# What patient assessment skills are required by pharmacists prescribing systemic anti-cancer therapy? A consensus study.

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Abstract

**Background**

In the UK, pharmacist independent prescribers (PIPs) can prescribe for any condition within their clinical competence including systemic anti-cancer therapy (SACT). Competency frameworks have been developed but contain little detail on the patient assessment skills (PAS) PIPs require to prescribe SACT with concern in literature over current training on these skills.

**Aim**

To gain consensus on the PAS required by PIPs prescribing SACT for genitourinary [GU] cancer (prostate & renal) and lung cancer across NHS Scotland.

**Method**

Two phases were performed to generate PAS consensus. Initially, the Nominal Group Technique (NGT) was performed within a local cancer network by discussion and participant ranking within GU and lung cancer multi-disciplinary teams (MDTs). Where consensus was achieved, PAS were carried forward to try to achieve national (NHS Scotland) consensus using a two-round Delphi questionnaire.

**Results**

Of the 27 PAS, consensus was gained for 21 and 23 PAS in the GU and lung NGT groups respectively. Within the GU (n=23) and lung (n=18) national groups, 13/21 and 18/23 PAS were agreed as required for a PIP to prescribe SACT in GU and lung cancer respectively. Eight common PAS were identified as core skills. Reasons for not reaching consensus included PIP competence, knowledge, skills and the roles and responsibilities of PIPs within the MDT.

**Conclusion**

We identified the core and specific PAS required to prescribe SACT within two tumour groups. Further work is necessary to develop PAS competency frameworks, training and assessment methods and to redefine the roles of PIPs within the MDT.

Keywords: Pharmacist independent prescribing, Systemic anti-cancer therapy, patient assessment skills.

## 1. Introduction

Non-medical prescribing has developed significantly in the last two decades, with several countries promoting this new role.[1,2,3] Pharmacists in the United States of America, Canada, New Zealand and the UK can now become independent prescribers but, a variety of different prescribing models exist with some countries only allowing pharmacists to prescribe under clinician supervision and others enabling pharmacists to prescribe without these additional restrictions.[2,3,4]

In the UK, pharmacists can prescribe independently for any undiagnosed or diagnosed condition within their competence.[5] Around 8% (3,944) of registered pharmacists in the UK are non-medical prescribers (NMPs).[6] Currently, training for pharmacist independent prescribers (PIPs) consists of university based training followed by observational learning and practice within the trainee's chosen therapeutic area. Competency is determined by a designated medical practitioner who supervises this practice.[5] The Scottish Government's strategy 'Prescription for Excellence' states that by 2023, every pharmacist will be a PIP.[7] Furthermore, Scottish Government guidance of the Safe use of Systemic Anti-Cancer Therapy (SACT) states that NMPs can prescribe SACT provided they have been appropriately trained and deemed competent.[8]

To support PIPs in this new role, a small number of prescribing frameworks have been developed in the UK. In 2016, the Royal Pharmaceutical Society (RPS) published a competency framework for all prescribers[9] and the British Oncology Pharmacy Association (BOPA) published a chemotherapy PIP prescribing competency framework.[10] The BOPA framework is based on the UK Medical Oncology Curriculum which is used to train registrars prescribing SACT and is approved by the Royal College

of Physicians and the Postgraduate Medical Education and Training Board.[11] Furthermore, the West of Scotland Cancer Network (WoSCAN) recently published a NMP competency framework and service development tool which suggests a tiered approach to PIP training with the use of training tools such as case-base discussions to assess competency.[12]

The BOPA and WoSCAN frameworks provide guidance for PIPs prescribing SACT however they do not include the patient assessment skills (PAS) [e.g. physical examination, vital signs (blood pressure (BP), respiratory rate (RR)] that a PIP may require to prescribe SACT, only stating the PIP should have the '*Ability to prescribe and order systemic therapies following assessment of the patient and relevant laboratory investigations, using appropriate systems defined by the local authorities*.'[10] The PAS training required for PIPs to prescribe SACT should be defined locally.

Review of the literature highlights a lack of information in the patient assessment skill training required for PIPs. It does however highlight concerns both by PIPs and other healthcare professionals over a PIPs current ability to fully clinically assess patients and the current training in place.[13] Current studies assessing pharmacists prescribing in SACT clinics demonstrate their benefit to patients in terms of reducing clinic waiting times, improving medicines compliance and management of adverse reactions but do not review PIP training.[14,15]

One previous study attempted to define a patient assessment competency framework for PIPs prescribing SACT via an electronic questionnaire which was distributed to multi-disciplinary teams (MDTs) across NHS Scotland [98/240 responses (40.8%)]. Of the 27

PAS included in the questionnaire, only 12 achieved agreement.[16] Reasons for lack of agreement included differences in current PIP practice between networks regions and a lack of information on training requirements.[16] Furthermore, the study did not use a validated consensus method and included all cancer types, each of which may require different patient assessment skills. For this reason, this study has focussed on two tumour groups, genitourinary (GU) cancer (renal and prostate) and lung cancer, selected due to disease burden and service pressures. The study aim was to gain consensus on the PAS required by PIPs in GU and lung cancer.

