A study of pharmaceutical care needs assessment in heart failure; to illustrate a multidisciplinary intervention to reduce hospital re-admissions in people with long term conditions

A research project

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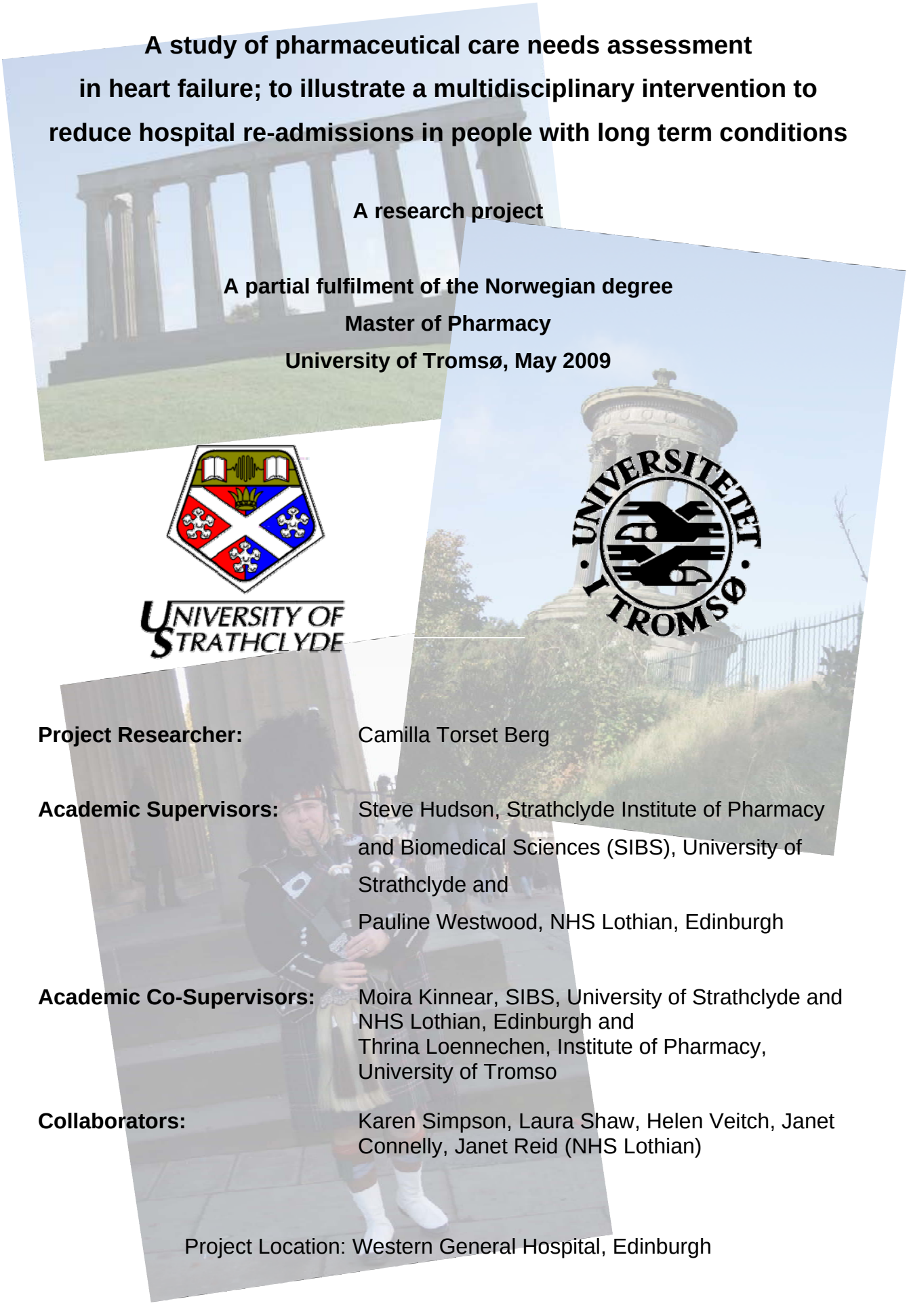

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Abstract

Introduction

The Edinburgh IMPACT (IMProved Anticipatory Care and Treatment) is aimed at people with long term conditions, and focuses on improving patients' quality of life and reducing preventable hospital admissions. The service is nurse led, and recently primary care pharmacists have been added to the team to perform a medication review pilot. Patients would be referred to the pharmacist, who would go to their house and review their medicines. The aim for this project was to assess pharmaceutical care needs of patients with heart failure, design a clinical document for the use in the care of these patients, and to develop a questionnaire to evaluate the medication review service.

Methods

A model of pharmaceutical care was adapted from a previous project, and was modified in order to show the multidisciplinary care for patients with heart failure. A pharmaceutical care plan for heart failure was developed by using a pharmaceutical care plan from previous work done on diabetes. A patient questionnaire with closed-ended questions was designed in order to evaluate the existing anticipatory care service. The draft care plan was revised following feedback from pharmacists in National Health Service (NHS) Lothian. The draft patient questionnaire was piloted in two patients that had been seen by the pharmacist.

Results

The output from the project was a tool kit for documentation of the anticipatory care service to heart failure patients. The toolkit comprises; a model of care for heart failure, a two page clinical document (patient profile and care plan) that can be used in the care of patients with heart failure, and a patient questionnaire that enables other to evaluate the anticipatory care service when it is up and running properly.

Conclusion

The researcher has developed a set of tools that after some redesign and modifications can be used to support the care of patients with heart failure, and to evaluate the medication review service.

Abbreviations

ACE inhibitor	Angiotensin Converting Enzyme inhibitor
ARB	Angiotensin II Receptor Blocker
Carenap	Care Needs Assessment Package
CHD	Coronary Heart Disease
CHPs	Community Health Partnerships
COPD	Chronic Obstructive Pulmonary Disease
DM	Diabetes Mellitus
GP	General Practitioner
GPASS	General Practice Administration System for Scotland
HCP	Health Care Professionals
HEAT	Health, Efficiency, Access and Treatment
HF	Heart Failure
HFN	Heart failure nurse
HT	Hypertension
IMPACT	IMProved Anticipatory Care and Treatment
LTC	Long Term Condition
LVSD	Left Ventricular Systolic Dysfunction
ME	Myalgic Encephalopathy
MI	Myocardial Infarction
NCM	Nurse case manager
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NYHA	New York Heart Association
SCI Store	Scottish Care Information Store
SIGN	Scottish Intercollegiate Guidelines Network
SPARRA	Scottish Patient At Risk of Readmission and Admission
UDSET	User Defined Service Evaluation Toolkit
UK	United Kingdom

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1 Introduction

Some 3-4 % of all United Kingdom (UK) hospitalisations are due to avoidable medicine-related illnesses. [1] In NHS Lothian, pharmacists are members of an anticipatory care team in the community and are available to undertake clinical medication review to optimise pharmaceutical care and prevent hospital admission. There is a need to evaluate this service.

1.1 Long term conditions

1.1.1 Long term conditions - definition

A long term condition (LTC) is defined as "a condition that requires ongoing medical care, limits what one can do, and is likely to last longer than one year". LTC are common in the Scottish population, more common in people living in deprived circumstances and in older people.[2] An estimated 2 million people in Scotland live with one or more LTC.[3]

Some people are born with LTCs, while others will be affected at different ages and stages of life.[3] People with LTC are twice as likely to be admitted to hospital and experience longer hospital stays when they are admitted.[4]

Scotland's life expectancy is improving and evidence suggests that people are living longer with LTCs. In most industrialised nations and in many developing countries, LTCs are the most common cause of death. They are also strongly associated with social deprivation.[3]

Examples of LTCs are asthma, depression, hypertension (HT), coronary heart disease (CHD), diabetes mellitus (DM), hypothyroidism, stroke, chronic obstructive pulmonary disease (COPD), epilepsy, cancer, arthritis and Myalgic Encephalopathy (ME). [3, 4]

1.1.2 Long term conditions – NHS in Scotland

The structure of the NHS in Scotland [4] is summarised in figure 1 below.

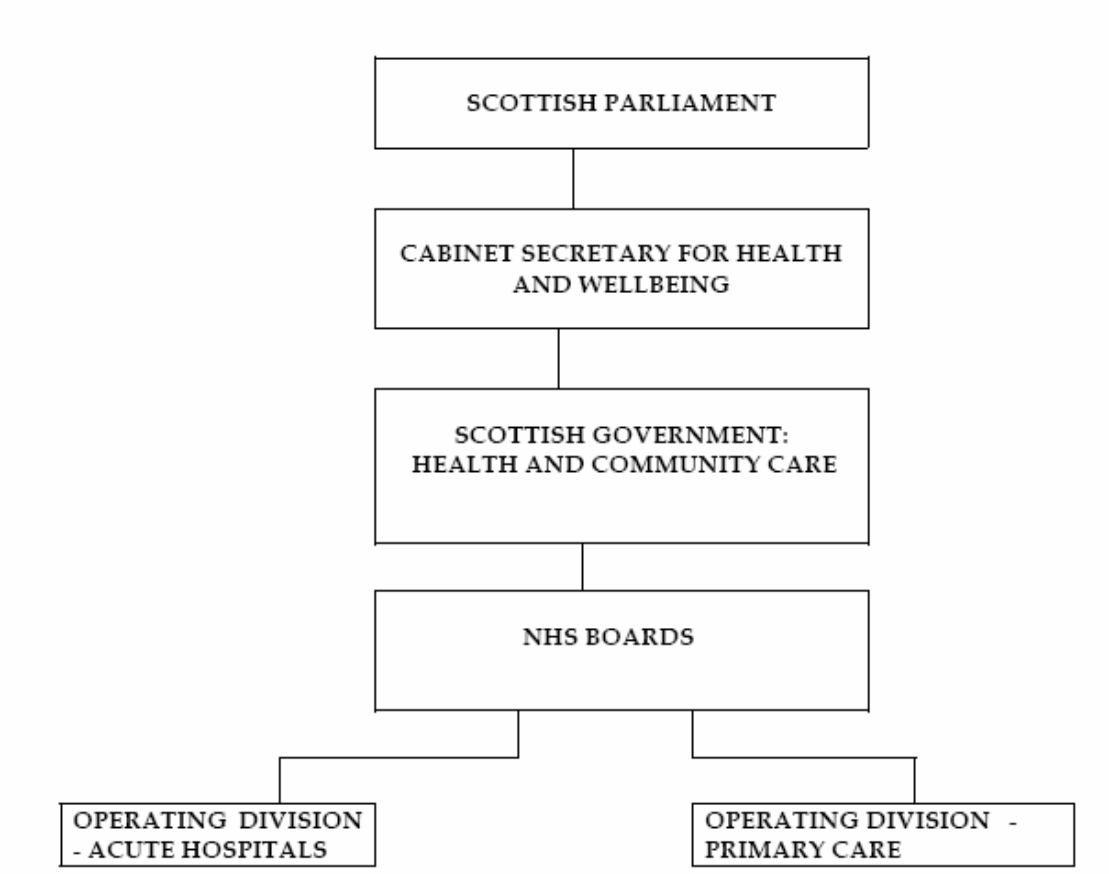

Figure 1. Structure of the NHS in Scotland

The *Cabinet Secretary for Health and Wellbeing* is responsible for the NHS in Scotland. The Cabinet Secretary is supported by the *Scottish Government*

Health and Community Care Department.

The Chief Executive of NHS Scotland leads the central management of the NHS in Scotland and is accountable to the Cabinet Secretary for the efficiency and performance of the service.

The role of the *NHS Boards* is the improvement of health for the resident population by developing a Local Health Plan, together with responsibility for operational issues through its operating divisions. NHS Boards have to put in place arrangements to ensure that the development of the Local Health Plan is a co-operative process in which local hospitals, General Practitioners (GPs)

and others participate actively. In addition the Local Health Plan includes plans for primary, community secondary and tertiary services provided by NHS bodies in the Board area. Each Board has set up a number of operating divisions. This includes Operating Divisions for secondary care and primary care.

Some of the roles of the *Operating Divisions for Primary Care* are to provide support to General Practice in delivering primary care services, and to support the development of a population wide approach to health improvement and disease prevention.

In each Health Board's area there are a lot of Community Health Partnerships (CHPs). Each of these Partnerships includes service providers from community hospitals, primary care and the local authority. The Partnerships are encouraged to work with the local authorities through the joint futures structure. Each Partnership has a budget for service development to manage their local priorities.

The *Operating Divisions for Secondary Care* has operational management responsibilities for running of hospital services and these functions are devolved under standing orders from the NHS Board.

Each NHS Board seeks professional advice from the Area Clinical Forum. This consists of the chairs of each of the seven Area Professional Committees representing medical, dental, nursing and midwifery, pharmaceutical, optical, professions allied to medicine and a new Local Health Care Co-operative Professional Committee. The Chair of the Area Clinical Forum is a full member of the NHS Board. For example in NHS Lothian, the Director of Pharmacy is the Chair of the Area Pharmaceutical Committee and Chair of the Area Clinical Forum and is a non-executive member of Lothian NHS Board.

One of the aims of the current NHS reforms in Scotland is to develop integrated services by removing artificial boundaries between primary and

secondary care. Managed Clinical Networks are linked groups of health professionals and organisations from primary, secondary and tertiary care working together in a co-ordinated manner, unconstrained by professional and NHS Board boundaries to ensure equitable provision of high quality, clinically effective services throughout Scotland.

In January 2003 the Clinical Standards Board for Scotland, Health Technology Board for Scotland, Clinical Resource and Audit Group, together with the Nursing and Midwifery Practice Development Unit and the Scottish Health Advisory Service joined together to form NHS Quality Improvement, Scotland. The function of NHS Quality Improvement, Scotland therefore is to provide advice on effective clinical practice, set national standards and inspect and publish reports on performance. [5]

The Scottish Government Health Department uses a performance assessment framework to monitor the performance of the NHS Boards. It also publishes annual national priorities and targets which must be met by the Scottish health and social care organisations. The Local Health Plan, agreed between the Scottish Government Health Department and the NHS board, describes how local health and social care organisations will meet national performance targets (Health Improvement, Efficiency, Access, Treatment)

In December 2000, Our National Health was launched. Following this, in February 2003, the Scottish White Paper – Partnership for Care – was published, which saw the abolition of all Trusts in Scotland. These structures were replaced by Operating Divisions (within NHS boards) and CHPs. The paper stated that, in the short term, the independent sector in Scotland would be used to reduce waiting times.[6]

Delivering for Health[7] was launched by the Scottish Executive in 2005 and described changes that would be made to the NHS in order to improve both the service and people's health. The aim of the Scottish Executive is develop the NHS in order to shift the balance of care from strictly relying on acute care in hospital through emergency admissions towards emphasising a wider effort

on improving health and well-being by focusing on preventive medicine, support for self care, and greater targeting of resources towards those of greatest risk by a more proactive support in the form of anticipatory care services. Another aim is to close the gap in life expectancy. Anticipatory care services is characterised by preventative medicine and earlier interventions aimed at those at greatest risk.

Better Health Better Care: An Action plan[8] was launched by the Scottish Government in 2007. This document was published in order to deal with the discoveries that were made after Delivering for Health was published in 2005. This document describes the proposals for changing the structure of the NHS and to obtain a "Healthier Scotland". To achieve this goal, they have focused on three main targets: health improvement, tackling health inequality and improving the quality of health care.

On health improvement, the main focus is to reduce smoking across Scotland. Other important issues are alcohol misuse, problems with obesity and to improve mental wellbeing as well as physical health.
In terms of health inequalities, the Scottish Government plans to extend anticipatory care approaches significantly and to develop early intervention programmes which invest in the health of pregnant mothers, babies and young children to break the link between early life adversity and adult disease.
In improving the quality of health care the NHS has made commitments regarding local care when possible, embedded in communities and tailored to people's needs.[8]

1.1.3 HEAT-targets

Better Health Better Care: An Action plan[8] introduced Health, Efficiency, Access and Treatment (HEAT) performance system which sets out the targets and measures against which NHS Boards are publicly monitored and evaluated. The four key targets are: Health improvement for the people of Scotland – improving healthy life expectancy, Efficiency and governance improvements – continually improve the efficiency of the NHS, Access to services – recognizing patients' need for quicker access to NHS services, and

Treatment appropriate to individuals – ensuring patients receive appropriate services.[8]

The HEAT-targets relevant to LTCs are:-
by 2008/09 the NHS will reduce the proportion of older people (aged 65+) who are admitted as an emergency inpatient two or more times in a single year, by 20% compared with 2004/05 and reduce, by 10%, the emergency inpatient bed days for people aged 65 and over by 2008; to achieve agreed reductions in the rates of hospital admissions and bed days of patients with primary diagnosis of COPD, asthma, diabetes or CHD, from 2006/07 to 2010/11.[8]

1.2 Current anticipatory care model within primary care

An anticipatory care model within primary care in Edinburgh was introduced last year to meet needs of people with LTC in keeping with local and national health policy and strategy.[7, 9, 10] The Edinburgh IMPACT service is aimed at people with LTCs. The aim of this service is to improve the quality of life for the patients, give support to carers and reduce preventable hospital admissions. [11]

Patients with LTCs at risk of admission or re-admission to hospital are identified through various means including analysis of SPARRA data (Scottish Patients At Risk of Readmission and Admission) and referrals to the service from health care professionals (HCP) following patient consultation. The HCP that would refer the patient would be e.g. GP and specialist nurses working in secondary care. SPARRA estimates a patient's risk of readmission/admission by an algorithm using the patient's demographics (age, sex, deprivation) and factors from their history of hospital admission over the 3 years prior to the year of interest to identify who are at most risk of readmission to hospital. [12]

The approach of the IMPACT service is to liaise with the multidisciplinary team to identify patients then allocate a nurse case manager who assesses the patient by: reviewing medication, co-ordinating services to simplify and streamline patients pathways, promoting self-care, improving carer support,

advising on falls prevention and working in partnership with others to maximise the impact of clinical and social care.[11]

The model is delivered through general practice and co-ordinated by community nurses. Pharmacists have recently been introduced into the team as a short term pilot, to conduct medication reviews when patients are referred from the case manager.

1.3 Pharmaceutical care

Hepler and Strand defined pharmaceutical care as “the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient’s quality of life.” These outcomes are cure of a disease, elimination or reduction of a patient’s symptomatology, arresting or slowing of a disease process, or preventing a disease or symptomatology. [13]

1.3.1 Pharmaceutical care issues

Pharmaceutical care issues can be defined as ”potential or actual drug-related problems”.[14] A drug-related problem can also be known as a drug therapy problem. A drug therapy problem is “any undesirable event experienced by the patient that involves or is suspected to involve drug therapy and that actually or potentially interferes with a desired patient outcome”.[15]

Classification of drug therapy problems:

1. Additional drug therapy
2. Unnecessary drug therapy
3. Wrong dose
4. Dosage too low
5. Adverse drug reaction
6. Dosage too high
7. Compliance [15]

A pharmaceutical care issue can be known as “an element of a pharmaceutical need which is addressed by the pharmacist”, where a pharmaceutical need is “a patient’s requirement for a pharmaceutical product or service.” [16]

Pharmaceutical needs include:
a) needs for a pharmaceutical product (a medicine, a particular formulation or a ‘compliance aid’)
b) needs for a pharmaceutical service (advice on medicines, medication review or monitoring of drug therapy)[16]

1.3.2 Categorisation of pharmaceutical care issues

Pharmaceutical care issues can be categorised as
(1) either a *check* or a *change*[17], where a *change* can be a *change in drug therapy process* or a *change in the drug therapy*.

