ADVANCING NURSING PRACTICE IN THE FIELD OF HEPATOLOGY THROUGH A PROSPECTIVE OBSERVATIONAL RESEARCH STUDY IMPLEMENTING INNOVATIVE SCREENING FOR LIVER DISEASE IN A COMMUNITY ALCOHOL SERVICE WITH A PORTABLE FIBROSCAN® DEVICE

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Abstract

Background
Alcohol related liver disease, including cirrhosis, is a major cause of death in the UK (Williams et al 2014). Liver disease is silent and usually presents late. FibroScan® is a non-invasive tool for measuring liver stiffness; an indicator for fibrosis/cirrhosis. Socially deprived patients with alcohol related liver disease are a “hard to engage” population (Watt 2013) therefore, simple screening methods may help early identification of liver disease.

Aims
1. Monitor uptake of FibroScan® in individuals accessing one community alcohol support service in a deprived area.
2. Determine prevalence of undiagnosed fibrosis/cirrhosis in study sample.
3. Monitor engagement following referral to specialist liver services.

Method
A prospective observational study recruited self-identified harmful drinkers between November 2014 and April 2015 for a liver FibroScan®. Participants with a FibroScan® reading of ≥7.1kPa were referred to a nurse-led liver clinic for further investigations, results of which determined referral to a liver specialist in secondary care. Participants referred were monitored for engagement over 6 months. Descriptive statistics were used to determine prevalence of undiagnosed cirrhosis and to determine engagement.

Results
Seventy-nine consented individuals participated, an uptake of 67% of those informed of the study (n=118). Of the 79 scans performed, three were unreliable leaving 76 participants. After scanning, 20/76 (26%) had a FibroScan® reading ≥7.1kPa requiring referral on to the nurse led clinic. All 20 (100%) engaged in further assessment. Of those, 12 required onward referral to specialist services. Subsequent compliance with specialist services in this sample (n=12) was ≥ 90%.

Conclusion
This nurse-led intervention advances nursing practice in the field of Hepatology. It demonstrates high uptake and subsequent engagement in liver services, giving potential for early intervention and improved health outcomes in a previously considered hard to engage population (Watt 2013).

Keywords: Alcoholic, FibroScan®, liver cirrhosis, nursing assessment, transient elastography, screening.
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I dedicate this thesis to the memory of my early academic supervisor, Professor Isobel Davidson, Queen Margaret University, who had great enthusiasm for this innovation and is sadly no longer here to see it to completion.
## Contents

Chapter 1: Introduction and Background ................................................................. 1

1.01 Background to Study ....................................................................................... 1

1.02 Anatomy, Physiology and Pathophysiology of the Liver ............................. 3

1.03 Factors Informing Critical Appraisal Through Searching the Literature ....... 7

1.04 Critical Review of the Literature .................................................................... 9

1.05 Conclusion of Review ..................................................................................... 20

1.06 Update of Literature Search and Review .................................................... 21

Chapter 2: Methods .............................................................................................. 24

2.01 Introduction ................................................................................................... 24

2.02 Research Question, Aim, Hypothesis and Study Objectives ....................... 24

2.03 Theoretical Perspective and Methodology Underpinning the Study ............. 25

2.04 Developing the Screening Intervention .......................................................... 28

2.05 Developing the Data Collection Tool for Assessment of Participants ............ 33

2.06 Alcohol History ........................................................................................... 37

2.07 Body Mass Index (BMI), Metabolic Syndrome and Diabetes ....................... 38

2.08 Blood Borne Viruses (BBVs) ......................................................................... 39

2.09 Other Factors with Possible Adverse Effects on Liver Health ................. 40

2.10 Fasting Status and Demographics ................................................................. 41

2.11 Structure of Consultation ............................................................................. 41

2.12 Research Data Collection .............................................................................. 42
Appendix 1.08: Search Strategy .......................................................................................... 125
Appendix 2: Critical Review Template .............................................................................. 126
Appendix 3: Innovation Event Voting Slide ...................................................................... 127
Appendix 4: Codebook for SPSS ..................................................................................... 128
  Appendix 4.01: Codebook for SPSS ............................................................................ 129
  Appendix 4.02: Codebook for SPSS ............................................................................ 130
Appendix 5: Early Iteration of Data Collection Tool (page 1) ....................................... 131
Appendix 6: Poster Advertising Study ............................................................................ 132
Appendix 7: Study Consent Form .................................................................................... 133
Appendix 8: Study Data Collection Tool ........................................................................ 134
  Appendix 8.01: Study Data Collection Tool ................................................................. 135
Appendix 9: Study Timeline and Costings ...................................................................... 136
Appendix 10: Ethics Approval for Study ....................................................................... 137
Appendix 11: Slide Showing Clinic Attendance ............................................................ 138
Appendix 12: Table Showing Fibroscan, Blood and Ultrasound Results for Participants Requiring Onward Referral ................................................................. 139
Appendix 13: Study Participant Pathway ....................................................................... 140
Appendix 14: Doctoral Conference Letter ...................................................................... 141
Appendix 15: Lancet Review .......................................................................................... 142
Appendix 16: Poster Presentation for BSG .................................................................... 143
Appendix 17: Journal of Clinical (JoCN) Nursing Manuscript ...................................... 144
Table 1: Participant Demographics of the 79 participants who Consented to Having a Fibroscan® ................................................................. 49

Table 2: Diagnostic Outcomes of Fibroscan® Screening in a Community Alcohol Service ........................................................................ 52

Table 3: Engagement of Participants Requiring Onward Referral to Specialist Services ........................................................................ 53
Chapter 1: Introduction and Background

1.01 Background to Study
As a Hepatology nurse practitioner part of the author’s remit was to offer a hepatitis C treatment clinic in a multi-agency drug and alcohol support centre. This centre was situated in an area of the South of Scotland serving a population who, according to the Scottish Index of Multiple Deprivation (SIMD) (2016), were living in an area of high deprivation. This is a deprivation score devised according to a combination of seven variables. These include income, employment, health, education, housing, geographical access and crime. This drug and alcohol support centre served a population who, according to a combination of these seven variables, were amongst the most deprived 20% (decile 2) in Scotland and, in one area local to the support centre, the most deprived 5% (SIMD 2016).

Over 90% of those infected with hepatitis C have acquired this through injecting drug use (Scottish Government 2015). The author, therefore, was predominantly in contact with those attending the service for support with recovery from drugs, less so with those attending for support in recovery from alcohol. To redress the balance, this study was developed; in particular, to enable early identification of liver disease in a group considered to be at high risk through a history of heavy drinking. In this context, heavy drinking includes hazardous drinking which is defined as a level of consumption which increases a person’s risk of harm, harmful drinking which is a pattern of drinking already causing mental or physical damage and dependent drinking which is characterised by a strong desire to drink alcohol and difficulty
controlling its use (NICE 2010). This chapter explores the rationale for the study, in particular where it sits within the context of current policy drivers and will demonstrate the advanced clinical practice skills (HEE 2019) of negotiation, influencing and leadership required by the author in analysis of the presenting problem and subsequent development of this initiative.

Liver disease, including cirrhosis, is the third commonest cause of premature death in the UK and mortality rates have increased by approximately 500% in those under the age of 65 years since 1970 (Williams et al 2014). As such, it stands as an exception to the improved prognosis of those with other chronic illnesses such as chronic heart disease, stroke and some cancers in the under 65-year age group (Williams et al 2014). Deaths from chronic liver disease (CLD), including cirrhosis, increased globally between 1990 and 2013 from 1.5 million to 2.1 million (Cowie et al 2015). Within the European Union, standardised death rates from chronic liver disease were 13 per 10^5 in 2013, compared to 16 per 10^5 in the UK alone (WHO 2017). Alcohol related liver disease is a major contributor to morbidity and mortality in the UK. Current data for death rates due to alcohol in the UK, including alcohol related liver disease, report rates at 14 per 10^5 since 2012 (ScotPHO 2017). This pattern is mirrored in Scotland, but with rates higher than in the rest of the UK. Death rates in men are 30 per 10^5 in Scotland and 18 per 10^5 in England and for Scottish women are 13.3 per 10^5 and 9.1 per 10^5 in England (ONS 2017). In 2015, mortality rates from CLD in Scotland in the most deprived decile were six times those of the least deprived (34 v 6 per 10^5) and morbidity rates were five times higher (435 v 88 per 10^5) (ScotPHO 2017). These data demonstrate the impact deprivation and health inequality issues have on CLD.
The World Health Organisation (WHO 2011) pledged to address health inequalities through developing strategies to promote effective partnerships with health and other sectors in achieving health through policies and actions on social determinants of health, specifically targeting vulnerable and high-risk groups. In Scotland, the Public Bodies (Joint Working) (Scotland) Bill (Scottish Government 2013) introduced a statutory duty for NHS Boards and Councils to integrate planning and delivery of health and social care services, strengthening the Scottish Government’s commitment to community-based anticipatory care (Audit Scotland 2015). This care is to be provided jointly between the NHS, statutory and non-statutory social care providers with the aim of reducing the number of patients with long-term conditions being admitted to acute services (Audit Scotland 2015).

1.02 Anatomy, Physiology and Pathophysiology of the Liver
The liver is the largest solid organ and exocrine gland in the body. Weighing between 1.3-1.5kg, it accounts for approximately 2% of total body weight in an adult (Dancygier 2010). Located in the right upper quadrant of the abdominal cavity, beneath the diaphragm and protected by the rib cage the principle functions of the liver include protein synthesis, elimination of toxins, metabolism of carbohydrates, fats and proteins and storage of vitamins (Sargent 2009). Hepatocytes account for 60-70% of the total cell volume and 80% of the parenchymal volume and are capable of regeneration following a single injury. Blood supply to the liver is delivered by both the hepatic artery and the portal vein; with blood from the splanchnic area i.e. spleen, pancreas, stomach and intestine travelling to the liver via the portal vein (Dancygier 2010).

Cirrhosis is characterised by diffuse nodules of regenerating hepatocytes surrounded by fibrous bands (Schuppan and Afdhal 2008, Sargent 2009) and is the potential end point for all causes of chronic liver disease (Pinzani, Rosselli and Zuckermann 2011). The most common causes of
cirrhosis in the developed world are Hepatitis C, alcohol and obesity (BASL, BSG 2009, Muir 2015). While regeneration of liver tissue can occur following a single injury, sustained injury of hepatocytes leads to a process of scarring known as fibrosis. Fibrosis is often a precursor to cirrhosis if the cause of liver damage continues; both being part of a continuous spectrum of disease which can take 15-20 years to develop (Sargent 2009, Muir 2015). This process alters the normal liver architecture, causing increased intrahepatic resistance and reduced liver function (Muir 2015). While fibrosis is potentially reversible if the causal factor is removed, removal of the causal factor in cirrhosis may only prevent further progression to more severe disease (Schuppan and Afdhal 2008). Cirrhosis is classified into either compensated or decompensated disease. Patients with compensated cirrhosis are largely symptom free as the liver continues to sufficiently perform its vital functions. In those with decompensated cirrhosis extensive disease causes rapid decline in liver function manifesting in symptoms most commonly associated with portal hypertension; an increased blood pressure within the portal vein (Muir 2015, Pinzani, Rosselli and Zuckermann 2011, Tsochatizis, Bosch and Burroughs 2014). These symptoms include ascites, the accumulation of fluid in the peritoneal cavity, encephalopathy or reversible cognitive impairment and non-obstructive jaundice (Sargent 2009, Tsochatizis, Bosch and Burroughs 2014).

Varices are asymptomatic, thin walled varicosities which can be formed by the development of collateral circulation between portal and systemic veins in response to an increase in portal pressure. They can develop in the oesophagus, stomach or rectum and are prone to rupture; a common cause of death in cirrhosis (Garcia-Tsao et al 2007, Sargent 2009). A variceal bleed carries around a 20% risk of mortality at 6 weeks (Muir 2015). All patients with cirrhosis should be offered screening for varices by endoscopy and prophylaxis, such as β-blocker therapy,
endoscopy band ligation and relevant follow up where appropriate (Tsachatzis, Bosch and Burroughs 2014).

Progressive failure in detoxification of harmful substances passing from the splanchnic region through the portal vein causes an inflammatory state, which further accelerates disease progression; this, in conjunction with the hepatic stimulus for regeneration, provides ideal conditions for the development of hepatocellular carcinoma, a primary liver cancer (Pinzani, Rosselli and Zuckermann 2011). Surveillance for hepatoma by 6 monthly abdominal ultrasounds is recommended following a diagnosis of cirrhosis (EASL 2012) to improve the chance of early detection and successful treatment for those developing a tumour.

While liver biopsy has been considered the gold standard diagnostic tool for cirrhosis (Castera 2011) the invasive nature and risk of complications renders it unsuitable for use as a screening tool in a community setting. A range of less invasive and non-invasive methods are available for the detection of fibrosis or cirrhosis, ranging from blood tests to more sophisticated methods including magnetic resonance imaging (MRI) (EASL-ALEH 2015). Of these, Liver Function Tests (LFTs) are the most commonly used blood tests. Many of these tests rely on biochemical changes induced by altered liver function. In a large population based retrospective cohort study (n= 95,977) the link to outcomes of liver disease and mortality from a large database in primary care in Tayside from 1989 -2003 suggested that, while specificity of these tests was generally high, sensitivity was low with gamma glutamyl transferase (GGT) having the best sensitivity at 72% (Donnan et al 2007). In addition, interpretation of LFTs can be difficult and confusing for non-liver specialists. Referral to specialist liver services often relies on the GP or health practitioner’s ability to interpret these results (Cook et al 2015). Due to the
size and cost of MRI equipment this method of screening is not appropriate in a non-acute setting.

Cirrhosis develops because of increased fibrotic tissue and, as a result of this, liver stiffness increases (Muir 2015). Non-invasive assessment of liver fibrosis can use blood tests or imaging techniques. Hyaluronic acid (HA) is one such blood test used in specialist services but is non-specific for the liver and can be raised in cases of arthritis (Adams 2011). Transient Elastography (TE), measured by a FibroScan device is a non-invasive imaging test of fibrosis which is currently used in specialist centres as a screening and diagnostic tool for liver disease. It measures liver stiffness in kilopascals (kPa), using the propagation of an elastic shear wave through liver tissue from an ultrasound transducer probe. The probe is placed at the 8th to 10th intercostal space in the mid axillary line while the patient is in the dorsal position, with their right arm in maximal abduction. This is a quick, painless, non-invasive assessment for cirrhosis using liver stiffness measurements (LSM) which gives an instant result. TE has been validated as a reliable marker for significant fibrosis and cirrhosis in a heavy alcohol using group (Nguyen-Khac et al 2008, Thiele et al 2015). TE readings range from 2.5 kPa to 75 kPa (Castera, Forns and Alberti 2008). The significance of the value of a TE reading varies depending on the aetiology of fibrosis or cirrhosis. The lower TE cut off for fibrosis and cirrhosis is debated with Thiele et al (2015) suggesting a lower cut off for significant fibrosis of 9.6 kPa and cirrhosis 19.7 kPa in their alcohol using cohort. Castera, Forns and Alberti (2008) suggest that readings between 7.1-12.5kPa indicate significant fibrosis with values above 12.5kPa indicating cirrhosis. The FibroScan device is available in portable form which, if used in a community setting, could reduce the need for attendance at specialist centres. The FibroScan has been demonstrated to elicit equivalent readings when compared to a static FibroScan (Parra-Ruiz et al 2014). Nurses
trained in the use of FibroScan® have been shown, through research, to elicit comparable readings to their medical colleagues (McCorry et al 2012).

1.03 Factors Informing Critical Appraisal Through Searching the Literature
A critical, focused review of the literature (Booth, Papaioannou and Sutton 2012) was conducted to establish the extent of work carried out, to date, with a review question “Is screening for liver disease in a community alcohol support setting with a portable FibroScan® device acceptable?”. This review was revisited throughout the study and on its completion, with details of the search strategy provided in Appendix 1. A key word search strategy, including the MeSH and CinAHL terms, “liver disease”, “liver cirrhosis”, “mass screening”, “alcoholic” and “transient elastography” was utilised, for the Medline and CinAHL databases. A wider key word search, including “liver fibrosis”, “liver stiffness”, “outreach”, “community” was used for the search engine “Discover” available online through Queen Margaret University library services. This software incorporates Medline, Cinahl, Psycinfo, SPORTdiscus, Science Citation Index, Science Direct, Social Sciences Citation Index. Each search was performed both under Boolean and “search all terms” conditions. In addition, the “Knowledge Network” available through NHS Lothian was utilised, which incorporates Ovid Embase and Ovid Medline. A search of the Cochrane database, for studies investigating community screening with a FibroScan®, was also carried out and the reference lists of relevant articles were examined for further articles of interest to this study.

Inclusion criteria included all articles investigating screening for liver disease with a FibroScan® device in a community setting. Abstracts were excluded for review due to lack of availability of information to critique and a commentary by Castera (2011), while referred to elsewhere in this thesis, was excluded for the same reason. No time limit was set for this search as the
FibroScan® device is a relatively new invention, with historical reports of its use unlikely beyond fifteen years. This also accounts for the paucity of research in this area at the time of carrying out the literature search to inform this screening study, as much of the earlier literature had a focus on testing the validity of the FibroScan® device against other diagnostic techniques.

The literature search found no published full text studies looking at the use of FibroScan® in a community alcohol support service prior to this study being carried out, several studies investigated its use either targeting PWID (People Who Inject Drugs) in the context of hepatitis C treatment or for use in primary care with the general population. Those studies targeting PWIDs in the community were of particular interest to the author due to their similarity in setting and the fact that they targeted a cohort seeking support in recovery from substance misuse; often considered “hard to engage”. In this respect, the author considered them to have some similar characteristics to the target group accessing the alcohol support service used in this study. Articles included for further critique included those by Roulot et al, (2010), Foucher et al (2009), Harmen et al (2015), Thurnheer et al (2015), Moessner et al (2011), Marshall et al 2015 and Fabrellas et al (2013). An article which was excluded from further critique was Jacomet et al (2015) as, while the FibroScan® was not carried out in an acute setting, it was conducted in a prison setting; therefore, not comparable to recruitment in a community setting.

A template outlining criteria for critique of the literature was designed (Appendix 2), informed by Wallace and Wray (2016). In total, seven full text articles were critiqued for this study. In commencing this critique, the research focus or research question for the study was recorded and its relevance to this screening study was assessed (Wallace and Wray 2016). This
assessment included investigation of the study rationale and in what respect this was relevant to the study which is the subject of this thesis. Research design and results were assessed, with the claims made being assessed for relevance to this piece of work. Results and claims were assessed for reliability and validity where possible and analysed for generalisability; in particular through assessment of the methods, sample size and rigour (Creswell 2014). Where the claims were supported or challenged by others’ work, this was assessed also and recorded in the critical review of the literature.

1.04 Critical Review of the Literature
In their prospective cross-sectional observational study, Moessner et al (2011) explored the use of FibroScan® for screening for liver disease in a cohort of PWIDs accessing all regional drug treatment centres in the city of Funen, Denmark, over a four-month period. It is unclear, from the text, how the potential participants were recruited. Members of the study team carried out the FibroScan® tests, with each technician completing 130 scans prior to carrying them out in this context. It is not documented whether interrater reliability checks were undertaken between technicians, making it difficult to assess the validity and generalisability of their findings (Creswell 2014). This was combined with serum biological markers, tests for viral hepatitis and HIV in a relatively large sample size (n=450). Participants with results suggestive of significant fibrosis with a reading of ≥ 8kPa were referred to the department of infectious diseases for further evaluation. Those with a Liver Stiffness Measurement (LSM) ≥ 12kPa, indicating possible cirrhosis, were referred for liver biopsy as part of their management. The results indicate that, while FibroScan® is apparently effective in identifying patients with cirrhosis in this drug using population, they caution that management should not be based on one single measurement as, in 30% of participants who attended for liver biopsy, LSM were
reduced; a conclusion based on small cohort numbers (6/20). In addition, 42% (19/45) of participants with elevated LSM did not attend for liver biopsy, shedding some doubt on the reproducibility of this finding. According to Trabut et al (2015) LSM can decline rapidly during withdrawal in heavy drinkers. Alcohol consumption was not recorded longitudinally therefore, any variation in this, as a possible factor for change in LSM, was not determined. Lemoine et al (2014) found that LSM could be lower under fasting conditions. The initial FibroScan® measurement was not performed under fasting conditions, while participants were asked to fast for the subsequent reading taken at the time of biopsy. These factors could influence a lower subsequent LSM reading and have been considered in the development of this study where participants’ last alcohol intake was recorded, and they were asked to fast prior to attendance for the FibroScan®.

In developing their theoretical framework of acceptability (TFA) for healthcare interventions, Sekhon, Cartwright and Francis (2018) suggest a conceptual definition of acceptability which acknowledges it is multi-faceted in nature and is determined by the extent to which those delivering the intervention and those receiving it anticipate or experience it to be appropriate. This is consistent with Sidani et al (2009) who suggest that perceived acceptability of an intervention, its suitability to a potential participant’s lifestyle, its effectiveness and convenience are important factors influencing their uptake or participation. Sekhon, Cartwright and Francis (2018) identify seven components within the TFA which include how an individual feels about an intervention, its perceived effectiveness, and perceived amount of time or effort needed to participate. They also suggest an individual's confidence that they can carry out the behaviour needed to engage in the intervention is important in determining its acceptability, as is the extent to which the intervention fits with their value
system. The extent to which the participant understands the intervention is another important factor in assessing acceptability. Finally, the extent to which benefits must be given up to engage in the intervention is suggested as a component of TFA.

In seeking to address the question of whether offering FibroScan® screening for liver disease is acceptable in a community alcohol service and, in the absence of literature specifically addressing screening in this setting, studies carried out by Foucher et al (2009) and Marshall et al (2015) were examined. Foucher et al (2009) and Marshall et al (2015) conducted prospective cohort studies targeted PWIDs, with a high risk of hepatitis C, and sought to evaluate screening for liver disease with a FibroScan® device in community and outreach settings, including drug support centres in France (Foucher et al (2009)) and Australia (Marshall et al (2015)). Both studies found screening with FibroScan® to be acceptable in reasonably large cohorts; n=298 (Foucher et al 2009) and n=250 (Marshall et al 2015).

