

# IMPROVING THE USE OF FLEXIBLE DIURETIC REGIMENS: An integrated model of care in regional NSW

Final report June 2015  
Rural Research Capacity Building Program  
Health Education and Training Institute: Rural and Remote Portfolio



**FRANCESCA LEATON**

Heart Failure Liaison Nurse  
Clinical Nurse Specialist 2  
Adult Community Health  
The Tweed Hospital

Corner Powell and Florence Streets  
[Francesca.Leaton@ncahs.health.nsw.gov.au](mailto:Francesca.Leaton@ncahs.health.nsw.gov.au)  
07 5506 7818

## Acknowledgements

I would like to acknowledge the following people for their professional support and encouragement:

- **Greg Fairbrother**, Mentor, friend and co-researcher. Post-Doctoral Research Fellow, The Collaborative Unit, Southern Cross University, Lismore Campus and Northern NSW Local Health District – for his dedication and love of research and his generous and unwavering support from beginning to end of this project.
- **Kerry Wilcox**, Mentor, friend and co-researcher. NNSW LHD Cardiac Services and Chronic Disease Co-ordinator – for her unwavering support, positivity and encouragement.
- **David Schmidt and Dr. Kerith Duncanson**, Rural Research Capacity Building Program Officers, Health Education and Training Institute (HETI) for their dedication, consistency and support of this project.
- **Sue-Anne Mills-McCarthy**, Nursing Unit Manager, Adult Community Health, The Tweed Hospital, Northern NSW Local Health District – for her belief in my capacity to undertake this project.
- **Russell Bond**, TBHSG Health Information Manager and **Lyn Danischewski**, Deputy Clinical Information Manager, Medical Records, The Tweed Hospital, Powell Street, Tweed Heads, NSW, 2485 - for their collegial support in releasing medical records for data collection during an abnormally busy period.
- **Debbie Searle**, Chief Librarian, The Tweed Hospital, Powell Street, Tweed Heads, NSW, 2485 for assisting me with the project's literature review and ongoing support.
- And last but not least to my fellow co-researchers/colleagues for their commitment and dedication to this project:

**Dr. Di Blanckensee**  
**Dr. J. Soden**  
**Kellie Babovic**

## Abbreviations

<b>ARRG</b>	<b>Action Research Reference Group</b>
<b>CHF</b>	<b>Chronic Heart Failure</b>
<b>HF</b>	<b>Heart Failure</b>
<b>FDR</b>	<b>Flexible Diuretic Regimen</b>
<b>GP</b>	<b>General Practitioner</b>
<b>NYHAC</b>	<b>New York Heart Association Classification</b>
<b>NAHF</b>	<b>National Australian Heart Foundation</b>

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## ABSTRACT

### Improving the use of Flexible Diuretic Regimens: An integrated model of care in regional NSW

#### Aim

Chronic heart failure (CHF) is a major health burden in Australia. Flexible Diuretic Regimens (FDRs) have been shown to improve clinical outcomes and admission and re-admission rates. Despite this, potentially avoidable fluid overload related admissions continue to increase. Flexible Diuretic Regimens are commonly prescribed and managed by specialist heart failure services in large metropolitan areas however this is often not the case in rural and regional settings, where General Practitioners (GPs) are principal prescribers.

The aims of this study are to improve FDR prescribing practices among GPs in the Tweed District and reduce readmission rates at The Tweed Hospital (TTH).

#### Design

This action research project employed a mixed methods research approach. Three main methods of data collection were used: i) clinical audits (n=3); ii) Focus groups among GPs; iii) Focus groups among CHF patients.

A partnership between Northern New South Wales Local Health District (NNSW LHD), TTH, North Coast Primary Health Network (NCPHN), Southern Cross University (SCU) and Tweed Health for Everyone Super Clinic (THESC) forms the foundation of the study's Action Research Reference Group (ARRG)

#### Results

Audits (conducted prospectively over an 18 month period) demonstrated an overall increase (from 4% to 20%) in numbers of FDRs found in the medical record of randomly selected samples of CHF patients presenting to Tweed Emergency Services. A marked linear trend demonstrated increasing numbers of FDRs occurred in the outpatient setting during the study period. The study has not demonstrated a reduction in the number of fluid related admissions across audit time points 1-3.

This may be due to several factors:

- 1) The mean co-morbid accompanying illness across time points 1 - 3 were >3;
- 2) By Audit 3, only 20% of randomly selected CHF patients had a FDR in place. Whilst this was a large and significant (P=0.043) improvement over baseline, greater FDR penetration (which will likely impact admission rates) continues to be worked on, but is yet to be achieved
- 3) The progressive nature of heart failure
- 4) Delays in transmission of discharge summaries and
- 5) The omission of instructions to implement FDRs in the 'Plan' section of the discharge summary.

#### Conclusions

Clinical staff are well positioned to promote the use of the FDRs. This will help patients understand and learn about the early signs of heart failure and prepare for the many challenges that lie ahead. Implementing the FDR may be mutually beneficial; the patient stays well longer at home and the NNSW LHD benefits through health savings. The improvements in FDR use demonstrated by this project demonstrate that multiple sectors (NNSW LHD, TTH, THESC, NCPHN and SCU – Lismore Campus) can work together to achieve real practice gains..

#### Implications for practice

The utilisation of the FDR will provide improved clinical outcomes and quality of life for CHF patients and savings for the NNSW LHD.

**Keywords** - Flexible Diuretic Regimen, Chronic Heart Failure, Diuretics, General Practitioner, Heart Failure, Regional NSW.

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## EXECUTIVE SUMMARY

Chronic heart failure (CHF), a heart condition impeding the pumping and/or filling capacity of the heart, is of national and international concern. The National Heart Foundation of Australia estimates that cardiovascular health care costs currently exceed the \$5 billion per year mark with a CHF component estimated to be around \$1 billion annually. (NHFA, 2012) Currently the point prevalence is estimated to be around 500,000 or 1.5 – 2.0% of the Australian population and this figure is estimated to increase with each decade of life. For example 1% in people aged between 50 – 59 years, 10% in those 65 years and over and more than 50% in people greater than 85 years. Compounding this is the longevity of the aging population and rising tide of chronic disease (ECS, 2014; NHFA, 2011 & 2013) Globally 26 million people are affected by chronic heart failure with an estimated 5.7 million cases in the USA. (ECS, 2014) According to the European Society of Cardiology (2014), heart failure (HF) is the most common reason for hospital admission in people over 65 years with one in five people, in developed countries, expected to develop HF in the future. While there is no cure for heart failure it can be prevented with the promotion of healthy lifestyle choices and education. (NHFA, 2013) For those people already living with CHF, symptoms can be managed well with self-management tools such as the Flexible Diuretic Regimen (FDR).

Recent research indicates that over 50% of all CHF hospital admissions are avoidable with appropriate outpatient interventions such as education, better symptom management and lifestyle changes. (Longman et al. 2012; Gallagher, 2012) Despite this we continue to see escalating CHF hospital admissions and readmissions with corresponding increases in health care costs.

Chronic heart failure patients often delay seeking medical treatment simply because they do not recognise the significance of their symptoms. (Gallagher et al. 2012) Some adopt a ‘wait and see’ approach while others seek help only when their family insists. Compounding this is the difficulty some patients have distinguishing heart failure symptoms from other accompanying illnesses; this is particularly true of the elderly. (Gallagher et al. 2012) The end result is that all too often, by the time a patient contacts a health professional their symptoms have progressed to such a degree that hospital admission is the only option. (Gallagher et al. 2012) According to The European Society of Cardiology (2014) delaying hospital treatment by as little as 4 – 6 hours can increase a CHF patient’s risk of death.

Flexible Diuretic Regimens (FDRs) offer a simple user-friendly solution in the education, management and monitoring of CHF patient’s symptoms. The aim of the FDR is to help patients:

1. **Identify** the early symptoms of heart failure such as shortness of breath, peripheral and pulmonary congestion, weight gain and fatigue.
2. **Action** a simple user-friendly FDR guide directing patients to increase diuretic (fluid) medication in response to weight gains of 1 - 2kg and/or to seek medical attention.

Research clearly demonstrates that adjusting diuretic medication reduces CHF hospital admission/readmission rates and visits to the emergency department. Despite evidence to the contrary we continue to see increases in potentially avoidable fluid overload related admissions.

### The Study

Action research provides the framework for this study. The aims are to improve FDR prescribing practices among GPs in the Tweed District. A partnership between NSW LHD, TTH, THESC NCPHN and SCU forms the setting for this clinical practice improvement project. Together these organisations form the decision making body which chooses action and clinical improvements known as the Action Research Reference Group (ARRG)

Action Research (AR) involves taking improvement steps iteratively on the basis of data. Our research employs a representative and participatory Action Research Reference Group (ARRG) from the abovementioned organisations as the decision making body. The study employs three

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main methods of data collection to inform the decisions of the ARR: i) Clinical audit data. ii) Focus group data (among GPs). iii) Focus group data (among CHF patients).

## Results

While time point two (18%, n = 9) and time point three (20%, n = 10) demonstrate a small overall increase in FDR numbers of 20% from baseline (4%, n = 2) and a marked linear trend of increasing FDR numbers in the outpatient setting (n=144), the study has not directly demonstrated a corresponding reduction in the number of fluid related admissions across the same time points.

This may be due to several factors:

- 1) the older age of the population at time point two, (n = 50) and time point three, (n = 50) being 82 and 78.5 respectively compared to baseline (n = 50) age of 75.5 years
- 2) the mean co-morbid illness across all time points >3
- 3) the progressive nature of HF
- 4) delays in transmission of discharge summaries and
- 5) the omission of medical instructions to implement FDRs on the plan section of the discharge summary.

