Evaluating the impact of a specialist frailty multidisciplinary team pathway with clinical pharmacist involvement

Final report

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Executive Summary

Background

As the population ages, frailty and polypharmacy present increasing burdens on the healthcare system. Frailty is one of the leading risks to global public health and a leading cause of death for older people. When tackling the complex care needs of the frail population, medication use is a key consideration. Evidence shows that prescribing for older people is generally suboptimal and inappropriate polypharmacy is often experienced. In accordance with global and national health policies, which prioritise medication reviews for frail patients and developing specialist frailty multidisciplinary teams (MDTs), Nottingham University Hospitals NHS Trust (NUH) launched its Specialist Frailty MDT Pathway in April 2018. Care on this pathway aims to optimise medicines and reduce readmissions to hospital through the involvement of a specialist frailty pharmacist as part of the MDT. Patients are directed to this pathway at admission if they are frail (defined as a Rockwood frailty score of 6 or greater) and have a propensity for rapid discharge (typically 72 hours). This study evaluated the outcome of the pathway relative to standard care.

Methods

A retrospective cohort study was conducted comparing the two care pathways: Those treated on the specialist frailty MDT pathway and those who received standard care within NUH's Health Care for Older Persons base wards. Each cohort consisted of 350 individuals who were selected using a forward sequential sampling approach based on their discharge date from 6th June 2019 onwards. Where patients had been discharged to an interim care facility, had previously been included as part of the study (i.e. readmitted) or where records were not available, these episodes were excluded. For each patient, personal characteristics (gender, age, and Rockwood frailty score), length of stay and admission/readmission and length of readmission(s) (within one calendar month of discharge) were recorded. Further, the medication, dose, frequency, route and quantity on both admission and discharge were collected, along with the reason for any change (as recorded on the discharge summary). For medications that had been changed, the quality of information on the discharge summary was assessed as either "poor", "satisfactory or "excellent". Persistence of any change decision in primary care at three months post discharge was also measured. All episode data was obtained from NUH hospital records whilst persistence data was obtained from patients' Summary Care Records, where available. Medicines are reported in aggregated form as defined by the British National Formulary.

Findings

Individuals on the specialist frailty pathway experienced fewer medication changes (41%, n=1423) than standard care (48%, n=1824). In specialist frailty these comprised of: New medicines - 43%; temporary stops - 5%; permanent stops – 33%; and other amendments – 19%. In standard care, medications changes comprised of: New medicines – 48%; temporary stops – 10%; permanent stops – 27%; other amendments – 16%. When antibiotics were excluded (patients in the frailty pathway are discharged before short course medicines are completed), per patient, 38% fewer medicines were initiated on the specialist frailty pathway compared to standard care. Additionally, the specialist frailty pathway also demonstrated that 5% more non-antibiotic medicines per patient were permanently stopped and 57% fewer non-antibiotic medicines per patient were temporarily stopped. Propensity for the medication change to be adhered to in primary care at three months was higher in specialist frailty (67%, n=948) compared to standard care (54%, n=988).

Of particular note were the number of new medicines prescribed for psychoses (n= 19 v 6 (standard care v specialist frailty); angiotensin-converting enzyme inhibitors (n= 6 v 1); corticosteroids (n= 17 v 7) enteral nutrition supplements (n= 30 v 5); H_2 receptor antagonists (n= 11 v 3); loop diuretics (n= 25 v 12); nitrates (n= 3 v 1); opioid analgesics (n= 64 v 41); oral anticoagulants (n= 19 v 10); osmotic laxatives (n= 58 v 28) and stimulant laxatives (n= 158 v 74). Further, the number of medicines stopped permanently included angiotensin-II receptor antagonists (n= 14 v 6); antipsychotics (n= 4 v 2); calcium channel blockers (n= 21 v 30); corticosteroids (n= 9 v 5); drugs for dementia (n= 6 v 1); H_2 receptor antagonists (n= 6 v 1); neuropathic pain (n= 2 v 6); nitrates (n= 4 v 10); opioid analgesics (n= 29 v 35); oral anticoagulants (n= 18 v 9); osmotic laxatives (n= 11 v 8) and stimulant laxatives (n= 7 v 4).

The quality of information provided on the discharge summary to the primary care health professionals was assessed to be ‘excellent’ for 47% (n=672) of changes in specialist frailty and 34% (n=610) in standard care. ‘Satisfactory’ scores accounted for 53% (n=749) in specialist frailty and 66% (n=1198) in standard care. Readmissions affected 20% of individuals in both arms, however multiple readmissions were more common for those on specialist frailty (3%, n=10) compared to standard care (1%, n=4).

Conclusion

This evaluation has highlighted the benefits of the specialist frailty MDT pathway at NUH in tackling polypharmacy in the frail population. The service demonstrates a reduction in new medicines prescribed during hospital stays and an increase in permanent deprescribing. It

has additionally decreased temporary stops on medications and, possibly through providing higher quality discharge information, increased the propensity for change decisions to be maintained in the primary care setting. This model provides insight to the benefits of specialist pharmacist involvement in the frailty MDT and could support others to develop similar services in the acute setting. Future work should aim to assess the economic implications of the variations in prescribing and of readmissions comparatively across the care pathways.

Contents

Project description

There is increasing burden on the healthcare system caused by both frailty and polypharmacy. In April 2018, a specialist frailty multidisciplinary team (MDT) pathway was launched at Nottingham University Hospitals (NUH) Trust. This pathway aims to enhance the optimisation of medicines and reduce readmissions to hospital through the involvement of a specialist frailty pharmacist (Agenda for Change (AfC) band 8a) as part of the MDT. The purpose of this study is to evaluate this pathway against standard care as situated.

The objectives of the study are to:

- Identify the characteristics of patients on each pathway;
- Characterise medicines optimisation interventions;
- Assess the persistence of medicines optimisation interventions 3 months post discharge to primary care;
- Assess the impact of the specialist pathway on the numbers of readmissions to hospital.

At the inception of the project it was intended that this evaluation would also be conducted at the University Hospitals of Leicester (UHL) trust. Just prior to the commencement of data collection, UHL reorganised services such that there was not an equivalent pathway at UHL. The project management team therefore agreed to transfer the data collection capacity to NUH to increase evaluation sensitivity. The authors are grateful to Professor Larry Goodyer and the clinical staff at UHL for their contributions to the methodological development of this study.

Background

As the population ages, the issue of frailty is of increasing concern. Frailty constitutes a leading cause of death in older people and has been recognised as one of the most severe risks to global public health.[1-3] Frailty can be defined as the lack of ability to return to homeostasis following a stressor event (such as an infection, minor surgery or introduction of a new drug). This causes a disproportionately negative effect on health; increasing the risk of falls, delirium (or acute confusion) and fluctuating disability.[4, 5] The latter refers to changeable levels of stability; patients may be able to carry out everyday tasks on some occasions but need care and support for the same tasks on other occasions. In addition to these symptoms, frailty can also present as unexplained weight loss, extreme fatigue or increased susceptibility to infections.[4]

Although most commonly associated with older people, frailty is not simply a normal part of the aging process. It can affect people of all ages;[2] particularly those with comorbidities, low socio-economic status, poor diet and sedentary activity levels.[6] Importantly, frailty is both preventable and reversible.[2, 4] International guidance therefore recommends that measures of frailty be routinely used to identify patients for early intervention, as well as to develop healthcare services for older people.[2, 5]

In England, the 2019 NHS Long Term Plan acknowledged the increasing care needs of the aging population; recognising that although people are living for longer, they are often living with frailty and multiple long-term conditions. One of its priorities was therefore to help people age well. In line with international guidance, strategies to achieve this included routinely assessing patients for frailty in general practice and introducing acute frailty services in secondary care, which would aim to reduce hospital admissions by providing comprehensive geriatric assessments (CGAs) and treatment from specialist frailty multidisciplinary teams.[7]

There are many different instruments available to assess frailty but none have been universally adopted, despite recognition of the need for a standardised measure.[8] Within the NHS one of the most widely used tools is the Clinical Frailty Scale (CFS).[9] The CFS was originally developed by Rockwood et al. in 2005.[10] It is well-validated as a predictor of adverse outcomes for hospitalised older people and was designed to be completed using drug chart data.[8] The tool originally had seven points: 1-Very fit, 2-Well, 3-Managing well, 4-Vunerable, 5-Mildly frail, 6-Moderately frail, and 7-Severely frail.[10] However, the need to differentiate between severely frail and terminally ill individuals later emerged and the tool was subsequently updated to the current 9-point version in 2007, which includes 8–Very severely frail and 9-Terminally ill.[11]

When addressing the complex care needs of the frail population, medication use is an important consideration. Evidence shows that prescribing for older people in general is often suboptimal and polypharmacy is often experienced (i.e.: the concurrent use of multiple – often five of more – medications).[12] Polypharmacy, when managed properly, can be highly beneficial to patients. However, it carries increased risk of drug interactions and adverse drug events and may not achieve the intended therapeutic outcomes – this is often termed inappropriate or problematic polypharmacy.[13, 14] Frailty adds additional complexity to the care needs of the older population, further tipping the risk-benefit ratio of medication use in this population and making them more susceptible to potentially inappropriate prescribing.[12]

As part of their work to reduce unsafe medication use, the World Health Organization (WHO) launched Medication Without Harm as their third global challenge in 2017.[15] This identified polypharmacy as one of three key action areas. Recommendations to tackle polypharmacy included the development of a multidisciplinary workforce and the prioritisation of frail patients for medication review.[16] Emphasis was additionally placed on the recommendations of the “Advancing the responsible use of medicines: Applying levers for change” report, which called for health ministers to support pharmacists to take on a greater role in medicines management and to collaborate with other healthcare professionals to develop therapeutic plans. The report also highlighted the importance of investing in medicines audits for older people on multiple medications.[16, 17]

Prescribing guidelines are generally based on the healthcare needs of younger individuals with few to no co-morbidities. As such, they usually focus on what medications or interventions should be started and when. However, as the population ages and polypharmacy - along with potentially inappropriate medication (PIM) use - become more of a concern, the unique needs of older people are being increasingly recognised.[12] PIMs include those that are not clearly prescribed according to evidence, are not cost-effective, or are associated with adverse effects.[18]

In 2013, the International Group for Reducing Inappropriate Medication Use and Polypharmacy (IGRIMUP) was established with the aim of reducing the negative health and economic effects of inappropriate medication use on a global level. By 2018, when the group published its initial recommendations, it consisted of over 100 members from 26 countries. The position statement acknowledged that “without evidence of definite relevant benefit, when it comes to prescribing, for many older patients ‘less is more’.” To achieve its goals, IGRIMUP advocated for more research exploring improving medicines use in older populations, as well as a return to evidence-based medicine; where treatment decisions would be informed not just by the guidance, but by the context, patient preference and informed clinical judgements.[12]

In order to improve prescribing and optimisation of medicines for older people, many tools - currently 26 in total - have been developed globally to identify PIMs.[14, 18] The STOPP/START tool, for example, was originally developed in 2008. Importantly, it acknowledged that inappropriate prescribing for older people encompasses not only PIMs, but also potential prescribing omissions (PPOs). Hence, the screening tool of older people's prescriptions (STOPP) and the screening tool to alert to right treatment (START) was conceptualised. Updated in 2014, the tool has proved to be effective in clinical settings.[19]

Various studies have demonstrated the value of implementing the STOPP/START criteria as part of a hospital-based intervention. One study for example, showed that as a one-off intervention during a hospital stay, STOPP/START was effective in improving the appropriateness of medication use in older people admitted for an acute condition. When followed up after six months, appropriate medication use was still improved.[19] Another study showed STOPP/START to be effective in reducing the risk of adverse drug reactions and duration of hospitalisation in older people when implemented as an intervention within 72 hours of hospitalisation.[19, 20]

Due to the increased prevalence of frailty and its burden on health and social care systems, a considerable amount of research has been carried out over recent years to improve understanding of the condition and to develop interventions to prevent and reduce this burden. In a recent series on Bringing Frailty into Medicine, The Lancet advocated for further research in this area to improve strategies for assessment and management. The series additionally highlighted the importance of the involvement of healthcare professionals other than geriatricians in care planning for frail individuals.[2]

In the hospital setting, there is some evidence to suggest that interventions involving placing patients on a specialist frailty pathway, or completing a medication review might be effective in reducing readmissions to hospital.[3, 21] However, this evidence is limited and highlights a key opportunity to develop current knowledge about which frailty intervention strategies are the most feasible and cost-effective.[3]

The purpose of this study is therefore to evaluate the specialist frailty multidisciplinary team (MDT) pathway currently in place at NUH. The objectives of the study are to identify the characteristics of patients on each pathway, characterise medicines optimisation interventions, assess the persistence of medicines optimisation interventions three months post discharge to primary care and assess the impact of the specialist pathway on the numbers of readmissions to hospital.

Evaluation methodology

The study employed a mixed methods design consisting of two study cohorts: Patients who received care on the frailty MDT pathway and those receiving standard care. Standard care describes care provided to patients whilst on the Healthcare for Older Persons (HCOP) wards that does not include any intervention from the specialist frailty MDT team. For both study cohorts, a retrospective cohort study was conducted to evaluate the impact of the

specialist frailty MDT intervention on medicines optimisation outcomes, along with qualitative interviews to explore patient and clinician experience of the intervention compared to standard care.

Cohort study

The retrospective cohort study was conducted to gather data on medicines optimisation interventions across both pathways and to assess the persistence of these interventions three months post discharge. The full cohort consisted of 700 patients in total, 350 from each pathway (Figure 1). The index date for the study was set as the 6th June 2019; the earliest date that hospital records were available for patients discharged from the MDT pathway. Starting from the index date, chronological sequential sampling was used to identify the required number of patients for each study arm based on their discharge date, irrespective of their date of admission. Where patients appeared in the dataset more than once due to readmission, the earliest discharge from the index date was used as the first episode and further episodes within month were recorded as readmissions. Any further admission past this date were excluded. Patients were also excluded if they were discharged to interim care facilities (discharge summaries are not produced for these patients as the interim care facilities are considered another ward setting for care purposes), or if they were assigned to the MDT arm but had no medicine information on their discharge summary (since this indicated that they had been discharged without being reviewed by either care pathway and hence were not appropriate for inclusion) (Figure 1).

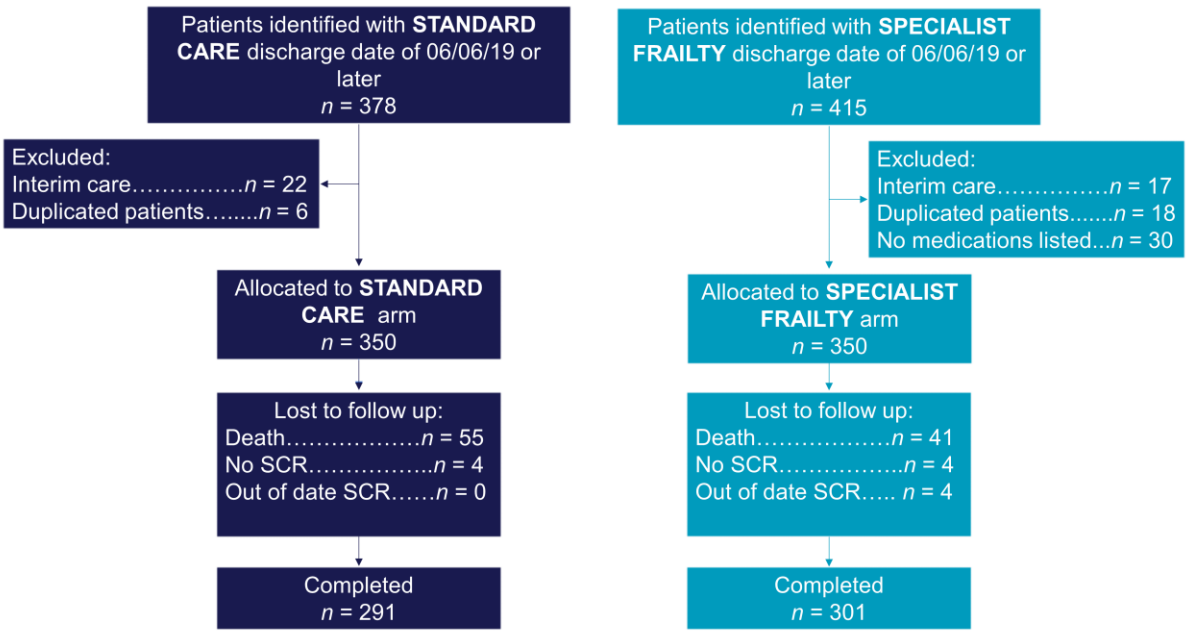

Figure 1 Cohort selection and follow up

Using the hospital records and discharge summaries, data was collected on each hospital episode, including patient characteristics (gender, year of birth and Rockwood Frailty score); loss to follow up (due to death, no SCR or out of date SCR) (Figure 1); length of stay; whether readmission had occurred within one calendar month of discharge (dates and reasons) and medications on admission and discharge (name, strength, frequency, route of administration, quantity per 28-day period, medication changes and the associated explanations stated on the discharge summary). An assessment of the quality of the information provided on the discharge summary was conducted (poor/satisfactory/excellent). Discharge summary scores were allocated as set out in Table 1. In order to ensure consistent and accurate scoring, the scoring system was developed collaboratively by the research team. A 10% sample was scored independently then cross-checked by the primary care pharmacist and specialist frailty pharmacist. Any discrepancies in the scoring were discussed and a consensus reached prior to scoring the remaining 90%.

Score	Explanation	Example
Poor	Discharge summary contains insufficient information to enable primary care providers to act without the need to make their own deductions or seek further clarification.	Warfarin stopped temporarily: "BLEED IN BRAIN. GP TO REVIEW IN 4 WEEKS TIME"
Satisfactory	Discharge summary contains limited but sufficient information or advice to allow change to be implemented.	Furosemide stopped permanently: "CHANGED TO BUMETANIDE"
Excellent	Discharge summary contains extensive information and/or clear instructions, allowing the change to be implemented, along with any constructive monitoring or follow up actions.	Ramipril stopped permanently: "SBP WITHIN ACCEPTABLE LIMITS - AT RISK OF ORTHOSTATIC HYPOTENSION - ACCEPT SBP LIMIT OF 150"

Table 1 Discharge summary scoring system

Data on general practice continuation of each medication change (initiation, amendment or cessation) at three months post discharge was obtained from the patient's Summary Care Record (SCR) (Figure 2).

All data was anonymised and recorded in an online repository. Data was then cleaned and analysed in Microsoft Excel.

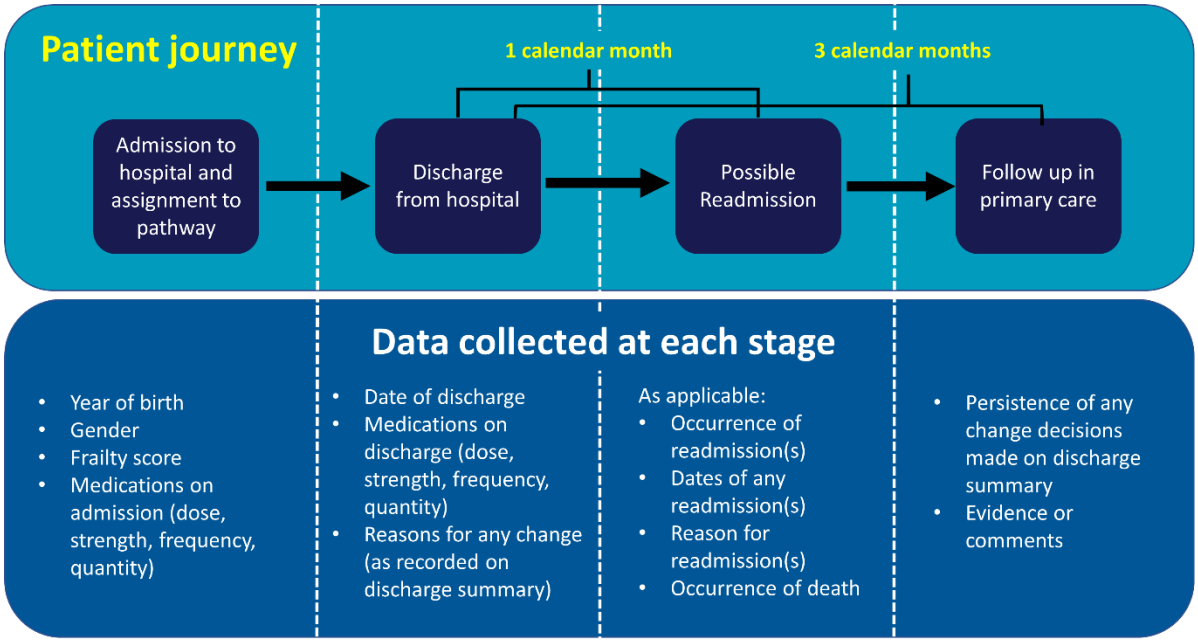

Figure 2 Summary of data collection process

Sample size calculation

Sample size was calculated based on a superiority trial assumption. Gallagher et al.[22] have previously reported an average number of medicines per patient of 6 and an interquartile range of 4-9. Using a mean of 6 and a variance of 2, the power calculation for 80% power and alpha of 5% for an assumed reduction in prescribing of 10% at the point of discharge requires a sample of 138 per cohort.[23] Further an allowance of 40% was made for the lack of availability of patient files giving a target sample per site of 388.