Foucher et al (2009) measured “acceptance” of the FibroScan® through uptake. As this study was carried out in France, it is assumed that English is not the first language of the research team and interpretation of this as a measure of acceptability, where those who choose to engage in the intervention consider it to be appropriate (Sekhon, Cartwright and Francis 2017), should be taken with care. However, this study sought to assess the influence of FibroScan® screening on management of hepatitis C in a group where uptake of screening and treatment was low. A FibroScan® test, with a low cut off threshold of 7.1kPa, was offered to consecutive drug users in two street-based outreach centres over a one-year period. In addition to the scan, participants were invited to complete a face to face questionnaire with trained outreach workers; it is not clear how and by whom, potential participants were invited or whether the
questionnaire had been validated. Following the FibroScan® each participant was invited, by a nurse, to supply a blood sample which included testing for hepatitis C. Following the scan and bloods all participants were offered a meeting with a Hepatologist in the centre. All drug users attending during the study period (n=298) agreed to have a FibroScan®; an uptake of 100%. Interestingly subsequent uptake of blood tests in this groups was 74% (221/298); higher than the authors’ expectation in this group considered hard to engage. During the study 10% (8/83) of those participants with hepatitis C commenced treatment; a group well known to the clinicians in the centre who, until the study had never accepted blood tests for hepatitis C. The authors conclude therefore that the uptake of screening and engagement with treatment for hepatitis C is a direct result of having the FibroScan® test. As this is a complex intervention it would seem reasonable to investigate this claim further. Participants were not described as self-selected and by stating they were “offered” a FibroScan® suggests that a verbal interaction took place with potential participants, either by staff at the outreach centre or the visiting research staff. This being the case, it is possible that the enthusiasm of either clinic or research staff may have had an influence on their motivation to have the scan. In addition, it is possible that information given to potential participants at time of recruitment may have influenced their decision to accept the intervention and subsequently influenced the outcome.

In their prospective observational study, Marshall et al (2015) sought to enhance liver disease assessment in a drug and alcohol setting for PWIDs and aimed to determine the baseline knowledge of hepatitis C, the acceptability of FibroScan® or screening and willingness of participants to receive hepatitis C treatment among PWIDs participating in a liver health promotion campaign (LiveRLife). This study took place in New South Wales, Australia over a six-month period. Participants were recruited from four centres based in the community; a
primary health care facility, two opiate substitution treatment centres and one medically
supervised injecting centre. While this study was targeted at PWIDs, with a focus on
engagement with hepatitis C treatment, the acceptability of FibroScan® in a community
recovery support setting for vulnerable and an often hard to engage groups is of interest to this
study targeting those with alcohol problems in a drug and alcohol setting. Participants were
asked to complete a self-administered tablet-based questionnaire, pre-intervention which
included questions regarding pre FibroScan® acceptability, based on a five-point Likert scale
asking the question “How willing are you to have a FibroScan®?” with answers ranging from
“definitely willing”, “somewhat willing”, “neither willing nor unwilling”, “somewhat unwilling”
and “not at all willing”. A further question regarding acceptability was posed with answers
ranging from “very acceptable”, “somewhat acceptable”, “neither acceptable nor
unacceptable”, “somewhat unacceptable” and “not at all acceptable”. The intervention was
carried out by a nurse and included the FibroScan®, a standard health check and review of
medical history and, for some, a blood test for hepatitis C. It is not stated within the text, what
preparation for this research to ensure validity and reliability in collecting data, was undertaken
by the nurse. It is, therefore, difficult to comment on this aspect of the study. Prior to
assessment 88% (221/250) of participants rated FibroScan® as “very acceptable”. Following
assessment, 95% (232/244) rated it as “very acceptable” with 91% (222/244) “definitely
willing” to receive FibroScan® again in the future and 93% (228/244) “definitely willing” to
recommend FibroScan® to their peers. As part of their recruitment strategy, potential
participants were offered a voucher to the value of $20 for their participation, which may have
influenced their choice in taking part; possibly in their attitude towards the acceptability of the
FibroScan®. The addition of the option for free text to the Likert scale questionnaire may have
enhanced the depth of information collected, regarding the acceptability, or otherwise, of the FibroScan®. However, this leaves interpretation of “acceptability” to the participants; with each potentially attributing a different meaning to this term. With reference to TFA, Sidani et al (2009) suggest asking more specific questions with regards to acceptability; questions which would elicit how participants felt regarding the appropriateness of the intervention, its suitability to their life style, effectiveness and convenience; which would have further enhanced understanding of participant’s views on the acceptability of the intervention further.

In their prospective cohort study, Thurnheer et al (2015) also sought to evaluate an outreach programme offering FibroScan® to improve CLD assessment and compare disease prevalence between tertiary clinics, community clinics, clinics for PWIDs and regional clinics in Victoria, Australia. Results indicated that FibroScan® was feasible as a screening tool within a community setting and that, following further assessment, a higher level of more advanced liver disease was found in regional clinics. Hepatitis C was a known factor with this group, however while alcohol use was documented it was not quantified; an important consideration for further assessment as recent levels of alcohol intake can influence the FibroScan® result and each individual’s subsequent management (Thiele et al 2015). While higher incidence of disease within the regional clinics may suggest lower socioeconomic status with poor access to tertiary care this is not stated and cannot be assumed. In addition, the cause of liver disease varied between the cohorts with those from community clinics more likely to be infected with hepatitis B from birth and of different ethnic origin with different lifestyle factors and therefore not directly comparable. Nonetheless, of interest to this study, is the higher prevalence of disease outwith the tertiary setting suggesting acute services may not be reaching those at most need and strengthens the case for screening for CLD in a community setting.
In the UK, Referral from a GP to a liver specialist is currently heavily reliant on an algorithm based solely on abnormal LFTs. Harmen et al (2015) sought to challenge this protocol in their prospective cross-sectional study across two GP practices in Nottingham. The aim of this study was to trial a new diagnostic algorithm where patients at most risk, through hazardous alcohol use, type 2 diabetes or a persistently elevated liver function enzyme (ALT) were identified from the GP database and invited to take part in the study. For those who participated (n=504), a blood-based biomarker test was offered; this varied according to the specific risk factors for each participant. Those at risk of alcohol related liver disease were assessed using AST/ALT ratio with a result >0.8 indicating increased risk, while patients with type 2 diabetes or persistently raised ALT were assessed using the BARD score (Ruffillo et al 2010), based on BMI and AST/ALT ratio with a result of ≥2 indicating increased risk. Those who elicited a raised biomarker result were then offered a FibroScan® test within the primary care setting; these scans were performed by one of three nurses trained in its use and with experience of conducting more than 50 scans. Those with indications of liver disease on the biomarker (n=442) were then offered a FibroScan®. Results demonstrated the inadequacy of screening using routine LFTs alone, with 26.8% (98/366) of those participants who required and attended for a FibroScan® eliciting an elevated result of ≥8kPa despite 72% (71/98) of these participants, having normal LFTs. In addition, 11 patients were identified with definite cirrhosis, which had not been previously diagnosed. By conducting this research in the least deprived area of Nottingham, it is possible that those taking part were less susceptible to the co-morbidities and lifestyle factors affecting those from a more deprived group. Harmen et al (2015) acknowledge that their findings need to be tested in other populations, to check the validity and generalisability of their claims. Of interest to this cirrhosis screening study is the uptake of
FibroScan® in this population, out of the 442 participants recommended to attend for a FibroScan®, following the result of their blood biomarker, a total of 77 (17.4%) either refused a scan or did not attend; an uptake of 82.6%. This suggests that FibroScan® is acceptable in this population and supports the claims to acceptability seen in the cohort of PWIDs in the studies by Marshall et al (2015) and Foucher et al (2009) discussed previously.

Roulot et al (2010) carried out a prospective observational study to evaluate the use of a portable FibroScan® device as a screening tool within the general population by offering screening to all patients over the age of 45 years old attending a social medical centre in a deprived area of France for a routine medical review. In addition to the FibroScan®, conducted by one physician, with experience of over 500 scans, participants were offered a clinical examination and laboratory blood tests in order that FibroScan® results were more likely to be valid, according to the study by Castera et al (2010). No data are offered to show how many potential participants declined to take part in the study, so no comment can be offered as to its perceived acceptability to those offered the intervention. The prevalence of an elevated LSM, with a lower threshold of >8kPa, and concordant with that used by Harmen et al (2015), was 7.5% (89/1190) in this large invited sample (n=1190) over a recruitment period of two and a half years. Participants with a LSM of >13kPa were offered a liver biopsy, as were those with a LSM >8kPa and clinical indication of liver disease. In all participants with histologically confirmed cirrhosis, each had an obvious risk factor such as drinking to harmful levels, obesity or viral hepatitis. Roulot et al (2010) state that among the five patients with alcoholic liver disease three had stopped drinking completely; it is not, however, stated over what period this was assessed and whether this was self-reported or assessed independently. Again, this study highlights the poor reliability of routine LFTs with 38/89 (43%) of those with LSM>8kPa having
normal ALT and GGT; as supported by the findings of Harmen et al (2015). While Roulot et al (2010) aimed to target the general population, they acknowledge that, by enrolling those over the age of 45yrs, they have targeted an older population, with a higher risk of liver disease and therefore cannot assume their results are generalisable. In addition, while this study was undertaken in a deprived area of France those who took part may be more likely to have co-morbidities which are less likely to be seen in a more affluent area. As with Harmen et al (2015) the study results would be more representative of the general population if they had been carried out across several sites, within differing areas of deprivation.

In their prospective observational intervention, described as a “pilot feasibility study” Fabrellas et al (2013) sought to determine the feasibility of a nurse led screening service for CLD using a FibroScan® device in a primary care nurse consultancy in Spain. The research team randomly chose participants from the health registry and invited to participate by telephone. Fabrellas et al (2013) did not state how many potential participants declined entry into the study, nor how the sample size was determined, other than stating how many participants agreed to take part (n=502). Two nurses trained in the use of the FibroScan®, with experience of 250 examinations prior to the study consulted with participants in a clinic specifically set up for the study. They collected participant demographics, blood samples to check for AST, ALT, glucose, lipids and viral hepatitis then conducted the FibroScan® with a lower cut off threshold of 6.8kPa. In a large sample of participants with reliable results (n=495/502) they uncovered a prevalence, within this cohort, of 5.7% (n=28) with elevated liver stiffness, suggestive of fibrosis. Without knowing the reasons for non-participation in those who were invited to take part in the study, it is difficult to comment on the generalisability of these results. Whilst the sample size was large it is possible that this type of intervention attracted those participants who already,
because of lifestyle factors, had concerns regarding their liver health; possibly eliciting a cohort with higher likelihood of CLD. However, these results are in line with the lower prevalence in Roulot et al’s (2010) general population study of 7.5%, as opposed to 26.8% in Harmen et al (2015) who directly targeted those at high risk. However, these studies cannot be directly compared as the lower threshold differs between 6.8kPa (Fabrellas et al 2013) and 8kPa (Roulot et al 2010 and Harmen et al 2015). Further stratification would be useful in determining the optimum lower threshold i.e. how many participants with a FibroScan® result between 6.8kPa and 8kPa in the Fabrellas et al (2013) study had subsequently been diagnosed with significant fibrosis.

Fabrellas et al (2013) state they targeted the general population; with no comment as to whether the nurse consultancy used was in an area of low or higher deprivation or mixed. Of the participants in whom successful readings were obtained, 441/495 (89.1%) were described as Caucasian; this differs from Roulot et al (2010) who held their study, also targeting the general population, in an area of deprivation, with a high percentage of immigrants; the percentage unreported. Again, this causes difficulty in directly comparing both studies. However, regardless of this, neither yielded as high a level of elevated LSM as that in the study by Harmen et al (2015.) By directly targeting those at high risk, albeit in an area of low deprivation, Harmen et al (2015) yielded 26.8% of participants with an elevated LSM. Roulot et al (2010) yielded 7.5% through offering screening to those in the general population over the age of 45yrs; with those subsequently diagnosed with cirrhosis having known and identifiable risk factors for CLD. In view of resource restrictions, for reasons of efficiency, it would seem preferable to target a population at high risk; as is the case in this study.
While Harmen et al (2015) devised a novel algorithm for highlighting those requiring further investigation of liver disease, the initial test was blood based; despite the availability and subsequent use of the FibroScan® device. Roulot et al (2010) also undertook blood samples at the same time as the FibroScan® while they demonstrated that the FibroScan® was valid as the initial screening tool for liver disease. In their study, Fabrellas et al (2013) blood sample were taken during the consultation, but it is unclear who interpreted these; the author does state that they had a close link and effective communication with the local liver specialist unit. It is possible that interpretation of the bloods may have been carried out by staff there, but this cannot be assumed. The invasive nature of blood tests, the subsequent need for interpretation of a range of serum markers and the high volume of data this would produce per participant, has influenced the decision to use the FibroScan® device as the sole instrument for screening in the nurse led innovation; the subject of this thesis.

While Fabrellas et al (2013) claim that it is feasible for nurses to carry out screening for CLD, using FibroScan®, in the general population it is not clear how much of the intervention was nurse led, beyond carrying out the FibroScan® and interpretation of the result. Nursing input to the design of and development of the intervention can be assumed, as four of the nine authors are qualified nurses and the article was published in “Nursing Research”. While the nurse led aspect of this study is of interest to this current study, it was conducted in a non-UK primary care setting; therefore, it cannot be assumed that the cohort is directly comparable to this study targeting service users attending an alcohol support centre in Edinburgh. In addition, the participants were randomly selected, rather than targeted according to behaviour predisposing them to liver disease; giving a different emphasis to their study aims and outcomes than is the case in this study.
1.05 Conclusion of Review

The limited literature focusing on community screening with a FibroScan® device in alcohol services suggests that research in this area is long overdue. While the studies reviewed suggest acceptability of FibroScan®, critical review of the evidence revealed potential biases in recruitment, study design limitations, the possible influence of the motivation of those recruiting on the motivation of those taking part and the provision of a financial incentive on the success of their recruitment strategies. This, therefore, influenced the choice of recruitment strategy in this study; where the researcher was not actively involved in recruitment of potential participants. Reviewing the literature highlighted the inadequacy of serum markers in screening for liver disease and the higher prevalence of disease outwith the acute setting. It also highlighted that targeting a high-risk group is more efficient; an important consideration for cost effectiveness, which influenced this study design. Finally, while one study suggests that a nurse led screening service with a FibroScan® device is feasible (Fabrellas et al 2013), this was conducted in a non-UK primary care setting and is unlikely to be directly comparable with the community alcohol setting in this study in terms of service management and cohort demographic.

The key themes emerging from this critical review of the literature, therefore, indicate that FibroScan® is an acceptable intervention in community settings, with the targeting of high-risk groups being more effective than recruiting from the general population. The inadequacy of blood tests alone, in screening for liver disease, has been highlighted and the increased incidence of CLD in regional clinics suggests a need to target groups not currently accessing mainstream care. Finally, there is little evidence of studies, to date, being nurse-led in their design and development.
This chapter outlined the current climate in liver disease. Through identifying a gap in provision of service in the potential early identification of CLD, the author promotes the argument that early intervention can be achieved by taking screening into a community alcohol service, to those defined as being at high risk of liver disease, with the use of a portable FibroScan® device. The methodology and study design shall be outlined and evaluated in the following chapter.

1.06 Update of Literature Search and Review

Through an update of the literature search on completion of data collection, further articles on studies were found which offered FibroScan® intervention in non-acute settings. While, at this stage, these studies could not influence the development of this screening study they are of interest when considering its overall outcome. These included a study by Arain et al (2016) who conducted a randomised controlled trial looking at health knowledge and uptake of screening and treatment for hepatitis C in a small cohort (n=25) of PWID in a community setting receiving health promotion and a FibroScan® compared to a small cohort (n=27) who did not receive this intervention and were considered “standard of care”. This study was not chosen for further critique due to the small sample size, making it difficult to generalise the results (Creswell 2014) and, more importantly for this screening study, the FibroScan® was not carried out in the community; with participants being taken to acute services in a taxi to have this carried out. This required the taxis to be pre-booked, once numbers were confirmed in advance, standing in contrast to the drop-in method of recruitment and the overall design of this screening study. Cheng et al (2016) conducted a general population study which excluded those drinking to harmful levels. Cheng et al (2018) utilised a FibroScan® device in a community setting, its focus was on surveillance in a cohort with known CLD; rather than screening to
uncover new disease or testing its acceptability in this setting. Solomon et al (2016) conducted a prevalence study for liver disease in a community of PWID in India. Their incidence of disease is difficult to compare with the screening study as this was a drug using cohort as opposed to a group drinking to harmful levels. In addition, while their recruitment centre was situated in the community it was conducted in a “Centre for Substance Abuse Research” suggesting this facility may not be comparable to the drug and alcohol support centre chosen as the research venue for this study.

Bloom et al (2018) conducted a prospective observational study recruiting patients with hepatitis C from 21 primary care practices in Victoria, Australia with a hospital cohort being recruited for comparison. The aim of this study was to assess the prevalence of elevated LSM in patients being managed in the community and to evaluate predictors of advanced liver disease, comparing this with the hospital cohort. Participants were followed up longitudinally, with a median follow up of 15.2 months and monitored for liver-related events. Participants were invited to attend, differing from the recruitment strategy in this screening study with a convenience sample of participants. In addition, they were not screening for CLD, as this group were already known to have hepatitis C. However, of interest to the screening study is the uptake of the FibroScan® intervention and engagement in specialist follow up of those who required onward referral, with a lower FibroScan® threshold of 8kPa in this large sample size (n=1134). Uptake of screening was 76% (859/1134) in the community cohort with 55% (128/233) engagement in specialist services for those requiring onward referral. Without a qualitative element to their study (Bloom et al 2018) it is not known why the uptake they found was so high and, with a cohort already known to have CLD, it is possible that concern regarding their known disease could have been a factor. Incidence of raised LSM in this study is not
directly comparable to the screening study, as this cohort are known to have CLD; indeed, that is an inclusion criteria. The screening study targeted a cohort at high risk of CLD. While the uptake and engagement will be further discussed in relation to the screening study, later in this thesis, the incidence of CLD in the community cohort, which was significant and comparable to the hospital cohort, will not. This was not a nurse-led intervention, with one of two Hepatologists carrying out the assessments, including the FibroScan® Bloom et al (2018); the possible relevance of this will be discussed later in the thesis.
Chapter 2: Methods

2.01 Introduction
This chapter will present and justify the research question, aim, hypothesis and study objectives. In addition, the theoretical perspectives and methodology underpinning the study design are discussed and analysed. Thereafter, this is followed by a critique of the development of the data collection tool. To achieve the aims of this study in recording the uptake of the FibroScan®, determining the prevalence of undiagnosed CLD and reporting attendance with specialist liver services within, and at, six months post intervention a prospective quantitative observational design was developed. Analysis of data sought to determine associations between variables such as FibroScan® result and length of drinking, quantity of alcohol consumed weekly and BMI; consistent with the philosophical underpinnings of a positivist paradigm (Rolfe 2013).

2.02 Research Question, Aim, Hypothesis and Study Objectives
The aim of this study was to determine the viability of a service providing screening for liver disease, with a portable FibroScan® device, to a group concerned about the health of their liver due to elevated levels of alcohol consumption. The research question “Can a portable FibroScan® device be an acceptable tool for cirrhosis screening in a community alcohol support service?” was posed with a hypothesis that the FibroScan® device would be an acceptable tool for cirrhosis screening in this setting. This prospective observational study, which will be discussed in this chapter, enabled the following objectives to be completed:

1. Record the uptake of a FibroScan® in individuals accessing one community alcohol support service.
2. Determine the prevalence of undiagnosed significant liver disease in a self-selected, convenience sample of individuals accessing one community alcohol support service.

3. Report attendance at six months following referral to specialist liver services, of those participants referred with a FibroScan® reading ≥ 7.1kPa.

2.03 Theoretical Perspective and Methodology Underpinning the Study
This study proposed the use of the portable FibroScan® device for the use of early detection of liver disease where, whilst it is a validated tool (Nguyen-Khac et al 2008, Thiele et al 2015), higher quality diagnostics are available. However, these tools, such as MRI are unsuitable for use in the community setting due to their lack of portability or requirement for a specially trained operator. Maier’s Law states that E=QxA (Sermeus 2015) with E=Effectiveness, Q=Quality and A= Acceptability. This demonstrates that the effectiveness of an intervention of the highest quality will be poor if it has poor acceptability; while a suboptimal intervention with good acceptability will be more effective (Sermeus 2015). This translates well to this study, where uptake of screening may indicate a level of acceptability (Sekhon, Cartwright and Francis 2017) and may, subsequently, be effective for screening in this community alcohol support setting.

A Nurse Led Cirrhosis Screening service using a portable FibroScan® device in an alcohol service requires several components to be in place. Each component contributes to the success or otherwise of the intervention and can be presumed to include the FibroScan® device, a nurse qualified in its use with experience and motivation to work with “hard to engage” groups, written participant information, a clear, safe, participant pathway for those requiring onward referral, participant motivation to learn of and improve their liver health and suitable premises.
within an alcohol service to conduct the study. In this respect, this resembles a multi-component complex intervention and, as such, theoretical underpinning and guidance in its development and implementation has been sought using guidelines on developing and evaluating complex interventions compiled by the Medical Research Council (MRC 2008).

Possible facilitators and barriers to the success or otherwise of the intervention were explored, in addition to practical effectiveness and whether this intervention could operate within the setting of an alcohol recovery service (MRC 2008).

In preparing for implementation of the study it was important to consider possible facilitators and barriers (Dogherty and Estabrooks 2015). Self-efficacy, the confidence in one’s own ability to exert control over their behaviour, is an important consideration in predicting positive health behaviour (Bandura 1997) and can be influenced by environmental, personal and behavioural factors (Brannon, Feist and Updegraff 2014). Factors which can enhance self-efficacy, include verbal support, in the form of counselling and vicariously experiencing others health benefits from health behaviour change (Brannon, Feist and Updegraff 2014). These enhancing factors are available in the form of one to one and group support at the recovery centre chosen as the research venue. According to the Health Belief Model (Sharma 2011), factors which influence health behaviour include perceived susceptibility to disease, perceived severity of disease, perceived benefits of health enhancing behaviour and perceived barriers to health enhancing behaviour. The Theory of Planned Behaviour states intention is the best predictor of behaviour change, in addition to self-efficacy and external control factors i.e. barriers or facilitators to change (Marks et al 2015).
While most components of this cirrhosis screening intervention are provided through external factors such as the FibroScan® device and nurse time, an assumption is made that potential participants are demonstrating a degree of self-efficacy through their attendance for support with recovery from alcohol. Similarly, it is assumed that, should they participate in cirrhosis screening, they are, at the time of participation, demonstrating ‘self-efficacy’ according to Bandura (1997), perceived susceptibility to disease and intention to change their health behaviour (Marks et al 2015, Sharma 2011). It is important to consider self-efficacy, in the context of the Health Belief Model and the Theory of Planned Behaviour, as one of the integral components to this intervention as it may prove to be a key factor in both recruitment and retention to the project; ultimately leading to its success or failure.