The study further demonstrates that 146 (97%) people across time points 1 – 3 (n = 150) had fluid-related causes necessitating admission and 122 (81.3%) across time points 1 – 3 (n = 150) had symptoms ranging from 2 – 30 days prior to admission.

## Recommendations

Standardising the use of FDRs for CHF patients in rural and regional NSW will provide an important self-management intervention that has the capacity to manage and monitor CHF patient's symptoms and avert unnecessary hospitalisations. Implementing and monitoring initiatives such as Health Pathways and Clinical Pathways will support and prompt health care professionals to prescribe FDRs for CHF patients. Additionally health professionals such as heart failure nurses, chronic disease practice nurses and programs such as Chronic Disease Management Program are well positioned to identify appropriate patients that would benefit from using a FDR in place action this accordingly.

### Achieving success is dependent on:

- 1) Utilising an integrated system-based approach that involves the co-operation, support and collaboration of key stakeholders such as hospitals, community health services and primary care to promote healthy lifestyle choices, heart failure monitoring and self-management to keep existing CHF patients well longer in the community and prevent others who may be at risk of heart failure live healthier lives.
- 2) Timely transmission of discharge summaries to GPs and Specialists will ensure continuity of safe and effective patient care and treatment. Thus minimising unnecessary medication errors, delays in treatment and avoidable readmissions. Finally utilising the discharge summary to prompt GPs to implement FDRs is also an important step in integrating heart failure symptoms management in the acute and community settings.
- 3) Given the projected growth of CHF in our district it is reasonable and indeed wise to consider alternative hospital avoidance schemes such as Hospital in the Home, the Chronic Disease Management Program (CDMP) and General Practice based chronic disease Practice Nurses for FDR and fluid status monitoring. Utilising the services of Hospital in the Home may potentially see CHF inpatient length of stay reduce considerably.

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## INTRODUCTION

One of the key challenges facing the NSW public health system in future decades is an aging population and the increasing prevalence of chronic disease. (NHFA 2011 & 2013). CHF is a growing burden in the Australian community. One of the ways to strengthen the management of CHF is with the FDR however this particular intervention has not been routinely used in northern NSW. This report outlines an AR project which investigates the process and impact of implementing the FDR in a regional rural community with CHF patients.

### Incidence of Chronic Heart Failure

Based on international estimates and Australian data, the prevalence of CHF in the Australian population is estimated to be greater than 500,000 or 1.5–2% of the population, increasing with each decade of life i.e. 1% in people 50–59 years of age, 10% in people aged 65 years and older and more than 50% in people aged 85 years plus with a five year survival rate of between 50–57%. (NHFA, 2011) In Australia CHF deaths rose by 20% between 2006 and 2011 (ABS, 2011) and from a global perspective approximately 26 million people are affected by CHF, leading some to describe it as a pandemic. (European Society of Cardiology, 2014)) Currently it is estimated that 5.7 million people in the USA are living with heart failure. This figure is expected to rise significantly with the aging population, by approximately 46% by the year 2030. Moreover CHF survival rates have been described as worse than those for bowel, breast or prostate cancer. (Bui et al. 2011)

### Burden of Chronic Heart Failure

Chronic cardiovascular disease contributes to more than \$5 billion annually in Australian healthcare expenditure with estimated CHF costs exceeding the \$1 billion mark. (NHFA ,2011) A significant proportion of this cost is associated with preventable CHF readmissions, which are estimated to be between 29 and 49%, within three to six months of initial discharge. (NHFA, 2013) Recent research indicates that more than 50% of all CHF hospital admissions are potentially avoidable with appropriate and timely treatment being provided in the outpatient setting. (Longman et al. 2012) In addition self-care strategies aimed at modifying risk factors such as diet, exercise, compliance with medication, tobacco and alcohol can significantly reduce the risk of most types of HF and prevent frequent and preventable hospital admissions. (NHFA, 2011)

### Monitoring and Management of Chronic Heart Failure

Compounding this is a contemporary lack of consensus about the management and treatment of CHF. Indicators of this include poor case detection, discordant management with evidence-based treatment, recurrent hospital admissions and disconnected care. (NAHF, 2013) According to the National Heart Foundation of Australia (2013) many individuals are not diagnosed in a timely manner, and once diagnosed treatment is frequently found to be sub-optimal. Diagnostic delays are often due to the under-recognition of heart failure symptoms by both the patient and their health professional. (NHFA, 2013) Additionally, it is suggested that these issues are magnified among marginalised and vulnerable populations (NHFA, 2011 & 2013). For example CHF is 1.7 times more common, and occurs at a younger age, among Aboriginal and Torres Strait Islander peoples than among other Australians. (Page et al. 2014) Recent figures show that Aboriginal and Torres Strait Islanders are more likely to die from CHF and their rate of preventable CHF-related hospitalisation is three times higher than that of non-indigenous Australians. (NAHF, 2013; Page et al. 2014)

Frequent hospital admissions are associated with an older age, being male, high levels of co-morbidity, disease acuity, depression and anxiety. Interestingly, the odds of being admitted frequently are nearly five-fold among older CHF patients. (Longman et al. 2012) Contributing to this is the fact that many deteriorating acute CHF patients are known to delay seeking medical advice by

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an average of 3-4 days and sub-acute patients anywhere from 7-10 days. (Gallagher et al. 2012) Indeed, according to The European Society of Cardiology (2014), delaying treatment by as little as 4-6 hours increases the risk of death in people with CHF.

A CHF action plan utilising a system-based approach, can integrate care, standardise treatment and promote communication and collaboration between and across health provider services. (Page et al. 2014) Achieving this should produce improved outcomes for CHF patients' quality of life and reduce the need for re-hospitalisation, a major driver in the escalating cost of CHF. (Bureau of Health Information, 2012; NHFA 2011 and 2013; NNSWLHD Strategic Plan, 2011)

## Using FDRs in the Management of Chronic Heart Failure

Dyspnoea (difficulty in breathing) is a common fluid related symptom experienced by many chronic heart failure (CHF) patients which often results in hospital admission and is seen as an early predictor of worsening heart failure. (Piano et al. 2010; Prasun et al. 2005) Chronic Heart Failure is heart failure that persists over time and is described as a condition that impedes the pumping and/or filling function of the heart. (European Society of Cardiology, 2014) Often classified as a nonspecific symptom of heart failure, dyspnoea is one of the most prominent symptoms associated with hospital admission. Prevention involves early intervention which requires the timely identification of common HF symptoms such as breathing difficulty, pulmonary congestion, fatigue, exercise intolerance, peripheral fluid retention and weight gain. (McDonald 2010; NHFA, 2011; Piano et.al. 2010)

The Flexible Diuretic Regimen (FDR) is an early intervention self-management tool specifically designed to help patients identify early warning signs and to activate a personalised diuretic self-management action plan in response to weight gains of 1-2 kilograms. (Piano et.al. 2010)

The daily use of a FDR can significantly improve patients' health and wellbeing because patients learn to develop confidence in their ability to recognise the early signs of failure and to follow an individual HF action plan instructing them to increase their diuretic medication for short specified periods of time and to seek medical advice when appropriate. This encourages and empowers patients to take control of their health through self-management. Improvements in fluid overload can also result in corresponding improvements in exercise tolerance with symptoms such as shortness of breath and fatigue, often secondary to fluid overload, being treated and actioned quickly, resulting in a higher quality of life with fewer hospital admissions. (Gallagher et al. 2012; Faris et al. 2012; Prasun et al. 2005)

Flexible Diuretic Regimens have been in use in HF Clinics in metropolitan hospitals in NSW for over 10 years. One of the main functions of a HF Clinic is to prescribe and adjust HF medications, including diuretics. In the outpatient setting an increase in diuretics is usually implemented in response to weight gains of 1-2 kg. It is not uncommon for diuretics to be increased by GPs and Physicians in response to weight gains of < 2kgs, particularly where concomitant HF and/or renal impairment is present. (Piano et.al. 2010)

In their systematic review, Piano et al. (2011) examined nine studies, among the nine studies, five were randomised. Three of the randomised trials included FDRs as part of broader multifaceted disease management programs and only two, which were reasonably small, were designed to specifically evaluate the FDR as the sole intervention. (Prasun et al. 2005; DeWalt et al. 2006) Collectively all nine studies support the idea that the FDR is potentially associated with reduced emergency room visits, reduced rehospitalisation and improved quality of life in HF patients. (Piano et al. 2011)

The Prasun et al. (2005) prospective RCT (n= 66) found that CHF patients, similar to other chronically ill patient populations such as diabetes, could be successfully taught to manage their symptoms and to self-adjust diuretic medication for short fixed periods of time after appropriate education was given. This they concluded, enabled patients to feel more in control of their illness.

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Similarly, the DeWalt et al. (2006) RCT (n=127) used a FDR self-management program designed for patients of all levels of literacy. Importantly they found that with appropriate education, in combination with an easy to read diuretic self-adjustment booklet and self-management plan, patients with lower levels of literacy benefited just as much as patients with higher levels of literacy. With careful teaching, many patients successfully incorporated diuretic self-adjustment into their daily routine and felt a greater sense of control in relation to their illness.

While DeWalt et. al (2006) RCT demonstrated fewer hospital admissions in their intervention group compared to the control group, Prasun et al. (2005) found no significant difference in HF-related hospital admissions. However Prasun et al. (2005) did demonstrate that patients using a FDR had significantly less HF-related emergency department visits.

Similarly, additional single group experimental research conducted by Shah et al, (1998) n = 27 and Steimle et al. (1997) n = 23 also found a corresponding decrease in HF related hospital admissions and significant improvements in fluid related symptoms. While these results are encouraging both studies were part of larger multifaceted disease management programs and could not assign success to any one intervention.