## 2. Methods

### *2.1 Design*

This two-phase study used a Nominal Group Technique (NGT) to obtain consensus within South East Scotland Cancer Network (SCAN) on the PAS a PIP requires to prescribe SACT, followed by a two-round Delphi questionnaire to gain consensus across NHS Scotland.

### *2.2 Setting*

The study was conducted within the three regional cancer networks within NHS Scotland: SCAN, WoSCAN and North of Scotland Cancer Network (NoSCAN).

### *2.3 Phase 1: Nominal Group Technique*

#### *2.3.1 Inclusion criteria & participant recruitment*

Within SCAN, each tumour specific MDT includes consultants, a rotational registrar, clinical nurse specialists and pharmacist prescribers. Members of the SCAN GU (n=9) and lung (n=10) MDT were invited to participate through an email comprising of an invitation letter, participant information sheet and consent form. From respondents, a convenience sample of a range of professions was determined through availability.

#### *2.3.2 Data generation*

Consensus methods such as the NGT and the Delphi technique are commonly used in medical research to gather information and develop guidelines in areas where there is little published research through consultation between a group of experts.[17,18,19] It was decided to use the NGT within SCAN to enable face-to-face discussion, generation of ideas and gain consensus on a list of PAS developed specifically for each tumour group.[17] This standardised

process was followed for each NGT (Figure 1). A 5-point Likert scale was used as this is a common scale used in consensus methods. [19, 20]

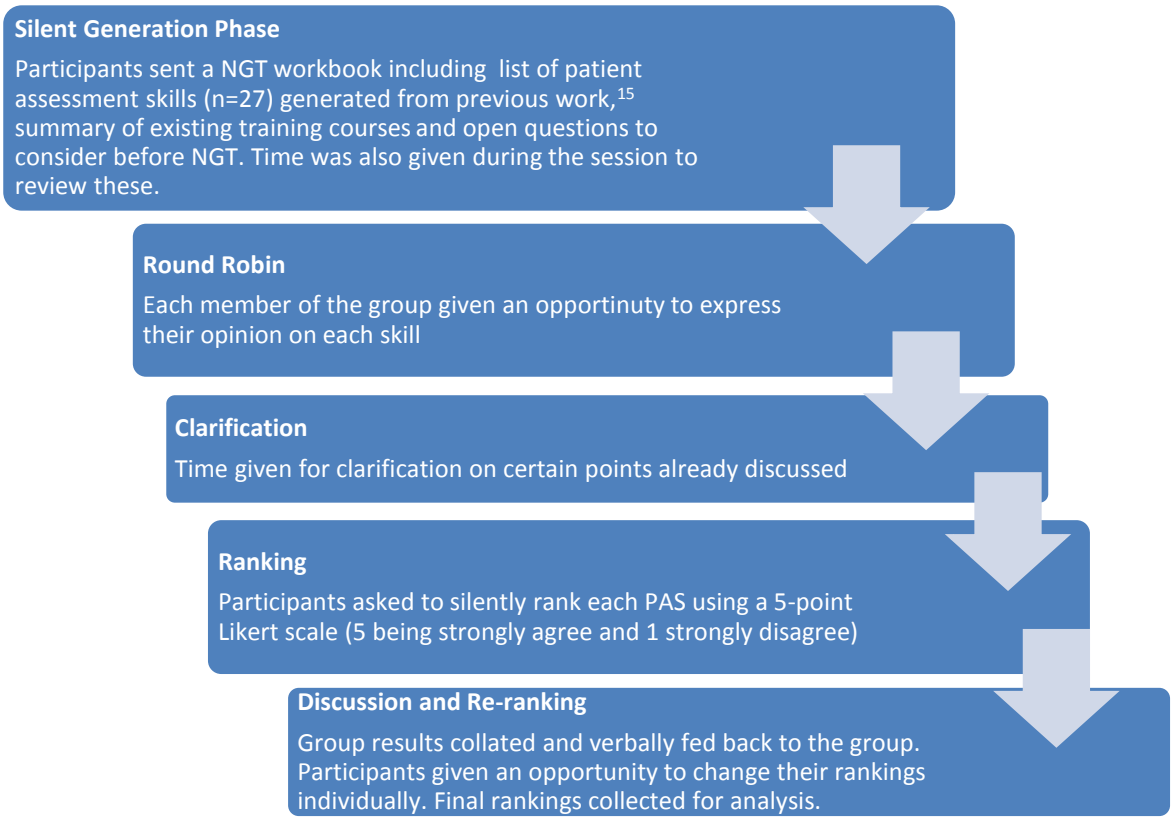


Figure 1: Nominal Group Technique process for each group

*2.3.3 Data analysis*

Consensus was achieved if at least 70% of the group scored an individual skill as 1 or 2 (for disagreement i.e. skill not required) or 4 or 5 (for agreement i.e. skill is required).[21,22] The skills that achieved 70% consensus were used to populate the Delphi for each tumour group. Skills which did not achieve consensus were removed as lack of local consensus on a certain skill was thought to be unlikely to achieve national consensus. Furthermore, comments for skills where there was a mixed response were reviewed to identify reasons for non-consensus.