Another consideration is practical effectiveness and the attitude towards the study of the multiple agency staff, acting as study hosts, within the chosen venue (MRC 2008). For example, the only room suitable for carrying out a FibroScan® is the largest in the building and that used for group activities; giving some concern for the potential for conflict as the study progressed. Practical effectiveness, whether the intervention will work in everyday practice, is a key question to consider in evaluating a complex intervention (MRC 2008) therefore designing the study to be as low maintenance for venue staff, as possible, was considered to be important in developing a sustainable service which would continue beyond the research phase and could, possibly, be integrated into routine services offered there. Venue staff were therefore consulted and involved in the design of the study from an early stage. This is also consistent with the key outcomes of Normalisation Process Theory where normalisation is the willingness to integrate a new intervention into everyday practice (May 2015). Normalisation Process Theory seeks to guide process development through considering such factors as coherence,
cognitive participation, collective action and reflexive monitoring (Murray et al 2010). To have coherence it is important that the intervention is easy to describe, and that hosting staff are aware of its purpose. It is also important to convey how this differs from current practice (May et al 2009). Cognitive participation, where staff engage and participate with their role, requires commitment and engagement with the intervention which is easier to achieve if staff think it is a good idea (May, Sibley and Hunt 2014). Collective action, where staff engage with the intervention as a group (May, Sibley and Hunt 2014) requires some thought as to how the intervention will impact on the current workload of staff hosting the study, while reflexive monitoring seeks to establish if staff feel there has been benefit to both them and their patients in hosting and possibly recommending the intervention (Murray et al 2010).

Normalisation Process Theory focusses on what people do and takes account of the turbulence and uncertainty often associated with the introduction and embedding of an innovation into an existing service (May 2013). This is an important consideration in the introduction of screening for liver disease in this venue; especially as the author was a visiting professional to this setting, was not a permanent member of staff and had no managerial responsibility for any of the local staff.

2.04 Developing the Screening Intervention
When investigating the possibility of delivering a screening service to a community alcohol service there was no capacity within the author’s clinical role to offer this within her work schedule. In addition to this, the liver unit did not own, or have access to, a portable FibroScan® device. Amongst some of the more senior staff members in the unit and with some members of the author’s team there was a general resistance to taking this innovation forward. Concerns were expressed regarding a possible breach of the currently defined role of the Hepatology
nurse and anxieties regarding the future of this role should this study go ahead. This desire to maintain the status quo is consistent with some of the common sources of resistance to change by current staff, often found in taking new projects forward (Dwyer, Stanton and Thiessen 2004). In addition, the capacity of the unit to deal with a source of referral from the community in addition to referrals from GPs was a source of anxiety; with one senior member of the team describing the innovation as “looking for work”. Within this climate of resistance, there was initial support from a senior member of the medical team in addition to management within the community alcohol service identified as the possible research venue.

In order to drive this innovation forward, the author worked autonomously to cement this support from her senior medical colleague, through advanced level discussion, influencing, leadership and negotiation skills (Stasa et al 2014); skills defined as a hallmark of advanced clinical practice by NHS Scotland (2017) and NHS Health Education England (HEE 2019). From the outset, the author organised meetings with her management within the NHS. In time, this resulted in developing support from key members of the NHS management team with the author finally being able to influence a positive outcome to enable the study to go ahead. Through this negotiation with senior management, she was able to secure time within her work schedule to deliver the intervention. This was set at two sessions per week for the duration of the data collection period; at that time undefined.

A pragmatic stance was taken with this study, in order that it can go ahead, rather than waiting for conditions to be optimal to do so (Creswell 2014). In considering time resource as part of the “budget” for managing this as a project with defined resources and outcomes (Dwyer, Stanton and Thiessen 2004) this allocated time set the frequency of the research clinics to two
sessions per week; with an agreement that admin time would be within the author’s own time. Subsequently, negotiation between management of a local alcohol recovery centre and the author, who currently delivered a clinic offering hepatitis C treatment once weekly there, were successful in securing a suitable room for two sessions a week, for the duration of the study; at that point undetermined.

While developing the study the NHS Innovation board called for applications from NHS staff to pitch for funds to support healthcare innovations. Funding ideas were reviewed by the board for selection to attend an NHS Lothian Innovation event. At this event the idea could be pitched to senior NHS, Scottish Government and Private Industry executives; a role requiring advanced level negotiation and influencing skills (NHS Leadership Academy 2013). Initially, the funds for the portable scanner, at approximately £45,000 to purchase, were deemed too high for this funding stream. However, the board were sufficiently persuaded with the idea and invited the author to apply to pitch for funding to rent the device for a period of six months at a more modest cost of £6020. This, amended, application was subsequently accepted, and she was invited to pitch the idea for two minutes, using one power point slide to an audience of just over one hundred, consisting of NHS executives, Scottish Government representatives and private sector entrepreneurs. Once all 30 candidates had pitched, the audience voted, using an electronic voting system, against the following criteria: “This proposal is an innovative approach for NHS Lothian which supports the delivery of safer, more effective and patient centred services”. Only the first five pitches with the most votes were allocated funding. The result of the voting showed that 48% of the audience strongly agreed with this statement, 35% agreed, 13% neither agreed or disagreed, 3% disagreed and 1% strongly disagreed (Appendix 3). The subsequent decision from the Innovation Board was to provide the funding for rental of
the device for six months. This, therefore determined this should be a time limited study with a
data collection period to six months, rather than being set by other scientific criteria such as
optimal sample size.

At this time, NHS Lothian Research Futures invited nursing, midwifery and allied health
professional staff to apply for funding and support in doctoral study. The author presented her
proposal to the panel for selection and was subsequently successful in securing funding and
study time for five years to take this innovation forward as the subject of this professional
doctorate; assisting in validation of the innovation as conforming to NHS Lothian’s priorities for
service and nursing research and development. Negotiation and leadership qualities were also
demonstrated through securing the further resources required; such as time to develop and
carry out the research within work time and provision of the room within the chosen research
venue. This also demonstrates the skills of the author in her ability to influence a range of
audiences with varying agendas and consistent with the high level of autonomy, leadership,
complex decision making in creating and developing an innovative solution with the aim of
enhancing patient outcomes as defined by advancing clinical practice (HEE 2019, NHS Scotland
2017).

However, in the course of developing this innovation, not all negotiation elicited a positive
outcome. As previously mentioned, there was initial resistance to its progress from some
members of the author’s nursing team and the wider medical team, within the liver specialty.
Whilst challenging for the author, this resistance is common in any prospective service
development or potential role expansion (Dwyer, Stanton and Thiessen 2004). With this
progress, it was important for the author to understand the rationale behind the perceived
resistance from the wider senior medical team and some nursing colleagues. In particular, the author felt it was important to understand the resistance from her nursing colleagues, leading to a series of meetings focusing on resolution of this. In leading on this innovation and to ensure transparency, as far as possible (Reed 2018), she presented her proposal at one of the liver unit’s weekly educational meetings. However, the timing of this presentation was carefully arranged to be in advance of data collection but after management, ethics approval and funding had been granted. In advancing this nurse led initiative, it was important to exercise and display autonomy (HEE 2019). With the relevant approvals now in place, the author was not asking permission to take this innovation forward but providing the opportunity to listen to any possible concerns or suggestions staff may have and provide answers and reassurance where possible; ultimately, to ensure the wider team felt they had the opportunity to feel fully informed. In identifying a need for this study and pursuing funding for the FibroScan® device the author became the Principal Investigator within the research team. This presented a challenge to her leadership skills as each member of the research team were more senior in their professional role than her and it has been necessary for her to take decisions on aspects of the research study where there had been a difference of opinion. This is consistent with skills required in project management, where an individual can be responsible for a defined piece of work while being junior in professional status to others in the wider team (Dwyer, Stanton and Thiessen 2004). This enabled the author to further develop her leadership skills and required complex analytical, negotiation and decision-making. These skills shall be further explored in Chapter 4: Discussion.

This chapter introduces the rationale for a study screening for liver disease in a community alcohol support setting with a FibroScan® device; working collaboratively with staff in this area.
Through specialist knowledge of liver disease, evaluation of current policy in the area of liver disease and public health and critique of the literature the author presents the case for initiating and taking this study forward. The challenges and the advanced clinical practice skills required in doing so, within her current role as a Hepatology Nurse Practitioner, are evaluated and will be revisited during in Chapter 4: Discussion. The remainder of this chapter shall outline the study design, methods and underpinning theoretical framework for this study.

2.05 Developing the Data Collection Tool for Assessment of Participants
Screening for cirrhosis with a portable FibroScan® device in alcohol services is not currently offered as a service at local level; nor were there published data in this field to suggest that this was currently operational within the UK. For this reason, no validated assessment or data collection tool was available specifically for use in this context. This section of the chapter explores the development of the structured data collection tool devised to support the FibroScan® test and ensure focused patient assessment, through adapting systematic assessment (Snadden et al 2013). Its purpose and factors ensuring content validity shall be explored and evaluated.

In construction of the data collection tool three key objectives were considered. Firstly, it should enable a lifestyle risk assessment for liver disease to establish if participants fit the inclusion criteria of those who are worried about the effects of their drinking on the health of their liver. In this respect, it should facilitate appropriate signposting to other support services where necessary and enable tailored health promotion advice. Secondly, it should facilitate a medical and family history for participants in order that factors increasing their risk of CLD can be documented and further assessment offered where appropriate (Snadden et al 2013). Finally, it should describe the sample population in such a way that data can be transferred to
the Statistical Package for Social Sciences (SPSS) for analysis (Lobiondo Wood and Haber 2014).

Prior to use in the study the data collection tool, content validity was checked by one clinical (Consultant Hepatologist) expert, and one academic expert (Senior lecturer and author) before being finalised.

As potential participants to this study could drop in to the bi-weekly research clinic; having requested a participant information sheet from the research venue reception, and with the information on exclusion and inclusion criteria offered in the research pack, self-screening for suitability to the study was expected. Further assessment regarding suitability by the author took place through discussion with potential participants in gaining their consent and before proceeding to data collection; therefore, screening for inclusion to the study was not a requirement for this tool.

Lifestyle risk for CLD alone could result in missing other key causes of liver disease and, in the event of a participant displaying signs or symptoms of liver disease, onward referral to specialist services would be organised; regardless of the FibroScan® result. Including a health assessment to complement the lifestyle risk assessment assumes a degree of reliance on the knowledge and skills of the author, working at an advanced level of practice (Kenney 2009) in their use of systematic enquiry to pursue a specific line of questioning in response to answers suggesting possible liver disease (Snadden et al 2013). This, in turn, could conflict with the aim of homogeneity in reporting of data where closed, dichotomous questions should be used (Moule and Goodman 2013). Incorporating questions which aid systematic enquiry, therefore, has the potential to result in a range of unnecessary data which are cumbersome to analyse and may bring disproportionate attention to signs and symptoms in a study taking place in a
non-medical setting. This, in a medical condition where the absence of these may be assumed in most participants (Williams et al 2014). In addition, consideration was given to time constraints for the study. With thirty minutes allocated to each participant, there was a limit to the extent further questioning could be incorporated into the consultation, as it risked overburdening the participants who, should they be identified as having a risk of CLD through either the FibroScan® result, or their history, would be referred for a comprehensive medical assessment with a senior member of the medical team in Hepatology. It was therefore decided that, while a health assessment was an important element of the data collection tool, scope and requirement for full systematic enquiry would be limited. Focused, problem orientated enquiry (McGee 2003) was expected in this study and was within the author’s advanced scope of practice (NMC 2015). The outcome of any further questioning would be documented and reported in a dichotomous way with some provision for free text reporting within an excel spreadsheet to enable further understanding of the possible signs or symptoms found in any sample requiring onward referral. Following completion of the excel spreadsheet data would be transferred to the codebook, developed for this study to be compatible with SPSS (Appendix 4).

In developing their tool for the collection of human responses of outpatients with chronic cardiovascular diseases, Carneiro et al (2014) devised a ninety-question nursing assessment tool for data collection. This was largely based on the North American Nursing Diagnosis Association (NANDA) taxonomy of nursing diagnostic terminology and Gordon’s Functional Health Pattern, which organises data into domains for structure and clarity (Gordon 1994). Their resulting tool consisted of four sections, which included demographic information, clinical data, physical examination and interview/subjective data. Carneiro et al (2014) suggested this
tool could be adapted for use with other chronic illnesses. However, they also state that this tool took an hour of nurse time to complete; this was considered in breach of the aim to avoid overburdening the participants and therefore prohibited its consideration for use, in its entirety, for adaptation in this study. In addition, as the NANDA taxonomy, which is not widely used in the UK, was an underpinning element to this tool concerns were raised as to the transferability of its psychometric properties for use in the UK.

Rather than being guided by specific questions, therefore, a more global approach was taken, and development of the data collection tool was, in part, guided by the four domains of the tool developed by Carneiro et al (2014) i.e. Identification, Clinical Data, Physical Exam and Interview. Their largely quantitative interview/subjective section was justified in the context of their study looking at the human responses of patients as it ranged from perceptions of health to nutrition, elimination, spirituality and self-perception in line with Gordon’s Functional Health Pattern taxonomy (Gordon 1994). This could be less justified in a study aiming to screen for liver disease within a consultation lasting around thirty minutes (Moule and Goodman 2013). However, in taking a pragmatic approach a more focused, problem based (McGee 2003) strategy to data collection, within the time constraints of the consultation, was considered important in identifying participants who may be identified with an elevated risk of CLD, regardless of FibroScan® result. Provision for subjective reporting by the participant was considered important in cases where they may wish to self-report details which may be pertinent but not specifically asked during the consultation. For this reason, a short “other” section was included to enable this.
Carneiro et al (2014) included a section to document physical examination. While, in this study, no full physical examination would be offered participants were asked whether they are aware of possible signs and symptoms of chronic liver disease. Indeed, the response to this may have elicited further focused systematic enquiry by the author (Snadden et al 2013) and onward referral to specialist services, regardless of the FibroScan® result and, in those with raised results, provide further support to their diagnosis. It was therefore considered important to have, albeit, a short section for this.

2.06 Alcohol History
According to Sargent (2009) a comprehensive alcohol history should include quantity, strength of alcohol and pattern of drinking. Other relevant factors include age, when they started drinking alcohol, timing of last drink and whether they have any alcohol related offences. Validated screening tools for alcohol misuse include the FAST score and AUDIT C (PHE 2017) and are commonly used in health care settings for identifying those who are drinking to hazardous, harmful or dependent levels (Scottish Government 2012). This study was targeting a self-selected group who, through drinking to hazardous, harmful or dependent levels, were at elevated risk of liver disease and therefore the issue of whether the participant was drinking to levels, which concern them, is suggested by their attendance for support in alcohol reduction at the recovery centre and subsequent enrolment in the study. In this respect, questioning on alcohol related offences and timing of last drink may not be so relevant and there would seem no need to use either the FAST or AUDIT screening tool but to focus the history on questioning regarding behaviour, which may give an indication of liver disease risk. Recording alcohol intake in units per week, length of drinking and pattern of drinking may be helpful in determining the level of anticipated harm to the participant’s liver (Williams et al 2014).
Recording whether a participant has a family history of alcohol misuse is important as this can indicate a possible predisposing genetic link to liver disease (Sargent 2009).

A level of motivation in reducing alcohol intake was assumed in this cohort, due to their attendance at the community alcohol support service. Some participants may have previous attempts at detoxification from alcohol. In data collection this may be of interest as a possible reflection on their ability, in the past, to keep their resolve and may give an indication of possible areas for discussion in pitching a health promotion message in a motivational way (Sharma 2011)

2.07 Body Mass Index (BMI), Metabolic Syndrome and Diabetes

According to WHO (2019), a body mass index (BMI) of ≥ 30kg/m² is an indicator of obesity. Non alcoholic fatty liver disease (NAFLD) occurs when fatty infiltration of liver cells results in damage of liver tissue (Sargent 2009). NAFLD can be present with or without inflammation (non alcoholic steatohepatitis or NASH) (Pinzani, Rosselli and Zuckermann 2011) and it is estimated that, due to either NAFLD or NASH, 15-20% of those who are obese will develop fibrosis or cirrhosis (ScotPHO 2017). The portable FibroScan® device used in the study could not support an XL probe, resulting in an increased likelihood that results in patients with a BMI ≥30kg/m² were unreliable with the medium probe (de Ledinghen 2012). Thus, from a health promotion aspect recording weight and height to establish a participant’s BMI can enable a discussion regarding the liver health implications of a raised BMI. From a data collection point of view, in addition to aid description of the study population, recording BMI can give insight into the reason why some scans may be unreliable. In individuals who are not currently obese a history of obesity can be a significant factor in liver disease (Muir 2015), as this may already have resulted in cirrhosis; this was also be included in the assessment.
Metabolic syndrome, the features of which include obesity, hyperlipidaemia and insulin resistance is (Sargent 2009) linked to NASH and the development of cirrhosis (Muir 2015). Type 2 diabetes is increasing rapidly in Scotland with 276,430 cases at the end of 2013; giving a prevalence of 5.2% (ScotPHO 2017). This can also be a clinical feature of cirrhosis due to disturbed glucose use or decreased removal of insulin by the liver (Shuppan 2008). Type 1 diabetes can be linked to development of cirrhosis (Harmen et al 2015) therefore it seemed prudent to make specific reference to diabetes when taking a medical history for this study.

2.08 Blood Borne Viruses (BBVs)
Approximately 50,000 of the Scottish population are infected with hepatitis C, with less than 50% currently aware of their diagnosis (ScotPHO 2017). While 5% of cases will self-clear, 5-15% of those with chronic infection likely to develop cirrhosis over 20 years if they remain untreated (ScotPHO 2017). Data linking the 10% of those with hepatitis B who develop chronic infection with CLD is currently unavailable (ScotPHO 2017) but those chronically infected with hepatitis B and C are at increased risk of developing cirrhosis (Muir 2015). While transmission of hepatitis B and C can occur through direct blood-to-blood and sexual contact, hepatitis B can also be contracted from close contact with infected body fluids (Sargent 2009). In establishing a participant’s risk of contracting viral hepatitis, it is important to consider lifestyle factors which increase the risk of BBVs such as injecting drug misuse and other drug taking risks, tattoos in unlicensed premises, travel to high prevalence areas and high-risk sexual practices or unprotected sex with an individual with a high risk of BBVs (Scottish Government 2015). Risks from exposure to blood products or unsterile surgical or injecting equipment in the UK prior to the development of an antibody test for hepatitis C in 1991 (ScotPHO 2017) or in areas outwith the UK where sterilisation procedures may be suboptimal carry a risk of BBVs and occupational
exposure, such as needlestick injury should be included in any BBV risk assessment (Scottish Government 2015).

2.09 Other Factors with Possible Adverse Effects on Liver Health
It is important to establish whether participants carry a possibility of a genetic liver disorder such as haemochromatosis or autoimmune hepatitis (Sargent 2009). This can be elicited through establishing whether there is a family history of these conditions as the participant is unlikely to have symptoms and, if not already diagnosed, unlikely to be aware of having these conditions themselves (Sargent 2009). However, as discussed elsewhere in this section, while an early iteration of the data collection tool (Appendix 5) included reference to autoimmune disorders on page one, it was suggested, through discussion with senior medical colleagues that this could be included in more general questioning regarding participant’s own and family history rather than a stand-alone question.

Consideration should be given to medication, whether it is over the counter, prescribed, herbal or illicit drugs which may cause abnormal liver function tests and hepatotoxicity (Sargent 2009). This again will help to inform a diagnosis should the participant require onward referral.

Smoking status should be recorded due to its ability to exacerbate existing liver disease (Schuppan 2008). A section for blood results was included in the early data collection tool. In further considering the participant pathway this was removed as only those requiring onward referral were required to have blood taken and, at this point, they were registered as NHS patients.

As this study is targeting a hard to engage population (Brackertz 2007, Watt 2013) and, in view of evidence suggesting improved engagement when reminders are issued (Wong et al 2009)
participants requiring onward referral would be asked if they felt they would benefit from a
text reminder before their appointment at the nurse led liver clinic. Their response would be
documented in the data collection tool to ensure this was noted.

2.10 Fasting Status and Demographics
As discussed in the previous chapter, and in line with evidence to suggest that FibroScan®
results are raised after eating (Lemoine et al 2014), it would seem prudent to document when
the participant last ate and whether they have presented in a fasted state. In order to enable
further contact with participants’ identifiable information can include their name, date of birth
or community health index (CHI), address and contact telephone number. Provision was made
by the author, therefore ensure these were locked in a drawer in the author’s office to ensure
security of data; as required by the Ethics committee and recommended in Good Clinical
Practice Guidelines (NHS Scotland 2014). GP details were recorded, in order that the GP can be
informed of their participation in the study. To establish whether participants in the study were
the target group of those who are accessing support in alcohol recovery, the agency or support
group accessed by each participant was also documented.

2.11 Structure of Consultation
As with any consultation developing a good rapport is important and (Snadden et al 2013) and
Fawcett and Rhynas (2012) suggest starting the consultation with less intrusive questions; an
important consideration in devising the flow of questioning. While participants in this study
were likely to accept the need for a thorough alcohol history, they may be less likely to expect
to be asked questions regarding other potentially sensitive lifestyle factors such as high risk
sexual activity and drug use. Douglas, Nicol and Robertson (2013) and Denvir (2012) suggest
that the practitioner should brief the participant in advance that they will be asked certain
questions and the rationale given for the questions, in order that they are not seen as being disrespectful of the answers should they need to probe further and that the participant is not taken by surprise or offended by the questions asked. It would seem reasonable to commence with participant and GP details leading to which agencies, if any, the participant is linked in with at the recovery centre. While asking these questions the general demeanor of the participant can be assessed. Whether they seem anxious, intoxicated or, of relevance to this study, whether they seem to be centrally obese, to an extent which may make scanning difficult (Williams et al 2014), can be included in this initial assessment. Communication difficulties such as illiteracy, language difficulties or sight impairment may also be highlighted at this time and arrangements made to help with this if necessary.