Statistical analysis

Data were analysed using descriptive statistics. Inferential statistics were deemed inappropriate as the cohorts were selected base on clinical need and operational matters and not randomised as part of the study.

Qualitative interviews

In order to add additional context to the study, individual semi-structured interviews were conducted with two health providers involved in the pathway: A specialist frailty pharmacist and the Head of Service for the intervention. Participants were purposively sampled based on their job role. Interview data was digitally video-recorded and transcribed verbatim using automated transcription software. Whilst a full thematic analysis was not considered

appropriate due to the small sample size, direct quotes from the participants were used to add insight to study findings. Appendices 1-3 contain the interview documents (topic guide, participant information sheet and consent form).

Patient and Public Involvement and staff experience

The East Midlands Academic Health Science Network's (AHSN) Patient and Public Involvement (PPI) committee was involved from the early stages of the study design. The research team initially sought agreement from the group on which elements of the study design would benefit from PPI. A decision was reached that the PPI committee should review the paperwork for the qualitative aspect of the study, which would involve patients.

The design for the evaluation initially involved exploring patient care on each of the pathways through conducting a thematic analysis on qualitative interviews with patients who had recently been discharged from HCOP. This would have involved semi-structed telephone interviews with eight patients from each study arm. These participants would have been recruited by the pharmacist whilst in hospital and purposively sampled based on their capacity to participant in telephone interviews (as assessed by the recruiting pharmacist). Written consent would have been obtained at the point of recruitment interviews aimed to be conducted within 72 hours of discharge.

Unfortunately, due to the COVID-19 global pandemic, which hit at the time recruitment was due to begin, the care pathways in HCOP had to be adapted to prioritise COVID-19 patients. The result of which was that the interviews with patients could no longer be conducted.

Although the interviews themselves were unable to take place, a great deal of work was done prior to this to ensure that patient and public views had been taken into consideration in the study design. The topic guide for the interviews, along with the participant information sheet, were reviewed by PPI groups at both the AHSN and NUH. Feedback from these groups proved valuable in improving the study documents prior to data collection.

Ethical considerations

Ethical approval was sought from the School of Pharmacy Research Ethics Committee at the University of Nottingham. Approvals for the initial study design and the subsequent amendment due to the pandemic were both granted (reference number: 016-2019). A summary of all relevant ethical considerations is provided in Appendix 4. Additionally, this service evaluation was registered with the Trust Audit Office.

Findings: Implementing the intervention

Pathway overview

The specialist frailty MDT pathway differs from the standard care provided in the HCOP base wards in several ways; however, the key difference is the involvement of the frailty pharmacist in the provision of care, whose focus is on specialist medicines optimisation. Patients are considered eligible for the specialist frailty pathway if they are assessed to have a clinical frailty score of 6 to 9 and are considered likely to be discharged within 72 hours. Once assigned to the pathway, the MDT delivers a comprehensive geriatric assessment (CGA).

> "Comprehensive *Geriatric Assessment, or CGA, is around functional assessment of the patient. So what we are expecting is that somebody is coming in with…they have frailty, they're mulitimorbid, they're aging, and an acute event has happened that has brought them in to acute care. So that could be an infection, it could be a fracture, it could be an adverse drug reaction, for example. So the idea is that CGA is trying to assimilate their acute medical problem, their past medical history, their functionality or functioning at home, or in their own environment, and it also focuses on their mental health as well. So it focuses on all aspects of care. So we are trying to assimilate all that information and make decisions about ongoing care in relation to those areas. And obviously a key component of the medical review of the patient in terms of their acute problem and their ongoing long-term conditions is medication review."*
>
> -Specialist Frailty Pharmacist, NUH

The specialist frailty pathway aims, where possible, to ensure patients are discharged within 72 hours of admission. Some of these patients can be discharged back to their own homes, whilst others are discharged to interim care homes for rehabilitation. In some cases, a patient may be required to stay in hospital for a longer time period. If the duration of stay is likely to be considerable, the patient might then be transferred to the HCOP base ward until discharge is possible. Figure 3 summarises the possible pathways that a patient may encounter. Further to this, a comparison of the individual components of each pathway is summarised in Table 2.

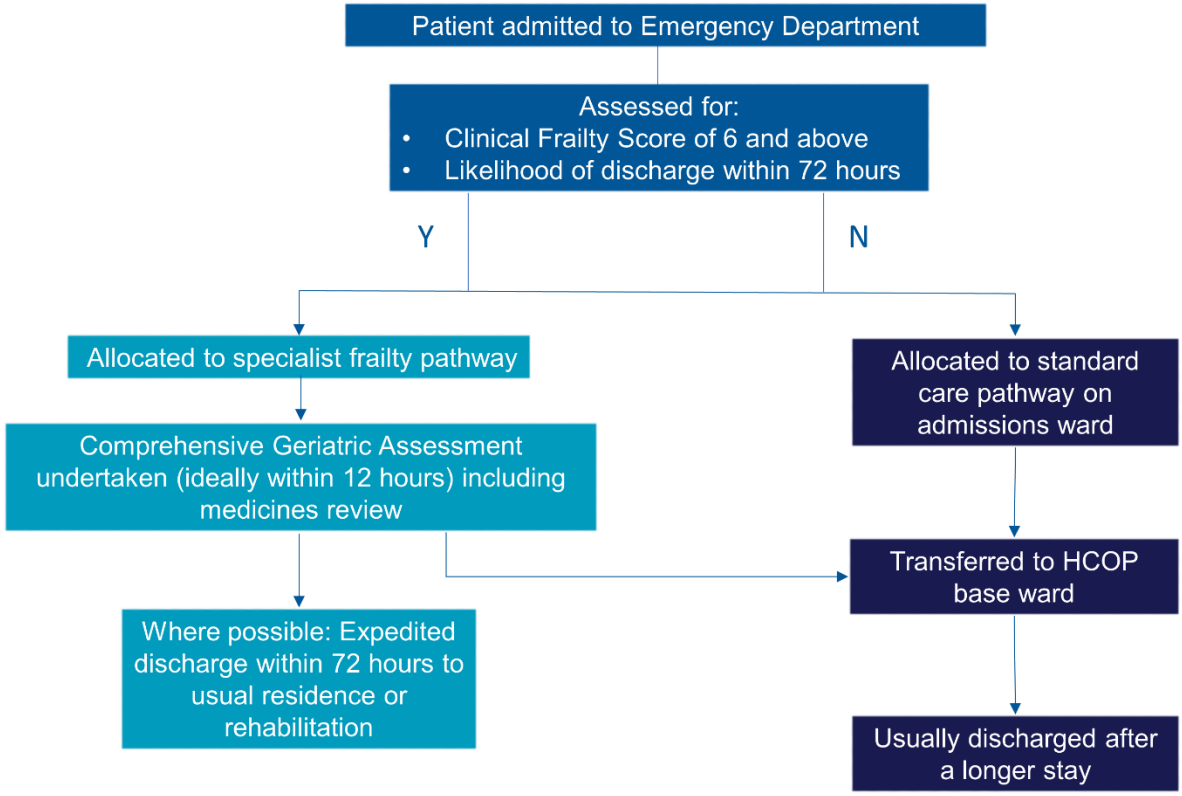

Figure 3 Specialist frailty MDT and standard care pathways within HCOP

Table 2 Comparison of specialist frailty and standard care pathway components

Pathway component	Specialist Frailty	Standard Care
Key health providers who have patient contact throughout pathway	Geriatrician, specialist pharmacist, occupational therapist/physiotherapist/speech and language therapist, conducting functional assessments	Geriatrician, non-specialist pharmacist, Occupational therapist/physiotherapist/speech and language therapist
Type of pharmacist involved	Senior clinical pharmacist with skills and experience in the management of patients with frailty	Predominantly junior pharmacists with limited experience and skills in the management of patients with frailty
Activities carried out by pharmacist	Initial drug history, medicines reconciliation, structured medicines review and medicines reconciliation on discharge	Clinical review of inpatient chart, no pharmacist led structured medicines review, medicines reconciliation on discharge
Comprehensive geriatric assessment (CGA)	Comprehensive CGA process that includes structured medicines review led by a specialist pharmacist	CGA is performed but the involvement of other MDT members is limited and pharmacists do not lead on structured medicines review leading to a more fragmented process
Amount of pharmacist time spent on the ward (per day)	Up to 7.5 hours if required	3.5 hours
Amount of pharmacist time spent with each patient (in total)	37.5 minutes per patient if required	7.5 minutes per patient if required (patients do not require drug history or medicines reconciliation)
Discharge process	Pharmacist involved in structured medicines review pre-populates the discharge summary with changes and discusses with patient or carer before discharge	Junior pharmacist with competing demands who is reliant on medics to input medication changes. Limited time to deliver education to patients or carers before discharge

Ensuring successful delivery: Development of the MDT

NUH's specialist frailty pathway was developed following a national drive to deliver acute specialist frailty services in acute hospital settings. The design of the pathway centred around the importance of a holistic approach as well as the call for MDT involvement. The development of the MDT itself was informed by the work of the NHS Acute Frailty Network (AFN). The network, first established in 2015, aims to optimise acute care services for older

people with frailty through supporting development of locally adaptable models for service improvement.[24]

> *"The national frailty network has given an idea of what an MDT should look like within a frailty pathway.* […] *It's led by a consultant geriatric or a consultant physician with an interest in geriatric medicine, it should involve a nurse with specialist skills in frailty, it should involve a clinical pharmacist with specialist skills in frailty. And then also a physio and an occupational therapist, so a therapy team."*
>
> -Specialist Frailty Pharmacist, NUH

As part of the specialist frailty MDT, NUH has an integrated discharge team whose key role is to support to expedite discharge on the specialist frailty arm (although referrals from standard care can be made if required). Below, a specialist frailty pharmacist provides further insight into the composition and responsibilities of the integrated discharge team at NUH:

> *"They're made up of a team of physios, nurses, and occupational therapists. So their main role is around functional assessments of patients as they come in, and actually designing a prescribed plan of care on discharge. That may require additional care within their own home, it may require a period of rehabilitation, it may require long term nursing or residential care, so that all depends on how they present to us within the acute care pathway."*
>
> -Specialist Frailty Pharmacist, NUH

There are four key stages of pharmacy involvement in the pathway. Firstly, after being admitted, confirmation of a patient's drug history is normally conducted by a specialist pharmacy technician. The specialist frailty pharmacist will then conduct the medicines reconciliation process; this could involve rectifying any errors or discrepancies on the drug history and amending the treatment as required, taking into consideration the presenting complaint along with any relevant observations or pathology results.

The third stage – also conducted by a specialist frailty pharmacist – is a structured medication review. This is defined by NICE as "*a critical examination of a person's medicines with the objective of reaching an agreement with the person about treatment, optimising the impact of medicines, minimising the number of medication-related problems and reducing waste*".[25] As part of their guidance on medication optimisation, NICE acknowledge older people and those taking multiple medicines as key groups who could benefit from this intervention.[25] At NUH, the structured medication review is carried out using the 7-step Scottish Polypharmacy Model.[26]

The final stage of the process is to communicate the plan to the patient, other clinicians in the hospital setting, and those in primary care. The importance of specialist frailty pharmacist involvement in this last step is arguably paramount, since without it, the impact of specialist involvement at the other stages could be reduced.

> *"A lot of the intervention that's done by the clinical pharmacist as part of the structured medicines review and the medicines reconciliation, can often be diluted or lost when that pharmacist isn't involved in the patient's discharge documentation. So actually, one of the advantages of having the specialist pharmacist involved in discharge is that they can ensure that their interventions are appropriately communicated to the primary care team. Because often the discharging clinician won't always record the full detail of decisions related to drugs that have been amended or deprescribed, for example."*
>
> -Specialist frailty pharmacist, NUH

The benefits of specialist pharmacist involvement in the MDT have been seen in various aspects of the pathway. The unique knowledge and skill set of the pharmacist was acknowledged to increase the safety and accuracy of medicines reconciliation. The focus on medicines also brought about time-saving benefits; allowing clinicians to focus on other aspects of holistic treatment. Additionally, since the specialist frailty pharmacists on the pathway are able to prescribe, they can correct any issues immediately, directly saving time for the junior doctors.

> *"I suppose if we didn't have the pharmacist in the role, I would be doing the medicines reconciliation myself, which is not the end of the world, it would just take more time off me. And I might not get it right because I'm not a pharmacist by trade, I'm a doctor, so there might be things that the pharmacist can do better and certainly in this situation I appreciate the extra pair of hands."*
>
> -Head of service, NUH

The importance of shared decision making was highlighted as a key advantage to the service. The expertise of the specialist pharmacist over more a more junior equivalent was also raised.

> *"What we find is, junior pharmacists covering this sort of patient cohort are able to identify specific drug problems; so, they may be able to identify a dosing error, a potentially inappropriate drug combination,* […] *or they may be able to identify drugs that could be potentially causing harm to the patient. But one of the issues is around how they then flag that problem to the appropriate clinician. So often it will be a junior pharmacist – junior doctor conversation and actually the recommendation to the*

junior doctor isn't followed through because there's a reluctance to make that decision. So actually, there's an issue around flagging those issues to the right clinician at the right level of seniority to actually make an impact."

-Specialist frailty pharmacist, NUH

Crucially, the presence of the specialist frailty pharmacist on the MDT also facilitated the learning of others on the team.

"*I think there is some element of education as well, because when the pharmacist institutes certain changes, they normally try to explain to me, to the others, to the junior doctors, why they are doing that, so I think there is some rubbing off, educationally, onto other members of the team about what, why they do certain things, and so on. So I would imagine those are the other benefits."*

-Head of service, NUH

Finally, the patients themselves were considered likely to benefit in several ways. Confirmation of the drug history taken on admission can reduce the risk of harm due to missing medications or other discrepancies. Amendments to drug therapies made by specialist frailty pharmacists likewise reduce harm to inpatients, as well as reducing the risk of future harm from adverse drug reactions. One of the key benefits to patients on the pathway is the medication review, which takes a patient-focused approach to optimise medicines and empower individuals.

"That will be an informed, patient-based discussion between the clinical pharmacist and patient where we come to an agreed plan on future drug therapy. So, of course, one of the main benefits to patients is a reduction in the number of uniquely prescribed medicines. So that confers a simplification in their medication regime, which is easier for them to manage because they're on a lower number of drugs, they're probably at lower risk of adverse drug reactions. Then they may have presented with an adverse drug reaction which we have identified and then eliminated as part of the intervention. And then of course, I think the patients often have a better understanding of why they are taking specific medicines and what the potential harms of those drugs are."

- Specialist frailty pharmacist, NUH

Evaluating the benefits of the pathway

Prior to this evaluation, the pathway had previously been modified and improved using the Plan-Do-Study-Act method. Although this gave the team an idea of the impacts from the pilot, a full-scale service evaluation was needed to better assess these.

> "*I don't think we have a real handle on what the impacts of our contributions are with regards to pharmacy impact. I think it was felt theoretically that we would be able to reduce admissions…I think it was felt that we would be able to facilitate some of these medicines reviews that should be happening in the community but aren't happening because the GPs haven't had time to do so. So if you get the medicines reviewed in the hospital and you then disseminate it out through some form of communication, it means that the GPs and GP practices and so on, and the patients benefit from that."*
>
> -Head of service, NUH

One of the key strengths of this service evaluation is that it is a collaboration between NUH, East Midlands Academic Health Science Network, and the University of Nottingham. The Plan-Do-Study-Act method is an effective method for quality improvement however it lacks independence and is often limited by the amount of time and resource that can be dedicated to it. The collaboration with the AHSN has allowed the expertise of the University of Nottingham and NUH to be appropriately resourced to collect a robust dataset.

Key staffing requirements for service adoption

In order for the other acute trusts to adapt and implement a similar service model to NUH's Specialist Frailty MDT pathway, the first step should be considering the requirements of the local population and ascertaining the need for an acute frailty service.

> "*I think in terms of rolling out things, we just have to be wary that its not a one-system-fits-all. But I think the concept of a* [specialist] *frailty pharmacist in an MDT setting is portable, and I think it's certainly translatable; not just in our setting but in other settings as well."*
>
> -Head of service, NUH

When setting up an MDT such as the one at NUH, it is important to consider which roles are crucial for the team. In line with AFN recommendations, the service lead at NUH is a consultant geriatrician. Whilst this brings a vast amount of specialist frailty expertise to the role, the head of service recommends that other clinicians should also take a more pronounced interest in frailty.

> *"There are a lot of people out there who would say that frailty is everyone's business anyway. So, you know, GPs, other -ology specialists should take an interest in it. I think as long as they understand the concepts of what frailty care should be, understand the limitations of what people can and can't do as they go through their different grades of frailty, understand the interactions between organ systems and why medicines review is important; that would probably help them and others in trying to develop a core team* […] *when setting up a frailty pathway"*
>
> - Head of Service, NUH

Since the specialist frailty pharmacist role represents a key component of this service model, it is likewise important to consider what experience is essential for the role. Whilst NICE recommends that all adult patients treated in acute care settings have access to a clinical pharmacist, they make no recommendations relating to the band of pharmacist or their required experience.[27] In addition, there is no formalised training pathway in the UK for specialist frailty pharmacists.

One of the specialist frailty pharmacists at NUH explained that the postgraduate clinical diploma contained some relevant elements, covering drug management in older people, as well as some learning related to falls and bone health. However, beyond this, most of their expertise were developed through self-directed learning and experience. At NUH, one of the factors that supported in the successful development of the specialist frailty pathway, was the work the specialist frailty pharmacist put into networking with other specialities and developing new care pathways. This included:

1. Patients presenting on potentially inappropriate psychotropic medicines – established a referral system so that pharmacists can refer to liaison psychiatry team within the hospital who will review the patient's treatments.

> *"We have certainly influenced the deprescribing of a lot of inappropriate psychotropics in this patient group, which would confer a reduction in things like falls, delirium,* […] *so things that would potentially bring the patient back into hospital."*
>
> -Specialist frailty pharmacist, NUH

2. Patients presenting without adequate treatment for osteopenia or osteoporosis, i.e. a lack of or poor adherence to oral bisphosphonates – creation of a referral pathway with the community-based fracture liaison service to allow patients to have IV bisphosphonate infusions in their own home every 18 months.

A specialist frailty pharmacist taking on a role such as this would therefore need to be innovative and drive solutions. It is also important to consider that when going into a newly created role, additional time may be required to develop professional relationships to create and implement referral pathways such as these; this may affect how quickly the benefits of the pathway begin to be seen.

It is recommended that a pharmacist taking on this role should be an AFC band 8a or above and should have some experience of the acute geriatric setting. One of the formal requirements that is considered vital to the success of the role is the ability to prescribe:

> *"The biggest thing is around the autonomous decision making. So it's actually identifying what the potential or actual problems are in terms of their long-term drug management, intervening on that independently as a non-medical prescriber and then making sure that the relevant people within the MDT are aware of what that plan is. So that would be senior and junior clinicians within the pathway; the patient, being the main one; and then obviously the primary care team."*
>
> -Specialist frailty pharmacist, NUH

Findings: Evaluating the intervention

Overview of evaluation cohort

In total, 700 patients were included in the study following discharge from NUH; this consisted of 350 patients on the specialist frailty pathway, and 350 patients on the standard care pathway.

Some of these individuals (15.4%, n=108) were lost to follow-up between discharge and the 3-month post-discharge timepoint, for a variety of reasons: Death (occurring within three calendar months of discharge date), no SCR being available or where the SCR had not been updated since the hospital episode. With respect to deaths in the 3 months post discharge, 13.7% of individuals (n=96) were lost to follow up. More deaths occurred in the standard care arm, with 15.7% (n=55) being affected, compared to 11.7% (n=41) of the specialist frailty cohort.

There were 4 instances of lost to follow up due to no SCR in both the standard care arm and the specialist frailty arm. In addition, a further 4 individuals in the specialist frailty arm were found to have out of date SCRs (Table 3).