The care issue is then categorised into
(2) *Quality Assurance (QA) Descriptors*[17], which indicate a care issue’s position in the process of delivering pharmaceutical care. If the care issue is a *change in drug therapy* this category also describes the extent of the change made.

The third categorisation is
(3) *drug therapy problem*[15], and only a care issue identified as a *change in drug therapy* can be categorised as a DTP

1.3.3 Integrating community pharmacies

A new NHS pharmacy contract is being phased in for Scottish pharmacies. The new contract came as a result of the Scottish Health Plan *Our National Health: a plan for action, a plan for change* from 2001 and the Scottish Executive’s strategy document *The Right Medicine* from 2002. Together these

documents set an agenda for modernising and redesigning pharmacy services.

The overarching aim is to improve patient care and to better utilise the skills of community pharmacists and their support staff to meet the local pharmaceutical needs.

The four elements of the new contract are:
eAMS – electronic Acute Medication Service
eMAS – electronic Minor Ailments Service
PHS – Public Health Service
CMS – Chronic Medication Service[18]

Electronic Acute Medication Service[19]

AMS involves dispensing prescriptions for acute conditions, plus provision of any associated advice. This service is based on electronic transfer of prescriptions between GPs and community pharmacists.

Electronic Minor Ailments Service[20]

This service was introduced in order to allow patients to use the pharmacy of their choice as the first port of call for the treatment of common illnesses on the NHS. The service aims to:

- improve access for patients
- promote care through the community pharmacy setting
- transfer care from GPs and nurses to pharmacists where it is appropriate
- help address health inequalities
- assist the primary care team to achieve their 48 hour access commitment

A pharmacist can provide advice, treatment or a referral to another health care professional according to the patients' needs.

Public Health Service[21]

The Public Health Service aims to:

- promote self care
- make use of window/frontage and/or display space in pharmacies to promote health
- provide access to appropriate health education information, materials and support
- encourage a more pro-active approach to self care and health promotion
- offer opportunistic interventions to promote health
- provide a rolling programme of pharmacy based health promotion activities

The role of community pharmacy contractors and their staff in public health would be further developed through:

- providing a health promoting environment in their Community Pharmacies
- promoting healthy lifestyles
- offering opportunistic interventions in areas such as alcohol, self care, smoking cessation and sexual health services, Chlamydia screening and emergency hormonal screening

Chronic Medication Service[22]

This service allows patients with LTC to register with a community pharmacy of their choice for the provision of pharmaceutical care as part of a shared agreement between the patient, community pharmacist and GP. It introduces a more systematic way of working and formalises the role of community pharmacists in the management of individual patients with LTCs in order to assist in improving the patient's understanding of their medicines and optimising the clinical benefits from their therapy.

The new pharmacy contracts in Scotland provide an opportunity to develop the contribution of the community pharmacist to management of LTCs. The new contracts for community pharmacy are part of a wider programme to modernise primary care contracts.[23]

Community pharmacy has several strengths that make them highly usable for speaking to patients: Acceptable to patients, well-located, increased coverage, skilled and willing, and cost-effective.
There are five key activities that the pharmacists can perform for people with LTCs: Case finding, monitoring and information review, structured education, medication review, and therapy management and prescribing. [24]

1.3.4 Pharmacist led medication review

Medication review has been defined as a "structured, critical examination of a patient's medicines with the objective of reaching an agreement with the patient about treatment, optimising the impact of medicines, minimising the number of medication-related problems, and reducing waste." [25] Medication reviews can be divided in four levels: Level 0 which is ad hoc; an unstructured opportunistic review, Level 1 which is prescription review; a technical review of a list of patient's medications, Level 2 which is treatment review; a review of medicines with patient's full notes but not necessarily with the patient present, and Level 3 which is clinical medication review; face-to face review of medicines and condition with the patient. [26]
On the other hand, "Medicines use review" describes what accredited community pharmacists conducts in England, which is "a structured concordance centred review with patients receiving medications for long-term conditions, to establish a picture of their use of the medicines – both prescribed and non-prescribed. The review will help patients understand their therapy and it will identify any problems they are experiencing along with possible solutions." This review resembles Level 3 medication review, except

from the fact that community pharmacist don't have access to the patient's clinical notes. [26]

A few studies have been performed in the UK but the results are mixed.[27] One article states that the most successful interventions have been delivered by small numbers of pharmacists working in close liaison with primary care physicians.[27] One study in a general practice demonstrated that a suitably trained pharmacist can conduct consultations with elderly patients to review them, their medicines and the conditions for which they were prescribed. This intervention resulted in a greater coverage of medication review and more interventions than if the pharmacist was not involved. The common approach in this study was an agreement between the pharmacist and GP regarding the level of intervention that the pharmacist could make without seeking prior approval. The pharmacist usually initiated minor changes to the drug treatment without referring to the GP. [28]

A review of randomised trials involving patients with heart failure concludes that pharmacist care in the treatment of patients with heart failure greatly reduces the risk of all-cause and heart failure hospitalisations. The article states that pharmacist collaborative care leads to greater reductions in the rate of heart failure hospitalisations than pharmacist-directed care. There were no significant differences between the two types of intervention regarding effect on mortality or rate of all-cause hospitalisations.

Pharmacist-directed care is defined as pharmacist-initiated and managed intervention while pharmacist collaborative care is when the pharmacist is part of a multidisciplinary team. [29] The belief persists that carefully targeted medication reviews do benefit some patients, despite the lack of supporting evidence in unplanned hospital admissions records. [30]
In the anticipatory care service, the pharmacist is part of the multidisciplinary team (which also includes nurses and GPs), and report back to the GP about recommendations and findings at the medication review.

1.3.5 Recording patient information

At this moment pharmacists have several places where they can record and obtain information about the patient, although access is obtained only from the general practice surgery. General Practice Administration System for Scotland (GPASS) [31], Scottish Care Information (SCI) Store [32] and Care Needs Assessment Package (Carenap) [33] are some examples. GPASS is the clinical record system used in general practice and contains patient demographics, electronic hospital referrals, access to laboratory results in addition to entering clinical notes and health values. SCI Store contains information about patients and results information. It is used by clinicians for sharing patient information within and between NHS Boards. 'Carenap' is a patient assessment tool and is used to assess individuals' needs. The assessment is divided into the Basic Information Sheet and the Needs Assessment – Person.

The Basic Information Sheet contains information that can be obtained from several sources, including the patient, informal carers, records and information technology systems. The Needs Assessment is further divided into current care and supports, mobility, health, nutrition, self-care and toileting, mental health, social behaviour/community living, life skills/opportunities, maintaining the home, housing, finances and risk factors. Relevant medical history (including past and current physical, medical or mental health issues and medication), details of relevant hospitalisations or known allergies is information that will be recorded.

Currently these systems have no facility for specifically recording pharmaceutical care issues. Work is required to define the technological requirements to enable this development and therefore models of care require to be evaluated to inform this process.

1.3.6 Model of care

Previous work has been done around generating a model of multidisciplinary care for patients with type 2 diabetes mellitus [34]. A literature search around diabetes and pharmaceutical intervention/practice/model of pharmaceutical

care were performed, and the results were used to draft a multidisciplinary model of care for diabetes. The treatment cycle was initially a generic model for chronic diseases, which was further defined in a linked table that was specific for diabetes. Interviews with diabetologists, GPs and diabetic specialist nurse practitioners were performed and a focus group meeting with community pharmacists was held in order to receive perspectives and comments. The feedback resulted in a revised model of care.

The generic model and the linked table formed the basis for development of a model for heart failure in the current project.

1.4 Heart failure

1.4.1 Aetiology

Heart failure (HF) can be caused by an abnormality in cardiac structure, function, rhythm, or conduction. In developed countries ventricular dysfunction is the most common underlying problem, and can result from myocardial infarction (systolic dysfunction), HT (diastolic and systolic dysfunction), or in many cases both. In other parts of the world, rheumatic valve disease, Chagas' disease, and endomyocardial fibrosis are more common underlying causes. [35]

HF has previously been classified as either low-output or high-output failure, where low-output failure predominates. Low-output failure is characterised by a decreasing volume of blood that is being pumped by a weakened heart in patients who have otherwise normal metabolic needs. Low-output failure is divided into left ventricular, right ventricular and biventricular failure. Since the left ventricle is the major pumping chamber of the heart, left ventricular failure is most common. Left ventricular failure is divided into systolic or diastolic dysfunction, where systolic is more common. Left ventricular systolic dysfunction (LVSD) is almost always caused by factors causing the heart to fail as a pump (generalised cardiomyopathy secondary to ischemic heart disease, damage to heart muscles or valves after myocardial infarction (MI),

persistent arrhythmias, poststreptococcal rheumatic heart disease, chronic alcoholism, viral infections or idiopathic causes). [36]

In diastolic dysfunction the cardiac muscle function is not impaired. Possible causes include coronary ischemia, HT, left ventricular wall scarring after an MI, ventricular wall hypertrophy, hypertrophic cardiomyopathy, constrictive pericarditis, restrictive cardiomyopathy, and valvular heart disease. [36]

In high-output failure the heart itself is healthy and often pumps a normal or even higher than normal volume of blood. Because of high metabolic demands caused by other underlying medical disorders (e.g., hyperthyroidism, anaemia), the heart becomes exhausted from the increased work load and eventually cannot keep up with the demand. The primary treatment of high-output failure is improvement of the underlying disease. [36]

HF can be acute, as the consequence of an acute cardiac event such as an MI) or chronic, which is most common in the GP practice. [35] HF can be classified according to the extent of symptoms (New York Heart Association classification [37]) and the different classes are summarised in table 1.

Table 1. New York Heart Association (NYHA) classification of functional status of the patient with heart failure

Class	Symptoms
I	No symptoms with ordinary physical activity (such as walking or climbing stairs)
II	Slight limitation with dyspnoea on moderate to severe exertion (climbing stairs or walking uphill)
III	Marked limitation of activity, less than ordinary activity causes dyspnoea (restricting walking distance and limiting climbing to one flight of stairs)
IV	Severe disability, dyspnoea at rest (unable to carry on physical activity without discomfort)

1.4.2 Epidemiology of heart failure

The Hillingdon Heart Failure Study that was performed in 1998 found a crude incidence rate of 140 per 100,000 (0.14 %) for men and 120 per 100,000 (0.12 %) for women. There are about 38,000 new cases in men and about 30,000 new cases in women each year in the UK. The incidence increases in the elderly, and is more common in men than in women.

Over 2% of the patients screened in the Heart of England study in West Midlands had definite HF (3 % of men, 1.7 % of women), and probable HF was seen in around a further 1 % of patients.

In 2001 around 11,500 deaths due to HF were recorded in the UK, and the actual number is likely to be a lot higher.[38] The same year it was estimated that there were over 100,000 admissions each year due to heart failure in the UK which accounted for approximately 5 per cent of all adult admissions to a medical ward. [39]

1.4.3 Lifestyle modifications

- *Exercise training and rehabilitation programmes*

Patients with HF should be encouraged to adopt regular aerobic and/or resistive exercise. This may be more effective when part of an exercise programme or a programme of rehabilitation

- *Smoking*

Patients must be strongly advised not to smoke. Referral to smoking cessation services should be considered

- *Alcohol*

Patients with alcohol-related HF should abstain from drinking alcohol. Healthcare professionals should discuss alcohol consumption with the patient and tailor their advice appropriately to the clinical circumstances

- *Diet and nutrition*

The evidence base for diet and nutrition for patients with HF is limited

- *"Natural" supplementary therapies*

No recommendations are made

- *Sexual activity*

Healthcare professionals should be prepared to broach sensitive issues with patients, such as sexual activity, as these are unlikely to be raised by the patient

- *Vaccination*

Patients with HF should be offered an annual vaccination against influenza, and a one-time vaccination against pneumococcal disease

- *Air travel*

Air travel will be possible for the majority of patients with HF, depending on their clinical condition at the time of the travel

- *Driving regulations*

Physicians should be up to date with the latest Driver and Vehicle Licensing Agency (DVLA) guidelines [40]

Since HF is a serious disease with high risk of hospitalisation and a relatively poor prognosis, with up to 40 % mortality within one year of diagnosis[29], it is important to address lifestyle changes in those patients at risk of developing HF and to prevent worsening in patients with established HF.

1.4.4 Treatment of heart failure

The goals of treatment are to prolong life [35] and prevent progression of the disease, thereby reducing symptoms, hospital admissions and mortality. [41]

Pharmaceutical care needs of patients with HF include both the optimal treatment to prevent exacerbations and to reduce the symptoms, but also the

need for education on the disease and the importance of adhering to their medicines.

Angiotensin Converting Enzyme (ACE) inhibitors

ACE inhibitors have been shown to have benefit on both mortality and morbidity[41], and it is well established that these drugs have beneficial effects in both the *treatment* and the *prevention* of heart failure.[42]ACE inhibitors are indicated as first-line treatment for all grades of heart failure due to LVSD, including asymptomatic patients. [37]

A common side-effect is dry cough and this is the most common reason for ACE inhibitor withdrawal. Other important adverse effects are hypotension, renal impairment and hypokalaemia. Contraindications include angio-oedema or anaphylaxis on previous exposure, pregnancy, and bilateral renal artery stenosis.[42] Appropriate dose titration, reaching target dose and monitoring for adverse effects are some of the care issues.

β-blockers

β-blockers reduce both mortality and morbidity, as well as they contribute to improving symptoms and the patient's well-being. [35]Bisoprolol, carvedilol or nebivolol should be chosen as first choice when treating patients with LVSD. [41] Bisoprolol is indicated for treatment of stable chronic moderate to severe HF with reduced systolic ventricular function. [43] Carvedilol is indicated for treatment of stable mild, moderate and severe chronic HF. [44] Nebivolol on the other hand is indicated for stable mild to moderate chronic HF in elderly patients over 70 years. [45] Some patients experience worsening of symptoms in the early phase, but this can be dealt with by reducing the dose and a temporarily increase in the diuretic dose. Because of this, it is important to have a "start low, go slow" approach, by having a low initial dose and gradually titrating it towards the target dose. [35] Patients with stable symptomatic heart failure due to LVSD should be considered for β-blocker therapy once treatment with diuretics and ACE inhibitors has been optimised.

Established contraindications include decompensated heart failure, reversible airways obstruction, advanced heart block, and symptomatic bradycardia or hypotension. [42] Pharmaceutical care issues include appropriate initial dose to avoid worsening of symptoms.

Angiotensin II receptor blockers (ARBs)

ARBs prevent the binding of angiotensin II to the receptor, and are therefore similar to ACE inhibitors regarding the effect. [35] Candesartan and valsartan are the only ARBs that are indicated for use in heart failure in the UK. [46] Even though the effect is similar as to the ACE inhibitor, ARBs don't have cough as a side effect. Therefore if a patient is experiencing cough from an ACE inhibitor, an ARB should be tried instead. If a patient is on an ACE inhibitor and a β-blocker and is still symptomatic, candesartan may be added on the initiation of a specialist. [41] The addition reduces cardiovascular mortality and hospital admissions for HF and improves symptoms and well-being. [35]

Aldosterone antagonists

Aldosterone antagonists are recommended for patients with heart failure in NYHA class III or IV, even though they are treated with an ACE inhibitor and β-blocker.[35] Spironolactone is indicated in the UK for use in HF. [46]For patients that experience side effects from spironolactone, or that has suffered from an MI, eplerenone might be used instead. [41] Some of the side effects from spironolactone are gynaecomastia, hyperkalaemia and renal dysfunction. Monitoring of blood urea, creatinine and electrolytes are essential during therapy. [41]

Diuretics

Diuretics relieve both oedema and dyspnoea, by reducing the fluid retention in the body. In most cases a loop diuretic is chosen, but if the fluid retention is quite small a thiazide might be sufficient. [41]Diuretics increase sodium and chloride excretion which leads to a decrease in fluid retention.[41]The dose is kept to the minimum dose needed in order to remove any excessive fluid, so

that electrolyte disorders, gout, and renal dysfunction are avoided. [35] Monitoring of electrolytes and renal status is essential.

Digoxin

Digoxin can be used in addition to β-blocker in patients with atrial fibrillation, to control the heart rate when β-blocker therapy is being initiated or uptitrated. When added to an ACE inhibitor, no survival benefit was seen but it reduced the risk of admission to hospital with worsening HF. [35]Digoxin should be used as add-on therapy in patients with HF and sinus rhythm that are still symptomatic after optimum therapy (ACE inhibitor, β-blocker, ARB/aldosterone antagonist) [41] It is important to avoid toxicity, and this could be done by measuring blood digoxin concentrations.[35]

The treatment algorithm for heart failure [35] is summarised in figure 2 below, and the summary of the use of major drug classes [41] is found in table 2 below.