A significantly larger (n = 297) 2012 FDR-focused case-control study, nested in a HF self-care randomised trial was conducted by Jones et al. who concluded that optimal adherence to weight monitoring ( $\geq 6$  out of 7 days) among all case and control time periods (n = 891, OR 0.49, CI 95% 0.28 – 0.84) and diuretic self-adjustment ( $>6$  out of 7 days) among all case and control time periods (n = 891, OR 0.43, CI 95% 0.20 – 0.95) were associated with lower odds of HF related emergency department visits and hospitalisations.

Importantly Jones et al. (2012) concluded that further evaluation of adherence to weight monitoring and diuretic self-adjustment could provide valuable insights into the efficacy of interventions that promote and utilise self-care strategies in the management of HF. Adopting self-care and self-management strategies such as weight monitoring in combination with a FDR may provide an important step in reducing HF-related morbidity a common cause of frequent hospital admissions and offer valuable insights into the efficacy of the FDR.

The abovementioned studies were undertaken in large metropolitan hospitals in the USA with heart failure clinics and affiliated universities. To date there has been no Australian rural or regional research undertaken on FDRs . Flexible Diuretic Regimens are commonly prescribed and managed by specialist heart failure services in large metropolitan hospitals in Australia. However this is often not the case in rural and regional settings which lack the necessary resources and depend primarily on GPs as the principle prescribers of FDRs.

### **Aims of this study**

The aims of this study were to explore the use of FDRs in the rural regional context, improve FDR prescribing practices among GPs in the Tweed District, reduce readmission rates at TTH, raise awareness about CHF and promote collegiality among the key stakeholders.

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## ACTION RESEARCH PROCESS AND FINDINGS

Action research (AR) has been used to progress social and organisational change since the beginning of the 20<sup>th</sup> Century. AR is usually attributed to the work of seminal psychological theorist Kurt Lewin who first coined the term while pioneering research around social reform after World War 1. Over the years, it has been used frequently in nursing and health to address practice change and development. (Munn-Giddings et al. 2008)

Lewin's (1948) Action research model involves four iterative stages of collectively planning, acting, observing and reflecting. These stages include; identifying the problem, reconnaissance or fact finding, planning action, action, evaluation, action and monitoring action. (Ivankova, 2014)

The basic principle of AR is that research should lead to change. It is an attractive methodological approach, often used in health and education to bridge the gap between theory and practice. AR is problem focused; future orientated and grounded in the reality of practice which means it can be carried out as part of, rather than alongside, practice. (Munn-Giddings et al. 2008)

This study employs a variant of Lewin's (1948) AR model. Grounded in Critical Pragmatism (CP) (Johansson & Lindhult, 2008) AR prepares the way forward for practice change. Pragmatism originated in the 20<sup>th</sup> Century, with the American philosopher Charles Pierce (1839 – 1814) who first coined the term to describe methods of finding practical solutions to every-day problems. Critical Pragmatism provides the foundation and framework for this research because it is 'critical' of and seeks to change existing FDR practices in rural/regional NSW without being grounded in either Marxism or the Frankfurt School of Critical Social Theory. (Johansson & Lindhult, 2008)

The purpose of this research was to improve practice by improving the number of FDRs being used in the local community, through raising awareness about its use in the management of fluid overload. AR provides the observation/investigation of this change process with a method that monitors and evaluates the progress of the study iteratively through cycles of action and reflection. (See Appendix 2 and 3)

The key stakeholders include: NNSWLHD, TTH, THESC, NCPHN and SCU. These stakeholders together formed the Steering Committee which ultimately became known as the Action Research Reference Group (ARRG)

Representatives from the above organisations consist of two senior cardiac nursing clinicians from the NNSWLHD and TTH, two General Practitioners from THESC, one participant from NCPHN and a Research Fellow from SCU.

The study setting was TTH, a regional hospital situated in Northern New South Wales with a capacity of 250 beds.

### The History

In November, 2012, prior to the current research, NCPHN and NNSWLHD hosted a workshop titled 'NSW Chronic Disease Management Program Workshop'. This was an interactive multidisciplinary event bringing together the Local Health District and primary care providers with the purpose of closing information gaps and improving and redesigning current services in chronic disease management. This workshop formed a starting point to chart a way forward to develop a new approach to integrated care within our local district.

Chronic heart failure and fluid management were identified as a major problem in the workshop and a small group of interested professionals formed a Steering Committee with the aim of redesigning

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and implementing a FDR as a self-management tool for improving fluid management in CHF patients in the outpatient setting.

### Phase 1- Reflection (See Appendix 2 – 3)

The inaugural Steering Committee meeting was held on 8/4/2013 with the purpose of determining the structure of the project, ensuring compliance with NNSWLHD policy and providing a foundation for the Steering Committee’s operation. Members of this committee would later be invited into the research project as co-researchers, and the Steering Committee was renamed Action Research Reference Group (ARRG). Our objectives were **three-fold**:

1. To develop a FDR weight diary and action plan that clearly and simply set about educating patients via the following steps:
  - a) Recognising the symptoms of fluid overload;
  - b) Understanding the importance of taking action when deteriorating; and
  - c) Following instructions as set out in the FDR to increase diuretic medication.
2. To raise awareness about HF fluid management via hospital in-service for doctors and nurses and education evenings for GPs in the local community.

Developing collegial relationships between the key stakeholders involved with the project. The Steering Committee agreed that for the purposes of documentation and as a method for data collection, minutes would be recorded for future meetings which continued throughout 2014 with the final meeting being held on 4/5/2015.

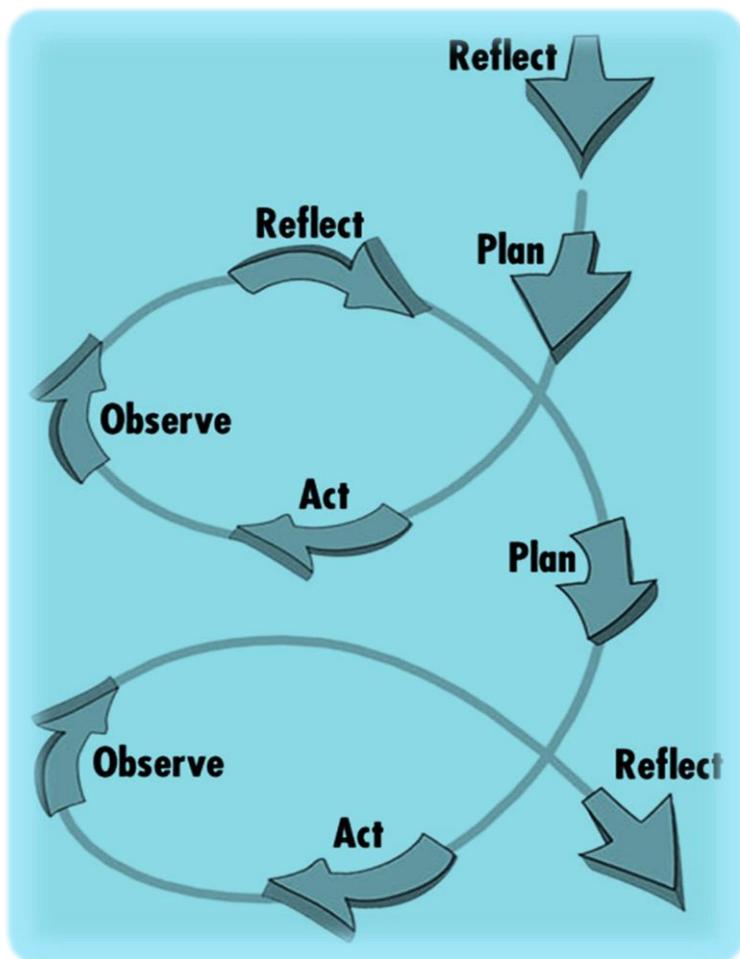


FIGURE 1

### ACTION RESEARCH CYCLES Please refer to larger diagram in Appendix 3 for description of Stages 1 – 10)

This diagram illustrates the stages and steps involved in the study’s AR cycles. **Step one** reflects on identifying the problem. **Step two to four** involves planning and measuring our progress. **Step five** is concerned with action and implementing a FDR redesign into practice. **Step six** involves further observation, evaluation and reflection of the results of the study’s data collection with the ARRG. **Step seven** returns to planning. **Step eight** returns to action in hosting PR events. **Step nine** monitors and observes ongoing mapping of FDR utilisation. **Step 10** reflects and reviews our progress.

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## Stage 2 – 4 (See Appendix 2 – 3)

The planning stage of the AR cycle officially began with the fourth meeting on 9/9/2013 and incorporated the previously endorsed objectives of the Steering Committee. The reference group elected to rename the Steering Committee the FDR Action Research Reference Group (ARRG). Over the duration of the study the ARRG met regularly - initially monthly during 2014 and then bi-monthly during 2015. Attendance has ranged from approximately five to six participants..

The ARRG elected to invite GF, SCU Post-Doctoral Research Fellow to join the group to undertake data and statistical analysis and offer mentorship to the Principle Researcher (FL), a novice researcher. The Action Group Reference Group received ethics approval on 12/12/13 followed by SSA (Site Specific Application) approval on 3/2/2014.

Collectively the ARRG chose the research framework and approach to data collection. This included a baseline audit followed by two further audits at six monthly intervals and two focus groups. All audits were carried out by the Principle Researcher (FL). The GP and Patient Focus Groups were facilitated by co-researcher (KW) and observed, transcribed and analysed by (FL). Co-Researchers (KW) and (GF) supervised and mentored the Principle Researcher (FL) in the process of thematic analysis. Due to staff changes RM was replaced by KB. An amendment to the Ethics Committee was lodged and approved on 27/11/2014.