Following completion of the data collection tool and recording of BMI, participants were then asked to lie on a couch with their upper left quadrant exposed in order that the FibroScan could be taken. As the FibroScan gives an instant result; this was discussed with the participant at the time of screening and their follow up discussed.

2.12 Research Data Collection
The research clinic was carried out by the author, an appropriately trained and experienced Hepatology Nurse Practitioner. In keeping with the decision to utilise a recruitment strategy where potential participants would not feel coerced into taking part a decision was taken that the author would not approach them in the reception area of the research venue. Instead, this study was advertised on a rolling TV screen in the reception area, posters in reception (Appendix 6) and all consultation rooms. Potential participants could then volunteer. The image on this poster was chosen to demonstrate that participants are not required to undress, merely
that the upper left quadrant of the abdomen is exposed for access of the FibroScan® probe in the event of this assumption being a barrier to participation.

Participant study information packs which included the participant information sheet and draft consent form, were numbered and available in the reception area. To assess uptake, the number of packs issued were counted against the number of participants in the study. While venue staff were not required to approach service users in the reception area to recruit to the study it is entirely possible that they drew attention to it and provided encouragement for their clients to take part. Indeed, this behaviour is more likely to occur if staff demonstrate a willingness to incorporate screening into their service and an ability to describe it; demonstrating coherence is an essential factor in the normalisation process (Murray et al 2010). However, while this may conflict with their role in the study, as any member of staff may man the reception area at any time, it could also be argued that this was indicative of them engaging with the role of the receptionist in this study; demonstrating cognitive participation, another key factor in the normalisation process. A pragmatic approach needed to be taken as it was not possible for the author to monitor what level of engagement staff may take in the process of recruitment; as she was not sited there on a full-time basis. A need for practical utility was important in designing this study and it was considered important to build this in from an early stage (MRC 2008). Ultimately potential participants demonstrate tacit, or implied consent, by attending the research clinic where informed consent would be discussed with them (NHS Scotland 2014) prior to the intervention. While not the primary mode of recruitment, therefore, it was accepted that information giving and sign posting by staff could be accepted as part of the recruitment pathway for this study.
Venue staff checked that individuals taking a study information pack were given the opportunity to have the information read to them on the premises. If a participant wished to take part in the study, they could return to a research clinic at their convenience on a Tuesday or Thursday between 11-2pm. This would enable potential participants to attend on an empty stomach to enhance the quality of the scan (Lemoine et al 2014); a full stomach did not exclude participation in the study, as is current practice in the specialist liver service. Potential participants who were pregnant, had a pacemaker or known cirrhosis would be excluded from taking part in the study, according to guidelines in the use of the device (EASL-ALEH 2015). Following discussion of the purpose of the study written consent was taken to share information with the participant’s GP and other health professionals, as appropriate (Appendix 7). In order to provide demographic data of the study cohort, to establish any possible link between FibroScan® result and BMI and to provide data, in the event of an unreliable FibroScan® result, participant’s height and weight were recorded, in order that their BMI could be established. A focused medical and lifestyle history (Snadden et al 2013) was taken, using the data collection tool specifically designed for this study (Appendix 8). The development of which was be discussed in the preceding section.

2.13 Pathway Following FibroScan®
Participants with a FibroScan® reading ≥ 7.1kPa were offered an appointment to attend a nurse led liver clinic within the service on another day, for further blood tests to determine the pathway of monitoring and follow-up. In the unlikely event of participants showing symptoms of CLD (Muir 2015), despite a reading ≥7kPa, an appointment for follow up would also be offered. The appointment date and time were given on the day of the FibroScan®. A reminder telephone call for the clinic appointment was also offered.
For those participants who showed no signs of cirrhosis from their scan (≤ 7kPa), lifestyle advice was reinforced through the literature offered at the research appointment (Drinkaware 2013). In the event of being unable to elicit a FibroScan® reading the GP was informed and invited to refer participants to the liver unit at the Royal Infirmary of Edinburgh (RIE) for further assessment, should they have any concerns regarding their liver health. Regardless of outcome all participants’ GPs were informed of their attendance and whether follow up was indicated or not.

Referrals to specialist liver services and adherence to surveillance were reported through checking participants’ appointment details on Trak (online tracking system used by NHS Lothian for booking patient appointments and recording attendance) for the duration of the study.

2.14 Sample, Sample Size, Data and Timescale
The sample was a convenience sample in one community alcohol support setting in Edinburgh. This recovery centre has a catchment area which includes an area of deprivation in Edinburgh (SIMD 2017); therefore, those at most risk through their liver disease could be targeted (Williams et al 2014).

Inclusion criteria included individuals over age 16, with the ability to provide informed consent who were attending either the triage facility for assessment of their support needs, or who were currently undergoing alcohol support in the centre. Exclusion criteria included the possibility of or known pregnancy, known to have a pacemaker, ascites, an open wound close to right 8th-10th intercostal margins, known cirrhosis and no alcohol history (EASL-ALEH 2015 2015).

As this study was evaluating the acceptability of the cirrhosis screening intervention in a community alcohol setting, no specific sample size was determined; with the sample size being
limited to the number of participants dropping in to the research clinics in a 24-week period. As this project planned to offer 12 screening slots weekly in a period of up to 24 weeks; a potential sample size of 288 participants was possible if all slots were utilised. Data, therefore, was used to describe the population and variables for data analysis included FibroScan® result against age, gender, length of drinking and BMI. This data was coded using the codebook developed for this study and stored within the “Statistical Package for Social Sciences” (SPSS). Statistical tests included the “Mann Whitney U” for non-parametric data and the “Independent t test” for parametric data to analyse differences between groups (Pallant 2010). The development of this study spanned 12 months from inception through to securing funding, commencing data collection to completion of the data collection involved when monitoring engagement. This timeline and basic costings can be found in Appendix 9.

2.15 Ethical Considerations
This project targeted those attending a community alcohol support service who were concerned about the effects of alcohol on the health of their liver. As such, they can be considered a vulnerable group (Watt 2013). In working with a group who are drinking to harmful or dependent levels (Scottish Government 2012) participants may attend in an intoxicated state; thus, posing a challenge to the author in determining whether they were able to participate in the study. Informed consent, determined by establishing that participants are informed on the process and implications of the study, are competent to consent and are taking part on a voluntary basis was a vital element in recruitment (NHS Scotland 2014). While, through their attendance at the alcohol service, potential participants acknowledge they have concerns regarding their alcohol use it was important that anonymity was respected at all times and ensured any discussions regarding the study were carried out in private rather than
in the communal areas or in the immediate vicinity of the service; where other service users may overhear.

During the screening consultation sensitive issues such as sexual activity, recreational drug use and public protection may be discussed. In addition to this, giving a potential diagnosis of cirrhosis can have life changing consequences. As a Hepatology Nurse Practitioner, the author has experience of asking such questions, referring to other agencies, as appropriate and supporting people with such a diagnosis. In the event of a public protection concern being highlighted, NHS Lothian Public Protection policy (NHS Scotland 2015) would be followed.

Without robust data to determine the cost effectiveness for using a FibroScan® as a screening tool in the community (Stevenson et al 2012), delivering an intervention with the potential for earlier disease identification and reducing later presentation of disease which could improve the quality of life for those who manage to implement lifestyle changes and reduce the need for more expensive treatments, such as liver transplant, would seem ethically preferable to the status quo.

To ensure beneficence when carrying out screening it is important to consider the possible anxiety a raised FibroScan® reading may cause to participants; in particular, when using the lower cut off value of 7.1kPa. It was therefore important to inform participants that a diagnosis could not be offered at point of screening and that elevated FibroScan® readings, which indicate possible fibrosis or cirrhosis would need to be confirmed with the range of tests available; such as serum biological markers and abdominal ultrasound, where appropriate.
In accordance with NRES guidelines (NHS Scotland 2014) it is the researcher’s duty to ensure security and confidentiality of any data collected during the research study. Raw data is required to be anonymised and held securely. In agreement with the ethics committee, data collected during this project was kept within a locked drawer in the author’s office at the RIE, within a lockable case when in transit or in a locked drawer within NHS offices at the research venue; if the author was not travelling directly back to the RIE. Only the research team (author, clinical collaborator and academic collaborator) have full access to this data. As this study involves NHS patients (NHS Scotland 2014) ethics approval had been sought and subsequently agreed by the South of Scotland Research Ethics Committee (Appendix 10).

This chapter has explored the theoretical perspectives underpinning the development of the study design as it progressed from inception to completion. It highlights the project management, leadership and negotiating skills required by the author in bringing together the various elements required to ensure that the study ran to a high standard; in keeping with advanced practice. The following chapter shall illustrate and evaluate the results from this study; both demographic data, describing the participant population, the FibroScan® results obtained and subsequent engagement with specialist services for those requiring onward referral.
Chapter 3: Results

3.01 Uptake, Incidence of CLD and Engagement in Specialist Services
This chapter details the results of the study from the initial objectives including uptake of screening, prevalence of disease in the study cohort and engagement with services for those requiring onward referral. Analysis of the results was carried out using Excel and SPSS (version 23). Participant demographics shall be detailed early in the chapter, to provide details of the cohort and incidental findings shall be documented following the results linked to the study objectives. Specific statistical analysis tools, where used, shall be detailed in the section with the relevant data.

During the recruitment period 118 participant information packs were requested and 79 service users took part in the study; representing an uptake of 67% of those who requested information. Attendance at research clinics ranged between zero to five participants. Typically, one to two participants attended each clinic (Appendix 11) with the Tuesday clinic attracting 52% (n=41) of the number recruited and the Thursday clinic attracting 48% (n=38). The data were collected using the data collection tool specifically devised for this study (Appendix 8). Table 1 outlines the demographics of the 79 participants who self-selected and consented to take part in the study; the implications and limitations of which will be further explored in Chapter 4: Discussion.
Table 1: Participant Demographics of the 79 Participants Who Consented to Having a FibroScan

<table>
<thead>
<tr>
<th>Participant information</th>
<th>Female (n=29)</th>
<th>Male (n=50)</th>
<th>Total Number (n=79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD) age in years</td>
<td>46 (11)</td>
<td>46 (8)</td>
<td>46 (9)</td>
</tr>
<tr>
<td>Currently receiving alcohol support at the community service (n (%))</td>
<td>24 (83%)</td>
<td>45 (90%)</td>
<td>69 (87%)</td>
</tr>
<tr>
<td>Attending triage facility – first step in accessing support (n (%))</td>
<td>5 (17%)</td>
<td>5 (10%)</td>
<td>10 (13%)</td>
</tr>
<tr>
<td>Previous detox from alcohol</td>
<td>20 (69%)</td>
<td>35 (70%)</td>
<td>55 (70%)</td>
</tr>
<tr>
<td>Pattern of drinking* (n (%))</td>
<td>Daily 22 (76%)</td>
<td>Daily 37 (74%)</td>
<td>Daily 59 (75%)</td>
</tr>
<tr>
<td></td>
<td>Binge 4 (14%)</td>
<td>Binge 13 (26%)</td>
<td>Binge 17 (22%)</td>
</tr>
<tr>
<td></td>
<td>Intermittent 3 (10%)</td>
<td>Intermittent 0 (0%)</td>
<td>Intermittent 3 (4%)</td>
</tr>
<tr>
<td>Levels of drinking in units per week (self-reported)</td>
<td>1-100 10</td>
<td>1-100 14</td>
<td>1-100 24</td>
</tr>
<tr>
<td></td>
<td>101-200 11</td>
<td>101-200 21</td>
<td>101-200 32</td>
</tr>
<tr>
<td></td>
<td>201-300 5</td>
<td>201-300 8</td>
<td>201-300 13</td>
</tr>
<tr>
<td></td>
<td>301-400 1</td>
<td>301-400 4</td>
<td>301-400 5</td>
</tr>
<tr>
<td></td>
<td>401-500 1</td>
<td>401-500 0</td>
<td>401-500 1</td>
</tr>
<tr>
<td></td>
<td>501-600 0</td>
<td>501-600 1</td>
<td>501-600 1</td>
</tr>
<tr>
<td></td>
<td>Unsure 1</td>
<td>Unsure 2</td>
<td>Unsure 3</td>
</tr>
<tr>
<td>Median (IQR: percentile 25, percentile 75) length of drinking in years</td>
<td>10 (7,20)</td>
<td>15 (5,20)</td>
<td>12 (6,20)</td>
</tr>
<tr>
<td>Possible symptoms of CLD – self reported (n (%))</td>
<td>6 (21%)</td>
<td>7 (14%)</td>
<td>13 (16%)</td>
</tr>
<tr>
<td>Reported risks of BBVs (n (%))</td>
<td>12 (41%)</td>
<td>35 (70%)</td>
<td>57 (72%)</td>
</tr>
<tr>
<td>Mean (SD) BMI of cohort (kg/m²)</td>
<td>26.5 (5.6)</td>
<td>26.6 (5.2)</td>
<td>26.5 (5.3)</td>
</tr>
<tr>
<td>Prevalence of cohort obesity (≥ 30kg/m²) (n (%))</td>
<td>8 (28%)</td>
<td>9 (18%)</td>
<td>17 (22%)</td>
</tr>
</tbody>
</table>

*Intermittent drinking describes “four on, three off” or “five on, two off” patterns of drinking. Binge drinking describes the pattern of drinking where non-drinking days typically lasted more than three days weekly.
Of the total cohort, 13 (16%) stated they had experienced possible symptoms of CLD including abdominal swelling and possible jaundice, at some point in the past. No participant declared these symptoms as a current problem and, following assessment by the author, no participant displayed signs and symptoms of CLD requiring referral for further medical assessment. In relation to possible risks of BBVs, 57 (72%) of the total cohort reported possible risk factors. These include injecting drug use, tattoos in unlicensed premises, travel in areas of high prevalence of BBVs, receipt of blood products in the UK prior to 1991 or, more recently, outwith the UK in areas of high prevalence, occupational risk or high-risk sexual activity. It was outwith the scope of this study to further stratify these risks to higher and lower risk activity. The mean (SD) BMI of all was 26.5(5.3) kg/m². This, in relation to FibroScan® result will be reported in greater detail later in this chapter.

As previously discussed, the lower threshold for the FibroScan® results for this study was 7.1kPa. Three participants elicited invalid FibroScan® results, according to the criteria for validity as set out by Schwabl et al (2015) where results >7.1 kPa require an IQR/Median of ≤ 30% to be considered reliable. As with all participants, their GP was informed so they were aware of this participation and could refer their patient to specialist liver services, should they have any concerns regarding their liver health; regardless of their participation. These participants have been removed for the remainder of the data analysis to enable a full data set for those who navigated the study pathway following a valid FibroScan® result; leaving a cohort of 76 participants for assessment of liver disease outcomes and engagement.

Of these 76 participants, 56 (74%) elicited a FibroScan® reading of < 7kPa, indicating no significant fibrosis and requiring no onward referral for further investigations. Of those
requiring further assessment bloods included full blood count, liver function tests, autoantibodies and hyaluronic acid, the results of these blood tests are outlined in Appendix 12. Of those requiring onward referral to the nurse-led clinic, 19/20 (95%) attended the nurse-led clinic, with one participant failing to attend either of the two initial appointments at the nurse-led clinic but attending their GP for baseline liver bloods and thereafter the nurse-led service for further assessment bloods; this participant, therefore had no definite diagnosis.

Following analysis of the blood results taken at the nurse-led liver outreach clinic by the Consultant Hepatologist supervising this study, none of the eight participants with a reading between 7.1kPa and 7.9kPa required onward referral for medical assessment. Of the remaining 12 participants seven (9%) had a reading between 8kPa and 12.4kPa indicating possible significant fibrosis and five (7%) had readings equal to or above 12.5kPa, indicating possible cirrhosis; these participants were subsequently offered an abdominal ultrasound for further assessment in addition to an appointment with either a consultant Hepatologist or senior registrar at the RIE in order that a diagnosis could be provided and subsequent follow up, if needed, agreed; as per study pathway (Appendix 13).

On completion of the study the diagnostic outcomes, as illustrated in Table 2, for the 20 participants requiring referral to the nurse-led clinic and thereafter onward referral to specialist liver services was recorded. Within this group six (8%) were diagnosed with definite cirrhosis. One participant was discharged back to their GP following a period of alcohol reduction over their six-month follow up period. One participant did not engage with their medical assessment and therefore never received a definite diagnosis but continued to attend for follow up with the author in the specialist liver clinic she runs within the community alcohol
support service. The remaining four (5%) were diagnosed with fibrosis and remain in follow up with specialist services.

Table 2: Diagnostic Outcomes of FibroScan® Screening in a Community Alcohol Service

<table>
<thead>
<tr>
<th>Diagnostic Outcomes</th>
<th>Cirrhosis (n)</th>
<th>Fibrosis (n)</th>
<th>Discharged following medical assessment (n)</th>
<th>Nurse only assessment no further referral (n)</th>
<th>No diagnosis (n)</th>
<th>No onward referral (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FibroScan ≤7kPa (n=56)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>56</td>
</tr>
<tr>
<td>FibroScan &gt;7kPa &lt; 8kPa (n=8)</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>8</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>FibroScan ≥8kPa &lt; 12.5kPa (n=7)</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>FibroScan ≥12.5kPa (n=5)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

Of the 20 participants referred to the nurse-led specialist liver clinic within the alcohol service, 19 attended. Of the 12 patients expected to attend the RIE for medical assessment, 11 did so.
and of 10 patients expected to attend for six monthly follow up, nine did so. All 12 patients referred for abdominal ultrasound attended; as summarised in Table 3.

Table 3: Engagement of Participants Requiring Onward Referral to Specialist Services

<table>
<thead>
<tr>
<th>Engagement of those requiring onward referral</th>
<th>Expected number</th>
<th>Number attended</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended nurse appointment at the research venue</td>
<td>20</td>
<td>19</td>
<td>95%</td>
</tr>
<tr>
<td>Attended first medical appointment at RIE</td>
<td>12</td>
<td>11</td>
<td>92%</td>
</tr>
<tr>
<td>Attended six month follow up</td>
<td>10</td>
<td>9</td>
<td>90%</td>
</tr>
<tr>
<td>Attended USS/CT/MRI</td>
<td>12</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.02 Results Concerning Age, Length of Drinking and BMI with FibroScan®
To assess whether data for age, length of drinking and BMI were normally distributed the Kolmogorov Smirnov® test was used; where a sig value of more than 0.05 indicates normality and sig value of 0.00 suggests violation of the assumption of normality (Pallant 2010). With a sig value of 0.2 both the data for age and BMI could be assumed to be normally distributed; while, with a sig value of 0.00 that for length of drinking could not. This, therefore, determined which tests were used in determining whether there was a significant difference between each
of these factors and FibroScan® results in those requiring onward referral for medical assessment (≥8kPa) and those who did not (≤7.9kPa); with the parametric Independent t test being used for age and BMI and the non-parametric Mann Whitney U test being used for determining associations with length of drinking and FibroScan® result.

In determining whether there was a significant difference between the age of those with requiring onward referral, with a FibroScan® result ≥ 8kPa and those with a result ≤7.9kPa the independent t test demonstrated there was no significant difference between the age of the group with FibroScan® result ≤7.9kPa (M=45.2yrs SD=9.6) and the age of the group with a FibroScan® result of ≥8 kPa (M=48.4 yrs SD=9.2). The magnitude of the difference in the means (mean difference= -3.2, 95% CI: -9.15 to 2.76) was small (eta squared= 0.02); where .01 = small effect, .06= moderate effect and .14 = large effect (Pallant 2010).

Similarly, the independent samples t test was conducted to compare the BMI of participants according to FibroScan between the same groups. There was no significant difference in BMI between the groups with FibroScan® results <7.9kPa (M= 25.5 kg/m² SD= 4.2) and those with a FibroScan® result ≥8kPa (M=30.2 kg/m² SD= 7.4; t= 2.12, p= .055 two tailed). The magnitude of the differences in the means (mean difference = -4.69 CI: -9.49 to .106) was moderate (eta squared = .06).

Finally, in determining possible associations between these groups and length of drinking the Mann Whitney U test showed no statistically significant difference between the length of drinking and FibroScan® result with p=0.926.
3.03 Incidental findings
During the study, two of the participants who required onward referral and were subsequently diagnosed with cirrhosis were also diagnosed with the genetic condition haemochromatosis which causes excess iron storage in the liver. Neither participants were aware of this prior to their participation. At the end of the study they continued to engage with specialist services for treatment of this condition; which involves a process of bloodletting to reduce the stored iron levels (Sargent 2009).

An initial assumption in designing the study was that participants would arrive for the scan having read through the participant information sheet and it quickly became clear that this could not be assumed. This, therefore, had an impact on the time dedicated to each participant; with the initial time slot of thirty minutes per participant approximating forty-five minutes while the author discussed the participant information sheet in depth prior to establishing that the participant was in a position to consent and proceed with the study. A decision was taken to make no adjustments to the study design as time slots were largely determined by the time negotiated with nurse management and room availability at the research venue; rather than an accurate estimation of sample size. This factor, in conjunction with recruitment numbers in this study, would inform future decisions regarding time allocation for a larger piece of work. However, thirty minutes per participant to carry out the procedure may already be considered by nurse management or funders to be over generous with competing demands on practitioner time. It is therefore important that, the author is able to defend the amount of time afforded to either each participant in a larger study or any patient in the future service. This would be easier to achieve following a rigorous evaluation of the intervention which aims to determine which components of the consultation were causal in
its success as it may not rely on each component equally (Clark 2013). However, it is vital that components seen as low priority are not overlooked as they may be the reason for the success or failure of the project (Clark 2013, MRC 2008).