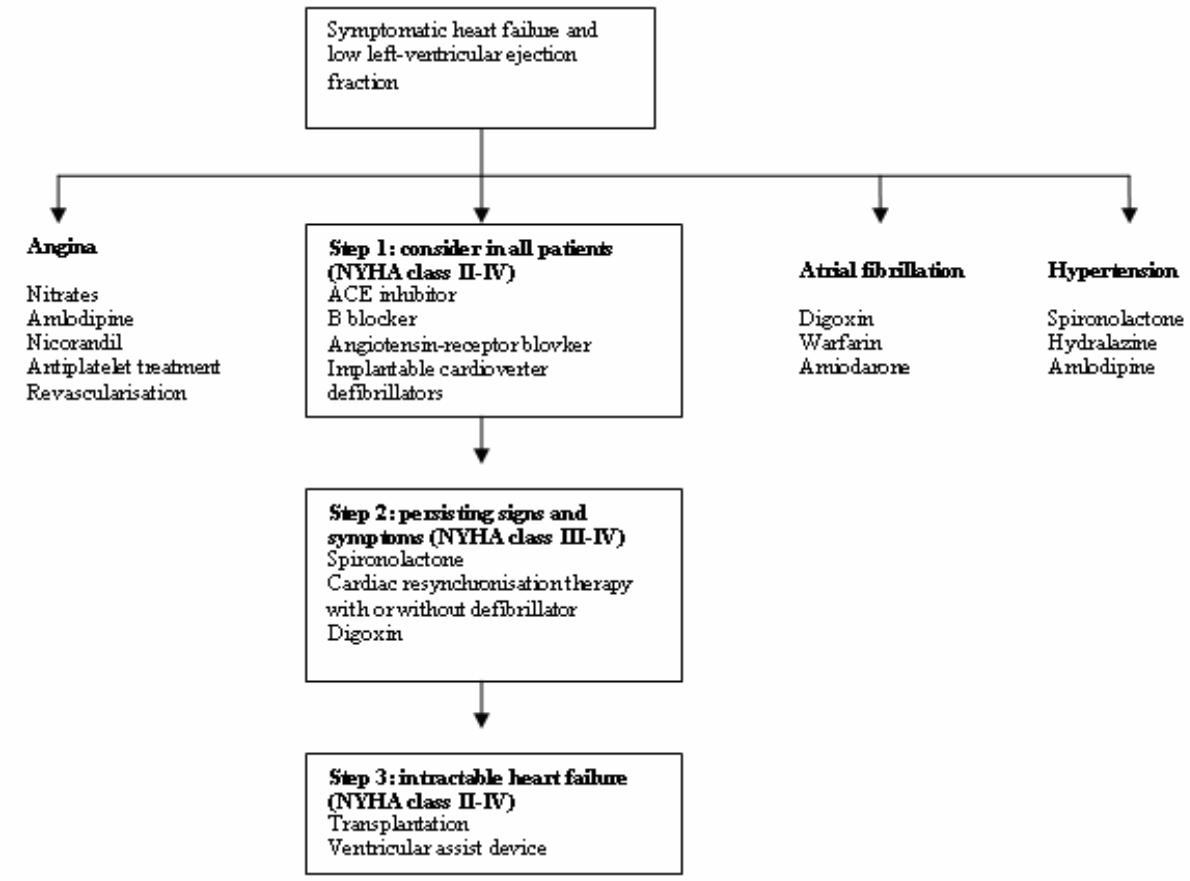

Figure 2. Treatment algorithm for patients with heart failure and reduced left-ventricular systolic function

Table 2. Summary of use of major drug classed for treatment of heart failure

Class	Prescribe
NYHA I	ACE inhibitor
	β blocker
NYHA II – III	ACE inhibitor
	β blocker
	candesartan (initiation requires specialist advice)
NYHA III – IV	ACE inhibitor
	β blocker
	spironolactone (initiation requires specialist advice)

1.4.5 Role of pharmacists in HF

Studies have shown various outcomes regarding pharmacist intervention on hospital admissions in heart failure patients. A review article that was published in 2008 by Koshman et al [29] concluded with the fact that having the pharmacist in the team that cared for the patient led to greatly reduced risk of all-cause and HF hospitalisations. Studies showed that pharmacist collaborative care led to greater reductions in the rate of HF hospitalisations than pharmacist-directed care. So for the benefit of the patients, it's better if the pharmacist is a part of the multidisciplinary team rather than providing care on their own. The pharmacist provided medication recommendations, education and compliance assessment.

The PHARM study [47] which was included in the review article showed a positive outcome when having a clinical pharmacist as part of the multidisciplinary team. The pharmacist intervention led to a reduction in hospitalisation or emergency department visits for heart failure. A randomised clinical trial performed in Spain by López Cabezas el al[48] also included in the review showed that performing patient education by a pharmacist after discharge reduced the number of new admissions in patients with HF, the total days of hospital stay and improved treatment compliance.

But on the other hand, in the HeartMed randomised controlled trial[49] which was mentioned in the review, that specific community pharmacist intervention did not reduce the number of hospital admissions. So after reviewing some of the available literature, the conclusion is that the results vary. Some studies show positive outcomes while others don't. Patient education on both the disease and their medicines is crucial in order to keep the patients out of hospital. Not taking their medicines as prescribed is one of the most common causes of hospitalisation in patients with HF. [47]

Many of the trials that have been conducted on heart failure interventions have involved specialist nurses, and most of them are done outside the UK. [49] One randomised controlled trial that was performed in Glasgow showed that specialist trained nursed can improve the outcome of patients admitted to hospital with HF. [50] There are few HF nurses in the UK, so it is difficult to provide the same service as in Glasgow. [49]

In the present study the pharmacists have just recently joined the IMPACT anticipatory care team as a pilot to perform medication reviews. They go out and see patients that have been referred to them, go through their medicines and offer suggestions to the GP regarding changes.
The documentation that the pharmacists use at this point is a general pharmaceutical care plan. This could be further developed to include prompts for HF or other diseases, so that the pharmacists cover all the patients' needs when visiting them.

2 Aims and Objectives, Subject and settings

2.1 Aims

- To identify pharmaceutical care needs of patients with chronic heart failure illustrated by a case series

- To design and validate a care plan to support a standardised patient assessment

2.2 Objectives

1. To generate a model of pharmaceutical care within an anticipatory care service using chronic heart failure as an example.

2. To characterise the pharmaceutical care needs of patients with heart failure from the perspective of an anticipatory care service model

3. To formulate and validate a pharmaceutical care plan

4. To design and field test a questionnaire to evaluate patients' perceptions of the pharmacy service.

5. Present the findings as a tool kit for the specification, delivery and evaluation of pharmacy services within the anticipatory care service model

2.3 Subject and settings

Six pharmacists working in anticipatory care and secondary care in Lothian were invited to participate in a nominal group to discuss pharmaceutical needs and multidisciplinary care model. Some of them specialised in heart failure, others were interested in management of LTCs.

Planned validation of care plan and field testing of questionnaire

Inclusion criteria: patients recruited into the anticipatory care service who have had a medication review carried out by the pharmacist.

The research group consisted of the researcher (Camilla Torset Berg), fellow researcher (Stian Skogly) and supervisors (Steve Hudson, Pauline Westwood).

The nominal group involved pharmacists from primary and secondary care.

2.4 Ethics and management approval

Local approval was sought from Long Term Conditions Implementation group and the NHS Lothian pharmacy service. Advice was sought in terms of need for ethics and R&D management approval, by sending the project protocol (Appendix 1) . The study was classified as an audit, and therefore didn't need ethics approval (Appendix 2). A project summary was approved by the University of Tromso.

3 Methods

3.1 Designing a model of care

The researcher generated a theoretical care service model from a generic chronic disease management template (Appendix 3) [34]. The information was gained from interviews with an experienced nurse case manager (NCM), a lead heart failure nurse (HFN) and three pharmacists. The National Institute for Health and Clinical Excellence (NICE) and Scottish Intercollegiate Guidelines Network (SIGN) guidelines were used to identify processes of care, methods of targeting care, and methods of communication and referral. Pharmacists from both primary and secondary care were invited by e-mail to participate in a nominal group to agree the model of care. Unfortunately due to service delivery pressures they were unable to attend the meeting and an alternative method of seeking their views was sought. One-to-one interviews at a mutually convenient time were considered but due to geographical difficulties telephone interviews were considered an alternative. Participants were invited by e-mail to provide available times and contact numbers. The model of care was attached to the same e-mail. A lead HFN who visits patients in primary care was also invited to participate. Research group meetings were held before and after the planned nominal group meeting, to prepare and evaluate the meetings.

Two pharmacists and one nurse agreed to participate in telephone interviews, where only one of the two pharmacists was interviewed. Those who did not respond were asked if they would be willing to provide e-mail comments on the model of care. One pharmacist provided comment by e-mail.

Questions for each step in the model were prepared before the interviews, but they were not used as the first question (their views on the model) contributed with information and views on the complete cycle. The telephone interviews were not tape recorded, but the views of the healthcare professionals were written down during the conversation. The transcript was sent to the nurse to

make sure that it represented her views and comments. The model was modified according to the feedback (Appendix 4).

3.2 Identifying pharmaceutical care needs

Pharmaceutical care needs were identified from the care model above in terms of patients with chronic heart failure. The treatment cycle was used as a basis and for each step of the model, processes of care identified from the heart failure guidelines (SIGN and NICE) was identified to generate a list of activities that may be carried out by a health care professional. The parts of the guideline that were relevant were the ones about treatment of heart failure, monitoring, and referral for specialist advice or to cardiac support groups. The list of activities were summarised in a linked table (Appendix 5). The content in the boxes in the cycle were used as starting points when reading the guidelines. The information was evaluated if it was relevant or not by comparing the information to the definitions in the boxes. If it was relevant, it was put in the table as an activity.

3.3 Generating a pharmaceutical care plan

The researcher generated a pharmaceutical care plan (Appendix 8) using heart failure as an example. Previous care plans were used as a base (Appendix 6), together with appropriate data fields collected from a previous project.[51] The data fields were classified as either “need-to-know” or “nice-to-know”, and the “need-to-know” fields were added to the care plan. The research group had a meeting on April 6th where, amongst others, the care plan was discussed. A few additions and changes were suggested. The care plan was updated with the new fields, and an attempt to simplify it was made (Appendix 7). The care plan was then sent to the HFN for comments. Six pharmacists were invited to a nominal group meeting to discuss the pharmaceutical care plan. Invitations were by e-mail and one responded positively. The pharmacist came to the meeting, and shared views on both the care plan and model of care. The meeting was tape-recorded and transcribed (Appendix 9). Those who were unable to attend were invited to comment by e-mail. Three pharmacists provided comments by e-mail, where one of them provided a list of standardised care issues that could be included in the care

plan. An additional pharmacist provided face to face feedback. The comments were summarised in a table and divided into design, additional things to put in the tables, clarification, remove and other. The revised care plan was then sent to the HFN for comments. The intention was to ask the lead heart failure nurse to test the use of the care plan in some patients but the feedback was that this was not practical.

3.4 Evaluating the service

The researcher conducted a semi-structured interview with two patients. The patients for the interviews were identified by the NCM and appropriate consent was obtained. One of the patients interviewed had been seen by the pharmacist during a visit when she was "shadowing" the NCM at the beginning of the service, while the other patient had recently been reviewed by a physiotherapist. Both patients had met the pharmacist only on one occasion. The interviews were tape-recorded and then transcribed (Appendix 10). One of the supervisors listened to the tapes after the interviews, and made changes so that the transcripts were correct. Tapes were destroyed following transcription.

The ideas and prompt questions for the semi-structured interview came from the researchers' perception of what the pharmacists wanted to know from the patient regarding the medication review. After the interviews a draft questionnaire (Appendix 11) was designed using User Defined Service Evaluation Toolkit (UDSET) [52] and other reference sources[26]. An article by Tinelli et al[53] described a service evaluation in the same field, and was used to identify statements for the questionnaire. Another draft was then designed (Appendix 12). The questionnaire was designed to obtain patient views about the service provided by the pharmacist in the anticipatory care team. The research group provided face validation of the questionnaire through review and discussion, and a final questionnaire was designed (Appendix 13). The questionnaire was piloted in two patients who had recently had a medication review and were identified by one of the pharmacists providing the service.

The cover letter was signed by the pharmacist on headed note paper of Lothian NHS, with a stamped envelope addressed to the pharmacist.

Unfortunately, an early, superseded draft of the questionnaire was mistakenly forwarded to the pharmacist and then sent to the patients. The error was due to lots of different drafts and misleading document titles within the researcher's files. The draft contained the some additional questions to those in the final questionnaire and a superseded covering letter.

3.5 Presenting the tool kit

The research group commented on and improved the model of care, the pharmaceutical care plan and the pilot patient questionnaire. These three documents were part of a pharmacy service tool kit.

The pharmacist members of the anticipatory care team commented on and helped to revise the proposals.

4 Results

4.1 Designing a model of care

4.1.1 Feedback on the cycles in the model

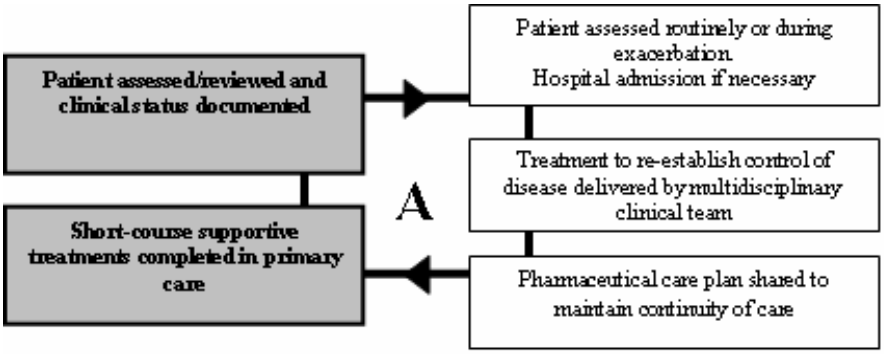

Figure 3. Box A in the model of care

Table 3. Linked table for box A

A – PATIENT CLINICAL ASSESSMENT		
Patient assessed/reviewed and clinical status documented	Patient assessed routinely or during exacerbation. Hospital admission if necessary	• Full clinical assessment • Referral for more specialist advice[2] ➢ HF due to valve disease, diastolic dysfunction or any other cause except LVSD ➢ One or more co-morbidities (e.g. COPD/asthma, renal dysfunction, anaemia, thyroid disease) ➢ Angina, atrial fibrillation, other symptomatic arrhythmia ➢ Women who are planning a pregnancy/are pregnant ➢ Severe HF ➢ HF that doesn't respond to treatment as discussed in the guideline and outlined in the treatment algorithm ➢ HF that can no longer be managed effectively in the home setting • One pneumococcal vaccination and an annual influenza vaccination[1]
Short-course supportive treatments completed in primary care	Treatment to re-establish control of disease delivered by multidisciplinary clinical team. Pharmaceutical care plan shared to maintain continuity of care	• E.g. Sublingual /oral nitrate preparations (for angina), colchicine/short course of prednisolone (gout)[1] • Pharmaceutical care plan communicated to the primary care team, so that the primary care team, patient and carer are aware of the management plan[2]

HFN: "patient isn't diagnosed by GP. GP can suspect heart failure, and send them to the cardiologist (diagnosed by echocardiogram). Cardiologist would do the clinical assessment, and start drug therapy. Other short-course supportive treatments: increase diuretics for 3-4 days. Short course of prednisolone for gout isn't given in HF. Should mention drug therapy in box A,

start on ACE-inhibitor and β-blocker. Should mention treatment plan in this box as well. Move short-course supportive treatment further down. There are different types of HF, clarify what type of HF → LVSD or not. Different treatment for different subcategories of HF "

Pharmacist 1 (P1): "Pharmaceutical care plan isn't shared with primary care, just in specific cases. The only thing that is transferred is the drug list. Patients don't usually have a care plan when they go into hospital. The patient gets a care plan in hospital, that stays there"

Pharmacist 2 (P2): "patient assessed / reviewed and clinical status documented" - I wondered who was to do this, was it by the cardiologist, by GP". - "Pharmaceutical care plan shared", yet in cycle B the Pharmaceutical care plan is designed? - Surely it needs to be designed before it can be shared?"

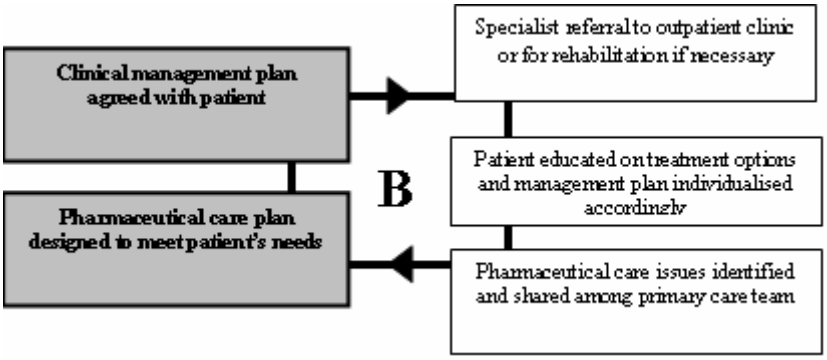

Figure 4. Box B in the model of care

Table 4. Linked table for box B

B – TREATMENT PLANNING		
Clinical management plan agreed with patient Pharmaceutical care plan designed to meet patient's needs	Specialist referral to outpatient clinic or rehabilitation if necessary Patient educated on treatment options and management plan individualised accordingly Pharmaceutical care issues identified and shared among primary care team	• E.g., Social work, patient cardiac support groups[1] • Anticipatory care plan produced, includes guide to recognising symptoms (e.g. infection) and what action to attend. Educating patients and their carers about their medicines to improve adherence[2] • Regimen and advice on monitoring and agreed individualised targets documented in a care plan and given to the patient. Care plan transferred to GP and a nominated community pharmacist[3]

P1: “usually GP that refer to an outpatient clinic, unless the patient was at a cardiac/heart failure clinic (then the pharmacist could do it). Where does it fit in? Where in primary care? (pharmacist with GP practice, community pharmacist, pharmacist at cardiac/heart failure clinic, supplementary prescriber, part of chronic disease management team)”

P2: "care plan transferred to nominated community pharmacy" - would this affect patient's ability to change pharmacies (e.g. moving to a different area, or if one pharmacy unable to start a dosette box, etc).

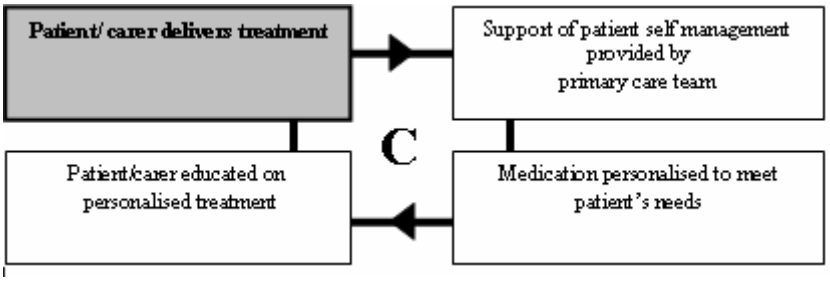

Figure 5. Box C in the model of care

Table 5. Linked table for box C

C – TREATMENT ADMINISTRATION		
Patient / carer delivers treatment	Support of patient self management provided by primary care team	• Carers and relatives of patients who are cognitively impaired should be made aware of treatment regimens for the patients they care for and be encouraged to identify any need for clinical support
	Medication personalised to meet patient's needs	• Simplifying the dosage regimen is important in improving adherence with treatment.[2] Medication regime should follow the recommendations, if not contra-indicated (e.g. co-morbidities as COPD/renal dysfunction etc)
	Patient / carer educated on personalised treatment	• Educated on lifestyle modifications[1] - refrain from excessive alcohol consumption - strongly advised not to smoke - promote regular low intensity physical activity

P2: "support of patient self management provided by primary care teams" - in NHS Lothian there are Intermediate care groups that work across the primary and secondary care interface. "Carers and patients who are cognitively

impaired" - why restrict info to just this group, what about carers and patients that aren't cognitively impaired? Not all patients will be cognitively impaired, so I just wanted to make sure why that was specified. Even patients that aren't cognitively impaired might not be very good with their medicines. "Education on treatment, and education on lifestyle modifications", in my opinion, are two different issues. I would have said that lifestyle modifications were an intervention rather than a treatment

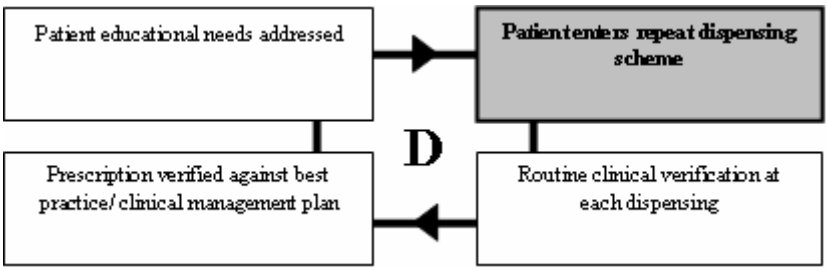

Figure 6. Box D in the model of care

Table 6. Linked table for box D

D – PATIENT TREATMENT MONITORING		
Patient enters repeat dispensing scheme	Routine clinical verification at each dispensing Prescription verified against best practice/ clinical management plan Patient educational needs assessment	• Pharmacist conducts opportunistic checks of patient-held records and pharmacy patient medication records at each dispensing[3] • Pharmacist conducts opportunistic check of individualised agreed targets set with the patient[3] • Prescription checked for adherence to disease management guidelines and patient's individualised management plan[3]

P2: "Pharmacist conducts opportunistic check of individualised agreed targets set with the patient"- is it just the wording that you've taken or the actual process you've taken from the reference. It wouldn't be the targets would it, because I suppose it would be different between diabetes and heart failure

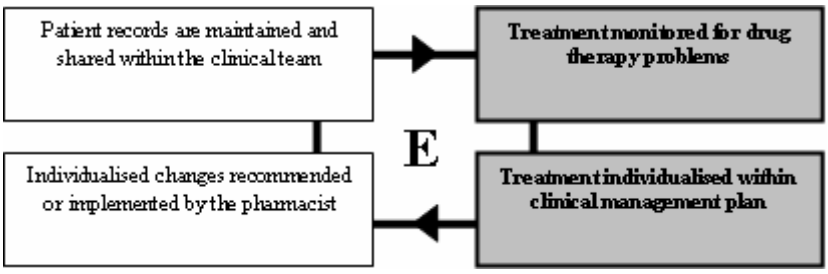

Figure 7. Box E in model of care

Table 7. Linked table for box E

E – PATIENT CLINICAL MONITORING		
Treatment individualised within clinical management plan Treatment monitored for drug therapy problems	Individualised changes recommended or implemented by the pharmacist Patients records are maintained and shared within the clinical team	• A clinical assessment of functional capacity, fluid status, cardiac rhythm, cognitive status and nutritional status. A review of medication, including need for changes and possible side effects. Laboratory assessment (serum urea, electrolyte and creatinine). Thyroid function, haematology, liver function, level of anticoagulation and serum potassium may be required depending on the medicine prescribed and co-morbidity[2] • Identification of drug therapy problems according to classification[4] ▪ Additional drug therapy ▪ Unnecessary drug therapy ▪ Wrong dose ▪ Dosage too low ▪ Adverse drug reaction ▪ Dosage too high ▪ Compliance

P2: "individualised changes recommended or implemented by pharmacist" - only if pharmacists are qualified prescribers? “There would be some changes possible by a non prescribing pharmacist”. "Clinical assessment of functional capacity, fluid status, etc" - would that be done by the pharmacist?