In preparation for measuring current FDR prescribing rates and to evaluate and analyse HF admission criteria an audit tool was designed by (FL) and (KW) in February, 2014. The audit tool was trialled with 30 CHF patients and appropriate changes made over a six month period prior to commencing this study. (See Appendix 1)

Meeting eight, held on 7/4/2014, was concerned with collaboration and assessment of the results of the FDR intervention baseline audit. The baseline audit results suggested that significant opportunities existed for improvement in FDR prescribing rates, service utilisation efficiencies and admission avoidance. ARRG meetings nine and ten, held on 4/8/2014 and 2/2/2015 respectively discussed and reviewed post intervention Audits two and three. At these meetings baseline results were compared with post FDR intervention Audits two and three and revealed significant work needed to be undertaken to improve existing FDR practices at TTH.

## Stage 5 - Action (See Appendix 2 – 3)

### Working Party Redesign of the FDR

In early 2014 co-researcher KW organised an independent working party consisting of two cardiologists and eight HF nurses to brainstorm ideas to improve the current design of the FDR. Relevant information was collated from the working party itself and combined with data from the ARRG and GP and Patient Focus Groups to create a new and improved version of the FDR.

Four versions were trialed over a one-year period; each version underwent screening for health literacy competency prior to the final version being published. Hospital records confirmed that 144 FDRs were implemented over the duration of the study. Each of these patients received two home visits that included initial FDR education and follow-up phone calls at six weekly intervals from the heart failure nurse (HFN). At a three-month time point patients were referred to the Chronic Disease Management Program for ongoing telephone support with fluid-related symptom management and FDR support and education.

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## Stage 6 – Reflection (See Appendix 2 – 3)

This stage primarily involved assessment and reflection on the results of our data collection i.e. 3 x audits and two focus groups. However, importantly observation and reflection occurred both individually and collectively within each stage of the action cycle through the regular monthly/ bi-monthly ARRГ meetings.

## Stage 7 - Planning (See Appendix 2 - 3)

In response to the ARRГ objective of raising awareness and familiarising GPs, Specialists and other health care professionals with the benefits of using a FDR, several events were planned to promote its use.

Locally a Heart Failure Conference was organised in Byron Bay on 7<sup>th</sup> September, 2013. The audience consisted of local GPs, Practice Nurses, Nurses, Pharmacists, Dieticians, Exercise Physiologists and Physiotherapists. Three CHF guest speakers were invited to the conference to share their experiences in relation to living with CHF. Additionally, a GP education evening titled 'Best Practice in Managing Medications' was also held on 27/2/2014, as a means of raising awareness in the local community about HF medications and FDRs. This event was hosted and organised by Doctors Blanckensee and Soden.

Several hospital in-services including Nursing and Medical Grand Rounds and Medical Orientation were attended by the Principle Researcher (FL), with the aim of familiarising doctors and nurses with the FDR. Hospital in-service continued throughout the duration of the study. A GP education evening titled '**Best Practice in Managing HF Medications**' was scheduled for 27<sup>th</sup> February 2014, hosted and presented by Cardiologist, Dr. A.J. Gandhi and Doctors DB and JS from Tweed Health for Everyone Super Clinic, KW from NNSWLHD and FL from TTH. This event was organised by RM who was later replaced by KB from NCNSW ML, and KW from NNSWLHD. Fran Leaton published an article in the summer edition, December, 2014, of GP Speak, titled '**Keeping patients with HF out of hospital - General Practice and the Local Health District working together**'. Additionally FL was invited to present our research undertaken to date at the NCPHN **Copernican Inversion Series Breakfast** at Kingscliff in August 2014.

## Stage 8 – Action (See Appendix 2 – 3)

The AARG continued to map, track and review the FDR Working Party's progress of the several draft versions prior to the final FDR being published and disseminated locally to GPs, Chronic Disease Practice Nurses, HF Specialist Nurses and members of the Clinical Cardiac Advisory Group with the aim of changing current practice.

Hosting the above events listed under Stage 7 Planning as a promotional and educational tool to help change practice.

## Stage 9 –Observe (See Appendix 2 – 3)

The ARRГ continued to monitor FDR numbers and FDR awareness with GPs and CHF patients with ongoing education, correspondence and telephone calls to GPs, Chronic Disease Practice Nurses and the Chronic Disease Management Program's staff, whilst simultaneously monitoring FDR use at TTH through discharge summary transmission to CHF patients.

## Stage 10 – Reflection (See Appendix 2 – 3)

The ARRГ continued to reflect on FDR promotion and considered the inclusion of the FDR in local Health Pathways in the outpatient setting and the development of a clinical HF pathway in the hospital setting. Appointments with appropriate personnel at TTH are planned for the future.

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Consideration is also underway to extend this research project by two years to include further audits to track FDR numbers in the hospital setting whilst simultaneously tracking outpatient numbers well into the future.

## QUALITATIVE DATA ANALYSIS

### Focus Group History

In February 2014 an electronic invitation was circulated to local GPs in the Tweed district by co-researcher (KB) of the NCPHN. Two female and two male GPs accepted the invitation and met for dinner held at an off-site location (See Appendix 4) Three months later, the patient focus group was held in a meeting room on-site (See Appendix 5). Invitations were mailed to 10 CHF patients who were currently using a FDR. Five were male and five were female. Two patients declined and three failed to respond. The remaining five being all women accepted the invitation. Consent forms were signed, returned and archived as per ethics protocol. The duration of both events was 1.5 hours. All focus group questions were designed as open-ended to allow for spontaneous dialogue. Participants for both focus groups were selected using purposive sampling. Both focus groups were recorded and transcribed verbatim by the primary researcher (FL) using Microsoft word format.

Eligibility criteria for the GP Focus Group included working in the local Tweed district and a willingness to attend. The Purpose of the GP focus group was to explore local GPs' views and practices surrounding the use of FDRs and what if any, were the potential barriers to prescribing. Whereas the Patient Focus Group's inclusion criteria included CHF patients with a diagnosis of heart failure with either preserved or unpreserved systolic function, English speaking or English as the second language and living in the Tweed district. The purpose of the Patient Focus Group was to explore patient experiences in relation to CHF self-management and the FDR. The chosen format for both focus groups included open-ended and semi-structured questions (See Appendix 4 and 5 respectively). This chosen format facilitated flexibility and encouraged further dialogue within both groups.

### Findings

Analysis of resulting textual data was progressed using descriptive thematic analysis as described by Sandelowski & Barroso (2003). This approach entailed typologically moving further away from the data towards a more conceptual thematic description of the themes within the data. The focus groups were audio-recorded and cross checked by co-researcher (KW). Transcripts were coded by the principle researcher FL using an open coding process via a cut and paste method (Pope et al. 2000). Consistent with descriptive thematic analysis, codes were identified and assigned to major themes. Two major themes were identified each containing two sub-themes:

- 1) **FDRs empower patients to take responsibility for their illnesses:**
  - a) Education (helping patients to take control)
  - b) Education (informing GPs)
  
2. **Collaboration occurs variably between the acute and primary health care sectors:**
  - a) Timing
  - b) Care co-ordination

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## Major Theme 1 - FDRs empower patients to take responsibility for their illnesses

A key guiding principle to any integrated approach to patient care includes empowerment. The patient is supported and encouraged to manage and take responsibility for their health. Doctors and patients in both focus groups were unanimous in their opinions that having a FDR in place supports the principles of self-empowerment and responsibility.

***‘...initially they might be reluctant to do the thing but slowly they get to understand that they can control what is happening to them and they know when to get help or when they need to access medical people’ (GP 1)***

***‘... that’s the change I saw in people who have been started on a FDR that they are taking more care of themselves. Rather than once in a blue moon standing on the scales or when they go to hospital’ (GP 1)***

Engaging patients in daily FDR self-management enables and strengthens ownership and responsibility.

***‘I start thinking from the moment my foot steps on the floor in the morning ..... you have to be thinking about your weight, fluid intake and what you are going to eat .... you have to be in control if you want to look after yourself’ (Patient 1)***

***‘well it’s all about supporting people to take responsibility for their own health ... we should all be doing that anyway’ (Patient 4)***

Despite the promotion of CHF self-management in national guidelines and interventions, gaps remain. Basic practices in CHF self-management such as weight monitoring, were seldom evident in a review of 63 qualitative studies examined by Clarke et. al (2014), despite evidence that CHF patients are enthusiastic, possess the appropriate literacy skills and are capable of self-managing (De Walt, 2006). Similarly, research conducted by Nieuwenhuis et al. (2011) demonstrated the need to improve CHF patient self-care with many patients having low compliance to weight monitoring and regular exercise and who are disadvantaged by their rural location in accessing specialist heart failure services.

Health professionals in both the inpatient and community sectors are well positioned to address this gap in CHF self-management by promoting and initiating the use of a FDR in the inpatient and outpatient settings. An important aspect of the FDR is that it incorporates a comprehensive HF action plan that includes the essentials of CHF self-management such as monitoring daily weighs, sleep patterns, feet/leg oedema and the identification of the early signs of failure. This acts as an education tool, guiding patients with their weight and fluid management.

### Sub theme 1 (a) - Education (helping patients take control)

Education enables CHF patients to learn about self-management. It is the window through which a patient comes to terms with the concepts that can empower them to take responsibility for their health. This can result in significant improvement to their quality of life.