This chapter has detailed the results, both in line with the study objectives and some incidental findings. The data was collected using the data collection tool devised for use in this study and discussion of these results is provided in the following discussion chapter, and a conclusion offered later in the thesis.
Chapter 4: Discussion

4.01 Discussion of Results in the Context of the Study Objectives, Research Question and Hypothesis
As discussed in the Results chapter, seventy-nine consented individuals participated, an uptake of 67% of those informed of the study. Of the 79 scans performed, three were unreliable leaving 76 participants in whom full data collection can be completed. After scanning, 20/76 (26%) had a FibroScan® ≥7.1kPa requiring referral on to the nurse led clinic. All 20 (100%) engaged in further assessment. Of those, 12 required onward referral to specialist services. Subsequent compliance with specialist services in this sample (n=12) was ≥ 90%.

Uptake of routine health screening is low in areas of deprivation (Watt 2013), suggesting low self-efficacy, i.e. the confidence in one’s ability to exert control over their behaviour (Bandura 1997). This could be attributed to low confidence, poor literacy and financial difficulties which make negotiation through the process of health care delivery and travel to appointments difficult (Watt 2013). Sekhon, Cartwright and Francis (2018) determined that acceptability can be anticipated when participants consider it to be appropriate; an important factor in influencing the uptake or participation in a healthcare intervention. Therefore, according to this definition, an uptake of 67% in this screening study, for those who received information, suggests that this intervention is acceptable to prospective participants in this setting; supporting the study hypothesis and giving an affirmative response to the study’s research question. Bloom et al (2018) recruited to their community-based study, offering FibroScan® in a community cohort of patients undergoing management for hepatitis C. Uptake in this study was 76% (859/1134) of those invited to attend. These two studies are not comparable, as this screening study is nurse-led and, other than the assessment using the data collection tool, the
FibroScan® was the only intervention offered. Bloom et al (2018) offered clinical assessment and bloodletting, in addition to the FibroScan®, with one of two Hepatologists. As previously discussed, without a qualitative element to their study (Bloom et al 2018) it is not known why the uptake they found was so high and, with a cohort already known to have CLD, it is possible that concern regarding their known disease, could have been a factor. However, the uptake in Bloom et al (2018) support the good uptake in this screening study.

Factors influencing self-efficacy include vicarious experience and verbal persuasion (Hayden 2019). As this study took place in an alcohol recovery centre, most potential participants had a level of contact with support staff, whether it be to support them in their recovery or to complete their initial assessment towards enrolment in a recovery plan. Therefore, it is feasible that verbal persuasion, or encouragement, took place and has had an influence on the uptake of screening, as was acknowledged when devising the recruitment strategy. This, in conjunction with vicarious awareness of the intervention through the participation of, or discussion between, service users could have influenced the self-efficacy of those who took part. In addition, the engagement with alcohol services of those who self-selected to take part in the study appears to demonstrate a level of self-efficacy in this cohort, which, subsequently, could have accounted for this level of uptake.

According to the Health Belief Model a cue to action, or factor that starts a person on the way to changing their health behaviour (Hayden 2019) is influenced by their perceived threat of disease. This perceived threat is guided by an individual’s assessment of their chances of getting the disease (perceived susceptibility), and their judgement of its consequences to them (perceived severity) (Skinner, Tiro and Champion 2015). In addition to personal attributes such
as age, gender and sociodemographic status a modifying factor to this perceived threat is knowledge and awareness of the health condition (Skinner, Tiro and Champion 2015).

In this study, the cue to action could be the study information posters in reception, the conversation between potential participants and their support worker or peers. Through their engagement with alcohol support services, those who participated in the study are likely to be aware of the effects of alcohol on the health of the liver, through access to health promotion materials and consultations with support staff in the service. This knowledge and awareness may be one of the modifying factors influencing the level of uptake in this cohort (Hayden 2019, Sharma 2011). Self-efficacy is an important factor in the Health Belief Model, particularly when considering the individual’s confidence in their ability for behaviour change, despite possible perceived barriers (Hayden 2019).

Burnham et al (2014) explored knowledge, attitudes, behaviour and barriers to care amongst patient with CLD through conducting three separate one-time focus groups sessions with a total of 13 participants with CLD, in the USA. While some barriers, such as lack of health insurance and high cost medical care, are not transferable to the UK, where healthcare is free at the point of care, other factors could be considered as relevant. These included a lack of knowledge about CLD and perceived stigma from staff and peers (Burnham et al 2014). This further emphasises the importance of knowledge, as a modifying factor in engagement with health interventions. Burnham et al’s (2014) cohort were known to have CLD, as opposed to the group in this study who, at time of uptake, had concerns that they have a risk of CLD. This becomes increasingly relevant for the engagement of the group who required onward referral to specialist services following a raised FibroScan® result with indications of possible CLD. While
not comparable in design, as previously discussed, to the study by Bloom et al (2018) this engagement for those requiring onward referral is higher than that in their study of 55% (28/233). As this is a convenience sample of participants, already attending this alcohol support service it can be assumed that concerns regarding possible stigma from staff and peers have been allayed through their experience of this service to date. High engagement with specialist services for those requiring onward referral thereafter suggests that trust in the service was gained through their contact with the author during screening and follow up appointment, for those who required it. This is consistent with the aim of nurse led services to provide, facilitate and expand access to quality care to an often vulnerable population who may not otherwise access care in mainstream services (Kleinpell et al 2014).

Without the benefit of having carried out a qualitative piece of work, where the participant experience could be understood it may be assumed that, at least, for those who participated in the study, perceptions of stigma from staff both in the recovery centre was low, for them to engage with screening in the first instance. Thereafter, following contact with the author during screening, it would appear that an element of trust in specialist services was gained. Alternatively, it could suggest that, in this self-selected group an existing level of trust was not damaged by this process. This is demonstrated by high levels of engagement for those requiring onward referral and does not account for those who did not participate in screening. This is acknowledged as a limitation.

The Theory of Planned Behaviour suggests that attitudes to a behaviour and subjective norms (behaviour perceived as favourable to people with influence over an individual) (Hayden 2019) influence behavioural intention with the concept of perceived behavioural intention, a
characteristic of TPB, considered similar to self-efficacy (Montaño and Kasprzyk 2015). According to Marks et al (2015), intention and self-efficacy are the best predictors of behaviour change; particularly when combined with facilitators to change such as the aforementioned possible verbal support from peers and staff. Such support could influence the subjective norm of potential participants. This is a self-selected group who, through their attendance with the alcohol service, demonstrated a level of self-efficacy and motivation to change their behaviour in a setting where support is available. In this respect this screening intervention appears to be in the right place at the right time.

As participants were recruited through a “drop in” system, it is beyond the scope of this study to determine the number of potential participants who did not request research information, and their reasons for this, and is acknowledged as a limitation. The study results on acceptability, as indicated by uptake, are consistent with other studies demonstrating the acceptability of offering FibroScan® as a screening tool in community drug services (Foucher et al 2009, Marshall et al 2015, Thurnheer et al 2015) and would appear to show it could be an effective way of encouraging initial engagement with specialist liver services.

As discussed, in Chapter 2: Methods, in working with a group who are drinking to hazardous, harmful or dependent levels (Scottish Government 2012) participants may attend in an intoxicated state. Indeed, this happened with two participants bringing further challenges to the author in determining whether or not they were able to participate in the study. Informed consent, determined by establishing that participants are informed on the process and implications of the study, are competent to consent and are taking part on a voluntary basis is a vital element in recruitment (NHS Scotland 2014). One participant argued with the author that
there was no requirement in the participant information sheet for sobriety indicating he had clearly read it and seemed to have a good understanding of the study. By coming forward for the study he was also displaying tacit consent through voluntary participation (Tappen 2011). However, whether he was competent to consent was unclear in this situation as, even though he seemed keen to have the scan taken he may not have been aware of the sensitivity of some of the questions asked through data collection. While in an intoxicated state he seemed easily distracted and emotionally labile. He was argumentative with the author one minute and tearful the next. Ultimately, the concern for his vulnerable state and a question mark over his competence to take part was the rationale behind asking him to return in a sober state. In returning sober this participant appeared anxious and displaying mild symptoms of alcohol withdrawal. A decision was taken to agree to his participation in the study as he had made the effort to return for the FibroScan® thereby displaying voluntary participation (NHS Scotland 2014). Again, his knowledge of the study was good and in returning he had displayed a competence in deciding to attend (NHS Scotland 2014). Indeed, this participant was very keen to have the scan taken. Unfortunately, this scan elicited an unreliable result. While a likely cause for this was due to a BMI ≥30kg/m² and a fatty thoracic belt (Castera, Forns and Alberti 2008) another reason for the unreliable result may have been the tension in his intercostal muscles due to mild withdrawal (Trabut et al 2015). This episode served to reaffirm the potentially vulnerable status of this cohort and the rationale taken in deciding on a low maintenance recruitment strategy (LoBiondo-Wood and Haber 2014). Had the author or recovery staff approached potential participants, regarding the study, in reception informed consent may have been more difficult to establish; especially if there is a possibility of them being in an intoxicated state when approached.
The data collection tool was designed to facilitate a medical and family history for participants, in order that factors increasing their risk of CLD can be documented and further assessment offered, where appropriate (Snadden et al 2013). Despite having extensive experience of taking sensitive medical and lifestyle histories, involving discussion regarding sexual history and drug use, the author was a relative novice in taking a comprehensive alcohol history. In designing the study and, as discussed in Chapter 2: Methods, it had been decided that the validated alcohol screening tools, such as AUDIT C and FAST (PHE 2017) would not be utilised with this cohort. These are used as a screening tool to identify those who are drinking to hazardous, harmful or dependent levels while the targeted group in this study have already acknowledged they are drinking to such levels by attending the service for support in reducing their alcohol intake. Indeed, in engaging participants whose attendance at the research clinic reflects their concerns regarding their alcohol intake on the health of their liver assumptions were made that this would be a relatively straightforward component in the data collection process. In commencing data collection, it became evident that more was required than asking “how much do you drink in a week” and converting it to units of alcohol, with 1 unit equal to 8g of pure alcohol (NHS 2019). Responses ranged widely from participants who were abstinent to participants who drank a varying amount each week with no standard amount in any one.

In their systematic review of the literature to evaluate the reliability and validity of self-reported alcohol consumption measures among adults, Mckenna et al (2018) assessed the psychometric properties of the short-term recall, quantity-frequency and graduated frequency methods of recording alcohol intake. As the name suggests, short-term recall determines the amount of alcohol consumed within a recent defined period and was the method of data collection originally planned for this study, as mentioned in the previous paragraph. The
graduated frequency method of data collection groups the number of drinks consumed per occasion. For example, it would ask of the interviewee how often, in the last 12 months, they drank over 12 units, then how often they would drink over 8 units and continue the questioning with reducing amounts. The quantity-frequency method asks questions regarding “usual” alcohol to estimate frequency and volume consumed. Using the consensus based standards for the selection of health measurement instruments (COSMIN) where they derive ratings of poor, fair, good or excellent for each checklist item relating to each psychometric property McKenna et al (2018) acknowledge that not all psychometric properties of each measure were assessed consistently in the literature. Despite this, they evaluated the quantity-frequency measure as that which performed best in psychometric terms and most likely, of the three measures, to produce reliable and valid measures of alcohol intake in a general population survey. They suggest the use of caution in using this measure in a population of dependent drinkers (McKenna et al 2018). This follows the recommendations by Toneatto, Sobell and Sobell (1992) who suggested there might be discrepancies participant’s alcohol history, depending on memory reliability, influenced by how much alcohol has been consumed on the day of questioning, and whether the participants were confident of confidentiality in the questioning. With this in mind, the author ensured she reinforced the confidentiality afforded to participants in taking part in the study. In addition, she decided to adapt the quantity-frequency mode of questioning for this study. To accommodate the fact that participants were attending for support with current or past drinking and that some participants were currently abstinent, they were asked “When drinking at your heaviest levels, how much would you drink in a typical week”. The aim of doing this was to elicit a more accurate history of lifetime alcohol
use to date; in particular heavy alcohol use which, even in historic cases, could have had a serious impact on their current liver health (Muir 2015).

In order to illustrate the UK sensible drinking measures, Gill and O’May (2007) asked employees from four sites in Scotland to pour their usual measure of wine or spirits and to estimate the number of units in this volume. Typically, drinks poured were 2.05 units of alcohol, with only 27% of participants estimating the unit content within 10% of its actual value. This correlates to an earlier study by Gill and Donaghy (2004) where a sample of the Scottish public were recruited from three employers and were asked to pour their usual measure of wine and spirits. In their study, the mean measure for wine was 1.92 units, while, for spirits it was 2.3 units; challenging an often implicit assumption in consumption surveys that one measure is equal to one unit of alcohol.

To further quantify weekly alcohol units, in this screening study therefore, participants were asked what a typical week’s intake would be with regards to the type of alcohol consumed and the typical volume consumed, in order that the author could calculate the units by referring to the unit calculator provided by Drinkaware (2019).

Some participants claimed to binge drink while others drank on a daily basis. While this seemed straight forward in describing their drinking behaviour as either “binge” or “daily”, it posed the question of how to describe drinking which was neither binge nor daily. Some participants stated that they drank four days on and three days off on a regular basis, the author decided that the group who drank regularly on some days during the week, such as four on three off, should be considered a separate group. In considering the development of the codebook for analysis of data using the SPSS (Pallant 2010), at the end of the study, it was decided to
describe this drinking pattern as “intermittent”. Data from the study showed that, out of 79 initial participants, 59 (75%) of the cohort described themselves as “daily” drinkers, 17 (22%) as “binge” and 3 (4%) as “intermittent”.

It also became apparent, through discussion with participants, that complete abstinence from alcohol was not the goal of all participants. This was in contrast to the author’s past experience of working closely with PWIDs who generally aimed for complete abstinence when attending support services. Denvir (2012) discusses issues which can arise if the practitioner forgoes their own clinical evaluation in favour of the patient’s self-evaluation due to a desire to build rapport; a common problem in lifestyle history taking. In taking a harm reduction approach it would seem reasonable to support participants in reducing alcohol intake. However, complete abstinence is optimum for improving liver health, especially where CLD is established (Williams et al 2014). This highlighted the importance of finding a balance between developing and maintaining a good rapport while delivering the message that their health outcome could be improved through reducing their drinking with the aim of abstinence even for those who may ultimately be diagnosed with cirrhosis.

At a time when mortality from CLD, including cirrhosis, has increased by 500% since 1970 in the under 65 age group (Williams et al 2014), the mean age of 46 years in this cohort of participants seems optimal for consideration of screening. With male mortality rates for CLD being almost twice as high as those reported for women (ONS 2017) the proportion of male to female attendees for 63% to 37% would appear to be representative of this population.

Participant alcohol histories confirmed this to be a heavy drinking group, as targeted; with self-reported alcohol intake of over 100 units per week in 76% (45/76) of participants. Those with a
FibroScan® reading ≥ 7.1kPa and < 8.0 kPa did not require onward referral once their blood profile was assessed by a Consultant Hepatologist (AMacG); supporting studies using a threshold of 8.0kPa (Harmen et al 2015 and Roulot et al 2010) and adding to the literature regarding the lower cut off for FibroScan® in general screening.

Obesity is one of the most common causes of CLD through fatty infiltration of liver cells (Muir 2015). Levels of obesity are highest for those living in deprived areas (ScotPHO 2017), often due to poor diet and lack of exercise. Within this cohort the prevalence of obesity was 21.1%, while the current prevalence of obesity is 29% in the general population of Scotland (ScotPHO 2017). The portable FibroScan® device used in this study (FibroScan® 402) could not support an XL probe. While only three scans were unreliable, according to criteria in Schwabl et al (2015), each of these participants had a BMI ≥ 30kg/m². This is consistent with the findings of (de Ledinghen 2012) and it would, therefore, seem advisable, given the level of obesity, that an XL probe is available in future.

Consistent with the asymptomatic nature of liver disease no participants described or displayed signs or symptoms (Muir 2015) and yet, as outlined in the Results chapter, one male participant was referred for medical assessment with an elevated FibroScan® result was subsequently diagnosed with cirrhosis in addition to haemochromatosis, a genetic disorder of iron overload in the liver known to affect approximately 1/200 of the British population, but thought to affect 1/5000 (BLT 2018). One female participant, who required onward referral for a raised FibroScan® result was also diagnosed with haemochromatosis, in addition to significant liver fibrosis. Neither participant had previously been tested for this genetic condition, which could have life limiting effects had it continued to be undiagnosed (Sargent 2009) or, subsequently, if
the participants did not engage with its recommended management which includes regular bloodletting to remove the excess iron from the circulating blood (BLT 2018). However, these participants did engage with specialist services and subsequent management of their condition; illustrating an incidental advantage to them of engaging in the study.

With 95% (19/20) participants attending the nurse appointment at the research venue, 92% (11/12) attending their first medical appointment in acute services, 90% (9/10) attending their follow up at six months and 100% (12/12) attending for further assessment with ultrasound, CT or MRI. This encouraging engagement in specialist services further demonstrates self-efficacy and high motivation in the cohort, as supported by Health Behaviour Theory (Sharma 2011).

Sheron et al (2013) devised a serum panel test known as the Southampton Traffic Light system. This system uses a combination of the fibrosis markers hyaluronic acid, collagen P3NP and platelets. Results are colour coded to red for possible fibrosis/cirrhosis, amber for possible fibrosis and green indicates negative for fibrosis. Their prospective feasibility study aimed to determine the feasibility of community screening for liver disease and determine whether feedback on liver risk can increase the number of subjects reducing alcohol consumption. This study was conducted across nine GP surgeries across Hampshire, Wiltshire and Dorset, UK, with a high initial sample size (n=4630). Sheron et al (2013) randomly selected patients aged between 25 and 54 from the GP databases and posted invitation letters, which included an AUDIT questionnaire. AUDIT scores of <8 were assessed as low risk for harmful drinking, those between 8-15 were assessed as consuming alcohol to hazardous levels while those with a score of ≥16 were assessed as drinking to harmful levels. Those respondents with an AUDIT score ≥8 were considered to be drinking to hazardous levels (WHO) and were subsequently invited to a
nurse led research clinic where blood was taken, and results recorded as per the traffic light system. Participants were informed of their results in writing and a further AUDIT questionnaire sent one year later to establish their drinking levels. In total 4630/9836 (47%) of questionnaires were returned with responders being significantly more likely to be older, female and with low deprivation scores. Of the 1037 who responded with an AUDIT score of ≥8, 393 (38%) attended the nurse led research clinic for further assessment. Of those, 303/393 (77%) responded to the follow up questionnaire at one year. Sheron et al (2013) state that, overall, the mean AUDIT score had reduced from 13 to 11, with the one-year changes being significantly greater in the red/amber group i.e. those drinking to more harmful levels. However, as Sheron et al (2013) acknowledge, the non-responders had significantly higher baseline AUDIT scores and alcohol consumption and should they have been included and considered to have no change in AUDIT score, the magnitude of effect would be less significant. Sheron et al (2013) found that, in the group with baseline AUDIT >15 the change in AUDIT score by more than one grade was significantly higher in the red/amber group than in the green group. Sheron et al (2013) conclude that feedback about liver health may be a useful prompt for behaviour change; with the biggest reductions in drinking being seen in the group with heaviest drinking behaviour up to one year following the intervention. This suggests that combining a screening intervention for liver disease with ongoing support in alcohol recovery, as in this screening study, should have a positive impact on behaviour change. However, in their study Sheron et al (2013) set, as an exclusion criterion, those with severe mental health problems; thus introducing possible bias in the results by excluding a potentially heavy drinking and recidivist group (Williams et al 2014). The recruitment strategy for Sheron et al’s (2013) general population study differs from this screening study targeting a cohort with a current or
past history of drinking to hazardous or harmful levels. However, in light of their findings, the early engagement with assessment, feedback and follow up in specialist services in this study was extremely encouraging as a possible predictor of health behaviour change. In addition, this is in line with the findings from Foucher et al (2009), discussed in the literature review, who concluded that uptake of hepatitis C treatment in a group who previously had not engaged, was a direct result of having a FibroScan®. However, it is important to continue research beyond this study to determine what, if any, impact this type of intervention has on the longer-term drinking behaviour of this or a similar cohort.

The author was concerned that a result ≤ 7kPa could be interpreted by the participant as giving them permission to continue drinking to harmful levels; as there was no indication of liver disease, so far. Nested within Sheron et al’s (2013) study was a qualitative piece of work, where participants identified as drinking to harmful or hazardous levels were asked to take part in an interview. This was in order that their experience of taking part in the study and their understanding of its delivery and process of screening for alcoholic liver disease could be explored. In total, 210 participants were approached by the research team. Of those, 48 responded, and 30 interviews took place before saturation was reached (Eyles et al 2013).

Of interest, to this screening study was Theme 2, which assessed whether alcohol blood testing was a catalyst for change, in terms of amount of alcohol consumed. Of particular interest to the author, was the response of six out of eight participants who were drinking to harmful or hazardous levels and had received a negative result on the serum panel test, for fibrosis. These participants stated they had not altered their drinking habits in view of what they perceived as an indication from the results that they could continue drinking to their previous levels.
Researchers for this study were concerned that they had, in effect, issued a license to drink or “green light” for drinking to harmful of hazardous levels. They decided that, when giving a negative result in the future, the serum panel test would be altered so that, when giving feedback to harmful or hazardous drinkers negative, which was previously green on the panel, would be amber. Amber, which originally had indicated some degree of fibrosis would be changed to red, for this group. Red, which indicated a high likelihood of fibrosis would thereafter be maroon or black. Whilst, visually, this may be a more effective way of communicating that there was some degree of risk, regardless of blood result, through their high levels of drinking, Eyles et al (2013) acknowledge that, in part, it may be also an effect of having the results being imparted to participants by the GP rather than liver specialist. There may have been some confusion, on the part of the GP as to what the negative result actually meant, and they aimed to address this for further interventions with further support being offered to GPs on the information which should be given to patients in similar situations in the future (Eyles et al 2013). The advantage the group in this screening study had, over those in the study by Eyles et al (2013) is that each participant had the opportunity to speak with an experienced liver Hepatology Nurse Practitioner at the time of their FibroScan®, giving the opportunity for health promotion to be tailored to the individual participant (Presky et al 2018).