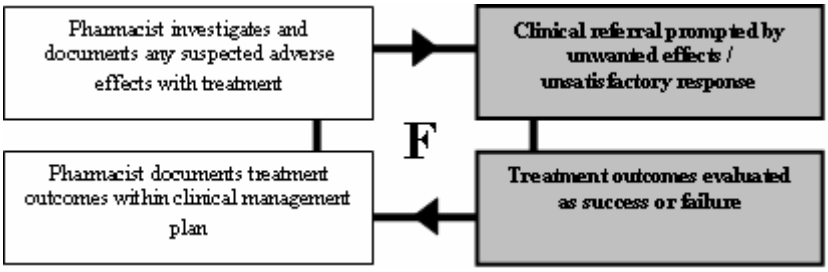

Figure 8. Box F in the model of care

Table 8. Linked table for box F

F – TREATMENT EVALUATION		
Treatment outcomes evaluated as success or failure	Pharmacist documents treatment outcomes within clinical management plan	• Confirmation of satisfactory achievement sought and documented. Failure to reach targets addressed by referral for clinical review[3] • Common side effects: *ACE-inhibitor* — cough, hypotension (including postural), renal impairment, hyperkalaemia, angio-oedema *β-blocker* — tiredness, bradycardia, coldness *AII blocker* — not licensed for use in heart failure in the UK. Hypotension and reversible renal dysfunction the most common serious side effects *Aldosterone antagonist* — spironolactone: gynaecomastia, hyperkalaemia, renal dysfunction (careful monitoring of blood urea, creatinine and electrolytes essential), tiredness, rashes *Diuretics* — postural hypotension, gout, urinary urgency, dehydration (risk of renal dysfunction or hypotension), hypokalaemia, hyperkalaemia *Digoxin* — nausea, arrhythmias, gastrointestinal side effects[2]
Clinical referral prompted by unwanted effects/unsatisfactory response	Pharmacist investigates and document any suspected adverse effects with treatment	

P2: "pharmacist investigates & documents any suspected adverse effects of treatment" - this should be ongoing process that could happen at any stage really

4.1.2 General feedback on the model

Some of the general feedback that was received on the model of care was that it was a little bit confusing, quite a complicated model to follow, a very theoretical cycle, not the correct order of how things are done according to the management of heart failure, maybe it should be simplified with less boxes, and a complicated way of doing things with the model with the linked table. The model should be simplified so that you don't have to scroll down to read the information in the table, so maybe putting the information into the boxes.

After speaking to the pharmacists it became clear that some of the boxes represent actions that aren't happening at the moment. For example the patient isn't diagnosed by the GP (but can suspect HF and refer the patient to a cardiologist), the pharmaceutical care plan isn't shared between secondary and primary care to maintain continuity of care, the pharmacist isn't performing specialist referral to outpatient clinic or for rehabilitation if necessary, and the patient hasn't entered repeat dispensing scheme. So if the making if this cycle says something about where in the NHS more work has to be done to support the multidisciplinary care of patients with long term conditions, these four areas need to be dealt with. The latter is in progress because of the new pharmacy contract. In the new contract this service is called Chronic Medication Service, so this term has been added to the model of care in order to clarify things.

4.2 Identification of pharmaceutical care needs

The SIGN and NICE guidelines on heart failure were used to identify activities for each step of the cycle, and from that the linked table was produced (Appendix 5). The definitions in the table were adapted from a previous project. [34] After the feedback from the nurse and the pharmacist, the linked table was slightly modified. Activities irrelevant for HF were taken out, and some of the terminology was changed to better represent the current activities.

4.3 Generating a pharmaceutical care plan

A pharmaceutical care plan from a previous project that was done in diabetes was used as a template. The diabetes fields were taken out, and replaced with heart failure fields. The recommendations in NICE and SIGN guideline were used to identify the top 10 guideline criteria, to make sure that the most important fields were represented in the care plan.

The research group made suggestions for changes/additions. The care plan was updated with the new fields, and an attempt to simplify it was made. The care plan was reviewed by a lead heart failure nurse in secondary care and two pharmacists. A third pharmacist contributed with examples of standardised care issues that they expected to be in the care plan (see below), while a fourth pharmacist provided comments face to face. All of the comments were summarised in a table and divided into design, additional things to put in the tables, clarification, remove and other.

General feedback was that it would be unpractical to use such a specific care plan in anticipatory care where the patients have multiple diseases.

4.3.1 Feedback care plan

Design:

- Put other medical history somewhere near the top beside the cardiac history
- Under drugs put a bit in for dose of drug
- Dosing frequency
- Date for the echocardiography, EF% and NYHA class
- Move BP & pulse so that it is not mixed in with the blood results
- Limited space for IHD/past MI
- Limited space for drug treatment

Additional things to put in the tables:

- Put pulse in beside BP, necessary for beta blocker

- Put all renal function tests together (urea, creatinine, sodium, potassium & eGFR)
- Would recommend putting in glucose
- List LFT's like your U&E's (bilirubin, ALT, alk phos, GGT, albumin)
- Space for serial weights rather than BMI's or as well
- A space for pack years under smoking status
- Record Haemoglobin, WBC and platelets, CO_2
- Possibly just have one column with pharmaceutical care issues, rather than dividing it into two
- Digoxin levels
- Lab references would be useful as most people are not familiar with them all
- Salt/exercise
- Cholesterol values

Clarification:

- Maybe need to clarify what you mean by mild/moderate exercise → NYHA would be more appropriate
- Clarify TFT's to TSH & T4
- Specific about the ACE I/ARB, diuretics, statin, calcium channel blocker
- AF/Valve probably needs to be AF/flutter and Valve separately

Remove:

- Don't think you need magnesium
- Not sure why you have microalbuminuria
- CO_2 wouldn't be measured in primary care

Other:

- Spelling mistake: isosorbide

4.3.2 Examples of Standardised Care Issues

- Confirm medication history and allergy status
- Evidence based treatment according to severity of disease e.g. NYHA classification
- Diuretic therapy
    - Appropriateness of dose
    - Route of administration
    - Monitoring needs
    - Response to therapy
    - Maintained on same dose for 48 hours before discharge
- ACE inhibitors/ARBs
    - Choice of ACEI/ARB – evidence based
    - Target dose
    - Cautions and contraindications
    - Monitoring needs
    - Slow titration
- Beta-blockers
    - Choice of Beta-blocker – evidence based
    - Target dose
    - Cautions and contraindications
    - Monitoring need
    - Slow titration
- Digoxin
    - Indication
    - Kinetics
    - Monitoring need
- Heart failure cautions and contraindications
    - E.g. diltiazem – pulmonary congestion, nitrates – AS, glitazones etc.
- Thromboprophylaxis
- Aldosterone antagonist
    - Indication

    - Monitoring need
- AF
    - Warfarin vs. aspirin
    - Warfarin
        - Monitoring need
        - Counselling
        - Interactions
- Prophylactic vaccines
- Counselling needs
- Seamless care provision

4.4 Evaluation of the service

After the semi-structured interview the transcripts (Appendix 10) were compared and similarities between the two patient's views and comments were summarised. The researcher wasn't provided with anything more information than the diagnosis and age.

Similarities between patient 1 and 2:

- felt that they already had enough information about their medicines
- had changes made to their medicines, one of which was recommended by the pharmacist
    - no 1: change because the patient didn't like the medicine
    - no 2: pharmacist picked up that the patient was on two diuretics
- felt the same about their medicines after as they did before the pharmacist's visit - just as confident as before
- didn't know about the purpose of the visit, didn't know who the pharmacist was

- o didn't remember the medication review

- o difficulty in distinguishing between HCPs (health care professionals) (respiratory nurse/physiotherapist)

- o willing to have the pharmacist come and see them
  No 1: "anything's worth a try"
  No 2: "… if she's going tae help in any way, then why not eh?.."

There were different perceptions between health care professionals and patients. For example the HCPs reported that the pharmacist explained how to use the medicine properly, but the patient did not remember this. There were also differing perceptions between HCPs. For example one of the patients interviewed had been seen by the pharmacist during a visit when she was "shadowing" the NCM at the beginning of the service, The pharmacist would not have identified this as a patient who had received the medication review service, whereas the NCM did.

The questionnaire was sent out to two patients, but no response was received before the deadline.

4.5 Presenting the tool kit

One of the pharmacists in the anticipatory care service made comments on both the model of care and pharmaceutical care plan.
Some of the comments about the care plan were positive (it was a good form, would in one way be helpful because you could pass on a lot of information by photocopying the first page) but on the other hand, the overall opinion was that it wasn't practical since it focuses on just one disease.

5 Discussion

5.1 Principal findings

The model of care is, as stated, just a model. Ideally it would show the ideal situation regarding the multidisciplinary care of patients but the practitioners did not think the model reflected current practice both in terms of heart failure management and the processes of care. Processes of care involving multidisciplinary teams are complex and evolve around local needs and established systems, therefore the model could be used as a basis to develop toolkits to suit local requirements as opposed to imposing a structure on already established processes of care. Comments and suggestions from health care professionals were used to modify the model.

One way of making the model of care more usable and less complicated to follow, is to simplify the cycles into just one box for each cycle or less.

The care plan was considered too specific for use in the anticipatory care service. It would be more suitable in secondary care or used by a pharmacist working with HF (for instance in a HF clinic). As with all specialist care plans, there is a need to define pharmaceutical care needs and in the future technology should allow pharmaceutical care needs associated with all co-morbidities to be integrated through computerised care plans.

The questionnaire was sent out, but no response was received before the deadline of the dissertation.

5.2 Strengths and limitations

Model of care

One of the reasons to why the healthcare professionals felt that the model was too theoretical and too complicated to follow was that it might not have been explained properly to them. A short text as to how to understand the model were provided in the e-mails, but this might not have been enough. In addition the comments and feedback was mostly around how things are managed at the moment rather than thinking about how things may be done in the future.

The researcher's limited experience in performing interviews may be one of the reasons for this particular feedback. These sorts of comments weren't expected and therefore it was difficult to come up with other questions that could lead to them thinking about how the service might develop, when the feedback only focused on the current situation. So it might have been easier to have them comment on how they envisage the patient care in the future, instead of only asking them about the generated model of care.

It may have also have helped if a group discussion was held instead of individual interviews. The advantages of having a nominal group is that you get multiple views on things, and one person's views and thoughts can inspire others in thinking in a different manner. This method takes a lot of time, because the participants most often have to travel to where the meeting is held, and group discussions always takes time so that all the participants gets to share their views. Telephone interviews and one-to-one interviews is less time-consuming, but then you don't get the group discussion. One-to-one interviews can be useful to observe facial expressions etc that you would miss over the phone, which could tell a lot about the patient's opinions.

In the previous work that this model is based on [34], one of the discussion points that health care professionals came up with after considering the initial generic model was about simplifying it. The model was then summarised in

five boxes, and the linked table was taken out. That approach makes the model much more understandable and user-friendly. It might have been an idea for this project as well, if there was enough time to do it.

Pharmaceutical care plan

The benefits of having a structured pharmaceutical care plan is that a lot of information is gathered in one place, the pharmacists will check the important things regarding the disease, they can document everything they do regarding for instance change in medication therapy, and other pharmacists/health care professionals who see the patient will know what the pharmacist has done.

Feedback was received by five pharmacists, and the care plan was changed accordingly. One of the pharmacists working in secondary care received a list of examples of standardised care issues that could be included from a pharmacist working in the cardiac wards, which was sent to the researcher. This list was provided because it was expected from them that the care plan would contain that type of care issue in addition to the blank fields. Most of the feedback that was received on the care plan was around the order and layout of the boxes and also quite a few comments on additional and unnecessary laboratory results. There was also disagreement between the pharmacists in primary and secondary care around which fields in the care plan were necessary. Information about e.g. echocardiography and ejection fraction, NYHA class and some of the lab results (e.g. heart rate, blood pressure) is something that the pharmacists in anticipatory care wouldn't have access to.

Because of the limited time, the care plan wasn't changed to include the standardised care issues but this is something that could be added if the care plan is to be further developed. Another weakness of the care plan is that it's not really usable in the anticipatory care service. The people that are in the service have a lot of diseases, and therefore it is not practical to use a disease specific care plan.

If the care plan is to be used by a pharmacist in a GP practice, almost all of the information is available on the computer from GPASS or SCI Store. The only thing that wouldn't be available would be the part about "individualised care issues". On the other hand, if it was to be used by a pharmacist in the anticipatory care service, they wouldn't have access to a computer while visiting a patient. So in that context a paper pharmaceutical care plan would be useful.

Since the plan contains a lot of disease specific fields and prompts, it might be useful for training purposes e.g. for pharmacy and nurse students. It would make them more familiar with using these kinds of plans, lead to greater confidence when facing one in practice later on, and increase the possibility of integrating the care plan in both professions.

No one from community pharmacy was invited to comment on the care plan, but that could be something worth considering later on when the new pharmacy contract is in place and they have more defined roles regarding the management of patients with long term conditions.

Semi-structured interview

One of the problems encountered when executing the semi-structured interview was that the patients couldn't really remember who the pharmacist was and what she had done when she visited them. One reason for this might be that the patients have a lot of people visiting them, and that the pharmacist only visited them on one occasion. Another explanation came across after reading the transcripts from the interviews and speaking to the pharmacist that performed the medication review. The reason why the patients didn't remember the medication review was because they hadn't had a proper medication review like the other patients in the pilot. The pharmacist had visited them together with the nurse case manager to see how the case manager worked, and this was a "shadow" visit. But the case manager felt that the pharmacist had performed medication reviews when visiting the patients and that it wasn't just a "shadow" visit. The pharmacist on the other

hand, didn't agree on this. So the patients that were interviewed weren't necessarily representative of the patients that would have been referred to the pharmacist. One of them didn't really have a lot of problems and the other one had just had her medicines sorted out by the respiratory physiotherapist. In order to receive valid opinions about the review it may have been more appropriate if the pharmacist had selected the patients. Although having the pharmacist choose the patients could introduce bias, the purpose of the interview was to develop the questionnaire, so bias would not have been less of an issue.

Even though the appropriate patients weren't interviewed, the meeting was still beneficial in some way. The researcher had the opportunity to speak to a few patients, and performing an interview was a new experience. From the interview issues that were important to the patients were identified. The patient's didn't provide all of the information that the researcher hoped for, and again the limited experience with performing interviews may be one reason for this. Another reason is the fact that they hadn't had a medication review, and the pharmacist was a person they couldn't remember clearly.

Evaluating the service

Evaluation by sending out a patient questionnaire was not possible in this case. The reason for that was because the case load turned out to be considerably smaller than anticipated. Out of over a hundred patients in the anticipatory care service, the pharmacists performed only 21 medication reviews. Therefore the questionnaire would only be piloted in order to test the questions. So hopefully in the future when the numbers are higher, someone can re-develop the questionnaire and use it for service evaluation.

After the pilot the questionnaire most likely has to be modified in order to have clear and easy understandable questions. One option would be having different people having a look at it, and explaining what their perceptions of the questions are, to see if everyone has understood them in the same way.

If there are differences in understanding, the questions have to be modified accordingly.

The reason why the case load was so small has several explanations. First of all, this pilot was conducted in addition to the pharmacists' normal job so they had limited capacity to work with this pilot. Another reason was that they didn't receive as many referrals from GPs and nurses as they expected. The problems encountered with this study demonstrate the risks associated with undertaking prospective studies where sample sizes are unknown. However, the study has identified many issues which require discussion among the multidisciplinary team to clarify optimal service design.

The error in sending out the questionnaire shows that it is important to check the documents that you send and to separate the drafts from the final versions by using the right nomenclature. If this bit of the project where to be done again, the researcher would have sent out the right questionnaire at an earlier time in order to receive responses.

Several factors might contribute to not receiving the questionnaire back. First of all, the wrong questionnaire was sent out. The draft questionnaire contained a cover letter at the top, an additional cover letter was attached and the pharmacist wrote a note to the patients. This could potentially be very confusing and might lead to the patient not filling out the questionnaire.
Another thing is that the questionnaire was sent out at a very late date, so there weren't a lot of time between the sending of the questionnaire and the deadline for the project.

The results from the semi-structured interviews and the evaluation of the service clearly show that the researcher tried to assess a service that was still early in its development.

5.3 Comparison to other studies

The model of care in this project was based on previous work done in diabetes. [34] In that piece of work literature searches were performed using search terms as diabetes and pharmacist intervention/pharmacy practice/model of pharmaceutical care. Health care professionals commented on the model and the linked table. After the comments were summarised the model was modified, and the result was a figure with 5 boxes. The reason for that was that some of the comments that came up were around simplifying the model, the same kind of comments that were brought up in this project.