Table 3 Summary of patients lost to follow up within cohort

	Standard Care		Specialist Frailty	
	n	%	n	%
Completed	291	83.1	301	86.0
Lost to follow up due to death	55	15.7	41	11.7
Lost to follow up due to no SCR	4	1.1	4	1.1
Lost to follow up due to out of date SCR	0	0.0	4	1.1
Total	**350**	**100.0**	**350**	**100.0**

Gender distribution

The majority of individuals within the overall cohort were female (60.1%, n=421) The specialist frailty arm comprised of 177 females and 173 males, making up 50.6% and 49.4% of the sub-cohort respectively. Meanwhile, 69.7% (n=244) of the standard care arm were female and only 30.3% (n=106) male (Figure 4).

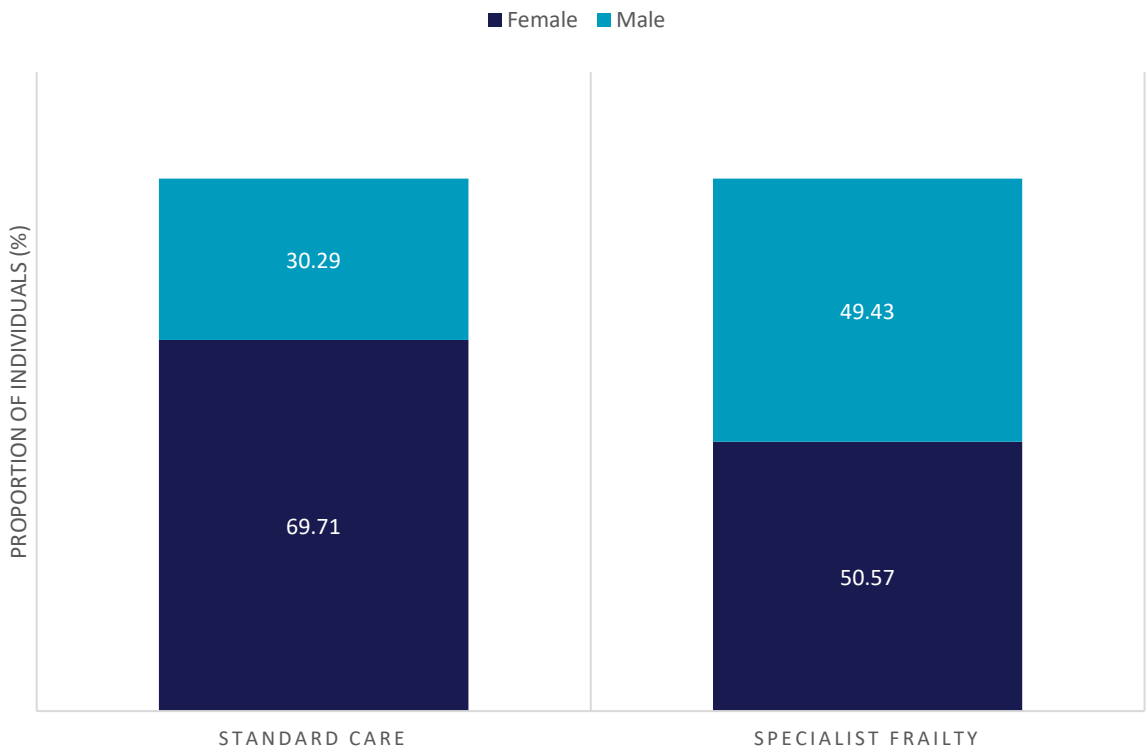

Figure 4 Gender distribution of cohort

Frailty

When considering the frailty of study participants, 21.4% (n=150) of the overall cohort had no recorded clinical frailty score during the hospital episode of interest. Evidence of frailty assessments was marginally higher in the specialist frailty arm, for which 81.1% (n=284) of individuals had a score recorded during their admission. By comparison, 76.0% (n=266) of individuals on the standard care pathway had a documented score (Figure 5). On the specialist frailty pathway, frailty scores ranged from 1-8; individuals on the standard care pathway received scores ranging from 1-9. For both study arms, the median score was 6, which represents moderately frail on the clinical frailty scale (Figure 5).

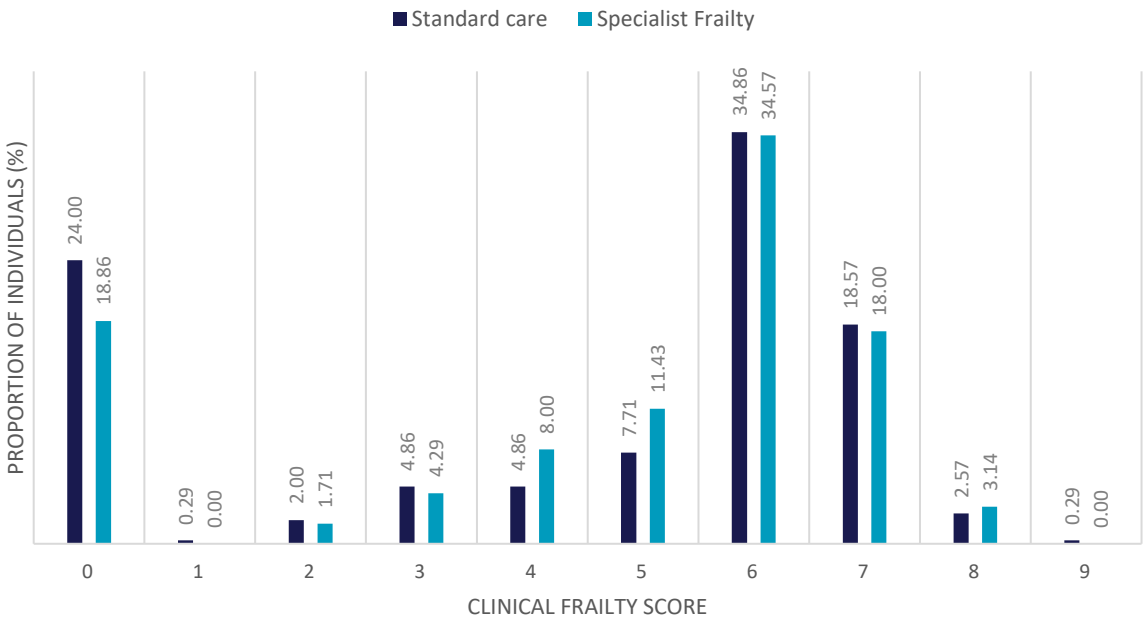

Figure 5: Recorded frailty of the cohort. A score of 0 indicates that no clinical frailty score was recorded in the patient's hospital record.

Age distribution

In terms of the age of the cohort, little difference was observed between study arms. An approximation of each individual's age at the time of discharge was made using their year of birth (by subtracting it from the year in which the discharge occurred – 2019).

Years of birth for the entire cohort ranged from 1905 to 1959. The approximate age of individuals in the specialist frailty arm ranged from 68-102. The mean age was 85.07 years ±7.26. Individuals in the standard care cohort ranged from 60 – 114 years of age. The mean age within this study arm was 85.04 years ±7.43 (Figure 6).

Length of stay

The mean length of stay for patients on the specialist frailty pathway was 2.81 nights, which is in line with the pathway's aim to expedite discharge within 72 hours. Individual lengths of stay ranged from zero to 35 nights on this pathway. The length of stay in standard care is considerably longer; ranging from 1 to 71 nights in hospital, with a mean patient stay of 11.82 nights (Table 4).

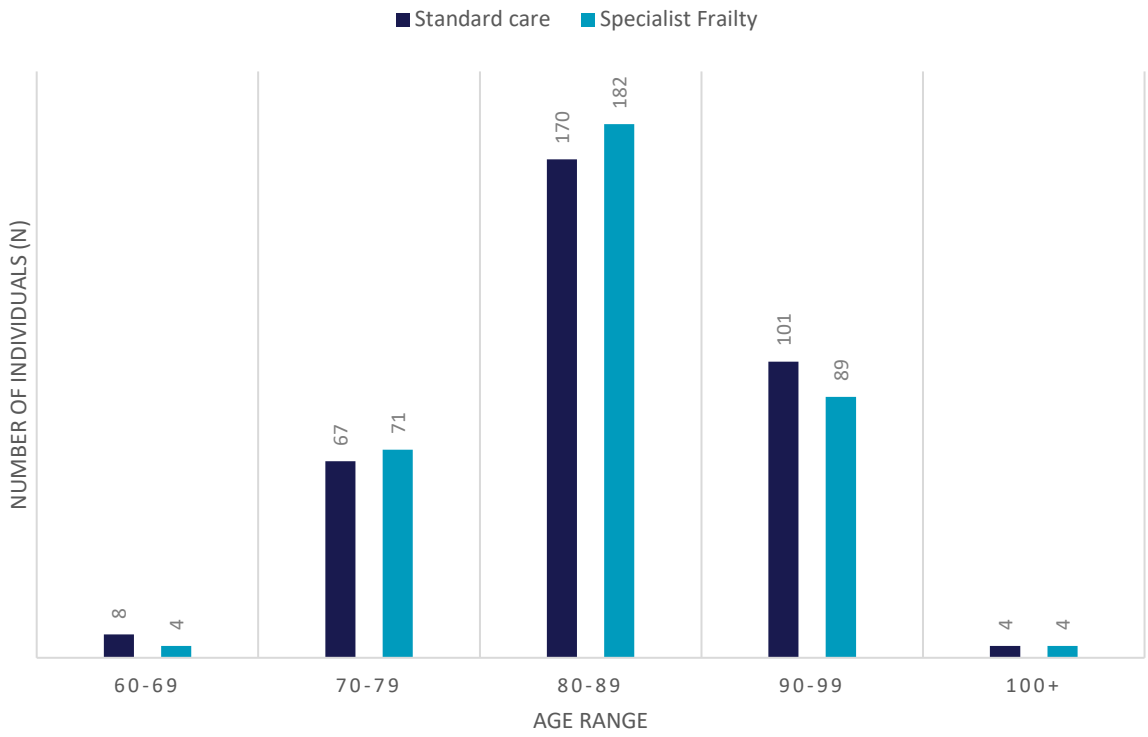

Figure 6 Age distribution of cohort

Table 4 Length of stay summary (nights)

	Shortest stay	Longest stay	Mean stay	Standard deviation
Standard Care	1	71	11.82	± 9.56
Specialist Frailty	0	35	2.81	± 3.05

Readmissions

Readmission data shows a slightly lower proportion of patients were readmitted to hospital within one calendar month of discharge from specialist frailty (19.7%, n=69) compared to standard care (20.3%, n= 71) (Figure 7). However, the patients on the specialist frailty pathway were more commonly readmitted for a second (n=10) or third (n=1) time in the month post discharge; four individuals in the standard care cohort were readmitted a second time and there were no third readmissions (Figure 8).

Figure 7 Proportion of cohort readmitted to hospital within 1 calendar month of discharge

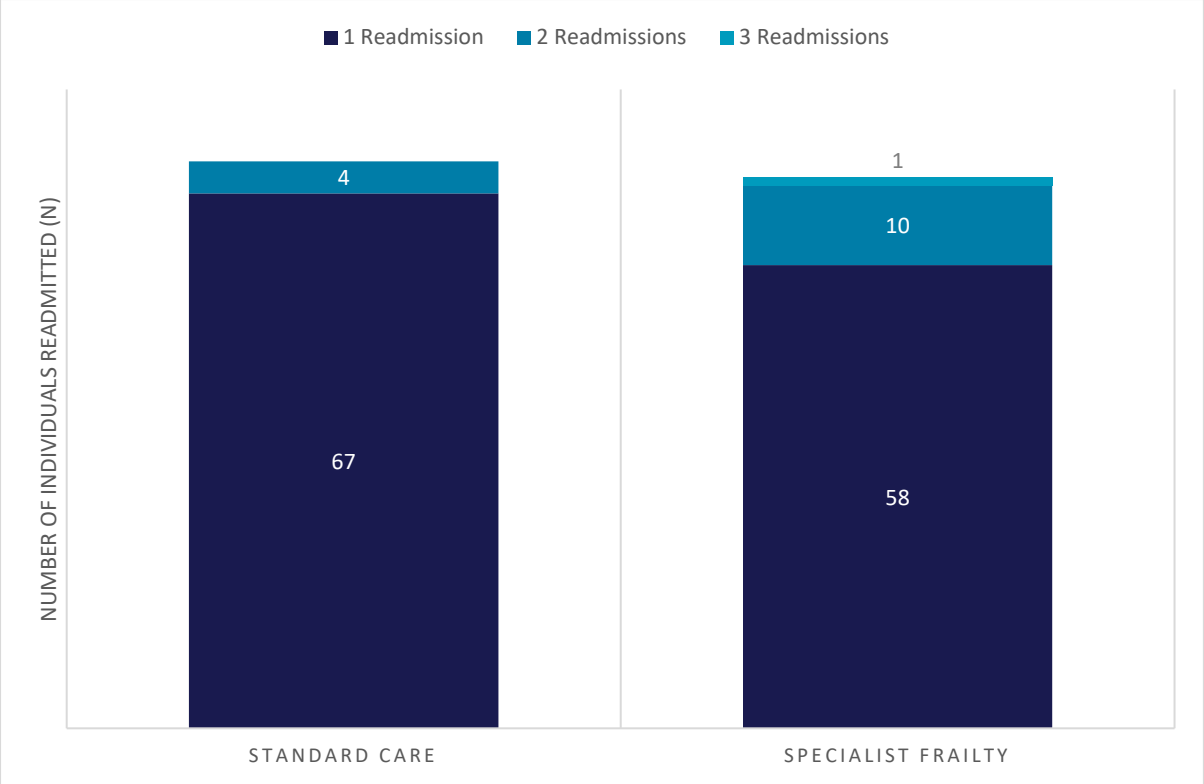

Figure 8 Number of readmissions for those readmitted within 1 calendar month of discharge

In contrast to the difference in length of stay for the initial admission, length of stay for readmissions occurring in the same calendar month showed more similar numbers. For both study arms, the mean length of stay was longer for the first readmission than the second. For the first readmission, the mean length of stay in specialist frailty was 11.1 ± 10.5 nights compared to 11.7 ± 9.6 nights in standard care. Meanwhile, the mean lengths of stay for a second readmission were 6.6 ± 5.8 nights and 7.8 ± 4.1 nights for specialist frailty and standard care respectively (Table 5).

Table 5 Summary of length of stay for individuals with one or two readmissions (nights)

	Readmission 1			Readmission 2		
	Range	**Mean**	**Standard deviation**	**Range**	**Mean**	**Standard deviation**
Standard Care (n=71)	0-51	11.70	9.64	3-13	7.75	4.11
Specialist Frailty (n=68)	0-53	11.07	10.52	1-19	6.55	5.79

NB: Readmission 3 not presented (n=1, specialist frailty)

Medication use and changes

In total, 7268 medications featured in the study; this consisted of 3454 (47.52%) in specialist frailty and 3814 (52.48%) from the standard care pathway (Figure 9). Standard care had a higher mean number of medications per individual; 10.90 ± 4.48 medications per person, compared to a mean of 9.87 ± 4.77 medications per individual in specialist frailty.

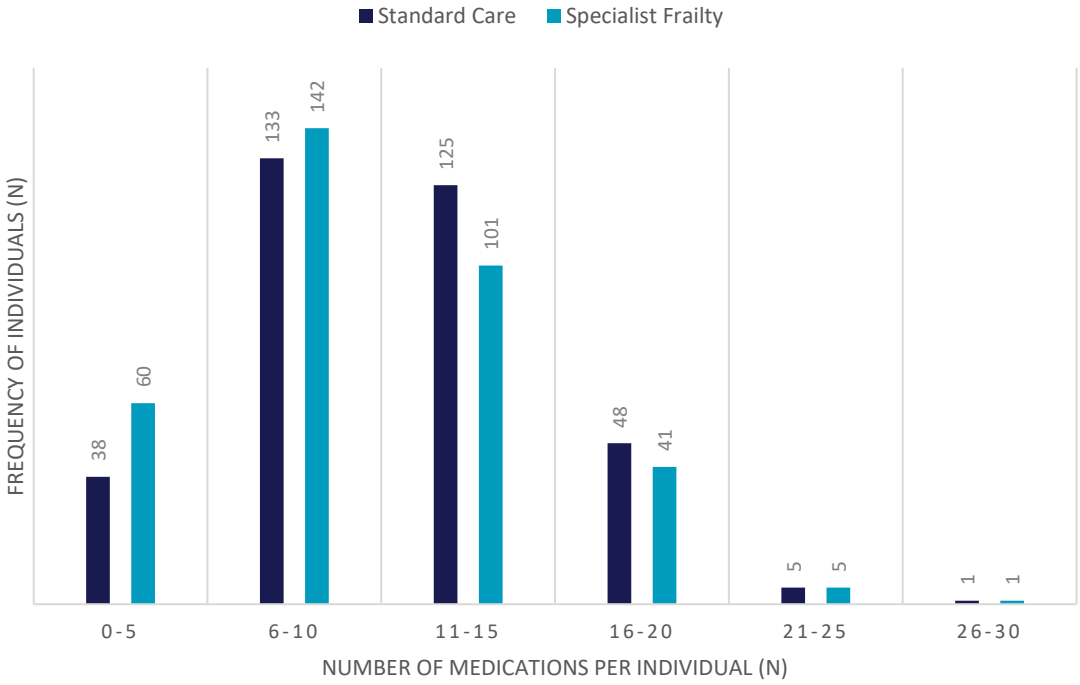

Figure 9 Number of medications on discharge summary

The most common types of medication were broadly similar in both the standard care and specialist frailty pathways. A comparison of the top 20 most commonly featured BNF classes revealed the same classes for both - although ranked in a different order. The exception to this was that whilst “Thyroid Hormones” were included in the top 20 classes for standard care they were not present in the same list for specialist frailty, instead being replaced by “Treatment for Glaucoma” (Table 6).

Table 6 The BNF classes most commonly featured on the discharge summaries (Top 20)

	Standard care		Specialist Frailty	
	BNF class	**Freq.** (n)	**BNF class**	**Freq.** (n)
1	Stimulant laxatives	308	Non-opioid analgesics & compound preps.	242
2	Non-opioid analgesics & compound preps.	253	Stimulant laxatives	226
3	Vitamin D	246	Vitamin D	209
4	Lipid-regulating drugs	156	Proton pump inhibitors	173
5	Proton pump inhibitors	155	Lipid-regulating drugs	141
6	Opioid analgesics	152	Opioid analgesics	117
7	Osmotic laxatives	124	Antiplatelet drugs	113
8	Oral anticoagulants	119	Osmotic laxatives	104
9	Antiplatelet drugs	118	Beta-adrenoceptor blocking drugs	98
10	Loop diuretics	118	Corticosteroids	88
11	Beta-adrenoceptor blocking drugs	112	Oral anticoagulants	86
12	Corticosteroids	93	Loop diuretics	83
13	Emollients	83	Emollients	79
14	Selective beta(2)-agonists	78	Selective beta(2)-agonists	73
15	Drugs used in megaloblastic anaemias	69	Calcium-channel blockers	63
16	Oral iron	66	Nitrates	63
17	Calcium-channel blockers	65	Treatment of glaucoma	62
18	Angiotensin-converting enzyme inhibitors	64	Drugs used in megaloblastic anaemias	60
19	Nitrates	60	Angiotensin-converting enzyme inhibitors	58
20	Thyroid hormones	57	Oral iron	55

Following medication review on the specialist frailty arm, slightly fewer changes were made (41.2%, n= 1423) than on the standard care pathway (47.8%, n=1824).

When considering the types of changes made, there were proportionally fewer new medicines initiated in specialist frailty (42.7%, n=608) and fewer temporary stops (5.4%, n=77) were made than in standard care (47.6%, n=868 and 9.9%, n=180 respectively). Permanent deprescribing decisions, meanwhile, accounted for 32.9% (n= 468) of medication changes noted on the discharge summaries of patients in the specialist frailty arm. Comparatively, only 26.9% (n=490) of medication changes in the standard care arm were due to permanent deprescribing (Figure 10).