In their observational cross-sectional patient survey, Presky et al (2018) considered possible factors influencing beliefs held by patients with alcohol related liver disease and non-adherence to their medication. In their study, the targeted sample were patients attending a liver outpatient clinic with already known alcohol related liver disease, thereby differing from the sample in this study who are, as yet, unaware of the health of their liver. However, one
similarity between the groups is alcohol as a factor in either their current condition or concerns regarding their health. Presky et al (2018) found that tailoring information on their health condition to the individual with alcohol related liver disease is likely to increase their likelihood of engaging in ongoing management. It, therefore, fell to the expertise of the author to tailor health promotion information in the context of individual participant history and FibroScan® result; highlighting the importance of working with their self-efficacy and motivation to reduce the alcohol intake of those who elicited a normal result. In his writing on perceived self-efficacy (Bandura 1997) suggested that information highlighting potential health losses are more effective than those emphasising health benefits, suggesting the benefits of advice on maintaining liver health through a continued attempt to reduce alcohol intake and discussion of other factors, elicited through data collection, pertaining to the individual participant. There was no scope to address the question of how a normal result impacted on participants’ motivation to change behaviour; this could be further investigated in a follow on, longitudinal, qualitative study.

In complex health interventions (MRC 2008) their success, or otherwise, is dependent on many factors and it is important to consider optimisation of the intervention, in order to progress it to an embedded service or further research (Levati 2016, MRC 2008). Sermeus (2015) acknowledges that an increasing number of components characterising interventions leads to them being harder to implement and it is important, not only to establish the key components, but also the inactive components in the intervention. In this study, one possible key factor is the acceptability of the non-invasive, painless FibroScan® device which gives an immediate result; as opposed to blood tests which can be painful and do not elicit results immediately. In addition to this the author offered the FibroScan® and also delivers the liver clinic at the
community alcohol service and, in this respect, is motivated to work with harder to engage groups and familiar with some of the challenges posed (Watt 2013). In particular, this is reflected in the recruitment process where participants were not approached directly by the author as it was important that vulnerable, potential participants should not feel coerced into taking part. The ability of the nurse to engage with the participant’s own motivation in considering changing their behaviour (Lau-Walker et al 2016) and continuity of care offered by seeing the same nurse in the initial stages of the pathway may be a crucial factor in gaining the trust of participants and may also account for the level of engagement seen. As discussed, another key component may be the choice of venue, the influence and support of staff and, importantly, the self-efficacy and motivation of the self-selected cohort of participants.

This screening study was a fixed term study, not designed to assess whether the encouraging level of engagement continues and whether the lifestyle changes required for improving the participant’s liver health were instigated and continued over a longer period of time and this is acknowledged as a limitation. Further work is required in determining the key components of screening and to gain insight into its acceptability and reasons for the encouraging level of engagement. This may be possible through a qualitative study, collecting data using one to one interviews with consented participants to understand the participant experience. In addition, a longitudinal study, designed to monitor changes in lifestyle behaviour beyond the six months post screening in this study, would help to establish whether engagement and lifestyle changes were sustained.
4.02 Dissemination of findings
For a study to have impact, in terms of support for funding for future research and possible
service development, it is important it be effectively disseminated (Reed 2018). Through his
Persuasive Communication Matrix, McGuire (2001) suggests a theoretical framework for
effective dissemination, constructed around five variables. These include the source of
communication, the message being communicated, channels of communication, characteristics
of the audience and the setting for the dissemination. For this study, the source would be
relatively inflexible and include the author sharing key aspects of the research. However, the
message, channels, characteristics of the audience and the setting were aspects of
dissemination, which, for this study were much more flexible. While the key message of the
study continued to revolve around the study findings, additional messages would be
dependent of the characteristics of the audience and will be explored later in this section.

Informing and gaining the support of interested parties, or key stakeholders early in the design
process increases the chance of the study being impactful and implementation being sustained
(Schell et al 2013). Delaying dissemination until the data collection is complete and the results
have been analysed risks missing possible buy in from key stakeholders at an early stage and
slow or halt progress later in the process (Reed 2018). Ultimately, this provided a challenge for
the author in being able to disseminate information regarding her study without compromising
the integrity of the results and her intellectual property (Reed 2018). In line with McGuire’s
(2001) framework, it is important that an appropriate audience are selected for this
dissemination in order that, to gain support from stakeholders, it is targeted at those who
could help take it forward, either financially or through their professional network.
In the case of this study, therefore, the first point at which to disseminate the research idea was the call for applications for funding for the portable FibroScan® device in the early stages of the design process, as discussed in the Chapter 1: Introduction. At this point, the study idea was very new to the author and the full participant pathway had not yet been decided; in part, because it was not known whether she could secure the funding for a FibroScan® device. Whilst this was her first preference for engaging participants attending the alcohol service, she was aware the device may not be secured and that she may need to return to the drawing board in order to determine what, if any, other intervention may be feasible. Any concerns she may have regarding the security of her intellectual property, at this stage, was insignificant compared to her drive to take the study forward. Without divulging her idea to the audience at the NHS Innovation Board, in the first place and risking another party taking her idea forward as their own, the study may never have got off the ground (Reed 2018). However, this was carefully assessed by the author as, in reality, the situation where, in this environment, someone could take this idea as their own, was unlikely due to the need for training in using the FibroScan® device and the lack of skill in this area outwith the liver unit.

Following her successful presentation to the NHS Innovation Board, the next opportunity for dissemination of her idea for the study arrived with the call for applications for funding towards doctoral study from a new funding body, NHS Research Futures. Whether the study could go forward, at this stage, was not in question, as the author had already secured funding for the FibroScan® device and by then, had successfully negotiated time resource and use of a venue for the study. However, the author was keen to use this opportunity to secure further academic support in order to raise the standard of this piece of research, which she did not initially design with a doctorate in mind. In disseminating information on the study to this audience,
including a NHS Lothian partnership representative, a clinical nurse manager responsible for research and adviser on nursing, midwifery and allied health professional research, the message was one of the potential impact of the intervention on possible service development and its concordance with current policy drivers, such as the Health and Social Care Integration (Scottish Government 2013) and the Scottish Government’s 2020 vision (Scottish Government 2017). With a positive outcome to her application came funding for doctoral studies and contracted study time. This gave her time resource and academic support in improving, where it was required, the rigour of the study.

While, at the time of her application the time resource and funding towards the fees for her doctorate, were the main drivers for the author in applying to NHS Research Futures, it has become apparent over the course of her studies how much more support it has given her. In engaging the support and funding from NHS Research Futures, the author joined a wider research network of fellow doctoral candidates working within the NHS and a wider network of doctoral candidates from other disciplines through her network at the university graduate school. Through this professional network, she has taken the opportunity for discussion and dissemination of her research ideas to a wide range of disciplines both within and outwith the health arena. In the early stages of dissemination, the message in this setting and to this audience focused on the research process, theoretical underpinnings and process of analysis. This dissemination opportunity has provided valuable formative feedback (Biggs and Tang 2011) for the author in enabling her to hear the critique of her work from this network and defend her research in what she considered a “safe” environment. In this setting, if she made an error, it would not affect the outcome of her research but was a learning opportunity where possible changes to the research process were considered prior to more formal dissemination.
to other professional audiences. In this respect, the author has had the opportunity to increase the depth of her learning in research design. Discussions within an inter-professional audience, such as these, not only enabled the author to consider aspects of her research from the viewpoint of her fellow students but also from a non-nursing perspective; ultimately improving her ability to strengthen her argument when faced with challenges regarding her study. In particular, this experience enabled the author to develop skills of dissemination to a non-healthcare audience. Importantly, this ensured she considered, where possible, that the information was accessible to a range of audiences (INVOLVE 2015); skills she would require later in her doctoral career. Examples of such dissemination include oral and poster presentations to two doctoral conferences at Queen Margaret University.

During one doctoral conference on the 28th April 2016, the author gave a poster (Appendix 14) and an oral presentation. The attendees at this conference voted on the best poster displayed that day, with the author winning first prize on this occasion. During a subsequent doctoral conference, the author took the “5 minute challenge”; an exercise in distilling the key factors of a piece of research into a five minute presentation, using only one power point slide, in addition to the title slide. As was the intention, this exercise enabled her to concentrate on the important messages of her study; through developing vital skills in focusing the information to the minimum needed to relay the key points while still ensuring the resulting presentation was unequivocally outlining her study. This exercise helped the author later on in her research career when writing for publication; in particular, when distilling information for writing abstracts for conference or publication, which typically required no more than 300 words.
On two occasions, the author presented the study to the liver unit. The first occasion was early in its design and prior to data collection, with the aim of ensuring transparency of the study. This was with the aim of gaining more buy in from the department, as a whole, in light of the resistance she faced from some of her nursing and medical colleagues in taking this study forward. This is consistent with Reed (2018) who suggests tendering for support from key stakeholders to ensure buy in and increase the likelihood of the sustainability of the study. As noted in Chapter 1: Introduction, this presentation came after the initial resistance she experienced from colleagues and once ethics approval for the study had been obtained. The author’s rationale for this, at the time, was to protect this as a nurse-led initiative. As a relatively new member of the liver unit, and as an inexperienced researcher she had concerns that, should senior medical colleagues, more experienced in research, become involved too early in the design phase, she may be convinced to alter its focus to a more medical approach. However, in the hope of securing more support for the study at that point, she was careful to emphasise the outcome of the study looking at incidence of disease; altering the focus of the dissemination message for this medical audience (McGuire 2001). As a newcomer to the liver unit, the author was unaware of some of the dynamics between some senior personnel, which, now with more experience in the unit, may have altered her decision on who to secure buy in from for the study from an early stage. In this respect, her research of the key stakeholders to represent the study could have been more extensive (Schell et al 2013). However, as the first nurse led study to take place in this unit, this was uncharted territory for even the most experienced of nurses in this area. Ultimately, the author had, at that stage, managed to secure enough senior support to ensure the study went ahead.
Later, when presenting the preliminary data of the study to the liver unit and knowing the audience to be largely from the medical side, she again emphasised the incidence of disease in the study cohort. She reported this with the blood results of those requiring onward referral through creating a slide with a table for discussion during the presentation in order to demonstrate the concordance of FibroScan® results with that of the serum fibrosis marker, hyaluronic acid. In this way, she had again, created a message which was likely to make the study more interesting to her medical colleagues (McGuire 2001). This slide did generate discussion on the day, illustrating that it had indeed caught their attention. While feedback regarding the study from her medical colleagues was more cautious following the first liver unit presentation, feedback from the second presentation was much more positive and supportive, with suggestions from some senior medical colleagues of the need for discussion in taking the findings from this study forward as a service development. This will be further explored in a later part of this chapter, looking at the impact of the study.

During the latter part of her research, the author took the opportunity to become involved in the Beltane Knowledge Network “Cabaret of Dangerous Ideas”. This initiative, funded, by a network of universities in central Scotland, has the aim of encouraging academics to engage with the public by presenting their research or topic of expertise in an accessible way during a one-hour show at the Edinburgh Festival Fringe (Beltane Network 2019). In applying to take part in this initiative, the author was invited to attend workshops or “Boot camps” which include creating material for a one-hour show. Training in how to engage an audience and use a microphone were also part of the training for those who signed up. In addition, a comedian, who used her experience of performing to ensure the show ran smoothly, hosted each show. This included helping to keep the light hearted, funny yet informative emphasis required by the
Beltane Knowledge Network through asking questions, helping to engage with the audience and deal, where necessary, with any hecklers. Audiences paid to attend these shows, with all the money going to the Beltane Network. In addition, each “performer” was required to pay a £200 fee for promotion of their show in the Fringe programme. The author applied for and secured this from the Centre for Applied Social Sciences at Queen Margaret University.

The show was called “Shiver me Liver” to reflect the effect of elastography on the liver. In attending the “Boot Camp” and through discussion regarding the content of her possible show, the author soon realised that within this academic group from a variety of backgrounds, knowledge of the liver was scant, with many in the group having no knowledge of where the liver was located. This gave her the idea of using the first 30 minutes of the show as more of an educational opportunity regarding the liver and liver health. With the comedian being available to help in whatever way the show required, the author decided to start the show with a game she devised. The comedian agreed to wear a T-shirt and a headband with Velcro strategically placed in various places. Three organs were crafted, a brain, a heart and a liver, each with Velcro attached. The author then invited members of the audience to site the organs on the T-shirt, corresponding to where the organ is located in the body. The rationale behind this was to illustrate where the liver was in a fun way and provide a starting point for further teaching on its functions and pathophysiology through active learning (Gibbs 1988). With the emphasis on a lighthearted delivery, the author decided to disseminate further information through a quiz; encouraging active learning through discussion (Brookfield and Preskill 1999). In this respect, the audience were participating in an educational experience, where the author illustrated, visually, facts regarding the liver. These facts were then discussed in the larger group, where they had the opportunity to learn vicariously from others' learning (Jacques and Salmon 2007).
Following this introduction to the liver, the next part of the show centred on the research findings. One aspect of taking part in this event, which challenged the author, was the need to ensure there was no compromise of her results, ethics or research process. The research study was a complex and important piece of work; it was important this was not undermined in doing this show. In undertaking this piece of research and having ethics approval granted by South East Scotland Research and Ethics Committee the author had agreed to ensure beneficence, therefore to do no harm (Hack and Gwyer 2013). Ultimately, she was required to protect the participants in the study and challenged in this by taking part in this knowledge exchange opportunity in a show with a comedian. It was imperative that any fun or comedy involved in disseminating this study should not be at the expense of the participants. It was also important, not only to protect the participant’s anonymity and confidentiality, but also to ensure there were no anecdotes used which would display them in an unfavourable or comedic way. Ultimately, it was important that the show was conducted in a manner which was inclusive and respectful to participants (INVOLVE 2015).

This show was taking place in a licensed premise where they served alcohol. It would be reasonable to anticipate comments regarding this during the show, particularly as the research study had taken place in an alcohol support service. Therefore, it was important for the author to ensure she was not seen to be complicit in any comments regarding the benefits or otherwise of alcohol. The alternative also being true, in that, as this was an entertainment show she could not engage in advice regarding the risks of alcohol in any way which could be perceived as judgmental (Reed 2018) and was mindful of keeping any advice there was regarding alcohol to answering specific questions by the audience or within what was the script for the show. In this respect the author had to act within her boundaries as a nurse, where she
must always represent the nursing profession (NMC 2015) and the liver unit; an essential quality in the NHS Leadership model (NHS Leadership Academy 2013). In addition, as a doctoral candidate and researcher she was also representing her university. Mindful of these challenges she ensured that, when writing the content for the show she considered how participants of her study and her NHS management would feel if they were in the audience. In taking this forward, she aimed for transparency as far as possible. She could no longer approach individual participants from her study, now that it had finished. Ethics approval had not been sought for this at the start of the research process. However, the author displayed posters for the event in the original research venue, in order that participants could be alerted to the fact the show was taking place and had the opportunity to attend should they be interested. In addition, she displayed posters for the event in her place of work and invited the management and staff from the research venue, NHS management and the ethics committee by email.

In devising the script for the second part of the show, where she discussed her research, she chose a format that ensured the information emerging from the quiz in the first half served as the background i.e. functions of the liver, pathophysiology, epidemiology of liver disease and introduction to the FibroScan® device. This part of the show followed a similar format to the first in that, rather than telling the audience the results of the research in a didactic way, the author chose to present an overview of this information in the format of a discussion. So, rather than telling them what the prevalence was for uptake and engagement for those requiring onward referral for the intervention she instead gave them options to choose from, by way of a poll. In this way, she could gauge the underlying assumptions of the audience and use this as a discussion point. This enabled her to deflect attention away from focusing too heavily on the participants of the study and enabled her to discuss with the audience the
rationale for their assumptions; bringing the focus more to the audience, while still illustrating
the excellent uptake and engagement in the study (Brookfied and Preskill 1999). Importantly,
the author had carefully created and delivered information in language that was accessible to
all for dissemination in this setting. No medical or research language was used, as consistent
with recommendations for dissemination of material in an accessible language appropriate to
the audience; outlined as a quality of leadership by the NHS Leadership Academy (2013) and as
recommended by INVOLVE (2015) and Reed (2018). Again, this illustrates the need for
flexibility in delivery of the message for different audiences (McGuire 2001). Unknown to the
author prior to and during the show, a reviewer from the Lancet was present in the audience.
He introduced himself to the author at the end of the show and subsequently published his
review in the Lancet: Gastroenterology and Hepatology (Appendix 15).

On completion of the study, the author arranged a feedback session at the research venue in
the hope of attracting some of the original participants. This is in line with the values of respect
and transparency, as outlined in the principles of public engagement in research, suggested by
the National Institute of Health Research (INVOLVE 2015) and was arranged to demonstrate
the author’s concern for participants and the importance she and the research team placed on
their feedback. Several service users attended, and this session was conducted in a very
informal way, with the author sitting with them around a table with some snacks she had
provided. The purpose of this was to create an atmosphere where the service users felt as
comfortable as possible (Reed 2018). Often this group have poor experiences of dealing with
health professionals (Watt 2013) and the author was keen she conducted this session with
them as equal partners. The author presented a poster of the study to them and invited
discussion. While the service users listened to the feedback regarding the study it became clear
to the author that they had questions to ask regarding their own liver health as many of them were attending the recovery centre for alcohol related issues. At least two of the participants expressed concerns regarding their own personal health, which the author was keen to discuss in a more personal face-to-face setting to enable confidentiality (NMC 2015). As a direct consequence of this feedback session, the author organised a general liver health session for one of the recovery groups held within the centre, where topics on liver health could be discussed in more general terms; an example of the impact on the recovery centre of dissemination of the results. Further examples of the impact of dissemination will be discussed later in this chapter.

In order to disseminate the results of the study to a professional audience, the author devised abstracts for application to both medical and nursing conferences. She was successful in securing a poster (Appendix 16) presentation, on the 21st June 2016, at the medical conference organised by the British Society of Gastroenterology as part of the Digestive Disorders Foundation conference in London in 2016. Subsequent to this the abstract was published in the BMJ supplementary edition of GUT (Matthews et al 2016). The author was successful in securing an oral presentation at the local Nursing, Midwifery and Allied Health Professional Conference in Edinburgh (2018) and an oral presentation to the Royal College of Nursing International Research Conference in Birmingham on the 16th April 2018. Thereafter the manuscript submitted to the Journal of Clinical Nursing was accepted in March 2018 (Appendix 17) and subsequently published in September 2018 (Matthews et al 2018).

4.03 Impact of Screening
As discussed, earlier in this chapter, representation of key stakeholders is an important principle in ensuring the impact of research Reed (2018). In considering the impact of this
research study, the author aimed to ensure, from an early stage, that she represented views of key stakeholders in the study design, through the initial meetings with her clinical lead, NHS management and management of the alcohol support centre. It has been demonstrated, in Chapter 2: Methods, that staff within the centre demonstrated coherence, cognitive participation, collective action and reflexivity; the key characteristics of Normalisation Process Theory where normalisation is the willingness to integrate a new intervention into everyday practice (May 2015). Staff demonstrated coherence, in being able to describe the intervention and an awareness of its purpose. They demonstrated cognitive participation, in engaging and participating in their role. Collective action where they engaged with the intervention as a group and reflexive monitoring where they felt there has been benefit to both them and their patients in hosting and recommending the intervention were also demonstrated (May, Sibley and Hunt 2014, Murray et al 2010). This is also consistent with the principle of engagement for impact in research (Reed 2018). Through involving staff from an early stage in the study design and gaining their support for the intervention, the author ensured engagement in the process. In addition, the author maintained regular contact with staff, in a less formal and more social way in order to ensure regular feedback regarding the study consistent with recommendations by Reed (2018). Through joining staff for lunch or having coffee and, on occasion, bringing cake to share with them she was able to communicate with them in their comfort zone; ensuring she spoke in language familiar to them rather than using medical or research jargon (NHS Leadership Academy 2013). As Reed (2018) suggests, demonstrating that she was truly listening to staff and behaving in an approachable manner at all times was important in developing a respectful culture; one where communication was facilitated in an inclusive environment. This enabled the author to react promptly to any possible negative
feedback, had there been any. Subsequently, through dissemination of the results of the research study to a range of audiences, including key stakeholders, she received positive feedback and a great deal of encouragement for taking this initiative forward as a possible service development.

In their competency framework for working in liver disease, the RCN (2015) suggest that all nurses, regardless of clinical background have skills and talents to integrate liver health into routine clinical practice. Public Health England’s “Make Every Contact Count” agenda (PHE 2016) suggests that nurses are integral in making an impact on liver disease through discussion of possible risks and lifestyle choices to improve liver health. In addition to alcohol intake, healthy eating, keeping to a healthy weight and being physically active are deemed to be three of the lifestyle issues which can make the greatest improvement to an individual’s health and, as such, are factors which should be included in every patient contact, according to PHE (2016). This is also in line with the Scottish Government’s “2020 vision” where a strong focus on prevention, anticipation and supported self-management is recommended in order to improve the health of the nation (Scottish Government 2017) and the NHS Scotland Healthcare Quality Strategy (NHS Scotland 2010) which emphasises the use of the most appropriate interventions and supports in providing quality healthcare. This suggests, therefore, that in the context of an alcohol support centre and with appropriate training, nurses are well placed to deliver not only liver screening but more general lifestyle discussion to a group at high risk of liver and other chronic disease through their alcohol intake and obesity levels.

In order to progress the research study to a service development it was clear that there were several considerations and challenges to overcome. Whilst NHS management agreed time for
the duration of the research study, lack of continued time resource meant this could not be sustained. As discussed, one limitation of this study was the small sample size. Whilst this was a convenience sample in this time-limited research, it would require a much larger sample size to be representative of the population and to give confidence in taking the research findings forward to a service development (Hack and Gwyer 2013). In addition, it was outwith the scope of the study to measure sustained lifestyle change, in relation to continued drinking. However, the results were promising in terms of the uptake, the incidence of previously undiagnosed liver disease and the engagement, at six months following the FibroScan®, for those who required onward referral to specialist services. As support for the idea of taking the research forward to development grew, it became clear that the author needed to take a decision on two options. One option was to apply for funding for a longitudinal and larger piece of research, to explore the areas outwith the scope of this small study as recommended earlier in this chapter and delay any service development until more conclusive evidence was available. Another option was to take a pragmatic stance in harnessing the support, while it was still current, for screening provision by the staff at the recovery centre and creating an innovative way for this her to provide this. This option would not preclude any decision to take the research forward to a larger, longitudinal study. The author was aware that relationships between researchers and those communities where they carry out research often depends on what the researcher does next (INVOLVE 2015). Communities who host research can perceive that researchers may only value their collaborative relationship whilst it is of immediate use to their research (Reed 2018). In this respect, the author did not want to risk harming a continuing relationship with these staff by halting any screening provision when the staff felt so strongly that it was of immediate benefit to their service users. It was decided to take the risk that by
obtaining further data, albeit not collected under research conditions, the case for taking it forward as a service development and larger study would be strengthened. There are another three similar recovery centres in this city within the South of Scotland, where the service should also be offered, if it was to continue as an embedded and sustainable service. At this point it was not feasible for screening to be offered in these sites due to resource capacity (Schell et al 2013). In order to achieve this, further funding would be required which would require further work in gathering the necessary evidence and presenting a business case to the relevant NHS and Scottish Government executives.