*2.4 Phase 2: Delphi technique*

*2.4.1 Inclusion criteria & participant recruitment*

Members of the SCAN, WoSCAN and NoSCAN MDTs (consultants, registrars, pharmacists/nurses (prescribers and non-prescribers)) for GU (n=30) and lung (n=43) were invited to participate in the study.

*2.4.2 Data generation*

The results from each nominal group were reviewed and developed into a questionnaire consisting of a set of statements (the PAS) for each tumour group (using the online Qualtrics Survey programme ®). The Delphi technique was then used to obtain national consensus through multiple questionnaire rounds (Figure 2). Participants were asked to rank the statements using a 7-point Likert scale (7 being strongly agree and 1 strongly disagree).[19] A free text box for participant comments was also added to the questionnaire. Participants were asked in the workbook (NGT) and questionnaire (Delphi) to consider the PAS required by PIPs working with the support of MDT when assessing patients and prescribing continuation of SACT.

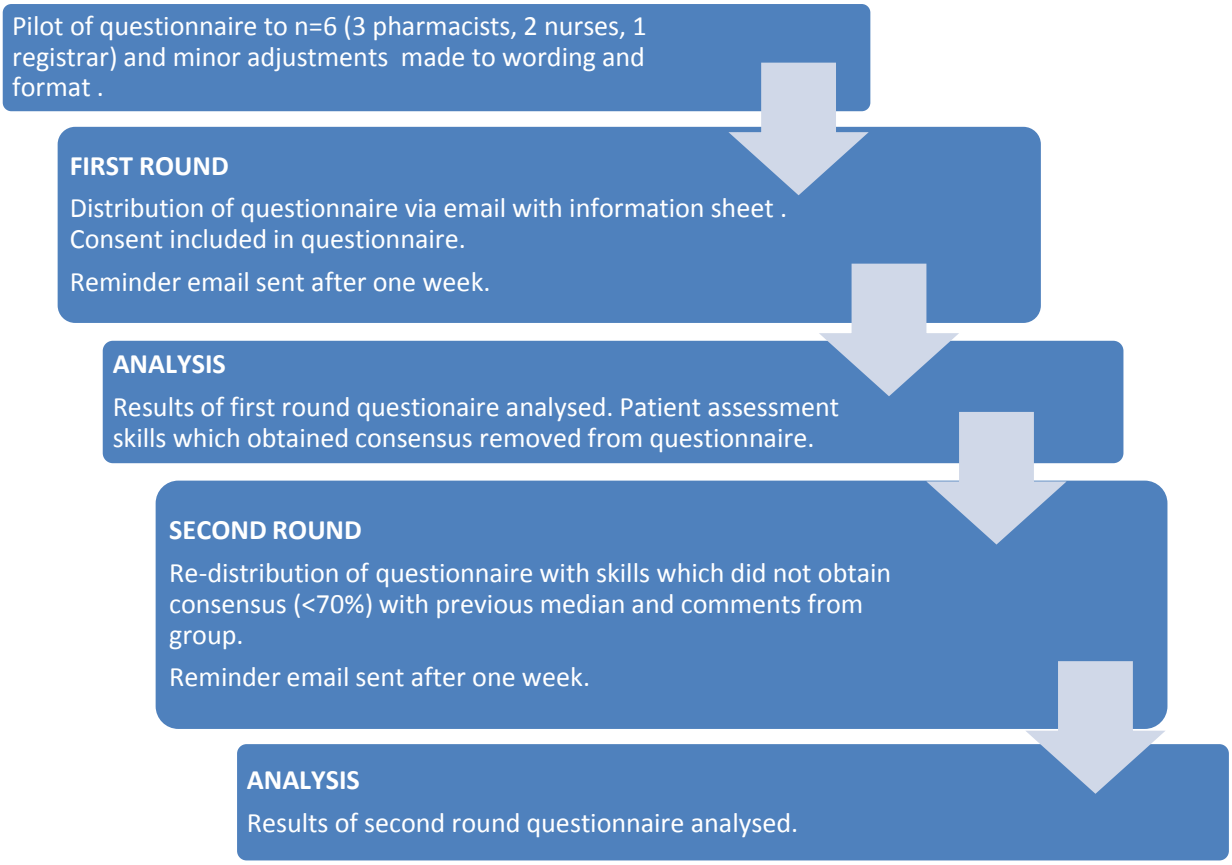


Figure 2: Delphi process for each national MDT group

*2.4.3 Data Analysis*

Setting consensus varies widely between studies; percent agreement appears the most common definition of consensus with a range of set values between studies (70-90%). [23,24] The project team agreed that consensus would be reached if ≥70% of the scores fall within 3 points of each end of the scale (1-3 for disagreement and 5-7 for agreement). The median was also calculated for each statement after the first round questionnaire to inform the second round participants of the group's median response. Statements which achieved consensus

(≥70% agree or disagree) were removed before the second round Delphi. Results from the second round were analysed via the same method.