Other projects have been performed around designing pharmaceutical care plans in various diseases, e.g. diabetes[51], mental health[54] and elderly with cardiovascular disease[55]. Some of the feedback on the care plan was similar to those received in the mental health project. The similarities were around the pharmacists being more familiar with smaller and simpler documents, negative comments about dividing 'individualised care issues' into two columns, and that a lot of the information about the patient's history could be found elsewhere.

A pre-registration pharmacist project was undertaken in 2005/06[56], and it was an evaluation of pharmacist supplementary prescribing for patients with hypertension. They performed semi-structured interviews with patients and developed a patient satisfactory questionnaire. There was a high response rate, and 70 % of the respondents rated the service the pharmacist is providing as excellent. In addition, 64 % stated that they would prefer to have the pharmacist managing their blood pressure. The difference between this evaluation and the current project is that the patients would see the pharmacist regularly, and therefore have a clear image of who she is and what she does.

5.4 Future work and unanswered questions

For the purpose of the care model, it might be worth speaking to the patients about how the processes of care are implemented in practice. It might be worth considering the option of simplifying the model to make it easier to understand.

The pharmaceutical care plan could ideally be further developed into a care plan that is more usable, either in primary or secondary care. This could be done by receiving several pharmacists' views of the care plan, from the perspective where it is intended to be used. This would ensure that the care plan is fit for purpose. Considerations could be made regarding the addition of a checklist of relevant evidence based care issues as well as a blank table.

The pilot questionnaire can now be redesigned, and the questions might have to be clarified in order to receive consistent responses. It can hopefully be used to evaluate the medication review service when it is up and running properly.

6 Conclusion

All of the objectives for the project have been reached, except for the validation of the pharmaceutical care plan.

The initial purpose of this project was to evaluate an anticipatory care service, where patients with long term conditions had a medication review performed by a pharmacist. Since the number of patients that had been seen by the pharmacists were so low, evaluation of the service by using a questionnaire wasn't possible. Instead the questionnaire would only be piloted and in addition a model of care was generated and a pharmaceutical care plan was made.

The researcher has developed a set of tools that after some redesign and modifications can be used to support the care of patients with heart failure, and to evaluate the medication review service.

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8 Appendices

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Appendix 1

Research protocol

The design and validation of a toolkit to support pharmaceutical care in people with Chronic Heart Failure within an anticipatory care service

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1. Introduction

Long term conditions (LTC) are defined as "conditions that require ongoing medical care, limit what people can do, and are likely to last longer than one year". LTCs are common in the Scottish population, more common in people living in deprived circumstances and in older people.[1] An estimated 2 million people in Scotland live with one or more LTCs.[2] People with long term conditions are twice as likely to be admitted to hospital and experience longer hospital stays when they are admitted. [1] All NHS Boards in Scotland were required to put in place a systematic approach to caring for the most vulnerable with long term conditions with a view to managing their conditions at home or in the community and reducing the chance of hospitalisation.[3]

This included identifying those people at greatest risk of hospital admission and providing them with earlier care to prevent deterioration of health and reduce emergency admissions.[4] Better Health Better Care: An Action plan [5] introduced the Health, Efficiency, Access and Treatment, (HEAT) performance management system which sets out the targets and measures against which NHS Boards are publicly monitored and evaluated. The four key targets are: Health improvement for the people of Scotland – improving healthy life expectancy, Efficiency and governance improvements – continually improve the efficiency of the NHS, Access to services – recognizing patients' need for quicker access to NHS Services, and Treatment appropriate to individuals – ensuring patients receive appropriate services.[5]

When it comes to LTCs, there are two relevant HEAT-targets regarding treatment. The first one is that by 2008/09 the NHS will reduce the proportion of older people (aged 65+) who are admitted as an emergency inpatient two or more times in a single year by 20 % compared with 2004/05 and reduce, by 10 %, emergency inpatient bed days for people aged 65 and over by 2008. The other one is to achieve agreed reductions in the rates of hospital admissions and bed days of patients with primary diagnosis of COPD, asthma, diabetes or CHD, from 2006/7 to 2010/11.[5]

An anticipatory care model within primary care in Edinburgh was introduced last year to meet needs of people with LTC in keeping with local and national health policy and strategy.[3, 6, 7] The Edinburgh IMPACT (IMProved Anticipatory Care and Treatment) service is aimed at people with long term conditions. The aim of the service is to improve the quality of life for the patients, give support to carers and reduce preventable hospital admissions. The patients are identified through various means including SPARRA data (Scottish Patients At Risk of Readmission and Admission) and referrals from other health care professionals. SPARRA estimates a patient's risk of readmission/admission by an algorithm using the patient's demographics (age, sex, deprivation) and factors from their history of hospital admission over the 3 years prior to the year of interest[8] to identify who are at most risk of readmission to hospital.

The approach of the IMPACT service is to liaise with the multi-disciplinary team to identify patients then allocate a case manager who will assess the patient by: reviewing medication, co-ordinating services to simplify and streamline patient pathways, promoting self-care, improving carer support, advising on falls prevention and working in partnership with others to maximise the impact of clinical and social care.[9]

The model is delivered through general practice and co-coordinated by community nurses. Pharmacists have recently been included in the team to conduct medication reviews. Medication review has been defined as a "structured, critical examination of a patient's medicines with the objective of reaching an agreement with the patient about treatment, optimising the impact of medicines, minimising the number of medication-related problems, and reducing waste." [10]

A few studies have been performed in the UK but the results are mixed.[11] One article states that the most successful interventions have been delivered by small numbers of pharmacist working in close liaison with primary care physicians.[11] One study in a general practice demonstrated that a suitably

trained pharmacist can conduct consultations with elderly patients to review them, their medicines and the conditions for which they were prescribed. This intervention resulted in a greater coverage of medication review and more interventions than if the pharmacist was not involved. The common approach in this study was an agreement between the pharmacist and GP regarding the level of intervention that the pharmacist could make without seeking prior approval. The pharmacist usually initiated minor changes to the drug treatment without referring to the GP. [12] A review of randomised trials involving patients with heart failure concludes that pharmacist care in the treatment of patients with heart failure greatly reduces the risk of all-cause and heart failure hospitalisations.[13] The belief persists that carefully targeted medication reviews do benefit some patients, despite the lack of supporting evidence in unplanned hospital admissions records. [14]

An evaluation of patients who had received a medication review showed that people found a review helpful when they had a chance to contribute to it, understood its remit and felt it was something being done with them rather than to them. People gained from the review when they perceived it and experienced it as for their own benefit.[15] There is a need for structured feedback and audit to establish whether patients are benefiting from a patient-centred service. Measures of the process steps, length of reviews and patient attitudes are suggested starting points for sharing best practice.[15]

2. Research Questions

Design of a system including documentation and questionnaire tools to address

1. What are the pharmaceutical care needs of chronic heart failure patients and the role of an anticipatory care service?
2. How can the pharmaceutical needs of patients recruited into an anticipatory care service be assessed and captured in a pharmaceutical care plan?

3. Aims and objectives

Aims

- To identify pharmaceutical care needs of patients with chronic heart failure illustrated by a case series

- To design and validate a care plan to support a standardised patient assessment.

Objectives

1. To generate a model of pharmaceutical care within an anticipatory care service using chronic heart failure as an example.
2. To characterise the pharmaceutical care needs of patients with heart failure from the perspective of an anticipatory care service model
3. To formulate and validate a pharmaceutical care plan
4. To design and field test a questionnaire to evaluate patients' perceptions of the pharmacy service.
5. Present the findings as a tool kit for the specification, delivery and evaluation of pharmacy services within the anticipatory care service model.

4. Study design

The study is a semi-structured interview with patients and health care professionals and a retrospective survey of pharmaceutical care needs using a pharmaceutical care
model.

5. Subjects and setting

Health care professionals with an interest in heart failure working in anticipatory care and secondary care.
Patients with chronic heart failure recruited into an anticipatory care service

Inclusion criteria: patients recruited into the anticipatory care service who have had a medication review carried out by the pharmacist
Local approval sought from Long Term Conditions Implementation group and acute pharmacy service. Advice will be sought in terms of need of ethics and R&D management approval.

6. Methods

1. The investigator will generate a theoretical care service model from a generic chronic disease management template (Appendix 1)[16]. The information gained from an interview with an experienced nurse case manager, pharmacists, literature reviews in databases such as Medline and Embase, and national guidelines will be used to identify processes of care, methods of targeting care, and methods of communication and referral. A research group will have a meeting to redraft the model. Then this model of care will be compared with a similar model in COPD (from Stian Skogly).

2. Pharmaceutical care needs will be identified from the care model above in terms of patients with chronic heart failure. For each step of the model, processes of care identified from the evidence base for managing heart failure will be detailed to generate a list of activities that may be carried out by a health care professional. These will be presented in a linked table. Health care professionals who are interested in heart failure will be invited to participate in a nominal group. The nominal group will review and comment on the model of care, and offer suggestions for changes.

3. Generate a pharmaceutical care plan (Appendix 2) using heart failure as an example. Health care professionals who are interested in heart failure will be invited to participate in a nominal group. The nominal group will offer suggestions for changes. The care plan will then be field tested on a small number of patients by the pharmacist providing the service to the patients.

4. The investigator will design a questionnaire and pilot it in order to recommend this in the service tool kit. The investigator will conduct a semi-structured interview with 2-3 patients. The patients for the interview will be identified by the nurse case manager/pharmacist

providing the service, and appropriate consent will be obtained. A questionnaire will then be designed using User Defined Service Evaluation Toolkit (UDSET)[17] and other reference sources[14], Questionnaire will be validated/reviewed by research group and then by nurse case manager and pharmacist members of anticipatory care team and will then be piloted in 2-3 patients. A cover letter will be attached to the questionnaire. The nurse case manager will help identify patients who could be approached to participate in the pilot.

5. The research group drafts proposals for the service model, care plan and patient evaluation questionnaire to form a pharmacy service tool kit. The pharmacist members of the anticipatory care team comment on and help to revise the proposals

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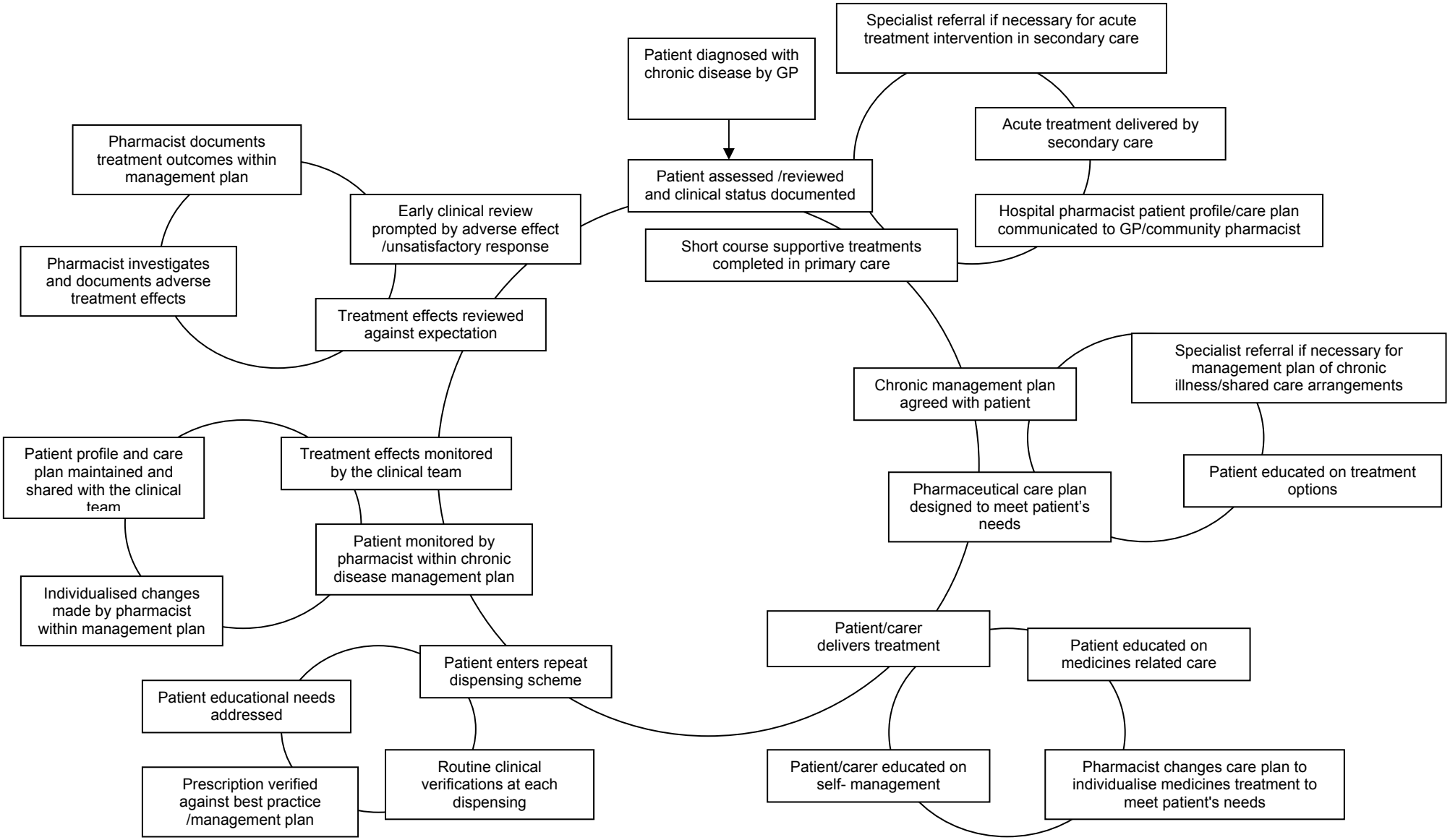
http://www.jitscotland.org.uk/downloads/1226937855-UDSETsupportpack0908[1].doc.

Appendix 1[16]



Appendix 2

Patient Name:		**Date Of Birth**	
MEDICINE STORAGE INFORMATION: Are medicines being stored correctly? Y / N			
MEDICINE DISPOSAL: Are there medicines requiring disposal? Y / N If Yes, attach			
Relevant Medical History		**Relevant Drug History**	
Date	**Current Problem**	**Date**	**Current drug therapy**

CARE ISSUE	**RATIONALE AND SUGGESTED ACTION**

Abnormal Investigation Results (eg. U&Es, FBC, INR, lipid screen, glucose, etc)			
Parameter / Date	**Parameter /**	**Parameter**	**Parameter / Date**

Further Information: (eg. relevant past medical history, relevant drug history, clinic attendance, hospital admissions)

Appendix 2

Ethics approval

South East Scotland Research Ethics Service

Deaconess House
148 Pleasance
Edinburgh
EH8 9RS
Tel: 0131 536 9067
Fax: 0131 536 9346

NHS Lothian

Name: : Pauline Westwood
Address : Teaching and Research
Lothian Pharmacy Practice Unit
Western General Hospital
Edinburgh
EH4 2XU

Date: 06/04/2009
Your Ref:
Our Ref: NR/0209AB04
Enquiries to: Alex Bailey
Extension:
Direct Line: 0131 536 9050
Email: alex.bailey@nhslothian.scot.nhs.uk

Dear Pauline,

Full title of project: The design and validation of a toolkit to support pharmaceutical care in people with Chronic Heart Failure within an anticipatory care service

You have sought advice from the South East Scotland Research Ethics Service on the above project. This has been considered by the Scientific Officer you are advised that, based on the submitted documentation (protocol version 6 CTB), it does not need NHS ethical review under the terms of the Governance Arrangements for Research Ethics Committees in the UK. The advice is based on the following:.

- *The project is an audit using only data obtained as part of usual care but note the requirement for Caldicott Guardian approval to permit sharing or publication of patient-identifiable information.*

- *The project involves NHS staff and is an audit of current or past practice concerning a healthcare issue.*

If this project is being conducted within NHS Lothian you should inform the relevant local Quality Improvement Team(s).

Please note that this advice is issued on behalf of the Research Ethics Service and does not constitute a favourable opinion or an endorsement from a Research Ethics Committee. It may be provided to journal editors, conference organisers or others who require evidence of consideration of the need for ethical review prior to publication or presentation of your results. If you wish you may still decide to apply to a REC, but note that a retrospective ethical opinion cannot be given.

You should retain a copy of this letter with your project file as evidence that you have sought advice from the South East Scotland Research Ethics Service.

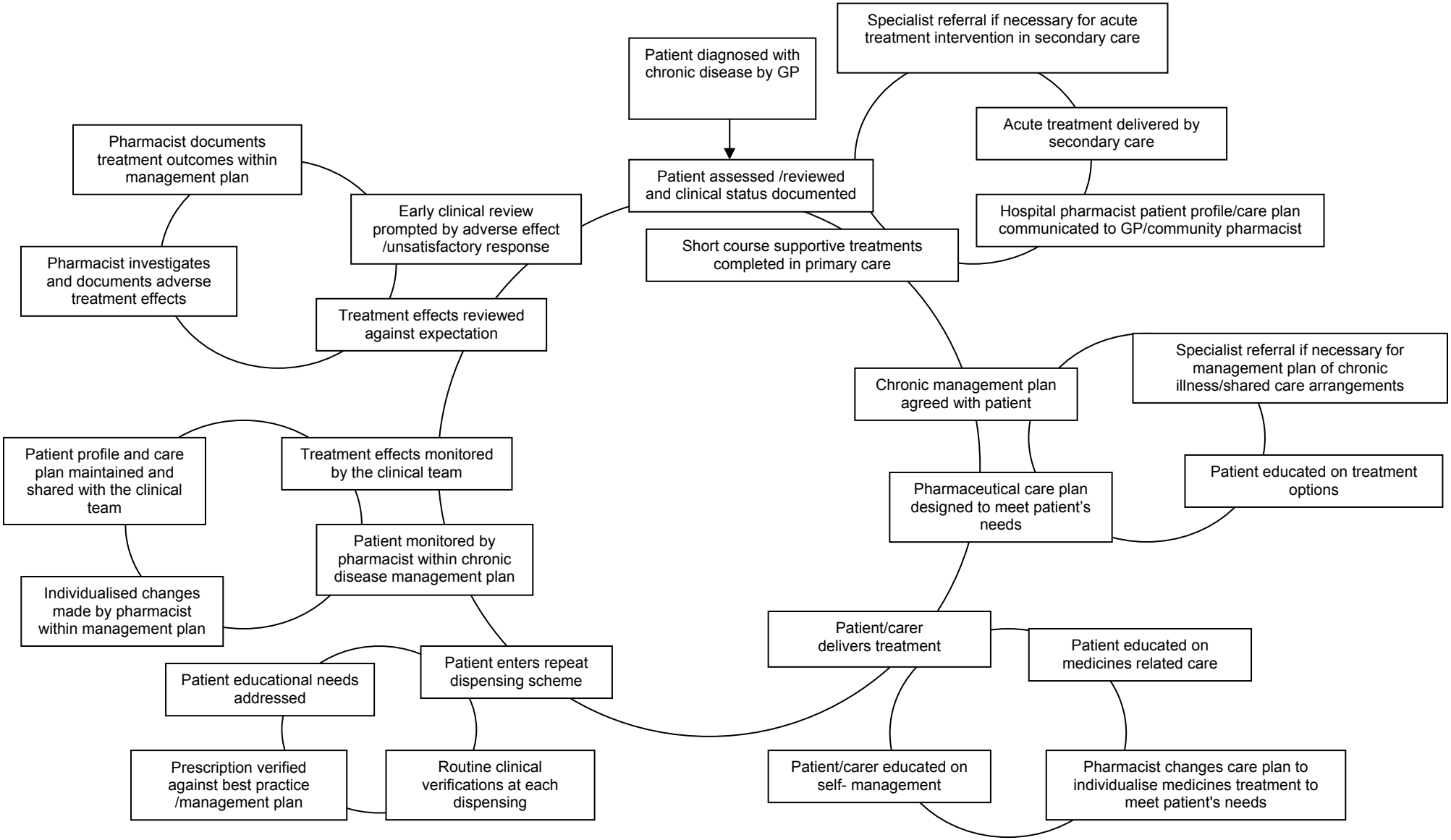
Yours sincerely,

Alex Bailey
Scientific Officer
South East Scotland Research Ethics Service

Enclosure: NRES leaflet - "Defining Research"