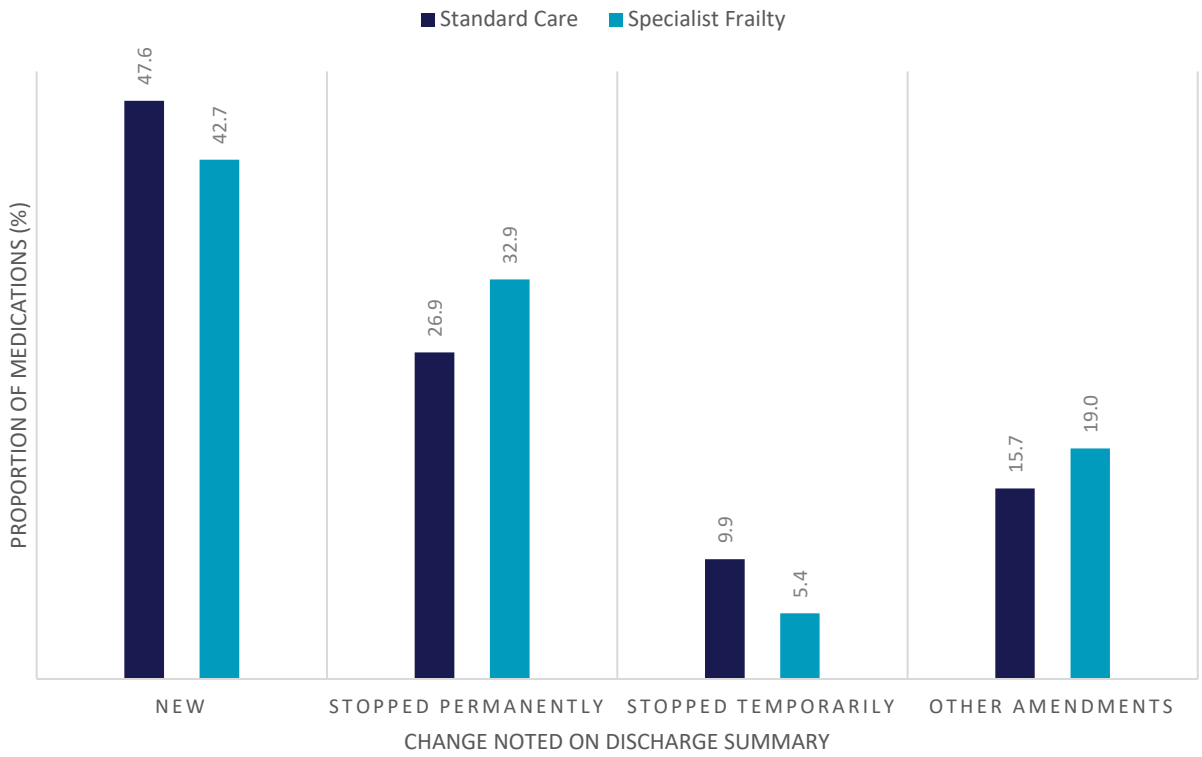

Figure 10 Proportion of medication changes noted on discharge summaries in standard care (n=1824) and specialist frailty (n=1423). NB "Other amendments" are any changes that are not "Stops" or "Starts" such as dosage changes

Antibiotics are commonly prescribed for short-term use and make up a large proportion of the medications changed. Due to the longer periods of hospitalisation seen on standard care, these short courses of treatment are likely to have been completed before discharge and therefore would not be included on the discharge summary. Table 7 takes this into consideration, summarising medication changes once short-term antibiotics have been removed to provide a more accurate comparison of the cohorts. After excluding antibiotics from the analysis, the differences between the two pathways are more pronounced, with the exception of temporarily stopped medicines, which remained similar (Table 7).

Table 7 Summary of medicines changes excluding antibiotics - n (%)

	Medicine changes for all medicines		Medicine changes excluding antibiotics	
	Standard Care	Specialist Frailty	Standard Care	Specialist Frailty
New	868 (47.6)	608 (42.7)	826 (46.5)	516 (39.0)
Stopped permanently	490 (26.9)	468 (32.9)	489 (27.5)	466 (35.2)
Stopped temporarily	180 (9.9)	77 (5.4)	177 (10.0)	76 (5.7)
Other amendment	286 (15.7)	270 (19.0)	285 (16.0)	269 (20.3)
Total	1824 (100)	1423 (100)	1777 (100)	1324 (100)

To add further context to this data, the number of medicines changes per patient was then considered. The difference between the two pathways was calculated using the following formula:

$$\%\ Difference = \frac{Standard\ Care\ (n) - Specialist\ Frailty(n)}{Standard\ Care\ (n)} \times 100$$

This revealed that 37.9% fewer new medications (excluding antibiotics) were initiated on the specialist frailty pathway, whilst 5.0% more non-antibiotics were permanently stopped and 56.9% fewer non-antibiotics were temporarily stopped. Additionally, 4.9% more other amendments were made in specialist frailty (Table 8).

Table 8 Summary of medication changes per patient

	Medicine changes per patient for all medicines			Medicine changes per patient, excluding antibiotics		
	Standard Care (n)	Specialist frailty (n)	Difference (%)	Standard Care (n)	Specialist frailty (n)	Difference (%)
New	2.48	1.73	30.2%	2.36	1.47	37.9%
Stopped permanently	1.40	1.34	4.3%	1.40	1.33	5.0%
Stopped temporarily	0.51	0.22	56.9%	0.51	0.22	56.9%
Other amendment	0.82	0.77	6.1%	0.81	0.77	4.9%

To gain an understanding of the types of medications that are commonly stopped, started or amended in each arm, the types of changes were then further divided into BNF class. Table 9 highlights the key drugs that were of particular interest to the research team; the complete list can be found in Appendix 5.

Table 9 Medication changes made on discharge summary by BNF class: Key drug groups – n (%) NB: SC = Standard care pathway; SF = specialist frailty pathway. Percentages are based on the total number of medicines in the relevant pathway (specialist frailty or standard care) for the BNF class in question

	Totals		New		Stopped permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Alpha-adrenoceptor blocking drugs	**8**	**9**	0 (0.0)	0 (0.0)	4 (50.0)	5 (55.6)	3 (37.5)	3 (33.3)	1 (12.5)	1 (11.1)
Angiotensin-converting enzyme inhibitors	**45**	**29**	6 (13.3)	1 (3.4)	15 (33.3)	12 (41.4)	19 (42.2)	6 (20.7)	5 (11.1)	10 (34.5)
Angiotensin-II receptor antagonists	**16**	**15**	0 (0.0)	0 (0.0)	6 (37.5)	14 (93.3)	6 (37.5)	1 (6.7)	4 (25.0)	0 (0.0)
Antiplatelet drugs	**36**	**30**	14 (38.9)	7 (23.3)	20 (55.6)	18 (60.0)	1 (2.8)	3 (10.0)	1 (2.8)	2 (6.7)
Antipsychotic drugs	**29**	**10**	19 (65.5)	6 (60.0)	4 (13.8)	2 (20.0)	2 (6.9)	0 (0.0)	4 (13.8)	2 (20.0)
Antispasmodic and other drugs altering gut motility	**19**	**8**	17 (89.5)	6 (75.0)	2 (10.5)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Anxiolytics	**6**	**5**	1 (16.7)	0 (0.0)	5 (83.3)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (60.0)
Beta-adrenoceptor blocking drugs	**54**	**46**	5 (9.3)	9 (19.6)	24 (44.4)	18 (39.1)	6 (11.1)	5 (10.9)	19 (35.2)	14 (30.4)
Bisphosphonates and other drugs	**12**	**13**	1 (8.3)	1 (7.7)	9 (75.0)	11 (84.6)	2 (16.7)	0 (0.0)	0 (0.0)	1 (7.7)
Broad-spectrum penicillins	**15**	**38**	15 (100.0)	38 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bulk-forming laxatives	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	9 (20.5)	4 (10.5)	21 (47.7)	30 (78.9)	10 (22.7)	2 (5.3)	4 (9.1)	2 (5.3)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Control of epilepsy	**17**	**14**	10 (58.8)	8 (57.1)	2 (11.8)	2 (14.3)	0 (0.0)	0 (0.0)	5 (29.4)	4 (28.6)
Corticosteroids	**31**	**25**	17 (54.8)	7 (28.0)	9 (29.0)	5 (20.0)	1 (3.2)	1 (4.0)	4 (12.9)	12 (48.0)
Drugs for dementia	**8**	**4**	1 (12.5)	1 (25.0)	6 (75.0)	1 (25.0)	0 (0.0)	0 (0.0)	1 (12.5)	2 (50.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	2 (18.2)	0 (0.0)	8 (72.7)	8 (88.9)	1 (9.1)	1 (11.1)	0 (0.0)	0 (0.0)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Enteral nutrition	**32**	**5**	30 (93.8)	5 (100.0)	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
H2-Receptor antagonists	**15**	**10**	11 (73.3)	3 (30.0)	2 (13.3)	6 (60.0)	1 (6.7)	0 (0.0)	1 (6.7)	1 (10.0)
Hypnotics	**10**	**5**	1 (10.0)	1 (20.0)	6 (60.0)	2 (40.0)	1 (10.0)	1 (20.0)	2 (20.0)	1 (20.0)
Loop diuretics	**86**	**49**	25 (29.1)	12 (24.5)	28 (32.6)	22 (44.9)	13 (15.1)	6 (12.2)	20 (23.3)	9 (18.4)
Macrolides	**7**	**27**	7 (100.0)	25 (92.6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.7)	0 (0.0)	1 (3.7)
Metronidazole, tinidazole and ornidazole	**4**	**4**	3 (75.0)	4 (100.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Totals		New		Stopped permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Neuropathic pain	**8**	**11**	3 (37.5)	0 (0.0)	2 (25.0)	6 (54.5)	0 (0.0)	0 (0.0)	3 (37.5)	5 (45.5)
Nitrates	**12**	**14**	3 (25.0)	1 (7.1)	4 (33.3)	10 (71.4)	2 (16.7)	0 (0.0)	3 (25.0)	3 (21.4)
Non-opioid analgesics and compound preparations	**123**	**130**	58 (47.2)	59 (45.4)	11 (8.9)	19 (14.6)	3 (2.4)	2 (1.5)	51 (41.5)	50 (38.5)
Non-steroidal anti-inflammatory drugs	**27**	**16**	13 (48.1)	6 (37.5)	9 (33.3)	5 (31.3)	2 (7.4)	1 (6.3)	3 (11.1)	4 (25.0)
Opioid analgesics	**120**	**93**	64 (53.3)	41 (44.1)	29 (24.2)	35 (37.6)	10 (8.3)	5 (5.4)	17 (14.2)	12 (12.9)
Oral anticoagulants	**47**	**25**	19 (40.4)	10 (40.0)	18 (38.3)	9 (36.0)	4 (8.5)	2 (8.0)	6 (12.8)	4 (16.0)
Oral iron	**43**	**31**	17 (39.5)	4 (12.9)	16 (37.2)	13 (41.9)	6 (14.0)	4 (12.9)	4 (9.3)	10 (32.3)
Osmotic laxatives	**90**	**55**	58 (64.4)	28 (50.9)	11 (12.2)	8 (14.5)	8 (8.9)	2 (3.6)	13 (14.4)	17 (30.9)
Other antianginal drugs	**2**	**4**	1 (50.0)	1 (25.0)	0 (0.0)	3 (75.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Other antidepressant drugs	**17**	**8**	1 (5.9)	3 (37.5)	8 (47.1)	4 (50.0)	1 (5.9)	0 (0.0)	7 (41.2)	1 (12.5)
Penicillinase-resistant penicillins	**5**	**6**	4 (80.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)
Potassium sparing diuretics and compounds	**4**	**1**	2 (50.0)	0 (0.0)	1 (25.0)	0 (0.0)	1 (25.0)	1 (100.0)	0 (0.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	1 (20.0)	0 (0.0)	3 (60.0)	2 (50.0)	1 (20.0)	1 (25.0)	0 (0.0)	1 (25.0)
Proton pump inhibitors	**45**	**48**	16 (35.6)	21 (43.8)	18 (40.0)	14 (29.2)	3 (6.7)	1 (2.1)	8 (17.8)	12 (25.0)
Quinolones	**4**	**11**	4 (100.0)	11 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Selective serotonin re-uptake inhibitors	**16**	**15**	2 (12.5)	0 (0.0)	9 (56.3)	7 (46.7)	1 (6.3)	0 (0.0)	4 (25.0)	8 (53.3)
Stimulant laxatives	**207**	**107**	158 (76.3)	74 (69.2)	7 (3.4)	4 (3.7)	18 (8.7)	2 (1.9)	24 (11.6)	27 (25.2)
Sulfonamides and trimethoprim	**4**	**1**	2 (50.0)	1 (100.0)	1 (25.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tetracyclines	**9**	**28**	9 (100.0)	28 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiazides and related diuretics	**9**	**18**	0 (0.0)	0 (0.0)	3 (33.3)	15 (83.3)	6 (66.7)	3 (16.7)	0 (0.0)	0 (0.0)
Tricyclic and related antidepressant drugs	**18**	**14**	0 (0.0)	0 (0.0)	9 (50.0)	7 (50.0)	0 (0.0)	0 (0.0)	9 (50.0)	7 (50.0)
Urinary-tract infections	**5**	**6**	4 (80.0)	6 (100.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)

Persistence of discharge medication decisions at 3 months post discharge

Medication change decisions made in the specialist frailty arm were more likely to be maintained in primary care at 3 months post discharge. In total, 66.6% (n=948) of changes in the specialist frailty arm were found to be adhered to at 3 months post discharge, compared to only 54.2% (n= 988) of medications in standard care (Figure 11).

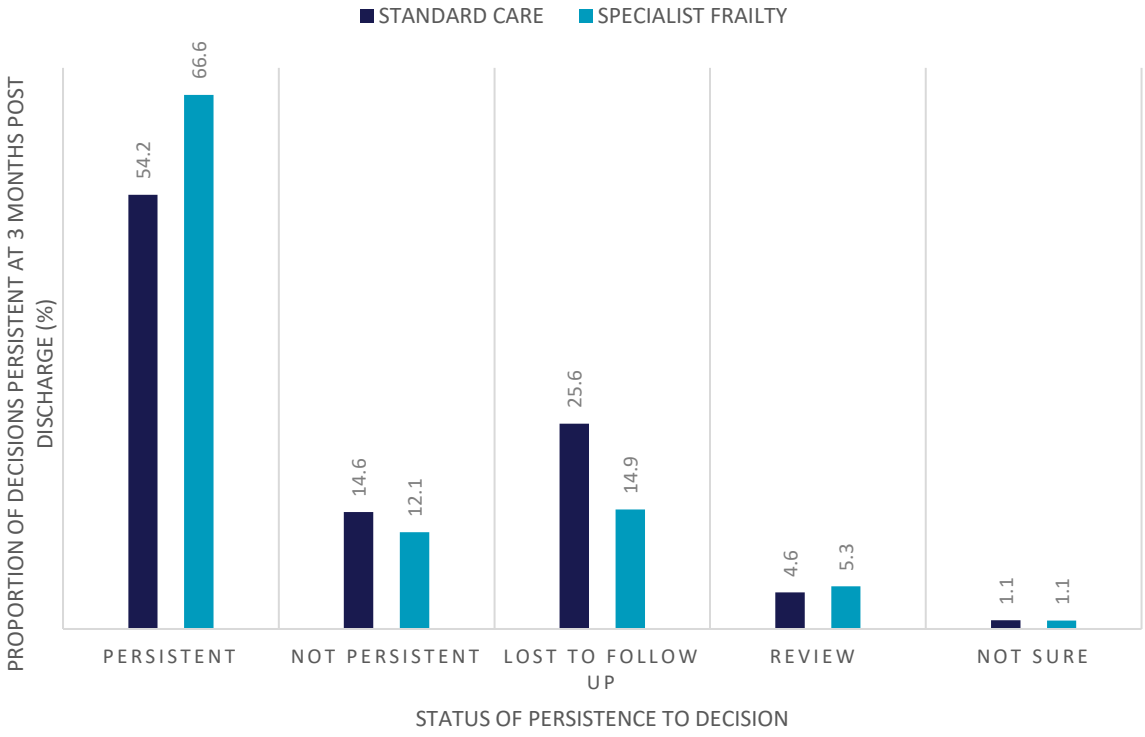

Figure 11 Persistence from primary care to medication change decisions made at discharge from specialist frailty (n=1423) and standard care (n=1824). NB "Review" are those changes where intentions for continuation are not clear such as medicines for constipation prescribed with opiates.

Further to this, Table 10 shows the persistence to decision of the key medications of interest. The complete persistence summary for all medication changes occurring in the study can be found in Appendix 6.

Table 10 Persistence in primary care to medication change decisions made at discharge by BNF class: Key drug groups – n (%) NB: SC = Standard care pathway; SF = specialist frailty pathway. Percentages are based on the total number of medicines in the relevant pathway (specialist frailty or standard care) for the BNF class in question

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Alpha-adrenoceptor blocking drugs	**8**	**9**	7 (87.5)	7 (77.8)	0 (0.0)	1 (11.1)	1 (12.5)	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Angiotensin-converting enzyme inhibitors	**45**	**29**	32 (71.1)	23 (79.3)	4 (8.9)	3 (10.3)	8 (17.8)	3 (10.3)	0 (0.0)	0 (0.0)	1 (2.2)	0 (0.0)
Angiotensin-II receptor antagonists	**16**	**15**	12 (75.0)	13 (86.7)	1 (6.3)	0 (0.0)	2 (12.5)	2 (13.3)	0 (0.0)	0 (0.0)	1 (6.3)	0 (0.0)
Antiplatelet drugs	**36**	**30**	20 (55.6)	22 (73.3)	7 (19.4)	3 (10.0)	8 (22.2)	5 (16.7)	0 (0.0)	0 (0.0)	1 (2.8)	0 (0.0)
Antipsychotic drugs	**29**	**10**	8 (27.6)	5 (50.0)	3 (10.3)	0 (0.0)	17 (58.6)	5 (50.0)	0 (0.0)	0 (0.0)	1 (3.4)	0 (0.0)
Anxiolytics	**6**	**5**	4 (66.7)	2 (40.0)	1 (16.7)	3 (60.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Beta-adrenoceptor blocking drugs	**54**	**46**	33 (61.1)	33 (71.7)	8 (14.8)	4 (8.7)	12 (22.2)	8 (17.4)	0 (0.0)	0 (0.0)	1 (1.9)	1 (2.2)
Bisphosphonates and other drugs	**12**	**13**	8 (66.7)	11 (84.6)	2 (16.7)	0 (0.0)	2 (16.7)	2 (15.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Broad-spectrum penicillins	**15**	**38**	12 (80.0)	34 (89.5)	0 (0.0)	0 (0.0)	3 (20.0)	4 (10.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bulk-forming laxatives	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	31 (70.5)	32 (84.2)	5 (11.4)	2 (5.3)	6 (13.6)	4 (10.5)	0 (0.0)	0 (0.0)	2 (4.5)	0 (0.0)
Centrally-acting antihypertensive drugs	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Control of epilepsy	**17**	**14**	14 (82.4)	9 (64.3)	1 (5.9)	4 (28.6)	2 (11.8)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Corticosteroids	**31**	**25**	20 (64.5)	20 (80.0)	3 (9.7)	1 (4.0)	6 (19.4)	4 (16.0)	0 (0.0)	0 (0.0)	2 (6.5)	0 (0.0)
Drugs for dementia	**8**	**4**	7 (87.5)	2 (50.0)	0 (0.0)	1 (25.0)	1 (12.5)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	9 (81.8)	6 (66.7)	1 (9.1)	2 (22.2)	0 (0.0)	1 (11.1)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Enteral nutrition	**32**	**5**	13 (40.6)	2 (40.0)	9 (28.1)	1 (20.0)	10 (31.3)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
H2-Receptor antagonists	**15**	**10**	7 (46.7)	4 (40.0)	4 (26.7)	4 (40.0)	4 (26.7)	2 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Hypnotics	**10**	**5**	3 (30.0)	3 (60.0)	2 (20.0)	2 (40.0)	5 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Loop diuretics	**86**	**49**	47 (54.7)	33 (67.3)	17 (19.8)	9 (18.4)	22 (25.6)	7 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Macrolides	**7**	**27**	6 (85.7)	23 (85.2)	0 (0.0)	0 (0.0)	1 (14.3)	3 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.7)
Metronidazole, tinidazole and ornidazole	**4**	**4**	2 (50.0)	3 (75.0)	0 (0.0)	0 (0.0)	2 (50.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Neuropathic pain	**8**	**11**	7 (87.5)	9 (81.8)	1 (12.5)	2 (18.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nitrates	**12**	**14**	4 (33.3)	9 (64.3)	4 (33.3)	0 (0.0)	4 (33.3)	5 (35.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Non-opioid analgesics and compound preparations	**123**	**130**	53 (43.1)	72 (55.4)	35 (28.5)	22 (16.9)	28 (22.8)	8 (6.2)	7 (5.7)	26 (20.0)	0 (0.0)	2 (1.5)
Non-steroidal anti-inflammatory drugs	**27**	**16**	14 (51.9)	12 (75.0)	10 (37.0)	2 (12.5)	2 (7.4)	2 (12.5)	0 (0.0)	0 (0.0)	1 (3.7)	0 (0.0)
Opioid analgesics	**120**	**93**	55 (45.8)	61 (65.6)	23 (19.2)	15 (16.1)	41 (34.2)	16 (17.2)	0 (0.0)	0 (0.0)	1 (0.8)	1 (1.1)
Oral anticoagulants	**47**	**25**	28 (59.6)	18 (72.0)	2 (4.3)	2 (8.0)	17 (36.2)	4 (16.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (4.0)
Oral iron	**43**	**31**	28 (65.1)	20 (64.5)	9 (20.9)	8 (25.8)	6 (14.0)	3 (9.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Osmotic laxatives	**90**	**55**	39 (43.3)	29 (52.7)	5 (5.6)	3 (5.5)	23 (25.6)	7 (12.7)	22 (24.4)	16 (29.1)	1 (1.1)	0 (0.0)
Other antianginal drugs	**2**	**4**	1 (50.0)	3 (75.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other antidepressant drugs	**17**	**8**	8 (47.1)	6 (75.0)	4 (23.5)	0 (0.0)	5 (29.4)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Penicillinase-resistant penicillins	**5**	**6**	2 (40.0)	5 (83.3)	0 (0.0)	1 (16.7)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Potassium sparing diuretics and compounds	**4**	**1**	1 (25.0)	1 (100.0)	3 (75.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	2 (40.0)	3 (75.0)	1 (20.0)	0 (0.0)	2 (40.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Proton pump inhibitors	**45**	**48**	29 (64.4)	31 (64.6)	6 (13.3)	10 (20.8)	10 (22.2)	5 (10.4)	0 (0.0)	0 (0.0)	0 (0.0)	2 (4.2)
Quinolones	**4**	**11**	3 (75.0)	9 (81.8)	0 (0.0)	0 (0.0)	1 (25.0)	2 (18.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Selective serotonin re-uptake inhibitors	**16**	**15**	9 (56.3)	12 (80.0)	4 (25.0)	2 (13.3)	3 (18.8)	1 (6.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Stimulant laxatives	**207**	**107**	105 (50.7)	51 (47.7)	13 (6.3)	5 (4.7)	35 (16.9)	17 (15.9)	54 (26.1)	34 (31.8)	0 (0.0)	0 (0.0)
Sulfonamides and trimethoprim	**4**	**1**	3 (75.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tetracyclines	**9**	**28**	6 (66.7)	21 (75.0)	1 (11.1)	0 (0.0)	2 (22.2)	7 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiazides and related diuretics	**9**	**18**	6 (66.7)	13 (72.2)	0 (0.0)	3 (16.7)	3 (33.3)	2 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tricyclic and related antidepressant drugs	**18**	**14**	12 (66.7)	9 (64.3)	3 (16.7)	5 (35.7)	3 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Urinary-tract infections	**5**	**6**	5 (100.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Quality of information on discharge summaries