Doctors viewed patient education as the foundation for self-management:

***‘.... I think is also about the education that ‘x’ gives, once they have been educated they know exactly what they are doing. They don’t feel they have to rush off to hospital. They feel they can manage it themselves’. (GP 2)***

From the patient’s perspective:

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***'I feel it has improved things for me because I wasn't aware before. I didn't understand that I had to take an extra Lasix when I had those problems'. (Patient 4)***

Patients talked about CHF self-management in terms of a complete lifestyle change. :

***'it's a whole lifestyle change'. (Patient 2)***

A major key to CHF self-management is the skill of identifying the early subtle changes in symptoms which are often not actioned if patients lack appropriate knowledge, confidence or downplay the severity of their symptoms. Typically this category of patient has multiple presentations to the Emergency Department and admissions to hospital. Clark et. al (2014)

Educating people about how to support a partner or family member who has heart failure is also an important aspect of promoting self-management and self-care. Patients are more likely to engage in beneficial and healthy behaviours if they have someone to support them. (Clark et al. 2014)

### **Sub-theme 1 (b) - Education (informing GPs)**

GPs expressed a clinical scenario where gaps in knowledge were common:

***'But the problem you have is that some GPs won't even know what an FDR is and what they are supposed to do with it'. (GP 3)***

The authors felt it important to identify and address potential barriers which have previously hampered the use of the FDR. Our purpose was to create and raise awareness in the local community about CHF, fluid management and the benefits of using a FDR. To this end we organised a GP education evening, HF conference titled Heart Failure and Fluid Management' and published an article in the summer edition, December, 2014, of GP Speak, titled 'Keeping patients with Heart Failure out of hospital - General Practice and the Local Health District working together'.

### **Major Theme 2: Collaboration occurs variably between the acute and primary health care sectors**

GPs felt there was a significant deficit in the co-ordination of care and communication between the inpatient and outpatient sectors. Collaboration is particularly important in CHF because of the progressive nature of the illness which requires ongoing collaborative medical management and care. (Page, 2014)

***'So the main thing that I think creates problems for us is patients get out of hospital and are back on our doorstep on Monday and we have no information. So even though we have electronic exchange I am still getting discharge summaries 2-3 weeks after the patient has been discharged'. (GP 2)***

The topic of poor co-ordination of information between acute and primary sectors is not new. In their retrospective study of 16,496 discharge summaries Li et al. (2013) found that 7,829 (47.4%) of discharge summaries were finalized prior to or on the day of discharge, 3,084 (18.7%) were completed within 48 hours of discharge, 1,899 (11.5%) were not completed within a week, 3,397 (20.6%) were not completed at seven days and 1,498 (9.1%) were never produced. These figures are concerning given that many patients follow-up with their GPs approximately five –to seven days after discharge and expect to receive instructions and continuity of care. This places GPs in a difficult position to navigate patient care and treatment.

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Hospital discharge is a widely recognized transition where patient harm can occur. According to Sponsler et al. (2015) as many as 70% of patients have unintentional medication discrepancies at hospital discharge. An estimated 50% experience a clinically important medication error within the first few weeks of discharge and a further 20% experience an adverse drug event after discharge that may potentially cause harm if left uncorrected.

Li et al. (2013) found a linear trend between the delay in transmission of the discharge summary and the readmission rate, whether measured at seven days ( $P < 0.001$ ) or 28 days ( $P = < 0.001$ ) post discharge. Importantly patients with no discharge summary had the highest rate of readmission and a delay of over seven days was equivalent to no discharge summary in terms of its effects on readmission rates at either seven or 28 days. Additionally Li et al. (2011) found 11% of patient discharges had a preventable adverse event in the month post hospital discharge and many of these events were related to inadequate communication between health care providers.

### **Sub-theme 1 (a) : Timing is everything**

Consensus regarding timing was seen to be an important factor in successfully implementing a FDR. Doctors voiced their dissatisfaction with the current system, suggesting that the admitting inpatient team make recommendations in the plan section of the discharge summary, for the GP to implement a FDR after discharge.

***‘Timing is everything - the patient comes to see me after he is discharged from hospital - this is the right time to initiate a FDR. If it comes after this time then the thing is lost’. (GP 2)***

***‘..... as GP 2 has mentioned if it is there on the discharge summary obviously that will trigger something’. (GP 1)***

These suggestions demonstrate the need for a coordinated and collaborative approach and highlight the importance of sharing patient information in a timely manner. This should enable GPs to efficiently action recommendations and changes in treatment prescribed by the admitting medical team. Addressing this existing fragmentation in communication between the acute and primary sectors will provide a holistic approach that ensures continuity of care and treatment (Page, 2014).

### **Sub-theme 2 (b): Care Co-ordination**

Patients expressed concern regarding the lack of communication and continuity of care between health providers.

***‘I have to have a colonoscopy and what I have gone through (sigh)! I have my Heart Specialist fighting with the Gastroenterologist about what he has to do. They are backwards and forwards fighting with each other and all the time here I am waiting to have the procedure’. (Patient 1)***

***‘There seems to be an argument between them going on all the time i.e. who knows best versus who knows bester’ (group laughing). (Patient 3)***

However not all patients expressed such dissatisfaction. In fact the following patient’s experience was quite different:

***‘I feel that I am lucky. I have my group of doctors that I see and they all talk to one another. Information is sent on .....’ (Patient 2)***

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Improving patient outcomes is an important goal in CHF management. However this will not occur until health providers and services work together to address gaps in the way patient information is managed. The benefits of this include fewer medication errors, improvements in evidence-based clinical care and clinician and patient satisfaction, and reductions in patient mortality, hospital admissions, readmissions and visits to emergency departments (Martinez-Gonzalez et al 2014; Page et al. 2014).

## REFLEXIVITY

The Principle Researcher (FL) works as a clinical nurse in the area of HF. She has been nursing for over 30 years and has worked as a cardiac nurse for the past 10 years. Currently FL works as the HF Liaison Nurse, Clinical Nurse Specialist Level 2, for TTH and has held this position for the past five years. She therefore had an existing relationship with all five patients and two of the four doctors participating in this study. Despite having experienced an open and honest relationship with the study's participants and believing patients and doctors to feel comfortable and honest in their responses, FL chose to separate herself further by stepping into the role of 'observer' during the focus groups. While co-researcher KW facilitated both focus groups, all FDR home visits, follow-up home visits and phone follow-up was conducted by (FL) over the duration of the study.

## QUANTITATIVE DATA ANALYSIS

De-identified data collected was manually entered into a Microsoft Excel Spread Sheet by the Principle Researcher (FL) and sent to co-researcher (GF) for analysis using SPSS V21.

For all three clinical audits a random retrospective sampling of all CHF admissions to Tweed Hospital was utilised. This ensured adequate representation outwards to the wider population of all CHF patients who are admitted in the district.

In each audit a purposive sample size of 50 was drawn. This represents an approximate one-in-eight sample of all patients who would have presented to TTH in the previous 12-month period canvassed by the study.

A total of three inpatient audits ( $n = 150$ ) were undertaken from January 2013 to June 2014. Each audit consisted of ( $n = 50$ ) MRNs. To meet eligibility criteria all MRNs required a primary/principle diagnosis of heart failure with a corresponding ICD code of I50 – I50.9

Key variables of interest as outlined in the Audit Tool attached as Appendix 1 were summarised using descriptive statistics. Key variables were tracked retrospectively across the three audits. Inferential statistics were utilised to assess the significance of any differences located over time. Additionally, and separately to the detailed clinical audit process described here, raw numbers of implemented outpatient FDRs were tracked and trended though out the study period. This was achieved jointly by FL and the Tweed local GP community by implementing FDRs with appropriate CHF patients and their GPs, either through inpatient or outpatient referrals.

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**TABLE 1**  
**THE TWEED HOSPITAL**  
**CHF DESCRIPTIVE DATA ACROSS TIME POINTS 1 – 3**  
**(N = 150)**

Variable	Audit 1 (n = 50) Jan – June 2013	Audit 2 (n = 50) July – Dec 2013	Audit 3 (n = 50) Jan – June 2014	Difference by Audit No. (P)
<b>Gender:</b>				<b>0.47</b>
Male	30 (60 %)	24 (48 %)	28 (56 %)	
Female	20 (40 %)	26 (52 %)	22 (44 %)	
<b>Age in years:</b>				<b>0.006</b>
<51	6 (12%)	0	2 (4%)	
51-60	12 (24%)	0	4 (8%)	
61-70	6 (12%)	0	6 (12%)	
71-80	32 (64%)	44 (88%)	40 (80%)	
81-90	38 (76%)	44 (88%)	46(92%)	
>90	6 (12%)	12 (24%)	2 (4%)	
<b>Fluid Related Reasons for Admission:</b>				
Acute Pulmonary Oedema	3(6%)	4 (8%)	1 (2%)	
Dyspnoea	4 (8%)	2 (4%)	2 (4%)	
Shortness of breath (SOB)	11 (22%)	9 (18%)	14 (28%)	
SOB with peripheral oedema	18 (36%)	21 (42%)	18 (36%)	
Peripheral oedema	5 (10%)	9 (18%)	10 (20%)	
Exacerbation of CCF <sup>^</sup>	7 (14%)	3 (6%)	4 (8%)	
Exacerbation of CCF and COPD <sup>#</sup>	1 (2%)	0	0	
<b>Non Fluid-related reasons for Admission:</b>				<b>0.45</b>
Chest infection	0	1 (2%)	0	
Pneumonia	0	2 (4%)	0	
Chest pain	1 (2%)	0	1 (2%)	
<b>Number of co-morbidities:-</b>				<b>0.70</b>
1	2 (4%)	2 (4%)	2 (4%)	
2	5 (10%)	8 (16%)	11 (22%)	
3	18 (36%)	10 (20%)	14 (28%)	
4	13 (26%)	14 (28%)	10 (20%)	
5	8 (16%)	12 (24%)	6 (12%)	
6	2 (4%)	4 (8%)	5 (10%)	
>6	1 (2%)	0	2 (4%)	
<b>Number of FDRs in place:</b>				<b>0.04</b>
Yes	2 (4%)	9 (18 %)	10 (20 %)	
No	48 (96 %)	41 (82 %)	40 (80%)	
<b>Avoidability/Unavoidability:</b>				<b>0.96</b>
Admission <i>avoidability</i> – symptoms > 2days	40 (80 %)	41 (82 %)	41 (82 %)	
Admission <i>unavoidability</i> – Symptoms < 2 days)	10 (20 %)	9 (18 %)	9 (18 %)	