*2.5 Research ethics*

This project was a service development involving NHS employees only therefore submission to the NHS Research Ethics Committee and Research and Development office was not required. Approval was obtained from the local pharmacy Quality Improvement Team.

## 3.0 Results

### *3.1 Phase 1: Nominal Group Technique*

Six specialists in renal and prostate cancer participated in the GU nominal group (two consultants, one registrar, two nurse specialists and one pharmacist). Consensus was reached for 21/27 (78%) PAS, nine were considered required for PIPs and 12 were considered not required . Six PAS did not achieve consensus. Five specialists in lung cancer participated in the lung nominal group (one consultant, one registrar, two nurse specialists and one pharmacist). Consensus was reached for 23/27 (85%) PAS, 15 were considered required for PIPs and eight were considered not required. Two PAS were considered irrelevant to the tumour group and two did not achieve consensus (Table 1). The skills which did not achieve consensus are summarised below.

*GU group*

**Interpretation of computerised tomography (CT) scans**

Some felt that with specific training the PIP would be able to interpret a CT scan as part of advanced practice whereas others thought it more appropriate that a clinician review the scan.

"Will need discussion in some cases. Back to cons clinic for review." *GU Consultant 1*

"May be able to with training in more advanced practice." *GU Consultant 2*

**Examination of oral mucosa, hands, legs/feet, skin and neurotoxicity**

A number of participants felt that as clinical problems with these areas are rare in GU cancers, they would always require clinician review. However, some felt these skills could be taught with adequate training.

"All these skills are rare in these tumour groups so would benefit from medic review. Not relevant to this cancer therefore always seek advice." *GU Consultant 2*

*Lung group*

**Lymph node palpation**

Some felt that this skill was rarely required however others felt like it could be a skill developed as part of advanced practice.

"Felt overall not appropriate and rarely required for a pharmacist to do this but with time might be something we could look at." *Lung Consultant 1*

**Interpretation of urinalysis**

The majority of the group did not feel this skill was necessary but the nurse specialists thought it may be useful in detecting diabetes.

"Rarely required but may be useful for diabetes – some new TKIs can cause this" *Lung Nurse 1*

Table 1: Group NGT results for GU team (n=6) and Lung team (n=5).

| Category | Skill | GU group | Lung group |
|---|---|---|---|
| **Common SACT toxicities** | Assessment of performance status | ● | ● |
| | Assessment of general appearance and well being | ● | ● |
| | Assessment of nausea and vomiting | ● | ● |
| | Assessment of diarrhoea | ● | ● |
| **Clinical examination skills** | Examination of oral mucosa and tongue | ▲ | ● |
| | Examination of hands | ▲ | ● |
| | Examination of legs, ankles and feet | ▲ | ● |
| | Examination of skin (e.g. rash, PPE) | ▲ | ● |
| | Assessment of neurotoxicity | ▲ | ● |
| | Assessment of arthralgia | ○ | - |
| | Measuring and interpreting vital signs (BP, HR, temperature, RR) | ● | ● |
| | Basic chest examination | ○ | ● |
| | Lymph node palpation | ○ | ▲ |
| | Abdominal examination | ○ | ○ |
| **Complications of cancer/SACT** | Identifying signs/symptoms of spinal cord compression | ● | ● |
| | Identifying signs/symptoms of neutropenic sepsis | ● | ● |
| **Interpretation of clinical tests** | Interpretation of thyroid function tests results | ● | - |
| | Interpretation of pulmonary function tests results | ○ | ○ |
| | Interpretation of tumour markers | ● | ○ |
| | Interpretation of electrocardiogram results | ○ | ● |
| | Interpretation of left ventricular ejection fraction reports e.g. ECHO/MUGA | ○ | ○ |
| **Interpretation of clinical reports** | Interpretation of urinalysis results | ○ | ▲ |
| | Interpretation of CT reports | ▲ | ○ |
| | Interpretation of x-ray reports | ○ | ○ |
| | Interpretation of ultrasound reports | ○ | ○ |
| **Emotional and holistic needs assessment** | Assessment of emotional needs and psychological impact of treatment | ○ | ● |
| | Holistic needs assessment | ○ | ○ |

Key:
● Agree (≥70% of participants voted agree or strongly agree)
○ Disagree (≥70% of participants voted disagree or strongly disagree)
▲ No consensus
- considered irrelevant to tumour group

*3.2 Phase 2: Delphi Questionnaire*

Of the 30 GU cancer specialists invited to participate, 23 (77%) provided consent and completed the first round Delphi (Table 2 and Figure 3). Consensus (≥70% of participants agreed or disagreed) was achieved for 13/21 PAS included in the questionnaire (Table 3). The eight skills which did not achieve consensus were carried forward to the second round Delphi questionnaire in combination with the median group result and comments from the group. In the second round Delphi, 20/23 (86.9%) participants responded and consensus was gained for a further two skills. In total, 13 PAS were agreed as required for a PIP to have to prescribe SACT in GU cancer.