Overall, a higher quality of information was provided on the discharge summaries for those on the specialist frailty pathway. Of the medications changed within specialist frailty, 47.2% (n=672) met the criteria to score ‘excellent’ compared to only 33.9% (n= 619) in standard care. Meanwhile, ‘poor’ scores were rarely seen in either arm (n=7 in standard care and n=2 in specialist frailty) (Figure 12).

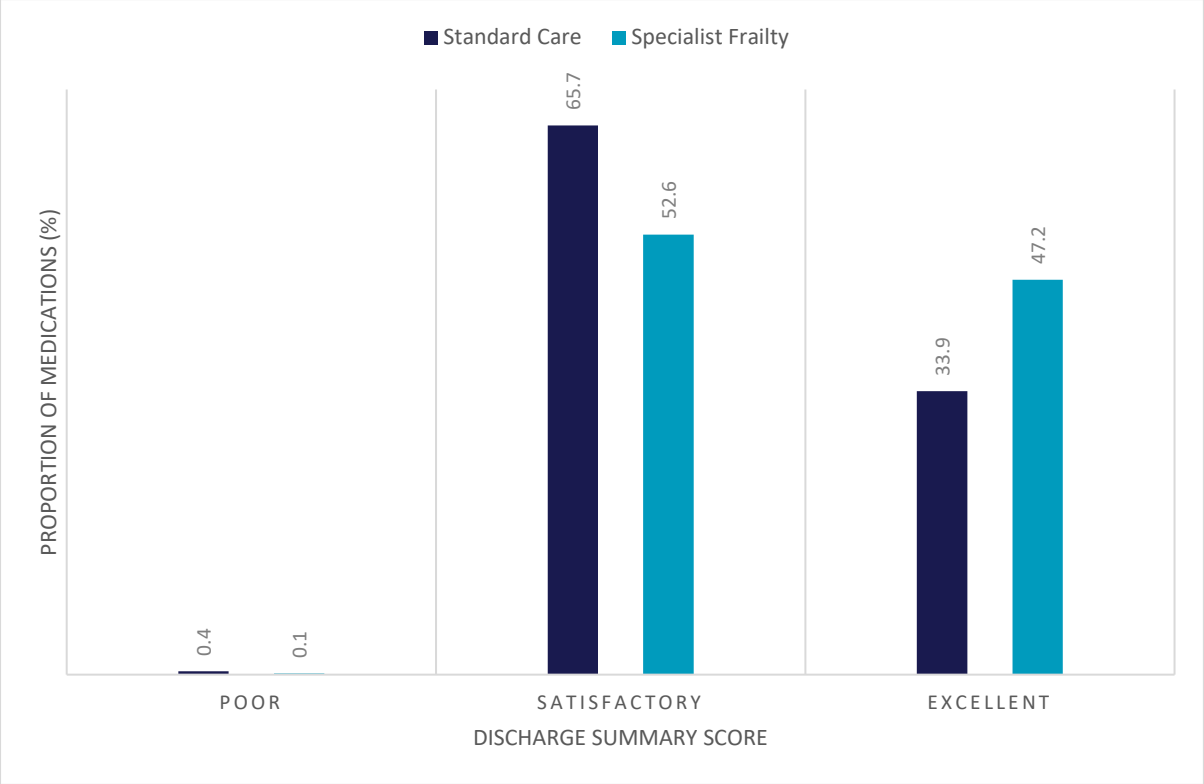

Figure 12: Quality of information provided on discharge summary for each changed medication

Table 11 summarizes the quality of information on the discharge summary for the medications deemed to be of particular interest. A complete list can be found in Appendix 7.

Table 11 Quality of information on discharge summary for each medication changed by BNF class: Key drug groups – n (%) NB: Percentages are based on the total number of medicines in the relevant pathway (specialist frailty or standard care) for the BNF class in question

	Totals		Poor		Satisfactory		Excellent	
BNF Class	Standard care	Specialist frailty	Standard Care	Specialist Frailty	Standard Care	Specialist Frailty	Standard Care	Specialist Frailty
Alpha-adrenoceptor blocking drugs	**8**	**9**	0 (0.0)	0 (0.0)	6 (75.0)	4 (44.4)	2 (25.0)	5 (55.6)
Angiotensin-converting enzyme inhibitors	**45**	**29**	0 (0.0)	0 (0.0)	27 (60.0)	10 (34.5)	18 (40.0)	19 (65.5)
Angiotensin-II receptor antagonists	**16**	**15**	0 (0.0)	0 (0.0)	11 (68.8)	5 (33.3)	5 (31.3)	10 (66.7)
Antiplatelet drugs	**36**	**30**	1 (2.8)	0 (0.0)	13 (36.1)	15 (50.0)	22 (61.1)	15 (50.0)
Antipsychotic drugs	**29**	**10**	0 (0.0)	0 (0.0)	21 (72.4)	6 (60.0)	8 (27.6)	4 (40.0)
Anxiolytics	**6**	**5**	0 (0.0)	0 (0.0)	3 (50.0)	4 (80.0)	3 (50.0)	1 (20.0)
Beta-adrenoceptor blocking drugs	**54**	**46**	0 (0.0)	0 (0.0)	40 (74.1)	21 (45.7)	14 (25.9)	25 (54.3)
Bisphosphonates and other drugs	**12**	**13**	0 (0.0)	0 (0.0)	6 (50.0)	2 (15.4)	6 (50.0)	11 (84.6)
Broad-spectrum penicillins	**15**	**38**	0 (0.0)	0 (0.0)	9 (60.0)	14 (36.8)	6 (40.0)	24 (63.2)
Bulk-forming laxatives	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	0 (0.0)	0 (0.0)	24 (54.5)	19 (50.0)	20 (45.5)	19 (50.0)
Centrally-acting antihypertensive drugs	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)
Control of epilepsy	**17**	**14**	0 (0.0)	0 (0.0)	10 (58.8)	6 (42.9)	7 (41.2)	8 (57.1)
Corticosteroids	**31**	**25**	0 (0.0)	0 (0.0)	16 (51.6)	11 (44.0)	15 (48.4)	14 (56.0)
Drugs for dementia	**8**	**4**	0 (0.0)	0 (0.0)	6 (75.0)	2 (50.0)	2 (25.0)	2 (50.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	0 (0.0)	0 (0.0)	2 (18.2)	5 (55.6)	9 (81.8)	4 (44.4)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Enteral nutrition	**32**	**5**	0 (0.0)	0 (0.0)	29 (90.6)	5 (100.0)	3 (9.4)	0 (0.0)
H2-Receptor antagonists	**15**	**10**	0 (0.0)	0 (0.0)	9 (60.0)	2 (20.0)	6 (40.0)	8 (80.0)
Hypnotics	**10**	**5**	0 (0.0)	0 (0.0)	6 (60.0)	1 (20.0)	4 (40.0)	4 (80.0)
Loop diuretics	**86**	**49**	0 (0.0)	0 (0.0)	55 (64.0)	26 (53.1)	31 (36.0)	23 (46.9)
Macrolides	**7**	**27**	0 (0.0)	0 (0.0)	5 (71.4)	13 (48.1)	2 (28.6)	14 (51.9)

	Totals		Poor		Satisfactory		Excellent	
BNF Class	Standard care	Specialist frailty	Standard Care	Specialist Frailty	Standard Care	Specialist Frailty	Standard Care	Specialist Frailty
Metronidazole, tinidazole and ornidazole	**4**	**4**	0 (0.0)	0 (0.0)	3 (75.0)	2 (50.0)	1 (25.0)	2 (50.0)
Neuropathic pain	**8**	**11**	0 (0.0)	0 (0.0)	6 (75.0)	3 (27.3)	2 (25.0)	8 (72.7)
Nitrates	**12**	**14**	0 (0.0)	0 (0.0)	9 (75.0)	8 (57.1)	3 (25.0)	6 (42.9)
Non-opioid analgesics and compound preparations	**123**	**130**	0 (0.0)	0 (0.0)	105 (85.4)	91 (70.0)	18 (14.6)	39 (30.0)
Non-steroidal anti-inflammatory drugs	**27**	**16**	0 (0.0)	0 (0.0)	19 (70.4)	5 (31.3)	8 (29.6)	11 (68.8)
Opioid analgesics	**120**	**93**	2 (1.7)	0 (0.0)	75 (62.5)	40 (43.0)	43 (35.8)	53 (57.0)
Oral anticoagulants	**47**	**25**	0 (0.0)	1 (4)	13 (27.7)	6 (24.0)	34 (72.3)	18 (72.0)
Oral iron	**43**	**31**	0 (0.0)	0 (0.0)	23 (53.5)	14 (45.2)	20 (46.5)	17 (54.8)
Osmotic laxatives	**90**	**55**	0 (0.0)	0 (0.0)	71 (78.9)	44 (80.0)	19 (21.1)	11 (20.0)
Other antianginal drugs	**2**	**4**	0 (0.0)	0 (0.0)	0 (0.0)	2 (50.0)	2 (100.0)	2 (50.0)
Other antidepressant drugs	**17**	**8**	0 (0.0)	0 (0.0)	9 (52.9)	4 (50.0)	8 (47.1)	4 (50.0)
Penicillinase-resistant penicillins	**5**	**6**	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)	5 (100.0)	5 (83.3)
Potassium sparing diuretics and compounds	**4**	**1**	0 (0.0)	0 (0.0)	2 (50.0)	1 (100.0)	2 (50.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	0 (0.0)	0 (0.0)	3 (60.0)	1 (25.0)	2 (40.0)	3 (75.0)
Proton pump inhibitors	**45**	**48**	0 (0.0)	0 (0.0)	21 (46.7)	21 (43.8)	24 (53.3)	27 (56.3)
Quinolones	**4**	**11**	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	4 (100.0)	10 (90.9)
Selective serotonin re-uptake inhibitors	**16**	**15**	0 (0.0)	0 (0.0)	4 (25.0)	6 (40.0)	12 (75.0)	9 (60.0)
Stimulant laxatives	**207**	**107**	2 (1.0)	0 (0.0)	165 (79.7)	88 (82.2)	40 (19.3)	19 (17.8)
Sulfonamides and trimethoprim	**4**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (100.0)	1 (100.0)
Tetracyclines	**9**	**28**	0 (0.0)	0 (0.0)	2 (22.2)	4 (14.3)	7 (77.8)	24 (85.7)
Thiazides and related diuretics	**9**	**18**	0 (0.0)	0 (0.0)	5 (55.6)	6 (33.3)	4 (44.4)	12 (66.7)
Tricyclic and related antidepressant drugs	**18**	**14**	0 (0.0)	0 (0.0)	7 (38.9)	1 (7.1)	11 (61.1)	13 (92.9)
Urinary-tract infections	**5**	**6**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)	6 (100.0)

Discussion

Key findings

The findings of this study provide insight into the impact of the specialist frailty pathway at NUH. An exploration of medication use revealed the types and numbers of medicines used to be broadly similar on both pathways. Notably, there were considerable differences in the types of changes that were made. The specialist frailty pathway saw approximately 7% fewer medication changes overall, and more permanent stops - 33% compared to 27% in standard care. In addition to this, the intervention proved less likely to initiate new medications (which accounted for 43% of changes in specialist frailty and 48% in standard care) and demonstrated half as many temporary stops.

In terms of newly prescribed medicines, opioids were more commonly initiated in standard care (n=64 compared to n=41 in specialist frailty). This was also the case for laxatives (new stimulant and osmotic laxatives totalled 216 in standard care and 102 in specialist frailty); which could be partially related to the increased initiation of opioids and also due to longer periods of hospitalisation, which can lead to constipation.

Antipsychotics were also more commonly initiated on standard care (n=19, compared to n=6 in specialist frailty). This could for example, include those with a high anticholinergic burden and could be an indication of suboptimal prescribing in standard care.

Conversely, broad spectrum penicillin and macrolides were noted more frequently on discharge summaries in specialist frailty (making a combined total of n=63, compared to n=22 in standard care). This can be potentially explained by the reduced length of stay in hospital; standard care patients initiated on antibiotics are more likely to have completed their courses before discharge and therefore a smaller percentage will be recorded on the discharge summaries. When excluding antibiotics from the analyses, the differences between the two care pathways were even more notable; revealing that 38% fewer new medications per patient were initiated on specialist frailty compared to standard care. Additionally, patients on the specialist frailty pathway also experienced 5% more permanently stopped non-antibiotic medicines and 57% fewer temporarily stopped compared to standard care patients. The decrease in temporary deprescribing is indicative of the experience and skill of the MDT on the specialist frailty pathway, whose work lends itself to more confident and decisive action, and therefore more permanent deprescribing.

Of the medications that were commonly stopped permanently, pain medications including opioids, neuropathic pain medications and NSAIDs featured highly on the specialist frailty pathway, suggesting a lack of optimised pain management in standard care. Perhaps more unexpected, was that standard care demonstrated higher numbers of permanent stops for anxiolytics (n=5 compared to n=2 in specialist frailty) and hypnotics (n=6 compared to n=2 in specialist frailty). However, since the numbers of these in both arms were small, the difference may be due to chance.

Temporarily stopped medications were more common on the standard care pathway; most likely due to the increased certainty of prescribing decisions on the specialist pathway leading to more permanent stops. The medications that represented the biggest difference between pathways were blood pressure medications (such as ACE inhibitors, angiotensin II receptor blockers, calcium channel blockers and thiazide diuretics), opioids and medications for constipation (including stimulant and osmotic laxatives).

Medication change decisions made in the specialist frailty arm were more likely to be adhered to in primary care after discharge; 67% of changes were adhered to at 3 months post discharge, whilst this figure was only 54% in standard care.

Medications with particularly notable differences in persistence to change levels between the two pathways included blood pressure medications (calcium channel blockers, angiotensin II receptor blockers and betablockers), antiplatelets and anticoagulants. The levels of persistence for all these medications were much greater in specialist frailty, indicating more appropriate prescribing in the intervention arm.

Persistence of the change decision was likewise notably higher for bisphosphonates and antipsychotics prescribed on the specialist frailty pathway (85% and 50% for bisphosphonates and antipsychotics respectively) than in standard care (67% and 28%). Some explanation for these differences could be offered by the two referral pathways established by the specialist frailty pharmacist, that aim to establish patients on IV bisphosphonate therapy and to assess for inappropriately prescribed antipsychotics.

The increase in persistence of change decisions seen on the specialist frailty pathway could be due to the quality of information passed on to primary care. Analyses highlighted that information provided on discharge summaries was of higher quality for those receiving the intervention, with an additional 13% of changed medications scoring ‘excellent’ compared to standard care.

Medications that had a higher level of persistence in standard care were anxiolytics - 67% - compared to only 40% in specialist frailty and drugs for urinary frequency enuresis and

incontinence – 82% in standard care; 67% in specialist frailty. Given the anticipated overall strengths of the pathway, these negative findings are unexpected. However, it should be noted that for both these medication groups, a higher quality of information was seen on the discharge summaries of those in standard care: 82% of anxiolytics and 50% of urinary frequency enuresis and incontinence drugs were rated ‘excellent’ in standard care, whilst only 50% of anxiolytics and 20% of urinary frequency enuresis and incontinence drugs were rated ‘excellent’ in standard care.

Of interest is the level of enteral nutrition, a high cost item, initiated in standard care compared to the specialist frailty arm (n= 32 v 5), however persistence at 3 months was 40% for both cohorts.

Medications that had the most ‘excellent’ ratings for the quality of discharge information included antibiotics, blood pressure medications, pain medications, bisphosphonates, hypnotics, antidepressants, and H_2 receptor antagonists; for which a better quality of information was achieved on specialist frailty than standard care.

Along with anxiolytics and urinary frequency enuresis and incontinence drugs, several other medications were rated as having higher quality discharge information (rated ‘excellent’) on the standard care pathway compared to specialist frailty. These included antiplatelets (61% of antiplatelets on standard care were rated ‘excellent’, compared to 50% on specialist frailty) selective serotonin reuptake inhibitors (75% on standard care, 60% on specialist frailty), other antianginals (100% on standard care, 50% on specialist frailty), quinolones (100% on standard care, 91% on specialist frailty) and penicillinase-resistant penicillin (100% on standard care, 83% on specialist frailty). Whilst overall, a better quality of discharge information was seen on specialist frailty, findings relating to these specific drugs could be worth further investigation by the MDT. However, due to the small numbers involved, these findings could be due to chance.

Meanwhile, the initial comparison of the characteristics of both cohorts showed that the same number of individuals were included in each arm of the study. The specialist frailty cohort, however, experienced fewer losses to follow-up; this included fewer deaths in the three-month period post discharge - 12% in specialist frailty compared to 16% in standard care. Findings also revealed there to be a fairly similar age distribution in both cohorts, but a higher proportion of females were seen in standard care.

In terms of frailty, both pathways demonstrated a median score of six, but only 81% of individuals on the specialist frailty pathway (and 76% of individuals in standard care) were recorded as assessed for frailty. Since one of the criteria for being admitted to the specialist

frailty arm is a frailty score of above six, these findings suggest that the selection process for specialist care may not be being either strongly observed or recorded.

The other criterion for assigning individuals to the specialist frailty pathway was their likelihood of being discharged within 72 hours of admission. In accordance with this, findings demonstrated that the mean length of stay was just under 3 nights. The mean length of stay for standard care patients was, by comparison, approximately three times that.

There was little advantage to the specialist frailty arm when considering propensity to be readmitted to hospital in the month post discharge, which occurred for around a fifth of the overall cohort. However, more individuals on the specialist frailty arm were readmitted more than once.

Implications

The findings of the study will be of most obvious benefit to the service providers at NUH, who can use this information to provide insight when considering how to adapt and develop acute frailty services in the future. Since this evaluation has highlighted many benefits of the current specialist frailty MDT pathway at NUH – such as addressing the increasing problem of inappropriate polypharmacy and improving the quality of discharge information communicated to primary care – the advantages of rolling the service out on a larger scale should be considered.