<sup>^</sup>CCF is an abbreviation for congestive cardiac failure

<sup>#</sup>COPD is an abbreviation for chronic obstructive pulmonary disease

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Difference in gender breakdown across audit stages was not significant ( $\chi^2=1.5$ ;  $P=0.4$ ). Age difference across the audit stages was significant (Mean age: audit 1=75 years; audit 2=82 years; audit 3=79 yrs. ANOVA:  $F=5.2$ ;  $P=0.006$ ). Reasons for admission were classified as fluid- or non-fluid-related with most admissions being fluid related. There was no difference across the audit stages regarding fluid/non fluid-related admission reason (Kruskall-Wallis Test,  $P=0.45$ ). Differences in 'FDRs in place' rates across the audit stages was significant ( $\chi^2=6.3$ ;  $P=0.043$ ). Whereas differences in admission avoidability were not significant across the 3 audit stages: ( $\chi^2=0.09$ ;  $P=0.96$ ).

**TABLE 2**  
**THE TWEED HOSPITAL**  
**CHF SERVICE UTILISATION DATA**  
**ACROSS TIMEPOINTS 1 – 3**  
**N = 150**

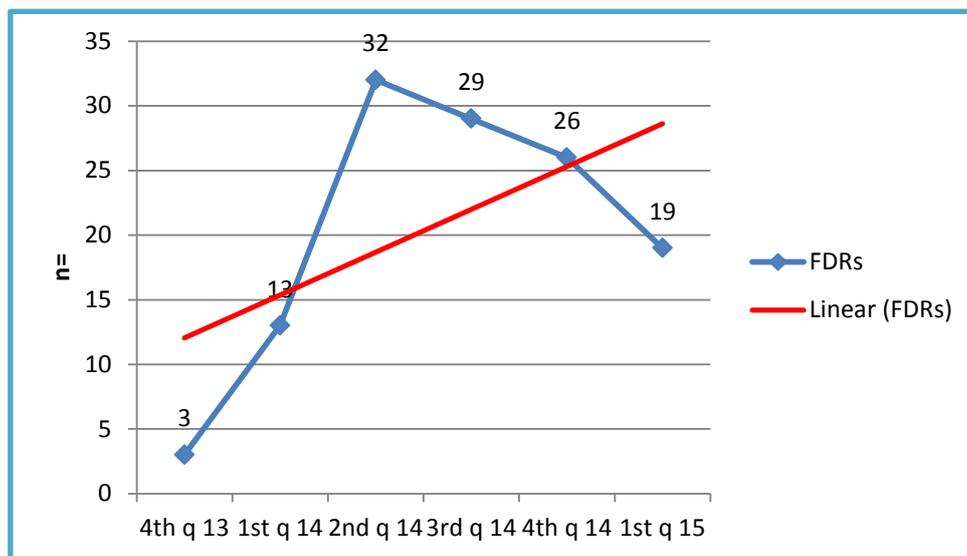
Variable	Audit 1 (n = 50) Jan - June 2013 Mean (SD)	Audit 2 (n = 50) July – Dec 2013 Mean (SD)	Audit 3 (n = 50) Jan – June 2014 Mean (SD)	Difference by Audit Number (P)
Number of bed days: In current admission	5.0 (4.5)	4.7 (3.5)	5.9 (6.4)	<b>0.48</b>
All Cause Admissions: Previous 12 month period	2.9 (2.0)	3.7 (2.8)	3.8 (2.7)	<b>0.18</b>
Heart Failure Admissions: Previous 12 month period	1.4 (0.8)	2.0 (1.5)	1.6 (1.2)	<b>0.06</b>
Number of Co-Morbidities	3.5 (1.3)	3.8 (1.3)	3.2 (1.5)	<b>0.70</b>

Differences in utilisation rates were not significant across the audit stages (Bed days:  $F=0.7$ ;  $P=0.48$ . Admissions:  $F=1.8$ ;  $P=0.18$ . HF admissions:  $F=2.8$ ;  $P=0.06$ ), although the mean number of heart failure admissions was markedly higher at time-point 2. Given that time-point 2 yielded a significantly older sample than time points 1 and 3, it is perhaps unsurprising that we saw a 'spike' in previous HF admissions in the time point 2 sample. Similarly differences in the number of co-morbidities was not significant across time points 1 - 3 (ANOVA:  $F=0.36$ ;  $P=0.70$ )

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Figure 1

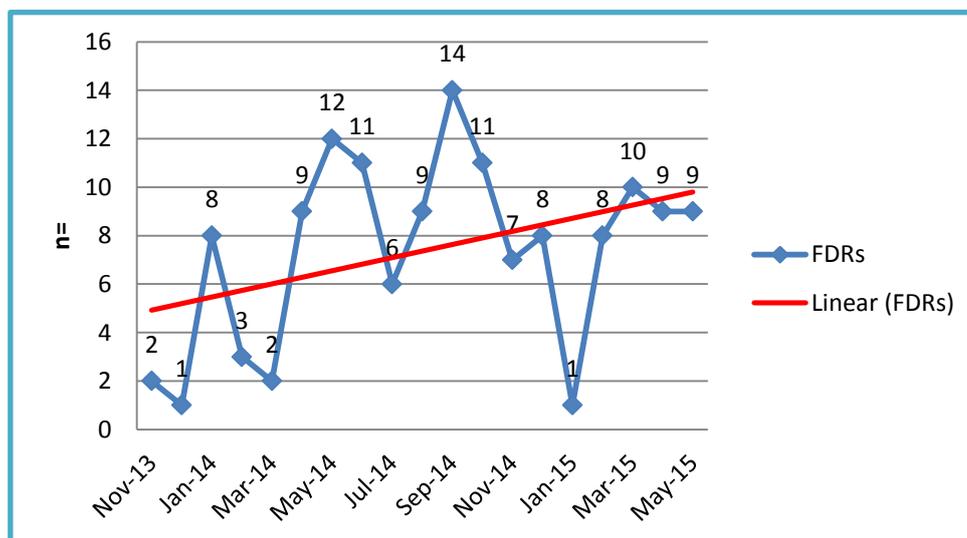
### Linear Trend of Quarterly Outpatient Implemented FDRs



- A marked linear trend is represented in Figure 1, indicating an increase over a one-year period from three FDRs in Quarter 4, November, 2013 to 29 FDRs in Quarter 4, 2014.

Figure 2

### Linear Trend of Monthly Implemented FDRs



- Figure 2 demonstrates a gradual monthly increase over time with reduced numbers in March, 2014 (Easter), July, 2014, November, 2014, January, 2015 (Christmas)

## DISCUSSION

This study demonstrates that 81.3% (n = 150) CHF admissions were avoidable i.e. had symptoms ranging from 2 – 30 days prior to their admission with 90% (n = 150) experiencing a fluid overload component as the 'Reason for Admission' (Table 1). Many CHF patient symptoms such as fluid overload are amenable to appropriate non-hospital health care services (Longman et. al. 2012) and interventions such as the FDR. These patients may have responded well to the implementation of an FDR and contributed substantially to reducing the annual Australian Chronic Heart Failure burden of \$1 billion. (NHFA 2011) Despite this we continue to see increasing numbers of avoidable fluid related hospital admissions.

Some reasons, previously outlined in the literature, may include: the discordant management of CHF, lack of understanding about self-management, lack of confidence patients have in recognising the early signs of deterioration, delays in seeking medical attention – taking a 'wait and see' approach, delays in transmitting discharge summaries with associated delays in patient care and treatment and avoidable readmissions, fragmentation in communication between acute and secondary care and the progressive nature of CHF.

Many of these reasons are amenable to community support with the FDR. GPs, Heart Failure and Chronic Disease Practice Nurses and the Chronic Disease Management Programs are well positioned to support CHF patients' action the FDR 'Action Plan' in response to weight increases and assist patients adjusting diuretic doses as set out on the 'Action Plan' inside the FDR. This may assist markedly in reducing delays in treatment and improving patient outcomes.

The study has in part achieved its original aims of 1) Increasing FDRs in the local region, 2) Raising awareness about HF and 3) Bridging gaps in communication between the inpatient and outpatient sectors.

Hospital records indicate that over the duration of this research and in combination with inpatient hospital Audits 1-3, 144 FDRs have been implemented in the outpatient setting (see Figure 1 and 2). This has resulted in the development of a close collaboration and integration of services between the Heart Failure Service at TTH and local Primary Care working to improve existing FDR numbers.

While time point two and time point three demonstrate a small overall FDR increase of 20% from baseline (4%, n = 2) (see Table 1) together with the implementation of 144 FDRs in the outpatient setting (see Figure 1 and 2), the study has not directly demonstrated a corresponding reduction in the number of fluid related admissions across time points 1-3 (see Table 2). This may be due to several factors: 1) the older age of the population at time point two, (n = 50) and time point three, (n = 50) being 82 and 78.5 respectively compared to baseline (n = 50) age of 75.5 years, 2) the mean co-morbid illness of the combined time-points (n = 150; mean = 3.5), 3) the progressive nature of HF and 4) delays in transmission of discharge summaries. (See Table 1)

These findings are consistent with Lil et al, (2013) who found increasing rates of unplanned hospital readmissions were more frequently associated with a lack of discharge summary finalisation than age. Whereas Longman et al. (2012) found several factors were associated with frequent hospital admissions such as age; being older, having several co-morbidities and a diagnosis of HF. Importantly having a diagnosis of HF increased the odds of very frequent hospital admission approximately five-fold and a Charlson Co-morbidity Index of three or more co-morbidities nearly quadrupled the odds of having four or more admissions. (Longman et al. 2012) Within this context it would be reasonable to see an increase in readmissions, however this is not the case in our study. The static readmission rate in our study may be due in part to FDRs being implemented in the outpatient setting (n = 144).