Of the 42 lung specialists invited to participate, 18 (43%) provided consent and completed the first round Delphi (Table 2 and Figure 3). Consensus (≥70% of participants agreed or disagreed) was achieved for 16/23 PAS included in the questionnaire (Table 3). In the second round Delphi, 12/18 (66.7%) participants responded and a further two skills gained consensus (Table 3). In total, 18 PAS were agreed as required for a PIP to have to prescribe SACT in lung cancer. Comparing the results for both tumour groups, eight PAS gained consensus as required for a PIP between both tumour groups and were thus defined as core PAS.

Comments from both groups on why they did not change their opinion are outlined in Table 4. From the comments provided, it was unlikely consensus on further PAS would be achieved therefore a third round Delphi was not completed. The main reasons for not reaching consensus were around PIP competence, knowledge and skills, and the roles and responsibilities of PIPs within the MDT (Table 4). The PAS agreed as required were divided into core (required for all tumour groups) and tumour specific (Figure 4).

Table 2: Participant demographics of the national Delphi questionnaire round 1

| Region | GU group n=23(n, %) | Lung group n=18(n, %) |
|---|---|---|
| **SCAN** | 9(39) | 5(28) |
| **WoSCAN** | 9(39) | 11(61) |
| **NoSCAN** | 5(22) | 2(11) |
| | | |
| Profession | | |
| **Consultant** | 9(39) | 5(28) |
| **Registrar** | 2(9) | 2(11) |
| **Pharmacist (prescriber)** | 9(39) | 8(44) |
| **Pharmacist (non-prescriber)** | - | 1(6) |
| **Nurse (prescriber)** | 2(9) | - |
| **Nurse (non-prescriber)** | 1(4) | 2(11) |

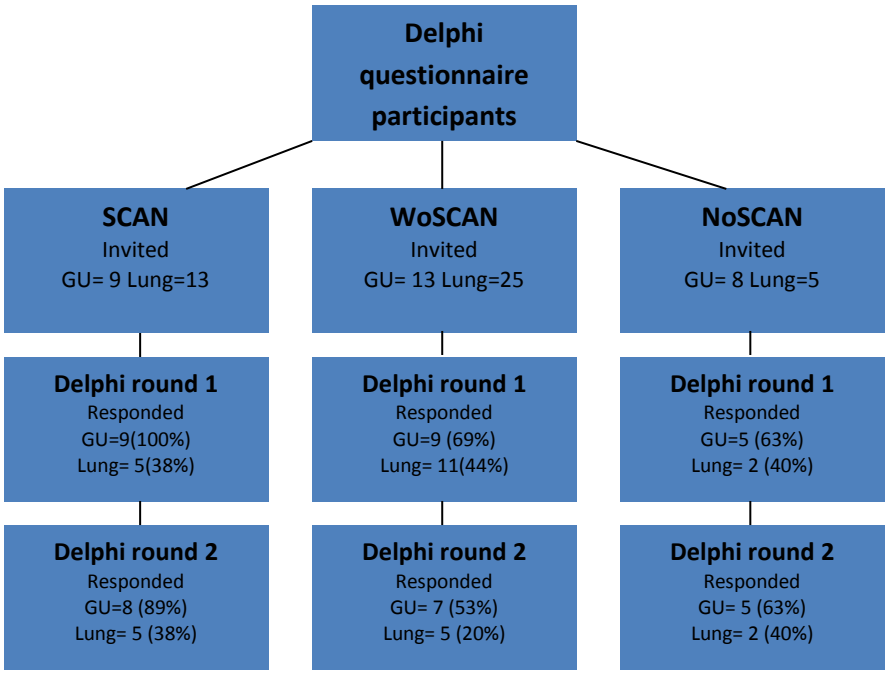


Figure 3: Number of participants from each MDT (GU and Lung) from each cancer network (SCAN, WoSCAN and NoSCAN) who were invited to participate and responded to the Delphi questionnaire.

Table 3: Results collated from round 1 and 2 of the Delphi questionnaire for GU team (n=23) and lung team (n=18).

| Category | Skill | GU group | Lung group |
|---|---|---|---|
| **Common SACT toxicities** | Assessment of performance status | ● | ● |
| | Assessment of general appearance, (lung cancer symptoms) and well being | ● | ● |
| | Assessment of nausea and vomiting | ● | ● |
| | Assessment of diarrhoea | ● | ● |
| **Clinical examination skills** | Examination of oral mucosa and tongue | - | ● |
| | Examination of hands | - | ● |
| | Examination of legs, ankles and feet | - | ● |
| | Examination of skin (e.g. rash, PPE) | - | ● |
| | Assessment of neurotoxicity | - | ● |
| | Assessment of arthralgia | ● | - |
| | Measuring and interpreting vital signs (BP, HR, temperature, RR) | ● | ● |
| | Basic chest examination | ▲ | ●* |
| | Lymph node palpation | ○* | - |
| | Abdominal examination | ○* | ▲ |
| **Complications of cancer/SACT** | Identifying signs/symptoms of spinal cord compression | ● | ● |
| | Identifying signs/symptoms of neutropenic sepsis | ● | ● |
| **Interpretation of clinical tests** | Interpretation of thyroid function tests results | ● | - |
| | Interpretation of pulmonary function tests results | ▲ | ▲ |
| | Interpretation of tumour markers/mutational status | ● | ● |
| | Interpretation of electrocardiogram results | ▲ | ● |
| | Interpretation of left ventricular ejection fraction reports e.g. ECHO/MUGA | ▲ | ●* |
| **Interpretation of clinical reports** | Interpretation of urinalysis results | ● | - |
| | Interpretation of CT reports | - | ▲ |
| | Interpretation of x-ray reports | ● | ▲ |
| | Interpretation of ultrasound reports | ▲ | ▲ |
| **Emotional and holistic needs assessment** | Assessment of emotional needs and psychological impact of treatment | ● | ● |
| | Holistic needs assessment | ▲ | ● |

*Skills which achieved consensus following the 2nd round.