There were some unexpected findings, for example in that the intervention seemed to have a slightly negative impact on the figures for patients being readmitted multiple times within one calendar month. However, it is worthwhile considering that although readmissions in standard care were lower, these individuals on average, experienced much longer stays in hospital following the initial admission. Therefore, when considering the cost implications for overall length of stay(s) and readmission(s), there could still be scope for potential savings.

A further potentially unexpected finding was the lack of frailty scores recorded for those assigned to the specialist frailty pathway, which applied to around one fifth of its individuals. Given that one of the criteria for assignment to the pathway was a frailty score of 6 or above, a lack of frailty scoring on admission could result in suboptimal use of resources. Ensuring frailty scoring has occurred would ensure that the correct patients are allocated the limited resource on the frailty pathway. The implications of this finding could be of benefit to the team at NUH when considering the importance of the current selection criteria and how best to optimise the use of pathway beds.

For healthcare providers in primary care such as GPs, wider implementation of this intervention would likely save them time. This would occur firstly through the communication of higher quality discharge information, providing them with a clear treatment plan for their patients. Secondly, the intervention showed fewer temporary changes. A temporary change, in most cases, would in turn create a need for further review by the GP; adding to their workload. A permanent change, in contrast could reasonably be assumed to save the GP time – removing the need for additional review, and potentially solving any medicine-related problems that may, under normal circumstances, require a future visit to the GP.

For other healthcare providers and those with an interest in improving frailty services, it could be possible to learn from this service model or even to translate it to other acute care settings. As acknowledged, there are many factors that have contributed to the success of this service, so prospective adopters would need to consider how it could be adapted to meet their specific needs locally and to suit the resources available to them. If aiming to adopt certain elements of the service, such as the involvement of a specialist frailty pharmacist, it is important to consider factors such as the importance of a prescribing qualification and autonomous decision making skills, involvement in the discharge process and wider influence into development of services.

Overall, the findings of this study provide an example of a service model that successfully tackles the growing problem of polypharmacy. As the population continues to age, the role of specialist frailty services will become increasingly vital. Expanding and optimising these services should therefore be a key priority on a national and even global level. This study adds to the body of evidence that advocates for multidisciplinary teams, holistic approaches, shared decision making and the role of the specialist pharmacist. Frail patients will undoubtably benefit most from this work, which as a whole, aims to provide them the best possible care, optimise their medicines use and avoid unnecessary medicines-related problems.

Strengths and limitations

The major strengths of this study include its longitudinal cohort design, which allows individuals to be followed up over time. Instead of focusing of a cross-section of time, this has allowed the researchers to take multiple factors into consideration when conducting the evaluation, such as length of stay and readmission data. Most importantly, it allowed researchers to identify whether the medication changes made in hospital continued to be

adhered to in primary care. This provided valuable insight into the impacts of the intervention in the longer term.

As with all retrospective studies, limitations include the completeness of data available, which relied on the accuracy of medical records rather than being collected specifically for the purposes of this research. Another limitation of the study was the accuracy of the persistence data collected. Since many Summary Care Records commonly only display six months' worth of discontinued medicines, for some of the earlier records it was difficult to ascertain whether a medication had been discontinued and subsequently restarted. This was particularly problematic for temporarily stopped medications and may have led to an overestimation of non-persistence. Researchers did what they could to counteract the effects of this by collecting the data as quickly as possible in chronological order.

A further limitation of the study were the delays and disruptions caused by the COVID-19 pandemic; this resulted in being unable to collect qualitative data from patients and therefore take their perspectives into account.

This study was also originally intended to take place over two sites, Nottingham and Leicester. Due to the variation in the MDT pathways at both sites, this made a multisite evaluation impractical, the focus then redirected towards NUH only.

Recommendations for future work

Recommendations for future work include further analysis on readmission data. This should include a cost analysis to determine whether the additional readmissions seen on the specialist frailty pathway are more cost effective than a longer stay in hospital. An exploration of the reasons for admission would also add further context; identifying any links between the initial admission and any subsequent readmissions.

In order to improve the quality of information provided on discharge, future qualitative work should aim to explore the perceived usefulness of different types of information recorded during the discharge process.

Determining patient perspectives on care on each pathway is important to explore additional impacts of the intervention. Qualitative interviews were initially planned as part of the evaluation, but again due to the impact of the COVID-19 pandemic, these could not be carried out. Instead, a future investigation into the similarities and differences in patient experience could highlight any benefits of the intervention from the patient perspective and provide insight into creating a truly patient-focused experience.

Conclusion

This evaluation has highlighted the benefits of the specialist frailty MDT pathway model at NUH. The pathway has successfully reduced the percentage of new medicines prescribed during hospital stays and increased permanent deprescribing. It has additionally achieved a reduction in the percentage of temporarily stopped medications and, in addition to providing higher quality discharge information, has increased the propensity for change decisions to be maintained in the primary care setting. Whilst the service did not prove successful in reducing readmissions, shorter stays may counteract the negative impacts of this. Future work is therefore recommended to assess the cost implications for readmissions over long stays. Overall, the pathway provides a working solution to the issue of inappropriate polypharmacy in the frail population and this service model may provide a good template for others looking to develop a strong multidisciplinary frailty pathway in the acute setting.

Funding

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Appendix 1: Health provider interview topic guide

Evaluating the impact of the specialist frailty multidisciplinary team pathway

Health Professional Interview Topic Guide

Introductory briefing

- The purpose of this interview is to discuss your experiences and involvement in the frailty pathway and to gather your insights and opinions about the impacts of the intervention and how it could potentially be used as a model to improve care in other hospitals.
- The interview is expected to last approximately 1 hour
- *Confirm that participant has read the participant information sheet and returned their signed the consent form*

TOPIC	PROMPTS
PATHWAY FORMAT AND SET UP	• What is the purpose of the pathway? • Could you please talk me through the overall format of the pathway? • How did the intervention come to be set up? • Was there any key evidence that informed the design of the pathway? • How are patients selected for the pathway? • What does the MDT look like? • What are the core tasks undertaken by the MDT as of the pathway? • How is the pathway different to standard care?
YOUR ROLE	• What is your role within the hospital? • What involvement do you have in the pathway? • How did you become involved in this intervention? • Could you tell me about your career background? • What training and qualifications do you have that have prepared you for this role? • How would you handle a case differently to less experienced pharmacist?
OPINIONS AND INSIGHTS ON PATHWAY IMPACT	• What impacts are you seeing from the pathway? • What do you think are the specific strengths and weaknesses of the pathway?

Appendix 2: Health provider participant information sheet

School of Pharmacy
School of Pharmacy Building
University Park Campus
East Drive
Nottingham
NG7 2RD

Study Title: Evaluating the impact of the specialist frailty multidisciplinary team pathway

HEALTH PROFESSIONAL PARTICIPANT INFORMATION SHEET

Research Ethics Reference: 016-2019
Version 1 Date: 20/07/2020

Chief Investigator: Dr Matthew Boyd

We would like to invite you to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. One of our team will go through the information sheet with you and answer any questions you have. Please take time to read this carefully and discuss it with others if you wish. Ask us anything that is not clear.

What is the purpose of the research?
The purpose of this study is to evaluate the medicines optimisation service provided by specialist pharmacists as part of the multidisciplinary frailty pathway

Why have I been invited to take part?
You have been invited to take part in this research because you are involved in delivering the service. We will be inviting two to three participants in total to take part in individual interviews.

Do I have to take part?
It is up to you to decide if you want to take part in this research. We will describe the study and go through this information sheet with you to answer any questions you may have. If you agree to participate, we will ask you to sign a consent form and will give you a copy to keep. However, you would still be free to withdraw from the study at any time, without giving a reason and without any negative consequences, by advising the researchers of this decision. This would not affect your legal rights.

What will happen to me if I take part?
Once you decide to take part, a member of the research team will contact you to agree when the interview will take place.
The interview take place over Microsoft Teams and will be audio and video-recorded. The session is expected to last up to an hour. As the interview will be conducted online, you will need a laptop or PC with access to the internet, a microphone and, where possible, video capabilities.
Before the interview, you will have an opportunity to ask any questions you may have about the study. If you are happy to take part, the researcher will read through each point of the consent form with you and you will be asked to verbally confirm your consent.

During the interview, you will be asked about your experiences and involvement in the frailty pathway and your opinions about the impacts of the intervention and how it could potentially be used as a model to improve care in other hospitals.

Are there any risks in taking part?
There are no significant risks of taking part in this study. The main disadvantage is the time you will be asked to contribute, which will be approximately 1 hour, plus a small amount of time beforehand to schedule the interview and provide consent.

Are there any benefits in taking part?
The findings of the study are expected to inform improvements in the care provided to frail patients in the future, in this hospital as well as in other hospital trusts.

Will my time/travel costs be reimbursed?
Participants will not receive an inconvenience allowance to participate in the study and no travel costs will be incurred.

What happens to the data provided?
Audio and video-recorded data will be stored securely on password protected computers within the university's IT infrastructure.

If you join the study, some parts of the data collected for the study may be looked at by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty.
To help ensure your privacy, you will be assigned a volunteer study identification code that it will be used instead of your name. We will save all the recordings and research data using that volunteer study identification number so that none of the data will have your real name or other individual identifiers associated with them. Your name and any information about you will not be disclosed outside the study centre.

Research data will be kept securely for a minimum of 7 years. After this time your data will be disposed of securely. During this time all precautions will be taken by all those involved to maintain your confidentiality, only members of the research team will have access to your personal data.

Personal / sensitive data including the consent forms, in which the participants will be identified, will be stored confidentially in locked storage at the University of Nottingham. All electronic audio and video files will be encrypted or password protected according to University procedures. Personal data will be kept for six months after the end of the study so that we are able to contact you about the findings of the study (unless you advise us that you do not wish to be contacted), then securely destroyed.

The research team and transcriber(s) will have access to video- and audio-recorded research data. Once transcribed, the data will be anonymised and all analysis will occur on using the anonymous research data.

We would like your permission to use anonymised direct quotes in research publications and will identify you only by your job role. However, due to your unique position with the organisation, we may not be able to guarantee complete anonymity.
All research data and records will be stored for a minimum of 7 years after publication or public release of the work of the research.

We would like your permission to use anonymised data in future studies, and to share our research data (e.g. in online databases) with other researchers in other Universities and organisations both inside and outside the European Union. This would be used for research in health and social care. Sharing research data is important to allow peer scrutiny, re-use (and therefore avoiding duplication of research) and to understand the bigger picture in particular areas of research. All personal information that could identify you will be removed or changed before information is shared with other researchers or results are made public.

Data sharing in this way is usually anonymised (so that you could not be identified).

What will happen if I don't want to carry on with the study?
Even after you have signed the consent form, you are free to withdraw from the study at any time without giving any reason and without your legal rights being affected. Any personal data will be destroyed.

If you decide to withdraw from the study, please do so no later than one week after the data collection date in order to ensure that your data will be fully removed from the study. After this stage, the data will be anonymised and will therefore not be traceable to you.

If you withdraw, we will no longer collect any information about you or from you but we will keep the anonymous research data that has already been collected and stored as we are not allowed to tamper with study records. This information may have already been used in some analyses and may still be used in the final study analyses. To safeguard your rights, we will use the minimum personally-identifiable information possible.

Who will know that I am taking part in this research?
All information collected about you during this research would be handled in confidence. Any imaging/audio digital recordings and electronic data will be anonymised with a code as detailed above. All such data are kept on password-protected databases sitting on a restricted access computer system and any paper information (such as your consent form, contact details and any research questionnaires) would be stored safely in lockable cabinets in a swipe-card secured building and would only be accessed by the research team.

Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally – identifiable information possible.

You can find out more about how we use your information and to read our privacy notice at:
https://www.nottingham.ac.uk/utilities/privacy.aspx/
Designated individuals of the University of Nottingham may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines.
With your consent, we will keep your personal information on a secure database in order to contact you for future studies.

Anything you say during an interview/focus group will be kept confidential, unless you reveal something of concern that may put yourself or anyone else at risk. It will then be necessary to report to the appropriate persons.

What will happen to the results of the research?
The results of this research will inform the work of the East Midlands Academic Health Science Network (EMAHSN) and support healthcare providers to improve medicines optimisation services for older and frail patients.

Findings may also be submitted for publication in any relevant scientific journals. If you are interested in receiving a copy of the published results, please notify the researcher when you attend the focus group. Your identity will be kept confidential in any reports or publications produced from this research.

Who has reviewed this study?
All research involving people is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by The School of Pharmacy Research Ethics Committee at the University of Nottingham. The study ref number is 016-2019

Who is organising and funding the research?
The research is being organised by Dr Matthew Boyd at the University of Nottingham and is funded by the East Midlands Academic Health Science Network (EMAHSN).

What if there is a problem?
If you have a concern about any aspect of this project, please speak to the researcher Dr Lydia Tutt or the Principal Investigator Dr Matthew Boyd who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how he/she intends to deal with it. If you remain unhappy and wish to complain formally, you can do this by contacting Professor Clive Roberts, Chair of the Research Ethics Committee on 0115 9515101 or via clive.roberts@nottingham.ac.uk.

Contact Details
If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

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Appendix 3: Health provider consent form

HEALTH PROFESSIONAL CONSENT FORM

(Final version 1.0: July 2020)

Title of Study: **Evaluating the impact of the specialist frailty multidisciplinary team pathway**

Name of Researchers: Matthew Boyd, Lydia Tutt

Name of Participant: _____ **Please initial box**

1. I confirm that I have read and understand the health professional information sheet version number 1 dated July 2020 for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my legal rights being affected. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis. ☐
3. I understand that the interview data collected in the study may be looked at by authorised individuals from the University of Nottingham, the research group and regulatory authorities where it is relevant to my taking part in this study. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential. ☐
4. I understand that the interview will be recorded and that anonymous direct quotes from the interview may be used in the study reports. I understand that whilst my data will be anonymised, reports will identify me by my job role and therefore complete anonymity cannot be guaranteed. ☐
5. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐
6. I agree to take part in the above study. ☐

_____

Name of Participant

_____

Signature

_____

Date

_____

Name of Person taking consent

_____

Signature

_____

Date

Appendix 4: Ethical Considerations

As part of the process for obtaining ethical approvals, the following ethical issues were taken into consideration:

Data management

All patient data obtained from NOTIS and SCRs were anonymised. Data was captured using a secure online repository and marked with a unique study identifier. The unique study identifier links to patient number via a master file held securely within the hospital only.

Data was stored securely in line with University procedures, using password protected files or in lockable cabinets accessed only by relevant members of the research team. Any hard copies of data will be retained for seven years.

Potential risks to participants

Quantitative data collection posed no risk to participants since the data was collected retrospectively and is fully anonymised. Interview data was collected using Microsoft Teams and could therefore be carried out at a time and location within which the participant feels comfortable and has sufficient privacy.

Potential risks to researchers

The researcher responsible for data collection initially obtained quantitative data on-site at the participating hospital. Relevant training was provided according to NUH procedures.

Although it did not occur, it was agreed that in the unlikely event that a potential prescribing error were to be identified during data collection (for example, if intended dose at discharge was incorrectly copied to the FP10), the specialist frailty pharmacist would be notified. The pharmacist would have then assessed the potential risks to patient safety and taken the appropriate action.

The collection of interview data occurred over Microsoft Teams. During data collection the researcher was based either in the office or in the library within the University and therefore no additional considerations were required in terms of assessing potential risks during data collection.

Changes to work and travel due to COVID-19

Following the changes to the University's working policy during the pandemic, data collection and analysis was undertaken remotely from the researcher's home. Secure VPN access was enabled to facilitate safe access to confidential data. Whilst this was being established,

occasional trips to the hospital site were required. A risk assessment was completed in line with University procedure to ensure the researchers' safety during this time.

It was agreed that the researcher would pre-arrange a time for each visit with a member of the pharmacy team, who would ensure an empty office was reserved and the workstation disinfected. The researcher would social distance whilst on the hospital site.

In order to comply with University procedures, travel to and from the site would be undertaken on foot, or in a Hackney carriage taxi with a screen (to ensure the ability to social distance from the driver). All other forms of public transport were to be avoided.

Participant recruitment

Participation in the interviews was voluntary. Prospective participants were provided with an information sheet about the study and had the opportunity to ask any questions. Informed consent was sought before the interview. Participants have the right to withdraw from the study at any time, however any data already collected may be used in the analysis.

Governance

This study was defined as service evaluation using the NHS research questionnaire and therefore did not require ethical approval from the NHS Health Research Authority (HRA). Researchers within the study all have enhanced disclosure and barring checks. Additionally, the data collection tool used for the quantitative data meets the requirements of GDPR.

Appendix 5: Medicine changes by BNF class

Table 12: Medication changes made on discharge summary by BNF class: Complete list – n (%) NB: SC = standard care pathway, SF = specialist frailty pathway. Percentages are based on the total number of medicines in the relevant pathway for the BNF class in question

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Alpha-adrenoceptor blocking drugs	**8**	**9**	0 (0.0)	0 (0.0)	4 (50.0)	5 (55.6)	3 (37.5)	3 (33.3)	1 (12.5)	1 (11.1)
Angiotensin-converting enzyme inhibitors	**45**	**29**	6 (13.3)	1 (3.4)	15 (33.3)	12 (41.4)	19 (42.2)	6 (20.7)	5 (11.1)	10 (34.5)
Angiotensin-II receptor antagonists	**16**	**15**	0 (0.0)	0 (0.0)	6 (37.5)	14 (93.3)	6 (37.5)	1 (6.7)	4 (25.0)	0 (0.0)
Antacids and simeticone	**2**	**0**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antibacterial preparations only used topically	**1**	**1**	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antifungal preparations	**7**	**5**	5 (71.4)	5 (100.0)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (14.3)	0 (0.0)
Antihistamines	**9**	**18**	2 (22.2)	2 (11.1)	5 (55.6)	11 (61.1)	2 (22.2)	2 (11.1)	0 (0.0)	3 (16.7)
Antimalarials	**8**	**5**	1 (12.5)	0 (0.0)	5 (62.5)	4 (80.0)	1 (12.5)	1 (20.0)	1 (12.5)	0 (0.0)
Antimotility drugs	**2**	**3**	1 (50.0)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Antimuscarinic bronchodilators	**5**	**2**	1 (20.0)	0 (0.0)	3 (60.0)	2 (100.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antimuscarinic drugs used in parkinsonism	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Antiplatelet drugs	**36**	**30**	14 (38.9)	7 (23.3)	20 (55.6)	18 (60.0)	1 (2.8)	3 (10.0)	1 (2.8)	2 (6.7)
Antipsychotic drugs	**29**	**10**	19 (65.5)	6 (60.0)	4 (13.8)	2 (20.0)	2 (6.9)	0 (0.0)	4 (13.8)	2 (20.0)
Antispasmodic and other drugs altering gut motility	**19**	**8**	17 (89.5)	6 (75.0)	2 (10.5)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Anxiolytics	**6**	**5**	1 (16.7)	0 (0.0)	5 (83.3)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (60.0)
Appliance	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Aromatic inhalations	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Barrier preparations	**6**	**3**	3 (50.0)	1 (33.3)	1 (16.7)	2 (66.7)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)
Base,diluent, suspending agents and stabilisers	**6**	**1**	5 (83.3)	1 (100.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Beta-adrenoceptor blocking drugs	**54**	**46**	5 (9.3)	9 (19.6)	24 (44.4)	18 (39.1)	6 (11.1)	5 (10.9)	19 (35.2)	14 (30.4)
Biguanides	**15**	**13**	2 (13.3)	0 (0.0)	7 (46.7)	10 (76.9)	2 (13.3)	0 (0.0)	4 (26.7)	3 (23.1)
Bisphosphonates and other drugs	**12**	**13**	1 (8.3)	1 (7.7)	9 (75.0)	11 (84.6)	2 (16.7)	0 (0.0)	0 (0.0)	1 (7.7)
Broad-spectrum penicillins	**15**	**38**	15 (100.0)	38 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bulk-forming laxatives	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium supplements	**2**	**0**	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	9 (20.5)	4 (10.5)	21 (47.7)	30 (78.9)	10 (22.7)	2 (5.3)	4 (9.1)	2 (5.3)
Cardiac glycosides	**8**	**6**	1 (12.5)	2 (33.3)	2 (25.0)	2 (33.3)	2 (25.0)	2 (33.3)	3 (37.5)	0 (0.0)
Cardiopulmonary resuscitation	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Centrally-acting antihypertensive drugs	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Cephalosporins	**3**	**6**	3 (100.0)	5 (83.3)	0 (0.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Compound Alginates and proprietary indigestion preparations	**3**	**5**	0 (0.0)	2 (40.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (66.7)	3 (60.0)
Control of epilepsy	**17**	**14**	10 (58.8)	8 (57.1)	2 (11.8)	2 (14.3)	0 (0.0)	0 (0.0)	5 (29.4)	4 (28.6)
Corticosteroids	**31**	**25**	17 (54.8)	7 (28.0)	9 (29.0)	5 (20.0)	1 (3.2)	1 (4.0)	4 (12.9)	12 (48.0)
Corticosteroids (respiratory)	**2**	**0**	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Corticosteroids and other immunosuppressants	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Dopaminergic drugs used in parkinsonism	**6**	**1**	2 (33.3)	0 (0.0)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (33.3)	1 (100.0)
Drugs for arrhythmias	**1**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs for dementia	**8**	**4**	1 (12.5)	1 (25.0)	6 (75.0)	1 (25.0)	0 (0.0)	0 (0.0)	1 (12.5)	2 (50.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	2 (18.2)	0 (0.0)	8 (72.7)	8 (88.9)	1 (9.1)	1 (11.1)	0 (0.0)	0 (0.0)
Drugs for urinary retention	**14**	**9**	1 (7.1)	2 (22.2)	12 (85.7)	7 (77.8)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used in megaloblastic anaemias	**37**	**21**	24 (64.9)	14 (66.7)	12 (32.4)	6 (28.6)	1 (2.7)	1 (4.8)	0 (0.0)	0 (0.0)