Appendix 3

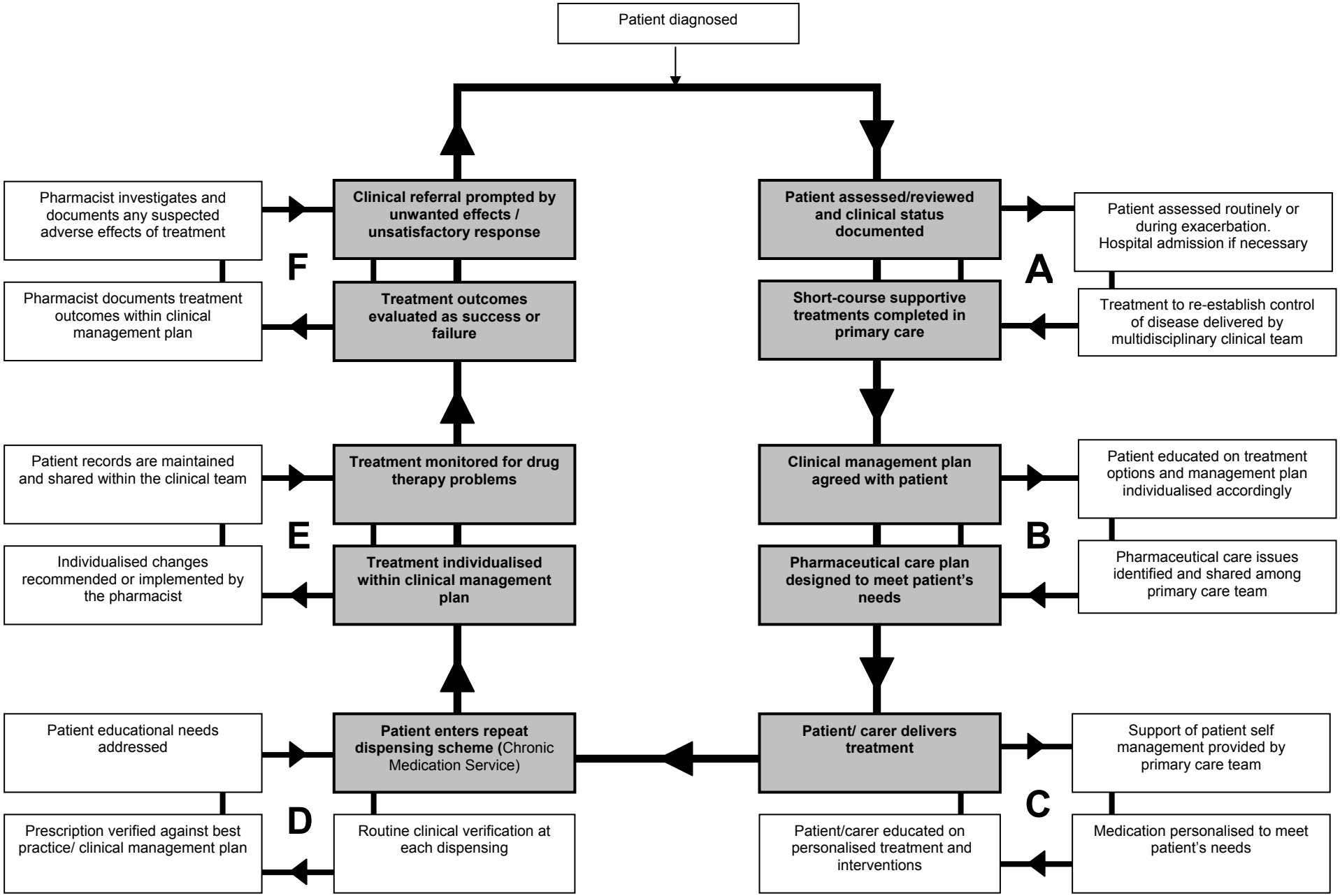
Model of care Ailsa Power et al


Specialist referral if necessary for acute treatment intervention in secondary care
Patient diagnosed with chronic disease by GP
Acute treatment delivered by secondary care
Pharmacist documents treatment outcomes within management plan
Patient assessed /reviewed and clinical status documented
Early clinical review prompted by adverse effect /unsatisfactory response
Hospital pharmacist patient profile/care plan communicated to GP/community pharmacist
Short course supportive treatments completed in primary care
Pharmacist investigates and documents adverse treatment effects
Treatment effects reviewed against expectation
Specialist referral if necessary for management plan of chronic illness/shared care arrangements
Chronic management plan agreed with patient
Patient profile and care plan maintained and shared with the clinical team
Treatment effects monitored by the clinical team
Patient educated on treatment options
Pharmaceutical care plan designed to meet patient's needs
Patient monitored by pharmacist within chronic disease management plan
Individualised changes made by pharmacist within management plan
Patient/carer delivers treatment
Patient educated on medicines related care
Patient enters repeat dispensing scheme
Patient educational needs addressed
Prescription verified against best practice /management plan
Routine clinical verifications at each dispensing
Patient/carer educated on self- management
Pharmacist changes care plan to individualise medicines treatment to meet patient's needs

Appendix 4

Model of care heart failure

The Treatment Cycle, Disease Management in Primary Care



Appendix 5

Linked table heart failure

Table 1 Processes occurring in the model of care for Chronic Heart Failure in the treatment cycle (Modified from Power A, Douglas E, Mc Gregor AM, Hudson S.: Professional development of pharmaceutical care in type 2 diabetes mellitus: a multidisciplinary conceptual model. IJPP. 2006, 14: 289-299)

Definition		Activity
A – PATIENT CLINICAL ASSESSMENT		
Patient assessed/ reviewed and clinical status documented	Patient assessed routinely or during exacerbation. Hospital admission if necessary	• Full clinical assessment • Referral for more specialist advice[2] ➢ HF due to valve disease, diastolic dysfunction or any other cause except LVSD ➢ One or more co-morbidities (e.g. COPD/asthma, renal dysfunction, anaemia, thyroid disease) ➢ Angina, atrial fibrillation, other symptomatic arrhythmia ➢ Women who are planning a pregnancy/are pregnant ➢ Severe HF ➢ HF that doesn't respond to treatment as discussed in the guideline and outlined in the treatment algorithm ➢ HF that can no longer be managed effectively in the home setting • One pneumococcal vaccination and an annual influenza vaccination[1]
Short-course supportive treatments completed in primary care	Treatment to re-establish control of disease delivered by multidisciplinary clinical team	• Eg. Sublingual /oral nitrate preparations (for angina), colchicine (gout), increase diuretics for 3-5 days[1]
B – TREATMENT PLANNING		
Clinical management plan agreed with patient	Patient educated on treatment options and management plan individualised accordingly	• Anticipatory care plan produced, includes guide to recognising symptoms (e.g. infection) and what action to attend. Educating patients and their carers about their medicines to improve adherence[2]
Pharmaceutical care plan designed to meet patient's needs	Pharmaceutical care issues identified and shared among primary care team	• Regimen and advice on monitoring and agreed individualised targets documented in a care plan and given to the patient. Care plan transferred to GP and a nominated community pharmacist[3]

C – TREATMENT ADMINISTRATION		
Patient / carer delivers treatment	Support of patient self management provided by primary care team	• Carers and relatives of patients should be made aware of treatment regimens for the patients they care for and be encouraged to identify any need for clinical support
	Medication personalised to meet patient's needs	• Simplifying the dosage regimen is important in improving adherence with treatment.[2] Medication regime should follow the recommendations, if not contra-indicated (e.g. co-morbidities as COPD/renal dysfunction etc)
	Patient / carer educated on personalised treatment and interventions	• Educated on lifestyle modifications[1] - refrain from excessive alcohol consumption - strongly advised not to smoke - promote regular low intensity physical activity
D – PATIENT TREATMENT MONITORING		
Patient enters repeat dispensing scheme	Routine clinical verification at each dispensing	• Pharmacist conducts opportunistic checks of patient-held records and pharmacy patient medication records at each dispensing[3]
	Prescription verified against best practice/ clinical management plan	• Prescription checked for adherence to disease management guidelines and patient's individualised management plan[3]
	Patient educational needs assessment	
E – PATIENT CLINICAL MONITORING		
Treatment individualised within clinical management plan	Individualised changes recommended or implemented by the pharmacist	• A clinical assessment of functional capacity, fluid status, cardiac rhythm, cognitive status and nutritional status. A review of medication, including need for changes and possible side effects. Laboratory assessment (serum urea, electrolyte and creatinine). Thyroid function, haematology, liver function, level of anticoagulation and serum potassium may be required depending on the medicine prescribed and co-morbidity[2]
Treatment monitored for drug therapy problems	Patients records are maintained and shared within the clinical team	• Identification of drug therapy problems according to classification[4] ▪ Additional drug therapy ▪ Unnecessary drug therapy ▪ Wrong dose ▪ Dosage too low ▪ Adverse drug reaction ▪ Dosage too high ▪ Compliance

F – TREATMENT EVALUATION		
Treatment outcomes evaluated as success or failure	Pharmacist documents treatment outcomes within clinical management plan	• Confirmation of satisfactory achievement sought and documented. Failure to reach targets addressed by referral for clinical review[3]
Clinical referral prompted by unwanted effects/unsatisfactory response	Pharmacist investigates and document any suspected adverse effects of treatment	• Common side effects: *ACE-inhibitor* — cough, hypotension (including postural), renal impairment, hyperkalaemia, angio-oedema *β-blocker* — tiredness, bradycardia, coldness *AII blocker* — not licensed for use in heart failure in the UK. Hypotension and reversible renal dysfunction the most common serious side effects *Aldosterone antagonist* — spironolactone: gynaecomastia, hyperkalaemia, renal dysfunction (careful monitoring of blood urea, creatinine and electrolytes essential), tiredness, rashes *Diuretics* — postural hypotension, gout, urinary urgency, dehydration (risk of renal dysfunction or hypotension), hypokalaemia, hyperkalaemia *Digoxin* — nausea, arrhythmias, gastrointestinal side effects[2]

1. SIGN 95. Management of chronic heart failure
2. Full version of NICE guideline no.5. Chronic heart failure. National clinical guideline for diagnosis and management in primary and secondary care
3. Power A, Douglas E, Mc Gregor AM, Hudson S. Professional development of pharmaceutical care in type 2 diabetes mellitus: a multidisciplinary conceptual model
4. Cipolle R, Strand L, Morley P. Pharmaceutical care practice. McGraw-Hill; 1998

Appendix 6

Pharmaceutical care plan Dalal

PHARMACEUTICAL CARE PLAN: TYPE 2 DIABETES PATIENT PROFILE

(Patient label) Name	CHI #	Gender	Social History	Family History
		Male ☐ Female ☐	Living alone ☐ Living with Partner/family ☐ Other: Pregnant ☐ Breastfeeding ☐	**Drug sensitivities**
Address **Postcode**	**Date of birth/ Age**	**Weight/ kg** / **Height/m** **BMI**	**Smoking status:** Smoker ☐ Number/day: Non-smoker ☐ Ex-smoker ☐ Since **Alcohol consumption** Y ☐ N ☐ Units/week:	**Vaccines:** **Date** Annual Flu ☐ Single Pneumococcal ☐ Comment
DepCat	**Date diagnosed**	**Occupation**		
General practitioner **Address** **Tel**	**Community Pharmacy** **Address** **Tel**	**Ethnic origin** White ☐ Black ☐ Asian ☐ Chinese ☐ Other ☐ *Specify:*		

Limitations/Special needs

Sight ☐ Hearing ☐ Speech☐ Language ☐ Physical ☐ Other☐

Comment

Annual Review: **GP/ Hospital**

	Date Attended	Date Due	Comment
Eye			
Foot			
Renal			

History of complications

Neuropathy☐ Retinopathy☐ Nephropathy☐ Amputations☐ Foot ulcers☐ Erectile dysfunction☐ Mood disorder☐ Recurrent infections☐

Date/ Comment

DIABETES TREATMENT (PAST AND CURRENT)

Medication	Start	Stop	Reason	Medication	Start	Stop	Reason

CARDIOVASCULAR HISTORY AND CURRENT MEDICINES

Hypertension ☐ **Stroke/TIA** ☐ **IHD** ☐ [Angina ☐ MI ☐] Angioplasty ☐ CABG ☐ **PVD** ☐ **Other**

Dates:

Aspirin 75-150mg	☐	**Oral nitrate** Specify	☐	**ACE I** Specify	☐	**Others/comments:**	
Clopidogrel 75mg	☐						
β-Blocker Specify	☐	**Ca blocker** Specify	☐	**Maximum tolerated?**	☐		
GTN Specify	☐	**Statin** Specify	☐	**ARB** Specify	☐		
		Maximum tolerated?	☐	**Maximum tolerated?**	☐		

OTHER MEDICAL HISTORY

	Date		Date

OTHER DRUG HISTORY (including OTC)

	Date		Date

EPISODES OF CARE	Care Episode 1 Date: Values	Date	Care Episode 2 Date: Values	Date	Care Episode 3 Date: Values	Date	Care Episode 4 Date: Values	Date	Care Episode 5 Date: Values	Date	Care Episode 6 Date: Values	Date
HbA1c *(%)*												
TC *(mmol/L)*												
HDL *(mmol/L)*												
LDL *(mmol/L)*												
TG *(mmol/L)*												
TC:HDL												
K *(mmol/L)*												
Blood pressure (*mmHg)*												
LFTs ALT/AST												
Creatinine *(µmol/L)*												
Microalbuminuria *(M: ACR >2.5mg/mmol) (F: ACR > 3.5mg/mmol)*												
Proteinuria (*ACR>30mg/mmol)*												
Comment												

EDUCATIONAL NEEDS ASSESSMENT *Date of assessment:*

General advice		*Self-medication*		*Self-management*		*Self-management Assessment*
Diabetes	☐	Oral agent timing	☐	Glucose monitoring	☐	Concordance *(min)* + ☐ ++☐ +++☐ *(max)*
Cardiovascular	☐	Missed doses	☐	Monitoring diary	☐	Comprehension (*min*) 1 ☐☐☐☐ 4 (*max*)
Diabetes control	☐	Insulin administration	☐	Hypos	☐	Dexterity (*min*) 1 ☐☐☐☐ 4 (*max*)
Complications	☐	Injection sites	☐	Foot care	☐	*Comments:*
Diet/Exercise	☐	Insulin compliance	☐	Intercurrent illness	☐	
Smoking cessation	☐	Written information on medicines	☐	Compliance aid	☐	

INDIVIDUALISED CARE ISSUES

Week No + Date	Care Issue	Patient Education / Documentation changes and Therapeutic Plan Checks	Therapeutic Plan Changes (Individualisations/ Dosage change/ Treatment interruption/ Management of co-morbidity)
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		

	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		

Appendix 7

Draft Pharmaceutical care plan heart failure

PHARMACEUTICAL CARE PLAN: HEART FAILURE PATIENT PROFILE

(Patient label) Name	CHI #	Gender	Weight (kg)	Social History	Family Cardiovascular History
		Male ☐ Female ☐	Height (m)	Living alone ☐ Living with Partner/family ☐ Other:	
Address	**Date of birth/ Age**	**Date**	**BMI**		**Drug sensitivities**
				Smoking status: Smoker ☐	
Postcode					**Limitations/Special needs**
DepCat	**Date diagnosed**	**Occupation**		Number/day:	**Vaccines:** **Date**
General Practitioner	**Community Pharmacy**	**Ethnic origin** White ☐ Black ☐ Asian ☐ Chinese ☐ Other ☐ *Specify:*		Non-smoker ☐ Ex-smoker ☐ Since	Annual Flu ☐ Single Pneumococcal ☐
Address	**Address**			**Alcohol consumption** Y ☐ N ☐	Comment
Tel	**Tel**			Units/week:	

Echocardiography EF%	Exercise intolerance	Compliance devices used	Ability to self-medicate
	☐ **Mild** ☐ **Moderate** ☐ **Severe**	Yes ☐ *specify:* No ☐	Yes ☐ No ☐

CARDIOVASCULAR HISTORY AND CURRENT MEDICINES

LVSD ☐ **AF/Valve** ☐ **IHD/Past MI** ☐ [Angioplasty ☐ CABG ☐] **Other**

Dates:						**Others/comments:**
Diuretic specify	☐	**Digoxin**	☐	**Aspirin** 75-150 mg	☐	
ACE I specify	☐	**ARB** Specify	☐	**Statin** specify	☐	
Maximum tolerated?	☐	Maximum tolerated?	☐	Maximum tolerated?	☐	
β-blocker specify	☐	**Amiodarone**	☐	**Isosorbide/ hydralazine**	☐	
Maximum tolerated?	☐	**Anticoagulant**	☐	**Ca blocker**	☐	
Spironolactone	☐	**Clopidogrel**	☐			

DRUG TREATMENT (PAST AND CURRENT)

Medication	Start	Stop	Reason	Medication	Start	Stop	Reason

OTHER MEDICAL HISTORY				OTHER DRUG HISTORY (including OTC)			
	Date		Date		Date		Date

EPISODES OF CARE	Care Episode 1 Date: Values	Date	Care Episode 2 Date: Values	Date	Care Episode 3 Date: Values	Date	Care Episode 4 Date: Values	Date	Care Episode 5 Date: Values	Date	Care Episode 6 Date: Values	Date
Urea												
TFTs												
LFTs												
ALT/AST												
Blood pressure (*mmHg)*												
K *(mmol/L)*												
Creatinine *(µmol/L)*												
Sodium												
Magnesium												
INR												
Comment												

SELF-MANAGEMENT ASSESSMENT		EDUCATION	
Concordance	(min) + ☐ ++☐ +++☐ (max)	Diet/Exercise	☐
Comprehension	(min) 1 ☐☐☐☐ 4 (max)	Smoking cessation	☐
Dexterity	(min) 1 ☐☐☐☐ 4 (max)	Written information on medicines	☐
Support above and optimise patient convenience through medication adjustments			

INDIVIDUALISED CARE ISSUES			
Week No + Date	**Care Issue**	**Patient Education / Documentation changes and Therapeutic Plan Checks**	**Therapeutic Plan Changes** (Individualisations/ Dosage change/ Treatment interruption/ Management of co-morbidity)
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		

