AN INVESTIGATION INTO NON-MEDICAL PRESCRIBING WITHIN ONCOLOGY

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Thesis Summary

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There is currently limited published evidence exploring aspects of oncology Non-Medical Prescribing (NMP) practice. To explore the opinions and recommendations of NMPs on oncology NMP practice, two focus groups were held with pharmacist and nurse NMPs (one per professional group). Participants were asked to discuss aspects of their current NMP practice including collaboration and post-qualifying training.

The opinions and recommendations of medical prescribers and senior managers on NMP practice within oncology were explored using a focus group for consultant oncologists and a semi-structured interview (SSI) for a registrar. Medical prescribers were asked to discuss aspects of current NMP practice including collaboration and training. Three organisational senior managers were then interviewed to explore the themes previously identified from medical prescriber data.

The NMP training theme was then explored within two further studies. The experiences, opinions and recommendations of multi-professional NMPs on post-qualifying NMP training were explored within separate one-to-one SSIs (three nurse, three pharmacist and three radiographer NMPs). NMP participants were asked to discuss aspects of NMP training such as current NMP training received, further training and support requirements.

Within the final study, the opinions and recommendations of consultant oncologists on post-qualifying NMP training were explored using an electronic survey. Participants were asked questions around key themes previously identified within the previous study, such as competence, support, experience related to training requirements and training methods.

This research programme explored aspects of NMP practice identified by stakeholders involved in oncology NMP practice. Key findings included the nurse prescriber 'dual' role, appropriate placement of NMPs in practice, and lack of time and funding for NMP development. The need for NMP organisational governance strategies were suggested and a draft NMP post-qualifying training matrix related to experience. Recommendations included implementation of lead NMP roles, a stakeholder NMP support network and an organisation-led NMP training programme.

Key words – Attitudes of healthcare personnel; Nursing; Pharmacist; Prescribing; Radiology; Training.

Dedication

Without the profound support from my husband Mattthew, completing my PharmD studies would not have been possible. I would like to thank my husband Matthew, two young children Jack and Louis, and my parents Pat and Ken for being so supportive, understanding and always believing in me throughout my studies. Not forgetting my nephew Dr Owen Harry who has proof read manuscripts when needed.

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Contents

Glossary

Abbreviation	Term
BOPA	British Oncology Pharmacy Association
CPD	Continual Professional Development
DoH	Department of Health
DPP	Designated Prescribing Practitioner
FIP	International Pharmaceutical Federation
GPhC	General Pharmaceutical Council
HEI	Higher Education Institution
IJCP	International Journal of Clinical Pharmacy
IRMER	Ionising Radiation (Medical Exposure) Regulations
JISC	Joint Information Systems Committee
JOPP	Journal of Oncology Pharmacy Practice
NHS	National Health Service
NMP	Non-Medical Prescriber
OSCE	Observational Structured Clinical Examination
PIS	Participant Information Sheet
R&D	Research & Development
SACT	Systemic Anti-Cancer Therapy
SoR	Society of Radiographers
SP	Supplementary Prescriber
SPR	Specialist Registrar
SST	Site-Specific Team
UKONS	UK Oncology Nurse Society

VCC	Velindre Cancer Centre

1. Chapter One: Programme background and introduction

1.1. What is non-medical prescribing?

A Non-Medical Prescriber (NMP) is a non-medical health care professional, namely a midwife, nurse, optometrist, paramedic, pharmacist, physiotherapist, podiatrist or therapeutic radiographer (dietitians or diagnostic radiographers can be supplementary prescribers only) who has undertaken necessary post-registration university training to gain prescribing rights.(1)

Since 2003, certain healthcare professionals have been able to practice as supplementary prescribers (SP), who can prescribe through development of a partnership between an independent prescriber (doctor or dentist) and a supplementary prescriber using an agreed patient-specific clinical management plan. The patient's agreement is also required.(2) The supplementary prescribing role differs from the independent prescribing (IP) role which allows certain professionals to prescribe autonomously for any condition within their clinical competence.(3) Since 2006, professionals have been able to train as independent prescribers without the need for an agreed patient-specific clinical management plan and many supplementary prescribers completed additional training to convert from an SP to an IP.(2)

1.2. History of NMP practice within Wales and the UK

The Health and Social Care Act in 2001 acted as the primary legislation to empower the Secretary of State to introduce secondary legislation on prescribing.(4) The secondary legislation, the Third Crown Report, *Review of Prescribing, Supply and Administration of Medicines* introduced and recommended the role of the supplementary prescriber and the extension of the prescribing role to new prescribing groups (i.e. pharmacists and nurses).(5) In 2002, the Welsh Health and Social Services Minister announced support of supplementary prescribing in Wales, and in 2003, amendments were made to the NHS regulations in Wales, to allow supplementary prescribers to prescribe within the NHS.(6) In 2004, the Welsh Government sponsored 250 nurses and pharmacists to train to become the first supplementary prescribers in Wales which enables them to prescribe medications using a patient-specific clinical management plan, agreed with the doctor and the patient.(2, 7)

Consultations in 2005, between the Department of Health (DoH) and the Medicines and Healthcare products Regulatory Agency (MHRA) examined the options for the future of nurse and pharmacist independent prescribing.(8, 9) These proposals were believed to benefit patients "by providing greater access and faster and more accessible services". The Committee on Safety of Medicines (CSM) in late 2005 reviewed the consultations and recommended to Ministers that suitably trained

and qualified nurses and pharmacists should be able to prescribe licensed medicines (limited list of Controlled Drugs by nurses only) for any medical condition within their competence. These recommendations were agreed by UK Ministers in late 2005 but these changes were not put into effect in Wales until 2007 when the NHS regulations for Wales were amended.(2, 10)

Since 2007, nurses and pharmacists have been able to train to become independent prescribers which enabled the prescribing of medications within the prescriber's agreed scope of practice, without the need for a clinical management plan.(11) The term Non-Medical Prescribers (NMP) is now more widely used as it can be used to include all health professionals who are practising as either a supplementary or an independent prescriber.(12)

The non-medical prescribing qualification is now offered by many UK universities and once obtained it is used by the qualified healthcare professional to prescribe medication within many specialties. These specialties include oncology, cardiology, respiratory, and within many aspects of the healthcare system such as GP surgeries within primary care, as well as at ward level and outpatient clinics within secondary care.(7)

1.3. Current non-medical prescribing guidance

In May 2017, Welsh Government published the most up-to-date guidance for non-medical prescribing in Wales, providing advice and information to promote good practice for non-medical prescribing.(2) This was required due to legislative changes allowing therapeutic radiographers to become independent prescribers and dietitians to register as supplementary prescribers in 2016 which came into force in January 2017.(13)

In 2016, the Royal Pharmaceutical Society (RPS) produced a competency framework for all prescribers within healthcare outlining key competency guidance that should be demonstrated by all prescribers and should be used to underpin the higher education institution (HEI) certificate in independent prescribing qualification.(14) This RPS framework has been regularly updated and the most recent update was undertaken in 2021.(14) In 2019, the RPS produced a competency framework for designated prescribing practitioners (DPP) to describe the key competencies which should be shown by DPPs when training NMPs. In 2021, the competency framework toolkit was produced by the RPS with key tools that should be used to gain and maintain key competencies within clinical practice as an NMP.(15) In June 2022, the RPS produced expanding scope of practice guidance to support NMPs when expanding their scope of practice.(16)

1.4. The study site

The main research study site used for this research study was Velindre Cancer Centre (VCC).(17) VCC is a specialist cancer treatment centre located on the outskirts of Cardiff in South Wales, UK. It provides treatment to over 1.5 million people across Southeast Wales and further afield. Every year around 50,000 new outpatients and 5,000 new referrals are treated by VCC either within the cancer centre or at one of its outreach clinics. It employs approximately 670 members of staff who work as a close multidisciplinary team spanning many professions and supportive services.(17)

This study site has been chosen due to its status as the leading specialist oncology centre for Wales, and the location of the PI's practice. The cancer centre is a part of Velindre University NHS Trust.

1.5. Oncology cancer care

Systemic anti-cancer therapy (SACT) is any treatment prescribed and administered to treat cancer.(18) Due to recent oncology medical staff shortages within NHS Wales, the demand by oncology for NMP prescribing support within SACT outpatient clinics has increased.(19) In addition, as the population ages, increased patient numbers are contributing to an evolution of the NMP role within many allied healthcare professions. The use of NMPs within the organisation has evolved over the last ten years.(19) NMPs are typically placed within clinics with a high volume of patients or limited traditional clinical cover. In 2016, an unpublished organisational scoping review report concluded that the organisation needed to utilise NMPs appropriately to deliver a cost-effective, high-quality patient-orientated service.(19)

Often oncology NMPs utilise the support of national organisations to provide support and advocacy for their role within oncology. The British Oncology Pharmacy Association (BOPA) support pharmacists and pharmacy technicians within their daily oncology practice with education events and produce policy and advocacy for the oncology pharmacy role.(20) BOPA published a NMP guideline in 2018 which outlines recommendations for some aspects of NMP practice within oncology.(21) The UK Oncology Nursing Society (UKONS) support nursing practising within oncology by providing an advisory role in the development of cancer guidelines and policy. UKONS also supports educational development of its members.(22) The Society of Radiographers (SoR) are not specific to oncology but do provide support to radiographers within their role across all healthcare specialties including oncology.(23)

1.6. NMP practice within oncology and at the study site

In 2022, study site had 41 non-medical prescribers of which 13 were pharmacist independent prescribers, 25 nurse independent prescribers, one nurse supplementary prescriber and five therapeutic radiographer independent prescribers.

At the study site, the majority of nurse and pharmacist NMPs work alongside Consultant Oncologists, Specialist Registrars and Specialist Nurses to review patients within a pre-assessment SACT outpatient clinic prior to their next cycle of SACT. NMPs prescribe SACT and other cancer therapy agents and any supportive medicines needed, assess blood results, and request appropriate scans and blood transfusions (if qualified to do so). They also refer to medical staff if appropriate. This process of review is repeated prior to every SACT treatment cycle providing a multidisciplinary approach to patient review. Therapeutic radiographers also practice as NMPs but review patients within a specific radiotherapy review clinic to prescribe supportive medicines when needed and some SACT treatments if used in combination with radiotherapy treatment. Prior to 2016, therapeutic radiographers (also known as radiotherapists) were only legally allowed to practice as supplementary prescribers, but an amendment to the Human Medicines Regulations 2012 resulted in legislation changes allowing therapeutic radiographers to become independent prescribers.(13)

On average each NMP is thought to see around six adult patients per chemotherapy or review session (approximately four hours long). There are around 20 four-hour chemotherapy clinic sessions and 20 radiotherapy review clinics run per week by different consultants at the study site.(17) Throughout this document, the term *site specific team* will be used; this terminology is used at the study site to refer to a team dealing with one cancer site, i.e. the breast team is one of the site-specific teams. A small number of nursing NMPs work at ward level at the study site, assessing and prescribing for patients attending for day case Systemic Anti-Cancer Therapy (SACT) and prescribing supportive medicines if needed during the administration of SACT.

An organisational NMP guideline has been in place at the study site and last updated in 2022.(24) This guideline was developed in line with the BOPA NMP guideline(21) and RPS competency framework for all prescribers(14) and describes the need for an annual NMP appraisal using a template between every NMP and their consultant to continue practising.(14, 21) There is also limited information and guidance within the organisations' guideline on NMP training post qualifying and NMPs are not categorised within the guidance dependent on their level of experience. Although brief outlines of general roles and responsibilities for stakeholders involved within NMP practice were added in 2022. Therefore, within this research programme, an NMP will be categorised as an early years NMP if they have practised as an NMP for less than five years and categorised as an

advanced practice NMP if they have practised for five years or more. Categorisation of the NMP dependent on experience has also not been documented within published literature except for within the publication produced as a result of this research programme. This classification was determined by the PI for convenience due to personal NMP experience, but was not contested by NMP practice stakeholders during the pilot phase or data collection phase of study four, as a question was incorporated related to this classification within the survey.

1.7. Role of stakeholders within oncology NMP practice

1.7.1. Consultant mentors

Many consultant oncologists within the organisation act as Designated Prescribing Practitioners (DPPs) to support the training of individual non-medical professionals when completing the HEI independent prescribing course to qualify as an NMP. Although pharmacists can also now act as a DPPs, this is not current practice within the organisation and the DPP roles continue to be fulfilled after the NMP qualifies by the consultant oncologists, due to the nature of the specialty and the treatments involved.

At the study site, the consultant mentor role is often continued by the same individual unofficially throughout the NMPs practice as an oncology prescriber post-qualifying, unless the NMP moves to a different area of clinical oncology practice or to a different SST. The organisation's NMP guideline outlines that each NMP should have an annual NMP appraisal using a suggested appraisal template with the consultant who oversees their practice, although some NMPs still approach the original consultant they completed their NMP qualifying training with if they do not perform a role directly practising with a consultant team e.g. at ward level.(24)

1.7.2. Line managers

Line managers within the organisation are managers within the employee's professional department who set objectives and manage aspects of the individual's employment including their annual appraisal for their role overall. Within the organisation, this does not include reference to the individuals NMP practice or sign off their competence to practice as an NMP and does not require demonstration of any evidence such as within a portfolio of evidence. Line managers can be practising professionals who may or may not be practising as NMPs themselves.

1.7.3. Senior managers

Senior managers within the organisation are managers who are responsible for the senior role within a professional department within the organisation or have management responsibility for the overall organisation. The senior managers within this programme of research are the Head of

Nursing, Chief Pharmacist, and the Clinical Director of the organisation. These individuals do not currently practise as NMPs themselves and may or may not have practised as a registered prescriber in the past.

1.7.4. Oncology NMP professionals

Within the organisation, the current practice for identifying the need for an oncology NMP involves a clinical need being identified within the organisation by SACT service leads, senior managers, or consultant oncologists to ease workload pressures within a clinic. Oncology NMP professionals are then allocated an SST to practise within and a consultant mentor by their department senior manager before commencing training as an NMP via a local higher education institution (HEI).

Pharmacist NMPs

Pharmacist NMPs are pharmacists who have trained as oncology pharmacists either within or outside of the organisation and currently have sufficient experience as an oncology specialist pharmacist as per GPhC pharmacist prescriber standards.(3) Once qualified they are often released for one or more sessions a week to practise within an outpatient clinic as part of the consultant team, which may be with their consultant mentor or under the direction of their consultant lead.

Nurse NMPs

Nurse NMPs are registered nurses who have trained within oncology either within or outside of the organisation and have sufficient experience, competence and academic ability to become a prescriber as described within the nursing and midwifery council (NMC) standards for prescribing programmes.(25) Once qualified, nurses can fulfil their NMP role in various ways:

As a clinical nurse specialist (CNS) NMP, which is a nurse job role who provides expert nursing care, advice, and support to patients with certain long-term diseases such as cancer. At the study site, they specialise within one specific area of oncology, such as breast cancer and may practice with different consultants within their daily job role.(26) They may be asked to fulfil their role as a CNS or as a prescriber or both within their daily clinical practice reviewing patients within outpatient clinics. There is one nurse NMP who is also a CNS and remains working as an SP. The majority of nurse NMPs are also CNSs within the organisation.

As a nurse prescriber only, these nurses are not CNSs within their main role but do perform a NMP role within outpatient pre-assessment SACT clinics on a sessional basis, in the same capacity as the pharmacist NMPs. There are a small number within the organisation.

As advanced nurse practitioners (ANP), these nurses practise on day units and on the admissions ward within the organisation. They are trained NMPs who prescribe within their ANP when needed to ensure a high level of patient care is achieved. There are a small number of these within the organisation.

Radiographer NMPs

Until 2016, therapeutic radiographers (also known as radiotherapists) were only able to register as SPs following completion of HEI prescribing training. In 2016, legislative changes allowed them to register as IPs in line with the HCPC standards for prescribing.(13, 27) For the purpose of this thesis, therapeutic radiographers will be named as radiographers. Radiographer NMPs review patients receiving radiotherapy within radiotherapy review clinics located within the radiotherapy department within the organisation not within outpatient pre-assessment SACT clinics. Within these clinics they utilise their expert knowledge of radiotherapy and its side effects to examine patients. They prescribe supportive drug treatments and, for certain patients, prescribe SACT when given in combination with radiotherapy as some cancer treatments involve delivery of combined SACT and radiotherapy.

1.8. Programme of research

Due to the lack of published evidence exploring non-medical prescribing practice within oncology, and the cohort of NMPs practising at the study site, study one and two were designed to explore oncology NMP practice. It was considered important to explore the opinions and recommendations of the different stakeholders involved in NMP practice within study one and study two, in order to progress the organisation's NMP workforce due to its significant role in managing cancer patient care and providing outpatient SACT services. Within study one, NMP stakeholders were participants and within study two, medical prescribers (consultant oncologists and a registrar) who practise and support NMPs were participants. Senior managers involved in placement and strategic future development of NMP practice within the organisation were also participants within study two. Many aspects that influence NMP practice were raised by stakeholders within the first two studies of the programme and the training of the NMPs post-qualifying was chosen by the principal investigator (PI) as an important aspect to be further explored by stakeholders within two further studies (studies three and four). Study three explored multiprofessional NMP experiences, opinions and recommendations of current NMP training within oncology and the consultant oncologists opinions and recommendations of NMP training post-qualifying was explored within study four. All four studies within this research programme explored current NMP practice within one organisation within Wales producing key recommendations for practice.

1.8.1. Overall aim of programme

The overall aim of this research programme is to explore aspects of current NMP practice, and to provide evidence to support the future development of NMPs within the field of oncology.

The development of NMPs within oncology post-qualification is an under-explored area within published literature.

1.8.2. Titles of studies contained within this thesis as part of the programme of research

Study one

Non-medical prescribers' opinions and recommendations concerning non-medical prescribing within current oncology practice.

Study two

The opinions and recommendations of medical prescribers and senior managers concerning non-medical prescribing within oncology.

Study three

Experiences, opinions and recommendations of non-medical prescribers concerning the post-qualifying training requirements of multi-professional non-medical prescribers within oncology.

Study four

The opinions and recommendations of consultant oncologists concerning the post-qualifying training requirements of multi-professional NMP prescribers within oncology.

2. Chapter Two: Programme method

2.1. Qualitative vs quantitative methods

There is a wealth of various qualitative and quantitative methods which could be used to explore NMP practice within oncology, as it is an under-researched area of practice. Qualitative methods are often used where deep exploration of the subject area is needed as a starting point where 'words' are used as data.(28) Lennan also used qualitative methods to explore NMP practice within a single chemotherapy unit in 2014.(29) NMP practice is challenging to explore as many factors depend on the individual's practice and location of practice including the practice of the consultant team. Qualitative methods are less 'fixed' and allow changes in focus more easily than quantitative methods. Therefore, qualitative methods are very useful when exploring a research subject, especially in the initial project programme.(30)

Qualitative methods are often useful within an under-researched area such as NMP practice, as they can produce vast quantities of rich data including detailed and complex accounts from each participant.(30) In comparison, quantitative methods require a research tool for data collection, which is more difficult to obtain within an under-researched area.(30) Qualitative methods can also further explore a topic by questioning the researcher as opposed to quantitative methods which do not allow the researcher to further explore the data obtained as easily.(30) For example, within qualitative data, probing questions can be used when data collection is taking place. Qualitative methods can sometimes become costly and slow to obtain and analyse, as opposed to the quick-to-complete numerical data obtained in quantitative methods.(30) Obtaining qualitative data can also be dependent on the experience of the researcher and sometimes not reproducible unless minimised by repeating until saturation, therefore enabling the data to become more generalizable as more participants are included.(31)

Quantitative methods such as surveys or questionnaires are also effective in exploring this subject area, as an increased number of participants can be included.(31) They can be performed in limited time producing vast amounts of data which is more likely to be generalisable to the population being explored.(31) Initial qualitative methods are most often used to develop the research instruments within the quantitative methodology.(30, 31)

2.1.1. Focus Groups

The focus group qualitative method is useful when exploring the opinions of participants on a certain subject, therefore requiring a more interactive session between individuals in a group.(32) When interactive sessions such as focus groups are undertaken, participants often disclose more

information regarding their opinions compared to a survey method, by including more detailed views on the subject posed.(32) The focus group setting can also encourage reluctant participants to air their opinions or to encourage participants who may feel they do not have anything to say, which is less likely within a one-on-one interview setting.(33) Another advantage of focus groups over one-on-one interviews is that they reduce the power and influence of the researcher and therefore their influence over the group is diffused.(34) This is because participants are given topics in order to discuss themselves as opposed to being in the interview setting and this is thought of as an egalitarian method.(32) Focus group participants are also thought to elaborate on their opinions when discussing with other participants.(32) This does not happen within an interview setting where often the use of probing questions is solely dependent on the researcher or interviewers experience and development of interviewing skills.(32, 34) One of the main advantages to focus groups is flexibility, as it can be held at anytime and anywhere if the group can be accommodated.(34) Focus groups (as with most qualitative methods) are thought to have a high level of validity as the interviewer can establish and explore the area further by asking probing questions and capture real life data in a social environment.(34)

Morgan(35) suggests that there are limitations to focus group study design, the most significant of which is that focus groups are not seen as generalizable to the full population of the study participants.(35) Therefore, they have low reliability because if the research were to be repeated, different results could be obtained.(35) Focus groups can often be time consuming and difficult to arrange so that all participants can attend. Furthermore, bias, manipulation and a false consensus can limit the focus group methodology if one strong participant dominates or leads the focus group.(36) However, focus groups can clearly highlight aspects within a subject area to be further explored within subsequent research.

2.1.2. Interviews

There are many advantages to interviewing participants on a one-to-one basis, such as the opportunity to speak freely without fear of the opinions of other participants. Therefore, this can sometimes make it easier to be 'probed' by the researcher without interruptions (therefore controlled) and allow deeper exploration of the subject area.(32, 34) They can also be organised more easily as there are fewer people involved and are relatively cheap to do so.(31) A number of interviews together can provide significant insight for quantitative research.(31) There are three main types of interviewing methods dependent on the approach such as structured, semi-structured and unstructured interviews.(31)

One negative aspect of one-to-one interviews is that they can be very time consuming.(30) It would therefore be impractical to gain the opinions of a large number of participants to be included. Within a one-on-one interview, the participants could be more apprehensive to speak truthfully, and they also cannot interact with other participants.(31) This may also be an issue when needing to elaborate on question responses, as only the researcher is there to 'probe' the participant and the data from the interview can be influenced by the researchers' experience.(31) The semi-structured interviews are also not reproducible and therefore not generalisable to the larger population.(31, 32)

2.1.3. Surveys

The use of surveys would be an option to obtain the opinions of large numbers of prescribers on a topic and costs and time constraints would be low.(34) They are often used to define descriptive factual quantitative data such as public intentions to vote.(34) If this method of data collection for opinions were used, it can be very difficult to obtain rich data as closed quantitative questions are often used, such as multiple-choice questions.(34) These types of questions give definite answers without the ability to explore the area in more detail, and are therefore heavily dependent on the data given by participants.(34) If participants also choose not to answer the questions or misinterpret the questions asked, the data collected will be limited. Surveys ask set questions to all participants regardless of their answers and are therefore inflexible and may not capture the details on opinions needed unless they are more sophisticated.(34) This is because there would not be any option to ask further questions to the prescribers to establish their opinion, and therefore it would be difficult to explore reasoning and collate general views on the topics posed.(34) Another issue with survey methods is that in order to ask valid questions, sufficient topic information is needed as the researcher needs to demonstrate that the questionnaire tool has validity.(31) Therefore, in summary, survey research is strong on reliability but weak on validity compared to field research.(34) Often response rates can also be low, especially when the questionnaire is lengthy.(31)

2.1.4. Triangulation

Triangulation is the use of two or more methods of data collection to analyse the same topic to enable close to accurate results as possible.(30) Triangulation was not used within this research programme.

2.2. Methods used within each study of the research programme

Both quantitative and qualitative methods were considered to explore NMP practice within this research programme. The following methods were chosen to explore within each study.

2.2.1. Study one

Study one explored the opinions and recommendations of NMPs on NMP practice within oncology using a face-to-face qualitative method. Two focus groups were set up, one for each professional group, i.e. nurses and pharmacists. The PI facilitated the focus groups encouraging discussions around the topic framework using appropriate probing questions when needed, although care was taken to prevent leading the discussions. This study was undertaken pre-covid pandemic (in 2014/2015) when the ability to set up virtual focus group was not established within the organisation. Focus group methodology was chosen as professionals are more often based within one department compared to other programme participants, enabling the ability to group NMP professionals together on one occasion. In addition to this, the PI was an NMP within the organisation and had an awareness of the need to minimise bias within the study. The focus group method therefore enabled free discussion between participants with minimal input from the PI as focus group facilitator.

2.2.2. Study two

Study two explored the opinions and recommendations of medical prescribers and senior managers on NMP practice using face to face qualitative methods. Two focus groups were planned and set up, one for each staff group, specialist registrars (SR) and consultant oncologists within the organisation and three SSIs for senior managers. The focus groups were chosen to reduce the time impact on the participants and the facilitator (PI) of data collection, as they had to attend only one pre-arranged meeting for each type of prescriber. However, only one registrar participant attended the SR focus group due to workload and time constraints and therefore the PI facilitated a semi-structured interview with the one registrar. The consultant focus group was undertaken as planned. The same topic framework used within study one was used within study two for the consultant focus group and SR SSI and then the themes emerging from the data within study two focus group and SSI were used to set the topic framework used within the three senior manager SSIs. SSIs were chosen for exploring senior manager opinions and recommendations due to the senior managers working within different departments of the organisation and logistical difficulties of inviting them to one focus group. The PI facilitated the focus groups using appropriate probing questions when needed, although care was taken to prevent leading the discussion. This study was undertaken pre-covid pandemic (in 2014/2015) when the ability to set up a virtual focus group was not established within the organisation.

2.2.3. Study three

Study three explored the experiences, opinions and recommendations of NMPs on NMP training post-qualifying using a qualitative method. A one-to-one SSI method was used to interview three NMPs from each professional group. Use of SSIs enabled flexibility to the participants and the PI to undertake them around their busy clinical role. This method removed any possible effects of other participants on the opinion of the participant being interviewed and was undertaken pre-covid pandemic (in 2018) when the ability to set up a virtual focus group was not established within the organisation.

2.2.4. Study four

Study four explored the opinions and recommendations of consultants on NMP training post-qualifying using an electronic survey to all consultant oncologists within the organisation. The survey contained both open and closed questions, and therefore was both a qualitative and quantitative method of data collection. A mostly quantitative survey approach to this study method was chosen to ensure engagement from the large cohort of consultant oncologists within the organisation during the Covid-19 pandemic, when there were social distancing regulations in place, and consultant participants were experiencing high workloads, both of which would have hindered organising meetings to perform focus groups or interviews.

2.3. Reasoning for choice of research programme study methods

Qualitative methods (studies one to three) were used to gain an in-depth view of the research topic and study four involved a survey which contained both quantitative and qualitative questions. Studies one and two used qualitative methods appropriately to explore the subject area in more detail and focus groups were chosen to explore the aspects of NMP practice within the organisation by many stakeholders enabling high validity by capturing real life data. The use of focus groups also allowed flexibility that was needed for all participants and the research to undertake data collection within their busy day to day roles. Organisational staff are often keen to share their opinions with others on certain topics and a survey method would not have enabled this to happen. The PI was the facilitator, but this had less impact on the rich qualitative data obtained as other participants can encourage discussions which prevented the need for probing questions from the PI in comparison to SSIs. An SSI method was used to interview a registrar, but this was due to only one registrar attending the planned focus group. The circumstances led this to be the only option to obtain registrar data at the time of data collection.

Study three used qualitative SSIs to collect data which enabled deep exploration of this under-researched area of NMP published literature. This enabled high validity of data obtained and

flexibility that the data collection could be undertaken when the participants could accommodate the SSI within their busy working day within the organisation. However, SSIs produce low reproducibility as data saturation is difficult to obtain with qualitative methods. Study four utilised the survey method. Both quantitative and qualitative data were obtained from the survey due to the open and closed questions it contained. The survey method was chosen for study four due to the difficulty with finding convenient times to meet with the previous focus groups (study two) and the restrictions of the Covid-19 pandemic. The opinions of consultants were also being requested on the themes already identified within study three by the NMPs, rather than identifying new themes, although they were given the opportunity to provide comments on these qualitatively throughout the survey. The use of a survey enabled a larger population of participants to produce more generalisable and therefore higher reliability of the data provided compared to the use of qualitative methods. However, this would mean that the survey would have had reduced validity compared to qualitative methods, as the answers provided were not able to be explored or elaborated upon to improve clarity to participants if needed. Nevertheless, the response rate of the survey by consultants was high, suggesting the validity of the survey was high due to clarity with survey design and therefore demonstrated high reliability of study data obtained.

Due to the location of this research programme within a single organisation, the data has low transferability to other organisations. If more study sites had been included, the transferability of study findings would have increased. Triangulation was also not used within this research programme due to time constraints but should be incorporated into the design of further studies within this area.

Table 2.1. Methods used within the research programme

Study	Methods	Qualitative/Quantitative
One – Non-medical prescribers' opinions and recommendations concerning NMPs within current oncology practice	Focus groups	Qualitative
Two – The opinions and recommendations of medical prescribers and senior managers concerning NMPs within oncology	Focus groups & semi-structured interviews	Qualitative
Three – Experiences, opinions and recommendations of non-medical prescribers concerning the post-qualifying training requirements of multi-professional non-medical prescribers within oncology	Semi-structured interviews	Qualitative
Four – The opinions and recommendations of consultant oncologists concerning the post-qualifying training requirements of multi-professional NMP prescribers within oncology	Survey	Both qualitative and quantitative

2.4. Length of time taken to complete the research programme

The reason for the increased time intervals between each study was due to personal circumstances of the PI. Leaves of absence totalling 25 months were taken during the programme due to maternity leave, a one-year extension was obtained at the end of the PharmD study period due to the PIs previous ill-health and the effects of the covid-19 pandemic. During the core part of the covid-19 pandemic (2020-2022), the PI practised as a front-line oncology specialist pharmacist within secondary care in Wales and administered vaccines within a vaccination centre on weekends. The PI also had two young children with limited childcare due to covid-19 restrictions inhibiting the ability to study.

Between 2014-2021 when data collection took place, there were limited NMP advancements within the organisation except for those discussed within Chapter 9 of this thesis. Therefore, the time difference between the studies had minimal effect upon the aspects identified and explored within study data. Although the number of professionals qualifying as NMPs has increased which strengthens the need for the programme recommendations within Chapter 9.

3. Chapter Three: Introduction to studies one and two

NMP practice continues to evolve as NMPs obtain more experience working as prescribers. Although NMP practice is becoming more commonplace within NHS hospitals, funding and research in NMP practice may not be evolving at the same rate.(21)

Study one was designed to explore the opinions and recommendations of NMPs on NMP practice within the organisation, whilst study two explored the opinions and recommendations of medical prescribers (consultant oncologists and registrars) and senior managers on NMP practice within oncology. At the time of undertaking data collection for studies one and two, there were seven pharmacist prescribers and 16 nurse prescribers who were able to practice as independent prescribers, and two nurses and two radiographers practising as supplementary prescribers. All supplementary prescribers were excluded due to differences within their practice. Nevertheless, since these studies took place in 2014 and 2015, the number of NMPs practising within the organisation has increased.

3.1. Reason for performing these studies

There is limited research on NMP practice within secondary care outpatient clinics and there are fewer studies based within the oncology specialty. As the number of NMPs qualifying increases, there is a need to ensure that the NMP service is used appropriately within the oncology specialty with consideration to factors that may influence NMP practice.(21) Therefore these studies were chosen to explore the main aspects of NMP practice from the viewpoint of the stakeholders involved within the delivery of NMP practice within the organisation.

3.2. Performing the literature search for these studies

The databases MEDLINE and EMBASE within Ovid were searched for peer-reviewed research articles published since 2007 using the following MeSH terms, *non-medical prescribing*, *nursing, pharmacists, prescriptions, medication therapy management* and narrowed further using *neoplasms*. This was undertaken prior to commencing studies one and two in December 2014 and frequently updated until completion of this thesis in December 2022. Although there are some NMP studies exploring aspects NMP practice within healthcare such as the barriers, benefits, and implementation of NMP practice, there are limited studies exploring the opinions of NMP practice stakeholders within secondary healthcare especially within the oncology specialty. Within a recent search update in December 2022, four published studies were found related to NMP practice within oncology.(29, 37-39)

3.3. NMP practice within published literature

There are more studies on nurse prescribing than pharmacist prescribing but pharmacist NMP studies have grown in number over the last ten years. This may be due to the qualification not being used as often as it is in other professional groups as it is by nurses once qualified. Courtenay et al(40) found that the qualification was used to varying degrees by the different professions involved, and more so within nursing, but no indication was given on how the role could be evaluated. Isolated studies such as Black(41) describe the application and safety of nurse prescribers within certain specialist areas such as accident and emergency departments and showed that nurse prescribers can be safe independent prescribers but, as with many studies, it states that more research is needed.(41)

3.3.1. Barriers and facilitators of NMP practice within literature

A recent systematic review by Jebara et al(42) explored stakeholder views and experience of pharmacist prescribing within clinical practice and described how facilitators such as organisational, managerial and medical support, resources and the personal qualities of pharmacist prescribers can influence NMP practice.(42) Jebara et al also concluded that barriers to NMP practice were a lack of certain skills, support, funding and accountability of NMPs.(42)

Courtenay et al(40) investigated the overview of the use of NMPs within a Strategic Health Authority and concluded that support from healthcare organisations is needed for NMPs to progress and to perform their independent prescribing practice.(40) Courtenay et al performed an e-delphi survey to obtain national consensus and establish priorities regarding NMP practice within Wales and also discussed the need for clear NMP organisational governance and strategies to support all NMP stakeholders.(43)

Whilst exploring the opinions of NMPs on their self-efficacy, Cope et al(44) found that the self-efficacy of each NMP was impacted by many factors, including the NMPs confidence levels and their willingness to take responsibility for their own practice. However, Cope et al discussed how confidence is likely to improve with experience.(44) Goswell and Siefers(45) also explored nurse NMP practice within an acute setting and discussed how confidence impacted upon their willingness to put their trained skills into practice. Members of the public within the Maclure et al(46) study described how NMPs reduced doctor's workload allowing them to review more complex patients.

McCann et al(47) explored pharmacist prescribers and medical colleagues perceptions of pharmacist prescribing and found that the pharmacist prescriber added to the delivery of a more holistic approach to the care of a patient, but challenges such as area of competency and older doctors

resistance needed to be addressed.(47) A recent focus group study by Graham-Clarke et al(48) explored the barriers and facilitators of NMP practice by pharmacists and physiotherapists and an acknowledgement was made of how the pharmacists undertake their NMP role in addition to their day to day role. Graham-Clarke(48) concluded that a key finding to the study was the collaborative working of pharmacist prescribers within the MDT, which aided appropriate implementation and use of the NMP role in practice to benefit patient care. The physiotherapist prescribers were believed to have a restricted and isolated prescribing role in comparison, which demonstrated how prescribing roles for different professionals had been implemented differently within the same organisation.(48)

The advanced nurse practitioner (ANP) role was sometimes described as the nurse NMP within published literature, although at the study site ANPs perform a different role to nurse NMPs or CNS NMPs by practising predominantly at ward level and the ANP role does not involve the prescribing of SACT. A systematic review by Barrott et al,(49) explored the patients experience of the advanced clinical practice roles of pharmacists and nurses who prescribed SACT within review clinics. Fothergill et al(50) and Anderson et al(51) evaluated the ANP role and concluded that the ANP role was underutilised and had evolved haphazardly over time. Two studies by Farrell et al(52, 53) explored aspects such as communication within nurse led SACT clinics, and described how ANPs often holistically assess patients which is time consuming, and a task-orientated approach was more appropriate due to time constraints.(52, 53)

Many aspects of NMP training have also been explored within published literature. Jebara et al(42) suggested that pharmacists have a lack of clinical assessment skills which are a barrier to pharmacist prescribing, although a consensus study by Allison et al(54) described how pharmacists should be trained to have appropriate clinical assessment skills related to their area of oncology practice. Latter et al(55) discussed that pharmacists and nurses had similar training needs regarding patient assessment whilst exploring whether pharmacists and nurses were making clinically appropriate prescribing decisions. Weglicki(56) and Stewart et al(57) also described the need for strategic direction with CPD and NMP training governance within each organisation whilst discussing how NMPs should be educated.

3.3.2. Patients' opinions of NMP practice

There are more published primary care studies than secondary care studies related to patient opinions of NMP practice. One primary care study by Gerard et al(58) used a discrete choice experiment (DCE) method to investigate patient preference for the health care professional they were consulted by, giving the following options: a pharmacist prescriber, own family doctor, and available doctor. Gerard et al concluded that the pharmacist prescriber service seemed to be valued

by patients as an alternative to doctor prescribing within the primary care setting.(58) Whilst exploring the patients perspective of NMP practice, Hobson et al(59) suggested that patients may see pharmacists as safe prescribers as only one out of 18 patients questioned if the pharmacist had sufficient information to make safe prescribing decisions.(59)

The patient and public view has also been investigated on an infrequent basis. Some studies addressing patients' views were found, such as Tinelli et al(60) who showed that within a primary care survey, 75% of respondents strongly agreed or agreed that the pharmacist prescriber had understood them.(60) Within a mental health setting, Deslandes et al(61) also found that pharmacist supplementary prescribers were perceived to be more approachable than medical colleagues.(61) Within medical clinical areas such as hypertension and diabetes management, McCann(62) found that patients observed differences in the approaches to care of pharmacists and doctors. McCann concluded that a team approach to their care would be appropriate, as pharmacists had a more drug focused approach compared to doctors who looked at the bigger picture.(62) A few studies also showed that some patients were initially apprehensive at being consulted by a pharmacist, but once they attended their appointment, they were assured that pharmacists were capable of prescribing.(63, 64) Alternatively, in another study by Stewart(65), participants reported that the confidence they had in the prescriber was more dependent on the quality of care offered than the type of healthcare professional.(65)

3.3.3. Medical prescribers' opinions of NMP practice

Medical staff views have also been explored by Lloyd et al(66) showing that medical staff who had acted as mentors for pharmacist prescribers are often pleasantly surprised at the benefit of pharmacist prescribing.(66) The medical staff identified that NMPs are best placed within the management of chronic conditions, but explained barriers to pharmacist NMP practice, such as funding and organisational barriers.(66) Latter et al(67) also discussed how patients may be managed more effectively by a non-medical prescriber, whilst evaluating nurse and pharmacist prescribing.(67) Stewart et al(63) showed that doctors, pharmacists and patients were all supportive of pharmacists acting as independent prescribers, although some doctors were apprehensive and questioned competence and awareness of levels of competence.(63) The image of a pharmacist as a prescriber has improved within recent years, as studies have highlighted that awareness is increasing further, possibly with more pharmacists qualifying as NMPs.(63-66)

3.3.4. NMP practice within the oncology specialty

In 2014, a study by Lennan(29) set within one chemotherapy unit, examined the views and experiences of professional stakeholders on NMPs prescribing chemotherapy.(29) Purposeful

samples of 23 stakeholders were interviewed and focus groups were held per professional group. A multi-professional focus group was then held to determine the strategic way forward for the one chemotherapy unit.(29) However the focus group was multi-professional but with more nurse NMP participants than pharmacists and the study was set within one small chemotherapy unit. The main findings by Lennan were that NMP practice for the prescribing of chemotherapy was appropriate within the right model of practice as part of an MDT.(29) This study therefore differs to the large cohort of multi-professional NMPs undertaking NMP practice regularly at the study site.

Other oncology studies identified within the literature searches were set within the oncology specialty but did not explore the aspects of NMP practice such as barriers and benefits explored within this programme. Hand Nee Davies(37) described the benefits to patients of setting up a CNS NMP led specialist SACT clinic for a certain oncology patient group and found that innovative clinics had a positive impact on patients as they combined the expertise of nurse prescribers and the medical team. Ryan-Woolley et al(39) explored specialist nurse opinions of becoming a prescriber within cancer care and found that there was a lack of enthusiasm amongst cancer specialist nurses to undertake training to become a prescriber.(39) A Japanese retrospective cohort study by Suzuki et al(38) explored the impact of a pharmacist prescriber on adverse drug reactions experienced within an oncology outpatient clinic, and found that pharmacists benefitted the management of adverse drug reactions when working in collaboration with oncologists. Finally, a study by Allison et al(54) aimed to gain consensus on the patient assessment skills required by oncology pharmacist prescribers when prescribing SACT within lung and genitourinary cancers. Allison et al identified the core and specific assessment skills required by pharmacist NMPs within these two tumour sites but identified further work needed to develop competency frameworks and training.(54)

4. Chapter Four: Study one

Non-medical prescribers' opinions and recommendations concerning non-medical prescribing within current oncology practice.

4.1. Aim

To explore the opinions and recommendations of pharmacist and nurse non-medical prescribers (NMPs) on current NMP oncology practice.

4.1.1. Study objectives

There were five main objectives to this study:

i. to explore the participants' perceived barriers and benefits of NMP practice

ii. to determine participants' opinions and recommendations of current NMP practice

iii. to identify participants' opinions and recommendations of oncology NMPs working collaboratively with other members of the multi-disciplinary team (MDT)

iv. to identify participants' opinions of patient opinions of NMP practice

v. to explore NMP participant opinions and recommendations concerning the post qualifying training requirements of NMPs.

4.2. Method

4.2.1. Ethics approval

The Principal Investigator was SH. Ethics and governance were managed via standard Aston University processes and authorisation obtained from NHS Wales R&D and Velindre NHS Trust R&D Department. Ethics approval was obtained (ref: #710) from the R&D Committee at Aston University in November 2014.

4.2.2. Pharmacist and nurse NMP focus groups

4.2.2.1. Participant selection

Seven pharmacist and seven nurse NMPs were invited to one of two separate professional focus-groups. All organisation-employed pharmacist NMPs were invited to participate within the pharmacist focus group as only seven pharmacist NMPs were employed at the time of the study. Nurse participants were selected at random from a database of NMP pharmacist and nurse database respectively using a Microsoft® Excel randomisation tool. Supplementary prescribers (therapeutic radiographers (n=4) and nurse (n=1)) were excluded due to the difference in their role to independent prescribers. All participants were employed by the study organisation.

4.2.2.2. Data collection

All participants were invited by email prior to each focus group. The email invitation included three attachments: the consent form, participant information sheet (PIL) and cover letter (see Appendix I). Both focus groups were undertaken on two consecutive weeks in December 2014 (11/12/14 and 19/12/14). The topic framework was developed by the PI (SH) following a thorough literature review of the subject area and using SH's own clinical practice knowledge of the subject area being explored. The topic framework was checked by one VCC pharmacist, one VCC consultant oncologist and PharmD supervisors to ensure validity and minimise bias.

The focus groups were facilitated by the principal investigator (PI), and all participants gave written consent via a completed consent form and verbal consent when asked at the start of each focus group. All data were audio recorded using an electronic recording device. The same topic framework (see Table 4.1) was used within both focus groups. The topics were displayed using a whiteboard and each participant was given a handout with the topics planned for discussion. The PI then facilitated the focus groups using the topic framework to guide and structure the focus group sessions which were undertaken for a maximum of one hour to avoid participant fatigue.

4.2.2.3. Data Analysis

The narrative from the two focus groups were transcribed verbatim by SH then anonymised. The transcribed manuscripts were quality controlled by emailing the anonymised scripts to one participant within each focus group to confirm accuracy of the transcript. The data were analysed using a pragmatic mixture of thematic analysis and framework analysis by SH to establish the main themes (68, 69) and checked by the PI's organisational colleague (AB). The analysis involved SH becoming familiar with the data, coding the data following upload of the manuscripts to NVivo® software (version 10). A framework was then formed from the codes and the study objectives to group the data codes whilst to continually establishing and refining emerging themes and sub-themes. Storage and collection of data related to data collection measures were adhered to throughout the study.

Table 4.1. Topic framework discussed within both focus groups to staff groups

Topic questions	
1	Share your general experiences of NMP practice within oncology
2	Comment on how effectively your clinics function overall
3	Discuss your views of the patients' opinions of NMP practice in clinic using examples
4	What are the benefits, limitations, boundaries of care (when to escalate to doctors), further training requirements regarding pharmacists/nurses NMP practice?
5	How could the role of NMPs be evaluated within the clinic setting at VCC to identify their worth?
6	What are your opinions and recommendations of pharmacists and nurse NMPs working together within the clinic?
7	What are your general opinions and recommendations on the comparison between pharmacist and nurse NMPs, regarding aspects of the consultation, prescribing etc?

4.3. Results

4.3.1. Nurse and pharmacist focus group data combined

Five nurse participants attended the first focus group, and five pharmacist participants attended the second focus group held the following week. Study data was combined and analysed and the following emerging themes and sub-themes were identified.

4.3.1.1. Experiences of oncology NMP practice

Impact of NMP practice on the NMP

Pharmacist and nurse NMPs had very different opinions on their current role as an NMP. Pharmacist participants agreed that the NMP role was "rewarding" and considered that it was also positive that they had fully utilised their qualification by prescribing within systemic anti-cancer therapy (SACT) pre-treatment clinics within their current role.

> *"Rewarding, it's one of those courses we have done which we have fully utilised and we have a niche here and it's very good." Pharmacist 1*

Pharmacist participants agreed that the NMP role could occasionally be stressful although they were very aware of their high level of responsibility as a prescriber.

"I find it quite stressful. I don't know if I enjoy being that stressed." ***Pharmacist 3***

Pharmacist participants discussed how the NMP role raised the profile of pharmacy and improves the pharmacist NMPs' understanding of the patient pathway. It also enabled the pharmacist NMP to empathise with the demanding role of other healthcare professionals (HCPs). One participant suggested that other HCPs could work within the pharmacy department in the future to understand pharmacy pressures.

> *"... it does make you a better pharmacist. When I am in the dispensary, I can appreciate more about the pressures in clinic, and I think it would be fantastic if it was the opposite way around as well..."* ***Pharmacist 4***

Nurse participants were less positive when describing their NMP role. Nurse participants believed becoming an NMP had caused them to become more focussed on patient side-effects within the clinic, rather than some of the wider patient issues. They believed their 'persona' of consulting with patients had changed within this role because of becoming an NMP and this had adversely affected how patients responded to them as nurses.

> *"I do notice that my relationship with the patient is subtly different when I am there within a prescribing role rather than a CNS role… I am more 'medicalised'...it's almost like my persona is slightly different and patients respond to me in a slightly different way"* ***Nurse 2***

The nurse NMP participants expressed that they obtained their prescribing qualification to extend their role and further support patients. In contrast, the majority of nurse NMP participants described having a very much 'task-orientated' role as a result which has taken over their CNS role.

> *"I don't think it's necessarily what I thought it was going to be, I mean, when we were doing the course it was very much supposed to be supporting your patients… rather than a (pause) 'task'… which for me, it feels like its task-orientated the way the clinic is run now. When I first went into it, it was supposed to be very much more of a 'holistic approach'"* ***Nurse 1***

Although one nurse prescriber who was not a CNS prior to undertaking the NMP qualification did not consider this to be the case within her clinical trials practice, as it is very protocol driven and she is able to extend her capabilities within her nurse-led clinic.

> ***"****I'm the opposite to that as I use my NMP role within trials clinic, so we have our nurse prescriber trials clinics set up and into those clinics we have a scope of patients that we see. So, I see it as more of a holistic role... Using the study protocol, we were always sort of like left hanging there as there were so many things we couldn't do"* ***Nurse 3***

NMP role providing governance for nurses

The nurses considered that they had 'better governance' as an NMP, by being able to write prescriptions for their own patients'. With the absence of pressure, they believed they can prescribe safely and see the benefit of becoming a prescriber.

> *"... I think there are fantastic governance issues. It's quite frightening really but I just think what better governance than writing your own prescription drug and a dose and signing your name next to it."* ***Nurse 2***

Assumptions of patient opinion

The NMPs made several assumptions of patients' beliefs from their NMP practice. The pharmacist participants believed that NMPs were seen as more approachable than consultants which may raise the profile of the pharmacy profession.

> *"I think patients find it easier to contact us than the consultant or find us more approachable. It is the one thing that struck me and I think that is the one thing that will raise the profile of pharmacy too."* ***Pharmacist 2***

The participants discussed the patients desire to see the consultant within the team and believed that mostly patients were happy to be seen by an NMP but discussed a few occasions where the patient had wanted to see a doctor.

> *"I had one person who insisted on seeing the consultant, but I don't think it was anything personal and I think I had seen her on a previous occasion and a post occasion. I think it was just that one time they wanted to see her."* ***Pharmacist 4***

The overall view by the pharmacist focus group was that patient are just happy to be seen but all agreed that the patients' opinions of NMPs needed to be formally assessed as this is very much their own perception of patients' opinion.

The nurse participants had many anecdotal reports of how patients perceive the NMP role. The nurses also believed that the patients like to see the nurse suggesting they were more approachable than consultants. Although one nurse stated that one patient could not believe she was writing a prescription.

"I love seeing the patients, it's the patient bit I like but the prescribing is terrifying... they love the way they get the answers from us and have said you have told me so much more than anybody else so far has told me." ***Nurse 1***

Both pharmacist and nurse NMP participants considered that when the consultation starts, and the patient builds a relationship with the NMP, they are generally happy to be consulted by an NMP on further occasions.

"I did have somebody a few months ago that looked horrified when I walked in and said, "why aren't we seeing the consultant today" ... but I think that was more the patient had been very unwell and it was more to have a discussion on about where to go from there... as I had seen and prescribed for the patient..." ***Nurse 5***

4.3.1.2. Benefits of the NMP role

'Freeing up' consultant time

Pharmacist participants discussed how utilising the skill mix of multidisciplinary staff within the clinic, had many benefits such as 'freeing up' consultant time to see patients with more complex clinical needs.

"It is good from a utilisation of staff point of view as it enrols the right skills. Y'know and freeing up consultants... so that the consultant is seeing the people that need to see her and the people that don't need to see her, we see." ***Pharmacist 2***

Supporting patients

One pharmacist prescriber believed that the benefit of the NMP prescribing role is to manage supportive care well leading to a reduction in patient admissions.

"My assumption is that very few patients now seem to be admitted with problems of nausea and vomiting that there used to be... I like to think that our role is to ensure that patients are safe but also, they are not admitted to hospital." ***Pharmacist 2***

All participants agreed that the frequency of clinic visits within the cancer centre enabled them to utilise their qualification to prescribe and support the patients within clinics.