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Drugs used in nausea and vertigo	**16**	**8**	4 (25.0)	3 (37.5)	9 (56.3)	5 (62.5)	2 (12.5)	0 (0.0)	1 (6.3)	0 (0.0)
Drugs used in status epilepticus	**16**	**6**	16 (100.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Electrolytes and water	**13**	**4**	13 (100.0)	4 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Emollients	**18**	**12**	13 (72.2)	7 (58.3)	0 (0.0)	3 (25.0)	2 (11.1)	1 (8.3)	3 (16.7)	1 (8.3)
Enteral nutrition	**32**	**5**	30 (93.8)	5 (100.0)	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Enzymes	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Gout and cytotoxic induced hyperuricaemia	**2**	**4**	0 (0.0)	2 (50.0)	2 (100.0)	2 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
H2-Receptor antagonists	**15**	**10**	11 (73.3)	3 (30.0)	2 (13.3)	6 (60.0)	1 (6.7)	0 (0.0)	1 (6.7)	1 (10.0)
Herpes simplex and varicella-zoster	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Hypnotics	**10**	**5**	1 (10.0)	1 (20.0)	6 (60.0)	2 (40.0)	1 (10.0)	1 (20.0)	2 (20.0)	1 (20.0)
Influenza	**0**	**14**	0 (0.0)	14 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Intermediate and long-acting insulins	**11**	**11**	4 (36.4)	0 (0.0)	2 (18.2)	0 (0.0)	0 (0.0)	2 (18.2)	5 (45.5)	9 (81.8)
Lipid-regulating drugs	**62**	**65**	6 (9.7)	5 (7.7)	46 (74.2)	45 (69.2)	5 (8.1)	7 (10.8)	5 (8.1)	8 (12.3)
Loop diuretics	**86**	**49**	25 (29.1)	12 (24.5)	28 (32.6)	22 (44.9)	13 (15.1)	6 (12.2)	20 (23.3)	9 (18.4)
Macrolides	**7**	**27**	7 (100.0)	25 (92.6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.7)	0 (0.0)	1 (3.7)
Magnesium	**1**	**2**	1 (100.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Male sex hormones and antagonists	**7**	**1**	1 (14.3)	0 (0.0)	6 (85.7)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Metronidazole, tinidazole and ornidazole	**4**	**4**	3 (75.0)	4 (100.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)
Mucolytics	**7**	**1**	3 (42.9)	0 (0.0)	1 (14.3)	0 (0.0)	1 (14.3)	1 (100.0)	2 (28.6)	0 (0.0)
Multivitamin preparations	**3**	**2**	3 (100.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nasal preparations for infection	**2**	**2**	2 (100.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Neuropathic pain	**8**	**11**	3 (37.5)	0 (0.0)	2 (25.0)	6 (54.5)	0 (0.0)	0 (0.0)	3 (37.5)	5 (45.5)
Nicotine dependence	**2**	**1**	2 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nitrates	**12**	**14**	3 (25.0)	1 (7.1)	4 (33.3)	10 (71.4)	2 (16.7)	0 (0.0)	3 (25.0)	3 (21.4)

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Non-opioid analgesics and compound preparations	**123**	**130**	58 (47.2)	59 (45.4)	11 (8.9)	19 (14.6)	3 (2.4)	2 (1.5)	51 (41.5)	50 (38.5)
Non-steroidal anti-inflammatory drugs	**27**	**16**	13 (48.1)	6 (37.5)	9 (33.3)	5 (31.3)	2 (7.4)	1 (6.3)	3 (11.1)	4 (25.0)
Ocular diagnostic & peri-operative preparations & photodynamic treatment	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oestrogens and heart	**1**	**1**	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oils	**5**	**1**	4 (80.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)
Opioid analgesics	**120**	**93**	64 (53.3)	41 (44.1)	29 (24.2)	35 (37.6)	10 (8.3)	5 (5.4)	17 (14.2)	12 (12.9)
Oral anticoagulants	**47**	**25**	19 (40.4)	10 (40.0)	18 (38.3)	9 (36.0)	4 (8.5)	2 (8.0)	6 (12.8)	4 (16.0)
Oral iron	**43**	**31**	17 (39.5)	4 (12.9)	16 (37.2)	13 (41.9)	6 (14.0)	4 (12.9)	4 (9.3)	10 (32.3)
Oral potassium	**4**	**6**	4 (100.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oral sodium and water	**3**	**0**	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Osmotic laxatives	**90**	**55**	58 (64.4)	28 (50.9)	11 (12.2)	8 (14.5)	8 (8.9)	2 (3.6)	13 (14.4)	17 (30.9)
Other antianginal drugs	**2**	**4**	1 (50.0)	1 (25.0)	0 (0.0)	3 (75.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Other antidepressant drugs	**17**	**8**	1 (5.9)	3 (37.5)	8 (47.1)	4 (50.0)	1 (5.9)	0 (0.0)	7 (41.2)	1 (12.5)
Other antidiabetic drugs	**2**	**3**	0 (0.0)	0 (0.0)	1 (50.0)	2 (66.7)	0 (0.0)	0 (0.0)	1 (50.0)	1 (33.3)
Other antifungals	**2**	**0**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Pancreatin	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Penicillinase-resistant penicillins	**5**	**6**	4 (80.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)
Peripheral vasodilators and related drugs	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Polyene antifungals	**5**	**4**	5 (100.0)	4 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Potassium sparing diuretics and compounds	**4**	**1**	2 (50.0)	0 (0.0)	1 (25.0)	0 (0.0)	1 (25.0)	1 (100.0)	0 (0.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	1 (20.0)	0 (0.0)	3 (60.0)	2 (50.0)	1 (20.0)	1 (25.0)	0 (0.0)	1 (25.0)
Progestogens and progesterone receptor modulators	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Proton pump inhibitors	**45**	**48**	16 (35.6)	21 (43.8)	18 (40.0)	14 (29.2)	3 (6.7)	1 (2.1)	8 (17.8)	12 (25.0)

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Quinolones	**4**	**11**	4 (100.0)	11 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Rheumatic disease suppressant drugs	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Rubefacients, topical NSAIDS, capsaicin and poultice	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Selective beta(2)-agonists	**5**	**5**	3 (60.0)	4 (80.0)	0 (0.0)	1 (20.0)	1 (20.0)	0 (0.0)	1 (20.0)	0 (0.0)
Selective serotonin re-uptake inhibitors	**16**	**15**	2 (12.5)	0 (0.0)	9 (56.3)	7 (46.7)	1 (6.3)	0 (0.0)	4 (25.0)	8 (53.3)
Short-acting insulins	**7**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (100.0)	0 (0.0)
Single substances	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Skeletal muscle relaxants	**2**	**0**	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Sodium bicarbonate	**2**	**0**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Some other antibacterials	**5**	**4**	5 (100.0)	4 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Soothing haemorrhoidal preparations	**2**	**4**	2 (100.0)	0 (0.0)	0 (0.0)	3 (75.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)
Stimulant laxatives	**207**	**107**	158 (76.3)	74 (69.2)	7 (3.4)	4 (3.7)	18 (8.7)	2 (1.9)	24 (11.6)	27 (25.2)
Sulfonamides and trimethoprim	**4**	**1**	2 (50.0)	1 (100.0)	1 (25.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)
Sulfonylureas	**12**	**9**	4 (33.3)	1 (11.1)	4 (33.3)	3 (33.3)	2 (16.7)	0 (0.0)	2 (16.7)	5 (55.6)
Tear deficiency, eye lubricant/astringent	**4**	**12**	0 (0.0)	2 (16.7)	1 (25.0)	5 (41.7)	2 (50.0)	2 (16.7)	1 (25.0)	3 (25.0)
Tetracyclines	**9**	**28**	9 (100.0)	28 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiamine hydrochloride (B1)	**5**	**4**	4 (80.0)	3 (75.0)	1 (20.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiazides and related diuretics	**9**	**18**	0 (0.0)	0 (0.0)	3 (33.3)	15 (83.3)	6 (66.7)	3 (16.7)	0 (0.0)	0 (0.0)
Thyroid hormones	**5**	**1**	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (60.0)	1 (100.0)
Toiletries	**0**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Topical corticosteroids	**2**	**0**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
Treatment of acute migraine	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Treatment of dry mouth	**12**	**5**	12 (100.0)	5 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Totals		New		Stopped Permanently		Stopped temporarily		Other amendment	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Treatment of glaucoma	**2**	**2**	1 (50.0)	1 (50.0)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tricyclic and related antidepressant drugs	**18**	**14**	0 (0.0)	0 (0.0)	9 (50.0)	7 (50.0)	0 (0.0)	0 (0.0)	9 (50.0)	7 (50.0)
Urinary-tract infections	**5**	**6**	4 (80.0)	6 (100.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)
Use of corticosteroids	**2**	**1**	2 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vasoconstrictor sympathomimetics	**5**	**3**	3 (60.0)	1 (33.3)	0 (0.0)	1 (33.3)	1 (20.0)	0 (0.0)	1 (20.0)	1 (33.3)
Vitamin B compound	**0**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vitamin D	**89**	**67**	47 (52.8)	50 (74.6)	23 (25.8)	12 (17.9)	7 (7.9)	2 (3.0)	12 (13.5)	3 (4.5)
Vitamin K	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Wound management	**8**	**0**	8 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
[unspecified]	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Totals	**1824**	**1423**	-	-	-	-	-	-	-	-

Appendix 6: Persistence of change decisions in primary care by BNF class

Table 13 Persistence in primary care to medication change decisions made at discharge by BNF class: Complete list – n (%) NB: SC = standard care pathway, SF = specialist frailty pathway. Percentages are based on the total number of medicines in the relevant pathway (specialist frailty or standard care) for the BNF class in question

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Alpha-adrenoceptor blocking drugs	**8**	**9**	7 (87.5)	7 (77.8)	0 (0.0)	1 (11.1)	1 (12.5)	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Angiotensin-converting enzyme inhibitors	**45**	**29**	32 (71.1)	23 (79.3)	4 (8.9)	3 (10.3)	8 (17.8)	3 (10.3)	0 (0.0)	0 (0.0)	1 (2.2)	0 (0.0)
Angiotensin-II receptor antagonists	**16**	**15**	12 (75.0)	13 (86.7)	1 (6.3)	0 (0.0)	2 (12.5)	2 (13.3)	0 (0.0)	0 (0.0)	1 (6.3)	0 (0.0)
Antacids and simeticone	**2**	**0**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antibacterial preparations only used topically	**1**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antifungal preparations	**7**	**5**	5 (71.4)	2 (40.0)	1 (14.3)	1 (20.0)	1 (14.3)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antihistamines	**9**	**18**	5 (55.6)	12 (66.7)	1 (11.1)	3 (16.7)	3 (33.3)	3 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antimalarials	**8**	**5**	8 (100.0)	4 (80.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antimotility drugs	**2**	**3**	1 (50.0)	2 (66.7)	1 (50.0)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antimuscarinic bronchodilators	**5**	**2**	3 (60.0)	2 (100.0)	0 (0.0)	0 (0.0)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antimuscarinic drugs used in parkinsonism	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antiplatelet drugs	**36**	**30**	20 (55.6)	22 (73.3)	7 (19.4)	3 (10.0)	8 (22.2)	5 (16.7)	0 (0.0)	0 (0.0)	1 (2.8)	0 (0.0)
Antipsychotic drugs	**29**	**10**	8 (27.6)	5 (50.0)	3 (10.3)	0 (0.0)	17 (58.6)	5 (50.0)	0 (0.0)	0 (0.0)	1 (3.4)	0 (0.0)
Antispasmodic and other drugs altering gut motility	**19**	**8**	2 (10.5)	3 (37.5)	3 (15.8)	1 (12.5)	14 (73.7)	4 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Anxiolytics	**6**	**5**	4 (66.7)	2 (40.0)	1 (16.7)	3 (60.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Appliance	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Aromatic inhalations	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Barrier preparations	**6**	**3**	3 (50.0)	1 (33.3)	2 (33.3)	1 (33.3)	1 (16.7)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Base, diluent, suspending agents and stabilisers	**6**	**1**	3 (50.0)	1 (100.0)	1 (16.7)	0 (0.0)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Beta-adrenoceptor blocking drugs	**54**	**46**	33 (61.1)	33 (71.7)	8 (14.8)	4 (8.7)	12 (22.2)	8 (17.4)	0 (0.0)	0 (0.0)	1 (1.9)	1 (2.2)
Biguanides	**15**	**13**	10 (66.7)	10 (76.9)	2 (13.3)	1 (7.7)	3 (20.0)	2 (15.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bisphosphonates and other drugs	**12**	**13**	8 (66.7)	11 (84.6)	2 (16.7)	0 (0.0)	2 (16.7)	2 (15.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Broad-spectrum penicillin	**15**	**38**	12 (80.0)	34 (89.5)	0 (0.0)	0 (0.0)	3 (20.0)	4 (10.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bulk-forming laxatives	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium supplements	**2**	**0**	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	31 (70.5)	32 (84.2)	5 (11.4)	2 (5.3)	6 (13.6)	4 (10.5)	0 (0.0)	0 (0.0)	2 (4.5)	0 (0.0)
Cardiac glycosides	**8**	**6**	5 (62.5)	6 (100.0)	1 (12.5)	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Cardiopulmonary resuscitation	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Centrally-acting antihypertensive drugs	**1**	**0**	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Cephalosporins	**3**	**6**	2 (66.7)	4 (66.7)	0 (0.0)	0 (0.0)	1 (33.3)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Compound Alginates and proprietary indigestion preparations	**3**	**5**	1 (33.3)	2 (40.0)	1 (33.3)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)
Control of epilepsy	**17**	**14**	14 (82.4)	9 (64.3)	1 (5.9)	4 (28.6)	2 (11.8)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Corticosteroids	**31**	**25**	20 (64.5)	20 (80.0)	3 (9.7)	1 (4.0)	6 (19.4)	4 (16.0)	0 (0.0)	0 (0.0)	2 (6.5)	0 (0.0)
Corticosteroids (respiratory)	**2**	**0**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Corticosteroids and other immunosuppressants	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Dopaminergic drugs used in parkinsonism	**6**	**1**	5 (83.3)	0 (0.0)	1 (16.7)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs for arrhythmias	**1**	**1**	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs for dementia	**8**	**4**	7 (87.5)	2 (50.0)	0 (0.0)	1 (25.0)	1 (12.5)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	9 (81.8)	6 (66.7)	1 (9.1)	2 (22.2)	0 (0.0)	1 (11.1)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)
Drugs for urinary retention	**14**	**9**	11 (78.6)	7 (77.8)	2 (14.3)	1 (11.1)	1 (7.1)	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used in megaloblastic anaemias	**37**	**21**	21 (56.8)	14 (66.7)	6 (16.2)	4 (19.0)	10 (27.0)	3 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used in nausea and vertigo	**16**	**8**	9 (56.3)	4 (50.0)	4 (25.0)	2 (25.0)	3 (18.8)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Drugs used in status epilepticus	**16**	**6**	1 (6.3)	2 (33.3)	2 (12.5)	0 (0.0)	13 (81.3)	4 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Electrolytes and water	**13**	**4**	0 (0.0)	2 (50.0)	2 (15.4)	0 (0.0)	11 (84.6)	2 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Emollients	**18**	**12**	6 (33.3)	3 (25.0)	8 (44.4)	7 (58.3)	4 (22.2)	2 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Enteral nutrition	**32**	**5**	13 (40.6)	2 (40.0)	9 (28.1)	1 (20.0)	10 (31.3)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Enzymes	**1**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Gout and cytotoxic induced hyperuricaemia	**2**	**4**	0 (0.0)	3 (75.0)	0 (0.0)	0 (0.0)	2 (100.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
H2-Receptor antagonists	**15**	**10**	7 (46.7)	4 (40.0)	4 (26.7)	4 (40.0)	4 (26.7)	2 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Herpes simplex and varicella-zoster	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Hypnotics	**10**	**5**	3 (30.0)	3 (60.0)	2 (20.0)	2 (40.0)	5 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Influenza	**0**	**14**	0 (0.0)	13 (92.9)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Intermediate and long-acting insulins	**11**	**11**	4 (36.4)	3 (27.3)	0 (0.0)	0 (0.0)	4 (36.4)	2 (18.2)	0 (0.0)	0 (0.0)	3 (27.3)	6 (54.5)
Lipid-regulating drugs	**62**	**65**	40 (64.5)	53 (81.5)	6 (9.7)	3 (4.6)	15 (24.2)	9 (13.8)	0 (0.0)	0 (0.0)	1 (1.6)	0 (0.0)
Loop diuretics	**86**	**49**	47 (54.7)	33 (67.3)	17 (19.8)	9 (18.4)	22 (25.6)	7 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Macrolides	**7**	**27**	6 (85.7)	23 (85.2)	0 (0.0)	0 (0.0)	1 (14.3)	3 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.7)
Magnesium	**1**	**2**	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Male sex hormones and antagonists	**7**	**1**	4 (57.1)	0 (0.0)	1 (14.3)	1 (100.0)	2 (28.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Metronidazole, tinidazole and ornidazole	**4**	**4**	2 (50.0)	3 (75.0)	0 (0.0)	0 (0.0)	2 (50.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Mucolytics	**7**	**1**	6 (85.7)	1 (100.0)	0 (0.0)	0 (0.0)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Multivitamin preparations	**3**	**2**	2 (66.7)	0 (0.0)	1 (33.3)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nasal preparations for infection	**2**	**2**	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Neuropathic pain	**8**	**11**	7 (87.5)	9 (81.8)	1 (12.5)	2 (18.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nicotine dependence	**2**	**1**	0 (0.0)	0 (0.0)	2 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nitrates	**12**	**14**	4 (33.3)	9 (64.3)	4 (33.3)	0 (0.0)	4 (33.3)	5 (35.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Non-opioid analgesics and compound preparations	**123**	**130**	53 (43.1)	72 (55.4)	35 (28.5)	22 (16.9)	28 (22.8)	8 (6.2)	7 (5.7)	26 (20.0)	0 (0.0)	2 (1.5)
Non-steroidal anti-inflammatory drugs	**27**	**16**	14 (51.9)	12 (75.0)	10 (37.0)	2 (12.5)	2 (7.4)	2 (12.5)	0 (0.0)	0 (0.0)	1 (3.7)	0 (0.0)
Ocular diagnostic & peri-operative preparations & photodynamic treatment	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oestrogens and heart	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oils	**5**	**1**	2 (40.0)	1 (100.0)	0 (0.0)	0 (0.0)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Opioid analgesics	**120**	**93**	55 (45.8)	61 (65.6)	23 (19.2)	15 (16.1)	41 (34.2)	16 (17.2)	0 (0.0)	0 (0.0)	1 (0.8)	1 (1.1)
Oral anticoagulants	**47**	**25**	28 (59.6)	18 (72.0)	2 (4.3)	2 (8.0)	17 (36.2)	4 (16.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (4.0)