Appendix 8

Final version Pharmaceutical care plan heart failure

PHARMACEUTICAL CARE PLAN: HEART FAILURE PATIENT PROFILE

(Patient label) Name	CHI #	Gender	Weight (kg)	Social History	Family Cardiovascular History
		Male ☐ Female ☐	Height (m)	Living alone ☐ Living with Partner/family ☐ Other:	
Address	**Date of birth/ Age**	**Date**	**Weight/ BMI**		**Drug sensitivities**
				Smoking status: Smoker ☐	
Postcode				Number/day: Pack years:	**Limitations/Special needs**
DepCat	**Date diagnosed**	**Occupation**			**Vaccines:** **Date**
General Practitioner	**Community Pharmacy**	**Ethnic origin** White ☐ Black ☐ Asian ☐ Chinese ☐ Other ☐ *Specify:*		Non-smoker ☐ Ex-smoker ☐ Since	Annual Flu ☐ Single Pneumococcal ☐
Address	**Address**			**Alcohol consumption** Y ☐ N ☐	Comment
Tel	**Tel**			Units/week:	

Echocardiography EF% **Date:**	NYHA class **Date:**	Compliance devices used	Ability to self-medicate
	☐ **I** ☐ **II** ☐ **III** ☐ **IV**	Yes ☐ *specify:* No ☐	Yes ☐ No ☐

CARDIOVASCULAR HISTORY AND CURRENT MEDICINES

Cardiovascular history	Dates	Level of treatment	Frequency	Dose	Additional therapy	Frequency	Dose
LVSD ☐		ACE I/ARB ☐ Specify:			Amiodarone ☐		
AF/flutter ☐		Beta blocker ☐ Specify:			Aspirin ☐		
Valve disease ☐		Candesartan (ARB) ☐			Statin ☐ Specify:		
IHD/Past MI ☐		Aldosterone antagonist ☐ Specify:			Isosorbide/ hydralazine ☐		
Angioplasty ☐		Digoxin ☐			Ca blocker ☐ Specify:		
CABG ☐		Oral anticoagulants ☐ Specify:			Clopidogrel ☐		
Other ☐		Diuretic ☐ Specify:					

OTHER MEDICAL HISTORY	Date		Date	OTHER DRUG HISTORY (including OTC)	Date		Date

DRUG TREATMENT (PAST AND CURRENT)							
Medication	Start	Stop	Reason	Medication	Start	Stop	Reason

EPISODES OF CARE	Care Episode 1 Date:		Care Episode 2 Date:		Care Episode 3 Date:		Care Episode 4 Date:		Care Episode 5 Date:		Care Episode 6 Date:	
	Values	Date	Values	Date	Values	Date	Values	Date	Values	Date	Values	Date
Blood pressure (*mmHg)*												
Heart rate												
Urea *(3,1 – 8,1 mmol/L)*												
Creatinine *(50 – 100 µmol/L)*												
Na *(137 – 145 mmol/L)*												
K *(3.5 – 4. 6 mmol/L)*												
eGFR *(mL/min/1,73m^2)*												
Glucose *(4.2 – 6.3 mmol/L)*												
ALT *(U/L)*												
Bilirubin *(µmol/L)*												
Alkaline Phosphatase *(U/L)*												
GGT *(U/L)*												
Albumin *(g/L)*												
TSH *(mIU/L)*												
T_4 *(pmol/L)*												
INR												
Haemoglobin *(g/dL)*												
WBC *(10^9/L)*												
Platelets *(10^9/L)*												
Digoxin *(mmol/L)*												
Cholesterol												
Comment												

SELF-MANAGEMENT ASSESSMENT	EDUCATION	LATEST HOSPITAL ADMISSIONS
Concordance (min) + ☐ ++☐ +++☐ (max) Comprehension (min) 1 ☐☐☐☐ 4 (max) Dexterity (min) 1 ☐☐☐☐ 4 (max) Support above and optimise patient convenience through medication adjustments	Diet/Exercise ☐ Smoking cessation ☐ Written information on medicines ☐	Date / Reason

INDIVIDUALISED CARE ISSUES			
Week No + Date	**Care Issue**	**Patient Education / Documentation changes and Therapeutic Plan Checks**	**Therapeutic Plan Changes** (Individualisations/ Dosage change/ Treatment interruption/ Management of co-morbidity)
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		
	Specify		
	Action		
	Output (Initial)		

Appendix 9

Transcript nominal group meeting

Meeting nominal group April 27th

Then we could move over to the pharmaceutical care plan. Have I forgotten to send you that one? (Investigator) what, that? I've never seen that before (Pharmacist 1) okay (I)
(laughing) xx well, that's the pharmaceutical care plan for heart failure. So you can have a wee look at it (I) am I right in saying that this has been taken from, the items in here (Pharmacist 2) ideally, but (I) right, not necessarily (p2) not necessarily, no, most of the fields come from, eh, the previous care plan. So I've, it's been modified a bit and put in some heart failure fields (I) o the care plan for heart failure or (p2) for diabetes (I) okay (p2) (pause) (printing) xxx ehm, not many though, we get, well currently a lot of the referrals xx for patients in the community are from the falls team or rapid response (p1) okay (p2) xx so I mean, it would just be a case of if they happened to have heart failure. Ehm, working with the nurse case managers, eh, I suppose there's a potential to get more heart failure patients, ehm, the majority are falls. Quite a lot of COPD patients as well (p1) some of the fields from the treatment comes from the guidelines (I) mhm (p1) for heart (p2) for heart failure. But then a lot of them, a lot of the fields up here came from the previous care plan (I) mhm (p1) they've just been left to stand there (I) I guess the top section is really around general information (p2) mmm (p1) you would collect on, on anybody to, obviously apart from their NYHA, ehm (p2) unless you, okay (I) xxx (p2) echocardiography (I) what's the EF percent (p1) ejection fraction (p2) oh (p1) yeah, so, I think the purpose of that box was to write in the patient's ejection fraction (I) never worked with that, so (p1) okay, so that would be, yeah that would be something eh they would do in the diagnosis of heart failure, so, okay, so it's not something, it's not piece of information that you routinely would collect (p2) yeah (p1) do you use the NYHA class or is that something that, not used that much in primary care? (I) well, we don't take any eh classification eh details (p1) yes, and than there's the next page just with labs and (I) oh right, so would the care episodes be for example an admission, hospital admission or even just if someone was visiting the patient (p1) yes, it would be if, it would, so I guess how ever many times you went to see them (p2) yeah (p1) is counted as a care episode (p2) eh, xxx were in particular the

diabetes care plan was it from the cardiovascular risk clinic for diabetes (p2) it was Dalal's, it was a Strathclyde (I) oh, perhaps not (p2) project (I) right. I'm assuming then that care episode refers to, cause I see this, this values bit (p2) so I suppose in a way xx the GP maybe (p1) mhm. Well, because if you're gathering this information you would, you would need to get it from somewhere. Where do you, you get your stuff from the GP don't you? Or (p2) eh, well (p1) in general (p2) SCI Store (p1) yeah (p2) xx hospital admissions (p1) so you get, right okay. So you, this sort of information would all be available from that exc, oh except things like heart rate and (p2) and blood pressure (p1) blood pressure wouldn't necessarily xxx (p2) don't tend to get that (p1) so you would ehm, depend on that coming from the general practice records (p2) ehm, either that or we would put it in eh in the letter sent out to the GP after the visit just saying, you know eh, well, certainly in the beginning I would speak to the patient during the home visit and at the end the last time they got it monitored. I mean some patients aren't quite sure (p1) mmm (p2) and can't really remember and things. They certainly can't remember the level except what some patients say is "oh I think it was normal" (p1) mhm (p2) ehm, so I mean I would put it in a letter just after the visit and just say, you know, eh according to patient eh the last blood pressure result was okay or whatever. Ehm, but we, we don't measure it ourselves and quite often we don't have the latest reading (p1) mhm (p2) so those two would be (I) you may or may not have them (p2) mhm (p1) so you'd never actually check someone's heart rate (p2) no (p1) you wouldn't measure their pulse (p2) (small pause) and also if a patient was eh been given details that would suggest that maybe it does need monitored quite urgently, for instance if they were saying that they felt really dizzy and light headed and everything ehm then that would obviously definitely be documented in the letter (p1) mhm (p2) (small pause) and these here, how is this, do you know how this xx (p2) (referring to grading for compliance) it was from the previous project, and Steve felt it was appropriate to have it in this one as well (I) do you have any xxx we were discussing compliance, do you, do you make any judgements as to someone's compliance (p2) oh, ay, definitely, ehm, we used to have a four page assessment sheet that we do in home visit (p1) right (p2) and it was a bit

of overkill, but I came into post and that was the paperwork we used and it was quite interesting actually because the pilot scheme working with the nurse case managers, ehm, Alpana came onboard for that and the two of us before we even started with the pilot scheme, was a case of “look, what can we do with the paperwork?” and trying to get it down to the minimum amount (p1) mmm (p2) and in the four sheet one ehm, for dexterity and everything, I mean we would go through and ask the patient, can they manage to unscrew eh childproof locks, can they manage to pop blister tablets out, eh if they need to eh split any tablets can they manage that, ehm, comprehension, I mean you’re checking that the patient knows what everything’s for and knows when to take it, what times of day (p1) mhm (p2) but a lot of that was just a case of ticking things off, whereas we’ve got it down to basically one sheet (p1)mhm (p2) and it’s something that you do automatically when you go out to a patient, cause I mean there’s the whole process making sure that they are taking what’s prescribed before you make any recommendations to the GP (p1) mhm (p2) ehm, so I mean we do, we do do this but we just don’t formulary, eh formuly, formally (p1 & p2) document it (p1) mhm (p2) ehm, but we do check that (p1) and do you grade it as in this one (I) no (p1) or just tick that they can do it (I) yeah, we just make a comment, ehm, I suppose a problem grading it, a patient may have a problem with one tablet but not with the others (p1) mhm (p2) ehm, so that’s maybe too general (p1) mhm (p2) a grading (p1) I’m just wondering what, do you know, is this linked to an actual definition, you know the, that you get a score if, of 4 if you know what all your tablets are for and (p2) I don’t know (I) okay, that’s, that’s, if you’re using a grading system you would need to know what it meant (p2) mhm (I) and also, I mean, if you’re speaking to the patient and the patient reels, is on ten medicines reels off what nine of them are for and is unsure of the tenth one, and you, or they come out with the wrong (p1) mhm (p2) eh, indication, so you correct it and the patients says “oh, yeah that, that’s right”. What’s to say that the patient’s gonna remember, so (p1) mhm (p2) I’m not sure about actual grading it, certainly as a check point, definitely (p1) so maybe exchange the grading to just a tick box? (I) ehm, aha (p1) I suppose what, cause what you mentioned there about the dexterity sounded like a grading, you know, sort of starting,

basic thing is that you can actually (p2) yeah (p1) undo a bottle and, or pop out tablets. The next thing which would be a bit more difficult would maybe be halving tablets (p2) yeah (p1) or, or, I don't know, measuring things I suppose (p2) yeah obviously it is tailored to the patient xxx. If a patient was on patches, you would be checking if they could manage to apply the patch and if they're changing site and everything. Ehm, and if the patient's not halving tablets, cause very few tablets actually need to be halved (p1) mmm (p2) eh, so I mean, that's not a routine thing (p1) no (p2) to check in every patient (p1) mhm (p2) so it would just be (p1) yeah (p2) xx just depend, ah (p1) mhm (p2) (small pause)would you have information about when the latest admission to hospital (I) ehm (p1) was (I) do you get that from SCI store (I) eh, we'd get any monitoring that was done during the hospital admission from SCI store, any scans, eh, in the GPASS summary, depending on how recent the hospital admission is, it could be under ehm interventions or if we get, is it the Carenap information that sometimes get sent through as well, and that would sometimes have a bit eh other times the patient eh some patients are unbelievably clued up (p1) mhm (p2) on their medical history eh so, so there's a few places that that information might come from (p1) mm (I) when you look at this, ehm, are there any fields which we haven't discussed that you feel eh aren't really necessary? (I) you don't use other from the NYHA, ejection fraction (I) well, personally speaking ehm, the education, and I don't know how right or wrong this is, but if I'm going out seeing an elderly patient ehm, there's one quite recently, eh bad COPD still smoking ehm had no intention of giving it up, had been counselled and was sick to the back teeth of hearing health professionals go on about why, you're not helping yourself (p1) mhm (p2) and I knew as soon as I opened my mouth and came out with anything along the lines of "smoking isn't helping you" (p1) mhm (p2) and the barrier's hah (illustrating that the patient isn't listening anymore) (p1) mhm (p2) so mmm, I'm not sure how appropriate that, that one is (p1) the one on smoking cessation? (I) well, just (p1) just the column there? (I) yeah, I mean, I do agree with it, but it's just, eh I don't know, it's difficult to word you're trying to get the patient on board and just being receptive to how they are and actually get, well if I get the impression that the patient just sat there and you can tell

they're just waiting for you to come out with something or about their drinking, I mean I sat there and xx "look, you know, you've heard it all before, I'm not going to condone it, but I'm not here to lecture you on your smoking", and then we just went on to the medicines. Or speaking about the alcohol, will obviously make sure that they do know (p1) mhm (p2) sort of healthy limits. But I won't sit there and preach to them about all the dangers (p1) mmm (I) so, it's a bit, it's a bit tricky, I mean, I do agree that it should be included (p1) mhm (p2) and again, that's something that's tailored to the individual patient (p1) mmm (I) I guess, I mean, the tick box is, so the other way to look at this is as, it's care plan but it's not, not necessarily saying that you, you have done all this, but that you (p2) aha (p1) have checked or you know that it has been done (p2) yeah (p1) eh, and xx that's xx, so if you are aware that someone routinely gets asked about their smoking (p2) aha (p1) then yeah you know that that had been done, so, that would be ticked, it doesn't mean that you personally have done it (p2) aha (p1) but, it's, I guess the point of this is to ensure that something doesn't fall between two (p2) aha (p1) stools and that everyone is thinking that everyone else (p2) aha (p1) has covered it (p2) yeah (p1) hm (I) it's a, a prompt (p2) also, the written information on medicines, would that be making sure the patient has got eh product information eh patient information leaflets or would that be for example giving them a reminder chart telling them all the medicines that they're on and when to take them. Would that include both? (p1) (small pause)in other words, is it information that's coming from the pharmacist who's going to see the patient or is it information that the patient may already have in the house? In other words, just making sure that they do have information available? (p1) I think it might be both (I) mhm (p1) in my opinion (I) cause you, you could have somebody who reads and digests all the patient information leaflets (p2) yeah (p1) in which case, you wouldn't need to give them anymore eh but in xx somebody who can't bear to look at the patient information leaflets (p2) yeah (p1) or you might have had to do the chart and say right morning, lunch time, evening and eh (p2) mhm (p1) I would have, I would include both (p2) mhm (p1) (pause) (p1 looking at the individualised care issues) just trying to get my head around this, ehm, so is it just the different column, ay because that's the

action and that's the outcome. Ehm, it's just the way I'm used to seeing it is like pharmaceutical care issue and then suggested action, but is this working down the way rather than across the way? Is that? (p1) yes, or you have the issue and the action and the output (I) maybe, like outcome is it? (p1) okey, yeah. Yes, this is where you (p2) write (I) you say what the problem is (p2) yeah (I) right (p1) and this xx is the actions (p2)so that column is about action (I) output (p2) yeah, or output column (I) oh right, so you are actually breaking down something like an education point or a check (p1) so, if this, the issue is that they've, if they've, if they smoke, they're a smoker ehm educating them you know or you establish that actually they were ready to stop smoking, and then you offer smoking cessation support I suppose (p2) mhm (p1) xx just trying to xx (p2) so is that the actual medication change is it? (p1) mhm. Therapeutic plan, so maybe some of the heart failure they had been started on an ACE inhibitor and then they needed it increased. They probably have to make checks on either renal function or something prior to eh titrating the dose up (p2) so what would be documentation (p1) (small pause) is this in relation to this business between checks and changes, that if you're checking, so distinguishing between checking that something is ok and actually changing something, so ehm, so I guess if somebody is on, if someone's on an ACE inhibitor ehm and you wanted to check that, you check that they were on the right dose and the renal function was ok and that's a check. If someone is on a low dose and you check it and establish actually it needs to be titrated up, so they, so you need to go through that process of changing it and check you know, and actually making sure that it gets changed then (p2) would that not then be under therapeutic plan changes (p1) yes, aha, so I suppose the distinction between I suppose checking the, verifying that something is ok and actually making a change to something (p2) oh, no I get that, it's just that documentation changes (p1) documentation changes (p2)I'm not really sure what that was (p1) ehm (p2) changes to what kind of documentation? (p1) did this, did this come from the (p2) diabetes (I) the diabetes. Do you have a project for xxx . it will have, it will have definitions I presume (p2) (long pause) (looking up a previous project) could you go back up to the table of verifications (p2) (small pause) there (p2) (small pause)you'll need to look into

that Camilla (p2) I need to clarify what (I) I mean, I understand the difference between the two columns, as I say it was just the documentation changes I wasn't sure what that was (p1) yeah, I will have a look at it (I) would you, would you, so the, what you're used to at the moment is pharmaceutical care issue and action or recommendation (p2) yeah (p1) so it would just really be two (p2) mhm, and, I mean we just xx everything (p1) mhm (p2) together (p1) together (p2) and do you, ay I suppose the thing is if you're dealing with different people with different disease states do you have a thing where you record that people are on particular treatments (p2) mmm no (p1) no (p2) so, so there's no way of standardising what everybody does eh because you're actually seeing lots of different types of people (p2) yeah, I mean we don't have any, well the paperwork that we use is just a general thing for all the patient xx (p1) mhm (p2) so, if eh so even if for example you see a lot of people you were saying through falls (p2) mhm (p1) eh, so you wouldn't have sort of a check list or things that people xxx (p2) ehm, actually we do have an additional insert for falls (p1) right you do, aha (p2) yeah, ehm, and that's the xxx, ehm how's that split. Eh, maybe we would see if the patient's at risk eh with their lifestyle, see if they're at risk with ehm the medicines that they're on eh or falls, and then see if they're at risk of actual osteoporosis (p1) right (p2) and whether they should be on eh drug measures for that (p1) right, and would that specify what the drug measures should be or not (p2) eh, well it would just be either eh for example Calcichew or Alfacalcidol (p1) mhm (p2) xxxx and also a biphosphonate (p1) mhm (p2) eh based on their compliance, eh renal function, eh GI symptoms (p1) mhm, okay (p2) that's the only additional sheet that we do use (p1) that's because you see a lot of patients (p2) aha (p1) like that (p2) so (p2) and also we're elderly care so (p1) mhm (p2) in theory the patients are at risk of having more fragile bones xx (p1) mhm (p2) or risk of being house bound as well (p1) mhm (p2) so, eh, you were mentioning that there was a lot of COPD, was that from the anticipatory care project or the patients you would see routinely (p2) aha, I mean a lot of the ones through the nurse pilot they have been COPD patients quite a few of them, ehm, whether or not that's significant, cause we haven't actually had that many referrals anyway (p1) mhm (p2) from the nurse managers, ehm, but