In view of the motivation from recovery staff for continuing screening the author’s decision was to negotiate for support from her own NHS management to explore pragmatic strategies for continuing this as a small-scale service development, or short-term project, in the first instance. The author gained support for a short-term project, with an initial timeline of six months. Management of the alcohol support centre, the original research venue, offered to host the screening as before. They agreed the use of the therapy room for screening, as was the case for the research study.

At this time, the Scottish Government published an update of the Sexual Health and BBV Framework (Scottish Government 2015). In this version, they introduced the aim of increasing BBV testing in the population of those drinking to harmful levels. The rationale for this being that it was common for those who use drugs to change their substance of choice in time (Scottish Government 2015). Many of those who have injected drugs in the past, with the risk of BBVs this confers on them, may have changed from using drugs to using alcohol in time (Scottish Government 2015). Through her professional network, the author commenced
negotiation with the local BBV community team. The aim of these discussions was to negotiate whether, in the hope of replicating the good uptake seen in the study, it may be possible for this team to increase their contact with those drinking to harmful levels through offering screening for liver disease using the FibroScan® device, in addition to offering them a BBV screen at their attendance. This, therefore, would be consistent with the aims of the new framework (Scottish Government 2015). Through dissemination of the study results, the BBV team were aware and supportive of the original research study, making it easier for the author to engage (Reed 2018) them in discussion regarding the possibilities of taking it forward as a project. In so doing, the pathway and data collection strategy for the research study would need to be adapted to reflect the additional aims of the BBV team and ensure consistency, between members of the team (Schell et al 2013).

Each member of the BBV team agreed to offer screening using the FibroScan® device, while in the study this was solely offered by the author. In this respect, the pathway for participants in this project (Appendix 18) differed from that used in the screening study (Appendix 13). Through negotiation with her management and those at the alcohol support centre, it was agreed that the liver outreach clinic, offered by the author for the research study, would accept referrals from this screening project, in order that those with a raised scan could be referred to her, as Hepatology Nurse Practitioner, for further initial assessment. Participants, with a FibroScan® result ≥7.1 kPa would be referred to this clinic for further assessment. At this point, the pathway followed that of the original research study, with those participants with a FibroScan® result ≥7.1 kPa being seen by the author for further assessment with blood tests. Discussion of the results took place with the Consultant Hepatologist and onward referral arranged if necessary. Those with a scan result ≥8 kPa were offered an assessment ultrasound
of the liver and an appointment with a Consultant Hepatologist, or Registrar, in the acute setting; as was the case in the original research study.

Through discussion with the BBV team, amendments were made to the original data collection tool to include more in-depth data regarding participant’s potential risks of BBVs and where, if at all, they had accessed BBV screening in the past. This was important in determining whether this group was, indeed, hard to engage in BBV screening. In addition, and in an attempt to ensure standardisation in the alcohol history section of the tool, further amendments, were made; in particular the patterns of drinking were stated on this tool, in order that they were reported as either “daily”, “binge” or “intermittent” (Appendix 19). With only one person collecting this data in the study inter-rater reliability (Hack and Gwyer 2013) was not an immediate concern. While this project was not conducted under research conditions, with three members of the BBV team carrying out the assessments it was important to ensure clarity and uniformity in, where possible. The assessment of participants continued in a focused, systematic manner, as was the case in the research study (McGee 2003).

In offering this screening, it was imperative that the team were proficient in the use of the FibroScan® device. The author organised the initial training offered by Echosens®, the company responsible for manufacturing the device. To date, this is the recognised and validated training each operator undergoes in order to use the device. In taking the lead for this initiative and as mentor for the BBV team in offering screening the author observed them performing five FibroScan® tests within the acute setting following their initial training. The purpose of this was to ensure the BBV team felt competent in performing screening in the community as an autonomous practitioner through having the opportunity for situational learning (Gibbs 1988).
in using the FibroScan® device on patients in a supported clinic. The members of the BBV team were able to maintain their competencies in the use of the FibroScan® through commencing and continuing its use with their own patient group, in addition to its use in this project.

As specialist nurses, the BBV team had good knowledge of the physiology and pathophysiology of the liver, especially in relation to hepatitis C. However, in being the first point of contact for participants in this project it was important that they had good knowledge of other possible presentations of chronic liver disease. In order to ensure clinical safety, the author agreed time with her nurse management to act as coordinator and supervisor for this project and the Consultant Hepatologist, who provided clinical mentorship for the author in the research study, agreed to provide clinical governance for the BBV team for the duration of the project. As the research study was developed by the author, she also assumed the role of educator for the BBV team in the data collection and assessment procedures. This took the form of case studies and discussion as consistent with student centred learning theory (Biggs and Tang 2011) where, as adult learners, the BBV team were invited to identify their own learning needs against the objectives of the intervention. The author invited the team to suggest topics for discussion in both group and individual meetings. In addition to this, they were encouraged to search for reference material appropriate to their learning needs and the author recommended Sargent (2009) as the current text for liver disease management. During both the individual and group meetings, the author presented typical case scenarios and, through discussion, worked with the BBV team to determine how best to manage the participants in the scenario. This is consistent with adult learning theory, where the students are in charge of their own learning (Hughes and Quinn 2013). Opportunities for learning, through discussion (Brookfield and Preskill 1999) were facilitated by the author, in these sessions. In addition, through learning
from each other’s learning in this discussion the BBV team was given the opportunity for vicarious learning (Jacques and Salmon 2007). Following these groups and individual teaching sessions, individual members of the BBV team were given the opportunity for situational learning (Biggs and Tang 2011) when they were invited to sit in and observe a liver clinic run by either a Consultant Hepatologist or Senior Registrar. This gave the BBV team the opportunity to observe the management of patients with complications of liver disease they were not likely to see in their current practice. While there was no expectation for them to manage complications of liver disease during the screening project, the rationale for this was to enable them to recognise such complications, should a participant present with them, and improve their confidence in appropriate referral to liver services of such individuals. In addition, the BBV team was subsequently invited to shadow the author in carrying out at least one screening clinic. Through situational learning (Biggs and Tang 2011) this enabled them to see the relevance of their learning by observing the consultation and screening in action and being given the opportunity to ask questions between consultations. Further opportunities for learning included opportunities to observe the nurse led cirrhosis surveillance clinics within the acute sector and the nurse led liver outreach clinic within the alcohol support setting. Through observation of these clinics, the BBV team was able to observe the participant pathway in action as any participant with a raised FibroScan® reading were referred to the liver outreach clinic. Thereafter, should they be diagnosed with cirrhosis, they would enter into cirrhosis surveillance; as carried out at these nurse led clinics. Observing these clinics therefore would also enable the BBV team to describe the full pathway to participants. As their learning progressed, the BBV team members were then in a position to offer the screening consultation whilst observed by the author who had devised competency sheets (Appendix 20) in order to
provide feedback to the individual members. At the point when both the author and each
individual member of the BBV team considered themselves to be competent in the screening
process and happy with the escalation process should a participant attend showing signs of
liver decompensation, the BBV team member were “signed off” as competent and able to offer
screening without immediate supervision. Importantly, as registered nurses, the BBV team
were responsible for ensuring they worked within their level of competency and scope of
practice (NMC 2015). Their involvement with this project had been agreed with their manager
and, with the publication of the updated version of the Sexual Health and BBV Framework
(Scottish Government 2015) their scope of practice had been extended to include those
drinking to harmful levels. However, for the duration of the screening project, the author
continued to offer clinical supervision to each member of the BBV team, provided further
assessment of those with a raised FibroScan® result and coordinated attendance of those
requiring onward referral to specialist services.

It is important to note that, as the author and the BBV team members were senior nurses with
years of experience working in their respective fields, this learning was not a one-way process.
Consistent with knowledge exchange, as defined by Reed (2018), knowledge was actively
shared between the BBV team and the author, with the author taking advice and learning from
the BBV team regarding the BBV aspect of screening. This was in contrast to knowledge
transfer, where knowledge passes in one direction from perceived expert to novice (Reed
2018).

In order to devise the escalation procedures, the author worked collaboratively with the BBV
team. It was important they felt clinically and educationally supported in this new role, and
that, while screening for liver disease was a novel intervention for them it was important that their confidence and competence in carrying out this work was comparable to the standard of the research study (Schell et al 2013), prior to commencing the project. One main difference between this project and the research study was that the author designed and ran the study; taking clinical advice, where necessary from the Consultant Hepatologist on her research team. In this project, the BBV team was offering screening under supervision from the author who conducted triage of patients with when the BBV team had queries regarding their management. The author, in this case managed the project (Dwyer, Stanton and Thiessen 2004) and acted as an intermediary between the BBV team and her medical colleagues; creating a link between community and the acute setting.

Schell et al (2013) devised a framework for sustainability of new services that include funding stability, political support, organisational capacity, programme evaluation, public health impacts and strategic planning. At that time when the author experienced resistance from some of her nursing and medical colleague, she invested energy getting buy in from the staff at the recovery centre, her nurse management and the interested Consultant Hepatologist, who subsequently became part of the research team. As a research study, it was not necessary for her to go beyond the permissions she required from her management and the ethics committee. However, since completing the research study the clinical lead has changed from the Consultant who supported the research study to the Consultant who initially felt that, by carrying out the study, the author was “looking for work”. While this has not stopped the project running to completion, there had been some initial resistance from members of the medical team, including the current clinical lead, in the project being taken forward. This resistance was similar to that experienced at the start of the research study. It is possible
therefore, that if the author had invested more time and strategic planning in enlisting the support of these colleagues from early on in the research process, they may have offered less resistance at the stage of further rolling it out for the project and subsequent service provision across all recovery centres in the city. Through involving a wider range of Consultants, at that stage, the author could have ensured more representation from possible stakeholders. In this way, there would have been more individuals with a personal or professional interest in the success, or otherwise, of the venture and may have ensured more support at the project to service development stage. Knowing the powerful individuals in an institution and getting them onside early on can help the sustainability of the research. While the author had identified the powerful individual, who could help her take the research forward, at that time, she did not fully appreciate the political environment, nor could she have anticipated that the power dynamics may change in the way they did. While, this may have slowed progress there is indication now of support from the aforementioned colleagues in taking this forward as a service development at a time when the follow-on project is currently under evaluation. The author is currently negotiating with senior medical colleagues and other interested parties within Public Health and nurse management, in advance of building a business case.

4.04 Advancing Clinical Practice
O’Connell, Gardner and Coyer (2014) emphasise the importance of capability in advancing practice i.e. the ability to manage change, be flexible and move beyond competency. In developing this study, where potential participants may drop in rather than work to pre-arranged appointments, capability would be a requirement in order that the nurse can work confidently and autonomously in what could be an unpredictable environment. In their concept analysis, Dowling et al (2013) highlighted the common themes relating to advanced nursing
practice, which include clinical expertise, leadership, autonomy and role development. While advanced nursing practice is often seen as the adoption of a more medical focus through role extension (Dowling et al. 2013), role expansion is a key feature of advanced practice through the advancement of the core nursing skills of clinical practice, research, education and leadership (Rolfe 2013). Health Education England (HEE 2019) further defines advanced clinical practice as a practitioner working with a high degree of autonomy, analysis of complex problems and decision making. In identifying the gap in service provision and having the courage to challenge beyond her remit, the author demonstrated self-confidence in her ability to question the status quo and resilience in continuing to challenge and promote her idea for developing the innovation as a research study. Ultimately, the author recognised the potential benefits of the innovation to patients and strove to achieve this, despite the resistance she experienced. This is consistent with the first of the nine dimensions of NHS Leadership Academy’s “Inspiring Shared Purpose” (NHS Leadership Academy 2013) where challenging beyond her remit for the benefit of the service she displayed this value at exemplary level (NHS Leadership Academy 2013).

Recognising the resistance from her nursing colleagues became a pivotal point in the development of the author’s leadership skills, as it was a demonstration of how her behaviour was affecting other members of the team. While resistance to change from immediate colleagues is common in taking any project or innovation forward (Dwyer, Stanton and Thiessen 2004) this was emerging into an escalating conflict situation (Proksch 2016), with, in the author’s perception, attempts being made to publicly damage her image. For her part, the author was aware she was starting to de-personalise these opposing colleagues to status akin to that of opponents in a competition which needed to be won. It could be argued that, in this
respect, the conflict could also be a driver for the development of the innovation (Proksch 2016) but, this would only be to the advantage of the “victor”. According to the escalation model for conflict which progresses from the “Resentment phase” to “Exchange of blows” to “Destruction” this conflict was reaching the “Exchange of blows” level. In this respect, the conflict was becoming destructive and was set to risk, not only the development of the innovation but the whole team dynamics and personal welfare of both the author and her opposing colleagues (Proksch 2016).

It became clear to the author that it was important to harness a positive attitude towards the study from immediate colleagues, where possible, to protect her own and others’ emotional wellbeing throughout this process. In order to improve relations with fellow teammates, the author requested a facilitated meeting with a member of her team, who seemed most resistant, and their manager. The aim of this meeting was to discuss any issues surrounding the development of this innovation in a safe space where both author and colleague could ensure their views were heard, as suggested by Proksch (2016). It was considered that this should reduce the possibility of an emotional escalation, which was becoming typical of communication between the two, at that time. This in itself, demonstrated leadership qualities on the part of the author, in taking responsibility for caring for herself and the team consistent with “Leading with care”, as outlined by the NHS Leadership Academy (2013). This also served to improve the author’s self-awareness, in particular, realising that her approach could, at times, be seem as “dogmatic” by some members of the team. Incidences referred to were remembered by the author as times when she felt under attack by members of the nursing team concerning the study and, in her opinion was acting defensively. In this respect, meetings with members of the nursing team were helpful in enabling more self-awareness with regard to
how her behaviour may be perceived by others and enabled her to work to improve this for the future.

In order to progress the study, the author worked to improve her communication skills to ensure clarity and transparency as suggested by Reed (2018). She presented the study to the liver unit, as discussed in Chapter 1: Introduction, and developed ongoing communication strategies; presenting updates to the team at nurse meetings and periodically emailing short progress reports to the wider team, the author demonstrates strategies consistent with the NHS Leadership Academy’s “Sharing the vision” dimension of leadership (NHS Leadership Academy 2013).

Through sharing her expertise with the BBV community team and supporting the development of their capability in devising a course of education to support the assessment process for the project, where none currently existed and in designing, developing and facilitating this learning the author displays qualities consistent with the pillars of advanced clinical practice, in particular, that of leadership, research and education, as defined by Health Education England (HEE 2019).
Chapter 5: Conclusion

5.01 Conclusion of Study Findings and Suggestions for Further Investigation
The author designed this study and sought support in its development from both clinical and academic collaborators after identifying a need, within an area of her work, for earlier identification of liver disease and creating an opportunity to respond in an innovative way by the use of a portable FibroScan® device as the primary screening tool. She targeted a cohort of service users, accessing a community alcohol support service, drinking alcohol to harmful levels and therefore at high risk of liver disease. These service users, who were considered hard to engage in mainstream services (Watt 2013), were not currently under her care and, prior to the research study, had no recognised pathway to specialist services other than referral by their GP. This chapter summarises the study results with links to current literature in this area, where possible and suggests recommendations for taking this work forward.

This prospective observational study was developed with the aim of determining the viability of a service providing screening for liver disease, with a portable FibroScan® device. The objectives of this study were to a) record the uptake of a FibroScan® in individuals accessing one community alcohol support service, b) determine the prevalence of undiagnosed significant liver disease in a self-selected, convenience sample of individuals accessing one community alcohol support service and c) to report attendance at six months following referral to specialist liver services, of those participants referred with a FibroScan® reading ≥ 7.1 kPa. Through pursuing these study objectives, the results of this study suggest a positive answer to the research question “Can a portable FibroScan® device be an acceptable tool for cirrhosis screening in a community alcohol support service?” and confirming the original hypothesis that it would be acceptable.
In designing this study, within the limitations of budget and time resource, complex intervention theory was consulted (MRC 2008) and, in line with the author’s pragmatic stance, the concept of practical effectiveness was utilised in taking this study forward. The author successfully engaged the multi-agency team working in the alcohol recovery centre, in order to progress the study, in line with Normalisation Process Theory (May 2015), where staff find the intervention easy to describe (coherence), they engage and participate in their role (cognitive participation), engage with the intervention as a group (collective action) and feel there is a benefit to both them and their patients (reflexive monitoring).

Through a convenience sampling recruitment strategy, this study targeted those accessing a community alcohol support centre, who were concerned about the effects of their past or present drinking on the health of their liver. This self-selected group were then offered a FibroScan® test. An alcohol history and other demographic data was collected using the focused assessment data collection tool developed by the author specifically for this study. This demographic data focused on conditions, which could either increase the participant’s risk or, in some cases, be a clinical feature of chronic liver disease. These include BMI, metabolic syndrome, diabetes, family medical history in first-degree relatives and history of alcohol excess in the immediate family (Muir 2015).

Acceptability in a healthcare intervention can be anticipated when participants consider it to be appropriate, an important factor when considering uptake or participation in a healthcare intervention (Sekhon, Cartwright and Francis 2017). In this respect, an uptake of 67% of those informed of the study suggests that cirrhosis screening, using a portable FibroScan® device, in the outreach setting of a community alcohol service in an area of high deprivation is
acceptable. This is consistent with the findings of Foucher et al (2009) and Marshall et al (2015), who found community screening for liver disease with a FibroScan® device in a cohort of participants who injected drugs to be acceptable, as discussed in the literature review. After scanning, 26% (20/76) of participants with a reliable result had a FibroScan® ≥7.1kPa requiring referral on to the nurse led clinic. While not directly comparable, due to the difference in threshold for referral to the nurse clinic, this finding is generally consistent with the outcomes of the study conducted by Harmen et al (2015). This study, as previously critiqued, also targeted a high risk population for liver disease for screening and, with a threshold of 8kPa, found that 26.8% (98/366) of his cohort required onward referral while Roulot et al (2010) also with a threshold of 8kPa, found that only 7.5% (89/1190) of his general population cohort required onward referral. The results of this study, therefore, further suggest that targeting a population at high risk of liver disease may be more efficient than offering a general population screening initiative.

Of the 20 participants requiring onward referral, in this study, 20/20 (100%) engaged in further assessment. Of those, 12 required onward referral to specialist liver services. Subsequent compliance with specialist services in this sample (n=12) was ≥ 90%. In evaluating this, using health behaviour theories such as Self-Efficacy (Bandura 1997), The Health Belief model (Skinner, Tiro and Champion 2015) and the Theory of Planned Behaviour (Montaño and Kasprzyk 2015), this level of engagement displays positive signs of motivation and intention to engage in a cohort initially considered hard to engage. This is a positive predictor for longer-term positive lifestyle changes such as reduction of alcohol intake and long-term engagement in specialist follow up. However, it was outwith the scope of this study to establish whether lifestyle
changes were sustained beyond the six-month follow up period, after onward referral. A further, longitudinal study is recommended in order to examine this.

This was a timely innovation, linking well with recent drivers such as The Lancet Commission’s “Addressing liver disease in the UK...” Williams et al (2014) who developed ten key recommendations, one of which was to “Improve support services in the community setting for screening of high-risk patients”. This recommendation acknowledges the impact of health inequality on liver disease and is consistent with findings from the study by Thurnheer et al (2015) where they found a higher prevalence of liver disease outwith tertiary settings, indicating that mainstream health care in liver disease was not reaching those at highest risk. This is also consistent with recent data where, in 2015, mortality rates from CLD in Scotland in the most deprived decile were six times those of the least deprived (34 v 6 per 105) and morbidity rates were five times higher (435 v 88 per 105) (ScotPHO 2017). The results of this screening study, therefore, suggest this could offer one option for engaging patients at high-risk of liver disease, through harmful alcohol consumption, in screening for liver disease attending a community alcohol support centre with a catchment area including areas of high deprivation.

The World Health Organisation (WHO) (2011) pledged to address health inequalities through developing strategies to promote effective partnerships with health and other sectors in achieving health through policies and actions on social determinants of health, specifically targeting vulnerable and high-risk groups. In Scotland, the Public Bodies (Joint Working) Scotland Act (Scottish Government 2014) introduced a statutory duty for NHS Boards and Councils to integrate planning and delivery of health and social care services, strengthening the
Scottish Government’s commitment to community-based anticipatory care (Audit Scotland 2015). This care is to be provided jointly between the NHS, statutory and non-statutory social care providers with the aim of reducing the number of patients with long-term conditions being admitted to acute services (Audit Scotland 2015). This initiative is an excellent example of health and social care integration, with the NHS and third sector working together with the shared aim of enhancing patient safety through facilitated screening for liver disease in a multi-agency community setting. In this setting where potential participants were attending for support in alcohol reduction, staff worked towards a common aim for with the aim of providing low threshold access to specialist services for patients considered, by support staff in the recovery centre, to be hard to engage in mainstream services.

Through successfully pitching for funding for the rental of the portable FibroScan® device to an audience of senior executives from NHS Lothian, the Scottish Government and private industry the author has utilised high-level negotiation and leadership skills (NHS Leadership Academy 2013). Though overcoming resistance to the research from some colleagues she has developed and demonstrated resilience in taking this study forward. As a consequence of developing and the use of excellent negotiating skills, she secured buy in from some senior medical colleagues, NHS management and non-statutory management within the alcohol recovery centre in supporting this initiative and is an excellent example of collaborative working, as consistent with the aims of the recent government strategy in health and social care integration (Scottish Government 2014). The author recruited support from a senior medical colleague and academic collaborator, in developing a research team, of which she was Principal Investigator. This demonstrated key project management skills (Dwyer, Stanton and Thiessen 2004), where, as the most junior member of the team in her professional capacity, she was, for the duration
of the study, responsible for designing, leading, evaluating the study with the support of their clinical and academic expertise. In addition to this, she was responsible for disseminating information on the study to a range of audiences with, as Principal Investigator, the responsibility for writing the material for the abstracts and manuscripts submitted for publication with editorial rights to this written content.