"I think it helps that our patient population come mostly in once every three weeks compared to patients in a cardiology clinic in a DGH, where it is random." ***Pharmacist 1***

NMPs working collaboratively

Pharmacists believed that NMPs bring their varying professional skills to benefit the team but also learn and develop skills from other team colleagues.

> *"I think also, we all learn from each other. I have learnt a lot of things whilst working with the nurse prescriber in clinic. It's good working with different people with different skills."* ***Pharmacist 1***

The pharmacist participants were asked to comment on multi-professional NMPs practising together. Overall, the collaboration of the two professional groups was viewed positively as they offered support to each other and reassurance in practice. The skills offered by pharmacists were thought to be valued by nurses and the pharmacists valued nurse input for "softer skills". One pharmacist commented that they aided another nurse NMP with their prescribing post qualifying.

> *"Well, I work with a nurse, and I think it works really well. I benefit from the nurse NMP in clinic, and I am there to answer pharmacy queries as well... so you have got that support and someone to talk too and a sounding board"* ***Pharmacist 2***

One pharmacist participant stated, and all participants agreed, that all NMPs should perform pre-SACT assessment regardless of their skills, and that pharmacists also get approached with differing questions from patients related to their role. It was implied that this happens in the same way as nursing NMP colleagues are also approached with questions relevant to them. Overall, it was thought that "all NMPs naturally work to their strengths" to achieve the same endpoint.

> *"I think your approach is going to be different, 'cause I always look at their drugs and remember patients by their drugs and I use the electronic prescribing system to look at the patient and she would have the other system... Our approach is different, but the end point is the same"* ***Pharmacist 3***

The nurses believed that the nurse CNS and NMP role would fit well together if they were allowed more time to undertake both.

> *"I think the role works very well together if we are allowed the time"* ***Nurse 2***

The nurses described scenarios where they benefited from working with or needed a pharmacist, but only one of the nurse participants described working with a pharmacist NMP at the time of the focus group; another two had worked with a pharmacist NMP in the past. They believed that pharmacists were approachable and helpful to provide information on drug queries and prescribing issues, possibly more so than doctors. They praised pharmacists for their organisational and IT skills. They found the ability to work with pharmacist NMPs useful when undertaking their NMP training both during the university course and as a newly qualified prescriber.

"Pharmacists are more approachable than a doctor, you often think of going to pharmacy than the doctor" ***Nurse 1***

4.3.1.3. Barriers to the NMP role

Absence of medical support

Although the pharmacist participant group agreed that the system of utilising NMPs as prescribers was effective, there were various barriers such as when the consultant is on annual or sick leave. In these situations, it can be difficult to refer a patient for a medical opinion therefore the NMP support network from medical staff can affect NMP practice.

"Sometimes we get into a sticking point if the consultant is off and I have to chase around to find another doctor to sort something out. It's ok if most people are fine, then if you have a few patients with hiccups then it starts to go horribly wrong." ***Pharmacist 2***

Pharmacist participants described how NMPs who regularly work alone within outreach clinics without continual medical support cannot refer when necessary. The pharmacists also described how reliant clinics have become on the NMP role in their ability to function without medical support.

"If they have a holiday, it is organised who I see. It's already sorted for me but if the consultant was sick, there would be a problem. Cause there would be 20 people, which I couldn't do on my own but there would be certain people who would come down and help but when people are on annual leave, thought is given on who I see." ***Pharmacist 4***

The nursing group did not comment on referring to doctors except for when nurse 5 commented that they did not want to "*bother the doctor*" due to their hectic schedule.

Clinic structure and design

The pharmacist NMPs agreed that the clinic structure can also affect NMP practice, such as using separate patient lists for NMPs to doctors can improve workflow but only within 'some' clinics. The pharmacists discussed how some NMP clinics have varying amounts of patients at different stages of their disease and treatment. These patients demand varying amounts of medical input between clinics, so within these clinics separate lists may not be as effective.

"I think having separate lists works really well in my clinics. I prep the clinics and that irons out a lot of problems before I get to clinic. It doesn't work well when patients are poorly with no medical support we need to get the on call. So that is a bit tricky sometimes but they are quite supportive but there are delays." ***Pharmacist 4***

One participant also explained the issue of limited clinic space to consult with patients; this slowed the running of the clinic and the number of patients seen within a certain time frame.

"...the most common thing that occurs quite frequently in clinic which does relate to um, the effectiveness and efficiency in clinic is lack of clinic rooms. At the moment, I think there are about 8 prescribers fighting over 6 rooms." ***Pharmacist 3***

The pharmacist participants discussed the varying amounts of preparation time that the NMP had before the clinic to decide on who should see each patient and to organise investigations that maybe needed. This may result in having more time to see more patients or deal with other issues. The varying preparation time used is most likely dependent on the free time available within their daily professional role or taken from personal time outside of working hours.

"I work with so many consultants, often I need to sort things out with patients before I get to clinic as the consultants aren't in the clinic" ***Pharmacist 2***

The number of clinics in which the nurses described themselves as performing a prescribing role varied widely. One nurse participant only practised as an NMP within one clinic and another nurse described herself as an 'extra prescriber' within a clinic. Some of the other nurse participants seemed to function as an NMP within many of their clinics, with their CNS role "tagged on the end of the clinic" if there were time.

"I consider myself an NMP primarily and my CNS role is tagged onto my role at the end of clinic if I have time." ***Nurse 4***

The nurses also believed that clinics where they were practising as NMPs alongside the doctors, functioned more effectively than clinics where they were isolated from other medical staff such as in outreach clinics.

"I think the clinics run better in the ones you are working alongside the medics." ***Nurse 1***

The pharmacists also spoke about geographical isolation within clinics without medical support, as both nurse and pharmacist NMPs seem to benefit from working as a team alongside other HCPs, predominantly the consultant. The nurses believed they can answer nursing queries as well as perform an NMP role in exchange for medical support, but they described how they sometimes lacked confidence when working as an NMP, especially when less straightforward situations occur. The nurse NMPs described sometimes 'feeling guilty' for asking for medical support.

"I love what we do, I love being with the patients and that we are their first port of call which is lovely but it's just the medical support should you need it without having to feel guilty, asking for it I suppose." ***Nurse 2***

The nurses commented on the difficulty with taking their own holidays and sickness cover as they do not get any type of cover from other NMPs or medical staff when they regularly practice within the clinics of outreach hospitals. One nurse participant spoke of returning from her holidays early not to

miss a clinic, and this was an issue echoed by pharmacist NMPs, especially within outreach clinics when NMPs are working alone.

> *"I have a situation that it is difficult to get my clinic covered and I have had situations where I have taken a week's holiday, and taken four days holiday instead of 5 and I've done that a couple of times because there is no other alternative"* ***Nurse 4***

Establishing boundaries to the NMP role

The nurse participants said that they had experienced difficulty with staying within their prescribing role to perform a pre-chemotherapy assessment, when they believe they have a "much bigger CNS role to perform". This is due to the expectations of other staff within the clinic team expecting them to prescribe. The nurses also reported expectations from managers that they should prescribe certain medications for patients they have not seen within the clinic and do not feel safe to prescribe in this way.

> *"... there is an expectation, for nurses particularly I think to stay within that prescribing role, for most of us that includes pre-chemo assessment. Then it can be hard within a clinic to have solely that expectation to prescribe when we have a much bigger part of our CNS role and either the expectation of the other people in the clinic is that you will prescribe and get through it in a fast and methodical way..."* ***Nurse 5***

Requesting radiology

Not being able to request radiological investigations for outside hospitals was an important limitation to the pharmacist participants especially when assessing patients, as they then had to refer to medical staff for completion. Many pharmacist NMP participants were trained to request radiological investigations within the cancer centre but were unfamiliar when practising at an outreach hospital.

> *"I often have to request scans for other hospitals, and I have to get the consultant to sign the forms. It isn't really a big limitation, but I see it as more of an issue if working at other hospitals more"* ***Pharmacist 4***

Nursing 'Dual role'

Two pharmacist participants commented on the nurse NMPs performing a 'dual role' in clinic. Some viewed the nurses as NMP prescribers but also practising as nurses concerned with patient issues such as "social circumstances". The nurses were believed to approach the consultation at a different angle as opposed to the pharmacist approach of focusing on the patient assessment for the drug regarding drug histories and prescribing. Both nurses and pharmacists described the nurses 'dual role' within their clinic and described instances where the nurse is approached to attend to nurse-type questions from the doctor. The pharmacist participants did also describe instances when the

pharmacist is also asked pharmacy questions related to their professional role so could possibly also be described as a 'dual role' for pharmacists within the clinic. The nurses believed that the pharmacists have only one role to prescribe within the clinic. The pharmacist participants discussed the nursing 'dual role' but argued that they also performed a 'dual role' when required, as they were often requested to utilise their pharmacist skills within clinics when needed.

> *"The nurses really feel pulled with the 'dual role' they perform, and the pharmacists don't really get that problem like we do"* ***Nurse 4***

> *"...they [the nurses] bring in a lot of their experience and we are bringing ours from another angle and it's just a different nature of working in a pharmacy such as this, this and this"* ***Pharmacist 3***

One nurse believed that these clinic issues were about managing the expectations of NMPs to perform their role from other members of the medical team. The pharmacists observed that the nursing staff found it difficult to define their role in clinic as they are performing a 'dual role' as a CNS and an NMP. The nurses also described performing two roles within the clinic, as one said they find it difficult to "marry up the two roles".

> *"...marrying up the two, CNS and the prescribing, that was really hard, I couldn't get my head around that at all"* ***Nurse 1***

4.3.1.4. Defining the NMP role

NMP confidence and referring to medical prescribers

The group of pharmacist participants were asked about their referral technique, and they all discussed and agreed that they refer and had been taught to refer for very similar scenarios around their scope of practice. The participants discussed that their confidence as an NMP continued to build as they gained experience, and this led to more appropriate referrals.

> *"I don't think from what we have just said that any of us is doing anything wildly different from the next person here, because I think we all know when we need to refer. Nothing is written down for that, that's just us being professionally aware of what we can or cannot do."* ***Pharmacist 3***

Evaluating the NMP role

It was agreed by the pharmacist participants that the evaluation of the NMP role within the cancer centre was difficult to achieve without bias, as practice within all clinics varied due to patient complexity. Although a patient satisfaction survey was suggested as a tool to evaluate how the quality of care differs between doctors and NMPs. Other areas for exploration were waiting times and the number of patients seen by the NMP, but patient complexity and cancer tumour site need to be considered.

> *"You would have to look at the patients and how demanding and ill they are. Categorise the patients almost before we can look at the value of the NMP. The tumour site, the complexity of the regimens and how long they will take to be seen and then apply the NMP to it."* ***Pharmacist 3***

There were limited suggestions from the nurses on how the NMP role could be evaluated. The suggestions given were around how the clinics would function if NMPs were not available and the effect of this on patient services. The NMPs agreed that the patient setting may affect the evaluation results obtained, but another suggestion on how the NMP role could be evaluated included collecting data on how well the NMP felt each consultation had progressed.

> *"...we need to look at not just patients in an adjuvant setting compared to metastatic setting and time taken, there is a difference."* ***Nurse 5***

4.3.1.5. NMP Training

Two nurses described the need for further training regarding clinical assessment such as diagnosing DVTs specifically, and all pharmacist participants specified clinical assessment as a further training need.

> *"...we have had a number of patients recently developing clots and I think we have had two people die from clots on adjuvant treatments and that's quite scary to think that could have been me prescribing and would it be something I would miss. Further training may help"* ***Nurse 5***

The nurses who had felt isolated also discussed how some had attended conferences about NMP practice and how useful it was to discuss NMP issues within the conference.

> *"I have been to another NMP conference a couple of times and it is quite useful to see what is happening around the country and you go there and think, oh yeah I am doing that right as you can feel quite isolated sometimes."* ***Nurse 3***

Currently within the organisation, the annual appraisal (with the team consultant) is the only compulsory NMP assessment required to continue practising as an NMP. The nurse NMP working within clinical trials described an alternate annual competency assessment along with the annual appraisal requested of all NMPs.

> *"As part of these clinical trials pathways, we have built into that the annual reviews. Like we have the appraisals, and we do competency assessment annually to get feedback from the doctors we work with to make sure they are ok"* ***Nurse 3***

Patient assessment skills

The ability to assess patients physically was agreed to be another limitation as (at the time of the focus group in 2014) more nurse NMP colleagues had completed clinical assessment skills training than pharmacist NMPs, although some pharmacist participants were more confident than others at

undertaking these tasks. Nevertheless, even though some NMPs had completed clinical assessment skill training and completed clinical assessments more confidently, they would find it difficult to display the confidence to state the result of that assessment and not need a doctor to check the result.

> *"I only have one clinic a week and I may not be using a particular assessment for a number of weeks; I am not sure that could class as keeping up my competency and I probably wouldn't feel confident enough."* ***Pharmacist 2***

The nurses also described confusion over medical decisions differing between different consultants unless they were "black and white decisions", such as on the prescribing system where prescribing protocols are available and the nurse's described nervousness with missing medical diagnoses such as deep vein thrombosis (DVT).

> *"Working with different consultants is confusing over what they would do in different situations, with deferring etc"* ***Nurse 4***

4.4. Discussion

All emerging themes and sub-themes identified within the study data are displayed within Table 4.2.

Table 4.2. Summary of themes established from focus group data

Themes	Sub-themes
Experiences of NMP Practice	Impact on the NMP Providing governance for nurses Assumption of patient opinion
Benefits of the NMP role	'Free up' clinicians Supporting patients NMPs practising collaboratively
Barriers to the NMP role	Absence of medical support Clinical structure and design Establishing boundaries to NMP Requesting radiology Dual role
Defining the NMP role	Confidence in referring to medical prescribers Evaluating the NMP role
NMP Training	General post qualifying training Clinical assessment skills

4.4.1. Experiences of NMP practice

Impact on the NMP

The NMP participants were aware of the responsibility of prescribing and often felt various pressures around prescribing within the current service structure. A Scottish government evaluation report exploring the extension of independent nurse prescribing also described the same sense of responsibility and pressures amongst NMPs.(70) Pharmacist NMPs described their role as stressful,

although the majority of pharmacist NMPs stated that they enjoyed their NMP role and believed that it furthered the progression of the pharmacy profession and extended their skills. Similarly, George(71) found that the NMP role provided greater job satisfaction and aided progression of the profession. This contrasts with the overall view of the nurse NMPs who commented on how they saw their role being becoming very task-orientated because of the addition of their new prescribing role. Many nurses described how they possibly would not have undertaken the qualification if they had been aware of the new expectations put upon them by their consultant teams and senior managers to prescribe within the clinic. Although the nurse working within clinical trials did not share this view which possibly may be due to the different role that nurse prescribers have within clinical trials.

Within published literature, the lack of team understanding of the NMP role has previously been described as a barrier to NMP implementation.(72-74) A recent systematic review by Edwards et al(74) has also discussed how many practising NMPs believe organisation managers lack the required knowledge and understanding of the NMP role and that their support for NMPs diminishes once the NMP role is established.(74) Ensuring that teams and senior managers understand the NMP role may mitigate the lack of understanding described by nurse prescribers.

Alternatively, some NMPs' experience and personality may affect the individual's confidence which may affect how challenging they find their NMP role especially if they are relatively inexperienced. A ward based review paper by Goswell and Siefers (45) also discussed how confidence influenced the application of theoretical knowledge to practice.(45)

Providing governance for nurses

Nurses believed they were now able to complete their role by becoming a prescriber without the need to get prescriptions signed by a doctor. Goswell and Siefer(45) also concluded how the nurses' ability to prescribe supported the ward based approach to providing holistic patient care.(45)

Assumption of patient opinion

Both nurses and pharmacists believed they understood patients' beliefs from anecdotal reports within their practice, but the pharmacists were aware this opinion was not evidence based. Both professionals described how patients had described them as being more approachable than doctors which may be due to their opinions of the role of nurses and pharmacists within the team. The Deslandes(61) study set in a secondary care mental health setting, suggested that pharmacist supplementary prescribers listened carefully to patients views during consultations and as a result were more approachable.(61) Another evaluation case study by Jones et al(75) discussed that

patients were more satisfied with being consulted by a nurse as they were also viewed as 'more approachable' than medical staff.(75) Other pharmacist prescriber studies also reported that pharmacists were approachable, non-judgemental, and easy to talk to.(62, 76, 77)

4.4.2. Benefits of the NMP role

'Freeing up' clinician

Pharmacist participants agreed that by the NMPs reviewing the more straightforward patients, this resulted in the release of medical prescribers to review patients with greater clinical needs. Whilst exploring the opinions of the Scottish general public on NMP practice, the Maclure study(46) discussed how NMP practice reduced doctors' workload and allowed them to focus on more complex patients.(46) In contrast with the pharmacist participants, the nurses did not discuss 'freeing up' clinician's time by performing their roles and were more focussed on the impact of NMP practice on their own nursing role.

Supporting patients

Working within a large NMP cohort at the study site within the oncology specialty was believed to complement oncology NMP practice. This is due to patients routinely being reviewed on a regular basis compared to other specialties where patients are reviewed annually. The overall oncology clinic structure at the study site enables the patient to be reviewed by various professional prescribers within the multi-disciplinary clinic to gain a rounded frequent review of the patient journey through cancer treatment. The BOPA NMP guidelines also suggests how appropriate NMP practice is within cancer care.(21)

The NMPs management of supportive care management such as SACT induced nausea and vomiting, was also discussed within study data. One pharmacist NMP expressed a view that their careful management of supportive medicines could possibly be preventing patient admissions and that they closely monitor and manage side effects more effectively than medical professionals. Although this opinion was not evidence based and should be explored within future research. The study by Lloyd et al (66) explored medical mentor views of NMPs, and discussed how pharmacist NMPs prefer to closely follow protocol when prescribing which could explain the pharmacist prescribers belief that they manage the patients' side effects well by closey following the protocol within oncology, as the oncology specialism is largely treatment protocol driven. Whilst evaluating NMP practice, Latter et al (67) also suggested that patients may have their conditions controlled more effectively and can be more content with their medications when reviewed by an NMP than when they are reviewed by a doctor.(67)

NMPs practising collaboratively

Positive views were expressed regarding the collaborative working relationship between pharmacist and nurse NMPs as each NMP was believed to utilise their professional skills within the collaboration. Some of the participants had either worked in collaboration with NMPs from another profession or worked alongside the collaboration within the clinic and could see the benefit of practising as NMPs together to benefit patient care. A study by Lennan et al(29) also discussed the benefit of working collaboratively to review patients within the oncology specialty.(29)

4.4.3. Barriers to the NMP role

Absence of medical support

Both nurse and pharmacist NMPs discussed practising in the absence of medical support either permanently at another location or whilst medical prescribers were on annual or sick leave. This lack of medical support may result in the NMP feeling unsupported within their role limiting the patient review that can be performed within the clinic. A study by Maddox et al(72) discussed that a lack of mentor relationships between NMPs and doctors limited prescribing competence development due to a lack of opportunity for informal support within practice and could result in a reduction in NMP confidence when prescribing.(72) A review paper on NMP practice by Cope et al(44) also concluded that confidence impacted pharmacist prescribing practice and Latter et al(78) described how working alongside medical colleagues can help build NMP confidence which may possibly be more relevant for inexperienced NMPs.(44, 78)

Clinical structure and design

Wide variations oncology clinic service design and structure were believed to have a significant impact on NMP practice. Various aspects regarding how the clinics function overall such as clinic lists and how elements such as geography and NMP staff annual leave can affect the ability of the NMP to perform their role. Appropriate placement of NMPs within clinics to maximise on the benefit of their NMP skills is needed, rather than fitting the NMPs around the clinics. Cooper et al(79) suggested that this was often the approach for NMP placement where a gap is identified where NMPs are needed and they are then placed to fill workforce shortages.(79) An optimum model of utilising NMPs was discussed by Lennan et al for a chemotherapy unit, which involved alternating patient review between the NMP and medical prescriber.(29)

Establishing boundaries to NMP

The expectations of other colleagues such as medical prescribers of their NMP role were discussed by nursing participants and they believed it impacted the NMPs' workload. This may be due to the disparity between the nurse NMPs opinion of what their NMP role involves and those of the medical prescribers and senior managers. If clarity were provided for the NMP role for each professional group were outlined by the organisation, there would be less variability in the expectation of each stakeholder involved in NMP practice. By defining the NMP role for each profession, this would help facilitate good relationships within the team which supports information transfer, shared learning and promoted supervision support. Edwards et al explored the evidence for the barriers and facilitators of NMP implementation in primary care and discussed how good working relationships between NMPs and their clinical team were needed to provide support and facilitate development of professionals within their NMP role .(74)

Requesting radiology

The nursing participants also discussed the difficulty of accessing resources such as the ability to access radiology at other hospitals especially when providing a clinical service at these outreach hospitals. The organisation needs to ensure that pathways are in place for all prescribers to access these services to ensure a high level of patient care is maintained.

Nursing dual role

The nursing NMP role as a CNS was believed to be difficult to perform within the same clinic as a prescribing role. They often seem to approach the pre-chemotherapy assessment holistically and some have difficulty performing the 'task-orientated role' that is required of all NMPs regardless of professional background to perform a pre-chemotherapy assessment. The Stenner et al(80) study and Jones et al(81) study suggest that nurse prescribers consider wider aspects of patient lifestyle when consulting with patients, which may describe their general holistic approach.(80, 81) This has an impact on consultation timings and as a result the number of patients seen within the clinic by the NMP. A primary care study exploring out of hours prescribing of antibiotics by Williams et al suggested the holistic approach by nursing prescribers imposed time constraints.(82)

The nursing NMPs sometimes finds the expectations of their role within the clinic to vary and described a need for clarification on the role they are required to perform, either a prescriber or a CNS (discussed previously). The pharmacists NMPs described and were thought to fulfil a more focused task-orientated approach as a prescriber which may have been due to the pharmacists viewing their role as reviewing the patient with a focus on their SACT treatment.

4.4.4. Defining the NMP role

Confidence in referring to medical prescribers

Appropriate referral to medical prescribers was believed to be a skill developed with experience for participants within this study and often as the NMP gains experience, the NMP confidence grows resulting in fewer referrals to medical prescribers. An exploration into the perceptions of NMP practice by Cope et al (44) discussed how NMPs are believed to become more self-efficient with experience.(44) A systematic review by Edwards et al(74) also suggested that a lack of confidence especially of new prescribers is often under-recognised by teams within practice. Although if a high level of referrals to medical prescribers was identified by the team, this could suggest that the NMP is lacking confidence in their practice and may require extra support.(74)

Evaluating the NMP role

The patients' views and the need for exploration regarding the NMP role was identified within the study data. The collection of patient experience data was a commonly suggested method of data collection. A recent review article by Famiyeh(83) discussed how previous studies have considered pharmacist prescribing with regards to the opinions of patients but there are not any published studies that investigated patients' views of NMPs within oncology.(83) There are a small number of studies looking at patients' views within predominantly the primary care setting. One Canadian systematic review by Bhanbhro et al,(84) suggested that prescribing within primary care is very different to prescribing within the hospital setting suggesting that these studies cannot be compared across healthcare sectors.(46, 58, 60, 63, 85, 86) Some research has been undertaken of patients' views of NMPs in other settings such as mental health, diabetes or hypertension and reported a high level of satisfaction with the services received.(46, 59, 61, 64, 86) These need further investigation within the oncology setting as this model of care is very different to other NMP practices in other settings but variations in clinic design and structure create difficulty to evaluate the effectiveness of NMP practice. The oncology setting involves a very multi-disciplinary approach; McCann(62) discussed how patients perceive this multi-disciplinary approach as very important within patient care. NMP practice may be best placed within the oncology setting, as NMP practice is thought to work most effectively when working alongside medical colleagues as explored by the McCann study,(62) and this was suggested by current study NMP participants. The number of patients reviewed by the NMP within the clinic was often suggested as a measure but the consultants and NMPs made it clear that the patient's' complexity and drug therapy would have to be considered.

4.4.5. NMP training

General post-qualifying training

The nursing participants described their general training needs such as attending NMP conferences to develop their practice, but other aspects of training were not discussed. One nurse also mentioned competency assessment and how it was all based on the annual appraisal. This demonstrated that the nurses are aware of the lack of competency assessment and training structure within the organisation. Maddox et al discussed how targeted CPD related to NMP learning needs was needed.(72)

Patient assessment skills

The need for both pharmacists and nurses to undertake patient assessment skills which they can remain competent with was described by study participants. Latter et al(87) discussed NMP training needs and concluded how pharmacists and nurses have separate training needs although both nurses and pharmacists within this chapter (study one) described the need to improve their assessment skills. The Allison et al(54) study also described how the patient assessment skills of the NMPs within oncology should be related to the area of clinical assessment expertise the NMP requires e.g., competence in respiratory examination for lung cancer NMPs. This could be more achievable by the NMPs as these examinations would be performed regularly within their NMP practice. Various studies have also highlighted a need to remain competent in performing clinical assessment.(87-89)

4.5. Strengths and limitations of study one

The study addressed the opinions of NMPs currently practising within oncology which is an area of NMP research which is underexplored within published literature. Investigator bias may have been introduced to the study design as the facilitator of the focus groups was a pharmacist prescriber who practised at the study site but thus was minimised by SH taking a facilitator role and not using any probing or leading questions and the focus group topic questions were utilised throughout. The likelihood of focus group fatigue was minimised by maintaining the focus group length to a maximum of one hour. The nurse NMPs focus group focused on nurses' views and focus of their own role within the wider consultant team and not the NMP service. Whilst the pharmacists spoke heavily about the limitations of the pharmacists NMP role and commented on issues around nurse NMPs such as the nursing 'dual role'. If question probes had been used throughout the focus groups, this could have helped to steer the discussions and potentially explore the nurse opinions of other members roles within the multi-disciplinary team.

The data obtained within this study design were not generalisable due to only one focus group per profession group being held and additional focus groups would have resulted in further exploration within this subject area. This would have enabled a greater sample size to be included but would have potentially led to inequity of participants as there were more nurse NMPs at the study site than pharmacist NMPs. Expanding the study sample size to include other organisations would have also improve generalisability. The opinions and beliefs established may be specific to the study site or could be shared within other cancer centre staff which would strengthen the data within this project.

The credibility of qualitative research has been defined as a measure of how well you can establish the accuracy and reliability of your research findings in order to have confidence in the 'truth' of the findings.(90, 91) Within study one, the credibility was ensured by including random selection of study participants to minimise bias where possible within each professional group. Member checking was used where participants were asked to check the focus group manuscripts following the focus group for accuracy of events. Peer debriefing was included which involved requesting that other researcher experts (PharmD supervisors CL and DT, as well as organisation mentors ACB and BT) review and provide feedback on the research process and findings through evaluation. The lead researcher used reflexivity to identify any investigator bias and perspectives through reflection and minimised their impact on the study by facilitating the focus group whilst minimising their input to the discussion and developing and using an unbiased topic framework which was reviewed by research experts prior to the focus group. The analysis was also evaluated by research experts (as described above) during various stages of coding, interpretation and by using participant words within the final report to support the results. Negative case analysis was also included by the lead researcher and checked by the checking research experts where relevant. The lead researcher added further credibility by their prolonged engagement in the field of NMP practice within oncology which enabled trust and understanding between the researcher and the participants.

The dependability of a qualitative study occurs when another researcher can follow the decision process of the lead researcher and ensure that the study findings are consistent and could be repeated.(90, 91) Throughout study one, the purpose of the research was described and participant selection choices were described regarding how and why they were chosen. The method clearly describes how the data was collected and the length of data collection and how analysis was undertaken. The research experts (AB, BT, CL and DT) checked that these were described clearly within the study at every stage and that the decision processes of the lead researcher could be followed throughout study one, whilst ensuring bias was minimised at every stage of the study

design. For example, randomised participant selection was used where possible and analysis checked by research experts to prevent bias resulting in overinterpretation of results.

4.6. Further Work

Further work could include undertaking alternative methods of data collection such as surveys to collect NMP opinion data, although this would have impacted on how rich the data obtained would have been. A greater sample size could have been achieved with the survey method. Semi-structured interview methods could have also explored NMP opinions without input from fellow NMPs. A future study could also include NMPs from other organisations within the UK and exploration of the opinions of other stakeholders such as medical prescribers and patients could enrich the exploration of this area.

Participants described anecdotal reports of patient opinions which were believed to be valuable to aid the development of the NMP service by exploring patient experience. Aspects of NMP practices raised within the study data such as NMP training, clinic structure and design and NMP collaboration could be explored further within future studies.

4.7. Study recommendations

- The oncology NMP role should be defined by the organisation and appropriate NMP governance developed to clarify organisational expectations of the NMP role
- The SACT pre-assessment clinic set-up and structure should be standardised where possible to maximise the utility of NMP practice and its future development
- Appropriate medical support for NMPs should be dependent on clinic structure and location to encourage NMP confidence when performing their role and future development
- NMP post-qualifying training opportunities should be developed by the organisation to aid NMP future development of all NMPs
- The NMP role should be evaluated by exploring patient experience and satisfaction data

4.8. Conclusion

NMPs currently practising within the oncology specialty at the study site had many varying opinions on their NMP practice but all agreed that the NMP role within oncology was of positive benefit to the organisation, and recognised that the role is a valued resource that is utilised within the organisation.

The main benefits of the NMP service are viewed as ‘freeing up’ consultant time within outpatient clinics, NMPs bringing their varied professional skills to the consultant teams, and the NMPs themselves believed that patients see the NMPs as more approachable than medical prescribers. Career benefits for NMPs include job satisfaction and career progression. All NMPs are believed to bring their individual professional skills to benefit the clinic and consultant teams.

Barriers to NMP practice were issues around clinic design such as NMPs working with minimal support within outreach clinics as well as lack of cover for annual leave or sickness leave. The wide variation in clinic practice may also be affecting the appropriate utility of the NMP role regarding a need for clinic lists, clinic preparation time and varied patient complexity.

All prescribers acknowledged the possible ‘dual role’ that the CNS nurses believe they perform along with their NMP role and the impact of the dual role on the NMP service that is provided within the organisation. Many prescribers viewed the collaboration between pharmacists and nurse NMPs working together as ideal, as their skills are believed to be complementary but not all NMPs had participated within this collaboration.

The NMP role is expanding and developing within the organisation, but NMPs acknowledge that clinic structure and design, post-qualifying training, support and NMP role evaluation need to be addressed to maximise the potential of NMPs meeting the ‘service needs’ of the organisation.

5. Chapter Five: Study Two

The opinions and recommendations of medical prescribers and senior managers concerning non-medical prescribing practice within oncology.

5.1. Aim

To explore the opinions and recommendations of medical prescribers and senior managers concerning the utility, barriers and benefits of NMPs within oncology.

5.1.1. Objectives

There were four objectives to this study:

i. to identify the medical prescribers' and senior managers' opinions and recommendations for the oncology NMP role

ii. to understand the medical prescribers' and senior managers' perceived benefits and barriers of oncology NMP practice

iii. to identify medical prescribers' and senior managers' opinions and recommendations of collaborative working between oncology NMPs

iv. to explore how NMP practice could be evaluated within the organisation to aid NMP future development.

5.2. Method

5.2.1. Ethics Approval

The Principal Investigator was SH. Ethics and governance were managed via standard Aston University processes and authorisation obtained from NHS Wales R&D and Velindre NHS Trust R&D Department. Ethics approval was obtained (ref: #710) from the R&D Committee at Aston University in November 2014.

5.2.2. Medical prescriber focus groups

5.2.2.1. Participant recruitment for medical prescriber focus groups

Seven consultant oncologists and seven specialist registrars (SPR) were invited to two separate professional focus groups (FG) after random selection using Microsoft® Excel software. All participants were employed at the study site. All participants were invited by email prior to each professional focus group. The email invitation included three attachments: the consent form, participant information sheet and cover letter (see Appendix II).

5.2.2.2. Data collection of medical prescriber focus group and SSI

The one consultant focus group and one registrar SSI was undertaken on two consecutive weeks in December 2014. A registrar SSI was performed due to only one registrar attending the planned registrar focus group. The same topic framework (see Table 5.1) was used to aid discussion within both the consultant focus group and registrar SSI and had been utilised previously (within study one) to explore NMP opinions and recommendations of NMP practice (see 4.2.2.2. for details on how the topic framework was developed). The topics were displayed on a white board within the meeting room and each individual participant was given a handout outlining the topic plan to be discussed. The PI then used the topic framework (see Table 5.1) to facilitate each focus group.

Table 5.1. Topics discussed within the focus groups for consultant oncologists and registrars

Topic number	Topic
1	Share your general experiences of NMP practice within oncology
2	Comment on how effectively your clinics function overall
3	Discuss your views of the patients' opinions of NMP practice in clinic using examples
4	What are the benefits, limitations, boundaries of care (when to escalate to doctors), further training requirements regarding pharmacists/nurses NMP practice?
5	How could the role of NMPs be evaluated within the clinic setting at VCC to identify their worth?
6	What are your opinions and recommendations on pharmacists and nurse NMPs working together within the clinic?
7	What are your general opinions and recommendations on the comparison between pharmacist and nurse NMPs, regarding aspects of the consultation, prescribing etc?

5.2.2.3. Data analysis of medical prescriber data

The qualitative data obtained from the consultant focus group and registrar SSI were analysed by a pragmatic mixture of thematic analysis and framework analysis by SH aided by NVIVO software (QSR – v10).(68, 69) The analysis was checked by the PI's organisational colleague (AB) (see study one method 4.2.2.3. for further description of analysis). The main themes were then used to formulate a theme plan for subsequent senior managers interviews (see Table 5.2 for theme framework).

5.2.3. Senior manager semi-structured interviews

Following the consultant focus group and registrar SSI, three senior managers were interviewed separately using semi-structured interview methodology by SH.

5.2.3.1. Participant recruitment of senior manager SSIs

The following senior managers were contacted by email (which included the PIL and consent form) to request their participation to the planned SSIs. The Head of Nursing, Head of Pharmacy and Clinical Director within the organisation were requested to participate, due to their responsibility for non-medical prescribing practice within the organisation.

5.2.3.2. Data collection of senior manager SSIs

All semi-structured interviews (SSI) for senior managers were held during January 2015 and no modifications were made of the theme framework (Table 5.2) as data collection progressed, each senior manager was asked to comment on the topics within the theme framework within each semi-structured interview. Each participant was given the theme plan outline in paper form prior to commencing the SSI. The theme plan was developed by SH using the themes and subthemes established from the previous medical prescriber focus group and SSI, and checked for validity by one VCC pharmacist, one VCC consultant oncologist and the PharmD supervisors to reduce bias.

Table 5.2. Theme framework for discussion within senior managers SSIs

Theme Number	Theme/ questions for discussion
1	Describe your overall opinions and recommendations of NMPs within oncology (both pharmacists and nurses)?
2	Comment on NMP training requirements
3	Please comment on: • the NMP role varying widely within different clinics • the NMP experience/personality affecting practice • how NMPs differ with supportive care to doctors' management • your opinions of pharmacists and nurses working together
4	How do you think the role of the NMP could be evaluated at Velindre?
5	What are the barriers to NMP practice within oncology and its future development?
6	What are the benefits of NMP practice within oncology and its future development?

5.2.3.3. Data analysis of senior manager SSI data

The qualitative manuscript data from the senior managers interviews was thematically analysed using a framework approach aided by NVivo software (QSR – v10) and coding and emerging themes

were established with reference to the medical prescriber themes previously established.(68) Analysis was checked by the PI's organisational senior colleague (AB) for accuracy. See Figure 5.1 for an overview summary of the methodology used within study two.

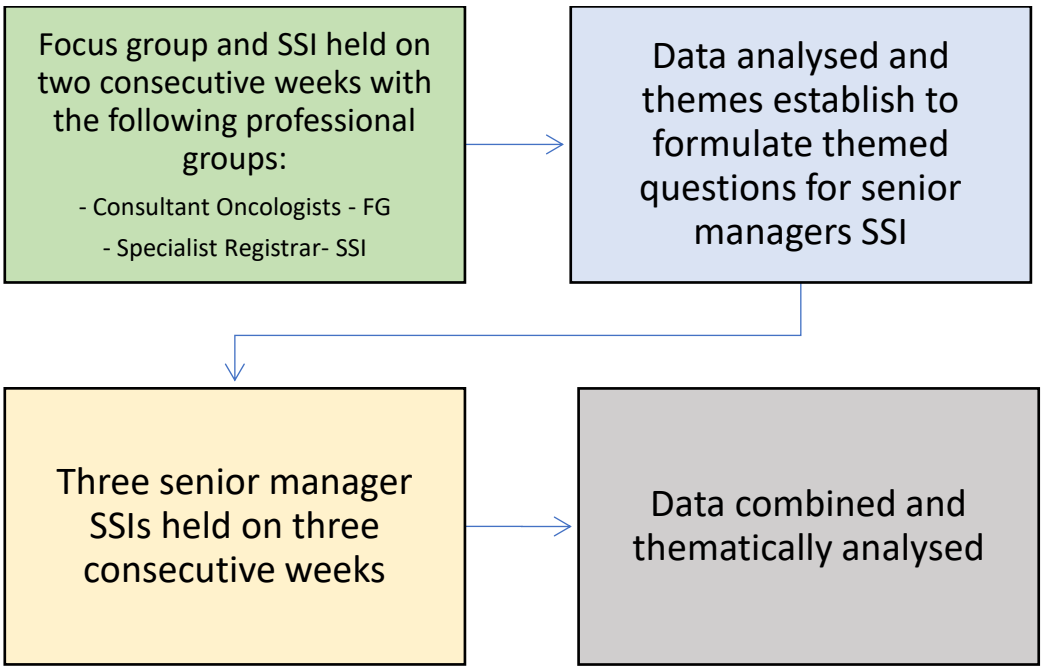


Figure 5.1. Summary of Methodology used within study two

5.2.3.4. Consent and data management of all study data

The focus groups and semi-structured interviews were facilitated by the PI for this project, and all participants gave written consent via a completed consent form and verbal consent when asked at the start of each focus group or SSI session. All data was audio recorded using an electronic recording device and then transcribed verbatim by SH.

5.3. Results

Table 5.3 shows the number of participants who did attend the focus groups for each staff group.

Table 5.3. Focus Group and SSI Participant attendees

Staff Group	Number of focus group participants	Number of SSI participants
Specialist Registrar		1
Consultant oncologists	5	
Senior managers		3

Due to one registrar participant attendee, a one-to-one SSI was held for this staff participant group

In December 2014, seven registrars were invited to a planned focus group, although only one registrar attended; the researcher was informed this was due to last minute work commitments. The focus group was unable to be rearranged due to late notice and time constraints. Therefore, the PI

held a semi-structured interview with one registrar participant using the topic framework within Table 5.1. A week later, five out of the seven consultants invited attended a planned focus group. All five consultant participants had previously had NMPs review their patients, and all had previously practised (on at least one occasion) as designated prescriber practitioners (DPPs) for the university non-medical prescribing course supporting professionals to qualify as NMPs within the organisation. All consultant participants had worked with both pharmacist and nurse NMPs except for one consultant who had only worked with nurse NMPs prior to the focus group taking place.

The following themes and sub-themes were identified within the medical prescriber's qualitative data obtained from the consultant focus group and registrar SSI.

5.3.1. Medical prescriber focus group and SSI data

5.3.1.1 General experiences of oncology NMP practice

The registrar had had experience of working with many different NMPs, both pharmacists and nurses alone and in combination within varying clinical settings throughout their training. The registrar described the role as a "*huge benefit*" within clinics when utilised appropriately. Although the registrar commented that the limitations of an NMP needed to be recognised, such as confidence and experience. The registrar believed that these factors should play a role in the way the NMPs are placed within oncology clinics.

> *"Overall. [NMPs] are a huge benefit in clinic and used in the right way they are really good, but equally, a clinic needs to recognise the limitations of an NMP and vice versa..."* ***Registrar***

The consultants described having varied previous experience of practising alongside NMPs, some with a wider group of NMPs from different professions and others with only one NMP professional. Nevertheless, all consultants believed that NMP practice was very positive and described how they relied upon NMP practice to manage the care of their patients.

> *"NMPs are dotted around my practice, and I find them very helpful and very positive, and I don't think I can function without NMPs... I also believe NMPs do things behind the scenes for my patients that I don't necessarily know that they have done"* ***Consultant 1***

5.3.1.2. Benefits of NMP practice

The consultants believed that one benefit of the NMP to the team was their ability to bring their skills to the practice of the consultant team. For example, a pharmacist NMP had produced audits and guidelines to be followed on certain medical issues such as magnesium monitoring. Those guidelines enabled the team and the organisation to manage patients using a set standard for the team to aid continuity.

"I think sometimes the NMPs help to change the policy as well, such as in my chemotherapy clinic we used to do magnesium levels on only new symptomatic patients but now with audits and protocols produced by pharmacist NMP, we do magnesium routinely on patients and then once we start doing it routinely, we got a protocol we have to start following the protocol. Such as previously there may have been a level I may not have treated and now cause of the policy. This is a big change of practice which is facilitated by having an NMP." ***Consultant 2***

5.3.1.3. Barriers to NMP practice

Referring to medical prescribers

The main limitations described by the registrar were linked to boundaries of care. The registrar described how the experience and confidence of the NMP affected when the NMP was likely to escalate to medical staff. Therefore, if they lacked confidence, they referred frequently to medical staff, but the registrar believed this could improve with NMP experience.

"Some NMPs are very, confident with what they do, but you know that when they have escalated to you, you know that it is for good reasons and I am generally very supportive and will always help but there are times when some NMPs will ask an awful lot. Clearly with time, people do get better, same as doctors." ***Registrar***

NMP responsibility when prescribing

The consultants all agreed that on occasions they may have misread or misunderstood the limitations of the NMP role which was also discussed by the registrar.

"I have been in the situation where I have perhaps read messages slightly or incorrectly and felt maybe NMPs want to have that whole independence and ability to make decisions and perhaps expected too much from them. It's a huge undertaking for them, the number of checks that they do and the responsibility that they feel, we get very used to doing is recognising that it is a pretty big leap for someone." ***Consultant 5***

Acceptance of NMP role

The registrar believed that the reason for training as an NMP can also be a limitation, as NMPs who are keen to prescribe often get on with their prescribing role, whilst other NMPs appear to be reluctant or obliged to prescribe within their professional role.

"...you can tell quite quickly when you work with people, whether they are doing it because they feel they are obliged to do it and other people who think, I have more autonomy and can get on and do things." ***Registrar***

Effect on SPR Training

One consultant mentioned, and all agreed, that one limitation of NMP practice is its effect on SPR training as they can possibly complete their registrar training by only seeing complicated patients, due to all straightforward adjuvant patients being seen by NMPs.

> *"Just the one point about deskilling SPRs because they can go through training without seeing adjuvant patients and prescribing and in radiotherapy review clinic massively to…. Which isn't a problem for NMPs but is a problem about how we organise it all."* ***Consultant 3***

Management of supportive medicines

Supportive medicines are medicines which are prescribed to aid patients manage the side effects of SACT treatment, such as anti-emetics for SACT induced nausea and vomiting or Neulasta to boost white cell count to aid prevention of any SACT treatment delays.

Two consultants described the NMP management of supportive medicines as a possible limitation as the incidence of using more expensive supportive drugs has increased and suggested that this could be due to some NMPs being keener to prescribe supportive medicines than medical prescribers. Although another consultant had completed a recent audit of supportive medicine prescribing within the organisation and believed that the NMP reasoning for prescribing these drugs was mostly justified with clinical notes. Two of the other consultants believed this was not an issue within their speciality regarding NMP practice and all consultants concluded that more investigation may be needed.

> *"...about the use of supportive drugs, for example Neulasta and dose reductions and patterns of prescribing such as stronger anti-emetics. It maybe that I am just not a nice person, so I am less likely to do this, but I do notice that the incidence of using Neulasta has gone up or using the more expensive anti-emetics such as Emend® has gone up. I don't prescribe those drugs as much as the NMPs do."* ***Consultant 3***

Governance of NMP practice

A lack of organisational NMP governance was discussed by one consultant regarding NMPs practising outside of their scope of practice. The consultant believed that NMP roles needed to be clearly defined by the organisation, otherwise any NMP errors may potentially occur putting the NMP and the organisation at risk.

> *"My main negative experience of NMPs is when they are outside your control (which sounds terrible) when I think the skills and knowledge that you get are very specific to what you are doing day to day. So, if you are asked to do something you are no longer doing regularly or you're not part of the team in which you work. You are at risk of falling down and making mistakes. It should be very clear what your role is within which team and with which team you are permitted to work. It's an issue of governance."* ***Consultant 5***

The need for specific governance requirements around electronic initial allocation of SACT treatment was also highlighted by one consultant. All consultants agreed that NMP role boundaries have not been determined by the organisation and the responsibility has been given to the NMP and their consultant mentor to be established. Consultant participants recommended reviewing the NMP

governance structure within other UK specialist organisations to establish the study organisation's position with defining the NMP role.

> *"I think if you look at what came from other centres regarding for example allocation of treatment. I am not sure if we have explored this role of where their roles come in. So, I think we don't define boundaries very well and we need improvement and have to agree as to what we are happy with."* ***Consultant 1***

5.3.1.4. Factors affecting the NMP role

Placement of NMPs

The consultants agreed that whether you require a pharmacist or a nurse NMP depended on the expected outcome of the clinic. One consultant commented, and all agreed, that pharmacists focus on the patients' drug treatment and are thought to assess patients faster within a SACT clinic, whereas nurses are more focussed with the rest of the patient's care resulting in lengthier consultations and reviewing fewer patients. The consultants recommended that the choice of NMP within a particular clinic should be related to the main function of the clinic, and a lengthier holistic approach to patient care should be made within separate nurse-led clinics.

> *"If you want to do an adjuvant breast chemo service, and you wanted to be efficient and get patients in and out. Then a pharmacist is great because they see the drug and don't worry about the rest of it... but if other nurses do it, then consultations can go on for an hour can't it? Because they have other roles which they are trying to introduce"* ***Consultant 3***

NMP confidence/personality

The consultants generally agreed that the more effective NMPs were those who needed to become a prescriber to complement their daily professional practice such as professionals who were very experienced and confident within their professional role. The registrar also described how confidence impacted on how useful the NMP was within the clinic.

> *"The most successful NMPs have been the ones that have actually worked closely and been confident in the environment that they are in, maybe might have been given the chance to do the assessment of the patient and then you come back and prescribe but they have got used to the assessment of toxicities and it's the next step."* ***Consultant 5***

Consultant participants discussed how a certain individual's personality and confidence can affect how they practise as effective NMPs and the potential loss of investment in individuals if they are unable to perform as effective prescribers due to their personality. The registrar also discussed the possibility that the NMP role does not suit everyone who undertakes training.

"I have had very contrasting levels of confidence within the NMP group, the two nurses that I have supervised. One has gone on to be a very confident prescriber, the other hasn't really done much prescribing. So, I think there needs to be an idea of what the expectations are and how that is evaluated and managed, because you could say well one was a failure in terms of all the investment and why was it? And who's addressed that? I think that's a shame." ***Consultant 1***

Dual role

The dual role that nurse NMPs were believed to perform when a clinical nurse specialist (CNS) becomes a prescriber was discussed as problematic within organisational NMP practice. The consultant believed the organisation was expecting too much from the nurse NMP role as they are unable to function as both a CNS and a prescriber within limited clinic time. They believed this goes unnoticed as the nurse NMP-led clinics are often undertaken when consultants are not present.

"The other challenge I find is that the NMP may be expected to substitute the role of the doctor, so there are nurse-led clinics and NMP led clinics and we have to be careful that we are not expecting too much of them in that consultation. I still think we are learning about that because we are not always there when clinics are happening independently of consultants and clinicians being around." ***Consultant 3***

The consultants also agreed that the nurses who are thought to perform this 'dual role' have difficulty separating their role, but it was a skill that needed to be developed rather than allowing extra time.

"I think there is an issue or problem emerging with the role. Particularly when…. umm. An oncology nurse has been a support nurse, is also being asked to be the NMP and I think trying to merge these two roles can be difficult for them" ***Consultant 1***

Although consultants concluded that some dual role CNS NMPs can fulfil a more 'task-orientated' role and others may find it difficult to 'switch off' their nursing skills.

"A lot of it depends on the personality of the individual prescriber as well. Some of the nurses are very touchy feely and some are more task-orientated and just do it" ***Consultant 4***

Separate CNS specific clinics

One participant suggested and all consultants agreed that the CNS role of the nurse NMP should not be undertaken within the SACT assessment clinic due to limited time. They believed that the holistic and supportive care should be dealt with within a separate nurse-led clinic where SACT prescribing does not take place. Only some of the consultants had these separate CNS clinics and consultants agreed that all teams should have access separate nurse-led clinics.

"... we have nurse-led clinics and they run separately but they are very small, and the specialist nurses are not in their role as an NMP. So, they are just in their specialist nurse role...therefore there are other nurse clinic that patients can bring those patients to be addressed...chemo clinic has to be a bit more directed and some nurse NMPs find this an issue." ***Consultant 3***

5.3.1.5. Comparing NMP professional groups

Differing NMP skills

The registrar compared the NMP role of the pharmacist to the NMP role of the nurse. The registrar believed that the nurse NMP can pick up many patients' supportive issues but can be more eager to prescribe than other prescribers who may have been more cautious. In contrast, the pharmacist NMP was more treatment focused and were excellent at prescribing resulting in fewer mistakes than doctors but can miss some of the patient supportive issues that nurses may pick up on. Although, the registrar concluded that there were good examples of both NMP professionals, although these differences should be considered when placing NMPs within a clinic.

"The nursing NMP will quite happily continue without dropping a dose than if I had seen them myself, I might think, I would be cautious with that. I would find that the nurse would be more prescription happy…Pick up a lot of issues because when a patient comes to clinic, it is not all about the prescription at the end of the day, but it is about the assessment. The pharmacist is more about 'the right drug, at the right dose, for the right patient' but some of the supportive things will be missed so, vice versa with the nurses. But equally there are good examples of both that do absolutely fine." ***Registrar***

The consultants also discussed how pharmacist NMPs specifically bring their skills such as drug query solving and their ability to look at patients in a different way to doctors to the clinic. Although consultants would not want an NMP to review their patient consistently throughout their SACT treatment journey.

"... it is very useful to have a pharmacist NMP within the clinic and I know we generally use them quite a lot for example when we have questions on herbal medicines or other pharmaceutical matters that come up in clinic. I think they look at patients in a different way and give patients a completely different experience to what we do, so I think supplement the care of the patient very, very well. Umm. So, I wouldn't want someone to be seen only by an NMP throughout the whole course of treatment, but I think it works much better when, sort of, when they are seen on alternate weeks." ***Consultant 2***

NMP professional collaboration

The registrar and one consultant described having recent experience of reviewing patients alongside a nurse and pharmacist NMP collaboration and believe their skills to be complimentary. Nevertheless, another consultant viewed this model as inefficient, but did not explain the reasoning for this. The registrar explained how the collaboration is impacted by the experience and confidence

of the NMPs involved alongside their collaborative approach with medical prescribers. The registrar referred to the NMPs experience both within their respective professions as well as their length of time as a prescriber to impact this collaboration.