Key:
● Agree (≥70% of participants voted agree, somewhat agree or strongly agree)
○ Disagree (≥70% of participants voted disagree, somewhat disagree or strongly disagree)
▲ No consensus
- considered irrelevant to tumour group

Table 4: Comments on skills which did not gain consensus following the Delphi

| Comments |
| --- |
| **Basic chest examination and abdominal examination**<br><br>"There may be the need to undertake these examinations, but I am still of the opinion.....it'd be most appropriate to refer to a medic…I think that it's important to recognise our own strengths as well as those of other members of the team." *GU Pharmacist 3*<br><br>"Having completed university level examination skill course and find once a practitioner has built confidence in their skills it is useful and allows more independent practice." *GU Pharmacist 5*<br><br>"I think if you are examining a patient and prescribing SACT for lung cancer then you should be able to examine a chest and abdo. How can patients have confidence in us as practitioners if we refer to nurses or medics?" *Lung Pharmacist 6*<br><br>"On reflection a basic/limited examination skill would be helpful in recognising abnormality and escalating." *Lung Registrar 1* |
| **Interpretation of ECG and left ventricular ejection fraction reports e.g. ECHO/MUGA**<br><br>"… if you are rarely using a skill it is difficult to be competent. I would never feel competent to interpret an ECG but have been successfully prescribing in a Renal Oncology setting for several years." *GU Pharmacist 6*<br><br>"I would expect a PIP to interpret at QTc, but not more subtle lead changes. Similarly, ability to understand a low ejection fraction on echo is critical to safe prescribing of some drugs. " *GU Consultant 2* |
| **Interpretation of x-rays, ultrasounds and CT scans**<br><br>"We alternate between chest x-rays and CT scans for our oral lung SACT, I think if you are in consultation with the patient and reviewing them you need to be able to interpret an x-ray and match these to clinical findings…." *Lung Pharmacist 6*<br><br>"The pharmacist IP should be aware of the need for imaging to monitor response to treatment and liaise with medical staff to ensure imaging is done at an appropriate time and the results have been reviewed by medical staff before continuing treatment." *Lung Consultant 3* |