in our normal workload there's quite a few COPD patients and also we are involved in eh the pulmonary rehab (p1) mhm, right (p2) xxxx (p1) in terms of delivering education you mean (p2) yeah (p1) so for COPD would, would a similar thing be useful, you know like you have an insert for osteoporosis (p2) aha (p1) or for falls. Or would one for COPD be something that you would use do you think? (p2) ehm, I haven't actually thought of it before today (p1) mhm (p2) but it would help to standardise and then for example if there are any people coming into service eh cause my colleague hadn't eh limited experience in that area so something like that would've been quite helpful when she started (p1) mhm (p2) that's a good point (p1) but with heart failure, if you, if you don't see very many patients, then gets to the point where's there only so many (laughing) sheets that you can have or (p2) yeah (p1) or is it eh something that again that you would, can you see yourself using something like that I suppose (p2) ehm (p1) or is it maybe to specific for (I) eh (p1) for heart failure (I) well, it's very specific for heart failure but a lot of it could be the problem that Alpana and I had with the paperwork at first and so far as this can be possibly a duplication between this sheet and the information that we've already been sent, so I mean xx as I said, how can we justify having to fill it out and write it out again, so we just keep all the documentation that had been sent to the patient all together, so we'll already have, even things like the address and xx details (p1) mhm (p2) we already have that down so there's no point writing it on another form. Ehm, so in terms of that, that's what we're trying to get away from the new paperwork. Ehm, and also just, just from my practice, something like this, if there was say, say if you were seeing a patient and you didn't actually suggest any changes to their medication but there was a lot of patient education or eh checking their compliance or whatever, but it fell into the one, eh the one side, you could end up with two or three sheets (p1) okay (p2) and yet the other side's blank if you know what I mean (p1) right, right, yes, mhm (p2) eh, although I mean, I think it's actually quite a good way of writing it out, it's just in practice eh going to, simply going across the way and lumping it all in together (p1) mhm, yeah (p2) eh, can reduce the xxx (p1) aha, okay (p2) so just not dividing it between patient education and therapeutic plan changes, just just have one (I) possibly, just in case there

was any problems with needing obviously more inserts because you'd filled up one column and yet the other column might actually be empty (p1) mhm, xxxxxx (p2) xxxx (p1) mhm (I) do you feel that there's anything important missing (I) that's missing (p1) eh that we haven't covered (I) eh, cause you even got like the community pharmacy so I mean if you were wanting to feed back eh to them any additional information, so that's already down, ehm what's this box, what is the comment, comment for what? Or is that just any additional comment? (p1) yeah, I think it's just a general box (I) (small pause)I'm just wondering if you would need both the ability to self medicate and eh this box here, just because that's the xxx "can the patient eh can the patient self medicate? Yes or no" and then you go into more detail over the page, I'm just not sure if you'd if you'd want both (p1) mhm (I) it was maybe designed to sort of cross over between secondary and primary care, I'm just wondering that the comment about ability to self medicate, are they talking about self medicating in a hospital or do they actually mean (p2) as I read in the, the abstract, it was, I think it was used both, it was used both in primary and secondary care, two sites in primary and two sites in secondary care but they didn't say anything about crossing (I) I just wondered that was an explanation to why there was a section there on the front page and another one on self management later on (p2) mhm (I) and the other thing is obviously to check that there's a definition or anything, was this in the original plan? (p2) (nodding) (I)

Yeah (p2) I just copied it from the previous one (I) so the one that you were using in anticipatory care, it was just one sheet wasn't it? (p2) yeah (p1) xxxx (p2) I mean, what we'd do in practice is eh for example if there's not enough space for the interventions or eh xx checks or whatever eh we'd done which is simply turn it over (p1) mhm (p2) and wrote freestyle on the back (p1) mhm (p2) eh obviously keeping it xx to care issue and suggested action, that's what we've been doing (p1) did you have many where you had to..? (p2) ehm, it was a few, just because ehm, we'll speak about this on Thursday actually, but just because we were trying to document everything that we were doing (p1) mhm (p2) cause that was one of our issues ehm just about the (p1) the xxx (p2) aha, because we wanted to document everything that we were doing and

if we came back and said you know, so many patients only needed like two interventions or whatever, but as in theory we were going out spending an hour or so with the patient and checking lots of things, counselling on inhaler technique ehm cause we were wanting to document everything to show eh the nurse managers what was happening (p1) mhm (p2) it was just on paper to then feed back and say that on average we made xxx of interventions really (p1) mhm (p2) that was all xxx (p1) yeah (p2) to document (p1) I think eh we'll probably need to discuss that on Thursday because, xx Stian brought this up, the classification that we, we had supplied was really drug therapy problems whereas eh the xxx there's other things round, the checks and the changes, would you necessarily know if something had been acted upon, do you have that information (p2) well, what we were doing is there's like a triplicate carbon sheet that we fill out just to summarise that we send out to the GP and ehm, there's three columns basically the care issue and suggested action or explanation and the final column is for GP feed back (p1) mmm (p2) and I must admit we've had quite a decent eh level of (p1) okay (p2) feed back, having said that, Alpana, the nurse that she was working with eh I think she, did Alpana say she was actually in a meeting with the GP ehm so she was able to sit there and basically have a list of things (p1) she did have one, aha, meeting with one of the GPs (p2) so she got the sort of feed back right away (p1) mhm (p2) up to the point the GP said oh actually, we don't need to do that because of x and y, or when the GP said oh, that's a good point xx or whatever (p1) mhm (p2) so she got the feed back there and then eh whereas I was writing to all mine, but just about everyone sent back (p1) okay (p2) eh I mean, sometimes they didn't actually put comments, and they just sign their name at the bottom, xx and ehm hopefully we can assume from that that they've just taken everything onboard xxxxx (p1) okay (p2) (small pause) I guess we've probably discussed this previously, but do you think that this care plan could be used in primary care, or is it too detailed (I) ehm, xx in primary care ehm (p1) or in anticipatory care (I) mhm, eh I think it could be eh I'm just not sure if, if we'd personally use it, but that's not to say that it's not a good form if you know what I mean. Ehm, I mean certainly if you were filling this out, you could pass on a heck of a lot of information just by photo copying it

and forwarding on to the community pharmacist or whatever, ehm, so I mean it would be helpful that way, ehm, but aha, I mean I think it would have it's place (p1) mhm (I) but do you think it potentially could follow a patient if it, if the patient was admitted to hospital, when containing all of this (I) yeah, I think it would be a great idea actually, following the patient ehm because hopefully you'd have quite a detailed eh medication history eh so I mean if it did follow the patient into hospital I think that'd be fantastic, eh (p1) other things, if it would (I) yeah, exactly (p1) xx information about the medicines where xx ticking a class of medicines, then writing a dose, is that's what's intended, eh (p2) maybe it should have a (I) specify (p2) yeah, maybe it should have a (I) I'm thinking, diuretic, would you not have to say which diuretic it was on in order for the dose to be meaningful (p2) yeah (I) and also, I mean, maybe frequency as well, cause maybe the dose is split (p1) mhm (I) and why, why has it got ACE inhibitor / ARB and then got candesartan (p2) that was because eh ACE inhibitor is the first line treatment and if you experience cough or are, you can't use it you would use an ARB instead, but then if you are so symptomatic when you are on ACE inhibitor and beta blocker, you could use candesartan in addition (I) so you then, so you can add candesartan and an ACE inhibitor (p2) yeah, it said so in the guideline (I) together? (p2) if they were symptomatic even though you were on an ACE inhibitor and beta blocker, you could add ARB but it would be, I guess it would be specialist (I) mhm (p2) initiative (I) okay (p2) it actually said, so that's why I've, I have it two places because up here it would be instead of an ACE inhibitor (I) so is that new? the recommendation (p2) it said so in the, I think it was in the SIGN guideline (I) okay (p2) xxx (p2) either it was that or the NICE, one out of two (I) okay (p2) I think that's all the questions I have about the care plan, do you have anything more? (I) I was thinking about digoxin, because you've got digoxin in there, would you not need to be recording levels? (p2) where is that xxx (p1) would you not need to monitor digoxin (p2) or we could put it here (p1) no, no I don't have it (I) so put in concentration (I) ehm, would that be put under an extra column the episodes of care (p1) or maybe, maybe put it under comments or something (p2) yeah, might be, didn't think (I) y'know there's space to record INR (p2) ay (p1) but nothing to record

(p2) mhm (I) digoxin (p2) that's true (I) and the pulse rate, do you not record? That's there already yeah (p2) I think that's all (I) okay (p1) cause I don't have any more things to ask about the xxx (I) no other forms I've never seen before?! (p1) hmm (p2)

Appendix 10

Transcript semi-structured interviews

Patient 1

C: So I just have a few questions about what Alpana did.
C: when Alpana was here to see you. Do you remember? Do you remember Alpana? The pharmacist?
P: oh yes, yes
C: So I just have some questions about what she did
P: aha
C: So before she came to visit you, did you know why she was coming?
P: no
C: no? she just came?
P: yes
C: yeah
C: Did she come with Janet, or?
P: yes, yes
C: eh, what did you know about you medicines before Alpana came? Like..
P: well, the.. the.. I had the xxx my nurse, the nurse come, the what do you call it, for my breathing. (Physio JC) yeah, she came. she came and she sorted out my medicines.
C: yeah, ok. So you felt that you had enough information about your medicines before Alpana came to see you?
(laughing)
P: I don't know
C: hehe, ok. But you know why you use them, and?
P: yes, yes aye aye
C: yeah. Eh, did you have any problems or difficulties with your medicines?
P: yes
C. yeah
P: ay
(laughing)
C: what kind of difficulties
P: I don't like the spiriva, I didn't like it
C: okay
P: which she's taken me off of that, and just for the ibupropin instead
C: yeah. Why didn't you like the Spiriva
P: I don't know. I just didn't feel it was…
C: working?
P: mhm
C: Ok. Yes. Ehmm. So when Alpana came to see you, did she explain how to use your medicines properly? Did she explain to you? How to use them, or?
P: well, I've used them a long time
C: yeah, so you knew?
P: yes
C: Yeah. Ok
P: aha.
C: And she explained why you were using them?
P: yes
C: were you satisfied with that?
P: Yes, aha, aha
C: mmm

C: ehh, do you feel that she could have done something more? Or additional things that she could have done?
P: no
C: no
P: I don't think so, no
C: no
C: ehh, and did she answer any questions that you had regarding the medicines?
P: no
C: did you have any questions
P: no, not really
C: no, because you've used them for so long?
C: eh, and how, ehh, and if you would have had any problems, do you think that she would have helped you with..?
P: well
C: those
P: anything's yes worth a try, yes?
C: yeah
C: ehh so, after she came to see you, have you made any changes to the way you take you medicines
P: Eh, well. No, but the respiratory nurse took me off the spiriva and put me on , I'm just on ibupropin now. I take that the 3 times xxx a day
C. ok, so the respiratory nurse
P: yes
C: helped you?
C. yeah, eh. so do you know more about your medicines as a result of Alpana being..?
(laughing)
C. here?
C. it feels like you know everything
P: yeah, ay
C: so do you feel more confident about your medicines or is it the same as it used to be?
P: just the..
C: the same? Yeah
C. and, ehh, in which areas do you think that maybe Alpana could be helpful for you in the future
P: I don't know
C: No?
P: I don't know.
C: no
P: I don't know
C: Let me see. I think that's about it. I think I've gotten the answers to most of my questions. So, just to sum it up, the. Did the respiratory nurse visit you before Alpana came?
P: yes
C: and then she
P : but she was on holiday for a while, aye

C. so she looked at you medicines and did changes. So Alpana didn't really do that much?
P. no no
C: yeah, then I've got it all

Patient 2

C: so, eh, before Alpana came to visit you did you know why she was coming?
P: mmm
C: and why was she coming?
P2: she was coming to see about my tablets, and to see what Janet said.
J: she was shadowing me to see what I did in my job as well. Because I think she was probably one of the first people that I brought
C: okay
C: so Janet explained to you why
P: aha
C. why Alpana was coming?
P: aha
C: yes
C: and what did you know about your medicines before Alpana came to see you
P: what did I know about them?
C: yeah
C: did you know, like, you know why you take them, and everything?
P: yes
C: yes
P: yes
C: so you feel, you feel that you had enough information about them before she came to see you
P: yes
C. and did you have any problems or difficulties with your medicines before Alpana came?
P: no dear, no
C: nothing nothing
P: nothing nothing
C: nothing nothing
C: so when Alpana was here, ehm, did she explain to you how to use your medicines properly
P: nooo
C: no
C: did you, you knew that before
P: I knew that before, ay, because you get it from the infirmary anyway
C: yeah
P: I've got some from the infirmary xxx
C: yeah
C: and did she explain why you were using your tablets

C: or did you know
P: well, I know why I'm using them, yeah, yeah, I know why I'm using them, ay
C: ehm, are there any more additional things that you feel that Alpana could have dealt with when she came to see you
P: no, I don't think so. Because I think she was just, she had to see the tablets, and she looked at them all and, ehh, wondered why I was having two for water, tablets
C: mhm
P: so, eh, well, either Janet or Alpana phoned the doctor and they got one of them cancelled
C: yep, okay
P: so
C: yes
C: did you have any questions for Alpana about your medicines
P: no (laughing)
C: no
P: no, no, no. I'm on loads
C: ehm, and if you had any problems with your medicines do you think that Alpana would have helped you with that?
P: oh well, I suppose if I had asked, yeah
C: yes
C: eh, and after she came to see you have you made any changes to how you take your medicines
P: no
C: no, you do as you have, always have done
P: yes
C: yes
C: eh, and do you know more about your medicines after she came to see you, or is it the same
P: just the same love, just the same
C: the same
P: aha, ay. Because always read the leaflets anyway, that's inside the packet
C: okay
P: always read them anyway, even though I've had them for long, doesn't xxx them
C: that's good
C: ehh, and do you feel the same about your medicines or do you feel more confident about them. It's the same as, do you feel
P: I think I feel the same about the medicines, the medicines
C: yeah
P: I feel better with this right enough (points to the oxygen tube)
C: yeah
P: well, this is xxxx, it's nearly 2 year old
C: okay
P: you know, the medicines a lot older than that, you know
C: and, in which areas do you think that the pharmacist could be helpful for you in the future
P: well, I think they do all they can, because I get them, my prescription taken up and then they bring the medicine back
C: mmm

P: so I think that's very good
C: mmm
P: you know, cause saves me having to get somebody to go and collect it
C: yeah
C: is it the pharmacist that brings your medicines in
P: xxxx
C: or is it a carrier
P: somebody who works for the chemist usually
P: aha
C: I think that's about it. Ehmm. So were you happy that Alpana came to see you
P: ay, yeah. Yes, ay. I mean the way I look at it if it's gonna help that. Xxx what she was, I (didn't know what she was – you know I didn't know what she…(yes yes that's right JC) I knew she was coming to visit myself? I thought well if she's going tae help in any way then why not eh? So that was that.
C: that's good

Appendix 11

Pilot questionnaire draft 1

Personal:

Gender:

☐ Male
☐ Female

Age:

☐ *Under 60*
☐ *61 – 70*
☐ *71 – 80*
☐ *Over 80*

Do you suffer from one of these diseases? *(multiple choices are available)*

☐ Asthma
☐ COPD
☐ Diabetes
☐ Heart disease
☐ Other. Please specify: _____

Use of medication:

How many different drugs are you using at the moment? *(check/pick/choose one option)*

☐ *1-3*
☐ *4-6*
☐ *7 or more*

Have you ever received information about how to use your medication properly?

☐ *No*
☐ *Yes, from my GP*
☐ *Yes, from a pharmacist*
☐ *Yes, from another person* _____

Pharmaceutical services:

Did the pharmacist provide any new information about your medicines at the visit?

- ☐ *Yes*
- ☐ *No*
- ☐ *Got some new information, but knew a lot from before*

How many times have the pharmacist visited you?

- ☐ *Just once*
- ☐ *A few times*
- ☐ *Many times*

Do you get any benefits from this service?

- ☐ *Yes, it is useful*
- ☐ *A wee bit*
- ☐ *No, it is not useful*

If you had a problem with your medication; who identified it?

- ☐ *I identified it by my self*
- ☐ *The GP did*
- ☐ *The pharmacist did*
- ☐ *The nurse did*
- ☐ *I have never had a problem with my medications*

To summarize this questionnaire, consider this statement: "Pharmaceutical services are beneficial!"

- ☐ *I strongly disagree*
- ☐ *I disagree*
- ☐ *No opinion*
- ☐ *I agree*
- ☐ *I strongly agree*

Appendix 12

Pilot questionnaire draft 2

Gender:

☐ *Male*
☐ *Female*

Age:

☐ *Under 60*
☐ *61 – 70*
☐ *71 – 80*
☐ *Over 80*

Which disease do you suffer from? *(Multiple choices are available)*

☐ Asthma
☐ COPD
☐ Diabetes
☐ Heart disease
☐ Other. Please specify: _____

Have you ever received information about how to use your medication properly?

☐ *No*
☐ *Yes, from my GP*
☐ *Yes, from a pharmacist*
☐ *Yes, from another person* _____

Did the pharmacist provide any new information about your medicines at the visit?

☐ *Yes*
☐ *No*

If you had a problem with your medication; who identified it?

☐ *I identified it by my self*
☐ *The GP did*
☐ *The pharmacist did*
☐ *The nurse did*
☐ *I have never had a problem with my medications*

Please grade these statements on a scale from 1 to 5, where 1 is strongly disagree and 5 is strongly agree

The pharmacist seemed to take a genuine interest in me as a person

Strongly disagree 1 2 3 4 5 Strongly agree

My concerns were taken seriously

Strongly disagree 1 2 3 4 5 Strongly agree

I could understand the information that was given

Strongly disagree 1 2 3 4 5 Strongly agree

The pharmacist made sure that I understood how to take my medicines

Strongly disagree 1 2 3 4 5 Strongly agree

I was able to ask the pharmacist all the questions I wanted to

Strongly disagree 1 2 3 4 5 Strongly agree

The pharmacist told me how to take my prescriptions

Strongly disagree 1 2 3 4 5 Strongly agree

I know more about my medications

Strongly disagree 1 2 3 4 5 Strongly agree

I understand more about why it is important to take my medicines as prescribed

Strongly disagree 1 2 3 4 5 Strongly agree

Appendix 13

Pilot questionnaire final version

YOUR MEDICINE REVIEW BY THE PHARMACIST

The results from this questionnaire will help to evaluate the medication review service

Please tick:

Gender:

☐ *Male*
☐ *Female*

Age:

☐ *Under 60*
☐ *61 – 70*
☐ *71 – 80*
☐ *Over 80*

When the pharmacist came to review your medicines, did she give you any new information about your medicines?

☐ *Yes*
☐ *No*

Please grade these statements on a scale from 1 to 5	Strongly disagree				Strongly agree
• **The pharmacist made sure that I understood how to take my medicines**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
• **My concerns about my medicines were addressed**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
• **I know more about my medicines than before the visit from the pharmacist**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
• **I now understand more about why it is important to take my medicines as prescribed**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
• **The pharmacist seemed to take a genuine interest in my health**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

If you have any more comments about the medicines review, please write them here:

Thank you for your time. Please return the questionnaire in the stamped addressed envelope