> *"Definitely experience makes a difference. Experience not only in how long they have been an NMP but also in how long they have been a pharmacist and how long they have been a nurse before the NMP part."* ***Registrar***

The registrar believed the clinic setup impacted upon how staff collaborate within the clinic, as developing individual NMP clinic lists can enable NMPs to take ownership of their patients and not select the patients they may find less challenging from the shared clinic list.

> *"... when you have a less confident NMP they would avoid seeing a lot of people...it can be a reflection on their confidence. When they have got their own lists of patients, they seem to get on and ask less questions and be less hesitant...They have ownership for their own patients, its good. I think clearly, they need support, but I think that works better."* ***Registrar***

The registrar and one consultant participant recommended an ideal clinic collaboration model involving a nurse NMP, a pharmacist NMP and a medical prescriber, where the patient review could be rotated between each professional prescriber.

> *"I think it works much better if you have a consultant, pharmacist and nurse working together. I think the patients like that and …. most patients if they haven't seen you for a couple of clinics, they start asking"* ***Consultant 5***

5.3.1.6. Evaluation of the NMP role

Two main methods of evaluating NMP practice were discussed by medical prescribers by exploring how NMPs practice and patients' opinions of their practice.

Evaluating NMP practice on patient care

The registrar and consultant participants discussed many methods of evaluating NMP practice such as reviewing the number of patients reviewed by NMPs and the length of the NMP consultation reviews to review the impact of NMP practice on patient waiting times. Other options were reviewing the number of queries that the NMP referred to medical colleagues and the NMPs systems of reviewing patients including when they perform administrative tasks.

"I think it is one of many factors, but I think how long it takes to see a patient is valuable and needs to be in there somewhere...the number of queries that come up after having seen a patient too..." ***Registrar***

Patients' opinions of NMP practice

All consultants were keen for patient opinions of NMP practice to be explored through the collecting of patients' opinion, preferences, and experience data due to many assumptions of patient opinion data being personal anecdotal reports.

"Should we find out what patients perceive? Because every newly diagnosed patient will see me initially once in their journey, but it is very possible they will only see me once and never again. And they will be discharged. It would be nice to know is that satisfactory for them or should they require more consultant contact..." ***Consultant 2***

Not all medical prescribers agreed that NMPs should be compared to doctors and the patients' opinions on NMPs alone were more valuable. Adapting the doctor appraisal questionnaire currently issued to explore patients' opinions was one suggestion of how patient data could be collected.

"One thing we do for evaluation for us is patient questionnaires, so I think it would be useful to look at that for NMPs. You could use the questionnaire we use for the doctor appraisal" ***Consultant 3***

Lack of awareness of NMP role

The registrar and consultant participants believed that the patients were not aware of the NMP role undertaken within the clinic, whilst the registrar believed that patients were content with their review by a competent professional regardless of their professional background. Nevertheless, one consultant believed that some patients still prefer to see the consultant and the patient should be informed how often they will be reviewed by members of the MDT prior to starting treatment.

"I have had positive feedback, but I think that patients also still think that they are gonna see the doctor... they also say to me "it is very nice to see you and I was wondering when I was gonna see you again". So, they haven't understood and maybe that is something we have to do better... we haven't made it clear to the patient how it is going to work and what the NMP role is" ***Consultant 2***

Although the registrar believed that if patients had any issues with the healthcare professional due to review them, they would not be happy to see that person regardless of whether they were an NMP or a medical prescriber and on some occasions the patients prefer to see the NMP.

"... if patients are happy with their care, it doesn't matter who sees them. If the patient had issues that weren't being addressed, I am sure they wouldn't be happy to see that person whether they were a doctor or an NMP... certainly, some prefer seeing the NMP to seeing the medic I think… they say, "I don't need to see you, I usually see the NMP" ***Registrar***

Reasons for lack of identifying clinical roles

Consultants believed that the patients make assumptions on whom the NMP is, but often due to stereotyping; the patients believe that the NMPs are all nurses if they are not a doctor and are not aware of the wider multi-disciplinary team.

"I don't know if it is just a stereotype going on with the patients and they think either a doctor or a nurse." ***Consultant 5***

There were many suggestions for the reason for why the patient may not be able to identify the NMP role, such as the lack of clinic uniforms for staff or the NMP role may not be explained within new patient consultations prior to starting treatment.

"We don't talk to the patient about that at all in the beginning actually... with the chemo patients we don't say "right you are gonna start seeing""" ***Consultant 3***

Aspects of continuity of care

Consultants all agreed that patients prefer continuity with who reviews them within the clinic, which is often difficult to ensure due to staff changes. Alternatively, two consultants believed that the best patient care was for the patient to see the consultant or NMP on alternate cycles or weeks due to skill mix.

"We have different NMPs and at one time we had an incredible throughput of people and there was real uncertainty and changes in our team, and I think patients would go to clinic and see a different person every time and that is not popular either. They like consistency if they see the same NMP its ok." ***Consultant 1***

Consultants had concerns about losing touch with their patients and had had feedback that occasionally patients can go through their care without seeing them. The consultants believed that they lose control with the patient's care journey, although this may be more of an issue for the consultant but can impact the consultant-patient relationship. The consultants also discussed how often they review their patients which varied widely as they now see more complex patients regularly and straightforward patients very rarely.

> *"From a personal point of view, I don't think I know my patients as well as I used to, 'cause I used to see every patient every cycle and have a relationship. I knew them in a way that I couldn't possibly know them now…but I don't think that the patients are missing out, it's just the way that it is affecting my role."* ***Consultant 1***

5.3.1.7. NMP training

University NMP training

The consultants acknowledged that the university NMP course trained professionals to fulfil the legal requirements of prescribing but did not teach them how to work within the clinic as SACT prescribers. The consultants were aware of the importance of their DSMP role within the university course but expressed difficulty with performing this role and occasionally meeting the NMPs needs.

> *"But I think the training that you get is about fulfilling legal requirements, so you know how to prescribe something, but it doesn't teach you how to manage chemotherapy which is what we are using them for."* ***Consultant 4***

Post-qualifying training

The registrar made many references to the training requirements of NMPs and the importance of the NMP's ability to identify and undertake their own additional further training following being involved in an 'ad-hoc' NMP local post-qualification training session within the organisation. The registrar discussed how the NMPs' approach to learning is important and how NMP confidence levels would affect their desire to build on their knowledge.

> *"I'd say there is a huge emphasis on the person, so if they feel that they're not adequately trained or there are areas for improvement, the responsibility should lie with them to escalate that."* ***Registrar***

Supervisor expectations

The consultants considered that the level of training that the NMP received is often a result of the NMPs desire to learn and progress. They also believed that the responsibility of NMP training was given to the consultant team, and this should be improved within the organisation.

> *"... it is very much up to the individual and their team to make sure they are trained properly as chemotherapy prescribers and we could do better at the generally, even with our needs"* ***Consultant 5***

NMP Clinical assessment skills

The registrar described how each individual NMPs further training requirements differed but explained how the NMP needed to be able to not only prescribe but also undertake patient clinical assessment. The consultants also described how all NMPs needed to ensure they can perform simple

clinical examinations which would result in improved job satisfaction. No other further training topics were discussed.

> *"Further training, again it is very individual, and some people are probably very suited to being an NMP and other people are probably not, because it is a big responsibility, and it is not just about prescribing but it's about being able to take a history and doing some kind of examination of some description. Even if it is some sort of inspection thing as well as prescribing a drug and having an appreciation of everything else, they take."* ***Registrar***

NMP Communication skills

One consultant explained how a pharmacist NMP had focused on communication skills during their training within the clinics and then gradually increased their confidence of dealing with patients in generally when qualified.

> *"I think the other thing that has worked well with the pharmacist NMP he had never worked in a clinic before, so he came in on 'a lot' of consultations and he was very focused on how you communicate with the patients, and he got to know how to deal with the patients and how I personally deal with patients..."* ***Consultant 5***

Another consultant suggested that different NMP professionals have differing learning needs such as how pharmacist NMPs needed to learn about communication skills specifically but nurse NMPs needed to learn about drugs.

> *"... maybe the nurses need to know, learn about the drugs and the pharmacists need to experience more about communication to patients."* ***Consultant 3***

Table 5.4 summarises the themes and sub-themes that emerged from the medical prescriber focus group and registrar SSI. These results were then used to formulate a theme framework for the subsequent senior manager's SSIs. (See Table 5.2)

Table 5.4. Themes and sub-themes emerging from medical prescribers focus group and SSI

Themes	Sub-themes
Benefits of NMP practice	Appropriate skill mix
Barriers of NMP practice	Referring to medical prescribers NMP responsibility when prescribing Acceptance of the NMP role Effect on SPR training Management of supportive medications Governance of NMP practice
Factors affecting the NMP practice	Placement of NMPs NMP confidence/personality Nursing dual role Separate CNS specific clinics
Comparing NMP professional roles	Differing NMP skills NMP collaboration
Evaluation of NMP practice	Evaluate NMP practice on patient care Patient opinion data of NMP practice Lack of awareness of NMP role Reasons for lack of identifying clinical roles Aspects of continuity of care
NMP Training	University NMP training Post-qualifying training Supervisor expectations NMP clinical assessment of skills NMP communication skills

5.3.2 Senior managers semi-structured interviews

The semi-structured interview theme plan was developed following the analysis of the key themes established from the medical prescribers focus groups and SSIs previously performed. The senior manager questions can be seen within Table 5.2. Three separate semi-structured interviews were held with senior managers from the organisation in January 2015. Qualitative results from senior manager SSIs were then combined for analysis to support anonymity and the following themes and sub-themes were established.

5.3.2.1. General opinions of oncology NMPs

The senior manager participants had a positive opinion of the NMP role. They described the NMP role as well-accepted, beneficial, and well-established role within the organisation. The senior managers described NMPs as being heavily relied upon to deliver the oncology service within the organisation and believed the NMPs were safe prescribers whom they admired.

"... a big cohort of NMPs, where the service is utterly dependant on that cohort to run" ***Senior Manager 2***

5.3.2.2. Benefits of NMP practice

'Freeing up' clinicians

The senior managers believed that NMP practice enabled clinicians to concentrate on more complex patients.

"... [NMP practice] *takes pressures off the service, perhaps allowing clinicians to do things that only they can do and concentrate on more complex patients"* ***Senior Manager 3***

Improved patient care

Two senior managers described how the NMP role provided a better patient service due to the NMP having in-depth knowledge within one oncology area.

"...NMPs can provide a service which is better for patients in terms of the consistency of seeing the same patient and being efficient and having a good knowledge of albeit a small area but knowing it particularly well" ***Senior Manager 1***

Impact of the NMP role on the individual

Participants described how the NMP role gave individual professionals improved job satisfaction and an enhanced role within the MDT, whilst furthering professional development for each profession group. Although one senior manager believed that NMPs can experience concerns over their responsibility when making patient care decisions and recommended that the awareness of this concern should be noted.

"It is more challenging and gives variety in work. But it also came with a fair level of worry and concern, we are making challenging decisions as NMPs on a daily basis and we should never forget that." ***Senior Manager 1***

Research on NMP benefits for funding

The managers discussed the need for more NMP research to investigate the benefits of NMP practice within oncology for them to demonstrate the need for further funding of NMPs to the board of commissioners within the organisation. To obtain a high level of impact, senior managers believed patient perspective data linked to other aspects such as quality of life data would be beneficial to demonstrate this.

"NMPs are here to stay but I also believe that the outcome of your PharmD will be informative on how we build future cases of supporting more NMPs financially and what sort of clinics we put them in and where we utilise them." ***Senior Manager 1***

5.3.2.3. Barriers to NMP practice

Funding

The managers described a lack of funding provided to backfill staff within their day-to-day professional roles whilst practising as NMPs as staffing levels within their department needed to be sustained to maintain the patient service provided. Managers recommended that job plans for NMPs needed to be developed in a session format reflecting the same approach as medical colleagues, to enable easier release of NMPs to attend clinics.

"... there is a need to backfill our staff's current positions" ***Senior Manager 1***

One manager acknowledged the banding differences between nurse and pharmacist NMPs within the organisation although the manager did acknowledge the differences within their job descriptions.

"One thing that we can't ignore anywhere is that a pharmacist NMP is an 8a or above and a nurse NMP is a band 7 VCC...there are reasons why and is primarily due to what happens with job descriptions, but you can't ignore that either." ***Senior Manager 1***

Service need

The managers described a need to establish the needs of the SACT service to determine how NMPs currently contribute to the SACT service, which can then be utilised to improve the efficiency of the NMP role and aid future NMP progression.

"We need to [establish the] 'service need' and know what they were looking to contribute to the service afterwards... we can then show how we can make the NMP role more effective and set limits and targets to help NMPs progress" ***Senior Manager 2***

'Generic NMP' role

The managers recommended how the NMP role should become a more generic role which would enable practice across several oncology areas compared to practising within one single disease site. The participants recommended that the current NMPs scope of practice from one single disease site should be widened within the future to achieve this style of generic practice.

"... more generic roles, from a nursing point of view. Nurses who could prescribe across a number of cancer sites" ***Senior Manager 2***

Role limitations

The managers believed there were limitations to the NMP skill set, whilst medical prescribers have a wider skill set to enable them to perform more functions than an NMP. To overcome this concern, the senior managers recommended that investment was needed to create a support infrastructure for NMPs to aid their development.

"I think it depends on how we support NMPs and make them function effectively, currently we aren't investing in that and ultimately we will only get out of the system what we put in." ***Senior Manager 1***

5.3.2.4. Factors affecting NMP practice

Nursing Dual role

The senior managers discussed how the CNS NMPs had difficulty defining their role and senior managers described the CNSs performing a joint role within the SACT pre-assessment clinics. Although, the senior managers explained how this issue had not been reported by nurses who had recently started employment within the organisation or by nurses who were not performing a CNS specialist nurse role prior to becoming a prescriber. One senior manager believed that these nurses functioned as a prescriber in the same manner as a pharmacist NMP.

"... many nurse NMPs have a joint role as a clinical nurse specialist. I think most non-CNSs, approach a patient in much the same way as a pharmacist does and would refer to support services as necessary without utilising their 'nursing hat' to manage issues. I don't know that that's negative necessarily." ***Senior Manager 1***

The managers discussed how having the patients' issues addressed within one consultation utilising a holistic assessment is ideal but due to capacity issues with SACT pre-assessment clinics this approach is unsustainable and impractical. One manager recommended the use of a model involving assessing the patients' holistic needs within a nurse-led clinic outside of the SACT pre-assessment clinic.

"I do know that some of the nurses are concerned about loss of aspects of their role around holistic needs and assessment, but things can't be combined around prescribing in what is a straightforward chemo clinic" ***Senior Manager 3***

NMP Experience/personality affecting practice

All the senior manager participants agreed that the NMPs level of experience improved their practice, as their confidence develops with experience. Participants discussed how the more confident NMP individuals could widen the scope of their assessment over time as they develop

from a junior to a more senior NMP role. All managers recommended that the organisation should provide clear standardised guidance for the NMP role to gain experience and for consultant mentors to guide their development.

> *"I would expect also that progression to be around confidence in their own abilities, confidence in understanding how the team works and understanding the decision-making progress within the team"* ***Senior Manager 3***

NMP role variation between clinics

Senior managers described how NMPs within a wide variation of clinic types can have very different roles due to the variation in practice between different consultant teams.

> *"...we might find there are variances in practice but that is something that we are trying to pull out, and I guess that's the NMP role varying within different clinics."* ***Senior Manager 2***

Participants described how NMPs had been 'fitted in' to a role that was vacant within a clinic and how the clinic was set up first as opposed to the clinic being set up around the individual NMP skills. Another senior manager also described how the organisations NMP service had not been set up by design and complete review of clinical services within the organisation was needed.

> *"...the NMP service is not a model they arrived at by design, and it really needs a complete review or overhaul of services"* ***Senior Manager 3***

Some NMPs were believed to find it difficult working within more than one tumour site or moving between tumour sites and some NMPs see more patients than others which one manager believed should be explored. Nevertheless, one manager commented that the patient outcome is more important than patient numbers seen.

> *"...volume of patients is not important but interaction and outcome that the patient gets is!"* ***Senior Manager 3***

The senior managers believed NMPs offered a different beneficial aspect to patient care but the NMPs needed to be appropriately placed within clinics to achieve more quality and the best value for money.

> *"I would say that the added benefits of having a pharmacist/a nurse within clinic would be the different aspect of care that they give to the patient, and if we can make sure that we can correctly place our non-medical prescribers then we would be getting quality and the best value out of them"* ***Senior Manager 1***

NMPs prescribing supportive care

The senior managers had varying opinions on how NMPs manage supportive medicines and care compared to medical prescribers. One manager believed that NMPs address the holistic needs of the patient more than medical colleagues which may be of benefit to the patient.

> *"... the NMP is more likely to tap into the holistic side of the patients than the medics do"* ***Senior Manager 3***

One manager believed this needed to be explored as it may just illustrate that NMPs are more nervous or even safer or, alternatively, approach their practice with more caution than doctors.

> *"... does that mean that NMPs are more nervous? Or safer or more/ less cautious? Needs to be explored"* ***Senior Manager 1***

5.3.2.5. Comparing NMP professional groups

Differing NMP skills

One senior manager described pharmacist NMPs as drug focused and possibly missing 'softer skills' whilst nurse NMPs had the softer skills but needed more drug focus. Although another senior manager viewed this assumption as not convincing and that these suggested stereotypes needed to be explored further or banished.

> *"... there are some professional stereotypes that we have all accepted as they seem to make sense and they need to be determined to be true or they need to be banished"* ***Senior Manager 2***

NMP collaborative working

The senior managers were asked their opinion on nurse and pharmacist NMPs practising collaboratively. All three participants described how their roles complemented each other well but explained how the collaborative nurse-pharmacist model was luxurious within current practice except for where it may benefit newly qualified NMPs.

> *"A good model but maybe it is just luxurious to have both, except as a kind of induction post qualifying"* ***Senior Manager 1***

5.3.2.6. Evaluating the NMP role

There were many suggestions from the managers on how the NMP role could be evaluated. The senior managers believed that the NMP value to the clinic needed to be proven to the organisation, not just to the patient.

Patients' opinion data

Senior managers believed patient opinion data could be very powerful and important data like the medical prescribers earlier in the study.

> *"Patient opinion is powerful as we have an obligation to find out what the patient thinks as the cancer centre holds those sorts of values very true about patient experience and thoughts... I think this is a very interesting piece of work that we should undertake."* ***Senior Managers 1***

Senior managers were very interested to find out if patients were aware of the NMPs' role. Two managers believed it was important that patients knew who was consulting them within the clinic setting (which healthcare professional) and viewed patients' opinions on this as invaluable. Whilst another manager suggested evaluating patients' opinions following a review by two different prescribers such as a pharmacist or nurse NMP or establishing patients' opinions on whether they would want to wait 30 minutes and see a nurse NMP or see a consultant and wait an hour.

> *"I definitely think patients should know who is seeing them and their opinion would be really valuable"* ***Senior Manager 2***

The senior managers recommended exploring the opinions of all stakeholders working with the NMP including the patient, and their opinion of the holistic or drug focussed approach to patient care. Although another participant suggested establishing how many times patients have seen the NMP when considering patient opinion data of NMPs.

> *"Patients' perspectives, definitely a questionnaire and I guess the rest of the team's perspective as well"* ***Senior Manager 1***

Evaluating NMP practice impact on patient care

One manager believed that it is essential that the number of patients that an NMP reviews should be evaluated and would inform on where NMP time is being utilised. Other aspects such as exploring clinic pathways, patient waiting times and comparing the experienced NMP role to a mid-level registrar role were suggested approaches to evaluating NMP practice.

> *"You could look at practical things such as how the clinic runs, and you could look at how the NMP links in with the consultant and gets support"* ***Senior Manager 3***

5.3.2.7. NMP Training requirements

University qualification

All managers believed that the university course needed reviewing, and two participants believed it was too long and intense. Although they did explain how the course produced safe practitioners as it taught prescribing legal aspects but did not train individuals as SACT prescribers.

"... some views of NMP training is that it is too long and too intensive, but then I think that what you see in practice then is really safe practitioners." ***Senior Manager 1***

Post-qualifying training structure

The current NMP appraisal process was believed to be important combined with the ability to feedback within the organisation for further support if needed. Although one manager explained that a post-qualifying structured training was not developed within the organisation and believed this would benefit current practice. One senior manager suggested a competency assessment approach using the nursing skills evaluation model could be used involving revalidation for certain skills on an annual basis.

"There isn't anything offered as far as I'm aware, there is no follow up or structure to it after qualifying and I think it would be useful" ***Senior Manager 3***

The senior managers described how an organisation-wide peer discussion session for NMPs is held three or four times a year by the organisation and was believed to be unique to the organisation.

"... two-tier responsibilities to training, one is that managers facilitate and encourage continual training and the other is that the individual NMP professional has a responsibility to identify their own needs". ***Senior Manager 2***

Two senior managers recommended that after obtaining the NMP university qualification, there should be standardised 'check points' along the post-qualifying NMP training journey that should be obtained. The use of this approach would outline to all NMPs and their mentors the expectations of their role and NMP development within the organisation.

"... we haven't got as supervisors and clinicians, a clear structure. We have been supervisors to get people through the qualifying point but once they are qualified, the process is unclear on how we train our NMPs." ***Senior Manager 1***

The senior managers concluded their SSIs that future NMP practice should continue with a wider scope of practice and for NMPs to be safe and confident within their practice.

"... there is a future, but I don't know what it is yet. I hope more of the same by and large" ***Senior Manager 1***

Table 5.5. shows a summary of findings from the SSI with senior managers which was then combined with the findings of the medical prescribers focus group and SSI. The themes and sub-themes established from all focus groups and SSIs for both medical prescribers and senior managers were summarised within Table 5.6.

Table 5.5. Summary of themes and sub-themes from senior managers SSIs

Themes	Sub-themes
Benefits of NMP practice	Freeing up clinicians Improved patient care Impact of the NMP role on the individual Research on NMP benefits for funding
Barriers of NMP practice	Funding Service needs Generic NMP role Role limitations
Factors affecting NMP practice	Nursing dual role NMP Confidence/personality NMP role variation between clinics NMP prescribing supportive care
Comparing NMP professional roles	Differing NMP skills NMP collaborative working
Evaluating the NMP role	Patient opinion data Evaluate NMP practice impact on patient care
NMP Training	University qualification Post qualification training structure

Table 5.6. Combined themes and sub-themes from all medical prescribers and senior managers focus groups and SSIs

Themes	Sub-themes
Benefits of NMP practice	Freeing up clinicians Improved patient care Impact of the NMP role on the individual Research on NMP benefits for funding Appropriate skill mix
Barriers of NMP practice	Funding Service needs Generic NMP role Role limitations Referring to medical prescribers NMP responsibility when prescribing Acceptance of the NMP role Effect on SPR training Management of supportive medications Governance of NMP practice
Factors affecting NMP practice	Nursing dual role and separate CNS clinics NMP Confidence/personality NMP role variation between clinics and NMP placement NMP prescribing supportive care Placement of NMPs Separate CNS specific clinics
Comparing NMP professional roles	Differing NMP skills NMP collaborative working
Evaluating the NMP role	Patient opinion data Evaluate NMP practice impact on patient care Lack of awareness of NMP role Reasons for lack of identifying clinical roles Aspects of continuity of care
NMP Training	University NMP training NMP clinical assessment and communication skills Post-qualifying training Supervisor expectations

5.4. Discussion

All participants believed NMP practice was a positive development within the study organisation. Many participants recommended that the organisation could not provide a sufficient patient service without the support of NMP practice. In 2014, the Lennan study(29) examined the views and experiences of professional stakeholders about non-medical prescribing (NMP) of chemotherapy and found that not all medical staff had a fully positive general opinion of NMP practice within oncology.(29) Although the Lennan study(29) was based within one singular chemotherapy unit compared to a large specialist organisation such as the study site which has a large well established taskforce of NMPs.

5.4.1. Benefits of NMP practice

Free up clinicians

Senior managers discussed how the NMP role freed up consultant time to review more complex patients whilst the NMPs review patients with less complex clinical needs. The MacLure(46) study explored Scottish general public opinions of NMPs and discussed how NMP practice was believed to reduce doctors' workload and allowed them to focus on more complex patients.(46) Medical prescribers did not discuss how NMPs freed up their time, but this theme was also identified by NMPs within study one. This may be because the amount of time saved can be dependent on the experience of the NMP within the clinic and the number of referrals made to medical colleagues within their practice. NMP confidence has been found to improve with experience and the Cope et al study(44) discussed this point whilst exploring the perception of NMPs. Cope believed that more confident and experienced NMPs were more self-efficient and referred to medical colleagues appropriately, therefore having less impact on the time of medical colleagues to assess their patients and allowing medical prescribers to see their complex patients.(44)

Improved patient care

The senior managers believed utilising the NMP role improved patient care due to the multi-disciplinary approach and in-depth knowledge within one area of oncology. A study by Lennan(29) also described the benefit to patient care of NMPs working collaboratively with other members of the MDT.(29) Within a system review by Barrott et al(49) exploring nurse and pharmacist SACT review clinics, multi-professional services involving the utilisation of advanced clinical practice roles were believed to positively impact patient care.(49)

Impact of the NMP role on the individual professional

Participants described perceived individual benefits to NMPs when training and performing an NMP role such as greater job satisfaction, career progression and furthered professional progression. Participants believed that practising as an NMP within such a large cohort of NMPs as there are within the study site organisation complemented these individual benefits as patients are reviewed by the NMP on a regular basis. The George study(71) also documented these findings whilst exploring pharmacists experiences of early supplementary prescribing.(71)

Research on NMP benefits for funding

Research was believed to be required to produce evidence for the benefits that NMPs provide to patient care, which could be achieved through evaluation of current NMP practice and its impact on patients including patient satisfaction data. There are limited published UK patient opinion studies exploring NMP practice within oncology; although one study by Dennison et al (92) found high levels of satisfaction with a pharmacist-led oral SACT programme, although this study may not reflect the same role that pharmacist NMPs are performing within SACT pre-assessment clinics within the organisation.(92) Another 2009 study within a non-oncology specific setting by Hobson et al(59) discovered that patients described favouring nurse-led services due to the perceived concerns around pharmacist training to undertake clinical reviews.(59) Therefore, it is difficult to demonstrate the benefits of current oncology NMP practice to commissioners and directors within the organisation and further up-to-date research is needed.

Appropriate skill mix

A benefit of NMP practice identified by consultants was the ability of NMPs to bring their professional skills to the consultant team. A systematic review by Jebara et al (42)explored the views and experiences of stakeholders of pharmacist prescribing and discussed how pharmacist NMPs use their skills and knowledge to benefit patient care when practising as a prescriber.(42)

5.4.2. Barriers of NMP practice

Funding

The lack of financial backfill support for NMPs to fulfil their NMP role within outpatient clinics is a major barrier to NMP practice and its progression. The relevant professional departmental (i.e., nursing, or pharmacy) budgets are unable to replace staff and therefore find it difficult to release staff to perform the NMP role as all aspects of patient services need to be maintained. Both the George et al study(71) and a commentary paper by Bourne et al (93) discussing NMPs in secondary care concluded that backfill was a challenge to pharmacist prescribing which needed to be

addressed.(71, 93) Due to a lack of backfill funding, NMPs are currently placed within outpatient clinics due to goodwill or historical arrangements. If the NMP were to leave the team due to maternity or sick leave or to see employment elsewhere the NMPs position within the consultant team would be lost as the relevant professional department has no obligation to replace that NMP within the outpatient clinic. Therefore, the lack of backfill not only impacts upon the service provided by the professional department the NMP belongs to but also the consultant team or clinic where they practice as an NMP.

Service needs

Senior manager participants recommended that SACT service needs should be established by the organisation including a service plan, as NMP practice within the current service had believed to have evolved over time. The number of employees who became NMPs within the organisations clinical services had increased but the current patient service structure had not been designed intentionally to incorporate current NMP practice services. A cross-sectional survey evaluating Advanced Nurse Practitioners (ANPs) by Fothergill et al (50) described how advanced practitioner roles (which can be interpreted within some publications as the NMP role) are underutilised within current service demands(50) and Anderson et al(51) discussed how ANP roles have evolved haphazardly over time, when exploring ANP and nurse identity.

Generic NMP role

The development of a 'Generic NMP' role within the clinical service was recommended by manager participants. A generic NMP role would enable staff to work as NMPs across several site-specific team specialities and may increase the flexibility of the NMP role and complement a new service design. Bourne et al(93) also described this generalist prescribing role compared to the more current advanced specialist NMP role within specific specialities where more advanced NMP training is needed. For some experienced NMPs who have an established advanced NMP role, a change of practice such as the generic NMP role described would require further training and refreshment of skills and would change the current NMP role especially for dual role CNS prescribers within outpatient clinics. Medical prescribers also expressed concerns about NMPs working outside of their scope of practice as this is where errors can occur. Therefore, if NMPs were required to perform a generic NMP role the scope of practice and role responsibilities would need to be clearly defined within the organisation. Nevertheless, there may be scope to utilise generic and advanced NMPs within the organisation to meet the identified service needs across the organisation.

Role limitations

Role limitations were described such as the ability to perform sound physical examinations confidently to diagnose medical conditions. Allison et al(54) explored the clinical assessment skills of NMPs within oncology and concluded that NMPs should develop patient assessment skills related to their area of practice within oncology. Role limitations such as patient assessment skills may have been easier for medical prescribers to identify as they are reviewing and comparing NMP practice to their own practice, although NMPs are not trained to have the same skill set as doctors. The NMP role is expanding and developing within the organisation but is viewed as limited without medical support and a relevant training structure is needed to expand the role of the NMP and to widen their scope of practice to reduce role limitations.(56)

Referring to medical prescribers

The experience and confidence of the NMP were also believed to impact on when the NMP would escalate to medical colleagues. The Cope et al study(44) found when exploring views of NMP practice that NMPs' confidence levels increase as they gain experience, which results in self-sufficient NMPs who refer to medical colleagues on a less frequent basis.(44)

NMP responsibility when prescribing

The responsibility believed to be experienced by NMPs may limit the NMPs practice especially when they may consider the lack of clarity with the consequences to NMPs of making an error within the organisation, due to a lack of governance around the NMP role. The need for clarity and governance around new advanced roles was also discussed within the PARED study (94) whilst exploring the experiences of trainee pharmacists within an advanced role within emergency departments. Therefore, trainees also described experiencing difficulty transitioning into their new advanced role and accepting new levels of responsibility.(94)

Acceptance of the NMP role

The NMPs acceptance of their prescribing role within their practice may also be a limitation if prescribers lack the will to prescribe. This hesitance for NMPs to prescribe may also be due to the NMPs believing they lack support with a sound governance structure within their NMP practice within the organisation. A classic e-delphi survey within Wales by Courtenay et al(43) also discussed how adequate NMP support is required through establishing clear NMP organisational governance.(43) Therefore clear NMP guidance and governance for all aspects of the NMP role may resolve any concerns the NMP may have with accepting their prescribing role.

Effect on SPR training

Consultant participants described how NMP practice can impact on other healthcare professionals such as training specialist registrars due to straightforward patients being reviewed by NMPs. This could potentially be impacted by the experience of the NMP as NMPs with vast experience would review the straightforward patients without any need for medical input. Although training or inexperienced NMPs may still need support from registrars with reviewing straight forward patients within the clinic. This issue could be overcome if NMPs were appropriately placed within clinics across the organisation purposefully to allow registrars sufficient exposure to straightforward patients within separate clinics or enabling SPRs to support inexperienced NMPs.

Management of supportive medications

Mixed opinions on the efficacy of the NMPs approach to the management and prescribing of medicines to treat the side effects of SACT treatments such as nausea and vomiting were discussed by consultants. One NMP within study one believed that management of the patients' supportive care was within their expertise as NMPs compared to medical colleagues. The medical mentors within the Lloyd et al study(66), also believed that NMPs are good at closely following protocols when prescribing, which could explain why the NMPs were believed to manage supportive medicines more appropriately than their medical colleagues.(66) Therefore, more investigation into the efficacy of their practice needed to be explored within the organisation.

Governance of NMP practice

Study data illustrate the clear differences within general clinic practice structure and therefore may be impacting on the differences between NMP practice within the organisation. For example, some NMPs allocate treatment, and some do not, but this may be affected by the varying patient group and patient treatment management between differing disease specialties. Clear governance structures and guidance for NMP practice within the organisation is needed to ensure clarity for NMPs and all stakeholders involved within NMP practice and to aid their future development.(43, 95)

5.4.3. Factors affecting NMP practice

Nursing dual role and separate CNS clinics

There are differences between the NMP role described for pharmacists and nurse NMPs as NMP practice can vary when practising within different specialities. The main variation is within the nursing NMP role where CNS NMPs are believed to have difficulty performing their CNS role and NMP role within the same clinic if required. They often seem to approach the pre-chemotherapy

assessment holistically and some have difficulty performing the 'task-orientated role' that is required of all NMPs regardless of professional background to perform a pre-chemotherapy assessment. Both Stenner et al (80) and Jones et al (81) explored stakeholders opinions of NMPs within other specialities (e.g. mental health and diabetes) and described how nurse prescribers are believed to consider wider aspects of patient lifestyle when consulting with patients, describing their general holistic approach.(80, 81) This has an impact on consultation timings and as a result the number of patients seen within the clinic by the NMP. Therefore, the recommendation by participants that a separate clinic where patients' holistic needs can be addressed by a CNS was favoured greatly by senior participants, allowing a task-orientated NMP role to be performed by the nurse NMP within the pre-SACT assessment clinic, meeting time and service constraints. The pharmacist NMPs were believed to fulfil a more focused task-orientated approach, which may have been to do with their day-to-day professional task-orientated responsibilities. Within two published studies by Farrell et al(52, 53) exploring aspects of UK nurse-led chemotherapy clinics, nurse-led holistic assessments within the clinics were believed to impact on the implementation of further nurse NMP clinics due to concerns with financial viability.(52, 53) Farrell et al(52) concluded that a task-orientated approach was required within reduced clinic time slots to increase the number of patient reviews performed, rather than a holistic approach to patient review.(52)

Confidence/personality

The ability of NMP individual influences such as experience and personality are believed to affect how NMPs practice, and their confidence levels were believed to have a significant impact on how an NMP practices within the clinics. Goswell and Siefers(45) explored acute ward based nurse prescribers within their study and also discussed how confidence influences the application of theoretical knowledge to practice.(45) The doctor participants within study one all agreed with Cope(44) regarding how confidence specifically influences NMP prescribing, but the project participants believed that, for many candidates, confidence could be developed with experience.(44) Nevertheless, it was discussed that some individuals will possibly never develop this confidence due to personality traits and therefore were not suited to becoming an NMP. It was suggested this could be identified prior to the candidate undertaking the training and therefore financial input saved. The clinical supervisors within the PARED study (94) also found that the ability of trainees to obtain and utilise relevant skills was dependent on personality types and that this finding was believed to be the same for nurses, doctors and pharmacists. Therefore, it may be possible to develop an assessment tool could be developed by the organisation to support professionals with the decision to become NMPs by incorporating questions around their likelihood to appropriately utilise the qualification once obtained.

NMP role variation between clinics and placement of NMPs

Development of an organisational service plan to identify the NMP service needs within the organisation was identified as a requirement to enable appropriate placement of NMPs within certain clinics resulting in optimal utilisation of their NMP skills. Completing this planned structure to clinic practice within the organisation would aid alignment with the 'Quality Statement for Cancer' which is a five-year service delivery plan for cancer in Wales which recommends how complex treatment pathways should be optimised.(2) This is in contrast to the current approach of placing NMPs within clinics as a result of the need to fill workforce shortages.(79) An optimum model of utilising NMPs was discussed by Lennan(29) within a chemotherapy unit, involving development of a workforce model for outpatient clinic use, which could aid development of the service plan.(29)

NMP prescribing supportive care

As previously discussed, the NMPs approach to supportive care management within the organisation (e.g. for nausea and vomiting or neutropenia) should be explored. This is due to the differing opinions of participant staff groups on whether NMPs appropriately improve supportive management or are overcautious when prescribing. One participant also discussed how the NMPs looked at the patient holistically compared to the medical prescribers, whilst medical prescribers also previously discussed how a holistic approach is not necessarily the most appropriate approach to assess patients within a pre-SACT assessment clinic and this approach should be used elsewhere with the patients care.(53)

5.4.4. Comparing NMP professionals

Differing NMP skills

Pharmacists NMPs were believed to be more treatment focused compared to nurse NMPs who are believed to have softer skills and pharmacists were believed to look at patient review in a different way to doctors. Although the registrar concluded that good examples of both existed, and one senior manager believed this stereotype should be "proven or banished".

NMP collaborative working

The nurse and pharmacist collaboration within a clinic was believed to be positive by all participants but the collaboration was believed to be 'ideal' by the consultant participants and not a model that addresses current clinical service need. Although participants did suggest that the collaboration could be more effective for inexperienced NMPs to have a sufficient support network. The consultant participants believed that the consultant should participate within the collaboration, as patients may benefit when seeing the consultant at certain time points within their treatment as

well as alternating between NMP prescribers. A medical leadership model was recommended within an American study by Bruinooge et al (96)when issuing a survey to explore the role of advanced nurse practitioners (ANPs) within oncology.(96) Bruinooge (96) discussed the benefit of close working relationships between multi-professionals within SACT clinics and this approach of effectively utilising staff skill mix would also address the consultants' concern about losing touch with patients. Within the 2014 Lennan study(29), it was also suggested by doctors that the optimum model would be for doctors and NMPs to alternate for each visit, but pharmacist NMPs were not mentioned. This could be because their pharmacist NMP role was not established within the single chemotherapy unit where the study was set.

5.4.5. Evaluating the NMP role

The senior managers explained the importance of the organisation to utilise the NMP role to enable delivery of a high level of quality for patient care. They suggested various approaches that could be utilised to evaluate and measure the benefits of NMP practice, such as the number of patients reviewed by NMPs, and the patient outcome data, such as comparing patients' opinions on the NMP service. Data such as this could be utilised to request backfill requirements for the development of future oncology NMP services within the organisation.

Patient opinion data

The need for evaluating patients' opinions was an important requirement by study participants, especially the patients' opinions of being reviewed by an NMP or their opinions on how the NMP managed their care. The use of patient opinion surveys was recommended by participants or the need for doctors to collect this data from patients on a subsequent clinic visit. A recent systematic review by Famiyeh(83) discussed previous studies exploring patients opinions of pharmacist prescribing. There are limited published studies regarding patients' opinions of oncology NMPs to conclude patients views of NMPs reviewing their care (as discussed previously).(59, 92, 97) A Canadian systematic review by Bhanbhro et al(84) also discussed the difference with prescribing within different healthcare settings. The medical prescribers believed that the NMP role should not be compared to the medical prescriber's role when requesting patient opinion data and the focus should be on the NMP role and the patients impact on patient care. Although senior managers believed the comparison should be made and were keen to compare the efficacy of the NMP role to the registrar role.

Evaluating NMP practice on patient care

Other suggestions were also made to explore and possibly quantify the NMPs' involvement within the speciality team within the clinic and the NMPs' activity within the clinic, such as, quantifying the

number of times NMPs referred to medical staff etc, and comparing an NMP to a registrar specifically on a cost per cost basis (as suggested by a senior manager). A review of nurse prescribers within diabetes by Carey et al(98) discussed that more research is needed comparing NMP practice with doctor consultations.(98) In the current project, the number of patients reviewed by the NMP within the clinic was often suggested as a measure but the consultants and NMPs made it clear that the patient's' complexity and drug therapy would have a significant effect on patient numbers and would have to be considered.

Lack of awareness of NMP role and reasons for this

Many participants also suggested that the patient may be unaware of whom the NMP is, due to a lack of awareness of the NMP role. McCann et al also found that patients lack awareness especially of the pharmacist NMP when exploring patient perspectives of pharmacist prescribing.(62) Within the Cooper study exploring stakeholder views of UK NMP practice,(79) patients within a supplementary prescribing consultation admitted to being confused about whom they would be seen by, and some thought that the prescribing pharmacists were doctors.(79) Further evaluation of patient opinions and beliefs of other stakeholders could explore this area, as one registrar suggested that the patients understanding of the NMP role was insignificant as long as the patient had no concerns with being reviewed by the NMP and patient care was optimised. Nevertheless, an American patient survey conducted by Towle et al(97) in 2011, explored patients' opinions of oncology non-physician practitioners and 98% of patients believed they were aware of whom they were being reviewed by within the oncology clinic, although patient awareness may be different internationally.(97)

Aspects of continuity of care

Consultants' concerns were raised regarding losing touch with their patients care if an NMP were to review their patients care and patients' opinions on seeing different members of the multidisciplinary team. Although, the registrars believed it didn't matter who saw the patient within the clinic. If the organisation's reliance on NMP practice increases due to increasing patient numbers and staff workload, consultants need to establish a different viewpoint when managing their workload. They are unlikely to be able to continue to review, oversee and control every consultation with members of their team but they should feel comfortable with developing trust with their NMP as part of the MDT team that they will make appropriate clinical decisions and refer appropriately when needed. Alternatively, as patients are reviewed by different members of the consultant MDT team, they will build a relationship with individuals with an awareness that they are treated as a MDT rather than by one individual, although their care is still consultant led. The Erickkson et al

study (99) explored patients opinions of being reviewed by the advanced practice nurse (APN) and patient participants described expecting to be reviewed by the physician due to them not being informed, but where content with the care they received from the APN.(99) Informing patients of whom they will be reviewed by within pre-assessment clinics may therefore manage patients expectations of who will review them within the multi-professional consultant team within each visit.

5.4.6. NMP training

Different elements of NMP training were discussed within the study data and has been separated into the themes below.

University qualification

Although some senior manager and consultant participants had commented that the university NMP qualifying course was too long and intense whilst including some elements that were not relevant to oncology NMP practice, one senior manager believed the course produced "really safe practitioners". The university non-medical prescribing courses offered at various universities across the UK caters for healthcare professionals from various speciality backgrounds.(2) Bourne et al(93) discussed the issues around the inability of independent prescribing courses to cover the wide spectrum of clinical knowledge needed by all specialities and suggested this was the reasoning for the general course outline and its focus on legal prescribing requirements.(93) The main aims of these courses are to enable healthcare professionals (HCPs) to obtain the skills to become safe prescribers, whilst also developing their skills within their specialised practice roles.(2, 93) Some of the senior managers and the consultants may not be aware of the aim and logistics of the course and the consultants openly acknowledged that they knew very little about the course. These participants may have developed their opinion in reliance on the comments from a few students who had undertaken the course and their own limited experience of NMP training.

NMP clinical assessment and communication skills

The need for pharmacist NMPs to have further training on clinical assessment and communication skills was identified by senior managers, although nursing NMPs were described as requiring further oncology pharmacology training. Although the registrar commented that all NMPs need to be able to clinically assess but did not differentiate between pharmacists and nurses.(87-89) Latter et al(87) discussed NMP training needs and produced similar findings for identifying the separate training needs for pharmacist and nurse NMPs. McIntosh et al(100) also identified the need for pharmacist prescribers to receive communication skills training within a survey of newly qualified pharmacists views on their potential prescribing role.(100)

Post-qualification training

Many participants commented on the lack of a structured post qualifying NMP training within the organisation, especially within the newly qualified years of NMP practice. The consultants and senior managers viewed the current appraisal process as important but in need of improvement across the organisation especially with the focus of the appraisal. Participants' recommended potential improvements of the appraisal process by linking this to competency, such as developing a 'portfolio of learning' linked to regular OSCEs and appraisals or assessing NMP skills alike the nursing skills assessments. The RPS framework for all prescribers also recommends the use of a portfolio of evidence to demonstrate prescribing competency.(14, 15) The discussion and recommendations that the participants provided demonstrated the varying expectations of the annual NMP appraisal and whether it relates to competency assessment. Therefore, the objective and assessment with NMP appraisal needs to be addressed by the organisation along with links to the standardised post-qualifying training requirements.

Although there were many negative comments on the lack of structure of post qualifying training, the current peer sessions held 3-4 times a year held by VCC were believed to be unique. Senior managers explained the need for post university qualifying training, involving setting standardised training checkpoints along the NMP training journey. The structure or framework suggested would identify set goals or targets, so that all involved understand the need for ongoing NMP training within oncology practice. Some of these framework targets are described within the BOPA NMP guideline(21) and this organisation wide NMP training document suggested by participants may aid training of all NMPs within the organisation.(21) The Stewart et al study explored NMP education and also stated a need for key stakeholders to provide strategic direction within an organisation and concluded that NMP practice needs to be underpinned by appropriate education and training structures.(57)

Supervisor expectations

The consultants discussed that the responsibility of NMP training was given to the consultant team, and this should be improved within the organisation due to the lack of organisational guidance around NMP practice. Establishing a clinical educator role within the organisation for NMP training could aid the organisation to progress NMP training and therefore future NMP practice. This role may be performed by the consultant or another professional within or outside of the consultant team, but a designated role would be defined by the organisation and time allocated to fulfil this role. Participants also described how the NMP's training is dependent on the NMP's desire to learn and progress and hesitancy to progress could be related to NMP confidence levels. Providing

effective supervisor support to the NMP individual has been found to be effective within a trainee mentoring project study by Szabo et al,(101) as it relieves anxiety when transitioning to a new advanced role.(101)

5.5. Strengths and limitations of study two

This study explored medical prescriber and senior manager opinions of oncology NMP practice which is largely under explored within published literature. The wide variance in the importance of distinct aspects of NMP practice was apparent to different senior managers who may have had a bias towards pharmacists, nurses or medical prescribers' dependant on professional background. Consultant oncologist attendees practised within gynae-oncology and breast oncology within the organisation, although other consultants practising within other specialties were invited but were unable to attend due to annual leave or work commitments. Investigator bias could have occurred as the PI was a pharmacist prescriber, but this was minimised by the PI facilitating the focus group and SSIs but not guiding discussions.

A strength of including the registrar and consultant participants was that they analysed the overall NMP service, as they are a different staff group to NMP professionals, although only one registrar participant was included due to staff work commitments. One registrar participant may have caused participant inequity, but very in-depth responses were given by the registrar interviewed. Focus group and SSI fatigue was reduced by limiting the length of discussions to one hour.

If the opportunity to hold focus groups with the participants who had undertaken the one-on-one semi-structured interviews had arisen, the participant responses may have been more in-depth if they had been challenged by other participants within the group. The study data was not generalisable due to small participant numbers and repeating the study with greater participant numbers and incorporating other organisations across the UK would have produced more generalisable data with greater validity. The opinions of study participants may have been specific to the study organisation or could be shared with other organisations which would strengthen the data within this project.

Credibility and dependability of the qualitative research was ensured during study two as described within study one, except randomised selection of study participants did not take place in study two as all consultants working with NMPs were included due to low numbers. See section 4.5.

5.6. Further Work

Holding further focus groups or interviews with other stakeholders within the organisation would further explore the many aspects identified within the study data. Further research is needed on this topic to explore medical prescribers and senior managers opinions of NMP practice within other

organisations with an increased sample size to provide reproducible and generalisable data. Other methods such as surveys could be used to obtain the opinions and views of NMP practice within oncology across various professional groups which would provide more generalisable data by increasing the participant sample size.

Exploring patient satisfaction and opinion data was believed to be a valuable approach to obtaining funding for the development of oncology NMP practice and further studies could explore patient opinions of the NMP consultation alone or NMPs in comparison to other prescribers. The impact of factors such as the NMP's confidence could also be explored within further studies as this was believed to impact on referrals to medical staff and NMP's ability to embrace their new prescribing role. Study participants also suggested evaluating the NMP role by establishing the number of patients reviewed by NMPs, exploring the clinical pathways and approach to practice that NMPs have within the current clinical service. The participants believed that the 'service need' and therefore structure of each clinic needed to be established to develop the NMP service further.

5.7. Study recommendations

- NMP roles should be clearly defined by the organisation, especially the nurse CNS prescriber role within SACT pre-assessment clinics, and a potential oncology generic NMP role.
- Separate nurse-led clinics should be set up outside of the SACT pre-assessment clinics to assess patients' holistic needs.
- Organisational governance for all aspects i.e., support, training, responsibilities of NMP practice is needed to meet up-to-date clinical service demands.
- Organisational support and investment are needed to develop the NMP workforce and meet service needs.
- Patient opinion-focussed research on NMP practice is required to guide service development and to obtain funding for development of the NMP service.
- Appropriate backfill funding needs to be issued to each department where NMP professionals are practising within another department within the clinical service i.e. backfill monies provided by pharmacy when an NMP pharmacist takes a role as a prescriber within medical outpatient clinics.

5.8. Conclusion

All medical prescribers and senior managers believed oncology NMP practice was a positive and valued resource that is currently relied upon to provide oncology clinical services within the organisation, but further work is needed for it to be optimally utilised.

The main benefits of the NMP service were believed to be freeing up medical colleagues to review more complex patients, appropriate use of skill mix to patient care and improved job satisfaction of NMP professionals. The NMPs' confidence and experience were described by all participants to have a significant impact on many aspects of NMP practice including their tendency to refer to medical colleagues. Significant barriers to NMP practice were the insufficient backfill funding of NMPs to fulfil a prescribing role outside of their professional department, a need to address the service needs and the need for a potential generic NMP role with the ability to practise across several oncology specialty areas rather than being heavily embedded with one area. Role limitations related to NMP assessment skills in contrast to medical prescribers, impact of NMP practice on SPR training and the need for appropriate organisational governance to define provide direction for all aspects of NMP practice were also barriers to NMP practice.

Factors which were believed to impact NMP practice within the organisation were the nursing dual role being performed, the individual NMPs personality and their placement within clinics related to their skills. The collaboration between pharmacists and nurse NMPs working together was believed to be ideal but a clinic collaborative model of a nurse-pharmacist-medical prescriber approach was perceived to be more appropriate to meet current organisational SACT service demands. The most impactful evaluation of NMP practice was believed to be patient-focussed data from exploring patient opinions or aspects of patients care such as the number of patients assessed within a clinic but a lack of consensus for whether the comparison should be made with medical colleagues. Further training guidance and development of a standardised pathway for all NMPs to develop post qualifying was suggested by participants, to guide post-qualifying NMP training within the organisation and potential clinical educator roles could be implemented to support NMP training needs.