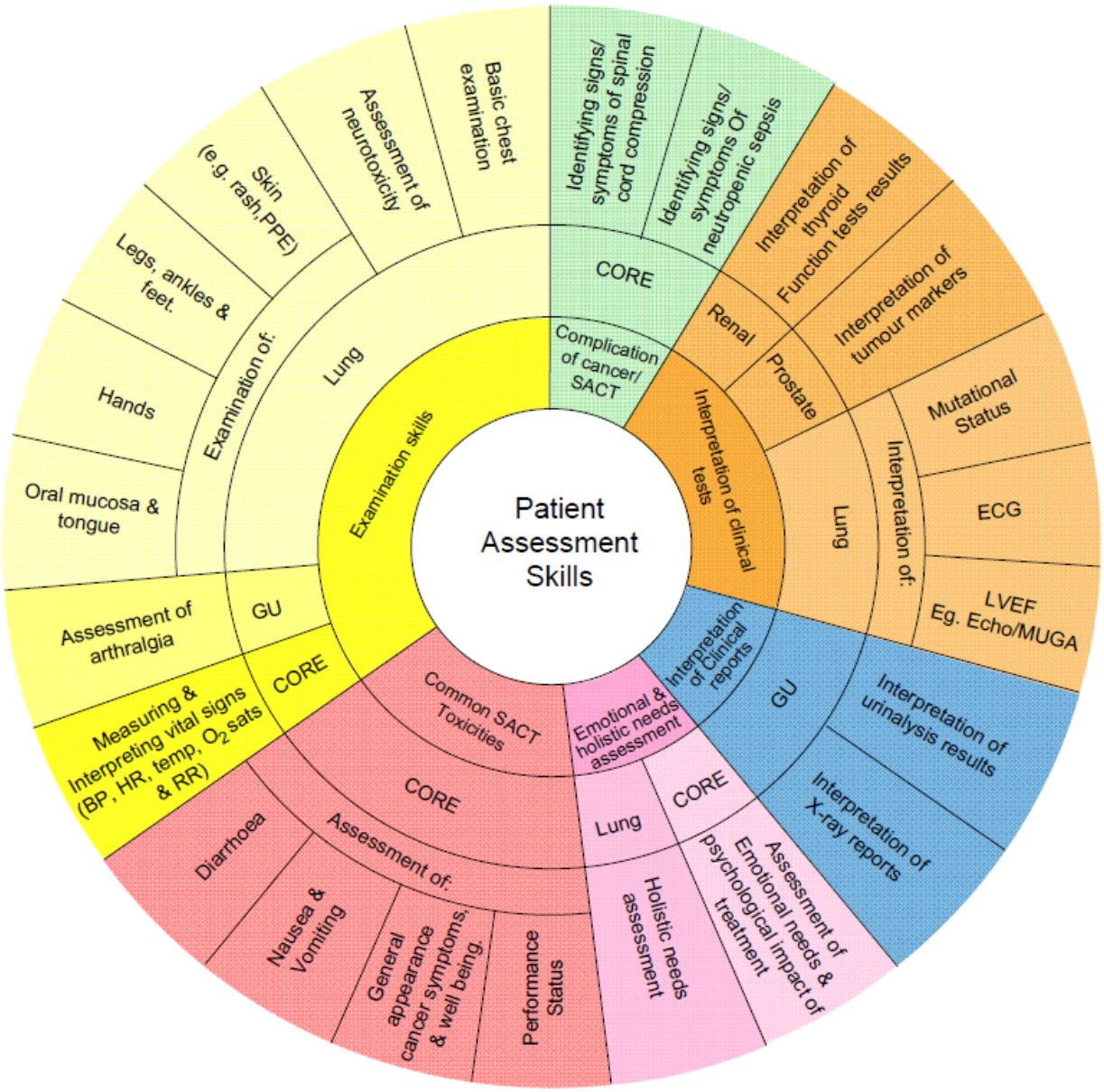


Figure 4: Summary of the PAS which were agreed as required for a PIP to have to prescribe SACT grouped as core skills across tumour groups and tumour specific skills.

## 4. Discussion

*Key findings*

This study explored with clinicians from two distinct tumour groups the PAS required for a PIP to prescribe SACT therapy and identified a group of core skills (n= 8) and PAS specific to GU cancers (n=5) and lung cancers (n=10). Examples of core skills included toxicity assessment and vital sign measurements whereas tumour specific skills appeared specific to the disease state, for example basic chest examination in lung cancer and checking prostate-specific antigen (PSA) as a tumour marker in prostate cancer. These findings could form the basis for the development of a competency framework for PIP SACT prescribing moving forward.

There were some differences in the number of agreed PAS between the NGT and Delphi questionnaire. These were considered a reflection of variation in local versus regional practice rather than the consensus method used. The role of PIPs as SACT prescribers is well established in WoSCAN and NoSCAN. PIPs that work in these clinics are experienced practitioners and may reflect PIPs in an advanced prescriber role. Their ability to perform PAS competently is likely to have developed over time and with experience demonstrating that learning these skills is achievable. Having experienced this more advanced PIP role, clinicians and nurses within these networks will be more aware of the potential abilities of PIPs. In contrast, SCAN has no PIPs prescribing SACT therefore the practice of other regions could be used as a basis for training of new PIPs.

A small number of PAS did not achieve consensus following the Delphi questionnaire. The themes arising from the comments on these skills centred around development of knowledge and skills and maintaining competence, specifically for skills that would be used infrequently.

Current pharmacist undergraduate and PIP postgraduate training programmes contain minimal patient assessment skill training.[7] Recently NHS Education for Scotland (NES) developed a number of clinical patient assessment training programmes for cardiovascular and respiratory disease, however these would not encompass the skills required to prescribe SACT.[25] Therefore, additional training programmes would be required to enable PIPs to improve their knowledge and develop PAS for prescribing SACT. However, some of the participant comments suggested that some skills cannot be taught and can only be developed through experiential learning. A number of participants suggested that certain advanced skills (e.g. interpretation of CT/ultrasound scans) could be developed as part of a more advanced PIP role.

Confidence in a PIP's ability to carry out these PAS was also a key theme. Despite being aware of the advanced roles of PIPs in other networks, participants who did not have experience carrying out PAS within their own network were not willing to change their opinion on certain PAS during the Delphi questionnaire. Most commented that they did not feel confident in some PAS. Confidence in ability to carry out clinical assessment skills and in maintaining competence has also been highlighted in the literature as a barrier to PIPs in new prescribing roles.[26]

Roles and responsibilities of each member of the MDT was another identified theme in both tumour groups. Even if a PIP has been trained in a certain skill, they may not be the best suited member of the MDT to carry out this assessment or the need for the skill is rare. For example, the lung group could not agree on the requirement for a PIP to interpret a report of a CT scan or x-ray. Some felt that although it was vital for PIPs to have an understanding of these types of reports to understand disease progression, it is more appropriate for a medical member of staff to interpret these, particularly for complex cases. For some of the PAS which did not achieve consensus in either tumour group, doctors and PIPs considered it more

appropriate to refer to a medical member of staff. This was a common comment from both PIPs and doctors and could be related to the perceived role of PIPs within the MDT as an expert in medicines rather than in clinically examining patients; a role more common of doctors and nurses.