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Oral iron	**43**	**31**	28 (65.1)	20 (64.5)	9 (20.9)	8 (25.8)	6 (14.0)	3 (9.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oral potassium	**4**	**6**	2 (50.0)	5 (83.3)	0 (0.0)	1 (16.7)	2 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Oral sodium and water	**3**	**0**	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Osmotic laxatives	**90**	**55**	39 (43.3)	29 (52.7)	5 (5.6)	3 (5.5)	23 (25.6)	7 (12.7)	22 (24.4)	16 (29.1)	1 (1.1)	0 (0.0)
Other antianginal drugs	**2**	**4**	1 (50.0)	3 (75.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other antidepressant drugs	**17**	**8**	8 (47.1)	6 (75.0)	4 (23.5)	0 (0.0)	5 (29.4)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other antidiabetic drugs	**2**	**3**	1 (50.0)	2 (66.7)	1 (50.0)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other antifungals	**2**	**0**	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pancreatin	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Penicillinase-resistant penicillins	**5**	**6**	2 (40.0)	5 (83.3)	0 (0.0)	1 (16.7)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Peripheral vasodilators and related drugs	**1**	**1**	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Polyene antifungals	**5**	**4**	3 (60.0)	4 (100.0)	0 (0.0)	0 (0.0)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Potassium sparing diuretics and compounds	**4**	**1**	1 (25.0)	1 (100.0)	3 (75.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	2 (40.0)	3 (75.0)	1 (20.0)	0 (0.0)	2 (40.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Progestogens and progesterone receptor modulators	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Proton pump inhibitors	**45**	**48**	29 (64.4)	31 (64.6)	6 (13.3)	10 (20.8)	10 (22.2)	5 (10.4)	0 (0.0)	0 (0.0)	0 (0.0)	2 (4.2)
Quinolones	**4**	**11**	3 (75.0)	9 (81.8)	0 (0.0)	0 (0.0)	1 (25.0)	2 (18.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Rheumatic disease suppressant drugs	**0**	**1**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Rubefacients, topical NSAIDS, capsaicin and poultice	**1**	**1**	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Selective beta(2)-agonists	**5**	**5**	2 (40.0)	2 (40.0)	2 (40.0)	2 (40.0)	1 (20.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Selective serotonin re-uptake inhibitors	**16**	**15**	9 (56.3)	12 (80.0)	4 (25.0)	2 (13.3)	3 (18.8)	1 (6.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Short-acting insulins	**7**	**0**	4 (57.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (28.6)	0 (0.0)
Single substances	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Skeletal muscle relaxants	**2**	**0**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Sodium bicarbonate	**2**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

	Total		Persistent		Not persistent		Lost to follow up		Review		Not Sure	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF	SC	SF
Some other antibacterials	**5**	**4**	5 (100.0)	3 (75.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Soothing haemorrhoidal preparations	**2**	**4**	1 (50.0)	4 (100.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Stimulant laxatives	**207**	**107**	105 (50.7)	51 (47.7)	13 (6.3)	5 (4.7)	35 (16.9)	17 (15.9)	54 (26.1)	34 (31.8)	0 (0.0)	0 (0.0)
Sulfonamides and trimethoprim	**4**	**1**	3 (75.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Sulfonylureas	**12**	**9**	8 (66.7)	5 (55.6)	2 (16.7)	3 (33.3)	2 (16.7)	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tear deficiency, eye lubricant/astringent	**4**	**12**	1 (25.0)	7 (58.3)	2 (50.0)	3 (25.0)	1 (25.0)	1 (8.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (8.3)
Tetracyclines	**9**	**28**	6 (66.7)	21 (75.0)	1 (11.1)	0 (0.0)	2 (22.2)	7 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiamine hydrochloride (B1)	**5**	**4**	4 (80.0)	2 (50.0)	1 (20.0)	1 (25.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thiazides and related diuretics	**9**	**18**	6 (66.7)	13 (72.2)	0 (0.0)	3 (16.7)	3 (33.3)	2 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Thyroid hormones	**5**	**1**	4 (80.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Toiletries	**0**	**2**	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Topical corticosteroids	**2**	**0**	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Treatment of acute migraine	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Treatment of dry mouth	**12**	**5**	1 (8.3)	2 (40.0)	1 (8.3)	0 (0.0)	10 (83.3)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Treatment of glaucoma	**2**	**2**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Tricyclic and related antidepressant drugs	**18**	**14**	12 (66.7)	9 (64.3)	3 (16.7)	5 (35.7)	3 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Urinary-tract infections	**5**	**6**	5 (100.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Use of corticosteroids	**2**	**1**	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vasoconstrictor sympathomimetics	**5**	**3**	4 (80.0)	2 (66.7)	1 (20.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vitamin B compound	**0**	**2**	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vitamin D	**89**	**67**	54 (60.7)	49 (73.1)	7 (7.9)	7 (10.4)	28 (31.5)	11 (16.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Vitamin K	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Wound management	**8**	**0**	2 (25.0)	0 (0.0)	4 (50.0)	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
[unspecified]	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	**1824**	**1423**	**-**	-	-	-	-	-	-	-	-	-

Appendix 7: Quality of information on discharge summaries by BNF class

Table 14 Quality of information on discharge summary for each medication changed by BNF class: Complete list – n (%) NB: SC = standard care pathway, SF= specialist frailty pathway. Percentages are based on the total number of medicines in the relevant pathway (specialist frailty or standard care) for the BNF class in question

	Totals		Poor		Satisfactory		Excellent	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF
Alpha-adrenoceptor blocking drugs	**8**	**9**	0 (0.0)	0 (0.0)	6 (75.0)	4 (44.4)	2 (25.0)	5 (55.6)
Angiotensin-converting enzyme inhibitors	**45**	**29**	0 (0.0)	0 (0.0)	27 (60.0)	10 (34.5)	18 (40.0)	19 (65.5)
Angiotensin-II receptor antagonists	**16**	**15**	0 (0.0)	0 (0.0)	11 (68.8)	5 (33.3)	5 (31.3)	10 (66.7)
Antacids and simeticone	**2**	**0**	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)
Antibacterial preparations only used topically	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)
Antifungal preparations	**7**	**5**	0 (0.0)	0 (0.0)	1 (14.3)	0 (0.0)	6 (85.7)	5 (100.0)
Antihistamines	**9**	**18**	0 (0.0)	0 (0.0)	6 (66.7)	9 (50.0)	3 (33.3)	9 (50.0)
Antimalarials	**8**	**5**	0 (0.0)	0 (0.0)	5 (62.5)	2 (40.0)	3 (37.5)	3 (60.0)
Antimotility drugs	**2**	**3**	0 (0.0)	0 (0.0)	1 (50.0)	2 (66.7)	1 (50.0)	1 (33.3)
Antimuscarinic bronchodilators	**5**	**2**	0 (0.0)	0 (0.0)	2 (40.0)	0 (0.0)	3 (60.0)	2 (100.0)
Antimuscarinic drugs used in parkinsonism	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Antiplatelet drugs	**36**	**30**	1 (2.8)	0 (0.0)	13 (36.1)	15 (50.0)	22 (61.1)	15 (50.0)
Antipsychotic drugs	**29**	**10**	0 (0.0)	0 (0.0)	21 (72.4)	6 (60.0)	8 (27.6)	4 (40.0)
Antispasmodic and other drugs altering gut motility	**19**	**8**	0 (0.0)	0 (0.0)	17 (89.5)	7 (87.5)	2 (10.5)	1 (12.5)
Anxiolytics	**6**	**5**	0 (0.0)	0 (0.0)	3 (50.0)	4 (80.0)	3 (50.0)	1 (20.0)
Appliance	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Aromatic inhalations	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Barrier preparations	**6**	**3**	0 (0.0)	0 (0.0)	6 (100.0)	2 (66.7)	0 (0.0)	1 (33.3)
Base, diluent, suspending agents and stabilisers	**6**	**1**	0 (0.0)	0 (0.0)	4 (66.7)	0 (0.0)	2 (33.3)	1 (100.0)
Beta-adrenoceptor blocking drugs	**54**	**46**	0 (0.0)	0 (0.0)	40 (74.1)	21 (45.7)	14 (25.9)	25 (54.3)
Biguanides	**15**	**13**	0 (0.0)	0 (0.0)	4 (26.7)	3 (23.1)	11 (73.3)	10 (76.9)
Bisphosphonates and other drugs	**12**	**13**	0 (0.0)	0 (0.0)	6 (50.0)	2 (15.4)	6 (50.0)	11 (84.6)
Broad-spectrum penicillins	**15**	**38**	0 (0.0)	0 (0.0)	9 (60.0)	14 (36.8)	6 (40.0)	24 (63.2)

	Totals		Poor		Satisfactory		Excellent	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF
Bulk-forming laxatives	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Calcium supplements	**2**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Calcium-channel blockers	**44**	**38**	0 (0.0)	0 (0.0)	24 (54.5)	19 (50.0)	20 (45.5)	19 (50.0)
Cardiac glycosides	**8**	**6**	0 (0.0)	0 (0.0)	6 (75.0)	3 (50.0)	2 (25.0)	3 (50.0)
Cardiopulmonary resuscitation	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Centrally-acting antihypertensive drugs	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Cephalosporins	**3**	**6**	0 (0.0)	0 (0.0)	1 (33.3)	2 (33.3)	2 (66.7)	4 (66.7)
Clindamycin and lincomycin	**0**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)
Compound Alginates and proprietary indigestion preparations	**3**	**5**	1 (33.3)	0 (0.0)	2 (66.7)	5 (100.0)	0 (0.0)	0 (0.0)
Control of epilepsy	**17**	**14**	0 (0.0)	0 (0.0)	10 (58.8)	6 (42.9)	7 (41.2)	8 (57.1)
Corticosteroids	**31**	**25**	0 (0.0)	0 (0.0)	16 (51.6)	11 (44.0)	15 (48.4)	14 (56.0)
Corticosteroids (respiratory)	**2**	**0**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Corticosteroids and other immunosuppressants	**1**	**0**	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Dopaminergic drugs used in parkinsonism	**6**	**1**	0 (0.0)	0 (0.0)	4 (66.7)	0 (0.0)	2 (33.3)	1 (100.0)
Drugs for arrhythmias	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)
Drugs for dementia	**8**	**4**	0 (0.0)	0 (0.0)	6 (75.0)	2 (50.0)	2 (25.0)	2 (50.0)
Drugs for urinary frequency enuresis and incontinence	**11**	**9**	0 (0.0)	0 (0.0)	2 (18.2)	5 (55.6)	9 (81.8)	4 (44.4)
Drugs for urinary retention	**14**	**9**	0 (0.0)	0 (0.0)	6 (42.9)	4 (44.4)	8 (57.1)	5 (55.6)
Drugs used for mania and hypomania	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Drugs used in megaloblastic anaemias	**37**	**21**	0 (0.0)	0 (0.0)	29 (78.4)	18 (85.7)	8 (21.6)	3 (14.3)
Drugs used in nausea and vertigo	**16**	**8**	0 (0.0)	0 (0.0)	12 (75.0)	4 (50.0)	4 (25.0)	4 (50.0)
Drugs used in status epilepticus	**16**	**6**	0 (0.0)	0 (0.0)	15 (93.8)	5 (83.3)	1 (6.3)	1 (16.7)
Electrolytes and water	**13**	**4**	0 (0.0)	0 (0.0)	13 (100.0)	4 (100.0)	0 (0.0)	0 (0.0)
Emollients	**18**	**12**	0 (0.0)	0 (0.0)	15 (83.3)	9 (75.0)	3 (16.7)	3 (25.0)
Enteral nutrition	**32**	**5**	0 (0.0)	0 (0.0)	29 (90.6)	5 (100.0)	3 (9.4)	0 (0.0)
Enzymes	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
Gout and cytotoxic induced hyperuricaemia	**2**	**4**	0 (0.0)	0 (0.0)	2 (100.0)	1 (25.0)	0 (0.0)	3 (75.0)

	Totals		Poor		Satisfactory		Excellent	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF
H2-Receptor antagonists	**15**	**10**	0 (0.0)	0 (0.0)	9 (60.0)	2 (20.0)	6 (40.0)	8 (80.0)
Herpes simplex and varicella-zoster	**1**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Hypnotics	**10**	**5**	0 (0.0)	0 (0.0)	6 (60.0)	1 (20.0)	4 (40.0)	4 (80.0)
Influenza	**0**	**14**	0 (0.0)	0 (0.0)	0 (0.0)	5 (35.7)	0 (0.0)	9 (64.3)
Intermediate and long-acting insulins	**11**	**11**	0 (0.0)	0 (0.0)	9 (81.8)	8 (72.7)	2 (18.2)	3 (27.3)
Lipid-regulating drugs	**62**	**65**	0 (0.0)	0 (0.0)	55 (88.7)	46 (70.8)	7 (11.3)	19 (29.2)
Loop diuretics	**86**	**49**	0 (0.0)	0 (0.0)	55 (64.0)	26 (53.1)	31 (36.0)	23 (46.9)
Macrolides	**7**	**27**	0 (0.0)	0 (0.0)	5 (71.4)	13 (48.1)	2 (28.6)	14 (51.9)
Magnesium	**1**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (100.0)	1 (50.0)
Male sex hormones and antagonists	**7**	**1**	0 (0.0)	0 (0.0)	5 (71.4)	1 (100.0)	2 (28.6)	0 (0.0)
Metronidazole, tinidazole and ornidazole	**4**	**4**	0 (0.0)	0 (0.0)	3 (75.0)	2 (50.0)	1 (25.0)	2 (50.0)
Mucolytics	**7**	**1**	0 (0.0)	0 (0.0)	7 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)
Multivitamin preparations	**3**	**2**	0 (0.0)	0 (0.0)	3 (100.0)	2 (100.0)	0 (0.0)	0 (0.0)
Nasal preparations for infection	**2**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	2 (100.0)	1 (50.0)
Neuropathic pain	**8**	**11**	0 (0.0)	0 (0.0)	6 (75.0)	3 (27.3)	2 (25.0)	8 (72.7)
Nicotine dependence	**2**	**1**	0 (0.0)	0 (0.0)	2 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)
Nitrates	**12**	**14**	0 (0.0)	0 (0.0)	9 (75.0)	8 (57.1)	3 (25.0)	6 (42.9)
Non-opioid analgesics and compound preparations	**123**	**130**	0 (0.0)	0 (0.0)	105 (85.4)	91 (70.0)	18 (14.6)	39 (30.0)
Non-steroidal anti-inflammatory drugs	**27**	**16**	0 (0.0)	0 (0.0)	19 (70.4)	5 (31.3)	8 (29.6)	11 (68.8)
Ocular diagnostic & peri-operative preparations & photodynamic treatment	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Oestrogens and heart	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
Oils	**5**	**1**	0 (0.0)	0 (0.0)	1 (20.0)	1 (100.0)	4 (80.0)	0 (0.0)
Opioid analgesics	**120**	**93**	2 (1.7)	0 (0.0)	75 (62.5)	40 (43.0)	43 (35.8)	53 (57.0)
Oral anticoagulants	**47**	**25**	0 (0.0)	1 (4)	13 (27.7)	6 (24.0)	34 (72.3)	18 (72.0)
Oral iron	**43**	**31**	0 (0.0)	0 (0.0)	23 (53.5)	14 (45.2)	20 (46.5)	17 (54.8)
Oral potassium	**4**	**6**	0 (0.0)	0 (0.0)	0 (0.0)	2 (33.3)	4 (100.0)	4 (66.7)
Oral sodium and water	**3**	**0**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)

	Totals		Poor		Satisfactory		Excellent	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF
Osmotic laxatives	**90**	**55**	0 (0.0)	0 (0.0)	71 (78.9)	44 (80.0)	19 (21.1)	11 (20.0)
Other antianginal drugs	**2**	**4**	0 (0.0)	0 (0.0)	0 (0.0)	2 (50.0)	2 (100.0)	2 (50.0)
Other antidepressant drugs	**17**	**8**	0 (0.0)	0 (0.0)	9 (52.9)	4 (50.0)	8 (47.1)	4 (50.0)
Other antidiabetic drugs	**2**	**3**	0 (0.0)	0 (0.0)	2 (100.0)	1 (33.3)	0 (0.0)	2 (66.7)
Other antifungals	**2**	**0**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pancreatin	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Penicillinase-resistant penicillins	**5**	**6**	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)	5 (100.0)	5 (83.3)
Peripheral vasodilators and related drugs	**1**	**1**	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)
Polyene antifungals	**5**	**4**	0 (0.0)	0 (0.0)	2 (40.0)	0 (0.0)	3 (60.0)	4 (100.0)
Potassium sparing diuretics and compounds	**4**	**1**	0 (0.0)	0 (0.0)	2 (50.0)	1 (100.0)	2 (50.0)	0 (0.0)
Potassium-sparing diuretics and aldosterone antagonists	**5**	**4**	0 (0.0)	0 (0.0)	3 (60.0)	1 (25.0)	2 (40.0)	3 (75.0)
Progestogens and progesterone receptor modulators	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Proton pump inhibitors	**45**	**48**	0 (0.0)	0 (0.0)	21 (46.7)	21 (43.8)	24 (53.3)	27 (56.3)
Quinolones	**4**	**11**	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	4 (100.0)	10 (90.9)
Rheumatic disease suppressant drugs	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Rubefacients, topical NSAIDS, capsaicin and poultice	**1**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
Selective beta(2)-agonists	**5**	**5**	0 (0.0)	0 (0.0)	4 (80.0)	4 (80.0)	1 (20.0)	1 (20.0)
Selective serotonin re-uptake inhibitors	**16**	**15**	0 (0.0)	0 (0.0)	4 (25.0)	6 (40.0)	12 (75.0)	9 (60.0)
Short-acting insulins	**7**	**0**	0 (0.0)	0 (0.0)	5 (71.4)	0 (0.0)	2 (28.6)	0 (0.0)
Single substances	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Skeletal muscle relaxants	**2**	**0**	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)
Sodium bicarbonate	**2**	**0**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Some other antibacterials	**5**	**4**	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	5 (100.0)	3 (75.0)
Soothing haemorrhoidal preparations	**2**	**4**	0 (0.0)	0 (0.0)	2 (100.0)	1 (25.0)	0 (0.0)	3 (75.0)
Stimulant laxatives	**207**	**107**	2 (1.0)	0 (0.0)	165 (79.7)	88 (82.2)	40 (19.4)	19 (17.8)
Sulfonamides and trimethoprim	**4**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (100.0)	1 (100.0)
Sulfonylureas	**12**	**9**	0 (0.0)	0 (0)	7 (58.3)	4 (44.4)	5 (41.7)	5 (55.6)

	Totals		Poor		Satisfactory		Excellent	
BNF Class	SC	SF	SC	SF	SC	SF	SC	SF
Tear deficiency, eye lubricant/astringent	**4**	**12**	0 (0.0)	0 (0.0)	4 (100.0)	8 (66.7)	0 (0.0)	4 (33.3)
Tetracyclines	**9**	**28**	0 (0.0)	0 (0.0)	2 (22.2)	4 (14.3)	7 (77.8)	24 (85.7)
Thiamine hydrochloride (B1)	**5**	**4**	0 (0.0)	0 (0.0)	5 (100.0)	3 (75.0)	0 (0.0)	1 (25.0)
Thiazides and related diuretics	**9**	**18**	0 (0.0)	0 (0.0)	5 (55.6)	6 (33.3)	4 (44.4)	12 (66.7)
Thyroid hormones	**5**	**1**	0 (0.0)	0 (0.0)	2 (40.0)	1 (100.0)	3 (60.0)	0 (0.0)
Toiletries	**0**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)
Topical corticosteroids	**2**	**0**	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)
Treatment of acute migraine	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Treatment of dry mouth	**12**	**5**	0 (0.0)	0 (0.0)	12 (100.0)	5 (100.0)	0 (0.0)	0 (0.0)
Treatment of glaucoma	**2**	**2**	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	2 (100.0)
Tricyclic and related antidepressant drugs	**18**	**14**	0 (0.0)	0 (0.0)	7 (38.9)	1 (7.1)	11 (61.1)	13 (92.9)
Urinary-tract infections	**5**	**6**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)	6 (100.0)
Use of corticosteroids	**2**	**1**	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	1 (100.0)
Vasoconstrictor sympathomimetics	**5**	**3**	0 (0.0)	0 (0.0)	4 (80.0)	2 (66.7)	1 (20.0)	1 (33.3)
Vitamin B compound	**0**	**2**	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)
Vitamin D	**89**	**67**	0 (0.0)	0 (0.0)	52 (58.4)	41 (61.2)	37 (41.6)	26 (38.8)
Vitamin K	**0**	**1**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Wound management	**8**	**0**	0 (0.0)	0 (0.0)	6 (75.0)	0 (0.0)	2 (25.0)	0 (0.0)
[unspecified]	**1**	**1**	1 (100.0)	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	**1824**	**1423**	-	-	-	-	-	-