The high reported rates of various symptoms from two to 30 days prior to admission, combined with 90% of patients experiencing fluid-related problems necessitating admission was consistent with research conducted by Chaudhry et al. (2007) who found many HF patients had gradual weight

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gains up to 30 days prior to admission with more significant weight gains occurring seven days prior to admission. This emphasises the importance of implementing an FDR at an early stage after a person is diagnosed with heart failure and can then monitor weight gains and increase diuretic medication accordingly.

Raising FDR awareness within the inpatient setting involved ward in-service and Nursing and Medical Grand Rounds. While information was well received from nursing and medical staff, the practical implementation of GPs recommendations to include FDR adjustments in the plan section of the discharge summary was often not actioned when randomly audited by (FL) despite clear written instructions in patient notes recommending FDR implementation after discharge. While this is a limitation of the study, the timely arrival of Health Pathways (HP) in NNSW LHD will promote the standardisation of fluid-management for CHF patients. Encouragingly plans are currently underway in NNSW LHD to include the FDR in HPs.

HPs are a comprehensive treatment plan providing information on how to assess and manage many medical conditions including HF. They are designed to be used at the point of care, primarily for GPs but can also be used by Hospital Specialists, Nurses, Allied Health and other Health Professionals. Importantly HPs can assist GPs and inpatient medical teams connect patients with the right care and provide a medium for continuity of care and standardisation of treatment such as the FDR for CHF patients. (NSW Health, 2015)

Raising awareness in the local community has been encouraging; with an FDR publication in Health Speak, a GP education evening, one-day conference, focus group discussions and the completion of this AR research. Dissemination of the research is planned to reach a much larger audience of GPs, Specialists, and multi-disciplinary health care practitioners and will continue to raise awareness well into the future.

A key principle of Integrated Care lies in the co-ordination and access of health information across services and providers. (Ferrer & Goodwin, 2014) Working to improve the transmission of discharge summaries that include the FDR, to GPs and Specialists will contribute significantly to meeting a more integrated and safe system by avoiding unnecessary medication errors and unplanned admissions. (Li et al. 2013) This has the potential to positively impact health savings for the patient and NNSW LHD by keeping patients healthier at home for longer periods of time.

While the implementation of advanced information technology systems such as Healthnet, by the NSW Ministry of Health, will certainly improve the actual process of transmitting discharge summaries, the actual process is dependent on a medical officer actually writing the report in the Electronic Health Record. Is it possible that delays in discharge summaries may be due to organisational issues? In their study on the timeliness in the transmission of discharge summaries Li et al. (2011) noted several reasons for delays and finalisation of discharge summaries such as busy medical officers, inadequate provision of infrastructure such as computers and an inability to locate the patient records after discharge. In many cases the actual writing of the discharge summary is allocated to more junior doctors who may not have the same level of expertise as a senior doctor has in the safe clinical hand-over of information. (NSW Health, 2014)

Although these reasons are plausible and understandable what is clear is that the discharge summary is the main mode of communication between hospitals and GPs. Because medical teams often schedule patient's follow-up appointment five to seven days after a patient's discharge, hospitals would do well to prioritise the discharge summary transmission to facilitate the continuity of integrated patient care and treatment. Importantly, Li et al. (2011) found that an absence of a discharge summary was associated with an observed increased risk of readmission and that delays were associated with unfavourable patient outcomes, particularly readmissions within a short period of time after discharge.

Healthnet is an integrated information system linked to the National Patient Controlled Electronic Health Record (PCEHR) in addition to Cerner and the nominated GP records. Which. The continued

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rollout of Healthenet will allow clinicians, hospitals and other healthcare providers to view and share health information thereby providing efficient and seamless access. (NSW Health, 2014)

The study's third aim of closing gaps in communication between inpatient and outpatient sectors has surpassed expectations. This is the first study of its kind to combine AR with key rural regional stakeholders whose aim has been to improve CHF patient's symptom management through the use of an FDR. Collaboration and participation with the study's key stakeholders has been paramount to the success of this study. Perhaps the most important aspect of this AR project has been the collective pioneering of a new integrated approach to CHF symptom management in the local rural/regional region. Success would not have occurred without the support and indeed tireless work of all involved. This has been instrumental in developing improved collegiality and communication between NNSW LHD, TTH, NCPHN and SCU. This Collaboration has created a strong foundation for Integrated Care to flourish in our district.

## **STRENGTH AND WEAKNESSES**

The main strength of this research is the fact that it is the first study of its kind in regional rural Australia and indeed internationally to use information from prescribers and CHF patients to redesign the FDR, an innovative tool designed to enable patients to improve their fluid management.

Limitations included a small response from the Tweed GP community in attending the GP focus group. However whilst the response was small, the participants were enthusiastic with their feedback and provided multiple levels of relevant information which allowed for flexibility in the process of the FDR redesign and in implementing this in the local community. However the GP participants' combined expertise with managing complex CHF patients in the community was considerable. This together with the FDR Working Party certainly negated any short fall due to GP numbers.

An additional limitation related to all the patient focus group participants being female and therefore the study was unable to capture opinions and ideas from the male perspective.

A further limitation was that the audit process relied solely on information contained in the medical record, thus limiting exploring the reasons that people were not using a FDR.

## **RECOMMENDATIONS**

- As 97% of admissions in this study are fluid-related, all CHF patients should be on a program of self-monitoring and self-managing weight irrespective of diuretic therapy.
- Empower HF nurses and the Clinical Cardiac Advisory Group to advise on implementation and roll out of the FDR throughout NNSW.
- Disseminate the FDR to HF and CHF inpatients at TTH and across the NNSW LHD.
- Health Pathways and Clinical Pathways should be used to standardise the use of FDRs for CHF patients in the inpatient and outpatient setting.
- Ensure the timely transmission of discharge summaries to integrate health care services and ensure continuity of patient treatment and care.

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- Ongoing integration through the NSW LHD Integrated Care Strategy to improve collaboration and communication between all providers of chronic health care across multiple settings and promote the 'patient centred health care home model'.
- Partner with GPs, Chronic Disease Practice Nurses, CDMP, Residential Aged Care Facilities, Department of Veteran Affairs and Non-Government Organisations to provide community self-management support and alternative hospital avoidance strategies to CHF patients.
- Education sessions for Interns, JMO's and Registrars, Grand Round – Medical and Nursing and ward in-service to familiarise staff with the FDR and to ensure patients receive copies.
- Disseminate this research report to stimulate discussion between doctors and other health professionals regarding the benefits of the FDR.
- Ongoing research to further monitor FDR numbers and the impact of the FDR on hospital readmission rates.

## CONCLUSION

The FDR facilitates CHF and HF patients to have control of their illness through daily weighing and self-management. The Authors encourage GPs, hospital management and clinical staff to promote FDR use not only for CHF patients but also for newly diagnosed HF patients as a means of understanding and learning more about the early signs of heart failure. This will prepare patients for the challenges that lay ahead. It is especially important to consider that the FDR is mutually beneficial to both the patient and the LHD; the patient stays well longer at home and the NSW LHD benefits through evidence base management and through health care savings.

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## APPENDIX 1

### AR AUDIT TOOL

Information	Drop-Down Menu	Explanation
MRN	Nil	
Date of Birth	Nil	
Age	Nil	
Name of (GP)	Nil	
GP Clinic	Nil	GPs may work from multiple sites in the district
This admission date	Nil	List date of current admission
Number admissions in last 12 months	Yes-amount/nil	Lists number of admissions in last 12 months
No. HF adm last 12 mth	Yes-amount/nil	
Reason for adm/readm	Nil	State cause e.g. fluid overload, infection, medication compliance
Avoidability	Nil	Determines if self-management/self-care strategies would have avoided admission.
New dx HF	Yes/No	Newly diagnosed heart failure will not be on maximum medication therapy
Echo Results	Yes/no/not documented	Clinically defines and confirms diagnosis of HF
Type of HF	Left/right/preserved/unpreserved	Defines whether left/right, preserved or unpreserved systolic function
NYHA Class	1/11/111/IV	Defines degree of severity of heart failure symptoms
ACE-I/ARB	Yes/name/no	Either ACE-I or ARB - Best practice reduces incidence of morbidity and mortality in HF
Contra-indicated	Yes/no	Valid reason if not on medication. Data should not reflect a negative response
Beta-Blocker	Yes/name/no	Best Practice - reduces morbidity and mortality in heart failure
Contra-Indicated	Yes/no	Valid reason if not on medication. Data should not reflect a negative response.
Diuretic	Yes/name/no	Best practice for reducing symptoms of fluid retention in heart failure
FDR	Yes/no/has one but doesn't use it/not documented	Best practice for managing deteriorating clinical signs of fluid retention in heart failure.
Meds Compliance	Yes/no/not documented	Best practice in reducing progression of HF. Reduces incidence of morbidity and mortality
Smoking	Yes/amount/no/not documented	A cause of coronary artery disease which is a major cause of HF
Fluid restriction	Yes/amount/no/not documented	Best practice in fluid management of heart failure
Low salt adherence	Yes/usually/sometimes/never	Best practice in the treatment of reducing fluid retention in HF
Daily weight adherence	Yes/usually/sometimes/never	Best practice in the treatment and early detection of worsening symptoms of HF
Exercise adherence	Yes/usually/sometimes/never	Best practice in reducing HF symptoms