*Strengths and limitations*

Consensus methods such as the NGT and Delphi questionnaire enable generation of ideas followed by consensus between a group of specialists and development of guidance where there is little published research.[17,18] The Delphi questionnaire enables consultation of a larger number of specialists on a national level. In this study, the two rounds enabled further consensus to be achieved as participants were able to review other participant comments and the group median before re-ranking the skills.[19] Differences between the NGT and Delphi groups could be attributed to the fact that the NGT involves a face-to-face discussion whereas the Delphi is anonymous, allowing opinions to be expressed more freely.

Setting consensus varies widely between NGT and Delphi consensus studies; percent agreement appears the most common definition of consensus with a range of set values between studies (70-90%).[23,24] Consensus was set at 70% in this study. This enabled consensus to be achieved in an area where there is currently a wide variety of practice. Reporting the median to participants allowed them to consider the opinion of the group in combination with the group comments before making a decision on their second round ranking.

During the NGT, there was difficulty in recruiting a sufficient number of people due to availability for face-to-face discussions and ensuring that an adequate range of professions were included. However, sample sizes for the Delphi questionnaire were adequate. Sample sizes for Delphi participants vary widely in literature, ranging from 10 to hundreds of

participants with no widely accepted minimal sample size for this consensus method. The sample size should be as deemed appropriate by the investigator and based on availability of participants.[27] There was a good response rate from the GU group nationally (n=23/30, 76.7%), improving the validity of the findings. Although there was a lower response rate for the lung group (n=18/42, 43%), this higher than observed in other studies. [19,26]

A limiting factor to low response rate for the lung group may have been the small number of PIPs currently prescribing within lung cancer meaning that the MDTs did not feel able to sufficiently complete the questionnaire as they had little, if any exposure to PIPs in this prescribing role. Whereas within the GU group, there are multiple PIPs within WoSCAN and NoSCAN who were established prescribers. Furthermore, the response rate to the second round Delphi was not 100% in each group, 20/23 (87%) in the GU group and 12/18 (66.7%) in the lung group, which limits the validity of the second round results. A reason for this may include that participants did not want to change their responses or had developed responder fatigue.

Within the GU national group there was a relatively equal spread of participants from each regional network meaning that the national group can be said to have been representative of all NHS Scotland cancer networks, with no single network dominating the consensus process. Within the lung group there was a higher portion of responders from WoSCAN (61%) however this did not appear to affect the ability to obtain consensus.

*Policy, practice and research implications*

There is currently a lack of guidance on the PAS training required for PIPs. Current literature assessing PIPs prescribing in SACT clinics demonstrates their value in these clinics but does not consider how PIPs may be trained in PAS to prescribe SACT safely.[14,15] In addition, concerns have been highlighted by various members of the MDT over a PIP's ability to fully

clinically assess patients and the current training in place.[13] Prescribing frameworks developed by the RPS, BOPA and WoSCAN contain minimal detail on PAS.[9,10,12] This means that further work is required to develop current PIP prescribing frameworks and policies to align with current practice of PIPs as prescribers in oncology and allow expansion of this role in other cancer networks.

This study has identified the PAS required for PIPs to prescribe SACT in two tumour groups. Further work will be required to define the evidence required by a PIP to demonstrate competence for each PAS. External training programmes may be able to provide baseline training in certain skills but it is likely that as certain skills are cancer specific and can often be quite complex, experiential learning may be required to fully develop these skills.

A recent study developed a competency framework for PIPs prescribing in heart failure. It used the RPS Foundation and Advanced Pharmacy Frameworks as structure in development of their framework to make it more widely applicable in the UK.[28,29,30] It may be that these frameworks could be used as guidance in combination with the BOPA prescribing framework to further develop competency frameworks to reflect the identified PAS. The next steps following this study will be to liaise with the Scottish Oncology Pharmacy Practice Group (SOPPG) and BOPA to integrate the identified PAS into current frameworks and develop training tools to suit all NHS Scotland cancer networks.

Further work will also be required to identify the method of assessment for competence in these frameworks. This could be in the form of observational assessment by a medical or experienced member of the team - these would need to be defined in a national framework. The recent framework developed by WoSCAN suggested that training tools such as case based discussion and mini-clinical evaluation exercise could also be used as evidence in the

training of PIPs.[12] Frameworks will be required to be developed and piloted for other tumour groups in order to identify which tumour specific PAS may be required for that tumour type.

Further work may also be required to identify the enablers and barriers to PIPs prescribing SACT and performing PAS to determine why there was a perceived reluctance to develop advanced skills. Overcoming barriers such as confidence in a PIP's own ability will hopefully aid new prescribers and current prescribers looking to develop their prescribing role.

*Conclusion*

This study defined the PAS a PIP requires to prescribe SACT within two tumour groups. It was evident from this study that current practice of PIPs working as part of the oncology MDTs varies widely across NHS Scotland cancer networks. As there are currently no PIPs prescribing SACT in SCAN, practice within other networks should be considered when developing national frameworks. Further work will be required to establish the training tools required to support this development in knowledge and skills and to explore how competence will be assessed. In addition, this work will need to extend to other tumour types to fully define the roles and responsibilities of a PIP within the oncology MDT.

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