Overall, the work of NMPs within the oncology field is well regarded but now needs to be standardised and justified regarding training and NMP appropriate placement, to ensure that the 'service needs' of the organisation are met.

6. Chapter Six: Introduction to studies three and four

The experiences, opinions and recommendations of different study stakeholders on NMP training were explored within studies three and four. Study three explored the opinions of nurse, pharmacist and radiographers who practised as NMPs within the organisation, whilst study four explored consultant oncologists who had NMPs reviewing their patients within their care. In 2018, when the data collection for study three took place, there were eight pharmacists, eighteen nurses (two of which were SPs) and four radiographers practising as NMPs across the organisation.

6.1. Reasons for performing these studies

Many consultant oncologists provide support to post-qualifying NMPs within a consultant mentor role at the study site. The consultant mentor can provide support with training relating to NMP learning needs and whilst practising within the consultant team clinics. Consultant participants within study two of this thesis, identified a lack of NMP training post-qualifying as a barrier to NMP practice. Prior to this within study one, NMPs had commented on a lack of guidance and support with post-qualifying training from the organisation and other stakeholders within the organisation. Recent literature searches have demonstrated that there are no published studies exploring consultant oncologists' opinions of NMPs and their post-qualifying training within oncology. Due to these reasons, the NMP training theme was chosen to be explored within studies three and four.

6.2. Performing the literature search

A literature search to explore NMP training post-qualifying was performed using MEDLINE and EMBASE in July 2018 and frequently updated until thesis submission in December 2022. The search identified 28 relevant NMP studies, published within the last 15 years which included non-medical prescribing by nurses, pharmacists or radiographers. The search strategy was narrowed further using key words and MeSH terms including *education, oncology*, and *attitudes of health personnel*.

The majority of studies identified were around nurse prescribing. There are a smaller number of pharmacist prescribing studies and no radiographer prescriber studies were identified within the literature searches undertaken in December 2022. Four studies were identified related to oncology NMP practice, (29, 37-39, 102) and only one study was found in related to pharmacist prescriber patient assessment skill needs within oncology by Allison et al(54), in addition to the publication based on the work from this thesis.(102) No other relevant NMP training studies were identified within the oncology specialty.

6.3. NMP training within published literature

Continued professional development (CPD) related to NMP practice was explored within some published studies, none were within the oncology specialty. One study by Scrafton (89) discussed nurses' experiences of prescribing in secondary care and described how nurse CPD post qualifying as a nurse prescriber varied widely, and concluded that there is a lack of formal national infrastructure to guide CPD. A published discussion paper by Blanchflower et al,(103) outlined the key barriers to nurse prescribing following a literature search and discussed how nurse NMP education can be a barrier but also an enabling factor. The paper identified that employers should recognise the importance of CPD for nurse NMPs and discussed how not all CPD is relevant to all prescribers.(103) Two other studies by Cary & Courtenay (98) and Cooper et al,(104) both concluded that the learning needs of prescribers is not relevant to all professional prescribing groups when exploring the benefits and barriers to interprofessional learning. The While & Biggs study(105) explored the benefits and challenges of nurse prescribing in three Trusts in southern England and also concluded that the education needs of nurse prescribers needed to be addressed.

The need for healthcare organisation support was concluded to be a requirement within the Courtenay et al(40) study in order for NMPs to progress and to perform their independent prescribing practice safely.(40) A study by Courtenay (43) discussed the need to provide national consensus and establish priorities with regards to the factors that promote the implementation and development of NMP within health services in Wales.(43) The study involved issuing a classic e-delphi survey to all NMPs and concluded that CPD and clinical supervision were important influences for NMP practice in order to embed prescribing and highlighted that each organisation should have a clear NMP strategy.(43) A review article by Zhou et al(106) in 2019, compared the barriers to pharmacist prescribing in the UK, New Zealand, Canada and Australia. Zhou et al concluded that clear policy pathways were required by organisations to offer targeted training courses, specific funding and appropriate infrastructure including methods to ensure competence within an organisation.(106) A national study by Smith et al(107) explored the experience of nurse prescribers and non-medical leaders across both primary and secondary care in England using a survey methodology. Smith et al explored current NMP education, CPD and clinical governance within English NHS health boards and concluded that most clinical governance and risk management strategies were in place across both sectors. Although, Smith et al then further explained how prescribing leaders reported lacking systems to ensure continuity of NMP practice and the effective monitoring of the experience of patients.(107)

The methods of obtaining NMP CPD were discussed within other NMP studies such as within a study by Latter et al.(78) Latter et al explored nurse prescribers' education and CPD for independent

prescribing (IP) practice.(78) Ninety-five percent of respondents reported engaging in self-directed CPD, and 50% had attended any kind of formal CPD such as an organised CPD event. Over half of these participants then identified a need for further CPD.(78) Green et al(108) performed a training needs analysis for NMPs in the South of England Strategic Health Authority (including only one pharmacist participant) using telephone interviews. The study considered whether participants had completed 'degrees' and 'masters' courses rather than CPD skills and training to extend the NMP role. The questionnaire method in this study included 'years of service as a professional' and showed that this possibly influenced the NMPs training requests as more experienced NMPs looked for more advanced courses. These studies by Green et al and While and Biggs et al both recommended that more CPD training should be delivered using a mixed method approach i.e. study days, short courses and web based e-learning especially when learning about new medicines. The Weglicki study(56) was another important study regarding NMP education and involved undertaking semi-structured in-depth interviews and a focus group of participants working in primary and secondary care.(56) The Weglicki study aimed to identify the NMPs preferred mode of CPD and establish the NMPs opinion of the support needed in order to meet the clinical demands of the prescribing role. The study went onto conclude that a potential collaboration between local higher education and workplace employer could be one suggestion of how a blended approach to learning for NMPs could obtained.(56) None of the published studies or papers identified a structure for NMP training or CPD related to the NMPs experience within any specialty, but the need for a structured CPD approach was commonly suggested.

The topics of CPD that were described as beneficial to NMPs within published literature were clinical skills, such as prescribing blood components described by Pirie.(109) Clinical assessment skill needs of oncology NMPs specifically were explored within a study by Allison et al(54) but did not explore clinical skills needed across all areas of oncology NMP practice.(54) Nurses specifically requesting radiological examinations was also discussed within a published article by Ford(110) but Ford explained how first the nurses need to understand relevant radiological issues (the issues would be the same for all NMPs). Another study by McIntosh et al (100) established the views of newly registered pharmacists on their potential prescribing role. Ninety-six percent of participants agreed that clinical examination was an important training need for pharmacists within the McIntosh study but only 35.3% believed general communication skills were an important pharmacist training need. Other studies for example by Hoti, (111) investigated the perceived training needs of Australian pharmacist prescribers. The study identified the key areas for pharmacists to expand their role, although listed vague topics such as 'principles of diagnostics' with no further explanation.

Assessing competency within NMP practice was discussed within the literature. A qualitative study by Abuzour et al(112) explored how pharmacist and nurse independent prescribers make clinical decisions in secondary care. The Abuzour study used think-aloud methodology and semi-structured interviews and concluded how there was a strong link between clinical knowledge, previous NMP experience and clinical reasoning. The study showed that clinical reasoning is a complex and dynamic process which is affected by professional background. (112, 113) Competency to prescribe was discussed further within a study by Maddox et al(72) which explored the factors influencing nurse and pharmacist's willingness to prescribe as an NMP. The Maddox study concluded that issues of NMP role, perceived risk and competency needed to be addressed and training and support provided to improve NMP competence.(72) Twelve pharmacists and 40 nurse NMPs participants both underwent semi-structured interviews and focus group methodology.(72)

The small number of relevant published NMP studies regarding NMP training and the lack of publications regarding training structure illustrates the requirement for more NMP research. The British Oncology Pharmacy Association (BOPA) issued an NMP guideline in 2018 which included a competency framework guideline for pharmacist NMP practice. The framework outlines the skills needed for oncology pharmacist NMPs but does not relate these needs to NMP experience or how they can be obtained through appropriate training courses.(21) The framework could be adapted for use to aid the development of the study site organisations current training infrastructure in collaboration with oncology nurse and radiographer NMPs.(21) A organisational framework or matrix for training and skills for NMPs would guide NMPs and their mentors with regards to training development.

6.4. Medical stakeholders' views of NMP training

A detailed literature search was undertaken in March 2021 prior to commencing study four data collection and frequently updated until thesis submission in December 2022 to identify relevant publications related to medical opinions of oncology NMP training. No publications were found related to medical opinions of oncology NMP training.

The views of General Practitioners (GP) on NMPs was explored by Ibrahim et al,(114) using a cross-sectional survey approach. Ibrahim et al identified that a strong interpersonal collaboration between pharmacist prescribers and GPs enabled a good working relationship with sound communication and this aided further development of the NMP role.(114) A Canadian study by Faruqee et al(115) explored the family physicians perceptions of pharmacist prescribers and found that family physicians (the equivalent of UK GPs) had more trust in pharmacist prescribers with whom they had developed a working relationship with than other pharmacist roles within community pharmacy.

These studies discussed how medical prescribers had more trust in pharmacist prescribers when they were involved in their practise on a one to one basis, than having trust in the pharmacy profession as a whole.(114, 115) Faruquee also described a collaborative model between the pharmacist prescriber and family physician to enable establishment of mutual respect and optimum communication.(115)

The consultant mentor role is utilised at the study site and described within the currently updated organisational NMP guideline (24) to support NMP practice especially whilst the NMP trains to become an NMP. A study by Afseth(116) explored the views of nurse NMP students and mentors on interprofessional competency assessment. Afseth described the benefits to being assessed by another professional group, especially the insight they gain into the development of those professionals.(116) Although challenges were suggested by Afseth as medical prescribers having a different approach to prescribing as nurses were very focussed on guidelines and procedures and medical prescribers rely much more on clinical judgement. (116)

Some studies described how medical mentors viewed certain NMP skills and a qualitative Scottish study by Stewart et al found that doctors described pharmacist supplementary prescribers as having inadequate clinical assessment skills across a range of settings. Although the Stewart et al study(65) was undertaken in 2009 and the skills and training of NMPs may have improved within the last 13 years, the Lloyd et al study in 2010 linked this potential lack of clinical assessment skills to a lack of training that pharmacists had received. A more recent study by Allison et al(54) explored necessary clinical assessment skills within certain oncology specialties and concluded how the skills required are unique to the NMP's area of oncology practice. Within an NMP self-efficiency survey by Cope et al(44), NMP confidence was believed to impact on how self-efficient the NMP was within their practice. Cope found that as the NMP's experience in practice developed, the NMPs confidence was also thought to increase.(44) Therefore, the experience and confidence levels of the NMP could have an impact on the training requirements of NMPs.

Recent guidance has been published by the RPS on the DPP role related to NMP development but has a focus on the DPP role to aid professionals qualifying as NMPs, and is therefore less relevant to the role of the consultant mentor involved in the post-qualification development of NMPs.(117) The organisational NMP guidelines have also been recently updated to incorporate the DPP role aligned with the RPS DPP framework.(24)

7. Chapter Seven: Study Three

Experiences, opinions and recommendations of non-medical prescribers concerning the post-qualifying training requirements of multi-professional non-medical prescribers within oncology.

7.1. Aim

To explore the training of pharmacist, nurse and radiographer NMPs practising within oncology post NMP qualification.

The study subjects are all nurse, pharmacist and radiographer NMPs who currently practice as independent prescribers at the study site (excluding supplementary prescribers) within the oncology specialty.

7.1.1. Study objectives

There were four objectives to this study:

i. to identify the training received by the study subjects at the study site

ii. to explore the opinions of the study subjects regarding the factors affecting the current NMPs skills and training post qualifying and how they could be addressed

iii. to explore the opinions of the study subjects regarding future skills and training needs

iv. to develop a draft skills and training matrix as a recommendation for practising NMPs within oncology at the study site.

7.2. Method

7.2.1. Ethics approval

The Principal Investigator (PI) was SH. Ethics and governance were managed via standard Aston University processes and authorisation obtained from NHS Wales R&D and Velindre University NHS Trust R&D Department. Ethics approval was obtained (ref: #961) from the R&D Committee at Aston University in September 2016 with a minor amendment for the study to include therapeutic radiographer NMPs in January 2021 due to therapeutic radiographer legislation changes in 2016 allowing them to prescribe as independent prescribing NMPs.(13)

7.2.2. Participant selection

In July 2018, there were eight practising pharmacist NMPs, sixteen nurse NMPs and four radiographer NMPs, trained and practising within oncology at the study site. In total, nine NMPs were randomly selected, three NMPs from each professional group (three nurses, three pharmacists and three radiographers) were interviewed once using a semi-structured interview structure.

Participants were randomly selected from each professional NMP group using a Microsoft® Excel software (version 15.0) calculation. Due to small numbers and the differing practice of supplementary prescribers (n=1) within a clinic setting, the nurse supplementary prescriber was excluded from this study.

7.2.3. Data collection

Once selected, the NMP participants were recruited via email, which included the ethics approved participant information sheet and a consent form attachment to the email (see Appendix III). The relevant questions and points for discussion were pre-determined by the PI on the topic of post-qualifying NMP training. Questions were developed by SH to establish current NMP CPD practice by utilising her NMP practice experience, and explored CPD factors identified within published literature such as training support and CPD courses completed (see Figure 7.1). The questions were checked by one VCC pharmacist, one VCC consultant and the PharmD supervisors to reduce bias. The questions were issued as a handout for both interviewer and interviewee during each interview. The PI asked open questions which allowed free discussion around the topic of NMPs training. Interviews were audio recorded.

Figure 7.1. Interview questions

- Describe your general experiences of NMP skills and training post university qualification?
- How do you think your individual skills complement the clinic?
- What is your opinion on the skills and training that should be available to NMPs?
- How can the changes suggested be implemented?
- Are there any courses that you feel you would like to attend or have attended and what are the hindrances are of having attended/attending?
- What support do you feel should be available to improve skills and training?

7.2.4. Data analysis

The narrative from the nine interviews were transcribed verbatim by the PI then anonymised and were analysed by the PI using a pragmatic mixture of a thematic analysis and framework analysis(68, 69) to establish emerging themes and sub-themes. The thematic analysis was performed by SH aided by NVivo® software (version 12) and analysis was checked by AB. For details of the analysis see section 4.2.2.3.

7.3. Combined Results & Discussion

Nine study participants were interviewed using a semi-structured interview methodology and the study participants described previously completing the following training courses (see Table 7.1).

Table 7.1. Study participants per professional group and their collective training completed post qualifying as identified within their semi-structured interview

Study NMP participants per professional Group	Length of years qualified as NMP (years)	No of participants from each professional group	NMP training course identified as completed per professional group
Nurse	Range (8 to 14 years)	3	Clinical Assessment course Advanced Communication course Microbiology course IRMER* course Site specific training Blood transfusion course
Pharmacist	Range (8 to 14 years)	3	Blood transfusion course Clinical Assessment course IRMER course Site specific training
Radiographer	Range (3 to 10** years)	3	Site specific training Clinical Assessment course Advanced Communication course Psychology course Financial support course
Total		9	

*IRMER = Ionising Radiation (Medical Exposure) Regulations, **IP since 2016 previously SP

7.3.1. Competency

Within the study data, there were different suggested methods of assessing oncology NMPs' competency. All participants discussed the annual NMP appraisal that they currently undertake as an organisational governance requirement to assess NMP competency. Other methods suggested by participants to assess competency were OSCEs, peer review, NMPs scope of practice and auditing.

7.3.1.1. NMP Appraisals

At the study site, all NHS employees have an annual appraisal within their main job role undertaken by their departmental line manager. In addition to this, all practising NMPs have a separate annual NMP appraisal with the Consultant Oncologist they practice alongside as an NMP.

One nurse and one pharmacist both discussed the current use of annual appraisals for revalidation as very much a 'paper exercise' to ensure competency governance.

> *"... everyone needs that appraisal revalidation thing every year but signing a piece of paper? My experience of that is just a tick box thing, rather than just "what can I get from this?" -**Pharmacist Two***

Although, one radiotherapist NMP described the annual NMP appraisal positively and commented that:

"... the annual review is really good, and some get a better deal with that than others."- ***Radiographer Two***

The difference in opinions of the NMP appraisal between professional groups may be due to radiotherapists not being able to become NMPs for as long a time as other professional colleagues. Therefore, they could make less of a comparison to other UK radiotherapists within the same role. The radiotherapist NMPs also utilised their NMP qualification within a radiotherapy review clinic as opposed to the well-established NMP cancer therapy outpatient clinic role or NMP ward-based role. Alternatively, the difference of opinion between members of each professional group suggests that the efficacy of each NMP appraisal varies widely between different NMP roles and different professionals. The use of NMP appraisals has not been explored within current published literature to date, but a national study exploring nurse prescribing by Smith et al (107) reported that 73% nurse NMPs had a regular appraisal which included reviewing their prescribing role. Smith et al did not comment on the efficacy of the appraisal process or any detail of the components of the appraisal.(107)

The variation in NMP appraisals is also affected by the level of support offered by the consultant mentor and the lack of evidence submitted within the NMP appraisal that the NMP competencies required have been met. The BOPA NMP guidelines (24) outline the NMP competencies required by pharmacist NMPs but at the study site, there are no detailed, clear NMP competencies outlined by the organisation.(24)

Radiographer One described how they practised with many different consultant teams but was appraised annually regarding their NMP practice by one consultant only.

*"I have an annual appraisal with one of the consultants but as I work with different teams my practice can change." -***Radiographer One***

Completing only one NMP appraisal with one consultant annually may affect the efficacy of the NMP appraisal as consultants may have varying opinions on the training required by the individual NMP to fulfil their NMP role.

Nurse One spoke about how they proactively collected evidence of their OSCEs and competencies within a portfolio. This was then reviewed by the nursing line manager instead of the consultant mentor but portfolio competencies and OSCEs were signed off by the consultant. Only one nurse explained this method of performing NMP appraisals with line managers.

"I have exactly the same appraisal with the Head of Nursing. I have to present my scope of practice and my competencies and describe the competence of it. Any changes of things I think I am not competent on; I can address those needs." -***Nurse One***

The line manager appraisal method described by nurse one involves combining both appraisals from the main job role and the NMP role, where a portfolio of competency evidence was reviewed. This method could be used across the organisation for all oncology NMPs. BOPA recommends within its NMP competency guideline (21) that pharmacist NMPs should demonstrate their recommended NMP competencies within their annual appraisals and suggests that a portfolio of evidence could demonstrate competency. (21) Although this method of assessment could be effective, other factors such as whether the line manager has any understanding of the NMP role may influence the level of support the NMP receives within the line manager appraisals. Although, involving line managers in the NMP appraisal could aid the ability to grant study leave or provide appropriate funding for NMP training.

7.3.1.2. OSCEs (Objective Structured Clinical Examinations)

Nurse One described the use of OSCEs as a revalidation tool for NMPs within oncology as it had formed a large part of their competency assessment within their current NMP role. The nurse explained that they do not continue to undertake these OSCE assessments on a strict annual basis.

"[OSCEs] *Some have not happened since I started, because* [the Head of Nursing] *takes it as read that I can do what I can do, but whether that is good enough or not I don't know."* -***Nurse One***

Nurse One believed that assessing the NMPs ability to perform clinical reasoning and appropriate judgement are possibly more important than regular OSCEs. Nurse One believed that OSCEs could be used within the NMPs early years career to establish skills but NMPs clinical judgement should be assessed separately.

"Once you have the skills and it takes a long time to become good at them because it is pattern recognition because it is you clinical reasoning and your judgement in situations. It could be argued that doing OSCE after OSCE after OSCE is just repeating the same thing that you are doing... OSCEs are ok and they satisfy the organisation but from a learning perspective they are actually not that useful. The clinical judgement and clinical decisions that you make, and reasoning is more where competence should be assessed." -***Nurse One***

Two nurses agreed that the OSCEs could be a useful learning tool but use of the OSCE tool would be limited by insufficient time by all staff to undertake current training and competency reviews.

"... it comes down to time but [OSCEs] *is a good way of auditing."* -***Nurse Two***

Pharmacist Two was unaware that another NMP colleague was undertaking assessments using OSCEs and it had not been a post-qualifying assessment method offered to the pharmacist NMPs at the study site. Pharmacist Two believed it should be offered to all NMPs.

> *"... If someone is doing OSCEs then we should all know about it and we should all be peer reviewed rather than just the one person doing OSCEs. Lovely for them but not that good for everyone else. Those types of things should be available to everyone and offered to everyone."* -***Pharmacist Two***

The radiotherapists were all keen to spend more time on the wards observing practice, but one radiotherapist did not want to be regularly assessed using OSCEs.

> *"I don't think I would like to keep being examined every year* [with OSCEs] *..."* - ***Radiographer Three***

In summary, one nurse described utilising the OSCE method of assessment within their practice and whilst developing their NMP role and their post-qualifying skills. The participants believed OSCEs to be useful within their early NMP career skill development but potentially less effective long term to assess for revalidation but identified that NMP clinical reasoning and judgement needed to be assessed. A qualitative study exploring how pharmacist and nurse prescribers make clinical decisions by Abuzour et al (112) showed that clinical reasoning was a complex and dynamic process and difficult to assess for NMPs.(112) Although complex, the OSCE method could be used to assess clinical reasoning and judgement rather than being used to assess clinical practice skills e.g. chest examination. The BOPA NMP guideline recommends using a mini-clinical evaluation exercise (mini-CEX) as a competency assessment tool. (21) The mini-CEX or OSCE method of assessing for competence could be offered to newly qualified oncology NMPs as tools to aid training development at the study site. They could be used as a tool when reviewing NMP practice rather than a regular annual examination tool for competency due to employee time constraints. Other assessments tools recommended by the BOPA NMP guideline were patient surveys, multi-source feedback, multiple consultant report and case based discussions.(21) A further option for assessing NMP competency could involve the use of a Medication Appropriateness Index (MAI) as described and explored within a study of clinical appropriateness of nurse prescribing by Latter et al(55). Latter et al used this method to assess nurse NMP clinical decision making and clinical appropriateness of their prescriptions issued within their consultations. (55)

7.3.1.3. Scope of practice

The NMP guideline at the study site currently requests that the scope of each NMPs practice should be defined and reviewed within each individual NMP's annual appraisal with their consultant mentor.(24) The following comment from nurse one, suggests that each NMPs scope is not clearly defined in the same level of detail, across all oncology specialities.

> *"In terms of scope* [of practice]*, I classically defined it and I wonder if that is really thought of in certain specialties." -**Nurse One***

Clearing defining each NMPs scope of practice would achieve a high level of clinical governance for NMP practice across the organisation. The organisation's NMP guideline should provide clarity on the level of detail required within each individual NMP's scope of practice to ensure standardisation leading to an increased level of clinical governance. (24) A further benefit of detailed scope of practice would be to make this available to all organisational prescription-reviewing pharmacists, so that the NMPs scope of practice can be checked with each prescription. At the study site, this process occurs within the radiology department with each radiological IRMER referral request made by organisational qualified non-medical referrers. 'Non-medical Referrers' are registered professionals who have completed appropriate training to be able to refer patients for radiological examinations within their clearly defined scope of practice but are not necessarily qualified to interpret the examination results. The British Institute of Radiology clearly defines how this practice is managed. (118)

Radiotherapist Two also mentioned that their scope of practice was only signed off by one of the Consultant Oncologists that they worked alongside, but they reviewed patients from other oncology specialties who were under different Consultant Oncologists. The radiographer described working as a generic prescriber across radiotherapy review.

> *"… I don't just do gynae which may be different if I was more site specific." **-Radiographer Two***

To ensure that an appropriate high level governance for NMP practice is achieved, a scope of practice should be signed off by all consultants whom the NMP prescribes for as requested within the organisation's NMP practice guideline. (24)

Finally, nurse two commented on the difficulty and lack of support at extending an NMPs scope of practice, such as with antibiotics prescribing.

> *"It's a grey area when you are extending your scope. Recently I was extending it to prescribe antibiotics but there was no formal training or support on this. I wouldn't know who to contact and it would be nice to sit down with somebody for an hour and talk. I like to learn the old-fashioned way but there wasn't any way to do this. So, I learnt myself through self-directed learning." -**Nurse Two***

There is limited published evidence exploring the extensions of an NMP's scope of practice. One study by Smith et al (107), discussed how NMPs who are moving into a new area of practice used a wide variety of resources to attain competency in a new area. The most frequently described method of expanding scope of practice within the Smith study was by undertaking training courses. A smaller percentage had used self-directed study such as journals, textbooks and the internet.(107)

In 2022, the Royal Pharmaceutical Society (RPS) published guidance for extending the scope of practice of prescribers and therefore should be used to develop organisational guidance on how an individual NMPs scope of practice could be extended. (16, 24)

7.3.1.4. Peer Review

Peer review assessments to ensure professional competence are now becoming common practice by medical professional groups. Two of the pharmacist study participants mentioned peer review when discussing assessing competency, one suggesting that there should be more formal peer review as an NMP aiming at possibly comparing clinical decision making to others within the same role practising elsewhere.

> *"You could also have more formal peer reviewed or be audited. Comparing your decisions to someone else doing that job or not. So, you could have a more formal system to look at how we assess if we are still competent in being an NMP which is what we are trying to achieve isn't it?" -**Pharmacist One***

One nurse suggested developing an 'advanced practice framework' and guide for independent prescribing specifically, as this had been developed for advanced nurse practitioners (ANPs) within many organisations across the UK.

> *"I am in the middle of getting an ANP advance practice framework and guide by our nursing body. It looks at a review of competence on an annual basis by peer review. Not only with the clinical side but with the competent side. So, people developing a portfolio and having that portfolio reviewed annually by a panel of experts within the trust which is done in a lot of other places for the advanced nurse practice...it's something you could do with independent prescribing and also it gives the person some ability to know they have been properly reviewed, and the organisation looks into what they are doing and they look into service need maybe" **-Nurse One***

An advanced NMP practice framework could be developed by the organisation and used for NMPs to produce evidence and be assessed on a regular basis (i.e., bi-annually) via peer review within the organisation. The peer review could involve the NMP's portfolio of NMP evidence being reviewed by a panel of trust oncology experts. A study by Smith et al (107) found that 52% of survey respondents who were nurse independent prescribers also used peer review as a quality assurance method to review their practice. The Smith et al study did not explore respondents use of peer review further, such as how it was undertaken and by whom. (107)

7.3.1.5. Auditing

Auditing was suggested as a method of assessing competency by one participant only. The nurse described auditing themselves by keeping a record of any prescribing errors or queries highlighted by the pharmacy department. Auditing was not described by any other participants and collecting prescribing data is not current practice within the pharmacy department at the study site.

"Prescribing is being aware of prescribing errors but there is good feedback from pharmacy to learn from … I keep those and self-audit." ***-Nurse Two***

Prescribing errors and query data for all prescribers could be collected by pharmacy and fed back to the NMPs as a learning tool or could be used to show patterns of prescribing for all NMPs. A cross-sectional survey study by McIntosh et al (100) reported that 65.8% of pharmacist participants agreed that prescribing auditing was an NMP training need. (100) Whilst, Smith et al demonstrated that prescribing monitoring data was used as a quality assurance tool by 68% of nurse independent prescriber participants but no details of the monitoring method was shared. (107) Prescribing monitoring data may be a useful tool for ensuring NMP competency but Baqir et al (119) showed that pharmacists had a low prescribing error rate of 0.3% whilst exploring error prevalence by pharmacist prescribers. The Baqir study data complemented the data from the EQUIP study where the pharmacist prescribing error rate was reported as 0% whilst nurse error rate was found to be 6.1% whilst investigating the cause of prescribing errors of foundation trainees. (119, 120)

In summary, a combination of the competency methods and tools discussed should be used by the organisation to assess NMP competency such as a portfolio of evidence for appraisal or peer review, OSCE and prescribing auditing tools. The BOPA NMP competency guideline recommends this mixed methods approach to assessing competency. (21) Although, time restraints are a factor when trying to achieve an accurate and safe review of competency (as described by two nurse participants) time restraints should not affect the ability to provide high levels of patient safety through implementing good clinical governance. A study exploring the CPD needs of professionals with the responsibility to prescribe by Weglicki et al (56), also discussed how employers and organisations have a responsibility to ensure the quality of prescribing is sustained. This could be achieved by ensuring prescribing competency in accordance with the governments call for effective support, supervision, and appraisal in the workplace. (56, 121)

7.3.2. Support

A variety of types of support were described by study participants and are discussed under each sub-heading of this theme. Participant responses may have varied widely due to differences in participants day-to-day role, as pharmacists and radiographers undertake similar roles to their own professional group, whereas nursing roles vary widely within their professional group. All participants agreed that support in general is fundamental to the NMP role.

7.3.2.1. Consultant support

Five out of nine participants discussed receiving support from their consultant mentor. The majority described a need for more leadership and support from their consultant regarding their individual

training needs. Pharmacist three described how they used their own initiative to identify their own NMP training needs.

> *"I feel well supported but every aspect that my DMP* [Designated Medical Practitioner] *has supported me on is stuff that I have taken to them… maybe going forward, there needs to be a responsibility the other way from consultant of what they want. More structure is needed." -**Pharmacist 3***

The results show that there are varying amounts of support offered by consultant mentors to individual NMPs within different teams within different specialty areas of oncology. A study exploring nurse prescribers pharmacological knowledge and decision making by Offredy et al(122), discussed how when NMPs were offered encouragement from doctors they gained confidence. Therefore if there were equality in the consultant mentor support given to all NMPs, this could develop NMP confidence and improve NMP practice.(122)

The three radiographer participants discussed the time they spent with their consultant mentor. Two radiographers described wanting more time with their consultant mentor rather than once a year during their NMP appraisal and both would like more time shadowing consultant team practice to aid learning.

> *"... I meet up with the doctor for my appraisal once a year to fill in the paperwork but because we are so busy...I would be keen to go to outpatients' clinics and meet up with the doctors more... It would be quite good to go every so often, say once a month, go down to clinic and observe the doctors." -**Radiographer Two***

Alternatively, radiographer three described having a lot of consultant support and further training which they then shared within the radiotherapy department.

> *"... [consultant mentors] are willing to help me with training and let me come along to clinic, to clinics perhaps I maybe wouldn't normally attend, so that I can have skills to take back to the radiotherapy department." -**Radiographer Three***

Although radiographers described the need to have more contact time with their consultant mentor, pharmacists and nurses did not describe the same need. This may be due to radiographer NMPs practising mainly within their radiotherapy clinics compared to the nurse and pharmacist NMP practising mainly within multi-disciplinary cancer treatment outpatient clinics. A study by Latter et al(55) described the benefit of medical team support for NMPs after they qualify as NMPs which agrees with the current study where medical team support was believed to be beneficial to NMPs. Study participants also described the need for consultants to have more responsibility regarding their opinions on individual NMP training needs, rather than individual NMPs using their own initiative to identify their training needs.(55, 67, 78) A structured approach to consultant support was requested by current study participants and could be supported by an organisational training programme to guide consultant support for all NMPs.

7.3.2.2. Line manager support

Five participants commented on their line manager support. One nurse discussed their line manager support as discussed previously within the NMP appraisal section earlier. Nurse One described undertaking an annual NMP appraisal with their line manager within their overall job role appraisal using an NMP portfolio of learning evidence. This method of revalidation was not described by any other participant and is not currently advised practice at the study site. Pharmacist Two believed that the opportunity to be assessed using a portfolio of evidence reviewed by their line manager should be available to all NMPs.

Two pharmacists described having no support from their line manager regarding their NMP practice. Pharmacist Two described requesting to attend a diagnostic course and how they needed to be persistent with the request.

> *"I asked to do the diagnostic course and it's kind of died a death and never happened. If you don't push for it, then it doesn't happen." -**Pharmacist Two***

Pharmacist Two further explained how they had minimal support from their line manager regarding their NMP role as their line manager was not an NMP, but believed they were supported by their Chief Pharmacist who is the lead for all NMP practice within the organisation.

> *"My manager isn't an NMP, so I wouldn't expect any support from them for this, but um... I think there is support from the Chief Pharmacist..." **Pharmacist Two***

Inequalities in pharmacist NMP support were also described within a mixed methods sequential study by Fisher et al(123) which concluded that development of an organisational infrastructure regarding pharmacist NMP practice was needed.

The radiographer NMPs described feeling more supported than other NMP professionals by their line managers. This may be due to their line manager also practising as an NMP but did not describe a structure to their line manager support as it was offered 'when needed'.

> *"We have quite a lot of ongoing training with the Consultant Radiographer (my line manager), so if we have complex patients, we go to them and we discuss what we can do and what can be prescribed and then go and take it forward ourselves. We don't do any other qualifications... but discuss within the team with the more experienced prescribers." -**Radiographer Three***

Radiographers receive support from their line manager who was a consultant practitioner, and practising NMP. The consultant non-medical professional role was not discussed by pharmacists and nurses due to this role not being implemented within their departments at the study site. Consultant professional roles such as the consultant pharmacist role may be best placed to support pharmacist NMP practice within a specialty. Consultant pharmacists within other specialties describe how they

are “clinically at the forefront of the profession and provide leadership to drive the profession forward.”(124)

In summary, the nurses and radiographers described more line manager support regarding their NMP practice when their line manager was an NMP themselves. The line manager support described by the participants involved attending courses and identifying further NMP related training needs. Differing funding streams available within each department could also affect the line manager support offered. For example, the pharmacy department has no financial support for attending any type of training courses but other departments within the hospital, e.g., nursing, have a significant training budget which can be applied for by all nursing staff. Another factor could be due to the varying departmental staffing levels across the study site e.g., the pharmacy department may be understaffed and therefore unable to grant study leave. Within the Smith et al study,(107) nurse NMPs described having varying different types of support from their department for CPD, such as 78% had been given study leave, 71% had attended in-house training courses and 58% had access to an external training budget. Alternatively, a study by Stenner and Courtenay(40) described how pain nurses had difficulties undertaking CPD due to a lack of funding. Therefore, the funding available for oncology NMP practice may vary widely depending on the area of specialty practice. A separate NMP financial budget for NMP training within an organisation which would enable all NMPs to apply for funding if supported by line managers and consultant mentors would create equality for all professional NMPs regarding their NMP training. The NMP fund could be accessed by application and monitored by a panel of professionals from each professional NMP group within the organisation to ensure equality. The panel could also be involved in ensuring study leave is granted across the organisation.

7.3.2.3. NMP peer support within the organisation

Since 2007, the study site Chief Pharmacist, as organisational NMP lead, invites all NMP practising within the organisation to a quarterly NMP meeting. One pharmacist and one radiographer described these meetings as a platform for NMPs to support each other which was unique to the organisation as such a forum is not documented to be implemented elsewhere across Wales for NMPs within any other specialty. Future in-house NMP training sessions are also planned within the NMP meeting forum on an ‘ad hoc’ basis within the organisation.

Although these NMP meetings are novel within NHS Wales, Pharmacist Three suggested that these meetings could be improved upon, regarding frequency and their efficacy.

> *"In our cancer centre we are quite lucky, our NMP* [practice] *is well established. We are above all other hospitals in Wales, by not only the amount of NMPs practising but also the support structure we have around NMPs. I am not saying its brilliant and perfect but at least we have meetings every few months to catch up on NMP issues and arrange a little bit of training and that's obviously one thing our manager leads on. It could be better, don't get me wrong although I said that we don't have them that often and we to solidify this." -**Pharmacist Three***

Attending the quarterly NMP meetings was described as 'difficult' by two radiographers due to working part time or did not have time to attend the sessions within their daily role.

> *"I know some of my colleagues attend but because I work part time, it is hard to get there as they are often on my day off." -**Radiographer Two***

Radiographers may be less enthusiastic to attend the NMP meetings as they may find them less beneficial. The main cohort of NMP practice within the study site is within outpatient SACT pre-assessment clinics and therefore NMP meetings may be more focused on this area of NMP practice and not within radiotherapy review clinics.

Two nurses commented on how oncology NMPs within the organisation could offer future support to peers. Nurse Two suggested utilising the NMP meeting forum for peer support which could involve more experienced NMPs sharing their experience with early career NMPs.

> *"There are always things you could probably learn from group sessions...because it is a case of sharing our experience. The newer ones are obviously probably gonna learn more but it should be everyone's responsibility to attend, as you might learn something and also the fact that in the discussion you could share the benefit of your practice. e.g., this is how I managed it..." -**Nurse Two***

Nurse Two described how NMP peer support occurs outside of the organisational NMP meeting, within outpatient clinics and found working alongside pharmacist NMPs beneficial within their clinical practice.

> *"Having a pharmacist in clinic is good and the consultant always says how we can always ask the pharmacist in clinic..." -**Nurse Two***

In summary, NMP peer support is described both within and outside of the NMP meetings. The NMP meetings could be developed further by developing a 'forum approach' to the meetings where the advanced NMPs share expertise with the early career NMPs. To develop the NMP support network further, both Maddox et al(72) and Bowskill et al(125) explored and discussed setting up a NMP mentoring system to support newly qualified NMPs.(72, 125) Maddox described how new NMP prescribers were mentored by experienced prescribers in primary care and this was found to be beneficial.(72) An NMP mentoring system has not be implemented at the study site but could be implemented in the future to support early career NMPs, especially as NMP numbers continue to rise.

7.3.2.4. Organisational support

Two nurse participants commented on how the organisation should be supporting practising oncology NMPs. One nurse described the need for more support regarding NMPs making an error, making decisions and the need for regulation protection regarding their clinical judgement.

> *"I think if you are going to ensure NMPs are an important part of the workforce. We should link in with service need and how things are growing and new developments in oncology. Everyone is focussed on clinical skills, but there are more sides of it too. We need more support on the realities on making an error and making decisions etc. It is a big problem and NMPs don't have the regulation in force to protect them if their clinical judgement isn't the right clinical judgement." -**Nurse One***

Another nurse described how if NMPs are seen as important to the organisations' workforce, regular study leave should be provided for NMP training on a regular basis as an element of each employees' job role in the same capacity as practising medical colleagues.

> *"... there is something we could do once a month not even every week [regarding training]. If it is recognised and if it is important for the organisation, then they should put their money where their mouth is, and we can say "ok that's our time"... we would have protected time for E&T but in reality, it won't happen, for example doctors have time built into their timetable...We should have dedicated time even if it is an hour or two a month..." **-Nurse Two***

In summary, the two nursing participants believed that implementing NMP practice governance should be of high importance to the organisation if NMP practice is found to be an important component of the organisational workforce. Aspects of support that were highlighted as important were support when making an error, making decisions and the need for regulation protection regarding NMP clinical judgement. The Department of Health (DoH)(95) produced guidance for implementing nurse and pharmacist independent prescribing within NHS England and described how each organisation should have NMP outline strategies for NMP development and implementation. These should include arrangements for monitoring NMP prescribing, stakeholder and patient awareness initiatives and mechanisms for supporting NMP training, but there is very limited published research on how the DoH requirement is followed across England.(95) At the study site, some of these organisational systems are in place such as NMPs databases and a NMP policy but other clinical governance areas need to be addressed such as NMP risk management and NMP strategies for structured NMP training programme and assessing NMP performance.(95) A classic e-delphi study by Courtenay et al(43) discussed the benefit of a clear NMP organisational strategy and Smith et al(107) further discussed the variation in organisational level NMP clinical governance systems currently implemented across England.(43, 107)

Study nurse participants outlined the need for regular protected time within job roles to complete regular training, as currently received by medical colleagues within the organisation. Courtenay (43) described a need to enable CPD to be completed by the NMP workforce and this should be included within the organisations NMP strategy.(43) A study by Weglicki et al(56) concluded that the employer is best placed to provide appropriate NMP learning environments in order to develop NMP confidence and competency in prescribing.

7.3.2.5. Professional group support

Across the study site, the internal professional group support would be the Head of Nursing for nurses and the Chief Pharmacist for pharmacists. The professional support group external to the study site would be the professional body supporting each profession e.g., the Royal College of Nursing (RCN) give support to nurse NMPs.

Internal to the organisation

One nurse NMP described receiving training from study site medical staff when attending clinical nurse specialist away days. This method of training was not described by the other two nurse participants because they were not clinical nurse specialists and therefore different training programmes are available to certain NMPs dependant on their main role.

> *"In our CNS away days we have some training on nausea and vomiting or painkillers etc, and drug company sessions if any new drugs come out... The palliative care consultants do some sessions too..." -**Nurse Two***

A competency pathway was described by Nurse One for organisational Advanced Nurse Practitioners (ANPs) in-line with similar ANP competency pathways elsewhere.

> *"I am in the middle of getting an ANP advance practice framework together guided by the nursing body. It looks at a review of competence on an annual basis by peer review. Not only with the clinical side but with the competency side. So, people developing a portfolio and having that portfolio reviewed annually by a panel of experts within the trust. It is done in a lot of other places for the advanced nurse practice roles." -**Nurse One***

The study pharmacist participants did not describe any kind of internal training support or competency pathways specific to pharmacist NMPs across the study site.

Two radiographers described having internal radiographer department support sessions for case discussion and in-house competencies that they have had to complete regarding NMP practice within their everyday role. The radiotherapy support network described was set up and led by the lead radiographer NMP.

> *"As a review team, we discuss difficult cases or if one of us has had a problem, someone else can help you find a way through it...We have our in-house competencies for reviewing patients and for using the PGDs [patient group directives] for prescribing and most of the team that have gone on to do the NMP have gone through that first." -**Radiographer Two***

In summary, internal professional support varies dependent on professional group. Nurse NMPs who are also fulfilling certain roles such as clinical nurse specialists (CNS) have an opportunity to give support to nursing peers and obtain organised training within CNS away days. Other nursing roles where NMP practice is incorporated such as ANPs are following a dedicated organisational framework to aid their competency and development. These opportunities for learning have not been developed for all nurses or for all other professionals across the study site i.e., pharmacists should be offered access to support with in-house pharmacist group training frameworks where NMP practice is addressed. Although one pharmacist did describe how attending one course for their lead role as a clinical trials pharmacist assisted their NMP practice highlighting that everyday professional roles can aid skills within individual NMP practice.

The radiographer lead NMP was described by one radiographer but nurses and pharmacists within the organisation do not have designated departmental professional NMP leads (the Chief Pharmacist is an NMP lead but is also the organisational NMP lead for all professional groups). Jarmain et al (126) described these NMP lead roles already implemented within the Southwest of England, whilst exploring their roles and responsibilities.(126) If lead professionals were in place for each profession at the study site, they could lead training within their departments (as the radiographer model) but also form a NMP leadership committee. The committee could be led by the overall organisational NMP lead (Chief Pharmacist) and co-ordinate NMP training and other NMP governance needs i.e. develop the organisational NMP strategy as described by the Smith et al study.(107) Potential differing professional NMP training needs as described within a stakeholder views study by Cooper,(79, 127) could be addressed by the committee, along with adherence to the required professional NMP competencies outlined by NMP professional bodies.(21)

External to the organisation

External NMP professional support groups were mentioned by two participants, one pharmacist and one radiographer. Although the UK Oncology Nursing Society (UKONS) is a well-established organisation supporting nurses working within cancer care, it was not discussed by any of the nursing participants within the study data.(22)

The pharmacist NMP described the BOPA annual conference and national BOPA training events as a tool for keeping up to date and networking with other pharmacist NMPs across the UK.

*"BOPA is useful to keep up-to-date and being able to talk to people." -**Pharmacist One***

One radiographer participant described a radiographer national online forum which was available to pose questions to other radiographer NMPs but did not discuss any other national forums for oncology radiographers.

*"... It is mostly a forum for radiographer NMPs. You can ask a question, and everyone answers..." -**Radiographer One***

Professional NMP support forums could be used by all NMP professionals across the study site and awareness of their existence and ease of access should be made available by the organisation. The Royal Pharmaceutical Society Wales (RPSW) has produced the 'Pharmacy: Delivering a Healthier Wales' document outlining the RPS Wales recommendations on how the pharmacy workforce in Wales should be developed including pharmacist prescribers within all specialties (i.e. including oncology). (128) The document could aid the development of pharmacist NMP assessment, competency and training across Wales and the organisation should ensure they are in-line with the Welsh RPS recommendations.

7.3.3. Experience and relevant training

Although NMP training post qualifying has not be explored extensively within current published studies, two studies by Green et al(108) and McIntosh (100) discussed various training needs for NMPs across a wide variety of different areas of specialty practice.(100, 108) A study by Maddox et al(72) also discussed how hard it is for NMPs to find appropriate training to meet their training needs post qualifying.(72) None of these three studies were within the specialty of oncology. Professional frameworks such as the BOPA NMP competency framework (21) discuss the NMP competencies required within oncology but does not discuss details of the training courses required to obtain these competencies depending on varying levels of NMP experience. (21)

The nurse and pharmacist NMPs participants included within this study were very experienced NMPs between 8 and 14 years. The radiographer participant group were less experienced with between 3 to 10 years' experience. Although all radiographer NMPs had only been able to practice as independent prescribing NMP since 2016, some may have been practising as a supplementary prescriber for some time prior to 2016.(13) The experienced study participants could reflect on their NMP training journey post-qualifying as an NMP and they described how NMP training needs should be related to NMP experience. The number of years of experience that enabled them to be classified as advanced practice NMPs, was not defined by study participants, and published studies do not explore the eligibility of an advanced practice NMP. Therefore, within this current study the arbitrary number of years when the NMP becomes an advanced NMP is greater than five years of NMP practice. Table 7.2. collates the training completed by the study participants and categorises the

appropriate training identified into early career and advanced NMP practice as classified by study participants. The early years training identified were described as important training courses for the initial stages of NMP training post qualifying by participants. A study by Scrafton et al(89) exploring the experiences of secondary care nurse prescribers concluded that a formal programme of CPD should be a priority for all employers.(89)

Table 7.2. The training courses completed by participants and identified to be relevant to NMP training development related to level of oncology NMP experience

Early years NMP	Advanced Practice NMP
Clinical Skills Assessment	Advanced Communication Course
IRMER	Blood Prescribing
Introduction to Prescribing	Microbiology Course
Psychology Course	New treatments
Financial support training	Oncology site specific training

7.3.3.1. Early career training

There were four main training courses or topics that were described by the participants as beneficial for early career NMPs post qualifying as an NMP.

Clinical Skills Assessment (CSA)

The clinical skills assessment course is a course where the ability to assess patients with physical examinations such as a chest examination can be learned and assessed.

Six out of nine participants (three nurses, two pharmacists and one radiographer) specifically described how they had completed the CSA course offered by Cardiff University and found it to be beneficial. All nine participants described the CSA course as essential to the NMP role and the remaining three participants who had not completed the CSA training would like to complete it in the future.

> *"(CSA) helpful to develop the clinical skills set, the other implications of it and how it affects your practice."* - ***Nurse One***

Two participants (one nurse and one pharmacist) suggested that the clinical skills training within the initial NMP prescribing course was insufficient to ensure they were competent performing patient assessment skills.

> *"I needed to do the clinical patient assessment module which I found very very helpful and then when I did the independent prescribing, they covered what I did in a three- or four-month course in a day which was quite intriguing."* -***Nurse One***

The pharmacist participants believed that the CSA course was needed by all pharmacist NMPs as many pharmacists are nervous when performing physical patient assessment skills, and believed the skill had to be utilised often by all NMPs to maintain skill competency.

> *"…* (it) *was very helpful, I was a bit nervous with the whole stethoscope and the whole diagnosis bit. So that helped with that but if you don't use it, it goes." -**Pharmacist Two***

A study by McIntosh et al(100) also identified that 96.3% of newly qualified pharmacist study participants viewed clinical examination as a pharmacist prescriber training need.

Two nurses described how CSA training is needed by all NMPs including nurses, especially within their early NMP career.

> *"I think all NMPs should have the clinical patient assessment because I don't think you can assess the patient in clinic and prescribe without being able to clinical assess them. I think you have to have some formal evidence that you have been trained properly." -**Nurse Two***

A study by Green et al (108) also found that both nurse and pharmacist NMPs viewed the CSA course as an essential NMP training requirement post qualifying, indicating that CSA training would be beneficial to all NMPs.(108)

All NMP participants across all professional groups discussed how CSA is a skill that had to be utilised often by all NMPs to maintain the skills learnt within training and advised that the CSA training was completed early in the NMPs practice.

The types of CSA required within oncology were not discussed within this current study but could be explored within future NMP training studies. A consensus study by Allison et al(54) explored the patient assessment skills required by SACT prescribing pharmacists and concluded that there are core CSA skills required across all oncology disease sites by all NMPs. Although, some specific clinical skills may be required within certain oncology specialties i.e., chest examinations within lung cancer clinics. Allison et al concluded that the specific CSA training needs for prescribing certain SACT specifically should be defined locally per cancer disease site within each organisation.(54) CSA competency per disease site is not currently defined at the study site and prescriber CSA competency is not assessed across the organisation.

Ionising Radiation (Medical Exposure) Regulations Training (IRMER) Course

Completing the IRMER course enables the NMP to become a 'Non-medical Referrer' and refer a patient for a radiological procedure i.e., chest x-ray or CT scan. Each individual NMP is required to complete a IRMER refresher course every three years.

Only four participants (two nurses, two pharmacists) described completing the IRMER course and one pharmacist and one nurse described how the IRMER training course was essential to NMP practice.

> *"Firstly, the IRMER training… that is probably the next biggest training need as an NMP." -* ***Pharmacist Three***

A publication by Ford (110), outlines the issues around requested x-rays by nursing staff, but these issues would also be applicable to all NMPs practising as non-medical referrers.

One nurse NMP described that the same level of training is not required for medical colleagues when requesting radiological examinations and questioned the reason for intensive NMP IRMER training.

> *"... doctors do not have the same level of training with radiological examinations, so why do NMPs require the same level?"-* ***Nurse One***

A questionnaire study by Shiralkar et al(129) explored doctors knowledge of radiation exposure which concluded that doctors have very little appreciation for the quantity of radiation their patients are exposed to. Therefore, this could suggest that doctors should also receive the same level of IRMER training. (129)

Intro to prescribing Systemic Anti-Cancer Therapy (SACT) course

One participant described attending the 'Introduction to prescribing course' which is held annually in Exeter (as the nearest venue to South Wales) for new SACT prescribers within oncology. The course is designed for new prescribers within oncology and provides an overview of practical issues around prescribing cancer treatments. The course is aimed at specialist registrars new to oncology and early years career oncology NMPs.

> *"...everyone is encouraged to go to the chemotherapy prescribing course down in Exeter, it is useful to go to towards the beginning of your prescribing career, and then once you have been doing it a long time then the amount you are going to learn from that is minimal." -* ***Nurse Three***

The introduction to prescribing course could be offered at the study site by utilising the expertise of current organisational staff. An in-house version of this course could form a part of the suggested early years career training. The study leave requirements and travel costs of staff prescribers attending this course in Exeter could be used to support the development of an in-house course for all new prescribers within oncology.