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## APPENDIX 2

### AR Stages, Steps, Aims and Methods (Use in conjunction with Appendix 3)

	Stages	Step	Aims and Methods Involved
<b>Reflect</b>	1. Identifying the problem 13 <sup>th</sup> May, 2013	Issue Identification:  i) Reducing CHF fluid overload admissions in TTH and  ii) Raising awareness surrounding the use of FDR  iii) Closing the gap between the inpatient and outpatient settings.  iv) Improving collegial relationships	Aim: To change current practice  Method: A preliminary meeting initially held 8 <sup>th</sup> April, 2013 included key stakeholders from General Practice, NNSW LHD, TTH and NCNSW ML.  Monthly/Bi-Monthly ARRG meetings to reflect, review and revise the viability of proceeding with the project. Each meeting was minuted and used as data collection in the action cycle of change.
<b>Plan</b>	2 .Fact –Finding 9 <sup>th</sup> September, 2013	Reviewing existing FDRs with the ARRG  Establishing referral and distribution processes  Establishing a FDR working committee.  Establishing methods of data collection and assessment.	Aim: Establishing a baseline environment.  Method: Developing communication channels.  Method: Collaboration with ARRG to determine an appropriate research design
<b>Plan</b>	3. Planning Measurement Strategy	Developing the study's audit tool	Aim: To collect hospital data for base-line audit 1 and compare the results with audits 2 and 3 using a pre and post-test method. Aim: Develop open ended questions for two focus groups.  Method: Development of the audit tool and question format for focus groups in collaboration with co-researchers KW and DB.
<b>Plan</b>	4 i). Measurement Audits	Audits 1 - 3 from Jan 2013 – June 2014	Aim: To determine existing numbers of CHF inpatients with FDRs.  Method: 3 x hospital audits n =150.
<b>Plan</b>	4 ii) Assessment Focus Groups	GP Focus Group  Patient Focus Group	Aim: Determine GP prescribing practices and ascertain what, if any, the barriers may be. Seek input for FDR improvements.  Aim: Explore patient's experiences using FDRs. Seek input for FDR improvements.  Method: Implementing change
<b>Act</b>	5.(i) Action  FDR Redesign	Establishing a working party consisting of two Cardiologists and 8 Cardiac Nurses from NNSW LHD. Redesign took place over a one-year period	Aim: Improving current FDR  Method: implementing recommendations for improvement by the working group in collaboration with the ARRG.

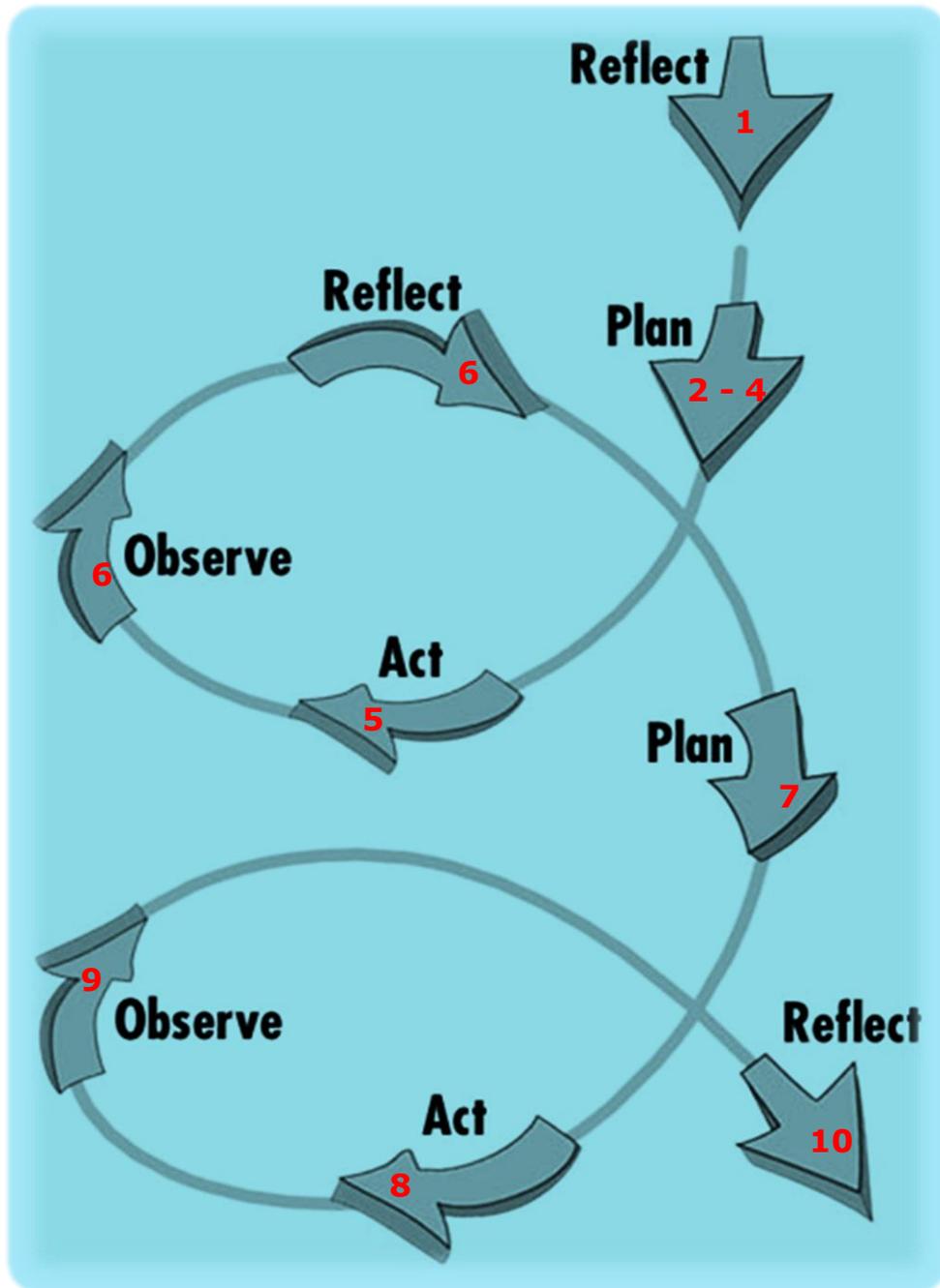
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## APPENDIX 2 continued

### AR Stages, Steps, Aims and Methods (Use in conjunction with Appendix 3)

	Stages	Steps	Aims and Methods Involved
<b>Act</b>	5 (ii) Action	FDR Consensus  Patient Supervision	Aim: trialling FDR in local community  Method: FDR trial with HF-patients and nurses in the local community for one year prior to consensus on the final FDR version. Implementation of 144 FDRs in the community with home and phone follow-up and referral onto Chronic Disease Management Team for ongoing telephony support.
<b>Observe and reflect</b>	6. Evaluation/ Reflection	Assess and reflect on results of data collection with ARRГ	Aim: To establish a composite picture of FDR use in the local community.  Method: Triangulate the results of i) audits x 3 (n=150), ii) focus groups and iii) ARRГ minuted meetings
<b>Plan</b>	7. Planning FDR Promotion	Raising Awareness	Aim: confirm the final model and plan distribution for implementation  Method: Print and publish FDR and distribute by communication channels to relevant stakeholders  Aim: Promote FDR and raise awareness  Method: i) Planning GP and patient education ii) publication in GP Speak iii) quarterly FDR medical orientation to FDR iv) Grand Rounds and ward in-service vi) CIS Breakfast vii) HF Conference
<b>Act</b>	8. Action Taking action Hosting events	4 x version and final version of FDR Hosting Events	Aim: change current practice  Method: Implement FDR – final version  Aim: Promote FDR and change practice  Method: Actual hosting of the above events
<b>Observe</b>	9. Monitoring	Ongoing mapping of FDR use Assess and measure	Aim: Maintain FDR awareness with GPs and CHF patients  Method – ARRГ meetings over two years combined with i) ongoing FDR recommendations for patients leaving hospital via correspondence and phone calls to GPs. li) ongoing monitoring of patients using FDRs. lii) ongoing education for GPs, hospital doctors and other health professionals at TTH and in the larger community Aim: Monitor progress in relation to numbers of FDRs implemented and further assess barriers to change.
<b>Reflect</b>	10. Reflection	Assess progress	Aim: Determine future action to enable change Method: Consider further audits and tracking of outpatient FDR numbers into the future  Method: Track increases in FDR numbers through Audits 1 – 3 and into the future

APPENDIX 3  
ACTION RESEARCH CYCLES



## APPENDIX 4

### GP PARTICIPANT FOCUS GROUP QUESTION FORMAT

Questions are designed as semi-structured and open ended to encourage dialogue.

The questions are as follows:-

1. What were your experiences using the FDR?
2. What barriers do you anticipate other GPs may have using a FDR?
3. How do you think we can overcome these barriers?
4. Do you have any suggestions to improve the FDR?
5. How confident were your patients in using the diary?

## APPENDIX 5

### **PATIENT PARTICIPANT FOCUS GROUP QUESTION FORMAT**

**Questions are designed as semi-structured and open-ended to encourage dialogue.**

1. What were your experiences using the FDR?
2. What were some of the problems you encountered?
3. Were the instructions clear on what to do and easy to follow?
4. Would you walk me through your average day and how you have been using the FDR
5. What happened when you returned with your FDR to see your GP?
6. Has your health changed since using the FDR?
7. Do you have any suggestions as to how we can improve the FDR?