Psychology course & other related modules

One radiographer described how the radiographer NMPs have completed distance learning modules through Sheffield Hallam University. These modules cover skills around the 'Psychology of the Cancer Patient' such as how to deal with psychology issues and financial issues around cancer care.(130) The modules were not discussed by other NMP participants from other professional groups.

"... we also support patients with financial problems. Y'know other stuff than just the prescribing…the module we do is called 'Psychology of Cancer Care' and it talks about being a referrer for the psychology services here, so we are a certain level..." - ***Radiographer Three***

The BOPA NMP competency framework outlines the need for a holistic approach to patient care and the supportive courses at Sheffield Hallam University described could aid the NMPs holistic approach.(21) The topics could all be offered by the organisation for new NMP training, resulting in reduced training costs and enabling training opportunities equality for all NMPs.

7.3.3.2. Advanced practice training

Advanced practice training needs for the organisation were identified by the study participants and four participants suggested the organisation developed an 'advanced practice training programme'. Weglicki et al (56) discussed the need for educational programmes for all NMPs not just the early years NMPs. (56)

Advanced communication course

The advanced communication course includes communication topics such as how to give bad news and is a further level of training to the basic communication course.

Four participants (one nurse, one pharmacist and two radiographers) discussed the benefit of NMPs completing an advanced communication course.

Nurse Two described how advanced communication is vital to the nurse NMP role every day to enable the nurse to deal with breaking bad news etc.

"In my role, attending the advance communication course was important as we do spend a lot of time breaking bad news..." - ***Nurse Two***

Pharmacist Three had not attended an advanced communication course but would have liked to attend the course and believed the course would benefit the pharmacist NMP role when dealing with emotional patients etc.

"I have never been on that advanced communication course and with our patient population that would be really important... it would be good to do some formal training or qualification on how to be empathetic or how to break bad news or how to deal with upset people. It is quite difficult in clinic when it is just you and them in a room and they are in tears..." - ***Pharmacist Three***

McIntosh et al also identified that pharmacist prescribers needed communication skills training and communication training is identified as a competency within the BOPA NMP framework. (21, 100)

Two radiographers both described completing advanced communication courses and believed it would be advantageous for early career NMPs to attend as they are needed at all stages of NMP practice.

> *"I think particularly the communication courses are good, I have done a lot of communications stuff before I did the prescribing course. I could imagine if you were doing the prescribing earlier within your career then that would be a beneficial thing to do."* - ***Radiographer 1***

The pharmacist NMP would not routinely complete communication training as a part of their oncology pharmacist role, whereas the radiographers and nursing staff had completed this training as part of their professional roles prior to obtaining the NMP qualification. Some communication training is completed as part of the NMP qualifying training course for all NMPs but is not specific to cancer care.(131)

Communication training is required by all oncology NMPs, but the advanced level communication training could be offered to more advanced NMPs dealing with more complex cases. Although, as NMP practice varies widely across the professional groups, there may be variation to when advanced communication training is required by oncology NMPs.

Blood Transfusion course

All participants except one pharmacist commented on the postgraduate diploma for blood transfusion prescribing course. Two NMP participants (one pharmacist and one nurse) had completed the training.

One nurse who had completed the training described the course as:

> *"... the best clinical course I have ever done."* -***Nurse One***

Four participants (two nurses, one pharmacist and one radiographer) who had not completed the training believed that to be able to prescribe blood would be a useful NMP skill. Although, the lack of available free time within their daily NMP role and personal life would prohibit them completing the course.

> *"The blood course is a whole year at Swansea and I can't justify the time at the moment. Not with the lack of nurses in my team. Time in work is an issue to be released."* -***Nurse Two***

The pharmacist NMP participant who had completed the blood transfusion course believed that the course was very useful but would not be relevant to every oncology NMP.

> *"... I have just finished the blood transfusion course and so again, this is going to be variable from clinic to clinic but as you know we prescribe a lot of blood products because of the type of patients we have and the type of chemo we give...I can see how it relates more into my practice, [it addressed] things I would not have thought about prior to doing the course... I would recommend it"* -***Pharmacist Three***

The three radiographer participants had not completed the blood transfusion training but were aware of the benefits of attending the course. One radiographer believed that all radiographer NMPs should be trained otherwise the responsibility of requesting the blood would fall on the person who had completed the course which could result in a compromise in patient safety.

> *"... it has been brought up that someone in the [radiotherapy] review clinic could do the training...it would help as it would save us time running after the doctor, but the person who takes it on would be asked to do the paperwork without seeing the patient. Obviously, they could but that would be added time then. If we were all trained though it wouldn't be."* -***Radiographer Two***

A published paper by Pirie(109) discussed whether nurses should prescribe blood components and described the need for organisational robust governance processes regarding blood products for all NMP involvement. Pirie also described a need for organisational support when NMPs are required to complete the training i.e. appropriately allocated study leave.(109) Green et al (108) identified how work commitments and lack of study leave are a barrier to NMP training.(108)

Overall, the blood transfusion course was described as beneficial by study participants but should be reserved for oncology NMPs who are regularly required to request blood transfusions within their NMP role due to the course intensity.

Microbiology course

Nurse One described attending a microbiology course which was a good course but very intense and expensive.

> *"Last year I was concerned about my microbiology knowledge, umm. So, I got sent on an intensive microbiology course but that was to address what I perceived as my need...It is a brilliant course to do...it's a week and its 8am until 6pm. Its intense...it is £500, so expensive for 5 days."* -***Nurse One***

One nurse described the microbiology course as a beneficial course for NMPs, other NMPs may not have been aware of the microbiology course or their ability to attend the course. These factors highlight a need for the organisation to identify the relevant competencies for all NMPs and explore if this type of training could be offered in-house. An in-house training course would ensure that there is equity with NMP training at an advanced level and could be used to expand NMP scope of practice at the study site. A systematic review by Ness et al, (132) explored the influences on antimicrobial prescribing behaviour of nurse NMPs and raised potential issues around prescribing

choice with antimicrobials and whether antimicrobials should be prescribed.(132) Anti-microbial training at all levels for NMPs would address some of these issues and improve patient safety.

Drug & oncology site-specific training course

Four participants (one pharmacist and three nurses) described drug and oncology site-specific training. Various ways of maintaining their training in this area were described by study participants.

One pharmacist described attending Welsh regional collaborative site-specific disease study days, and the other three nurses had differing responses. Nurse One described the importance of keeping up to date with current clinical practice as an NMP within one site specific disease area.

> *"... you have to keep up with what's happening in your area if you are site specific."-**Nurse One***

Nurse Three described how they attended training on drug updates and topics relevant to their specialty and was aware of some *"conferences which could be useful"* but had not attended.

Nurse Two believed there should be regular in-house training on certain drug treatments that are prescribed by NMPs but was aware that this all came down to time constraints as discussed previously.

> *"... it all comes down to time. In an ideal world, I would like it if there were training every one or two months on pain killers or antibiotics... If there was a rolling program that repeated itself every month or two would be good." -**Nurse Two***

The nursing participants were not probed further with these comments by the researcher but could be referring to pharmaceutical company hosted events on certain types of oncology specialties and conferences relevant to certain cancer sites.

The organisation should provide more continuity on how drug and site-specific training is offered within the organisation. Some NMPs, such as CNS NMPs who practice closely within the multidisciplinary consultant team, may be more aware of training offered to the team through pharmaceutical company representatives etc, compared to other NMPs. Communication amongst NMPs is therefore important to ensure that there is equity in training opportunities available within and across each site-specific cancer team. All NMPs should have the opportunity to develop their skills regardless of the level of experience they have, although more experienced or advanced NMPs may want to develop in certain areas further as they already have the core skills embedded within their oncology NMP practice. A study by Maddox et al (72) discussed how there are limited training courses specific to certain specialist areas of practice and explains further the need for the organisation to develop appropriate and obtainable training pathways for NMP development across all cancer sites.

7.3.3.3. Other future training suggestions by study participants

Participants from all professional groups suggested that structured in-house training for all NMPs is needed. Table 7.3. shows a list of future training ideas per professional NMP group.

Table 7.3. Future training requirements suggested by each NMP professional group

NMP Profession	***Course/training suggested***
Nurses	Clinical decisions training Dealing with critically ill patients How to critically research papers Pharmaceutical industry training sessions Refresher course on interpreting blood results etc. Skin toxicity management (EGFR drugs) Study days on developing the NMP role.
Pharmacists	Diagnostic training module Filling out forms and relevant tasks training How to critically research papers How to read CT scans Immunotherapy study day Interpreting biochemical & haematology results New trials coming up relevant to specialised area Robust way of keeping up to date with NICE & New treatments
Radiographers	ChemoCare electronic prescribing training Dealing with emergency and ill patients in clinic

There were many types of future training suggestions by all participants. There were some similarities in how potential NMP training can be shared by all professionals and other future suggestions were more specific to the needs of the professional group. For example, pharmacists requested training and skill development with reading CT scan results and completing logistical tasks such as completing relevant paperwork as this is rarely a part of the daily role of an oncology pharmacist. Radiographers suggesting core ChemoCare training.

There were some similarities between nurses and pharmacist training suggestions as both groups described requiring training on how to critically appraise research papers and completing diagnostic or clinical decision training. Radiographer NMPs may not have described this need as their prescribing role differs to the nurse and pharmacist NMP role.

Both nurses and pharmacists described the need to keep up to date with new treatments through attending pharmaceutical industry hosted sessions, but this was not described by the radiographers. This may be because the radiographers prioritise the radiotherapy treatment within their clinics and are the experts in the field of radiotherapy and the SACT they may prescribe is very much seen as a supplement to radiotherapy treatment.

7.3.4. Training methods

Various methods of NMP training were discussed by all types of professional participants. The main methods described by participants have been included within this section.

7.3.4.1. Learning from others

All participants commented on various aspects of 'learning from others' except for one radiographer NMP. Pharmacist and nurse NMP participants described how they learn from others within their NMP role whilst working as part of a multidisciplinary team.

> *"You learn a lot from others in the team and working with others you learn new things."* -***Pharmacist One***

Pharmacist Three and Nurse Three described sharing their own knowledge with colleagues when working within the multidisciplinary team.

> *"... when working within the clinic as a pharmacist NMP the medics and the NMPs nurses do come to you with regards to pharmaceutical issues."* -***Pharmacist Three***

The primary care study by While and Biggs (105) also discussed how regular discussions between multi-disciplinary team members benefitted nurse prescribers especially when nurturing early career NMPs.

Another aspect of 'learning from others' described by one nurse participant was discussing their practice with other nurses fulfilling the same role, both within and outside of their organisations.

> *"Speaking to AMPs in different areas. That's really important, it makes me think. "Oh, crikey I could do with that!"."* -***Nurse One***

Radiographers also share their knowledge within their department at the study site as a radiographer team.

> *"As a review team, we discuss difficult cases or if one of us has, y'know had a problem, someone else can help you find a way through it. We are good at that."* -***Radiographer One***

Pharmacists mentioned learning from other pharmacists at external events such as events held by the BOPA organisation but did not mention learning from other pharmacist NMPs within the organisation unlike radiographers and nurses. The pharmacist NMPs may not share their NMP experiences and knowledge with pharmacist peers within the organisation as the pharmacists may not have appropriate in-house pharmacist discussion forums. Pharmacist NMP regular discussion forums could be set up within the organisation to enable sharing of pharmacist NMP knowledge and experiences with peers as already established by other professional NMP groups. A study by Zhou et al(106) recommended these professional peer groups to aid development of pharmacist prescribers as part of a sound NMP organisational infrastructure especially regarding CPD.

Learning from other NMP professional groups was described as beneficial by nurse three as different professional groups display different skill strengths and weaknesses.

> *"I think we learn better from each other...The pharmacists quite typically come with obviously far more knowledge of pharmacology and pharmacokinetics, which obviously y'know, the nurses even struggled to say the names of the drugs! The nurses come with a lot more hands-on patient assessment skill. So that is where the pharmacists lack some skills, but gain in others..." -**Nurse Three***

Overall, Nurse Three believed that regardless of type of prescribing role and speciality, the MDT approach was very much practising well within the organisation.

> *"The key thing is that we are part of a team and we learn from each other all the time. Everyone works to help and support each other... Almost all of the time people are more than happy to help you... We work together." -**Nurse Three***

Another aspect of learning from others was discussed by Radiographer Three. Radiographer three described learning from the doctors specifically by shadowing doctors within their outpatient clinics on a regular basis, although having an awareness of time constraints of everyone's job role.

> *"I would be keen to go to outpatients' clinics with the doctors and meet up with the doctors more... it is hard to have time to do as much contact as we did on the course observing. It would be quite good to go, say once a month, down to clinic and observe the doctors." -**Radiographer Three***

There are clear differences between each professional NMP group as to how they learn from others. For example, nurse NMPs train and discuss practice with their colleagues within the same role on a regular basis. Radiographers learn within departmental peer review sessions, but pharmacist NMPs did not mention any process of learning from other pharmacist NMP peers within the study organisation. If a pharmacist specific NMP lead role was developed, this role could develop a pharmacist NMP specific NMP pathway within the organisation.(133) The pathway could include methods of establishing NMP pharmacist peer discussion forums, as established within other professional NMP groups and therefore would help to ensure NMP training equality across the organisation. Courtenay et al(43) also discussed that professional group NMP leads should be in place to produce across organisational equality in appropriate NMP CPD provisions.

7.3.4.2. Inhouse training by organisation

Many study participants gave a variety of opinions regarding current in-house training and made suggestions for the development of a structured in-house organisational wide NMP training programme. Currently at the study site, occasional in-house training sessions are held on an ad-hoc basis often utilising the 'good will' nature of medical colleagues to provide training sessions.

Nurse two explained how they had not completed any formal training after qualifying as an NMP except occasional in-house education sessions as there was no formal in-house training programme for NMPs post qualifying within the organisation.

> *"Once you qualify there is no formal development unless you get a new role...I haven't done any formal training after qualifying except for attending some lunchtime education sessions...but they can be useful" -**Nurse Two***

Three participants (two nurses and one pharmacist) mentioned the in-house training sessions that had already taken place on the topic of 'Interpreting blood results.' The session had been developed and ran by a registrar out of 'good will' and the three participants all found the session useful. The nurses may have found this session more useful than the pharmacists.

> *"... within NMP meetings we have had some biochemical and blood training which as pharmacists we are probably more comfortable than nurses" -**Pharmacist Three***

The pharmacist believed that the biochemical training session had been more focussed at nursing NMP education needs and highlighted that not all CPD is relevant to all NMPs. This may be due to professional groups having more undergraduate and postgraduate training on certain medical topic areas than others. Studies by Cooper et al (79, 104, 127) complement this finding as it discussed how some pharmacist NMPs considered inter-professional training courses as advantageous in facilitating networking and support. Other pharmacists within the study found inter-professional courses disadvantageous in trying to teach professionals with different knowledge and skills.(79, 104)

Nurse three described how in-house educational sessions should be available on a more regular basis and Radiographer three agreed that regular in-house training would be beneficial, but the topics should be beneficial to all NMPs.

> *"A regular training in-house for NMPs could be beneficial. Like once a month, but it could be difficult to establish topics to benefit everyone." -**Radiographer Three***

Two participants described how a rolling training programme could complement the needs of advanced NMPs due to time constraints by all study site NMPs. Many published studies such as the Weglicki study(56) identified the need for ongoing in-house training for all NMPs post qualifying not just the early years NMPs. The 'Single Competency Framework' for prescribers developed by the National Prescribing Centre in 2012 (now the NICE Medicines and Prescribing Centre) was described by Weglicki et al and could be used to develop a skills and training matrix at the study site.(56) Weglicki explained how the framework should be used to design and deliver educational programmes and the development of on-going CPD to all prescribers at any stage of their career. Weglicki also discussed potential models for providing CPD training education by the introduction of

university master's level courses developed in collaboration with local NHS organisations which would sit within professional advanced practice programmes.

Rather than developing a separate NMP programme for training, pharmacist three discussed how they believed that NMPs should be allocated time to attend the in-house medical training for junior doctors already in place within the organisation study site.

> *"... maybe attending the medical training sessions would be useful. They present a lot of cases and think about what you would you do in this scenario or in that scenario...sharing the same education as the medics have essentially as what you are doing in the NMP clinic is the same as what the medics are doing."-**Pharmacist Three***

Attending the doctors in-house training would create an opportunity to develop alongside the junior doctors and both NMPs and medical professional groups may benefit as experiences could be shared. A published article by Picton(134) on the competency framework for prescribers by the RPS, discussed how there were significant benefits to multi-professional training, but potential drawbacks could be if NMPs were apprehensive to ask questions as part of a wide multi-disciplinary group.

Nurse three discussed further the possibility of fellow NMPs running sessions for each other to share best practice, enabling NMPs to learn from each other and utilising advanced NMPs knowledge and skills.

> *"... there are things we could do in house which could help each other out as we learn better from each other...I spent some time developing guidance with another pharmacist and if I have experience, then that is something we could do a workshop on... there are a few of us like this" -**Nurse Three***

Currently the study site organisation offers no regular allocated study leave within the NMPs role for CPD. Two of the nursing participants then discussed how they believe that NMPs should have designated recognised time built into their job role by the organisation, to complete training mirroring the junior doctors training programme.

> *"If the medics have recognised time for training, can it not be the same for nursing and pharmacy NMPs? Whether it is 4pm on a wed then that everything shuts early for training... or is it something we do once a month not even every week. If it is recognised and if it is important for the trust, then they should put their money where their mouth is and say ok that's our time." -**Nurse Three***

A study by Green et al(108) also discussed the lack of staff cover and time constraints of nursing IP to attend relevant NMP training and While et al (105) described time constraints for CPD as a barrier to NMP practice. Although a study by Smith et al(107) found that in England, 78% of nurse independent prescribers are thought to have study leave to undertake CPD and 71% of nurse survey participants had access to in-house training courses but no information on how regular the sessions or study leave were documented.

Radiographer One believed there are core skills that are needed by all oncology NMPs, and certain more specific skills need to be looked at in more detail before developing the in-house training programme required for all NMPs.

> *"I think probably we need to look at what skills are actually needed and whether they are the same for everyone or whether they are going to be different. Personally, I think they are probably some core skills that everyone needs and then to develop in your particular area and then rely on for example the head and neck team to teach on head and neck examinations."* -***Radiographer One***

An organisation-wide core skills training programme for early career or newly qualified NMPs is needed as described by the study participants, but another rolling CPD training programme for advanced NMPs should also be offered within the organisation for more advanced training needs.

In summary, an in-house training programme was described as a requirement by many participants and within study literature for NMPs. (108) Two separate training programmes for both early years NMP practice and advanced level NMPs could be developed to aid oncology NMP development. Study leave request approval for attending training also needs to be reviewed due to limited time to attend in-house training within job roles. Traditional short stand-alone courses should be considered by the organisation as part of the training programmes, as both studies by Green and Smith concluded that short stand-alone courses were sufficient and more popular amongst NMPs.(107, 108) The use of traditional short study day courses may address the NMP training needs but potentially have less impact on other work commitments and staff cover rather than attending lengthy external training courses. The need for allocated time within all NMP job roles should also be addressed by the organisation.(56, 108) There is also further need for the in-house training programme topics to be reviewed by a multidisciplinary team of NMP leads as one radiographer stated that not all topics were beneficial to all NMPs, as NMP practice varies even within each oncology specialty.

7.3.4.3. Self-directed Learning

Seven participants (three pharmacists, three nurses and one radiographer) described using their own initiative to undertake relevant training to develop their own NMP role as there is not an NMP training structure currently in place at the study site.

> *"I am quite proactive...I have asked to do a course and I have been granted a place on a course for ANPs working in critical care assessment units, coronary care... I requested that myself..."* -***Nurse One***

Nurse Two described using self-directed study methods when aiming to extend their scope of practice as no support or knowledge of training courses etc was offered by the organisation (discussed previously).

Pharmacist One used their own initiative to utilise external contact through the BOPA organisation and BOPA hosted education events to keep up to date with developments within their oncology specialty and how all NMPs need to set up their own self-directed method for learning.

> *"... with BOPA its useful to keep up to date and being able to talk to people...as long as you have a supportive manager, and you can set up your own system for learning from others and talking to others. Its ok." -**Pharmacist One***

Pharmacist Two described a different method of self-directed NMP learning, by utilising other aspects of their role to keep up to date with developments within their area of specialty.

> *"... having worked in the xxxxx clinic for a few months and working in trials it has helped a lot. It has been good to see what is coming up and what patient is eligible for this and you feel informed. I found that quite useful." -**Pharmacist Two***

Developing self-directed web based learning could also be considered by the organisation as described by a study by While and Biggs, where two-thirds of study participants acknowledged the potential for web-based learning especially when sourcing information on new drug products.(105) Therefore, the use of web-based learning could also be explored within the development of in-house training programmes to address learning time constraints. The development of webinars or pre-recorded sessions for NMPs who cannot attend the 'live' sessions may benefit NMPs.

Pharmacist NMP participants described using self-directed learning by attending external education events and utilising learning from other aspects of their role to keep up to date with oncology developments. These aspects of self-directed learning would be beneficial for all oncology NMPs at the study site and would enable equality in NMP training opportunities within the organisation if available to all. The same level of self-directed learning and opportunity should be made available to all NMPs regardless of their main role within the organisation. One nurse described difficulties with extending their scope of practice and how the only option was to undertake their own self-directed learning. Radiographers did not discuss any self-directed learning methods they had used.

Latter et al (78) also identified that nurse prescribers had a high level of engagement with self-directed learning as part of their CPD needs to support their prescribing competence. An organisation led NMP CPD guideline in the form of a training and skills matrix to develop the organisations NMP workforce needs to be developed at the organisation study site. The matrix would guide the development of the oncology NMP and create equality in the training opportunities and methods available to them. The matrix would also guide consultant mentors and line manager support for each NMPs training development. An education and training NMP framework has not been developed within published literature linking NMP experience and training requirements, but

competencies for NMP training and skills are suggested within NMP competency frameworks by professional organisations such as BOPA and RPS. (14, 21)

7.3.4.4. Pharmaceutical company funded educational meetings

Across all oncology specialties, pharmaceutical companies fund educational meetings and invite organisation staff at the study site to attend at no cost.

Nurse three described how although these sessions can be useful to NMP learning, the timing at which these events take place can affect the ability to attend.

> *"... a lot of these things are held after work because getting us all together is tough."* **- *Nurse Three***

Nurse Three described how they found the pharmaceutical company education sessions beneficial for developing NMP skills and form a part of one type of learning method used by NMPs.

> *"One of the reps organised a skin session and got a specialist nurse from one of the other cancer centres to come and did a whole session on managing skin toxicity. Which is one of the most complicated, specifically around the EGFR inhibitors and it was really useful and informative and a good meeting..."- **Nurse Three***

Pharmaceutical industry funded sessions enable training to be undertaken within the organisation for NMPs at no cost to the organisation, but job role time constraints can affect the NMPs availability to attend. The topics chosen are identified and organised by the pharmaceutical company. There may be more appropriate ways for the organisation to utilise and guide the pharmaceutical company support provided for NMP education and training by developing web-based training support packages and webinars which can be accessed at any time by all NMPs. These methods of learning could be used for NMP training as core skills. A study by Meade et al(135) explored the use of web based podcasts as a learning tool for NMPs. This tool could be explored as a NMP learning tool within the organisation and available pharmaceutical company funding could be accessed to fund this method of NMP training if all parties agreed.

The following table (Table 7.4.) shows the emerging themes and sub-themes identified as a result of thematic analysis. The text was coded by the PI aided by NVivo® Software, then themes were established using an iterative process.

Table 7.4. Themes & sub-themes establish from the semi-structured interview data obtained.

Themes	Sub-themes
Competency	NMP Appraisals Observational Structured Clinical Examinations (OSCEs) Scope of practice Peer Review Auditing
Support	Consultant support Line manager support NMP peer support within organisation Organisational support Professional group support Internal to organisation External to organisation
Experience and relevant training	Early Training Clinical Assessment IRMER Course Intro to SACT prescribing course Psychology course & related modules Future training ideas Advanced Practice training Advanced communication course Blood transfusion course Microbiology course Drug & oncology site-specific training course Other future training suggestions
Training methods	Learning from others Inhouse training by organisation Self-directed learning Pharmaceutical company funded educational meetings

7.4. Strengths and limitations

There are limited published studies exploring NMP training especially for pharmacists and radiographers. Therefore, this study aids the exploration of an unexplored area of NMP practice which could be further explored within future studies. The study has a unique approach by exploring the viewpoints of three oncology NMP professional groups within one study with equal quantities of participants per professional group. If the number of interviews undertaken and participants per professional group had been increased, this would have added further strength to the study.

Participants within the SSIs within this study, may have been more willing to offer their opinions than as part of a wider group of colleagues within a focus group. The interviews also allowed the researcher to explore the participants opinion in more depth.

This study allowed staff undertaking the NMP training to offer their opinion of the NMP training they are actively receiving and comment on future training developments by the organisation. The viewpoints of other stakeholders such as patients, medical prescribers and senior managers could

have been explored to form a more rounded review of oncology NMP training and further strengthen the development of NMP training within the organisation.

The difference in formal staff training budgets between departments could have affected the ability of some departments to fund staff training. Some departments such as pharmacy have no formal training budget unless funded by pharmaceutical companies etc, whereas the nursing NMPs may be more successful when requesting funding to attend training courses as they do hold a training budget.

The study participants may not have discussed certain relevant training courses they had attended prior to undertaking the NMP qualifying course and therefore it may appear that they had not completed them. Some participants had described attending these courses prior to qualifying as an NMP as they require them for their role.

Credibility and dependability of the qualitative research was ensured during study three as described within study one. See section 4.5.

7.5. Further Work

The study has raised many themes around the training and skills of NMPs which could be addressed within the organisation.

Further work could include exploring the consultant oncologist's opinion of the NMPs skills and training and whether it matches their practice needs within their specialty. Establishing their opinion of the NMP training currently available post qualifying and how it could be developed and standardised to develop the future oncology NMP workforce.

A further study exploring the development of an NMP training and skills matrix by utilising focus groups could be undertaken. The details of how the training methods and courses could link into the NMPs experience post qualifying as an NMP could be explored. A greater number of oncology NMPs and stakeholder participants from across the organisation could be invited to participate. Numerous focus groups could explore different aspects of the matrix. The results could then be used to provide a detailed draft of oncology NMP training, and this draft could be used to access a wider audience for further exploration within surveys to all stakeholders such as consultant oncologists and senior oncology hospital managers.

Patient perspective studies could also be undertaken to explore the patient's opinion of the training and skills of oncology NMPs and whether the skills that NMPs express when they are reviewing is satisfactory to the patients' needs.

Further studies could be developed to explore NMP's skills and training across Wales or the UK for a large sample of cancer care NMPs who could utilise a generic training and skills matrix to standardise oncology NMP practice across Wales and the UK.

7.6. Key Findings

- The current main method of assessing NMP competency was identified as the appraisal tool, but other methods such as OSCEs and auditing had been used by a small number of NMPs.
- Participants believed that NMP competence review within the organisation should be improved using other methods of assessing competence. i.e., OSCE or peer review.
- The organisation should develop a support infrastructure which would guide structured NMP support by consultant oncologist mentors and line managers with regards to NMP development.
- Opportunities for NMP peer support varied between NMP professions but NMP participants require peer support equality across the organisation.
- Factors such as lack of time within NMP job role, lack of knowledge of training availability, course length and lack of departmental funding affect the NMPs ability to attend training.
- Not all departments have NMP leads to provide NMP support within their profession, both internally and externally to the organisation.
- Participants believed that NMP training requirements were dependent on the NMPs level of experience and developing two training programmes for early career and advanced NMPs could address this.
- Lengthy training courses are difficult to attend and in-house training courses should be developed by the organisation to address NMP training needs, using e-learning, self-directed learning and face to face sessions.
- The future skill and training needs for oncology NMPs was believed to vary by level of NMP experience and by profession.
- Participants described requiring clarity from the organisation by developing clear organisational governance and strategies for the future of NMP practice including NMP training, competency assessment and support.

7.7. Study recommendations

- A mixed methods approach to assessing NMP competence should be used.

- Annual NMP appraisals should be incorporated into line manager appraisals utilising the NMP portfolio of evidence tool.
- Development of an organisation wide NMP training guide would aid consultant and line manager support with NMP career progression.
- The professional group NMP leads could encourage NMP networking and form a panel to manage study leave and funding requests.
- The professional NMP lead panels could develop organisational NMP governance strategies to protect both patients and NMP staff within governance NMP frameworks and guidelines.
- Development of a structured in-house NMP training programme for all oncology NMPs dependant on their level of NMP experience should be implemented utilising various training methods to enable attendance.

7.8. Conclusion

The main aim of this study was to explore the training of oncology NMPs post qualifying. The key findings of the study can be found listed above. The participants identified a variety of training they had received related to their NMP role which included IRMER training, advanced communication training and clinical assessment courses (see Table 7.1.).

The following themes were identified whilst exploring the study participants opinions regarding the factors affecting the current NMP skills and training: NMP competency, support, experience relating to training requirements and training methods. In order to address these factors, participants suggested implementing a mixed methods approach to competency assessment utilising assessment tools such as OSCE or peer review and development of a well-structured NMP strategy to underpin an NMP support network to guide NMPs with their development including appointing NMP leads. Implementing these changes would ensure equality with NMP training, regardless of the NMP's professional background. Other factors such as a lack of departmental funding, a lack of knowledge of training availability and time to train within the NMP job role should also be addressed by the organisation. See 'key findings' section.

Future NMP training needs were also explored by participants and relevant training for both early years career and advanced level NMPs were suggested by participants, such as how to deal with critically ill patients, how to critically appraise research papers and clinical decisions training (see Table 7.3.). NMP training needs were suggested to be delivered within an organisation-led in-house training programme for all NMP professionals related to NMP experience and incorporating relevant training methods to aid accessibility by all NMP professionals.

A draft training matrix outline has been suggested within this study relating to NMP experience (see Table 7.2.), but development of a more detailed NMP training matrix is required. The matrix needs to be developed further in-line with the organisations NMP strategy and should complement published professional competency frameworks. (14, 21, 22) The matrix could then potentially be adopted further by other oncology organisations across the UK to manage the development of their own oncology NMP workforce.

8. Chapter Eight: Study Four

The opinions and recommendations of consultant oncologists concerning the post-qualifying training requirements of multi-professional NMP prescribers within oncology.

8.1. Aim

To explore consultant oncologist's opinions and recommendations for the current training and future development of post qualifying oncology nurse, pharmacist and radiographer NMPs.

8.1.1. Study objectives

There were four objectives to this study:

i. to determine the opinions of consultant oncologists on the contribution of each NMP professional group to oncology practice.

ii. to explore the opinions of consultant oncologists on current competency assessment methods and their recommendations on how future competency assessment should be designed.

iii. to explore the opinions of consultant oncologists on the current support available to NMPs and their mentors, and their recommendations on how a future organisational support structure should be provided.

iv. to determine the opinions and recommendations of consultant oncologists on appropriate training topics and methods of training delivery for NMP post-qualifying training.

8.2. Method

8.2.1. Ethics approval

The Principal Investigator was SH. Ethics and governance were managed via standard Aston University processes and study authorisation obtained from NHS Wales R&D and Velindre NHS Trust R&D Department. Ethics approval was obtained from the Aston University Ethics Committee (Approval ref: 158-2016-SH) on 30/9/2016 with a minor amendment in January 2021 to include therapeutic radiographer NMPs due to therapeutic radiographer legislation changes in 2016 allowing them to prescribe as independent prescribing NMPs.(13) There was no patient or public involvement in this study.

8.2.2. Participant selection & data collection

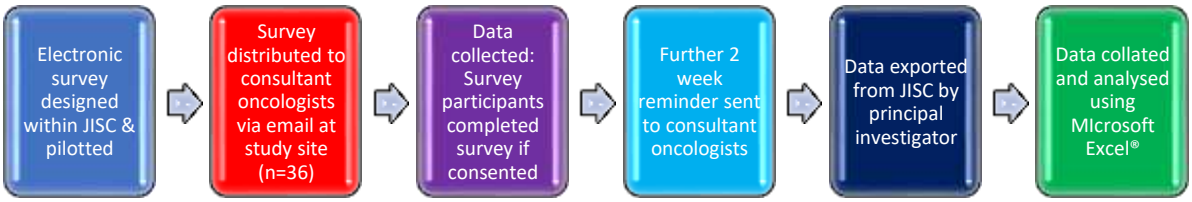
In July 2021, an electronic survey was designed using the JISC Online Surveys electronic package (version 2021) by the PI (SH). Survey questions were designed using the main themes identified within study three (and Harding et al (102)) to explore consultant oncologist opinions of NMP training post qualifying. Once SH had written the survey questions, they were further refined for clarity by DT and CL and checked by one VCC pharmacist and one VCC consultant to reduce bias and ensure validity. Both qualitative and quantitative survey questions were used throughout, and both closed and open question designs such as a 10-point Likert scale were used (see survey questions in appendix VI).(31) The questions were then grouped into five major themed domains and mapped within the JISC survey package: NMP competency, NMP practice, NMP training support, NMP training topics and NMP training methods (see Appendix VII for survey outline pathway). The survey was piloted for face and content validity by three consultant oncologists, one pharmacist and one nurse. Face validation was needed to measure the appropriateness of the survey tool to capture the concept being explored and a high level of content validation was needed to ensure that the survey tool included the full meaning of the concept aimed to be assessed within the study.(136) Final amendments were then made to the electronic survey following the pilot findings which included improvement in clarity, flow and shortening the length of the overall survey. The final survey was checked by the associate supervisor (CL) and distributed by organisational email (by SH) to all practising consultant oncologists employed at the study site including the consultant participants in the study pilot (n=36). Study participants were requested via email to complete the survey via the survey link provided within the email and the participants were informed that the survey was estimated to take 10-20mins to complete. Included within the email was an ethics approved participant information sheet (PIS) (see Appendix IV for PIS and consent) and a consent section to obtain participant consent was incorporated into the survey before proceeding with the survey questions (see Appendix V for covering letter section and consent questions). All practising consultant oncologists at the study site were sent reminders to complete the study survey via email two weeks later to prompt non-responders. See Figure 8.1 for summary diagram of study method.

8.2.3. Data analysis

The anonymised survey responses were exported into, collated and analysed within Microsoft® Excel (version Microsoft® 365) by the lead researcher SH. The data was analysed using cross-tabulation and filtering (e.g. by sentiment) using a comparative approach to the quantitative analysis between the consultants opinions of different NMP professionals and identified trends within the data. The qualitative analysis of the qualitative data obtained was thematically analysed through manual coding to established emerging themes and sub-themes. Representative quotations were then used

to evidence and support the analysis. All analyses was checked by the associate supervisor (CL). Statistical analysis was not performed due to insufficient sample size.

Figure 8.1. Diagram of Study Method



8.3. Results

8.3.1. Survey participants

At the time of data collection, there were 40 consultant oncologists employed at the study site. Of the 40 consultants, four consultants were not practising at the study site due to maternity leave or long-term sick leave. From the remaining 36 consultant oncologists, 24 consultants responded to the survey demonstrating a response rate of 67%. The response rate achieved in this study is high in comparison to other published studies exploring physician surveyed opinions such as a study by Svensson et al.(137) The survey link was distributed to the 36 participants before the researcher established the eligibility of the sample size due to the study methodology outlined within the study protocol and therefore four survey responses were received which were classed as ineligible. Three stated that an NMP has not been involved in the care of their patients within the last 30 days and one participant was unsure whether an NMP had been involved in the care of their patients (and did not complete all survey questions). These four respondents were therefore excluded from the study due to their ineligibility. Therefore, the remaining 20 participant respondents were eligible to co complete the survey as they had described having an NMP review their patients within the last 30 days. See Table 8.1 for survey participant information.

Table 8.1. Information on Survey Participants

Consultant oncologists	Number of consultant oncologists
Total number of consultants employed at the study site	40
Number of consultants on maternity/long term sick leave	4
Number of participants responded to survey	24 (67%)
Number of participants excluded due to not working or being unsure if they had worked with an NMP in last 30 days	4
Number of participants responded to survey who declared having an NMP review their patients within the last 30 days	20

8.3.2. Consultants practising with NMPs at the study site

Twenty participants who completed the survey stated that their patients had been reviewed by an NMP within the last 30 days. Three participants stated that their patients were reviewed by one or more nurse NMP only, three participants had one or more pharmacist NMP only review their patients and two participants had one or more radiographer NMP only review their patients. Two participants had one or more nurse and pharmacist NMP and two participants had one or more nurse and radiographer NMP review their patients. Eight participants had one or more of all three professionals nurse, pharmacist and radiographer review their patients and therefore have experience of working with all three NMP professionals. Table 8.2 presents these data.

Table 8.2. Consultant participant respondents describe having their patients reviewed by these combinations of NMP professionals (n=20)

NMP professional reviewing consultant's patient(s)	Number of participants working with NMP(s)
One or more nurse NMP only	3 (15%)
One or more pharmacist NMP only	3 (15%)
One or more radiographer NMP only	2 (10%)
One or more nurse AND pharmacist NMP	2 (10%)
One or more nurse AND radiographer NMP	2 (10%)
One or more pharmacist AND radiographer NMP	0 (0%)
One or more nurse AND pharmacist AND radiographer	8 (40%)

The data within Table 8.2 were further analysed to establish the number of participants who have each professional NMP involved in the care of their patients alone or as well as another type of NMP professional (see Table 8.3).

Table 8.3. The NMP professions who consultant participants declared review their patients

Professional NMP	No. of participants who have each profession NMP involved in the care of their patients*
Nurse	15
Pharmacist	13
Radiographer	12

*(could have one NMP group only or more than one NMP professional group review their patients)

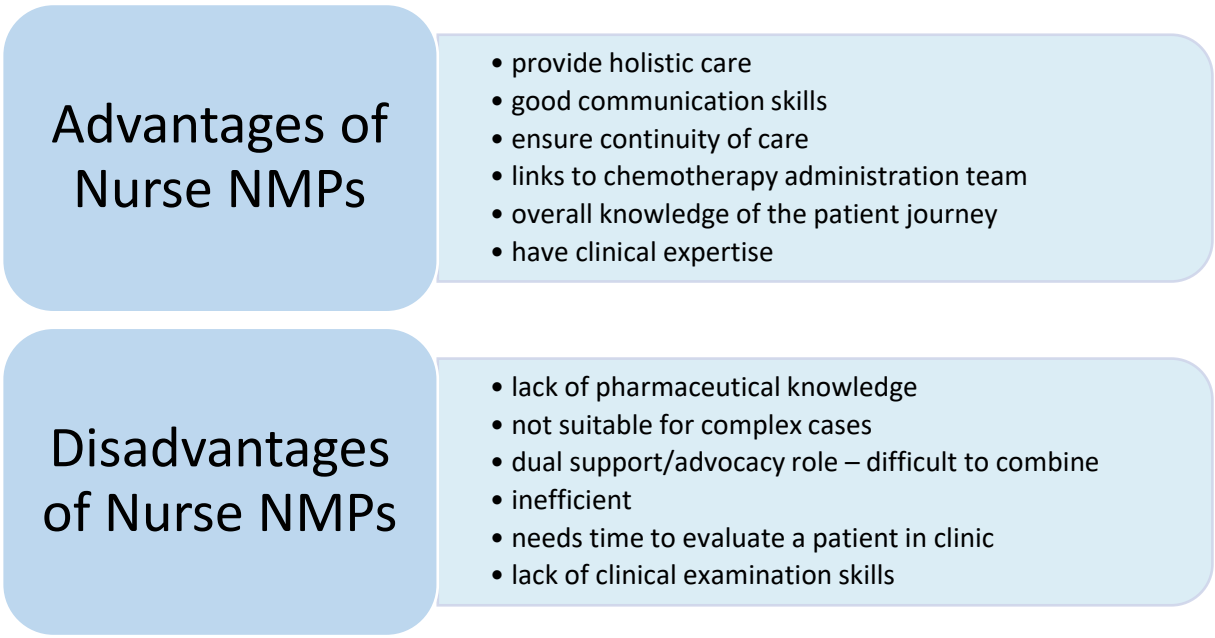
8.3.3. Contributions of each NMP professionals

8.3.3.1. Nurse NMPs

Fifteen participants who practise with nurses provided advantages to practising with nurse NMPs. Themes established from these comments were "*clinical expertise*" as nurses work closely with their consultant largely daily enabling sound development of clinical expertise and creating a *"link to chemotherapy administration team".* Nurse NMPs were believed to have a good overview of the patient journey within the cancer disease site and ensured *"continuity of care"* for patients. Nurse NMPs were believed to provide *"a holistic approach"* to care and have good communication skills. (See Figure 8.2. for advantages and disadvantages of nurse NMPs.)

Twelve out of 15 participants provided comments on the disadvantages of nurse NMPs. These comments mainly centred around a "*lack of pharmaceutical knowledge*" and that nurse NMPs could be seen as *"not suitable to review complex cases"* which can impact on the *"need to carefully plan clinics to get the flow right".* The nurse NMP role was also believed to *"detract from the support/advocacy role"* and they often find it *"difficult to combine roles at same time demands on CNS time outside clinic."* One participant stated that the nurse NMP role was *"inefficient"* which may be linked to another comment on how the nurse NMP *"may take time to evaluate a patient in clinic"* and another that the *"dual role can slow down the consultations".* One participant also stated that the nurse NMPs have a lack of clinical examination skills.

Figure 8.2. Advantages and disadvantages of nurse NMPs

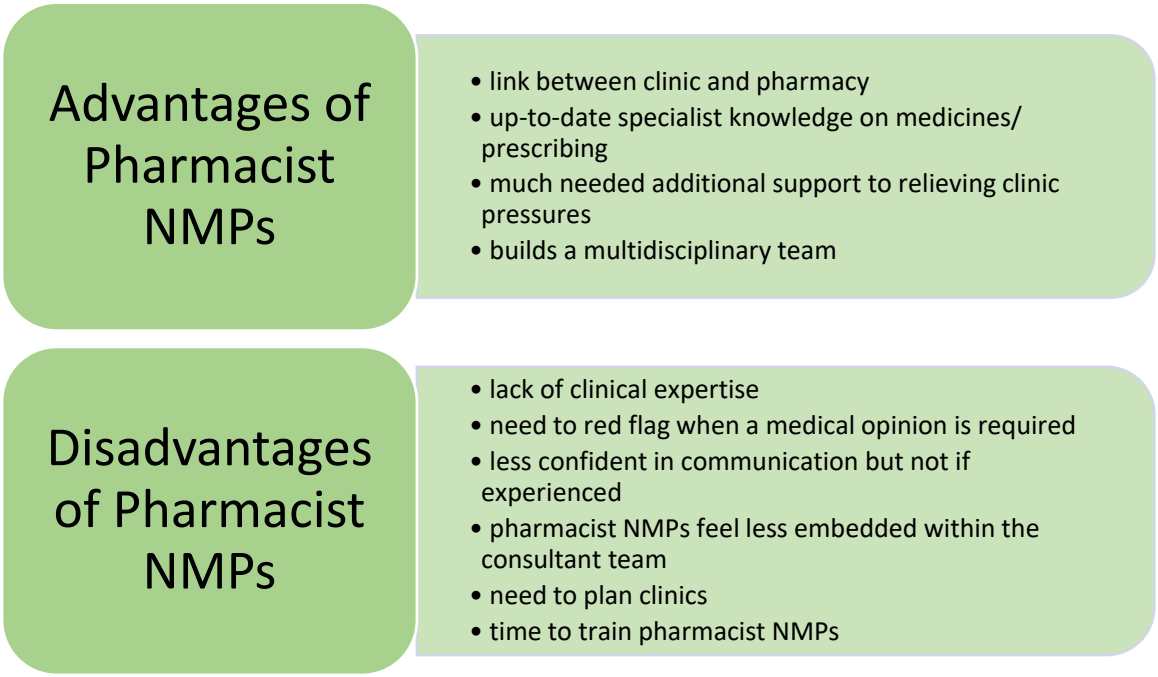


8.3.3.2. Pharmacist NMPs

All 13 participants who work with a pharmacist NMP provided a comment for advantages and 10 out of 13 participants provided comments for disadvantages of pharmacist NMPs. The main themes provided for advantages were pharmacists providing "*pharmaceutical expertise*" and "*up to date specialist knowledge on medicines and prescribing*". The participants further described how a pharmacists "*pharmaceutical expertise*" was valuable and improved patient safety. They also described how pharmacist NMPs provided a good link between clinic and pharmacy if there were questions about medicines as the pharmacist NMP is readily accessible. The pharmacist NMP was also described as a "*much needed additional support to busy clinic*" and "*helped to build a multidisciplinary team spirit*" as well as "*relieving clinic pressures*".

Themes within the main disadvantages of pharmacist NMPs were "*lack of clinical expertise*" and the requirement for the pharmacists to "*red flag when a medical opinion is required".* One participant also commented that the pharmacist is" *less confident in communication issues but this is not a problem with experience*". The frequency of the NMP sessions that the pharmacist NMP performs once a week may also suggest that "*pharmacist NMPs feel less embedded within the consultant team*." The need to plan clinics *"to get the workflow right"* is also an issue for pharmacist NMPs as it was for nurses as a medical review may be needed. The *"time to train pharmacist NMPs"* was also included as this is not built into consultants work plans. (See Figure 8.3).

Figure 8.3. Advantages and disadvantages of pharmacist NMPs

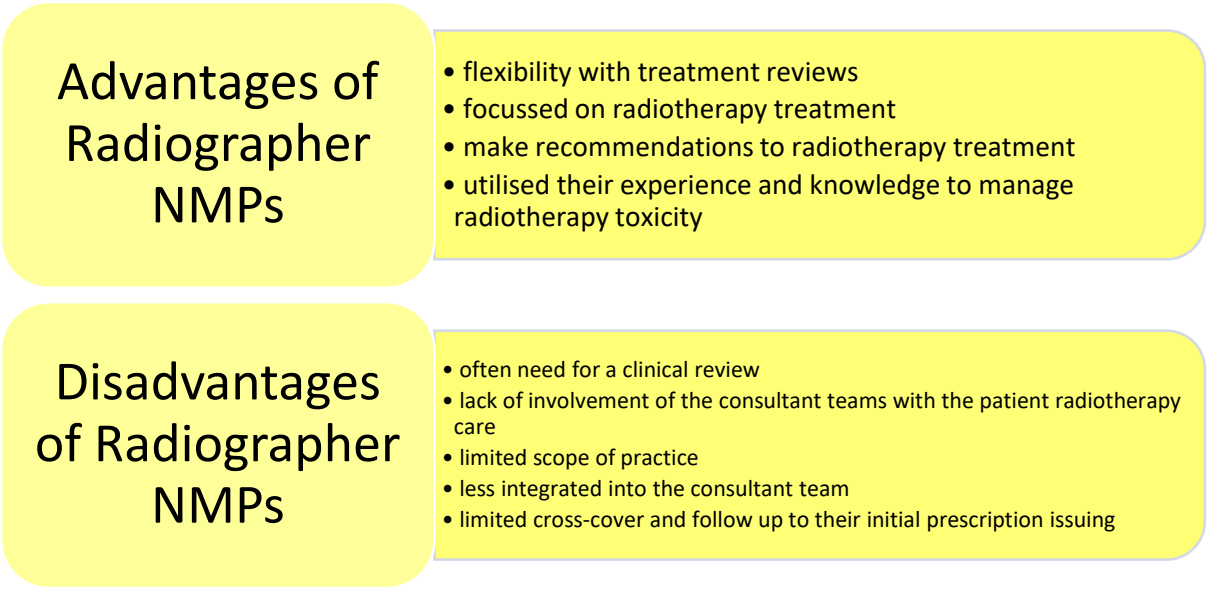


8.3.3.3. Radiographer NMPs

Twelve consultant participants who work with radiographer NMPs commented on the advantages of radiographer NMPs and 11 participants commented on the disadvantages of the radiographer NMP role. The main themes provided for the advantages were how the *"on treatment reviews were more flexible and streamlined"* when radiographer NMPs were performing the role. The radiographers were focussed on the radiotherapy treatment with a *"narrow and defined scope"* and "*utilised their experience and knowledge to manage radiotherapy toxicity*" and *"make recommendations to modifications of radiotherapy treatment".*

Disadvantage themes were focussed on "the need for a clinical review if outside the radiographer scope of practice" which was described as limited by two respondents. The other main comments involved the "lack of involvement of the consultant teams with the patient care" due to lack of communication and the radiographer NMPs were "less integrated into the consultant team" as the radiographer NMPs offered a stand-alone service with "limited cross-cover and follow up to their initial prescription issuing." (See Figure 8.4).

Figure 8.4. Advantages and disadvantages of radiographer NMPs



8.3.4. NMP Competency

8.3.4.1. Consultants' opinions of performing the NMP appraisal

Fifteen out of 20 consultants' responses showed that they had conducted an NMP appraisal in the last 12 months and five out of 20 participants had not. The 15 participants were then asked whether they conduct the NMP appraisals for NMPs who were involved in the care of their patients. See Table 8.4. for participant responses. The majority (73%) of participants had conducted an NMP appraisal for some but not all NMPs who reviewed their patients.

Table 8.4. Participant responses regarding conducting NMP appraisals

Consultant oncologist participants	Number of participants (%)
Number of participants who had not conducted an NMP appraisal in the last 12 months (n=20)	5 (25%)
Number of participants conducted an NMP appraisal in the last 12 months (n=20)	15 (75%)
Number of participants who conducted an NMP appraisal for **all** NMPs who reviewed their patients (n=15)	3 (20%)
Number of participants who had conducted an NMP appraisal for some but not all NMPs who reviewed their patients (n=15)	11 (73%)
Number of participants who did not know if they conducted the NMP appraisal for the NMPs who reviewed their patients (n=15)	1 (7%)

The 20 participants were then asked who they believed should conduct the NMP appraisal for the NMPs who review their patients and nine out of 20 participants believed they should be conducting

the NMP appraisal for NMPs who review their patients. Seven out of 20 participants disagreed with this comment and four participants neither agreed nor disagreed so were therefore undecided.

8.3.4.2. Consultants' opinions on NMP competency assessment methods

The participants were then asked their opinions on the NMP competency assessment method used at the study site (see Table 8.5). The majority (55%) of participants agreed that the mixed method approach of combining the NMP appraisal with other methods of assessment was favourable. However, 65% of participants disagreed that they did not know how competency should be assessed suggesting that they are aware of how competency assessment should be undertaken. Table 8.6 demonstrates an exploration of individual participant responses regarding whether the participants undertook NMP appraisals for their NMPs and then how they believed competency should be assessed in the future. Most participants agreed with certain method options of competency assessment such as the NMP appraisal alone or the NMP appraisal combines with another method and then disagreed with the comment that they did not know how competency should be assessed. Therefore, the individual responses suggest that the participants did have an opinion on how NMP competency should be assessed. (See Table 8.6).

Table 8.5. Consultants' participant opinions on NMP competency assessment methods (n=20)

Competency assessment method	Participant numbers (%)		
	Agree	Unsure	Disagree
NMP Appraisal sufficient alone	5 (25%)	8 (40%)	7 (35%)
NMP Appraisal combined with other methods	11 (55%)	6 (30%)	3 (15%)
Other methods more appropriate than the NMP Appraisal	5 (25%)	10 (50%)	5 (25%)
I do not know how competency should be assessed	4 (20%)	3 (15%)	13 (65%)

Table 8.6. Exploration of individual participant responses to establish any possible linkage between participants who conducted NMP appraisals and their opinions on NMP competency assessment methods

Participant	Have you conducted an NMP appraisal in last 12months?	NMPs who review my patients	I conduct the appraisal for: All NMPs/Some NMPs/no NMPs	Should you complete all appraisals for NMPs who review your patients?	Is the Appraisal sufficient alone?	Appraisal combined with other methods should be used	Other methods of assessment more appropriate	I don't know how competency should be assessed
1	Yes	N/P/R	Some NMPs	Strongly agree	Unsure	Agree	Disagree	Disagree
2	Yes	N only	Some NMPs	Strongly disagree	Unsure	Disagree	Agree	Disagree
3	Yes	P only	All NMPs	Strongly agree	Agree	Unsure	Unsure	Disagree
4	Yes	N/P/R	Some NMPs	Disagree	Disagree	Agree	Agree	Agree
5	Yes	N/P	Some NMPs	Strongly agree	Disagree	Agree	Disagree	Disagree
6	Yes	R only	All NMPs	Strongly agree	Unsure	Agree	Agree	Disagree
7	Yes	N/P	All NMPs	Neither agree/ disagree	Unsure	Agree	Unsure	Unsure
8	Yes	N only	Some NMPs	Strongly disagree	Disagree	Agree	Unsure	Agree
9	No	P only	No NMPs	Agree	Unsure	Unsure	Unsure	Unsure
10	Yes	N/P/R	Some NMPs	Neither agree/ disagree	Disagree	Agree	Unsure	Disagree
11	Yes	N/P/R	Some NMPs	Disagree	Disagree	Agree	Agree	Disagree
12	Yes	N/P/R	Some NMPs	Strongly agree	Disagree	Disagree	Unsure	Disagree
13	Yes	N/P/R	Some NMPs	Neither agree/ disagree	Unsure	Unsure	Disagree	Agree
14	No	N/R	No NMPs	Agree	Disagree	Agree	Agree	Disagree
15	Yes	N/P/R	Some NMPs	Agree	Agree	Unsure	Disagree	Disagree
16	Yes	Nurse only	Some NMPs	Disagree	Agree	Disagree	Disagree	Disagree
17	Yes	N/R	Some NMPs	Disagree	Agree	Agree	Unsure	Disagree
18	No	P only	No NMPs	Agree	Unsure	Agree	Unsure	Disagree
19	No	R only	No NMPs	Neither agree/disagree	Unsure	Unsure	Unsure	Agree
20	No	N/P/R	No NMPs	Neither agree/ disagree	Agree	Unsure	Unsure	Unsure

8.3.4.3. Future methods of NMP competency assessment at the study site

Participants recommendations concerning the future methods of assessing NMP competency are shown within Table 8.7. The majority (85%) of participants believed the use of the NMP appraisal to be appropriate as well as other methods such as the auditing prescribing errors and near misses (75%), and the use of observational assessments of practice (e.g., OSCE method) (65%). The majority (65%) of participants also believed that the use of a peer review panel of oncology experts to review an NMPs portfolio of evidence was appropriate. Whilst 50% of participants believed the use of an up-to-date portfolio of evidence without a formal review as inappropriate.

Table 8.7. Participant responses to the future methods of assessing NMP competency (n=20)

Further methods of reviewing NMP competency	Participant number (%)		
	Appropriate	Neither Appropriate nor Inappropriate	Inappropriate
Current practice of NMP assessment e.g., annual appraisal	17 (85%)	2 (10%)	1 (5%)
Auditing prescribing practice e.g., prescribing errors, near misses or prescribing decisions	15 (75%)	2 (10%)	3(15%)
A peer review panel of oncology experts to review NMPs portfolio of evidence at certain time points	13 (65%)	3 (15%)	4 (20%)
Observational assessments of practice e.g., OSCEs	13 (65%)	3 (15%)	4 (20%)
Up-to-date portfolio of evidence, but no peer review required	5 (25%)	5 (25%)	10 (50%)

Participants were asked to suggest alternative methods of competency assessment for NMPs, and comments are displayed in Figure 8.5. Comments received discussed the observation of NMPs, auditing practice and the use of case-based discussions. Other comments included suggestions in relation to errors, compliments or complaints that have been received previously and how these methods of assessment may address these issues such as communication skills. One respondent commented that they need time within their role to perform the NMP assessments.

Figure 8.5. Participant responses regarding suggestions for alternative methods of competency assessment for NMPs

Comments
"Ensure communication skills assessment e.g., communication skills are often key to error/complaints"
"Auditing practice, review any incidents or complaints/ compliments"
"Case based discussions around difficult decisions/ review in person of any errors etc"
"Observed patient consultations"
"Clinicians need TIME to do this review, that is often the biggest barrier"

8.3.4.4. Frequency of NMP competency assessment

The frequency of competency assessment was explored within the survey, and 14 out of 20 (70%) participants believed that the NMPs should have their competency assessed once a year, whereas six participants (30%) stated once every two years.

8.3.4.5. Continued practice as a consultant mentor

Fifteen out of 20 participants (75%) had practised as a designated medical practitioner (DMP) for any member of staff undertaking a university course to qualify as an NMP. Therefore 5 (25%) of participants had not been a designated consultant mentor, however they may have been a consultant mentor to post qualified NMPs as NMPs can move between teams once qualified depending on clinical service need. The participants were then asked if they believe they should perform the competency assessment of NMPs who they had trained but were no longer part of their consultant team and out of 15 responses, three (20%) agreed that they should continue to conduct the competency assessment, whilst seven (47%) respondents disagreed. Five (33%) respondents were unsure on whether they should be conducting these competency assessments.

When asked to comment on conducting competency appraisals for NMPs who were no longer part of the consultant team, the responses within Figure 8.6. were received. Five participants commented that they could appraise but not assess competency, suggesting that the NMP appraisal was not a method of competency assessment and other comments suggested that this was not appropriate and should be undertaken by the consultant who the NMP practises with the most.

Figure 8.6. Responses to whether the consultant mentors should continue to conduct the NMP competency assessment for NMPs who were no longer a part of their consultant team

Comments
*"... for trainees are now working in another team in another HB [*Health Board*], I am happy to appraise but should not be assessing competency."*
"It would be better done by a consultant or team member that is working with the NMP currently, I do 2 appraisals where NMPs are not working with me so have no real evidence to base it on [their competency] (other than I know they are great!)."
"Not appropriate if they have moved on e.g., they may work for another organisation. Others would be better placed to provide this role. This will create all sorts of problems!"
"Would be happy to, but not seen as necessary if taken care of elsewhere"
"It is nice to see the progress being made for an individual but not essential that this is done by the initial supervisor. It's more appropriate to appraise someone who is heavily involved in your practice."

8.3.5. Support

8.3.5.1. Support for consultants with NMP mentorship

The consultant participants were questioned about the support provided to consultant mentors by different providers listed in Table 8.8. One participant refrained from answering this question as 19 participants responded. The support provided by the organisation, NMP line managers and professional bodies were seen as highly appropriate to consultant mentors.

Table 8.8. Participant responses regarding support requirements of consultant mentors (n=19)

Providers of support to consultant mentors	Appropriate	Neither appropriate nor inappropriate	Inappropriate
Organisation	18 (95%)	0 (0%)	1 (5%)
NMP's line manager	18 (95%)	0 (0%)	1 (5%)
NMP's professional body	17 (89%)	1 (5%)	1 (5%)
Peer support for each other	15 (79%)	3 (16%)	1 (5%)
Consultant mentor's own line manager	13 (68%)	3 (16%)	3 (16%)

Respondents were then asked to comment on who should provide support for consultants regarding NMP support (see Figure 8.7). Qualitative comments provided were focussed on the time requirements to provide this support to NMPs as often these roles *"are just absorbed and not 'seen'"*. One consultant was content with the current system, and two responded to say that the NMP appraisal system etc needed to be as simple as possible, whilst another participant wanted support and links from the course provider, the organisation and the NMP manager. Varying opinions of support requirements were discussed by the five participants.

Figure 8.7. Comments received regarding support to consultant mentors

Comments explaining responses to the question regarding support to consultant mentors
"I think the current system is fine and don't need to make it more complex - but ongoing CPD is important too"
"Links with the course provider along with VCC and the NMPs management would be helpful to provide support on the curriculum and competency guidance when mentoring"
"... [consultant mentor] *time needed is very important and must be recognised"*
"Many additional roles just absorbed and not 'seen' – we can't continue in this fashion without risks"
"... need time to do this well. often done around other commitments"
"... also need flexibility e.g., to adapt/shape scope of practice and clinical services change or to respond to incidents/problems in a timely way. Both of these may need to be reactive in addition to any planned regular appraisal"
"Set up an appraisal process that is fairly fixed in terms of a template that can be easily populated requiring minimal training."

8.3.5.2. Support for each NMP professional group

The participants were asked who the support providers should be for nurse, pharmacist and radiographer NMPs separately. Most respondents believed that all NMP professional groups should receive support from all of the providers listed in Table 8.9.

Table 8.9. Suggested support providers to NMP professionals within the survey

Providers of support
NMPs peer support to each other within their own organisation
All NMP groups provide peer support across professional NMP groups within the organisation
The employees' workplace
Consultant oncologist mentor
NMP's own line manager
External professional body (e.g., UKONS, RPS, SoR)

Two consultants responded to say that *"peer to peer support was a good plan"* for nurse NMPs specifically and that all routes of providing support were *"all equally appropriate as a holistic approach".* No further comments were provided by consultant oncologist participants regarding pharmacist or radiographer NMP support.

8.3.5.3. Further comments provided by participants regarding NMP support overall

Comments were received regarding overall NMP support from study participants and displayed within Figure 8. Many of these comments described how the time and resources required to train and support NMPs should be recognised, and time should be allocated to the consultant and the NMP to achieve this within their roles. One comment also recognised the need for NMPs to receive time for training and maintaining their practice.

Figure 8.8. Comments received by participants regarding NMP support providers overall

Comments
"All appropriate. NMPs need time for training and keeping up to date once qualified"
"Attending educational events with consultant trainers can be very useful"
"Training (initial training and ongoing/updating) should be valued and recognised by all levels/people: both for the NMP and for those giving the training, both take time, expertise and need to be done well."
"There needs to be a resource that is set up in house with some external assessment/peer review to ensure the standards are met."
"Consultant mentors being allocated time within job plans to do education formally."

8.3.5.4. NMP Training topics

The training topics for NMPs was also explored within the survey dependent on the NMP's level of experience. Early years NMPs are classified as practising for less than five years and Advanced level NMPs are classified as practising for more than five years within their specialist area.

Nurse NMPs

All 15 participants who worked with nurse NMPs responded to the question regarding the training topics relevant to early years or advanced practice NMPs. The participants believed that most of the training topics listed in Table 10 were relevant for nurse NMPs. However, the IRMER course was seen as less appropriate for both early years and advanced practice NMPs and the blood transfusion course was believed to be less appropriate for early years nurse NMPs.

Pharmacist NMPs

All 13 participants who worked with pharmacist NMPs responded to the question regarding training topics for early years or advanced practice pharmacist NMPs. The participants believed that clinical assessment and the IRMER course were less appropriate for pharmacist NMPs at early years and advanced practice level and the intro to prescribing course was less appropriate for advanced practice pharmacist NMPs. The blood transfusion course was also believed to be less appropriate for early years pharmacist NMPs. See table 8.10 for list of training topics suggested within the survey.

Radiographer NMPs

All 12 participants who worked with radiographer NMPs responded to the survey regarding training course topics relevant to early years and advanced practice radiographer NMPs. The IRMER course was believed to be less appropriate for early years and advanced level radiographer NMPs and the intro to prescribing course was also believed to be less appropriate to advanced practice radiographer NMPs. The blood transfusion and microbiology course were also believed to be less appropriate for radiographer NMPs but more appropriate for advanced practice radiographer NMPs. See table 8.10 for list of training topics suggested within the survey.

Table 8.10. Suggested training topics for NMP professionals to complete dependent on experience

Training topics suggested
Advanced Communication course
Clinical Assessment Skills
Intro to prescribing course
Cancer site specific training courses
Psychology of the cancer patient
Microbiology course
Blood transfusion prescribing course
IRMER course

8.3.5.5. Future training topics

Nurse NMPs

All 15 participants who worked with nurse NMPs responded to the future training topics for nurse NMPs survey question. All the topics in Table 8.11 were believed to be appropriate by the majority of respondents except for the training topic on 'How to read CT scans.'

Figure 8.9 displays the comments from participants regarding future topics for nurse NMPs. These comments highlight that although respondents believed the training on 'how to read CT scans' to be less appropriate, training on how to interpret other imaging such as x-rays could be beneficial to the practice of nurse NMPs.

Figure 8.9. Comments from participants regarding future topics for nurse NMPs

Comments
"... site specific knowledge and advanced communication is key"
"Interpreting simple x-rays would be useful. A couple of sessions with a radiologist to look at scan and x-ray images of common emergencies like cord compression and pneumonia, colitis etc will be good for all NMPs to visualise, to put these conditions in context."

Pharmacist NMPs

All 13 participants who worked with pharmacist NMPs responded to the future training topics for nurse NMPs survey question. All topics in Table 8.11 were believed to be appropriate by most respondents except for the 'how to read CT scans' topics which was believed to be less appropriate.

For pharmacist NMPs, two comments were received (see Figure 8.10). One comment referred to communication skills and the second comment explained the need to ensure that NMPs can cross cover and are not dependent on one consultant.

Figure 8.10. Comments from participants regarding future topics for pharmacist NMPs

Comments
"... communication skills"
"... we must expand the workforce with professionals that can cross cover and enable a service to continue and that is not dependent upon one consultant."

Radiographer NMPs

All 12 participants who worked with radiographer NMPs responded to the future training topics for radiographer NMPs survey question. All the topics in Table 8.11 were believed to be appropriate by the majority of respondents except for the training topic on 'How to read CT scans.' The diagnostic training modules were also believed to be less appropriate for radiographer NMPs.

Two comments were provided by respondents for radiographer NMPs (see Figure 8.11). One comment suggested further topics on clinical audit and consent training and the other suggested that radiology requesting is relevant for all. This suggests that the participants may be less familiar with the meaning of 'IRMER course' for NMPs which is training to enable NMPs to request radiology.

Figure 8.11. Comments from participants regarding future topics for radiographer NMPs

Comments
"*All NMPs would benefit from shared decision making and consent training, also responsibility for participating in mortality reviews post SACT/clinical audit/QI/ pathway development"*
"Radiology requesting for all".

Table 8.11. Suggested future training topics for each NMP professional group

Future training topics
ChemoCare training
Interpreting blood results
Acutely unwell patient
NICE guidance
Clinical Trials Available
Critically appraise papers
Diagnostic training modules
How to read CT scans

8.3.5.6. Methods of training delivery for NMPs

Participants were asked whether certain methods of training delivery would be appropriate for certain NMP professional groups. The responses obtained are reported by NMP professional group.

Nurse NMPs

All 15 participants who work with nurse NMPs responded to the survey question on how appropriate various methods of training delivery listed in Table 8.12 were to nurse NMPs. All methods of training delivery were believed to be appropriate with learning from peers outside of the organisation and pharmaceutical company funded meetings being the less appropriate options.

Pharmacist NMPs

All 13 participants who work with pharmacist NMPs responded to the survey question on how appropriate various methods of training delivery listed in Table 8.12 were to pharmacist NMPs. All methods of training delivery were believed to be appropriate with learning from peers outside of the organisation and pharmaceutical company funded meetings being the less appropriate options.

Radiographer NMPs

All 12 participants who work with radiographer NMPs responded to the survey question on how appropriate various methods of training delivery listed in Table 8.12 were to radiographer NMPs. All methods of training delivery were believed to be appropriate with learning from peers outside of the organisation and pharmaceutical company funded meetings being the less appropriate options.

Figure 8.12. Comments provided by participants for NMPs regarding methods of training delivery

Comments from participants
"Mixture of learning from peers, medical teams are reasonable, alongside some learning externally as often this can bring new practices to light and be informative. Self-directed learning plays a role but has limitations. Pharma workshops/talks can be useful updates but not a main source of learning."
"Useful for radiographers to sit in some clinics to see broader picture i.e., patients' management, but most of the time we won't be prescribing what they will need to be prescribing so not a great use of time other than for a short number of sessions. More would be gained doing the clinics they do (i.e., sit in their treatment clinics)"
"NMPs should be given opportunities to improve and learn."
"Pharmaceutical educational meetings can be helpful especially if attending by the team where practice can be discussed, but limitations of what is presented needs to be acknowledged."
"A mix of these would be good."
"Really important that regular OSCE teaching available. At present, I run one from 8-9am on a Thursday morning that is available to anyone but is not formally recognised."

Six comments were provided regarding methods of training delivery, these comments included how training organised and provided by pharmaceutical companies were less favourable and how a mixture of the training methods suggested is favourable to train NMPs after they qualify.

Table 8.12. Suggested methods of training delivery for NMP professionals within the survey

Methods of delivery
In house training
Self-directed
Learning from doctors
Learning from peers within the organisation
Learning from peers outside of the organisation
Pharmaceutical company funded training

8.4. Discussion

8.4.1. Consultant mentorship

Over two thirds (71%) of consultants responded to the survey from across a wide range of oncology specialties, although data on the specialities of each participant was not explored due to potential identifiability of the study participants. The survey results showed that the largest proportion of consultant participants have nurse NMPs supporting the management of their patients (either nurse NMPs alone or in combination with alternative NMP professionals) (n=15, see Tables 8.2 and 8.3). Nurse NMPs also represented the majority of NMP professionals at the study site (25 nurses out of an NMP cohort of 41). Eight out of 20 respondents had at least one of each of the three NMP professionals supporting the management of their patients' care and therefore these participants would have a view of NMP training across the professions. This could have affected the opinions of the consultant participants., e.g., one consultant may have one nurse NMP review their patients whilst another may have three NMPs, one from each professional group.

8.4.2. Contributions of each NMP professional group

There were many advantages described for each NMP professional group. Most consultants described each NMPs professional expertise (i.e., pharmacists as medicines experts) as an advantage to benefiting patient care. One consultant suggested that a lack of clinical expertise was a limitation to the role of a pharmacist NMP. This may be exacerbated by pharmacist NMPs reviewing their patients within their consultant team only once per week. Alternatively, nurse NMPs often practise as part of the consultant team full-time and are familiar with the consultants' day to day practice and are focussed on the patients' journey within that disease site providing continuity of care. One consultant also described how the pharmacist and radiographer NMPs are less integrated within the consultant team which could be resolved if the pharmacist or radiographer NMPs were embedded in the consultant team as is the case for nurse NMPs. Increased patient exposure may allow these groups to develop the appropriate clinical expertise and complete understanding of the patients' disease pathway and become embedded within the consultant or disease site team. Ibrahim et al(114) distributed a cross-sectional survey of General Practitioners (GPs) views on general-practice based pharmacists and discussed how strong interpersonal collaboration between pharmacist NMPs and GPs improved the relationship between the two professions regarding good communication and development.(114) Faruquee et al (115) explored family physicians (GPs) perceptions of pharmacists prescribing in primary care in Canada, and also demonstrated how family physicians had a higher level of trust towards pharmacist prescribers working closely in collaboration within their practice rather than pharmacists placed elsewhere i.e., community pharmacists.(115) These findings may also be relevant to the practice of radiographer NMPs but there is a lack of published evidence.

The ‘dual role’ of the nurse NMPs was described as a disadvantage to nurse NMPs and occurs because of a nurse practising as a clinical nurse specialist (CNS) for the consultant team (supporting patients within a certain disease area) and as a nurse NMP. Two studies, one by Stenner et al who explored patient views of nurse NMPs within a diabetes clinic, and Jones et al which explored stakeholder views of mental health nurse prescribers described the nurse prescribers holistic approach to their consultation due to their nursing background.(80, 81) One consultant participant described the nurse NMP role as ”inefficient” and although this comment was given out of context, it could be related to the thorough holistic ‘dual role’ that nurse NMPs are believed to provide within a pre-assessment SACT clinic and referred to in published literature.(80, 81, 138)

Pharmacists were believed to provide a drug-focussed approach to patient review by participants which was described as providing valuable support with pharmaceutical knowledge within the multi-disciplinary approach of the consultant team. The consultant participants also described the pharmacist NMPs as lacking confidence with communication which does improve with experience, which was described by Cope et al (44) where NMPs were believed to gain self-confidence and as a result of self-efficiency with experience when explored using a cross-sectional survey of NMPs within acute medical unit across the UK. Latter et al (55) discussed how NMPs in general are more confident when medical colleague support is provided whilst evaluating the clinical appropriateness of nurses' prescribing practice, which suggests that the lack of confidence is not unique to pharmacists. The lack of confident communication by pharmacist NMPs could be linked to them being less integrated than nurse colleagues into the consultant team (as suggested previously within this study (study four)) and therefore having less contact with medical colleagues.(55) Faruquee et al (115) described how pharmacist prescribers and family physicians (GPs in the UK) needed to develop a mutual respect by establishing a collaborative model which incorporates trust and communication between the pharmacist prescriber and physician (GP within the study). A lack of this type of collaboration model could affect the responses of consultant participants within the current survey study.(115)

The consultants’ opinions of radiographer NMPs related to their expertise in radiotherapy and their beneficial input to radiotherapy treatment and toxicity management. The participants believed radiographers to have a narrow scope of practice which is likely directly linked to their expertise and professional training, since the narrow scope of practice was not described for pharmacists and nurse NMPs. The pharmacist and nurse NMPs focus mainly on prescribing SACT rather than radiotherapy and treatment of radiotherapy side effects and have been practising as independent prescribers over a longer time than radiographers. This is due to radiographers only being able to practise as independent prescribers since 2016 and may suggest that they have a less developed role

which results in difficulty when making comparisons with practice of the nurse and pharmacist NMP role.(139, 140)

Participants described the need to plan clinics as a disadvantage of all three NMP professionals within the survey as a result from various factors such as: not being suitable to review complex patient cases; a lack of clinical examination skills; and the need to red flag when a medical opinion is required. Within current practice, the oncology NMP professionals within the organisation practise across a wide variety of clinic structures. Clinics can be focused on predominantly protocol driven patient care when treating conditions such as early breast cancer where patients are largely well except for their cancer diagnosis, compared to clinics caring for patients in the end-of-life stage of their disease e.g., advanced lung cancer clinics. The consultant participants opinion may suggest that there should be more structure to how NMPs are appropriately placed within oncology clinics to relate to the limitations of the NMP role. Lloyd et al explored medical mentor views of pharmacist prescribing and discussed limitations to the NMP role as they were keen to follow protocols but often not keen to deviate from them.(66) The participant responses could have been received from consultants working with early years NMPs who have a narrower scope of practice and less practice experience and may request more medical support than other more advanced level NMPs. Cope et al found that experience positively impacted NMP self-efficiency.(44)

In summary, the consultant participants responses suggested that the NMP role was beneficial due to the multi-disciplinary approach of each NMP professional bringing their expertise to the team. Overall drawbacks to all NMP professional roles were described as a restriction due to either a narrow scope of practice or their inability to review complex cases.

8.4.3. NMP Competency

Fifteen out of 20 consultant participants who had NMPs supporting the management of their patients conducted NMP appraisals with an NMP in the last 12 months. However, only three of these 15 participants conducted the NMP appraisal for all NMPs who review their patients' care. Nine (45%) out of 20 participants responded that they should conduct the NMP appraisal for all NMPs who review their patients and seven (35%) respondents disagreed with this comment (although none of these were the participants who currently undertook all their NMP appraisals following a further sub-analysis (see Table 8.6)). These responses could be linked to the level of involvement and control the consultants feel they need over how the NMPs who are involved in the care of their patients. Table 8.6 demonstrates that there was no association between whether a consultant participant believes they should perform all appraisals for the NMPs that review their patients and the profession of the NMP that reviews their patients. One exception to this was the three

participants who had one or more nurse NMP reviewing their patients, as all three participants disagreed to undertake all the NMP appraisals for NMPs who review their patients. This may also be affected by how closely the nurse NMP works with the participants as they may review their practice daily whilst working in collaboration as part of the consultant team.

A mixed methods approach for NMP competency assessment was supported by 55% of participants. One participant commented that they are *"... happy to appraise but should not be assessing competency"* for NMPs who no longer review their patients. Therefore, this comment suggests that the annual NMP appraisal performed between consultant and NMP may not be an accurate assessment of competency and the mixed methods approach as recommended by the British Oncology Pharmacy Associations (BOPA) should be used.(21) However, the majority of participants (85%) did view the current assessment review method (NMP appraisal) as appropriate. Case based discussions and auditing of NMP practice were also suggested as competency assessment tools for NMPs. A study by Smith et al issued a questionnaire survey to nurse NMPs and NMP leaders in England and nurse IPs described using case audits and NMP appraisals as part of their NMP quality assurance methods.(107) Other methods of auditing prescribing practice, were explored within the current study where the use of a peer review panel and OSCEs were also highly favoured except for the up-to-date portfolio of evidence without a peer review (only judged appropriate by 25% of participants); (see Table 8.7). Nevertheless, the use of a portfolio of evidence alone is suggested within the BOPA NMP guidelines and a portfolio of evidence related to the Royal Pharmaceutical Society's competency framework for all prescribers is suggested within the RPS prescribers support tools.(15, 21) Therefore, the NMP portfolio of evidence and the potential peer review assessment believed to be appropriate by study participants could help develop a mixed methods approach (including NMP appraisal) to NMP competency assessment as supported by 55% of current study participants.(see Table 8.5). A study by Green et al (108) explored the use of a training needs analysis in one English health authority for NMP using a questionnaire method and discussed how evaluation of current CPD undertaken could lead to the structure of a rolling organisation CPD programme. Therefore, if NMPs at the study site were required to develop a portfolio of evidence, the evaluation of these portfolios could aid the development of a rolling CPD programme at the study site.(108)

Around two thirds (70%) of consultant participants expressed the opinion that annual competency assessment was more appropriate than assessments every two years. Frequency of NMP competency assessment has not been currently explored within current published literature but the need for annual NMP appraisals is stated with the NMP guideline at the study site and described as current practice by Smith et al.(24, 107)

Seventy-five percent of participants had practiced as DSPs for trainee NMPs. Therefore, the remainder of participants (25%) responding to the survey questions may have limited knowledge or understanding of the NMP training background and the competence required to become an NMP at different levels of experience. Twenty percent of participants agreed that they should be competency assessor for former trainees who were no longer part of the consultant team. However, the survey question did not describe if the NMPs were still working within the organisation or were working outside of the organisation. The comments provided suggested that if the NMP was outside of the organisation, then the original consultant (DSP when completing their IP course) should not be assessing competency and consultants should be assessing competency of NMPs who are heavily involved in their practice. The use of a peer review process would eliminate the need for the focus of the competency assessment to be solely on an individual consultant mentor. The use of the peer review method of assessment was also discussed within the Smith et al study but the role of the consultant mentor was not discussed.(24, 107) A competency assessment may also take different forms in different professions and medical competency may vary from multi-professional NMP practice competency assessment. Afseth et al (116) explored medical mentor opinions of non-medical prescribing students and concluded that there are challenges to how competency is defined between professions but there are also benefits such as allowing other professionals to have an insight into NMP practice, knowledge and roles.(116)

8.4.4. NMP Support

Support for consultants was viewed as appropriate by the study participants from many sources such as the organisation, NMP's line manager and peer support. Study participants expressed their opinion that support to consultant mentors from their own line manager was believed to be less appropriate by study participants. However, own line manager support is needed if the consultant mentor is of the opinion that more time should be allocated within their job role to provide support to NMPs (see comments on support from participants in Figure 8.7). The consultant participants also suggested that the organisation provided a fixed template for the appraisal process with the aim of saving time when completing paperwork requirements, although there is already a template currently in use at the study site which could be further developed.

The consultant participants responded that they viewed all the suggested support providers to NMPs such as peer support, consultant mentors, NMP groups and the NMPs own line manager as highly appropriate. Therefore, this suggests that a mixed stakeholder approach for all NMPs should be used to provide support, and the focus should not be solely on the consultant mentor. The requirements for NMP support should be outlined within organisational strategy documents for NMP practice as described within a study by Courtenay et al. This was a classic e-delphi survey used

to establish national consensus for NMP practice in Wales and DoH guidance for the implementation of NMP practice in England.(43, 95) One participant was of the opinion that a holistic approach to support was needed incorporating all support stakeholders as they commented that "*equally appropriate as a holistic approach* [to support]". A holistic approach is often defined as "looking at the patient as a whole not in parts" and the support an NMP requires to receive when practising has not been described as needing a holistic approach within published literature.(141) However an 'holistic approach' to NMP support could accurately describe how the NMP professional should be supported throughout all aspects of their professional role including the NMP element of their role.

Further comments were received regarding the need for both NMPs and their consultant mentors to receive ongoing allocated time for CPD and training for NMPs and how this time allocation should be recognised by the organisation and incorporated into their role. Weglicki et al explored the CPD needs of nursing and allied healthcare prescribing professionals using a cohort of NMP students at an East Midlands University and described how it was the responsibility of the organisation to provide this time allocation. (56, 102) Two studies, one by Bowskill (125) evaluating the use of a mentoring scheme for NMPs and the Maddox et al study (72) which explored NMPs willingness to take responsibility for their practice in community and primary care settings both described the benefit of a 'buddy system' for peer-to-peer support between NMPs. The peer-to-peer support was favoured by study participants as described above and should be implemented by the organisation.

8.4.5. NMP Training topics

Respondents believed an IRMER course was less appropriate for both early years and advanced practice NMPs working within oncology at the study site. The participants may be less familiar with the IRMER course undertaken by the majority of NMPs at the study site to enable them to request radiology examinations or less familiar with the terminology.(118) The participants later commented that *"radiology requesting for all"* should be a future training topic and therefore further suggests that they are unaware by the meaning of an 'IRMER course'.(118) The blood transfusion course was viewed as less appropriate for early years NMPs, but the majority of participants believed it to be appropriate for all advanced practice NMP professionals. The participant responses may reflect the area of oncology specialty they practice in as the request for blood transfusions is used more often in certain oncology specialty settings such as gynae-oncology more than other specialty areas. Pirie (109) discussed whether nurses should prescribe blood components within their practice. Weeks et al explored the prescribing of blood products compared to other usual care givers and concluded that NMPs offer an equal service and therefore could be equally as appropriate to prescribe blood components. (142)

The microbiology course was favoured by respondents but less so than other training topics such as clinical assessment skills and communication. These responses could be due to the level of training required to be able to prescribe antibiotics against an approved guideline not being appropriate within the oncology setting. Undertaking the psychology of the cancer patient modules was seen as favourable for pharmacist and radiographer NMPs at both levels. Although the psychology training was favoured predominantly for early years nurse NMPs rather than advanced practice level nurses. This may be due to nurse professionals having greater exposure to the psychology of the patient earlier within their professional career than other NMP professional groups. The introduction to prescribing course was favoured for early years NMPs specifically for all professional groups rather than advanced level NMPs who would have sufficient experience once they had practised as an NMP for five years or more.

The clinical assessment skills were favoured by all participants for all NMP professionals but favoured more highly for nurse and radiographer NMPs. This conflicts with previous qualitative responses that pharmacist NMPs lack clinical assessment skills. The reason for this response may be due to the consultant participants viewing pharmacists as needing less clinical assessment skills as their focus is on drug therapy or the pharmacists spend less time in the clinical environment as previously mentioned. Allison et al(54) explored the clinical assessment skills required by pharmacist prescribers and described the need for pharmacists to undertake clinical assessment training when prescribing systemic anti-cancer therapy (SACT).(54) The need for all NMPs to have skills to support their prescribing is outlined within the RPS competency framework for all NMPs, suggesting that pharmacists should have the same level of clinical skills as other NMP professionals.(14, 15)

Participants responded that advanced communication training was appropriate for all NMP professional groups for early years and advanced practice pharmacists and radiographers but only early years nurse NMPs. This response may be due to the consultants believing that nurse NMPs develop advanced communication skills within their everyday role and therefore would be unnecessary for advanced practice nurse NMPs.

Expansion of the NMP role scope of practice could also require the NMP to undertake specialist courses such the microbiology course when needed, rather than being embedded into standardised NMP training programmes for all. The RPS released guidance on expansion of NMP scope of practice in 2022, and described methods of how to extend prescribers' scope of practice.(16)

8.4.6. Future training topics

All seven future topics for NMP training suggested in Table 10 were believed to be appropriate for all NMP professionals. The training on 'how to read CT scans' was considered less appropriate by study

participants which could be due to their opinions on delivering CT scan reports and how this could be seen as the role of the consultant or registrar within the team and not an NMP role.

One participant commented that NMPs should be trained to work as 'generic prescribers' compared to practising solely with one consultant team. A commentary publication by Bourne et al (93) discussing the opportunity and challenges of pharmacist IPs in secondary care defined generalist prescribers as prescribers who provide pharmaceutical care across a wide range of medicines or disease sites. This contrasts with the specialist prescriber who provided a more advanced level of pharmaceutical care within a certain specialty. Therefore, if generalist prescribers were necessary, they should be expected to have less specialist knowledge within an area, such as breast cancer, but could be focussed on certain treatments which are used across various disease sites. Utilising generic prescribers at the study site may require a restructure of how NMPs are placed within oncology outpatient clinics and the expectations of their role within the clinic.

8.4.7. NMP Training methods

All of the training methods suggested within the survey were seen as highly appropriate for all NMP professionals suggesting that all NMP professionals should have a mixed methods approach to training delivery as described within study three of this thesis (also by Harding et al and by the British Oncology Pharmacy Association (BOPA)).(21, 102) Participants were of the opinion that pharmaceuticals company funded sessions were less appropriate for radiographer NMPs. The reason for this response is likely due to the radiographer role being radiotherapy focussed and less related to newly available SACT treatments. The pharmaceutical company funded events can benefit prescribers, but one participant commented that prescribers should be aware of their limitations and the pharmaceutical company events should not be the NMPs main source of learning. Pharmaceutical companies funded sessions could be tailored to the needs of NMPs and could potentially provide sponsorship for certain NMP training webinars, if a blended approach to delivery is provided and recommended by the organisation as described in study three of this thesis and published with the Harding et al study. (102)

Participants recommended practical methods of learning for NMPs, as for example one participant described providing a weekly opportunity for colleagues to develop their clinical examination skills utilising an OSCE method tool. Although this OSCE session is described by one participant as being 'open to all', many prescribers may not be aware that this opportunity is available and therefore these pockets of good practice should be shared and acknowledge to ensure equality of access across the organisation as recommended by Weglicki and the Department of Health guidance.(56, 121) Shadowing medical staff was suggested for radiographer NMPs as also discussed within the

Harding et al study (102) specifically for radiographer NMPs. However, the consultant participants believed the shadowing to be an ineffective use of their time as prescribing differs within SACT as opposed to radiotherapy review clinics, although the RPS expanding prescribers' scope guidance recommends observing best practice to gain confidence in a new area.(16) The training focus of radiographer NMPs should be established before further development of the role of the radiotherapy NMP within the organisation.(139)

One participant also recommended that all NMPs should have opportunities to "improve and learn" which suggests that this not currently the case within the organisation and implementation of an NMP training structure would address NMP professional development.(56, 102, 121)

8.5. Strengths and limitations of study three

A high survey response rate was achieved within this study which was considered acceptable as documented within survey practice literature.(114) The opinion of consultant oncologists on NMP post-qualifying training is not explored within published literature to date and this study addresses an underexplored area of NMP practice within the oncology setting across multi-professionals.

The small sample of participants could be viewed as a limitation to the study design along with the sample being taken from one study site but did allow the survey questions to be specific to the current practice within the study site and would have had to be less specific to NMP practice if explored across multiple sites. Although the lead researcher familiarity in this area likely contributed to a high response rate, some investigator bias may have been introduced as respondents were aware the investigator was a pharmacist prescriber. The investigator bias was minimised by the survey link being distributed to consultants by the clinical director of the organisation rather than the lead researcher which produced more reliable data. The survey was extensively piloted to ensure clarity of survey questions to participants, however wording of some of the questions could have been misinterpreted depending on the consultants' knowledge of NMP practice terms and their training. The length of time taken to complete the survey was also shortened following the pilot phase to ensure user satisfaction and increase participant response rate.

The amount of experience each consultant had as a consultant and as a consultant mentor to NMPs was also not explored due to risk of breaching confidentiality but could have explained some variations within the survey participant responses. Capturing more data around the area of oncology that the consultant worked within could have explored NMP needs within certain specialties of oncology where there was more variation in the use of NMPs within their practice.

The use of a survey method to gather oncologist opinions enabled a broader understanding of their views over many participants (n=20) and the data was generalisable to the consultant oncologists at

the study site but would not be generalisable to all consultant oncologists across different organisations. An interview or focus group method which approach would have enabled a deeper exploration of participant responses with smaller participant numbers, but the data obtained would have been less generalisable than the survey data.

8.6. Further Work

Further research should be developed around exploration of consultant oncologist opinions of NMP post-qualifying training across multi-centres to increase sample size achieved. Inclusion of other centres within the study would have increased the complexity of survey link distribution, a requirement for ethics across different organisations and increased cost of undertaking the study. Therefore, research funding for the study would potentially be required to obtain sufficient engagement.

Qualitative method tools such as interviews or focus groups could be utilised to explore the reasoning for consultant opinions on NMP post-qualifying training and would allow the researcher to prompt responses further within the qualitative data obtained. Establishing the reasoning for participant responses may support the development of practical beneficial changes within the organisation.

The consultants could be questioned on their experience and expertise with NMP mentorship and could therefore lead to further reasoning for responses provided. The opinions of other stakeholders (i.e., senior organisational managers and patients) of NMP post-qualifying training and the NMP professionals could also be explored. Other topics for exploration could include NMP well-being and perception of worth related along with NMP recruitment and retention. The ability of NMPs to transfer their skills between clinical areas, settings and specialties could also be explored. Pilot studies exploring these changes in practice could be undertaken and evaluated within clinical practice to establish its effect on the NMP and the clinical service provided.

8.7. Study recommendations

- Consultants need protected time to support NMPs with their training, and perform competency assessments of NMPs under their management, and NMPs need protected time within their role to undertake relevant NMP training within a structured organisation-led training programme.
- Pharmacist and radiographer NMPs should become imbedded within the consultant team to develop their clinical expertise and a clear overview of the patient journey currently experienced by nurse NMPs.

- A mixed methods approach to NMP competency should be established within the organisation by incorporating peer review into NMP assessment frameworks.
- A mixed methods approach to NMP training delivery is needed and guided by organisational NMP structure and leadership.
- A varied training programme should be available which incorporates training topics appropriate to the level of experience and professional group the NMP belongs to.
- The NMP's organisation should ensure a 'holistic approach' to NMP support is in place from various support providers to ensure NMP development needs meet SACT service demands such as to ensure flexibility to work across consultant teams.

8.8. Conclusion

This study explored the opinions of consultant oncologist participants on three different NMP professional groups practising within the oncology specialty. The contributions of each of the three professional groups were related to the professional's area of expertise such as pharmaceutical expertise for pharmacists. There were common disadvantages described across all three professional NMP groups such as the need for NMP clinics to avoid complex cases and the need for adequate support to be provided by medical staff. Radiographers were believed to have a narrow scope of practice regarding prescribing compared to nurse and pharmacist NMP colleagues, although seen as experts in radiotherapy. Both pharmacist and radiographers were believed to have limited clinical expertise in comparison to nursing NMPs and thought to be less imbedded within the consultant team due to fulfilling other aspects of their professional role within their relevant departments.

Consultant oncologists believed they should not be conducting the NMP appraisal for NMPs who no longer review their patients but are willing to conduct NMP appraisals for all NMPs who review their patients. Consultants recommended that competency assessment should be undertaken using a mixed methods approach of utilising the NMP appraisal along with other assessment methods such as OSCEs. The use of portfolio of evidence peer reviewed on an annual basis was favoured by consultant participants. A lack of time allocation within the day-to-day role of the consultant mentors and NMPs was identified to hinder the completion of assessments.

Consultants believed that the support requirements needed by consultant mentors and the NMP professionals themselves should be provided by various stakeholders such as the NMPs line manager, the organisation and professional body. The recommended that there was a 'holistic' approach to how support is provided within the organisation for NMPs and not solely from the

consultant mentor. Consultants believed that time should be provided within their job role to provide adequate support to NMPs.

The NMP training topics suggested within the survey should be linked with the NMPs level of experience and were believed to be appropriate e.g., advanced communication skills, psychology of the cancer patient. The future NMP training topics suggested were also believed to be appropriate, however there were some variations between professional groups. Consultants recommended other training topics and methods of training delivery that could be useful when providing post-qualifying training and described isolated areas of best practice training which could be utilised by all NMPs but are often accessed by a small number.

This study demonstrates that consultant oncologists have important opinions and recommendations on NMP training within oncology which should be addressed by the organisation to enable further progression of the oncology NMP role.

9. Chapter Nine: Programme discussion, conclusion and recommendations

9.1. Programme discussion

This research programme explored non-medical prescribing within one oncology setting. The first research study (study one) involved exploring the opinions and recommendations of NMPs on their NMP practice. Study two then explored the opinions and recommendations of medical prescribers (consultant oncologists and one registrar) and senior managers on NMP practice. Many aspects of NMP practice were explored and common themes identified across both studies such as training, barriers and benefits, and the factors affecting NMP practice. Various aspects of the NMP role were identified as needing further investigation within the oncology speciality; these are NMP training requirements post qualifying, evaluating NMP practice and development of organisational governance strategies for NMP practice. One common theme of NMP training post-qualifying was chosen by the PI to explore within the final two studies of this programme. The experiences, opinions, and recommendations of oncology NMPs on NMP training post-qualifying were explored within study three and finally, study four explored the experiences, opinions and recommendations of consultants on oncology NMP training post-qualifying. Aspects of NMP training post-qualifying were discussed including the need for support and leadership structures, NMP competency assessment methods and the need for an in-house organisational NMP training programme dependent on the level of experience of the NMP. All stakeholder participants involved within the programme of research had a positive opinion of NMP practice within the organisation but were also aware of the limitations of NMP practice. Many of the emerging themes identified within the studies were linked in some way and will be discussed within this chapter.

9.1.1. The NMP role

NMP participants within study one had differing opinions about their NMP practice. Pharmacist NMPs described how their role was rewarding but stressful due to the level of responsibility, whilst nurse NMPs described how prescribing was beneficial to their day-to-day role but time constraints affect their prescribing practice. All stakeholders within the research programme expressed their opinion that CNS NMPs performed a dual role within the pre-assessment SACT clinic. The nurse NMP dual role was previously described by Stenner et al (80) and Jones et al.(81) Within this research programme, pharmacist NMPs were aware of the concerns of nursing colleagues to fulfil this role, whilst the nurse NMPs described having limited time to perform their dual role due to the expectations of others. All stakeholders within the programme also described how the CNS role is a holistic supportive role within the clinic, whilst the NMP role is often very task-orientated. Nursing professionals are often well supported and guided within their CNS role whilst performing a holistic nursing role alongside medical prescribers but when they become an NMP, the expectation of their

role within the consultant team may change, resulting in increased responsibility and a new system of patient review. The PARED study also described difficulties with professionals transitioning into new roles with higher levels of responsibility.(94) Medical prescribers (within study two) suggested that the CNS NMPs needed to change their approach to a task-orientated nurse NMP role. They also suggested that the holistic CNS assessments should be performed within separate holistic nurse led clinics held at a different time to the SACT pre-assessment clinic due to time constraints. Stenner et al(80) also found that the nurse prescriber role impacted upon the time needed for nurses to review patients within the diabetes specialty. Clear organisational guidance for the wide variety of NMP roles (especially CNS NMPs) would provide clarity with the expectation of NMPs and would guide all stakeholders involved in NMP practice.

9.1.2. Organisational governance

An organisational NMP practice guideline which includes guidance with aspects such as performing the NMP appraisal and support of qualifying NMPs is currently utilised within the organisation. However, there is no other organisational NMP governance in place at the study site, such as a NMP strategy or policy to guide development of NMP practice. The requirement for NMP governance within the organisation to address all aspects of NMP practice was identified by NMPs and medical prescribers throughout the programme of research. For example, if the boundaries of the NMP role were defined by the organisation, NMPs and consultants would receive guidance to support the NMP role. Some experienced NMPs within study one described needing to use their own initiative to progress their NMP practice. Therefore, implementing an NMP development pathway within the organisation to consultant level professional practice, in line with professional credentialing pathways e.g., the RPS credentialing frameworks, would guide individuals on a career pathway within their development as a prescriber.(143)

9.1.3. Clinic structure and skill mix

Consultants (study four) described how pharmacist and radiographer NMPs are not embedded within the consultant team and therefore do not have a good understanding and exposure to the complete patient pathway for that oncology disease site. By developing the career pathway for NMPs (discussed above) within the organisation, the NMPs involvement within the consultant team could also increase as the NMP progresses within their practice and this would increase their exposure to the pathway within one disease area. Although this would contradict the senior managers and consultant's suggestion of a generic role within study two and four respectively, where NMPs should be trained as generic prescribers who could practise across several specialist clinics, rather than be deeply involved with prescribing within one oncology disease area or with one consultant team. The generic prescribing role was also described within published literature by

Bourne et al.(93) Many newly qualified NMPs could be allocated to develop as generic prescribers rather than requesting that experienced advanced level prescribers already embedded within one specific area becoming generic prescribers. Organisational training and clarity of responsibilities of the generic NMP role would need to be provided by the organisation to embed these roles if strategically needed.

9.1.4. Multi-professional collaboration

Within all four studies, multi-professional collaboration was discussed by study participants. Within study one, NMPs were content with working in collaboration with other NMPs but also valued medical support. Within studies two and four, medical prescribers described how collaboration between nurse and pharmacist NMPs was 'ideal' and potentially should be reserved for newly qualified NMPs. The consultant participants (study two) expressed their opinion that the ideal model for patient review was a collaboration between a nurse NMP, consultant and pharmacist NMP where the patient reviews were alternated with different members of the collaboration within the clinic. Lennan(29) also recommended this model for patient review between an NMP and a medical prescriber within one single SACT clinic.(29) Some clinics within the organisation are already set up with this collaborative clinic model but many within the organisation are not. The structure of clinics within the organisation needs to be mapped and streamlined (as suggested by medical prescribers and senior managers within studies two and four) to ensure NMPs are supported but also allowed to develop with experience. The medical prescribers (study two) also described how NMP practice has a significant impact on specialist registrar (SPR) training, due to them failing to obtain significant exposure to straightforward patients as these patients are often seen by NMPs within clinics. Therefore, SPRs could be placed to support early years NMPs or within separate clinics to advanced level NMPs to ensure they obtain sufficient exposure to straightforward patients within their training. An organisation wide review of all clinic structures and models should be performed to explore the impact on all members of the MDT including its impact on MDT members who are in training positions.

9.1.5. Evaluation of NMP practice

Exploration of patients' opinions of NMP practice were suggested as being valuable by the senior managers within study two. NMPs and registrar (studies one and two respectively) described how patients may perceive NMPs to be more approachable, but consultants believed patients wanted more contact with their consultant. It may be possible that patients may wish to see the consultant for certain reasons e.g., radiology results and see NMPs at other times. Therefore, the clinic model of alternating (as previously discussed) between the different professional prescribers may be agreeable to patients. NMPs, consultants and senior managers (within studies one and two) were of

the opinion that there was a lack of patient awareness with who is reviewing them within the clinic, and they believed patients should be better aware. Although the registrar participant within study two agreed that patients were possibly unaware of the NMP role but described how patients are often content with their care regardless of who they are reviewed by, and the prescribers' professional background was irrelevant. To overcome potential issues of patient awareness, stakeholders suggested advising patients prior to starting treatment that they may see any member of the MDT throughout their treatment journey including NMP professionals. Patient opinion and experience data should be obtained to establish their satisfaction with patient care and how it relates to NMP practice.

NMP practice was described as difficult to evaluate by study one and study two participants, as NMP responsibilities and practice can vary across the study site depending on the clinic structure and MDT expectations of NMP practice. Senior managers and some medical prescribers (study two) suggested assessing the number of patients seen within the clinic to demonstrate the benefit of NMP practice. The NMPs and other medical prescribers (studies one and two) discussed that although patient review numbers could be assessed to evaluate NMP practice, NMPs add more to the MDT than enabling more patients to be reviewed within the clinic. NMPs were of the opinion that the complexity of each patient and the NMPs professional input to the clinic should be considered such as answering drug related queries. If clinic structures and patient pathways through each clinic were mapped as suggested by medical prescribers (study two) and senior managers (study two), clinic structures and patient pathways could be streamlined, aligned with NMP organisational governance standards for NMP practice. NMPs could then be appropriately placed within clinics where they are well supported and allow NMP practice development as the NMP gains experience. Evaluation of other measurable factors, such as reviewing patient waiting times for all prescribers within the clinic (suggested within study two), could be undertaken but may be affected by complex patient issues which can arise when practising within an MDT clinic. NMPs may be asked to provide professional input to the review of patients who are being reviewed by other members of the team, which can slow down the NMPs review of their patients and result in fewer patients reviewed.

9.1.6. Freeing up consultants' time

One significant benefit identified by NMPs and senior managers (studies one and two respectively) was the freeing up of consultants' time to review more complex patients. Although consultants (study two) described how the NMPs confidence, experience and personality can impact on how effective the NMP is within their role and therefore the amount of medical support required. The consultants (within study four) previously described NMP practice limitations, such as the need for

appropriate placement within clinics to enable support and a lack of required clinical expertise. Therefore, the amount of time 'freed up' may be dependent on the support they require because of their experience, personality, confidence and the clinic in which they practise. The consultants within study four described further the need to plan clinics so that there were appropriate patients for the NMP to review, as some patients need a medical review and are less appropriate for NMPs to review e.g., within advanced cancer clinics. Therefore, NMP practice may have less positive impact on these clinics as they are limited with the number of patients they are competent to review, hence reducing their impact on freeing consultant time.

9.1.7. Medical support

The need for medical support was seen as a limitation of NMPs' practice by consultants (studies two and four) even though NMPs are trained to appropriately refer to medical colleagues and not trained to have the same level of clinical skills as medical colleagues. There are many variations in the level of medical support required and participant NMPs and consultants described how experience is the main factor in appropriate referral to medical staff, which is also discussed within published literature by Cope et al.(44) Although there is now a large cohort of NMPs at the study site, the SACT service is still medically led due to the consultant team model clinical structure at the study site. Therefore, NMP development is heavily dependent upon the consultant mentor, a responsibility that the consultants within study four appreciate and are now feeling time pressures and responsibility to mentor NMPs. The development of a support network set up to support NMPs and appropriate organisational governance was recommended by all stakeholder participants especially the consultant participants within studies two and four. Support stakeholders either support the consultant within this role so that they experience less of a burden with this responsibility or other supportive roles could be developed such as NMP educator roles and lead NMP professionals within the organisations who could work collaboratively to support and develop the large NMP cohort. Within all four studies, line managers reviewing a portfolio of practice evidence within the NHS appraisal was discussed and described by all study stakeholder groups. Enabling line manager involvement within the assessment of NMP competency would reduce the consultants' burden and enable shared responsibility for competency assessment. Within studies three and four, peer review was suggested as a competency assessment method which would increase the workload of consultants, but consultant time could be reserved for peer review rather than annual NMP appraisals. Peer review was favoured by NMPs and consultants within studies three and four and would ensure shared opportunities and continuity with NMP practice across the organisation. This will also compliment the national plans for development of NMP competency standards by Health Education and Innovation Wales (HEIW) (a special health board organisation in Wales dedicated to

education and training for the Welsh healthcare workforce) which are pending approval by Welsh Government.(144)

Medical prescribers (studies two and four) expressed an opinion that NMPs confidence', experience and personality impacted on all aspects of NMP practice including when undertaking training and when practising e.g., when referring to medics. Medical prescribers (within study two and four) believed that pharmacists lacked confidence and potentially communication skills to support their NMP practice but concluded how they built confidence with experience. NMP support from line managers, the organisation, peers, and professional bodies was agreed to be beneficial as a support network for NMPs by consultants within study four but also suggested within study three by NMPs. Development of a buddying system pairing inexperienced NMPs with advanced level NMPs could support early years NMPs to build confidence within their practice, and was suggested by NMPs within study three, supported by consultants within study four and documented within published literature.(72, 102)

9.1.8. Funding

All stakeholders described the need for extra time or ring-fenced time within their role to enable NMPs to practise within the clinic (especially nurse NMPs), to enable completion of any post-qualifying training, and for consultant mentors to support the NMPs and undertake competency assessments. Bourne et al and George et al also described a need for financial backfill to support NMP practice.(71, 93) Therefore, to support further expansion of NMP practise within the organisation, there is not only a need for sound organisational governance strategies and guidance but also for necessary funding investment. This will allow staff to train and perform their NMP role and NMP support stakeholders identified to provide necessary support within their roles. Funding and therefore necessary backfill of NMPs was also identified by NMPs and senior managers within study one and two, as no backfill funded was provided for NMPs within the organisation when these studies took place. Since 2019, a funding deficit was identified within the organisation and newly qualified NMPs are now funded to practise within clinics so that their professional departments can backfill their roles. Although, NMPs who were placed prior to 2019 were seen as 'gifted' to the consultant teams and reimbursement was not received for their clinical sessions. Therefore, there is still a deficit but not as significant a deficit to each professional department.

9.1.9. NMP competency

Throughout studies three and four, NMPs and consultants were of the opinion that there was a link between training needs and establishing competency post-qualifying. NMPs and consultants identified the need for organisational guidance governance for both accessing training and assessing

NMP competency. They also suggested development of an NMP training programme dependent on NMPs level of experience (see Table 7.3 for draft outline). An organisational NMP training programme should align with the updated RPS competency framework for all prescribers and BOPA NMP guidance whilst utilising the RPS prescriber's toolkit.(14, 15, 21) All methods of delivery should be utilised and allocated time within stakeholder roles to complete training would support the programme. Funding the establishment of leadership roles within each NMP profession, such as the consultant radiographer role as described by the radiographer NMPs (study three) could provide the appropriate professional NMP leadership required within all professions. The professional NMP lead would guide NMP development, act as an advocate for NMP practice within each professional group and create equality in a potential training allocation panel, aid development of governance and develop the organisational NMP training programme.

The current annual NMP appraisal was believed to be appropriate as a competency assessment method by consultants (study four). One consultant (study four) suggested that the NMP appraisal alone is not a measure of competence and pharmacist NMPs within study three believed it was often just a paper exercise. These findings suggest that it may not be appropriate for the consultant mentor to be the sole reviewer of NMP competency using the annual NMP appraisal alone. The consultant mentor's involvement in the NMPs practice may also vary, which would impact on how appropriate the NMP appraisal is to demonstrate NMP competency. The NMPs and consultants described the need to use a mixed methods approach to assessing competency, where other methods such as OSCEs, peer review, prescribing audits would be used in combination. Nevertheless, the most favoured method for competency assessment by consultants (study four) was the production of an NMP portfolio of evidence in combination with MDT peer review. One nurse NMP (study three) described currently updating a portfolio of evidence for their unique role as a ward level nurse NMP which is reviewed by their line manager but signed off by their consultant mentor. The portfolio of evidence approach to competency assessment was also recommended within the BOPA NMP guidelines but this was not described by any other NMP within study three.(21) Use of a portfolio of evidence and peer review approach would relieve the pressure upon consultant mentors as the NHS annual job-role appraisal is routinely performed and the NMP appraisal review could be added to the annual employee NHS appraisal. Although, NMPs (study three) were of the opinion that the line manager support can be influenced by whether the line manager was an NMP. Incorporation of guidance for competency assessment within its NMP governance strategies would outline equitable methods and approaches to assessment for all NMP professionals within the organisation.

9.1.10. Management of supportive care

The management of supportive care e.g., prescribing for SACT induced nausea and vomiting was believed to be superior by NMPs themselves compared to medical prescribers (study one). However, some medical prescribers within study two expressed the opinion that NMPs were too cautious. Other medical prescribers and senior managers gave their opinion that NMPs prescribe appropriately. This range of opinions will benefit from further investigation. The consultants vary within their own practice and NMPs need to accommodate this variance when they review patients under the care of specific consultants. If an organisational main educator NMP role was developed, then NMPs may develop a more standardised management for certain conditions. In this manner adopting consultant specific prescribing habits or variations in practice may be reduced. A standardised approach may have advantages for patient care but in some cases may be less relevant depending on the aim of the NMPs role within that clinic if certain treatments are unique to that consultant's area of practice.

9.1.11. NMP training post-qualifying

Training topics described and classified by current NMP participants (study three) were seen as appropriate by consultants (study four) and these participants also discussed how self-directed learning should be utilised within the organisation. NMPs and consultants described how pharmaceutical company educational sessions are accessed if appropriate, but consultants saw these as less relevant for radiographer NMPs (study four) and should not be the only form of site-specific learning. Nevertheless, some NMPs in study three described this as their only formal learning training completed regularly for all NMPs. NMPs and consultants also expressed an opinion that a mixed methods approach to training delivery methods should be utilised to enable access for all NMPs across the organisation. All stakeholders within study three and four recommended the development of a rolling NMP training programme to ensure NMPs are continuously developing which could be linked into junior doctors training, enabling shared learning and experiences between different professionals (as suggested within study three).

Many stakeholders within the research programme described the need for certain NMP training such as patient clinical assessment, to be undertaken by all NMPs including nurse NMPs. One senior manager (study two) described development of clinical assessment skills as a particular requirement for pharmacist NMPs, but consultants (study four) expressed an opinion that pharmacist and radiographer NMPs lacked necessary clinical expertise. The number of NMPs who have completed the training may have changed between studies one and two, which took place between 2014 and 2015, and then studies three and four, which took place between 2018 and 2021, and clinical expertise may be potentially less of a concern by nurse NMPs as they spend a large proportion of

their daily practice within clinic alongside medical colleagues. All NMPs should complete the training and continue assessing patients to maintain the skills utilising OSCE methods as suggested by pharmacist NMPs (study one), nurse NMPs (study three) and consultants (study four) within their daily practice. The organisation should set boundaries for the use of clinical assessment skills within NMP governance plans as these skills can be lost if not utilised regularly. NMPs within study three requested guidance for expanding the NMP's scope of practice due to a lack of clarity within the organisation. Guidance for changing the NMP role to develop a new scope of practice is also needed. The organisational guidance for expanding scope should align with the RPS guidance for expanding prescribing scope of practice.(16)

9.1.12. NMP support

An integrated approach to NMP support was described by NMPs (study three) and consultants (study four). These stakeholders were of the opinion that a network of different stakeholders such as the consultant mentor, the organisation, their own line manager and professional body should be established to ensure NMP development meets SACT service demands. As the ever-increasing reliance on NMP practice within the organisation continues, it become more and more apparent that the NMP training, development and support should not be the sole responsibility of the consultant oncologist. Consultants recommended that a multi-faceted approach to NMP support should be incorporated, involving many stakeholders within the organisation to support each NMP. The overall responsibility of NMP development should lie with the organisation if the NMP practice is to continue to be heavily utilised by the organisation to support delivery of its SACT patient services.

9.1.13. Reflection of the influence of the lead researcher on the results obtained as an NMP working within the organisation

The lead researcher and principal investigator (SH) was an experienced NMP working within the organisation for many years and could therefore have influenced the research study. The participants may have been keen to support them due to good working relationships, by agreeing to participate in the studies and therefore this could have led to an increased attendance at the focus groups and SSIs within studies one to three and to completion of the survey within study four. The lead researcher had an established rapport and trust with the participants which resulted in a deeper understanding of the purpose of the research. Due to the lead researchers' prolonged engagement with the topic as an NMP themselves, they would have had a deeper understanding of the topic within the organisation which could have improved their interpretation of the results and analysis.(90) Drawbacks to the lead resarcher undertaking and facilitating the research were the possibility of introducing investigator bias which has been previous described within this thesis. The

risk of selection bias was minimised by inviting focus group and SSI participants using randomised sampling where possible (within studies one and three). The lead researcher facilitating all of the focus groups and SSIs which ensured continuity but could have influenced the discussions, due to personal relationships or own opinions and comments. This issue was identified as a possible concern and the facilitation of the focus groups and SSIs was undertaken with minimal impact and involvement within the disussions by providing no comments or opinions of their own, except to use non-leading probing questions where an explanation was needed or to introduce the next topic within the focus group/SSI topic framework to enable flow of the focus group or SSI. These actions minimise investigator bias within the study design, but investigator bias could have been further reduced if the focus groups/SSI were facilitated by a non-NMP from outside of the organisation whom did not know the participants. However, the non-NMP may have minimal knowledge of the topic being explored and this could have affected their ability to facilitate the focus group/SSI appropriately.

The lead researcher also transcribed the data verbatim and anonymised the data before analysing and interpreting the data as described within the study methods. Therefore, investigator bias could have also have been introduced when transcribing, to overcome this the manuscripts were checked for accuracy by at least one participant once anonymised. More than one research expert (not involved in the study) then evaluated and checked the thematic analysis and interpretation of the results to reduce any further bias that the lead researcher may have introduced such as overinterpretation. This ensured dependability. In summary, the lead researcher led the research to completion to fulfil a gap in the research area which needed to be explored but designed and evaluated a study design that minimised investigator bias where possible to ensure credibility and dependability and trustworthiness of the data obtained.(90)

9.1.14. Applicability of structured post-qualification training to other oncology sites and to other sites where general NMP practice takes place (e.g., hospital, GP Practice and community pharmacy)

Since UK legislation launched in 2005 enabling certain non-medical professionals to become independent prescribers, many UK cancer centres have implemented and establised NMP roles within their SACT cancer clinics across a wide range of specialties.(2) Some of the cancer centres have now established large cohorts of NMP professional prescribers who support a continuously expanding SACT service due to ever increasing patient numbers (particularly since the Covid-19 pandemic). The BOPA NMP guidelines(21) support and guide NMP practice within the oncology setting. These practice guidelines are utilised across the UK and therefore demonstrate that there is continuity to how oncology patients and SACT treatments should be managed across the UK.

Therefore the recommendations within this research programme, particularly regarding the introduction of a structured post-qualification training programme for oncology NMPs, would benefit all NMPs managing cancer patients and protocol standardised SACT treatments within cancer centres across the UK, which ensures continuity of care for patients regardless of their location. Therefore this research programme, should be generalisable to other UK cancer centres, although its generalisability has not been explored within other research.

The implementation of a structured post-qualification NMP training programme (as suggested) within other sectors or sites within general healthcare is likely to be beneficial to all areas of practice as there is limited guidance and published literature to support NMPs across the healthcare system after obtaining their qualification to prescribe. However, the choice of topics chosen within this research programme may be less relevant, such as IRMER training or psychology of the cancer patient, but other types of training such as communication and clinical skills would be relevant to all areas of healthcare and should form a basis of a post-qualification training programme. Developing and implementing a training programme across all areas of healthcare would support progression within the NMP role across all professions, and allow prescribers and professionals to develop clinically within their career aligned with professional credentialing requirements to consultant level.

The location of SACT treatment delivery to patients is also being exploring following a recent Welsh Government strategy named 'A Healthier Wales', which describes how patients should receive their treatment closer to home.(145) Currently, many cancer patients receive their SACT treatment within specialist cancer centres but future developments within healthcare along with NHS staffing pressures, may require staff from the more general sectors such as GP practices and community pharmacists to manage cancer patients on lower risk treatments within their community. These NMP professionals would need to receive training and support post-qualifying as an NMP to become competent with managing cancer patients and SACT treatments and would therefore benefit from a structured NMP post-qualifying training programme tailored to support their practice needs.The training needs of the increasing NMP workforce will also increase in 2026, due to the increasing number of professionals qualifying as NMPs.(128, 146)

9.1.15. Impact of the new General Pharmaceutical Council (GPhC) Initial Education and Training standards and how it will influence how pharmacist NMPs fit into current practice in the future

The recent initial education and training standards published by the GPhC in 2021, has set learning outcomes for HEIs to ensure that undergraduate pharmacy professionals qualify as independent prescribers upon graduation, with the first cohort due to qualify in 2026.(147) There is now a

professional ‘push’ for all current pharmacist professionals to become NMPs within the next three years to ensure the pharmacist workforce is aligned, and have also created a need for all organisations to establish a clear pathway for the safe utility of these newly qualified pharmacist prescribers within clinical practice. Newly qualified prescribing pharmacists have basic general clinical knowledge, but this prescribing resource could be utilised to treat certain conditions within GP practice or community pharmacy rather than entering specialist areas early within their career, whilst addressing the vision described by the Welsh Government.(145) Although the limited clinical knowledege of newly qualified pharmacists should not inhibit their employment within specialist centres due to staff retention issues. A pathway should be created for these newly qualified pharmacist professionals to complete post-qualifying training within a structured programme working towards more specialist roles over a defined timeframe aligned within the RPS publication ‘Pharmacy delivering a healthier Wales 2025 goals’ launched at the end of 2022.(148) For example within cancer care, pharmacists may initially use their prescribing ability to support the SACT administration of cancer patients on day units as a generalist prescriber prescribing non-SACT treatments, or run telephone clinics reviewing and prescribing for patients on low risk SACT treatments where appropriate. Utilising general NMPs within this capacity would release workload impact on busy oncology clinics and experienced professional prescribers. Therefore, working towards all pharmacists being qualified to prescribe should be taken as an opportunity to upskill the pharmacy workforce, and create a career development pathway for pharmacist prescribers supported by a post-qualification NMP structured programme aligned with NMP competency assessment plans in development within Wales led by HEIW. Many of these points are aligned and discussed within the research programme findings within this thesis.

9.2. Programme conclusion

Many aspects of NMP practice were investigated within this research programme by exploring the experiences, opinions, and recommendations of a number of stakeholders, which included NMPs, consultant oncologists and senior managers directly involved with the clinical utility, training, and delivery of NMP practice within the organisation. Within study one and two, there were clear opinions and recommendations of the barriers, benefits and factors affecting NMP practice whilst exploring aspects of NMP practice such as funding, clinic placement and the dual role for CNS NMPs. NMP training post-qualifying was then further explored within two subsequent studies (three and four). Study three explored NMPs opinions and recommendations of NMP practice, by identifying the training that current NMP participants had received, the factors affecting the current NMP training and suggested a draft training matrix for use within the organisation. The final study explored the consultant oncologists’ opinions and recommendations of NMPs training, particularly

regarding their support, competency and training topics and training methods of delivery. The consultants described variation and similarities between NMP professional groups, believed that the NMP appraisal should be undertaken alongside other methods of assessment and identified stakeholders who should support NMP practice.

The research programme studies discussed the need for organisational governance strategies and guidance to lead, deliver and support the organisation's increased reliance on NMP practice to deliver the SACT service to patients with cancer across South-East Wales. Definition of the NMP roles is needed especially the nursing CNS NMP role within practice and potential separate holistic nurse-led clinics should be set up for supportive care. The need for mapping of clear standardised clinic structure and models to complement the multi-disciplinary skill mix and patient pathway was also recommended by programme participants. Career progression for NMPs is needed at all levels of experience (to consultant level practice) and increased incorporation of all NMPs within the consultant team where appropriate.

To address the issues identified by the research programme, a multi-stakeholder organisational support network should be established and defined incorporating potential new roles for NMP mentors and educator roles and departmental professional leads. A buddy system of NMPs and cross-professional NMP support could also be established within the organisation. NMP competency assessment methods should also be defined within organisational strategies to support NMPs and their assessors with their practice and competency review and incorporate a mixed method approach to assessment and not to rely solely on the annual NMP appraisal.

Development of an NMP rolling training programme related to both early years and advanced level NMPs was recommended within the research programme to support all stakeholders with NMP progression, and a mixture of training topics and training delivery methods should be incorporated. Time for the training should be incorporated into the roles of NMPs and their consultant mentors and any other supportive roles established by receiving funding from the organisation.

Due to the increasing number of professionals becoming registered as NMPs, ring-fenced time and funding resource needs to be considered within stakeholder job descriptions and appropriate backfill provided for NMPs to practise as NMPs. These recommendations will address factors identified as barriers to NMP practice across the organisation and support the future delivery of NMP practice within the organisations SACT patient service.

A summary of research programme recommendations for practice is provided below.

9.3. Programme recommendations for practice at the study site

The NMP role

1. The oncology NMP role should be defined by the organisation and appropriate NMP governance developed to clarify organisational expectations of the NMP role.
2. Development of an oncology generic NMP role should be considered to enable increased flexibility within NMP practice.

Organisational governance

3. Organisational governance for all aspects of NMP practice i.e., support, training, responsibilities of NMP practice is needed to meet up-to-date clinical service demands.
4. Establishing professional NMP lead roles would be essential to support the development of organisational NMP governance strategies to protect both patients and NMP staff by the implementation of governance NMP frameworks and guidelines.

Clinic structure and skill-mix

5. The SACT pre-assessment clinic set-up and structure should be standardised where possible to maximise the utility of NMP practice and its future development.
6. NMPs should be placed within appropriate clinics with sufficient skill-mix so that medical support can be provided to the NMP to further develop NMP confidence within their practice.
7. Separate nurse-led clinics should be set up outside of the SACT pre-assessment clinics to assess patients' holistic needs.
8. Pharmacist and radiographer NMPs should become embedded within the consultant team to develop their clinical expertise and a clear overview of the patient journey currently experienced by nurse NMPs.

Evaluation of NMP practice

9. The NMP role should be evaluated by exploring patient experience and satisfaction data.
10. Patient opinion focussed research on NMP practice is required to guide service development and to obtain funding for development of the NMP service.

Funding

11. Appropriate backfill funding needs to be issued to each department where NMP professionals are practising within another department within the clinical service.

NMP competency

12. Annual NMP appraisals should be incorporated into line manager appraisals utilising the NMP portfolio of evidence tool.
13. A mixed methods approach to NMP competency should be established within the organisation by incorporating peer review into NMP assessment frameworks.

NMP training post-qualifying

14. NMP post-qualifying training opportunities should be developed by the organisation to aid the future development of all NMPs.
15. Development of an organisation wide NMP training guide would aid consultant and line manager support with NMP career progression.
16. A varied training programme should be available which incorporates training topics appropriate to the level of experience and professional group to which the NMP belongs. Any implemented training programme should utilise various training methods of delivery.
17. A mixed methods approach to NMP training delivery is needed and should be guided by organisational NMP structures and leadership.
18. Professional group NMP leads should be appointed to encourage NMP networking and form a panel to manage study leave and funding for training requests.

NMP support

19. Organisational support and investment are needed to develop the NMP workforce and meet service needs.
20. Consultant mentors need protected time to support NMPs with their training and perform competency assessments of NMPs under their management and NMPs need protected time within their role to undertake relevant NMP training within a structured organisation-led training programme.
21. The NMP's organisation should ensure a 'holistic approach' to NMP support is in place from various support providers to ensure NMP development needs meet SACT service demands such as to ensure flexibility to work across consultant teams.

10. Chapter Ten: Summary of publications and conference submissions

10.1. Study one

10.1.1. Unpublished draft journal article (not submitted to journal– in draft)

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Wilson, K, Terry, D.R., Non-medical prescribers' opinions and recommendations concerning non-medical prescribing within current oncology practice.

10.1.2. Conference oral presentation at 78th FIP World Congress of Pharmacy and Pharmaceutical Sciences, Glasgow UK. 2-6th September 2018

Harding, S.E, Borley A, Terry, D.R., Tranter, B., Wilson. K., Non-medical prescribers' opinions and beliefs of non-medical prescribing practice in oncology.

10.1.3. Conference poster presentation at BOPA conference October 2018 and published conference abstract within Journal of Oncology Pharmacy Practice (JOPP)

Harding, S.E, Borley A, Terry, D.R., Tranter, B., Wilson. K., Non-medical prescribers' opinions and beliefs concerning nonmedical prescribing within oncology. Abstracts. Journal of Oncology Pharmacy Practice. 2018;24(8_suppl):1-67. doi:10.1177/1078155218796724 (See Appendix XIIII).

10.2. Study two

10.2.1. Unpublished draft journal article (not submitted to journal – in draft)

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Wilson. K., Terry, D.R., Opinions and recommendations of medical prescribers and senior managers concerning non-medical prescribing practice within oncology.

10.2.2. Conference poster presentation at 78th FIP World Congress of Pharmacy and Pharmaceutical Sciences, Glasgow UK. 2-6th September 2018

Harding, S.E, Borley A, Terry, D.R., Tranter, B., Wilson. K., Opinions of medical prescribers and senior managers concerning non-medical prescribing practice in oncology.

10.2.3. Conference poster presentation at BOPA conference October 2018 and published conference abstract within JOPP

Harding, S.E, Borley A, Terry, D.R., Tranter, B., Wilson. K., Opinions of medical prescribers and senior managers concerning non-medical prescribing practice in oncology. Abstracts. Journal of Oncology Pharmacy Practice. 2018;24(8_suppl):1-67. doi:10.1177/1078155218796724 (See Appendix X)

10.3. Study three

10.3.1. Published journal article – International Journal of Clinical Pharmacy (IJCP)

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Terry, D.R., Experiences and opinions of multi-professional non-medical oncology prescribers on post-qualification training: a qualitative study. Int J Clin Pharm 44, 698–708 (2022). https://doi.org/10.1007/s11096-022-01396-6. (Appendix XIII).

10.3.2. Conference oral presentation at SACT research event - Welsh Cancer Network - September 2021

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Terry, D.R., Experiences, opinions and recommendations of multi-professional non-medical oncology prescribers on post-qualification training.

10.3.3. Oral Presentation – Celebration of Research Event – Velindre Cancer Centre – October 2021

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Terry, D.R., Opinions and recommendations of Nurse, Pharmacist and Radiographer non-medical prescribers on post-qualification training (see Appendix XI).

10.4. Study four

10.4.1. Unpublished journal article - Submitted to IJCP 16th October 2022 – awaiting response.

Harding, S.E., Langley, C.A., Borley, A., Tranter, B., Terry, D.R. Experiences and opinions of consultant oncologist mentors on the training needs of multi-professional non-medical oncology prescribers.

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APPENDIX I: Study One - Participant Information Sheet (PIS) & consent form

Participant Study Information Sheet

You are invited to take part in a research study which is entirely voluntary. Before you decide whether to take part it is important for you to understand what it will involve, and the purpose of the research being undertaken. Please read the following information carefully.

Lead research workers and subject area responsible

This study is being led by:

Researcher: Mrs Sophie Harding, Pharmacy Dept., Velindre Cancer Centre, Cardiff

Principal Investigator: Dr David Terry, Life & Health Sciences, Aston University, Birmingham

Project Title

An Investigation into Non-medical Prescribing within Oncology

What is the purpose of the study?

The purpose of this study is to determine the opinions and beliefs of practising NMPs within oncology, in order to identify the utilities and benefits of this group.

You currently either work as a prescriber within VCC or are responsible for the utility of Non-Medical Prescribers (NMP) within VCC. We want to capture your opinions and beliefs to help us identify how the NMP role is best utilised within oncology. This will involve four focus groups including pharmacist NMPs, nurse NMPs, consultants and registrars separately and then further semi-structured interviews to establish the views of senior managers responsible for NMP management and funding. Each focus group and interview will have pre-determined themes and topics to aid the researcher (Mrs Sophie Harding), to guide the focus group or interview sessions.

Why have I been chosen?

You have either been randomly selected from a pool of prescribers from each discipline within the multidisciplinary team, or you currently influence NMP practice as your role as a Senior Manager

within VCC. Your opinions and beliefs on NMP prescribing is important and relevant to how the NMP is utilised within oncology in the future.

What will happen if I take part?

By volunteering to participate you will giving consent to participate in an allocated focus group session or semi-structured interview held within VCC and offer opinions and beliefs on NMP practice within oncology when prompted using pre-determined themes. You will not be required to carry out any form of research or study prior to the session, as all relevant information regarding focus groups or interviews will be sent to you via email prior to the session taking place. Written informed consent will also be obtained prior to the focus group or interview session commencing and you will receive a copy to retain for your own reference. All data obtained will be fully anonymised. You will be asked to complete an evaluation/feedback form after taking part in the focus group or interview session.

Are there any potential risks in talking part in the study?

There is a possibility of risk of breaching privacy and confidentiality in relation to certain patient details and therefore this risk will be minimised by asking all participants to avoid identifying any patients specifically. The data obtained will be kept anonymous at all times as well as not identifying which member of staff provided each opinion, belief or comment. As a member of VCC staff, Mrs Sophie Harding will be responsible for putting your results onto a database for analysis and maintaining your privacy and confidentiality. Other members of the research team will only be given access to the database after your identity has been removed.

The participants should not divulge the content of the focus group or interview outside of the focus group or interview session as all discussions should remain confidential.

Do I have to take part?

No, you do not have to participate if you do not wish to do so. You are free to withdraw at any time from the project, whilst participating within the focus group or interview or within 14 days of taking part in the focus group/interview session. No sanctions will be taken against any employee of Velindre Cancer Centre who refuses to participate in or withdraws from the study.

Expenses and payments:

Participation within the study will not involve any expenses or payments.

Will my taking part in this study be kept confidential?

Yes, your participation in the study will be fully confidential. All reports of the study will be fully anonymised, and no participant will be identifiable from the results. The data collected during the focus groups or interviews will be stored for one year and then destroyed.

What will happen to the results of the research study?

We aim to publish the results of this study. However, there will be no reference to any individual participant in any publication.

Who is organising and funding the research?

Mrs Sophie Harding is leading the study as part of her Professional Pharmacy Doctorate (PharmD) course at Aston University, Birmingham. The course is currently funded by the Charitable Funds Committee at Velindre Cancer Centre which is dependent on annual updates on research progression.

Who has reviewed the study?

This study has been given a favourable view by the School of Life and Health Sciences Ethics Committee, Aston University, Birmingham and approved by Velindre NHS Trust Research & Development Department.

Who do I contact if something goes wrong or I need further information?

Please feel free to contact:

Researcher: Mrs Sophie Harding (hardinse@aston.ac.uk or sophie.harding2@wales.nhs.uk or 02920 316227)

or

Principal Investigator: David Terry (d.terry@aston.ac.uk or 0121-333-9793)

Who do I contact if I wish to make a complaint about the way in which the research is conducted

If you have any concerns about the way in which the study has been conducted, then you should contact the Administrator of the School of Life and Health Sciences Ethics Committee at Aston University on r.giles@aston.ac.uk or telephone 0121 204 4665.

Thank you for your time in considering this important study.

If you are willing to take part in the study, please complete the form below.

Aston University

VOLUNTEER CONSENT FORM

Title of Project: An Investigation into Non-medical Prescribing within Oncology

Name of Researcher: Mrs Sophie Harding

Principal Investigator: Dr David Terry (d.terry@aston.ac.uk or 0121-333-9793)

If you are willing to consent to participate, please initial all the consent boxes that you agree with and sign and date below.

	Please initial
I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
I understand that my participation is voluntary and that I am free to withdraw at any time from the study without giving any reason, without my medical care or my legal rights being affected.	
I agree to take part in the above study and will refrain from divulging any content of the focus group or interview outside of the focus group or interview session.	
I agree to any comments I make during the focus group or interview to be directly quoted, but documented anonymously if relevant to the study outcome	

Participants name Date Signature

…… …… ……..

Researcher name Date Signature

…… …… …….

Once completed, please return to Mrs Sophie Harding as soon as possible

Sophie Harding, Pharmacy Dept., Velindre Cancer Centre, Cardiff, CF14 2TL.

(02920 316227; sophie.harding2@wales.nhs.uk)

This study has been given a favourable view by the School of Life and Health Sciences Ethics Committee, Aston University, Birmingham.

APPENDIX II: Study Two – PIS and consent form

Participant Study Information Sheet

You are invited to take part in a research study which is entirely voluntary. Before you decide whether to take part it is important for you to understand what it will involve, and the purpose of the research being undertaken. Please read the following information carefully.

Lead research workers and subject area responsible

This study is being led by:

Researcher: Mrs Sophie Harding, Pharmacy Dept., Velindre Cancer Centre, Cardiff

Principal Investigator: Dr David Terry, Life & Health Sciences, Aston University, Birmingham

Project Title

An Investigation into Non-medical Prescribing within Oncology

What is the purpose of the study?

The purpose of this study is to determine the opinions and beliefs of practising NMPs within oncology, in order to identify the utilities and benefits of this group.

You currently either work as a prescriber within VCC or are responsible for the utility of Non-Medical Prescribers (NMP) within VCC. We want to capture your opinions and beliefs to help us identify how the NMP role is best utilised within oncology. This will involve four focus groups including pharmacist NMPs, nurse NMPs, consultants and registrars separately and then further semi-structured interviews to establish the views of senior managers responsible for NMP management and funding. Each focus group and interview will have pre-determined themes and topics to aid the researcher (Mrs Sophie Harding), to guide the focus group or interview sessions.

Why have I been chosen?

You have either been randomly selected from a pool of prescribers from each discipline within the multidisciplinary team, or you currently influence NMP practice as your role as a Senior Manager

within VCC. Your opinions and beliefs on NMP prescribing is important and relevant to how the NMP is utilised within oncology in the future.

What will happen if I take part?

By volunteering to participate you will giving consent to participate in an allocated focus group session or semi-structured interview held within VCC and offer opinions and beliefs on NMP practice within oncology when prompted using pre-determined themes. You will not be required to carry out any form of research or study prior to the session, as all relevant information regarding focus groups or interviews will be sent to you via email prior to the session taking place. Written informed consent will also be obtained prior to the focus group or interview session commencing and you will receive a copy to retain for your own reference. All data obtained will be fully anonymised. You will be asked to complete an evaluation/feedback form after taking part in the focus group or interview session.

Are there any potential risks in talking part in the study?

There is a possibility of risk of breaching privacy and confidentiality in relation to certain patient details and therefore this risk will be minimised by asking all participants to avoid identifying any patients specifically. The data obtained will be kept anonymous at all times as well as not identifying which member of staff provided each opinion, belief or comment. As a member of VCC staff, Mrs Sophie Harding will be responsible for putting your results onto a database for analysis and maintaining your privacy and confidentiality. Other members of the research team will only be given access to the database after your identity has been removed.

The participants should not divulge the content of the focus group or interview outside of the focus group or interview session as all discussions should remain confidential.

Do I have to take part?

No, you do not have to participate if you do not wish to do so. You are free to withdraw at any time from the project, whilst participating within the focus group or interview or within 14 days of taking part in the focus group/interview session. No sanctions will be taken against any employee of Velindre Cancer Centre who refuses to participate in or withdraws from the study.

Expenses and payments:

Participation within the study will not involve any expenses or payments.

Will my taking part in this study be kept confidential?

Yes, your participation in the study will be fully confidential. All reports of the study will be fully anonymised, and no participant will be identifiable from the results. The data collected during the focus groups or interviews will be stored for one year and then destroyed.

What will happen to the results of the research study?

We aim to publish the results of this study. However, there will be no reference to any individual participant in any publication.

Who is organising and funding the research?

Mrs Sophie Harding is leading the study as part of her Professional Pharmacy Doctorate (PharmD) course at Aston University, Birmingham. The course is currently funded by the Charitable Funds Committee at Velindre Cancer Centre which is dependent on annual updates on research progression.

Who has reviewed the study?

This study has been given a favourable view by the School of Life and Health Sciences Ethics Committee, Aston University, Birmingham and approved by Velindre NHS Trust Research & Development Department.

Who do I contact if something goes wrong or I need further information?

Please feel free to contact:

Researcher: Mrs Sophie Harding (hardinse@aston.ac.uk or sophie.harding2@wales.nhs.uk or 02920 316227)

or

Principal Investigator: David Terry (d.terry@aston.ac.uk or 0121-333-9793)

Who do I contact if I wish to make a complaint about the way in which the research is conducted

If you have any concerns about the way in which the study has been conducted, then you should contact the Administrator of the School of Life and Health Sciences Ethics Committee at Aston University on r.giles@aston.ac.uk or telephone 0121 204 4665.

Thank you for your time in considering this important study.

If you are willing to take part in the study, please complete the form below.

Aston University

VOLUNTEER CONSENT FORM

Title of Project: An Investigation into Non-medical Prescribing within Oncology

Name of Researcher: Mrs Sophie Harding

Principal Investigator: Dr David Terry (d.terry@aston.ac.uk or 0121-333-9793)

If you are willing to consent to participate, please initial all the consent boxes that you agree with and sign and date below.

	Please initial
I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
I understand that my participation is voluntary and that I am free to withdraw at any time from the study without giving any reason, without my medical care or my legal rights being affected.	
I agree to take part in the above study and will refrain from divulging any content of the focus group or interview outside of the focus group or interview session.	
I agree to any comments I make during the focus group or interview to be directly quoted, but documented anonymously if relevant to the study outcome	

Participants name Date Signature

…… …… ……..

Researcher name Date Signature

…… …… …….

Once completed, please return to Mrs Sophie Harding as soon as possible

Sophie Harding, Pharmacy Dept., Velindre Cancer Centre, Cardiff, CF14 2TL.

(02920 316227; sophie.harding2@wales.nhs.uk)

This study has been given a favourable view by the School of Life and Health Sciences Ethics Committee, Aston University, Birmingham.

APPENDIX III: Study Three - Participant information Sheet and consent form

The Skills and Training Requirements of Pharmacist, Nurse and Radiographer NMPs within Oncology: Interviews

Participant Information Sheet (NMP Interviews) Version 5

Invitation

We would like to invite you to take part in a research study.

Before you decide if you would like to participate, take time to read the following information carefully and, if you wish, discuss it with others such as your family, friends or colleagues.

Please ask a member of the research team, whose contact details can be found at the end of this information sheet, if there is anything that is not clear or if you would like more information before you make your decision.

What is the purpose of the study?

The purpose of this study is to determine the skills and training of practising Non-Medical Prescribers (NMPs) within oncology - in order to produce a skills and training matrix for NMP practice within oncology.

You currently work as a non-medical prescriber within Velindre Cancer Centre (VCC). We want to capture your opinions of the desired training and skills of NMPs within oncology. This will involve undertaking semi-structured interviews of nine pharmacist NMPs, nurse NMPs and radiographer NMPs. Each interview will have pre-determined questions to aid the researcher (Mrs Sophie Harding), to guide each interview session.

Why have I been chosen?

You are being invited to take part in this study because you work as a pharmacist, nurse and/or radiographer NMPs within your oncology practice as part of a multidisciplinary team within VCC and have been randomly selected to participate. Your opinion on the desired skills and training of NMPs is important and relevant to NMP development within oncology in the future.

What will happen to me if I take part?

By volunteering to take part you will giving consent to participate in an allocated interview session held within VCC (or virtually during the covid pandemic) and offer opinions on the desired training and skills requirements of NMP practice within oncology. You will not be required to carry out any form of research or study prior to the session. Written informed consent will be obtained prior to the interview session commencing (see Appendix A) and you will receive a copy to retain for your own reference (written consent will be obtained via email electronically during the covid pandemic). All data obtained will be fully anonymised.

Study interviews undertaken during the covid pandemic will be undertaken virtually using Microsoft® Teams software.

Do I have to take part?

No. It is up to you to decide whether or not you wish to take part.

If you do decide to participate, you will be asked to sign and date a consent form before starting the interview. You are free to withdraw from the study whilst participating within the interview or within a two-week period after the interview.

No sanctions will be taken if you decide not to participate in or withdraw from the study.

Will my taking part in this study be kept confidential?

Yes. A code will be attached to all the data you provide to maintain confidentiality.

Analysis of your data will be undertaken using coded data.

The data we collect will be stored in a secure document store electronically on a secure password protected computer server by the researcher for one year and then destroyed.

To ensure the quality of the research, Aston University may need to access your data to check that the data has been recorded accurately. If this is required, your personal data will be treated as confidential by the individuals accessing your data.

What are the possible benefits of taking part?

While there are no direct benefits to you of taking part in this study, the data gained could potentially aid the development of NMP strategies related to NMP training within Velindre University NHS Trust.

What are the possible risks and burdens of taking part?

There is a possibility of risk of breaching privacy and confidentiality in relation to certain patient details and therefore this risk will be minimised by asking all participants to avoid identifying any patients specifically. The data obtained will be kept anonymous at all times. Within any written reports we will not identify which member of staff provided each opinion, comment or piece of information, but will label any quotations using a study 'code' previously assigned e.g. Pharmacist One. As a member of VCC staff, Mrs Sophie Harding will be responsible for putting your results onto a database for analysis and maintaining your privacy and confidentiality. Other members of the research team will only be given access to an anonymised database.

A protected lookup table of participants and their coded anonymised numbers will be kept by the researcher. Therefore, in the event that a break of confidentiality is needed e.g., in order to remove a participant from the study under their request, or to change the location of the interview etc, the lookup table could be used by the researcher only to identify and contact participants.

The participants should not divulge the content of the interview outside of the interview session as all discussions are confidential.

What will happen to the results of the study?

The results of this study may be published in scientific journals and/or presented at conferences.

A lay summary of the results of the study will be available for participants when the study has been completed and the researchers will ask if you would like to receive a copy.

The results of the study will also be used in Sophie Harding's Doctor of Pharmacy (PharmD) thesis submission.

Expenses and payments

Participation within the study will not involve any expenses or payments.

Who is funding the research?

Mrs Sophie Harding is leading the study as part of her Professional Pharmacy Doctorate (PharmD) course at Aston University, Birmingham. The course is currently funded by the Charitable Funds Committee at VCC which is dependent on annual updates on research progression.

Who is organising this study and acting as data controller for the study?

Aston University is organising this study and acting as data controller for the study. You can find out more about how we use your information in Appendix B.

Who has reviewed the study?

This study was given a favorable ethical opinion by the School of Life & Health Sciences Research Ethics Committee and approved by Velindre University NHS Trust Research & Development (R&D) Department.

What if I have a concern about my participation in the study?

If you have any concerns about your participation in this study, please speak to the research team and they will do their best to answer your questions. Contact details can be found at the end of this information sheet.

If the research team are unable to address your concerns or you wish to make a complaint about how the study is being conducted, you should contact the Aston University Research Integrity Office at research_governance@aston.ac.uk or telephone 0121 204 3000.

Research Team

Principal Investigator (Researcher): Mrs Sophie Harding (email: hardinse@aston.ac.uk or Sophie.harding2@wales.nhs.uk or 02920 316223)

or

Project Supervisor: Dr David Terry (d.terry@aston.ac.uk or 0121-204-3941).

Thank you for taking time to read this information sheet. If you have any questions regarding the study please don't hesitate to ask one of the research team.

Consent Form for The Skills and Training Requirements of Pharmacist, Nurse and Radiographer NMPs within Oncology: Interviews (Version 5)

Name of Chief Investigator:__Sophie Harding_____

Please initial boxes

	I confirm that I have read and understand the Participant Information Sheet (version 5 dated 21/03/2021) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
	I understand that my participation is voluntary and that I am free to withdraw within a two-week period after the interview without giving any reason and without my legal rights being affected.	
	I agree to my personal data and data relating to me collected during the study being processed as described in the Participant Information Sheet.	
	I agree to my interview being audio recorded and to anonymised direct quotes from me being used in publications resulting from the study.	
	I agree to take part in this study.	

_____ _____ _____

Name of participant Date Signature

_____ _____ _____

Name of Person receiving Date Signature

consent.

Once completed, please return to Mrs Sophie Harding as soon as possible.

Sophie Harding, Pharmacy Dept, Velindre Cancer Centre, Cardiff, CF14 2TL.

(02920 316227; sophie.harding2@wales.nhs.uk or hardinse@aston.ac.uk)

Please provide your email address below if you would like a summary of the results:

.....

APPENDIX B: **Transparency statement**

Aston University takes its obligations under data and privacy law seriously and complies with the General Data Protection Regulation ("GDPR") and the Data Protection Act 2018 ("DPA").

Aston University is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study. Aston University will process your personal data in order to register you as a participant and to manage your participation in the study. It will process your personal data on the grounds that it is necessary for the performance of a task carried out in the public interest (GDPR Article 6(1)(e). Aston University may process special categories of data about you which includes details about your health. Aston University will process this data on the grounds that it is necessary for statistical or research purposes (GDPR Article 9(2)(j)). Aston University will keep identifiable information about you for 6 years after the study has finished.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally identifiable information possible.

You can find out more about how we use your information at www.aston.ac.uk/dataprotection or by contacting our Data Protection Officer at dp_officer@aston.ac.uk.

If you wish to raise a complaint on how we have handled your personal data, you can contact our Data Protection Officer who will investigate the matter. If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful you can complain to the Information Commissioner's Office (ICO).

APPENDIX IV: Study Four – PIS and consent form

Aston University
BIRMINGHAM UK

GIG CYMRU NHS WALES
Ymddiriedolaeth GIG Prifysgol Felindre
Velindre University NHS Trust

The Skills and Training Requirements of Pharmacist, Nurse and Radiographer NMPs within Oncology: Survey

Participant Information Sheet (Version 5)

Invitation

We would like to invite you to take part in a research study.

Before you decide if you would like to participate, take time to read the following information carefully and, if you wish, discuss it with others such as your family, friends or colleagues.

Please ask a member of the research team, whose contact details can be found at the end of this information sheet, if there is anything that is not clear or if you would like more information before you make your decision.

What is the purpose of the study?

The purpose of this study is to determine the skills and training of practising Non-Medical Prescribers (NMPs) within oncology - in order to produce a skills and training matrix for NMP practice within oncology.

As you are currently a consultant oncologist who may work with NMPs within Velindre Cancer Centre (VCC), we want to capture your opinions of the desired training and skills of NMPs within oncology. This will involve receiving an electronic survey via NHS email from the researcher and being asked to complete the survey online. The survey will contain pre-determined questions to aid the researcher (Sophie Harding), to obtain valuable data on the training and skills of NMPs within oncology.

Why have I been chosen?

You are being invited to take part in this study because you work with pharmacist, nurse and/or radiographer NMPs within your oncology practice as part of a multidisciplinary team within VCC. Your opinion on the desired skills and training of NMPs is important and relevant to NMP development within oncology in the future.

What will happen to me if I take part?

The study information sheet and consent form is attached as a cover sheet to the electronic survey (an example of the electronic consent form can be found in Appendix A). The short electronic survey will be distributed by the researcher via a secure Velindre University NHS Trust email account. The survey will ask pre-determined questions on the desired training and skills requirements of NMP practice within oncology and will take approximately 15-20 minutes to complete. You will not be required to carry out any form of research or study prior to the session. Written informed consent will also be obtained electronically at the start of the survey prior to the survey commencing (see Appendix A). All data obtained will be anonymised.

Do I have to take part?

No. It is up to you to decide whether or not you wish to take part.

If you do decide to participate, you will be asked to sign and date an electronic consent form before starting the survey. You are free to withdraw from the study whilst participating within the survey, but once the survey is submitted the details will be put forward for analysis and possible inclusion in the findings.

No sanctions will be taken if you decide not to participate in or withdraw from the survey study.

Will my taking part in this study be kept confidential?

Yes. A code will be attached to all the data you provide to maintain confidentiality.

Analysis of your data will be undertaken using coded data.

The data we collect will be stored in a secure document store electronically on a secure password protected computer server by the researcher until the final report is submitted in approximately 12 months' time and then destroyed.

To ensure the quality of the research, Aston University may need to access your data to check that the data has been recorded accurately. If this is required, your personal data will be treated as confidential by the individuals accessing your data.

What are the possible benefits of taking part?

While there are no direct benefits to you of taking part in this study, the data gained could potentially aid the development of NMP strategies related to NMP training within Velindre University NHS Trust.

What are the possible risks and burdens of taking part?

There is a possible risk of breaching privacy and confidentiality in relation to certain patient details. This risk will be minimised by requesting that all survey participants avoid identifying any patients in their responses and participants. The data obtained will be kept anonymous at all times. In any written reports we will not be able to identify which member of staff provided each opinion, comment or piece of information as consultant participant names will not be taken during the survey. The researcher will be responsible for putting your results onto a database for analysis and maintaining your privacy and confidentiality. Other members of the research team maybe given access to the anonymised data.

The participants should not divulge the content of the completed survey as all survey responses should remain confidential.

What will happen to the results of the study?

The results of this study may be published in scientific journals and/or presented at conferences.

A lay summary of the results of the study will be available for participants when the study has been completed and the researchers will ask if you would like to receive a copy as part of the electronic consent.

The results of the study will also be used in Sophie Harding's Doctor of Pharmacy (PharmD) thesis submission.

Expenses and payments

Participation within the study will not involve any expenses or payments.

Who is funding the research?

Mrs Sophie Harding is leading the study as part of her Professional Pharmacy Doctorate (PharmD) course at Aston University, Birmingham. The course is currently funded by the Charitable Funds Committee at VCC which is dependent on annual updates on research progression.

Who is organising this study and acting as data controller for the study?

Aston University is organising this study and acting as data controller for the study. You can find out more about how we use your information in Appendix B.

Who has reviewed the study?

This study was given a favorable ethical opinion by the School of Life & Health Sciences Research Ethics Committee and approved by Velindre University NHS Trust Research & Development (R&D) Department.

What if I have a concern about my participation in the study?

If you have any concerns about your participation in this study, please speak to the research team and they will do their best to answer your questions. Contact details can be found at the end of this information sheet.

If the research team are unable to address your concerns or you wish to make a complaint about how the study is being conducted, you should contact the Aston University Research Integrity Office at research_governance@aston.ac.uk or telephone 0121 204 3000.

Research Team

Principal Investigator: Mrs Sophie Harding (email: hardinse@aston.ac.uk or Sophie.harding2@wales.nhs.uk or 02920 316223)

or

Project Supervisor: Dr David Terry (d.terry@aston.ac.uk or 0121-204-3941).

Thank you for taking time to read this information sheet. If you have any questions regarding the study please don't hesitate to ask one of the research team.

Appendix A: The Skills and Training Requirements of Pharmacist, Nurse and Radiographer NMPs within Oncology: Survey

Consent Form (Version 5)

Name of Chief Investigator:__Sophie Harding_____

Please initial boxes

	I confirm that I have read and understand the Participant Information Sheet (version 4 dated 21/03/2021) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
	I understand that my participation is voluntary and that I am free to withdraw without giving any reason and without my legal rights being affected but withdrawal is not possible after submitting answers.	
	I agree that any anonymised data relating to me collected during the study can be processed as described in the Participant Information Sheet.	
	I agree to take part in this study.	

_____ _____ _____

Name of participant Date Signature

_____ _____ _____

Name of Person receiving Date Signature

consent.

An electronic version of this consent form will form part of the cover sheet for the electronic survey for the study and if you are willing to take part, please complete the electronic consent form and survey questions using the link provided within the researcher email.

Please provide your email address below if you would like a summary of the results:

.....

Aston University takes its obligations under data and privacy law seriously and complies with the General Data Protection Regulation ("GDPR") and the Data Protection Act 2018 ("DPA").

Aston University is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study. Aston University will process your personal data in order to register you as a participant and to manage your participation in the study. It will process your personal data on the grounds that it is necessary for the performance of a task carried out in the public interest (GDPR Article 6(1)(e). Aston University may process special categories of data about you which includes details about your health. Aston University will process this data on the grounds that it is necessary for statistical or research purposes (GDPR Article 9(2)(j)). Aston University will keep identifiable information about you for 6 years after the study has finished.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally identifiable information possible.

You can find out more about how we use your information at www.aston.ac.uk/dataprotection or by contacting our Data Protection Officer at dp_officer@aston.ac.uk.

If you wish to raise a complaint on how we have handled your personal data, you can contact our Data Protection Officer who will investigate the matter. If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful you can complain to the Information Commissioner's Office (ICO).

APPENDIX V: Study Four – Covering letter at start of survey on JISC

The Skills and Training Requirements of Pharmacist, Nurse and Radiographer Non-Medical Prescribers (NMPs) within Oncology: Consultant Survey

We would like to invite you to take part in a research study exploring the Skills and Training Requirements of Pharmacist, Nurse and Radiographer NMPs (who are currently practising) within Oncology from the viewpoint of consultants based within Velindre University NHS Trust.

What is the purpose of this study?

The purpose of this study is to explore the skills and training of practising Non-Medical Prescribers (NMPs) within oncology in order to aid the development of NMP strategies related to NMP training within Velindre University NHS Trust including, for example, the development of a future standardised skills and training matrix for NMP oncology practice after they qualify as NMPs.

Why have I been selected to participate?

As you are currently a consultant oncologist who may work with NMPs within Velindre Cancer Centre (VCC), we want to capture your opinions of the desired training and skills of practising NMPs within the following electronic survey questions. The survey will be sent to all consultant oncologists within VCC and contains pre-determined questions to aid the researcher (Sophie Harding), to obtain valuable data on the training and skills of NMPs within oncology.

How long will the survey take?

The survey will take approximately 15-30 minutes to complete. Written informed consent will also be obtained electronically at the start of the survey prior to the survey commencing using your initials.

You are free to withdraw from the study whilst participating within the survey, but once the survey is submitted the details will be put forward for analysis and possible inclusion in the findings.

What will happen to the data obtained?

The data obtained will be kept anonymous at all times. In any written reports we will not be able to identify which member of staff provided each opinion, comment or piece of information as consultant participant names will not be taken during the survey.

What will happen to the results of the study?

The results of this study may be published in scientific journals and/or presented at conferences. The results of the study will also be used in Sophie Harding's Doctor of Pharmacy (PharmD) thesis submission.

If you have any concerns about your participation in this study, please speak to the research team (contact details below).

Research Team

Principal Investigator: Mrs Sophie Harding (email: hardinse@aston.ac.uk or

Sophie.harding2@wales.nhs.uk or 02920 316223)

or

Project Supervisor: Dr David Terry (d.terry@aston.ac.uk or 0121-204-3941).

****Thank you for taking time to read this information. If you have any questions regarding the study please don't hesitate to ask one of the research team.****

Please email the researcher (Sophie Harding) if you would like a summary of the survey results.

General Data Protection Regulation (GDPR)

Aston University takes its obligations under data and privacy law seriously and complies with the General Data Protection Regulation ("GDPR") and the Data Protection Act 2018 ("DPA").
Aston University is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study. Aston University will process your personal data in order to register you as a participant and to manage your participation in the study. It will process your personal data on the grounds that it is necessary for the performance of a task carried out in the public interest (GDPR Article 6(1)(e). Aston University may process special categories of data about you which includes details about your health. Aston University will process this data on the grounds that it is necessary for statistical or research purposes (GDPR Article 9(2)(j)). Aston University will keep identifiable information about you for 6 years after the study has finished.
Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally identifiable information possible.
You can find out more about how we use your information at www.aston.ac.uk/dataprotection or by contacting our Data Protection Officer at dp_officer@aston.ac.uk.
If you wish to raise a complaint on how we have handled your personal data, you can contact our Data Protection Officer who will investigate the matter. If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful you can complain to the Information Commissioner's Office (ICO).

Do you agree to give your consent to take part in the survey? Please choose ONE answer.

- ***Yes. I do give my consent to proceed with the survey.***
- ***No. I do not give my consent to proceed with the survey.***

In order to give your consent to complete this survey, please read each statement below and type your initials in the boxes provided to the right of each statement. You will then proceed to the survey questions.

	PLEASE INITIAL BELOW
I confirm that I have read and understand the study participant information. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
I understand that my participation is voluntary and that I am free to withdraw without giving any reason and without my legal rights being affected, but withdrawal is not possible after submitting answers.	
I agree that any anonymised data relating to me collected during the study can be processed as described within the participant information.	
I agree to take part in the study.	

APPENDIX VI: Study Four - Survey questions

Survey questions for consultant oncologists at the study site

1. Within the last thirty days, were any of your patients seen by a non-medical prescriber (NMP)?

NMP practice

2. Please summarise any advantages and/or disadvantages that Nurse or Pharmacists or Radiographer NMPs bring to the care of your patients.

NMP competency

3. Within the last 12 months, have you conducted any annual NMP appraisals?
4. you ever been a designated consultant mentor for any member of staff undertaking a university course in order to qualify as an NMP? This role is often called a Designated Supervisor Medical Practitioner (DSMP) or Designated Supervisor Practitioner (DSP)?
5. As an NMP mentor (DSMP or DSP), to what extent do you agree (or disagree) that you should continue to conduct the competency assessment of your former trainees who are no longer part of your consultant team?
6. The following statements suggest potential future methods of reviewing an NMP's competency. Please choose one number for each statement corresponding to how appropriate each method is
7. If you can suggest any other potential methods of reviewing an NMP's competency, please provide details.
8. In your opinion, how frequently should an NMP's competency be assessed?

NMP training support

9. To what extent do you believe the following NMP training support options should be available to consultant NMP mentors?
10. Please suggest any other appropriate sources of support for consultant NMP mentors.
11. Who do you believe should provide NMP training support to Nurse, Pharmacist and Radiographer NMPs? Please explain your answer.
12. Do you have any other suggestions on how appropriate Nurse, Pharmacist and Radiographer NMP training support should be provided? Please explain your answer.

NMP training topics

13. The following NMP training topics have been suggested within a previous study. Please select the training you believe should be available to Early Years and/or Advanced Practice Nurse, Pharmacist or Radiographer NMPs.
14. In the future, which training topics should be made available to Nurse, Pharmacist or Radiographer NMPs?
15. Please describe any other training topics that you think should be provided to Nurse NMPs, Pharmacist or Radiographer NMPs.

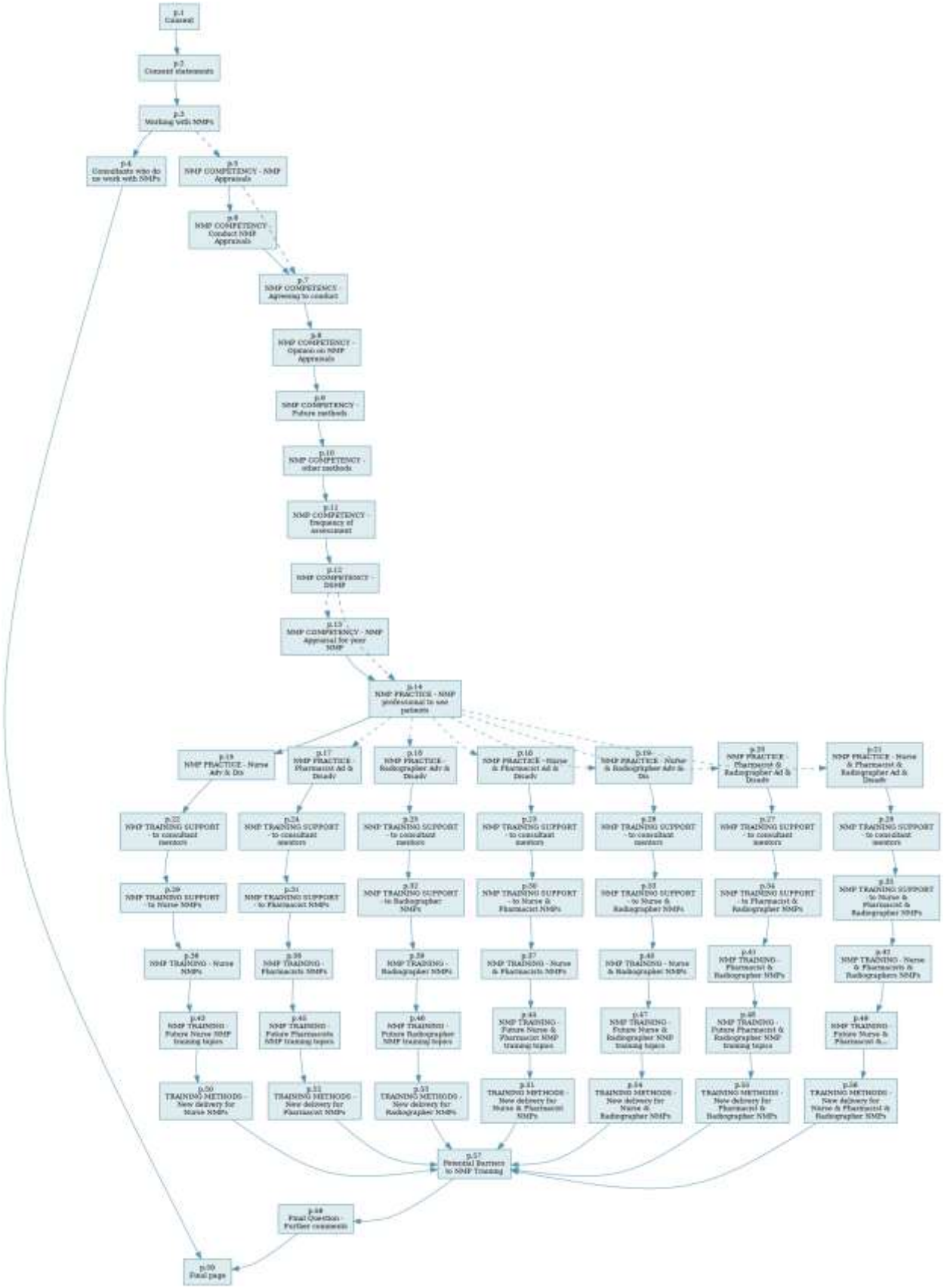
NMP training methods

16. Potential future learning methods for Nurse, Pharmacist or Radiographer NMP training are listed below. Please choose one number for each statement corresponding to how appropriate each learning method is.
17. Please explain your answers to the question above.

(Overall NMP training)

18. Potential barriers to NMP training are listed below. For each option listed, state how much you agree (or disagree) that they are a barrier to NMP training within the organisation.
19. Please provide further comments or suggestions regarding the skills and training of NMPs within oncology.

APPENDIX VII: Study Four - Survey question mapping within JISC package



APPENDIX VIII: Study Three – Published article within IJCP

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RESEARCH ARTICLE

Experiences and opinions of multi-professional non-medical oncology prescribers on post-qualification training: a qualitative study

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Abstract

Background: Within the UK, a non-medical prescriber is a non-medical healthcare professional who has undertaken post-registration training to gain prescribing rights. Lack of post-qualification NMP training has previously been identified as a barrier to the development of oncology non-medical prescribing practice. *Aim*: To explore the experiences and opinions of multi-professional non-medical oncology prescribers on post-qualification training. *Method*: Nine out of 30 oncology non-medical prescribers (three nurses, three pharmacists and three radiographers) from a single cancer centre in Wales, were selected from a study site NMP database using randomisation sampling within Microsoft® Excel. Participants were interviewed using a validated and piloted semi-structured interview design on the topic of post-qualification training for non-medical prescribers. Participants were invited via organisational email. Interviews were audio-recorded and transcribed verbatim. Anonymised data were thematically analysed aided by NVivo® software. *Results*: Main themes identified: experience related to training, competency, support and training methods. Competency assessment methods discussed were the annual non-medical prescriber appraisal, peer review and a line manager's overarching appraisal. Support requirements identified included greater consultant input to help non-medical prescribers identify training and peer support opportunities. Organisational support was requested regarding regular study leave and governance around clinical judgement and errors. The need for regular structured in-house training related to non-medical prescriber's level of experience was identified. *Conclusion*: Development of organisation-led governance strategies and in-house training programmes will support training equity for all non-medical prescribers within the organisation.

Keywords Drug prescriptions · Education · Medical oncology · Nurses · Pharmacists · Radiology

Impact on practice

- Non-medical prescribing competence incorporating a variety of assessment methods and tools, such as OSCEs, peer review and 'portfolios of evidence', will support maintenance of non-medical competence.
- Implementation of an organisation-wide oncology non-medical prescribing training programme, based on level of experience, will guide non-medical prescribers and their consultant mentors with support and aid transition from early career to advanced practice.
- Establishing consultant roles for each non-medical prescribing profession will provide leadership and development of non-medical prescribing governance strategies, to support training equity for all non-medical prescribers.

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Introduction

Within the United Kingdom, a non-medical prescriber (NMP) is a non-medical healthcare professional, who has undertaken post-registration university training to gain prescribing rights [1].

NMPs are either an 'independent' or 'supplementary' prescriber. An independent prescriber (IP) is defined as 'a practitioner, who is responsible and accountable for the assessment and diagnosis of patients' conditions and can make prescribing decisions to manage the clinical condition of the patient'. Professionals who can qualify as IPs

in the UK are midwives, nurses, optometrists, paramedics, pharmacists, physiotherapists, podiatrists, and therapeutic radiographers [2]. A supplementary prescriber (SP) is a practitioner who can prescribe within the scope of a pre-agreed Clinical Management Plan (CMP) which was implemented and agreed between an independent prescriber (doctor/dentist), an SP and the patient, to manage the patient's condition. In the UK to date, diagnostic radiographers and dietitians are able to register as SPs only [2].

The main objectives of implementing non-medical prescribing were to improve access to medicines, utilise eligible professionals' clinical skills and to reduce the workloads of medical colleagues so they could focus on more complicated patient cases [3]. NMPs have become integral to the UK's National Health Service (NHS) when delivering patient services. Although an NMP workforce is developing at pace in the UK, where the education and training provision of healthcare staff is highly regulated and supported, there is a definite gap regarding NMP post-qualifying training as there are no training specific national competency frameworks or training guidance inclusive of all multidisciplinary NMPs once qualified. This issue was identified within a recent scoping review [4] and an e-Delphi survey establishing priorities in Wales [5]. Unstructured continuing professional development (CPD) opportunities may arise across the country dependant on the sector and specialism of healthcare in which the individual NMP practises. The need for each UK organisation to develop a sound infrastructure and governance pathways for NMP CPD to progress safely within their practice was highlighted within a national study of nurse independent prescribing [6].

Within oncology, all treatments given to treat cancer are known as systemic anti-cancer therapy (SACT) [7]. The NMP workforce contribute significantly to SACT service delivery. Once qualified, oncology NMPs work alongside oncology or haematology consultants prescribing SACT and supportive treatments for cancer therapy in a variety of roles [8]. The oncology NMP role benefits medical prescribers by easing some of the burden of routine prescribing/patient care and ensuring cancer services are responsive to patients' needs at a difficult time in their lives [8]. There is limited published literature of NMPs within oncology except a national survey exploring specialist nurse prescribing within cancer care [9] and another nurse-led study around prescribing SACT in an oncology outpatient setting [10]. A further study explored the impact of pharmacy services collaboration on improving adverse drugs reactions in cancer chemotherapy [11]. There were no published studies concerning training requirements of oncology NMPs post qualifying, although a NMP guideline has been produced by the British Oncology Pharmacy Association (BOPA) which includes a competency framework for pharmacist NMPs [8].

In 2018, the study site had 30 non-medical prescribers: eight pharmacists, 18 nurses (including two nurse supplementary prescribers (SPs)) and four therapeutic radiographers. Nurse SPs were excluded from this study as their practise varied due to clinical restrictions within CMPs which may affect their training requirements.

At the study site, the majority of nurse and pharmacist NMPs practise within medical consultant oncologist teams reviewing outpatients prior to their next cycle of SACT. NMPs prescribe SACT and supportive medicines, assess haematological tests and request scans and blood transfusions if appropriate. Three nurse NMPs review patients at ward level. Therapeutic radiographer NMPs review patients within radiotherapy review clinics, prescribing supportive medicines and SACT in combination with radiotherapy [12].

NMPs have varying levels of experience at the study site. For this study, NMPs were classified as an 'advanced practice' NMP if they have practised within oncology as an NMP for five years or more; if the NMP has practised within oncology for less than five years, they were classified as an 'early years' NMP.

Currently, there is no structured programme for NMP training at the study site, although ad-hoc NMP training sessions on various topics are arranged through quarterly NMP meetings, known as the 'NMP meeting forum' if needed and mostly arranged by NMP staff themselves. There is no automatic provision of study leave for NMPs, although some NMPs will undertake certain CPD training dependant on their day-to-day role, e.g., Clinical Nurse Specialists (CNS) have an annual CPD training day. All NHS employees at the study site have an annual appraisal with their departmental line manager. All practising NMPs also have an additional annual NMP appraisal with their consultant oncologist mentor as a governance requirement of the organisation. Previous studies undertaken at the study site by Harding and colleagues have explored the opinions and beliefs of all oncology prescribers and their senior managers. They concluded that skills and training of oncology NMPs across the study site organisation needed to be strengthened for NMP practice to develop further.

Aim

To explore the experiences and opinions of multi-professional non-medical oncology prescribers on post-qualification training.

Ethics approval

Ethical approval for the study was obtained from Aston University Ethics Committee (Approval ref: 158–2016-SH), on approval date 30/09/2016 (minor amendment in April 2021

adding therapeutic radiographers due to practice change) [13]. Organisational R&D approval was obtained from the study site for the study to proceed but the organisation stated that NHS ethics approval was not required. There was no patient or public involvement in this study.

Method

A literature search (September 2021) via EMBASE and MEDLINE identified 28 relevant NMP studies published within the last 15 years (since non-medical practitioners were allowed to qualify as NMPs) and focused on non-medical prescribing by pharmacists, nurses and radiographers and narrowed further using education and oncology. MeSH terms were used. Studies were included if they included the study of UK NMP practice and published in English, whilst conference abstracts and publications not published in English were excluded. Although many were predominantly focused on nurse prescribing, only three studies were identified related to oncology NMP practice; none was associated with oncology NMP training [9–11].

Study site

The research study was set within one oncology centre in Wales, which employs 670 staff from a range of professions across all departments. Each year, 5000 new referrals are received and around 50,000 outpatients are treated. [14].

Between January and June 2018, nine participants were randomly selected to participate in a 60-minute one-to-one face-to-face semi-structured interview (SSI). A randomisation calculation within Microsoft® Excel software (version 15.0) was used to choose potential participants within each professional group. The interview schedule was designed for a 60-minute interview using McNamara guidelines [15]. Interview questions were reviewed using think aloud testing by the researchers. Interviews were piloted by one NMP participant from each professional group who were selected at random (total of three pilot interviews). No changes to interview questions were needed following the pilot. Three participants were randomly selected, irrespective of any other confounders such as length of practice from each of the three NMP professional staff groups practising at the study site [pharmacist group ($n=8$), nurse group ($n=16$) and radiographer group ($n=4$)].Three SSIs from each of the three professional groups were included as this was considered sufficient to explore both the depth and width of the study site, and on analysis findings were considered to be reliable and valid. Further interviews were considered but believed unlikely to add anything of importance. SPs were excluded from the study. Each of the pre-selected nine participants were emailed by the research team using the organisation's email directory for recruitment and contained both the participant information sheet and a consent form. Provisions were made to recruit more participants using the randomisation software if needed. Participants were asked to sign the written consent form and submit it before the start of the SSI. The study was designed and conducted in accordance with COREQ principles [16].

Data collection

Face-to-face SSIs were undertaken using reflexivity (by SH) at the study site. The SSIs were audio recorded and included pre-piloted topic questions which were validated by the R&D department at the study site and the pilot interviews were included in the main study data. Free discussion was encouraged around open questions on the topic of NMP training and aimed to explore topics identified within published literature (see Box 1 for interview questions).

Data analysis

Recordings from all nine interviews were transcribed verbatim by the lead researcher (SH) then anonymised and analysed using a thematic approach (by SH; all transcripts and analysis checked for accuracy by AB) [17], aided by NVivo® software (version 12). Analysis involved coding data and emerging themes were developed and further refined. Representative quotations have been used to evidence and support the analysis, each coded to represent

- Describe your general experiences of NMP skills and training post university qualification?
- How do you think your individual skills complement the clinic?
- What is your opinion on the skills and training that should be available to NMPs?
- How can the changes suggested be implemented?
- Are there any courses that you feel you would like to attend or have attended and what are the hindrances of having attended/attending?
- What support do you feel should be available to improve skills and training?

Box 1 Study interview questions

the participant profession. Data protection measures were adhered to for storage and collection of data.

Results

All participants were IPs practising within oncology at the study site at the time of the interviews. Participants were three nurse NMPs, three pharmacist NMPs and three radiographer NMPs.

Analysis using a thematic approach of the data identified four main themes: experience relating to training, competency, support and training methods. Sub-themes were also identified (see Table 1).

NMP experience relating to training requirements

Table 2 displays study participant demographics and their number of years' experience. The post-qualifying NMP training participants had received is also within Table 2 grouped for each professional group. Similarities between the current NMP training experienced by participants are displayed within Table 2. Table 3 shows when the study participants believe the NMP training topics (within Table 2) should be completed by the oncology NMP, categorised by the NMP's level of experience.

Other future training suggested by study participants

Participants from all professional groups recommended that structured in-house training for all NMPs is needed. Table 4 shows a list of future training topic ideas per professional NMP group.

NMP competency

Respondents discussed several areas relating to competency, NMP appraisal, objective structured clinical examinations (OSCEs), scope of practice and peer review. Exemplar quotes are provided in Box 2.

NMP appraisal

Nurse-1, Pharmacist-2 and Radiographer-1 described varying opinions on the use of annual revalidation appraisals as a method of ensuring competency governance at the study site. Nurse-1 discussed undertaking a combined appraisal method which involved NMPs proactively collecting a competency 'portfolio of evidence' which was reviewed by their nursing line manager and signed off by the consultant oncologist.

OSCEs

An OSCE is a direct observation evaluation tool used to assess clinical staff [18]. Nurse-1 described previously using OSCEs as a revalidation tool for their NMP practice. Nurse-1 believed that assessing NMPs' clinical reasoning and judgement were more important than completing regular OSCEs for more experienced NMPs.

Scope of practice

Nurse-1 suggested that each NMP's scope is not clearly defined at the same level of detail across all oncology

Table 1 List of themes and sub-themes identified from SSI transcript analysis

Main themes	Sub-themes
1. NMP competency	NMP appraisals
	Objective structured clinical examinations (OSCEs)
	Scope of practice
	Peer review
2. Support for NMPs	Consultant support
	Line manager support
	NMP peer support within the organisation
	Organisational support
	Professional group support
3. NMP experience relating to training requirements	Early years training
	Advanced practice training
	Other future training suggestions
4. Methods of providing training	Learning from others
	In-house training
	Self-directed learning

Table 2 Study participants per professional group and their collective training completed post-qualifying as identified within their semi-structured interviews

Professional Group	Years qualified as NMP	No. of participants from each professional group	Post-qualifying training completed by participant professional group
Nurse	Range (8 years to 14 years)	3	Advanced communication course Blood transfusion course Clinical assessment course Introduction to prescribing IRMER[a] course Microbiology course Oncology site specific training
Pharmacist	Range (8 years to 14 years)	3	Blood transfusion course Clinical assessment course Introduction to prescribing IRMER[a] course Oncology site specific training
Radiographer	Range (3 years to 10[b] years)	3	Advanced communication course Clinical assessment course Financial support course Psychology course Oncology site specific training
Total		9	

[a]IRMER – Ionising radiation (medical exposure) regulations

[b]Years practising as an NMP, but not as an independent prescriber due to regulations allowing radiographer independent prescribing only being introduced in 2016

Table 3 The training courses identified to be relevant to NMP training development related to the level of oncology NMP experience

Early years NMP (Up to five years' practice as an NMP)	Advanced Practice NMP (More than five years' practice as an NMP)
Clinical assessment course	Advanced communication course
Financial support course	Blood transfusion course
Introduction to prescribing	Microbiology course
IRMER[a] course	Oncology site specific training e.g. new treatments
Psychology course	

[a]IRMER – Ionising Radiation (Medical Exposure) Regulations

specialities, which may be due to variable expectations of consultant mentors.

Peer review

Pharmacist-1 and Pharmacist-3 believed that peer review could be used to assess competency. Nurse-1 recommended developing an oncology 'independent prescribing advanced practice framework' which could be used to peer review NMPs by reviewing their portfolios of evidence.

Nurse-2 described how they audited themselves as a method of assessing competency, which could have been undertaken due to lack of peer review available at the study site. Collecting and recording NMP prescribing data is not current practice at the study site.

Support for NMPs

All participants agreed that training support from all stakeholders is fundamental to the NMP role. Exemplar quotes are provided in Box 3.

Table 4 Future training requirements suggested by each NMP professional group

NMP Professional group	Course/training suggested
Nurses	Clinical decisions training
	Dealing with acutely unwell patients
	How to critically appraise research papers
	Interpreting blood results
	Pharmaceutical company training events
	Study days on developing the NMP role
Pharmacists	Diagnostic training module
	Filling out forms and relevant tasks training
	How to critically appraise research papers
	How to read CT scans
	Immunotherapy study day
	Interpreting blood results
	Keeping up to date with NICE & new treatment
	New trials related to specialised area
Radiographers	ChemoCare® electronic prescribing training
	Dealing with acutely unwell patients

Consultant support

Most participants stated that they did receive training support from their consultant oncologist, although they also described a need for more leadership and support with their NMP development. Pharmacist-3 explained that they used their own initiative to direct their own learning and training needs.

Line manager support

Pharmacist-1 and Pharmacist-2 described a lack of support for attending NMP training from their line manager, due to their line manager not being an NMP themselves, but there was support from the NMP lead. Radiographer-1, Radiographer-2, Radiographer-3 and Nurse-2 described feeling supported by their line managers regarding NMP training. This may be due to their line manager also practising as an NMP. The consultant non-medical professional role was not discussed by pharmacists and nurses due to this role not being implemented within their departments at the study site. Radiographer-3 did describe their consultant radiographer currently providing NMP leadership within the radiotherapy department at the study site.

NMP peer support within the organisation

All participants described how future in-house NMP training sessions are planned within the study site NMP meeting forum on an 'ad hoc' basis. Pharmacist-3 suggested that these meetings could be improved upon, especially regarding their frequency and efficacy. Nurse-2 suggested utilising the NMP meeting forum to facilitate peer support, i.e., more experienced NMPs sharing experiences with early career NMPs.

Organisational support

Nurse-1 and Nurse-2 commented on organisational support. Nurse-1 described the need for support when NMPs make an error, making decisions and for regulation protection regarding their clinical judgement. Nurse-2 believed that regular study leave should be provided by the organisation

NMP appraisal

"... everyone needs that appraisal revalidation thing every year but signing a piece of paper? My experience of that is just a tick box thing, rather than just 'what can I get from this?'" (Pharmacist 2)

"I have exactly the same appraisal with the Head of Nursing. I present my scope of practice and competencies and describe the competence of it ..." (Nurse 1)

OSCEs

"... OSCEs are OK ... but from a learning perspective they are actually not that useful once an NMP is experienced. The clinical judgement and clinical decisions that you make, and reasoning is more where competence should be assessed." (Nurse 1)

Scope of practice

"... scope [of practice], *I classically defined it and I wonder if that is really thought of in certain specialties."* (Nurse 1)

Peer review

"... [Advanced Nurse Practitioners (ANPs)] *develop a portfolio and have that portfolio reviewed annually by a panel of experts within the trust which is done in a lot of other places for the ANPs .... do it for independent prescribing ..."* (Nurse 1)

Auditing

"Prescribing is being aware of prescribing errors but there is good feedback from pharmacy... I keep those and self-audit." (Nurse 2)

Box 2 Comments from participants related to competency

Consultant support

"I feel well supported… but every aspect that my DMP [Designated Medical Practitioner] *has supported me on is stuff that I have taken to them …, there needs to be a responsibility the other way from the consultant of what they want. More structure needed."* (Pharmacist 3)

Line manager support

"I asked to do the diagnostic course and … [it]never happened. If you don't push for it then it doesn't happen. My manager isn't an NMP, so I wouldn't expect any support from them … there is some support from the Chief Pharmacist …" (Pharmacist 2)

" [my line manager who is a consultant radiographer] *if we have complex patients, we go to them and we discuss what we can do and what can be prescribed and then go and take it forward ourselves …"* (Radiographer 3)

NMP peer support within the organisation

"… we have meetings every few months to catch up on NMP issues and arrange a little training … It could be better …." (Pharmacist 3)

"… it is a case of sharing our experience. The newer ones are obviously probably gonna learn more, and in the discussion, you could share the benefit of your practice …" (Nurse 2)

Organisational support

"… We need more support on the realities on making an error and making decisions etc. NMPs don't have the regulation in force to protect them …." (Nurse 1)

"… we should have protected time for E&T, but in reality, it wouldn't happen, for example doctors have time built into their timetable … We should have dedicated time even if it is an hour or two a month …." (Nurse 2)

Professional group support

Internal to the organisation

"As a review team, we discuss difficult cases. We have our in-house competencies for reviewing patients and for prescribing …" (Radiographer 2)

External to the organisation

"BOPA is useful to keep up-to-date and being able to talk to people." (Pharmacist 1)

"It is mostly a forum for radiographer NMPs. You can ask a question, and everyone answers …" (Radiographer 1)

Box 3 Comments from participants in relation to support

for NMPs' training mirroring the current medical prescribers' training at the study site.

Professional group support

Regarding professional support internal to the organisation, Radiographer-1 and Radiographer-2 described having internal radiographer department support sessions for case discussion and in-house NMP competencies led by the lead radiographer NMP (Consultant Radiographer) and believed these to be beneficial. Pharmacist-1, Pharmacist-2, Pharmacist-3 and Nurse-1, Nurse-2 and Nurse-3 did not describe any internal professional training support across the study site, although Nurse-2 described attending useful regular CPD sessions within their CNS role.

Regarding professional support external to the organisation, Pharmacist-1 described utilising British Oncology Pharmacy Association (BOPA) events to keep up to date and network with external colleagues. Radiographer-1 described a radiographer national online forum for NMPs. Both Pharmacist-1 and Radiographer-1 found these beneficial to their practice.

Learning from others

"Speaking to ANPs in different areas. That's really important'" (Nurse 1)

"… pharmacists quite typically come with obviously far more knowledge of pharmacology and pharmacokinetics … The nurses come with a lot more hands-on patient assessment skill …" (Nurse 3)

In-house training

"Once you qualify there is no formal development unless you get a new role …" (Nurse 2)

"Regular training in-house for NMPs could be beneficial. Like once a month, but it could be difficult to establish topics to benefit everyone." (Radiographer 3)

Self-directed learning

"It's a grey area when you are extending your scope. Recently I was extending it to prescribe antibiotics but there was no formal training or support on this …" (Nurse 2)

Box 4 Comments from participants in relation to training methods

Methods of providing training

Main training methods described by participants are detailed below with exemplar quotes in Box 4.

Learning from others

All participants commented on various aspects of 'learning from others'. Nurse-1 discussed how their practice benefitted by communicating with other nurses fulfilling the same role, both within and outside of their organisation. Learning from other NMP professional groups was described as beneficial by Nurse-3.

In-house training

Nurse-2 explained how they had not completed any formal training after qualifying as an NMP. Nurse-3 believed that in-house training should be available on a regular basis and Radiographer-3 was in favour of regular in-house training, but topics should be beneficial to all. Pharmacist-3 described how NMPs should be allocated time to attend established in-house junior medical training within the organisation. Participants made suggestions for the development of a structured in-house organisation-wide NMP training programme.

Self-directed Learning

Seven NMP participants described using their own initiative to undertake relevant training to develop their own NMP role. Nurse-2 had experienced a lack of guidance when extending their scope of practice and believed that more guidance should be available from the organisation.

Discussion

Key findings

NMP appraisal was the main method of competency assessment described at the study site and its structure was believed to vary between different NMP professional roles or between NMP individuals. One participant described a line manager NMP appraisal method of assessing competency which could be made available to all NMPs. Another participant believed that an NMP's scope of practice should be clearly defined; this does not currently occur, although it is requested within the organisation's NMP guideline. Peer review of a portfolio of evidence was not currently utilised for NMP competency assessment at the study site, but participants believed it would be beneficial to implement.

Most study participants felt supported by their consultant mentor but believed their consultant mentors should have more responsibility for sharing their views on an individual's NMP training needs. The level of line manager NMP support experienced by participants was believed to be affected by line managers' understanding of the NMP role. Participants believed organisational support for NMP training should be viewed as high importance if NMP practice is seen as important to the organisation's strategy. Departmental support sessions were in place for radiographer NMPs and led by a radiographer lead NMP (Consultant Radiographer). However, nurses and pharmacists within the organisation did not describe any designated departmental professional NMP leads.

Various learning methods for NMP training were described by each professional NMP group. Nurse NMPs train and discuss practice with their nursing colleagues within the same role, radiographers learn within departmental peer review sessions, and pharmacist NMPs learn from other pharmacist NMP peers outside of the organisation. No formal training after qualifying as an NMP was in place and developing an in-house rolling training programme incorporating training for both early years NMP practice and advanced level NMPs was recommended to aid oncology NMP development at the study site.

Strengths and limitations

Prior to this study, oncology NMP training was underexplored within published literature, especially the inclusion of equal representation of pharmacist, nurse and radiographer NMPs. Semi-structured interviews allowed the researcher to explore participants' opinions in depth.

Trustworthiness in qualitative studies involves ensuring credibility, transferability, dependability and confirmability [19, 20]. The credibility of the study data was supported by randomly selecting participants, but a greater number could have been included to improve credibility further and potentially reach data saturation. Random selection also did not allow selection of participants with a variation in experiences as an NMP as many of the participants included were advanced level NMPs. Dependability and confirmability were ensured by having the analysis checked by another researcher following initial analysis by the lead researcher (SH).

Although participants were all employed and practised at one study site, experiences and opinions on NMP competency and support may vary within other organisations. Therefore, study findings may or may not be transferable to other organisations or other medical specialties. Triangulation was not used within the study methodology but could have established a higher level of trustworthiness of the study data.

Interpretation

Organisation-wide adoption of the combined NMP and line manager appraisal method model, which involves a review of each individuals' portfolio of evidence (previously signed off by the consultant mentor) within an annual line manager appraisal, is in line with BOPA recommendations on competency assessment [8]. At the study site, clear details of NMP competencies are recognised within the organisation's NMP guidelines, but were not linked with appropriate training opportunities [2]. Participants described OSCEs as a revalidation tool but believed they would be utilised more effectively for assessing clinical reasoning and judgement. However, a qualitative study exploring how pharmacists and nurses make clinical decisions by Abuzour and colleagues discussed complexity of assessing NMP clinical reasoning, so further investigation into the suitability of OSCEs to assess clinical reasoning within this group is warranted [21]. Peer review was suggested involving a panel of oncology experts within the organisation reviewing a portfolio of evidence. A national study by Smith and colleagues exploring the safety and quality of nurse IP found that 52% of nurse respondents also used peer review to review their practice but did not provide detail on how and by whom [6]. Prescribing audits could also be used organisation-wide to feedback to NMPs and would demonstrate prescribing patterns. A cross-sectional survey of newly registered pharmacist views by McIntosh and colleagues and national study by Smith and colleagues reported that pharmacists and nurses both either identified prescribing auditing as a training need or as already utilised as a quality assurance tool within their organisations [6, 22]. Study findings around competency assessment support the recommendation by BOPA to use a combination of methods [8]. A study exploring the CPD needs of nursing and allied healthcare professionals stated that the employer is ultimately responsible for ensuring prescribing competency [23, 24].

Consultant support is seen as beneficial to NMPs, the study by Latter and colleagues also described how the benefit of medical support can build NMP confidence [25]. Varying support from line managers may have been affected by variability in departmental training budgets and staffing levels allowing them to enable access to NMP CPD courses. Further improvement in NMP peer support is required and recommended using a 'forum approach' where more experienced NMPs share their expertise with early career NMPs. A 'buddy' mentoring system has been previously recommended to provide extra support for early career NMPs in two studies, exploring the use of a mentoring scheme for NMPs and factors affecting willingness to take responsibility for NMP [26, 27]. The Department of Health (DoH) and the e-Delphi survey study describes how each organisation should have NMP outline strategies for NMP development including providing adequate support for NMPs [5, 28]. Pharmacist NMPs may not have opportunities to share their NMP experiences and knowledge with pharmacist peers and establishing professional peer groups has been recommended to aid development of pharmacist prescribers within a scoping review of barriers to pharmacist prescribing [4]. Creating a specific consultant pharmacist role could also lead on implementing a pharmacist-specific NMP development pathway within the organisation, including setting up a pharmacist NMP peer discussion forum as suggested within one strategic health authority study [29].

A need for a post-qualifying training programme related to competency was highlighted by study participants and the development of formal programmes of CPD have been recommended as a priority for all employers in two nursing studies exploring nurse prescriber CPD [23, 30]. A UK study exploring stakeholder views of nurse and pharmacist SP discussed how some pharmacist NMPs considered interprofessional training courses as advantageous, whilst others did not [31]. Picton and colleagues, whilst exploring the need for a prescribing competency framework to address polypharmacy, discussed significant benefits to multi-professional training [32]. The need for a multi-professional oncology NMP training framework is further strengthened due to a projected increase in registered pharmacists becoming IPs by 2025 [33], and because all UK newly qualified pharmacists will be registered IPs from 2026 [34]. Structured NMP training for registered NMPs will therefore enable organisations to attract and retain staff in the future.

Future research

Themes identified could be further explored in more detail within focus groups, including representation from NMP stakeholders such as current NMP staff, medical staff, and hospital managers both across the organisation and within other organisations offering oncology services. Survey methods could also be used to obtain more generalisable data across a wider participant population and include greater participant numbers. Future development of an underpinning research framework would explore reasons for the lack of training implementation in secondary care settings.

Recommendations for practice

The combined NMP and line manager appraisal method model suggested should be adopted across the organisation incorporating the portfolio of evidence (which is in line with BOPA recommendations) [8].

Establishing consultant posts for all NMP professional groups within the organisation may provide equitable and strengthened support to all professional NMP groups. These

lead professionals could deliver a clinical educator role for oncology NMPs within their departments, but also form an NMP leadership panel. The leadership panel would lead on implementation of a NMP training programme for all professionals, as well as development of their own professional group. The panel could hold a central NMP training budget and manage training allocations and lead on the development of clear organisational NMP governance strategies. The panel would provide support and mentorship to address current NMP training inequalities identified by participants.

Development of a core multidisciplinary NMP programme with separate training on certain topics for certain professional groups is recommended. Future training topics suggested in this study should be considered and incorporated into a training framework algorithm for oncology NMPs within the study organisation with consideration of the NMPs' level of experience.

Conclusion

This study explored experiences and opinions of oncology NMPs of current post-qualification NMP training across three professional groups. Lack of a multi-disciplinary standardised approach to NMP post-qualifying training needs to be addressed by the organisation. An organisation-led NMP training programme should be developed which incorporates NMP levels of experience and professional needs. The programme should be supported by a sound organisation-wide NMP training strategy incorporating factors such as support networks and competency assessment, in order to aid development and bolster resilience of future oncology NMP practice.

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Conflicts of interest All authors declare no conflict of interests.

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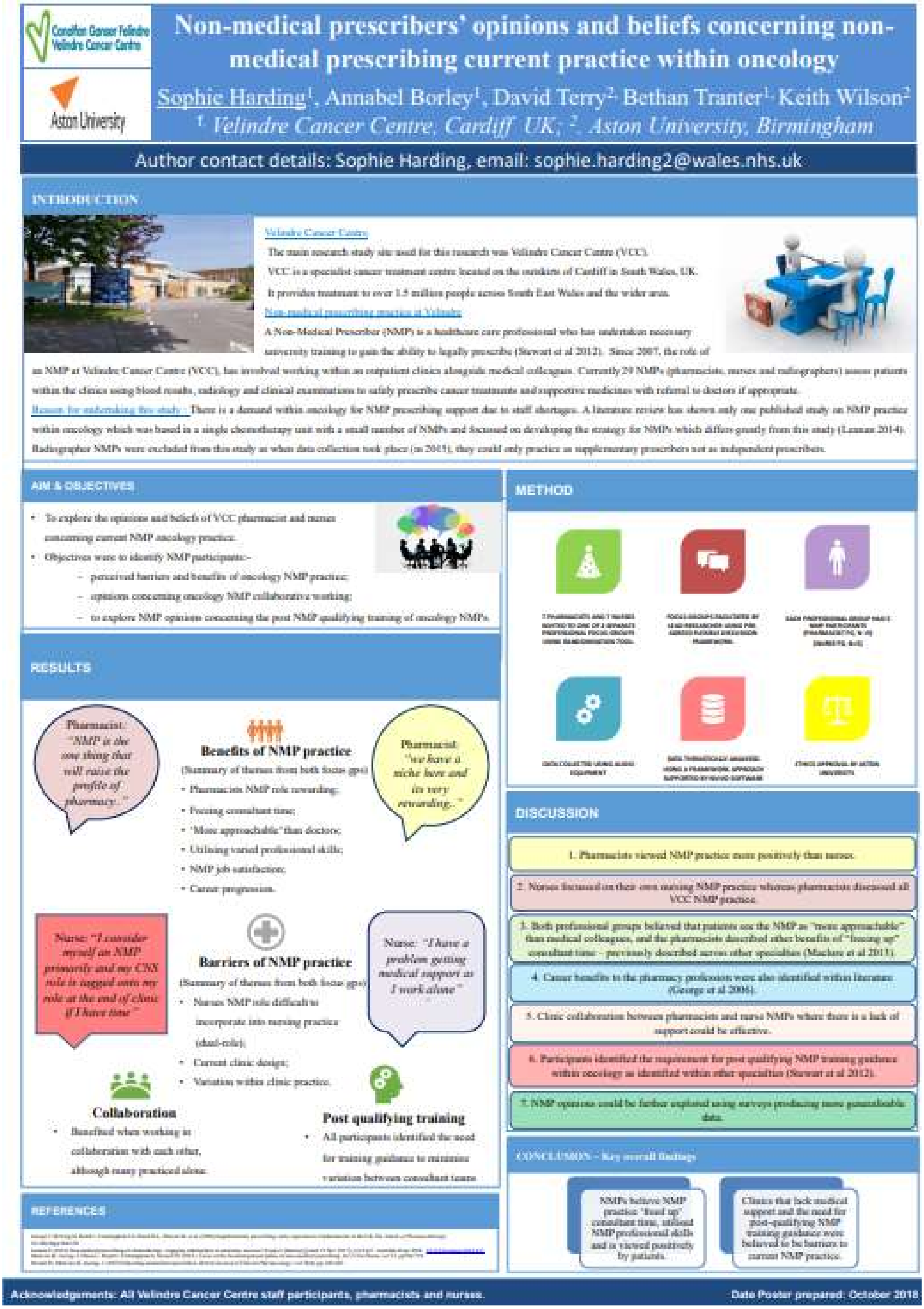
APPENDIX VIIII: Study One: BOPA Conference 2018 poster presentation



APPENDIX X: Study Two – BOPA Conference 2018 poster presentation

Canolfan Ganser Felindre
Velindre Cancer Centre

Aston University

Opinions of medical prescribers' and senior managers' concerning non-medical prescribing practice within oncology

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Introduction

Velindre Cancer Centre

VCC is the leading specialist oncology centre for Wales located on the outskirts of Cardiff in South Wales, UK. The study site used for this research was Velindre Cancer Centre (VCC).

Non-medical prescribing at Velindre Cancer Centre

At VCC, a large cohort of 29 NMPs (pharmacists, nurses and radiographers) each work along side a consultant team reviewing patients within cancer outpatient clinics. NMPs safely prescribe cancer treatments and supportive medicines, after assessing blood results, undertaking clinical examinations, requesting scans and blood transfusions.

Reason for undertaking this study

There is a demand within oncology for NMP prescribing support due to staff shortages. A recent literature review has shown only one published study on NMP practice within oncology (Lennan 2014). The Lennan (2014) had a different aim and methodology as it largely aimed to develop a strategy for NMPs within their single chemotherapy unit.

Key Finding:
NMPs are relied upon to run the oncology service but the 'service needs' should be determined in order to address the barriers to NMP practice.

Aim & Objectives

To identify the views of medical prescribers (MP) and senior managers (SM) based at VCC, on NMP practice within oncology.

Objectives:
To identify MP and SM participant opinions concerning:
- The barriers and benefits of NMP practice;
- pharmacist-nurse NMP collaboration
- NMP training requirements within oncology

Method

Figure 1: Diagram of study method

- Seven SM and seven MP participants were randomly selected using a randomization tool;
- One consultant focus group (n=5) and one specialist registrar semi-structured interview (SSI) (n=1) conducted using a pre-agreed discussion guide;
- Key themes raised by MP used to formulate questions within further separate SSIs with SMs (including the chief pharmacist, head of nursing and clinical director (n=3));
- All data thematically analysed using a five-stage framework approach within NVivo software (fig 1) (Pope et al 2000);

Results

Figure 2: Main Benefits of NMP practice (themes)

Figure 3: Main Barriers to NMP practice (themes)

N.B. The size of the circles in fig 2 & 3 represents the amount of participants who expressed that view

(All themes above originated from data obtained within the focus groups and SSI's described within methods.)

NMP collaboration within clinics : The pharmacist-nurse NMP collaboration is unrealistic in current service demands although described as 'ideal' by participants.

NMP training requirements within oncology:

Current NMP training post – qualifying is reliant on the consultant and NMP only, and more guidance needed to standardise training.

Discussion

Senior managers believe that service needs should be determined by key stakeholders in order to address the barriers to NMP practice.

Actions identified by SM & MP to support development and overcome barriers include:
- developing a standardised NMP training framework to address any lack of skills;
- standardising clinic design by setting up separate nurse led holistic clinics;
- ensuring medical support for all NMPs.

Addressing the barriers may aid development of more generically skilled oncology prescribers to meet the service needs, i.e. able to work within different cancer specialties.

Inadequate backfill to facilitate release of NMPs from core professional duties was viewed as a barrier, also identified in other publications (Bourne et al 2016).

Only one registrar was included due to poor attendance and researcher time constraints. Repeating a registrar focus-group may enrich the data.

Conclusion

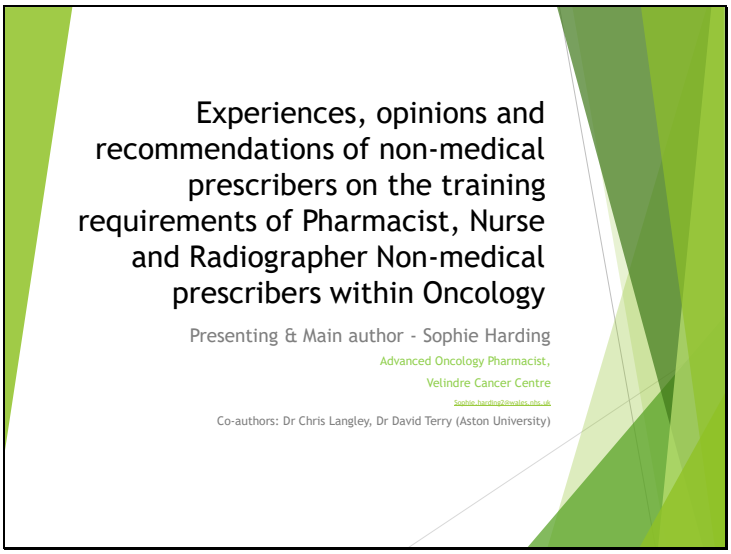
1. The overall benefits of NMP practice were:
   - NMPs are relied upon to run the oncology service.
   - 'Hand-up' consultants.
2. The overall barriers were:
   - Inadequate NMP backfill.
   - separate nurse-led clinics needed.
3. The oncology service needs should be critically determined in order to address the barriers discussed.

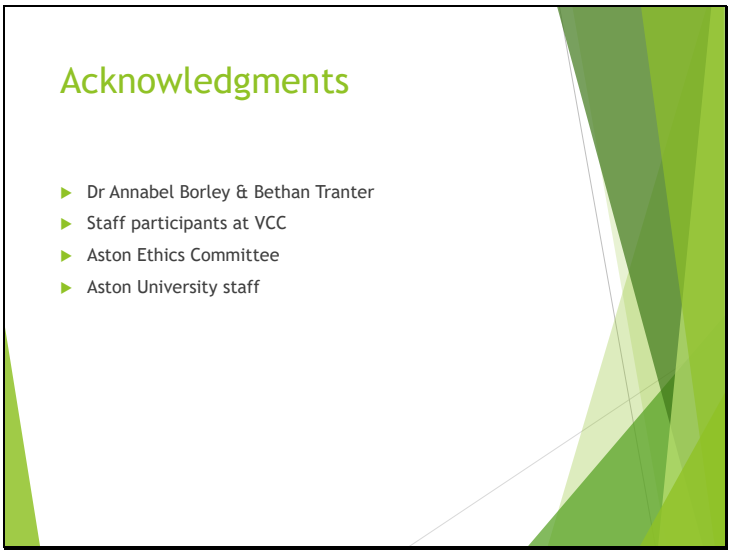
References

Acknowledgements to Velindre Staff participants, Velindre Cancer Centre R&D department and Aston University Ethics Committee

Date of poster preparation: October 2018

APPENDIX XI: Study Three – VCC Celebration of research conference – Oral presentation





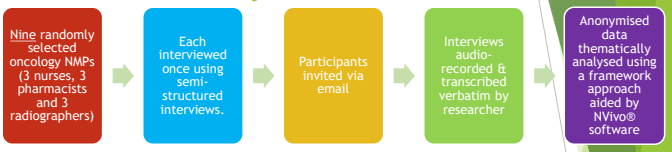
Introduction

- Non-Medical Prescriber (NMP) - A non-medical healthcare professional who has undertaken the necessary post registration training to gain independent prescribing rights.
- Third study of 4 in PharmD series
- Training post qualifying as NMP - theme from previous study
- Lack of post-qualification NMP training has been identified as a barrier to development of oncology NMP practice.
- Needs to be addressed in order to support future cancer service needs
- Very limited published data

Aim & Objectives

- **Aim :**To explore the training of NMPs within oncology post NMP qualification
- **Setting**: Tertiary adult oncology centre in Wales (Velindre Cancer Centre)
- **Objectives:**
  - To identify the training received by participants
  - to explore their opinions of NMP training post qualifying and how it could be improved
  - to explore NMP opinions regarding future training needs
  - to develop a draft oncology NMP training guide at the study site

Method of study



- Pre-designed piloted semi-structured interview (SSI) schedule
- SSI offered to each participant on one occasion
- Consent and Participant information leaflet sent via email prior to the SSI

Study Results & Key Findings

- 4 Main themes identified

Results and discussion

- Future 'mixed methods' approach to competency assessment
  - Current appraisal method
  - OSCEs
  - Peer review assessments
  - Combined appraisals
- Organisation-led development of NMP support mechanisms
  - NMP training guides
  - NMP peer support opportunities
  - Consultant support
  - Line managers
- Identified need for NMP governance strategies which include equality with NMP study leave/funding for all

Results & Discussion continue….

- Future NMP training requirements were believed to be dependent on NMP experience
- Training methods – short courses, learning from others
- NMP lead panel of NMP professional leads
- VCC training programme
- Participants suggested topics for a draft structure for an oncology NMP training programme

Limitations & Future work

Limitations

- Opinion level evidence only
- Only staff opinions
- Generalisability is limited

Future Work

- Other stakeholders e.g. patients and medical staff & hospital managers
- Across multiple organisations
- Surveys – more generalizable data across wider audience

Conclusion

- A future 'mixed methods' approach to competency assessment and organization-led development of NMP support mechanisms e.g. NMP networking opportunities and NMP governance strategies could enable post-qualified training equity for all NMP professionals within a cancer organization.

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