In creating enthusiasm and securing buy in from key stakeholders in taking forward the findings from the study forward to a project where screening is offered by members of another team the author has further developed her leadership skills. Supporting the BBV team to build on their capacity to deliver this screening through developing training and supervision, demonstrates her skills in education; another pillar of advancing clinical practice (HEE 2019).

This innovation has demonstrated it can identify significant liver disease in the targeted population and results indicate a high level of early engagement in NHS liver services in a cohort who are drinking to harmful or hazardous levels; previously considered hard to engage (Watt 2013). Nurse led screening in this setting provides an opportunity for education and discussion regarding lifestyle factors in liver disease with a cohort who seem motivated to improve their liver health. Further work is needed to optimise this intervention to understand, more fully, what are the essential active components necessary to replicate this outcome (Levati 2016, Sermeus 2015). This study demonstrates advanced nursing practice in the area of Hepatology through the implementation of this innovation in screening for liver disease with a portable FibroScan® device in a group considered hard to engage.
References


106
References


References


References


LAU-WALKER, M., PRESKY, J., WEBZELL, I., MURRELLS, T. AND HEATON, N., (2016). Patients with alcohol-related liver disease—Beliefs about their illness and factors that influence their self-management. Journal of Advanced Nursing. 72, 173-185,


References


References


References


References


References


References


# Appendix 1: Search Strategy

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## Appendix 1.01: Search Strategy

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<td>11. Reason: No focus on community screening. Duplicate result to #13 and #14.</td>
<td>N/A</td>
</tr>
<tr>
<td>#18a. Liver stiffness, community, alcohol</td>
<td>QMU Discover: Science citation index, Academic search index, Complimentary index, Science Direct. Medline.</td>
<td>Peer reviewed. Full text.</td>
<td>Apply related words, apply equivalent subjects</td>
<td>Find all search terms.</td>
<td>None</td>
<td>15</td>
<td>15. Reason: No focus on community screening. Duplicate result to #13 and #14.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
# Appendix 1.06: Search Strategy

<table>
<thead>
<tr>
<th>#</th>
<th>Search Strategy</th>
<th>Databases Used</th>
<th>Peer reviewed</th>
<th>Apply related words, apply equivalent subjects</th>
<th>Boolean</th>
<th>Reason</th>
</tr>
</thead>
</table>
## Appendix 1.07: Search Strategy

<table>
<thead>
<tr>
<th>#21. Liver and Outreach and Fibroscan*</th>
<th>QMU Discover: PsychINFO.</th>
<th>Peer reviewed</th>
<th>Boolean</th>
<th>None</th>
<th>5</th>
<th>5</th>
<th>Reason: Duplicate result to #5, #13 and #20.</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medline. Science citation index. Complimentary Index.</td>
<td>Apply related words, apply equivalent subjects.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>#21a. Liver Outreach, Fibroscan*</td>
<td>QMU Discover: Academic search index. Complimentary Index. Medline. Science citation index. PsychINFO.</td>
<td>Peer reviewed</td>
<td>Find all search terms</td>
<td>None</td>
<td>8</td>
<td>8</td>
<td>Reason: Duplicate result to #5, #13 and #20.</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Apply related words. Apply equivalent subjects.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>#22. Outreach and Fibroscan*</td>
<td>QMU Discover: PsychINFO. Medline. Science citation index. Social sciences citation index. Academic search index.</td>
<td>Peer reviewed</td>
<td>Apply related words. Apply equivalent subjects.</td>
<td>Boolean</td>
<td>None</td>
<td>6</td>
<td>6</td>
<td>Reason: One article recruited in community but Fibroscan performed in acute setting. Duplicate result to #5, #13 and #20.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>#22a. Outreach, Fibroscan*</td>
<td>QMU Discover: Medline, Cinahl, Science Direct, Science Citation Index, Social Sciences Citation Index</td>
<td>Peer reviewed</td>
<td>Find all search terms.</td>
<td>None</td>
<td>11</td>
<td>11</td>
<td>Reason: No focus on community screening. Duplicate to #5, #13 and #20.</td>
<td>N/A</td>
</tr>
<tr>
<td>#23. Liver fibrosis and acceptability and transient elastography</td>
<td>QMU Discover: Medline, Cinahl, Science Direct, Science Citation Index, Social Sciences Citation Index</td>
<td>Peer reviewed</td>
<td>Apply related words, apply equivalent subjects</td>
<td>Boolean</td>
<td>None</td>
<td>6</td>
<td>5</td>
<td>Reason: No focus on community screening.</td>
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</tbody>
</table>

*Note: *Fibroscan* refers to a specific device used for liver fibrosis assessment.
## Appendix 1.08: Search Strategy

<table>
<thead>
<tr>
<th>Search Strategy</th>
<th>Database/Others</th>
<th>Search Terms</th>
<th>Terms Used</th>
<th>Number of Results</th>
<th>Reason</th>
<th>Notes</th>
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</thead>
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<tr>
<td>#23a. Liver fibrosis, acceptability, transient elastography</td>
<td>QMU Discover: Peer reviewed</td>
<td>Apply related words, apply equivalent subjects.</td>
<td>Find all search terms</td>
<td>6</td>
<td>Reason: No focus on community screening. Duplicate result to #23.</td>
<td>N/A</td>
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<tr>
<td>#24. Fibroscan and community and liver</td>
<td>Knowledge Network: Ovid Embase, Ovid Medline</td>
<td>All terms</td>
<td>None</td>
<td>1 abstract</td>
<td>Discounted as not full text</td>
<td>N/A</td>
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<tr>
<td>#25. Transient elastography AND community</td>
<td>Cochrane library. Cochrane reviews and trials</td>
<td>Search word variations.</td>
<td>Boolean</td>
<td>Nil</td>
<td>Nil</td>
<td>N/A</td>
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<tr>
<td>#27. Transient elastography</td>
<td>Cochrane library</td>
<td>Cochrane reviews</td>
<td>Search word variations</td>
<td>All terms</td>
<td>5</td>
<td>Reason: No focus on community screening.</td>
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</table>
Appendix 2: Critical Review Template

<table>
<thead>
<tr>
<th>Journal article</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research focus/question</td>
</tr>
<tr>
<td>2. Relevance to cirrhosis screening study.</td>
</tr>
<tr>
<td>3. Rationale for study.</td>
</tr>
<tr>
<td>4. Research design.</td>
</tr>
<tr>
<td>5. Validity</td>
</tr>
<tr>
<td>6. Results</td>
</tr>
<tr>
<td>7. Claims relevant to my review question?</td>
</tr>
<tr>
<td>8. Certainty and generalisability of author’s claims?</td>
</tr>
<tr>
<td>9. To what extent are the claims supported/challenged by other’s work?</td>
</tr>
<tr>
<td>10. To what extent are the claims consistent with my experience?</td>
</tr>
<tr>
<td>11. What is my summary text in relation to my review question?</td>
</tr>
</tbody>
</table>
P3: This proposal is an innovative approach for NHS Lothian which supports the delivery of safer, more effective and patient centred services.

1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree
### Appendix 4: Codebook for SPSS

#### SPSS Codebook for Cirrhosis Screening in Alcohol Services

<table>
<thead>
<tr>
<th>Variable</th>
<th>SPSS Variable Name</th>
<th>Coding</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification number</td>
<td>ID</td>
<td>CS number assigned to participants</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
<td>Age in years</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Gender</td>
<td>1=Male 2=Female</td>
<td></td>
</tr>
<tr>
<td>Fasted&gt;3 hours</td>
<td>Fasted</td>
<td>1=Yes 2=No</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>BMI</td>
<td>BMI value to one decimal point</td>
<td></td>
</tr>
<tr>
<td>Linked in with agency</td>
<td>Agcy</td>
<td>1=Yes 2=No</td>
<td></td>
</tr>
<tr>
<td>Weekly units</td>
<td>Wklyunits</td>
<td>1=1-100 2=101-200 3=201-300 4=301-400 5=401-500 6=501-600 7=601+ 8=Unknown</td>
<td></td>
</tr>
<tr>
<td>Currently abstinent</td>
<td>Abst</td>
<td>1=Currently abstinent 2=Not abstinent</td>
<td></td>
</tr>
<tr>
<td>Pattern of drinking</td>
<td>Ptn</td>
<td>1=Daily 2=Binge 3=Intermittent</td>
<td>Intermittent is to cover 4 or 3 off etc – neither daily or binge</td>
</tr>
<tr>
<td>Previous detox attempts</td>
<td>Pvdtx</td>
<td>1=Yes 2=No</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 4.01: Codebook for SPSS

<table>
<thead>
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<th>Variable</th>
<th>SPSS Variable Name</th>
<th>Coding</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of drinking (in years)</td>
<td>Lghdrig</td>
<td>Numerical value</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>Dbs</td>
<td>1=Yes</td>
<td>2=No</td>
</tr>
<tr>
<td>Symptoms of CLD</td>
<td>Scld</td>
<td>1=Yes</td>
<td>2=No</td>
</tr>
<tr>
<td>History of obesity</td>
<td>Hxoby</td>
<td>1=Yes</td>
<td>2=No</td>
</tr>
<tr>
<td>Psychiatric history</td>
<td>PsychHx</td>
<td>1=Yes</td>
<td>2=No</td>
</tr>
<tr>
<td>History of liver disease</td>
<td>MedHliver</td>
<td>1=Yes</td>
<td>2=No</td>
</tr>
<tr>
<td>Family history of diabetes</td>
<td>FamHxdiab</td>
<td>1=Yes</td>
<td>2=No 3=Don’t know</td>
</tr>
<tr>
<td>Family history of alcohol</td>
<td>FamHxalcohol</td>
<td>1=Yes</td>
<td>2=No 3=Don’t know</td>
</tr>
<tr>
<td>Family history of liver disease</td>
<td>FamHliver</td>
<td>1=Yes</td>
<td>2=No 3=Don’t know</td>
</tr>
<tr>
<td>Current medication</td>
<td>Currmed</td>
<td>1=Hepatotoxic</td>
<td>2=Possible hepatotoxicity 3=No hepatotoxicity</td>
</tr>
<tr>
<td>Past medication</td>
<td>Pastmed</td>
<td>1=Hepatotoxic</td>
<td>2=Possible hepatotoxicity 3=No hepatotoxicity</td>
</tr>
</tbody>
</table>
### Appendix 4.02: Codebook for SPSS

<table>
<thead>
<tr>
<th>Variable</th>
<th>SPSS Variable Name</th>
<th>Coding</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non prescribed medication</td>
<td>Othmedn</td>
<td>1=Street, 2=Herbal, 3=Nil</td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>Smoker</td>
<td>1=Current, 2=Past, 3=Never</td>
<td></td>
</tr>
<tr>
<td>IVDU history</td>
<td>IVDUHx</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Tattoos unlicensed</td>
<td>Unilcetto</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Blood products before 1991</td>
<td>Bpdrct</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Occupational</td>
<td>Occl</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td>Tvl</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Sexual risk</td>
<td>Sxl</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
<tr>
<td>Fibroscan result</td>
<td>Fibroscan</td>
<td>1=0-7.9, 2=8+</td>
<td>In view of significance of results &lt;8</td>
</tr>
<tr>
<td>Referral to liver nurse</td>
<td>Refnurse</td>
<td>1=Yes, 2=No</td>
<td></td>
</tr>
</tbody>
</table>
# Cirrhosis Screening Proforma

**Date**

<table>
<thead>
<tr>
<th>Name:</th>
<th>DOB/CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td>Contact tel:</td>
</tr>
<tr>
<td>GP:</td>
<td>Other agency:</td>
</tr>
</tbody>
</table>

| Height = | Weight = | BMI = |

**Alcohol History**
- Units per week
- Pattern of drinking
- Previous attempts at detox

**Medical History**
- Autoimmune disorders
- Diabetes
- Signs of CLD
- Other

**Family History**
- Autoimmune disorders
- Diabetes
- History of alcohol misuse
- Other

**Medication History**
- Current
- Past
- Non prescribed/herbal/street
- Smoker (if yes please state quantity per week)
Appendix 6: Poster Advertising Study

Are you worried about the effects your drinking is having on your liver?

We are currently offering liver screening at the Hub using a simple painless test which gives an instant result, as part of a research study.

Please speak to a member of staff if you would like more information or drop in on Tuesdays 11-2, Thursdays 11-2.
CONSENT FORM
Cirrhosis Screening In Alcohol Services
(Pilot Study)

Please initial box

1. I confirm that I have read and understand the participant information sheet (version 2, 17/7/14) for the above study and have had the opportunity to consider the information and ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

3. I agree to have a Fibroscan to assess the stiffness of my liver.

4. I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the research team, from the NHS organisation or other authorities, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

5. I agree to my General Practitioner being informed of my participation in this study.

6. I agree to other health professional having access to my scan result, (if required).

7. I understand I will be asked about my medical history and my lifestyle.

8. I understand that from the medical information I provide, the researcher may offer me a referral to an appropriate NHS service, despite the results of my Fibroscan.

9. I agree to take part in the above study.

Name of Participant

Date

Signature

Name of Person taking consent

Date

Signature

1x original – into Site File; 1x copy – to Participant; 1x copy – into medical records

Consent form (version 2) 24th July 2014
# Appendix 8: Study Data Collection Tool

## Cirrhosis Screening Proforma

<table>
<thead>
<tr>
<th>Clinic Date</th>
<th>DOB/CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>DOB/CHI</td>
</tr>
<tr>
<td>Address:</td>
<td>Contact Tel:</td>
</tr>
<tr>
<td>GP:</td>
<td>Other agency:</td>
</tr>
<tr>
<td>Time last ate food</td>
<td>Fasted for 3 hours or more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height =</th>
<th>Weight =</th>
<th>BMI =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol History</td>
<td>Weight =</td>
<td>BMI =</td>
</tr>
<tr>
<td>Units per week</td>
<td>Pattern of drinking</td>
<td>Previous attempts at detox</td>
</tr>
<tr>
<td>Previous attempts at detox</td>
<td>Length of drinking (when started)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medical History</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms of CLD</td>
<td>History of obesity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th></th>
</tr>
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</table>
Appendix 8.01: Study Data Collection Tool

<table>
<thead>
<tr>
<th>Name:</th>
<th>DOB/CHI</th>
</tr>
</thead>
</table>

**Family History**
- Diabetes
- History of alcohol misuse
- Other

**Medication History**
- Current
- Past
- Non prescribed/herbal/street

**Smoker** *(If yes please state quantity per week)*

**Possible Viral Hepatitis Risks**
- IVDU
- Tattoos
- Blood products/Non sterile invasive procedures
- Occupational
- Travel
- Sexual

**Result of Fibroscan**

**Refer to nurse** *(YES/NO)*

**Appointment date and time (if applicable)**

**Would like an appointment reminder call** *(YES/NO)*
## Appendix 9: Study Timeline and Costings

### Timeline and costings for Cirrhosis Screening in Alcohol Services Study

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>1. Funding pitch to Innovation Board</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Time allocation agreed with clinical lead for consultant supervision (0.25 FTE agreed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.1. Funding secured from Innovation Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2.2. Negotiation for space at NE Hub</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>2.2.1. Delay of 6 months while negotiations took place to determine whether source of funding should be from Innovation Board or via funds from Liver Transplant Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Application to King's College London for liver disease management course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1. Negotiation of study leave and course funds with manager.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>4. Completion of IRAS form for ethics committee</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Commence liver disease management course KCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Submission of IRAS form</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6.1. Ethics committee with approval granted</td>
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<td></td>
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<td></td>
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<tr>
<td>6.2. Submission of assignment for liver course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Secure Research Futures funding</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>7.1. Negotiation of time allocation of 7.5 hours per week for study</td>
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<td>8. Successful completion of liver course</td>
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<td>8.1. R&amp;D approval secured</td>
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</tr>
<tr>
<td>8.2. Secure cupboard space for storage of scanner agreed</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9. Commence study</td>
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</table>

### Cost

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<tbody>
<tr>
<td>£5180 applied for (not secured)</td>
<td>£5180</td>
<td>£1200</td>
<td></td>
<td></td>
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<td>£5180 (secured)</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

£3700 for first two years of study
£30 for cupboard looks paid by NE Hub
Appendix 10: Ethics Approval for Study

Lothian NHS Board

Ms Karen Matthews
Hepatology Nurse Practitioner
NHS Lothian
Royal Infirmary of Edinburgh
51 Little France Crescent
Edinburgh
EH16 4SA

South East Scotland Research Ethics Committee 01
Waverley Gate
2-4 Waterloo Place
Edinburgh
EH1 3EG
Telephone 0131 536 0000
www.nhslothian.scot.nhs.uk

Date 21 July 2014
Your Ref
Our Ref

Enquiries to: Sandra Wylie
Extension: 30473
Direct Line: 0131 465 5473
Email: Sandra.Wylie@nhslothian.scot.nhs.uk

Dear Ms Matthews

Study title: Cirrhosis screening in an alcohol support service in NE Edinburgh
REC reference: 14/SS/1021
Protocol number: N/A
IRAS project ID: 140799

Thank you for your letter of 17 July 2014, responding to the Committee’s request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HIRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, Mrs Sandra Wylie, sandra.wylie@nhslothian.scot.nhs.uk

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with
Appendix 11: Slide Showing Clinic Attendance

**Number of participants attending each clinic**

![Chart showing number of participants attending each clinic](chart.png)
Appendix 12: Table Showing Fibroscan, Blood and Ultrasound Results for Participants Requiring Onward Referral

<table>
<thead>
<tr>
<th>Fibroscan Result</th>
<th>ALT</th>
<th>AST</th>
<th>AST/ALT</th>
<th>Hyaluronic Acid</th>
<th>Platelets</th>
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<td>71</td>
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<td>107</td>
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Recruitment pathway for Cirrhosis Screening at the North East Recovery Hub

Potential participant (PP) attends North East Recovery Hub for support or advice regarding alcohol use

PP views poster advertising research study

PP requests participant information sheet (PIS) from reception staff

PP attends drop in research clinics held on Tuesdays and Thursdays

Karen Matthews
APBB
04000427
Appendix 14: Doctoral Conference Letter

Dear Karen

Thank you very much for attending and presenting at the Doctoral Student Conference on 28th April 2016. And congratulations for winning the best poster prize! I hope you enjoyed the day and that it was of benefit to you in terms of your development and PhD experience.

I thought you would like to know that the feedback I have received from both your peers and academic colleagues has been very positive and they were very impressed with the standard of both your poster and oral presentation.

Thank you again and I wish you well as you continue to progress with your studies.

Kind regards
Lindsey

Dr Lindsey Defew BSc (Hons), PhD
Graduate School Officer
Division of Governance and Quality Enhancement
QMU, Musselburgh, East Lothian, EH21 6UU
graduateschool@qmu.ac.uk
Appendix 15: Lancet Review

Event
Talking liver screening

Some topics are intrinsically linked to the minds of the public: high blood pressure and heart attacks, smoking, obesity and lung cancer, and alcohol abuse and liver disease. Kevin Matthews, a liver nurse specialist at the Royal Infirmary of Edinburgh, UK, and professor of medicine at Queen Margaret University, Edinburgh, challenged the public's misconceptions about alcohols and liver disease during his talk, part of the Colloquium on Drug Abuse (CODA) at the Edinburgh Festival Fringe. CODA was created by the production company Tell Play and the Scottish public engagement network, which brings together scientists from the four universities in Edinburgh to deliver talks and other events to the public about their research.

"Tonight's talk is about liver health, which is kind of ironic given that we're in the middle of the fringe. Our society is very much on the stage being held up as a model of how things should be. However, we need to talk about what's happening in reality," joked stand-up comedian and cancer survivor Susan Morrison as she introduced Matthews at the start of the event. Matthews talked around the findings of "LiverTalks" screening in an alcohol support service in Manchester during 2018, a piece of research he carried out after learning about the "death from liver disease on the WHO list for all diseases. Since 2000, deaths from liver disease have risen by more than 50% compared to other chronic health diseases. The study suggests that the problem is getting worse and needs attention." Matthews explained. "We've worked in the liver unit for five years and during my first week I was shown this group—which is the core of my research because I checked the hell out of me."

Matthews warned that patients were being diagnosed with liver cirrhosis during the later stages of the disease because there were no clear early symptoms. Her research involved taking a Fibroscan machine from the liver unit to a community alcohol support centre. She told the audience that the equipment measures the stiffness of the liver by emitting ultrasound waves and measuring how long it takes to bounce off the liver and return to the probe. The liver becomes "stiffer" as fibrosis increases and leads to cirrhosis. The FibroScan is usually used in hospitals for diagnosis but Matthews wanted to test it in a screening setting. In total, 116 people had their livers scanned at the centre with the scan showing that 11.8% might have cirrhosis. What surprised Matthews most was the engagement rate among the patients—more than 80% came back to hear the results for the blood tests, more than 80% of those who were invited to attend the Royal Infirmary of Edinburgh for the screening. They were asked to return 6 months later for follow-up appointments.

"The attitude of the government and other people is that these people aren't seen and they're not interested. We're not going to get people with cirrhosis to get treated so what's the point if they don't engage with services," she pointed out. "You have to say all the time. This is a very small study. Let's see what it tells us. We can't call a complete multi-component health intervention. Is it the FibroScan alone, the intervention that we've done, or the combination of the two?" Matthews also asked everyone to continue to whether they were having the screening to continue or whether it was having the nurse involved.

Audience participation was a major component of Matthews' event. She encouraged the crowd to ask questions and several of the colleagues who attended the talk joined in the discussion. Matthews also used humour to great effect. She asked Morrison to put on a white T-shirt and headband and then asked the audience of the audience if it was the same shirt and asked if it was the same shirt. Matthews also borrowed the "If this is the answer, what is the question?" from the television series "House" and asked the audience to bring on stage. Matthews also said that she was "not a great performer" and that she was trying to "stop being a great performer." Peter Scanlan of the}

Theatre
Patients showing patience

It's the question that sits at the very heart of the healthcare system—who is "worthy" of receiving a new organ and who is not? That dilemma formed the premise for "Patients," a one-act play written by Juliet Marillier and performed by the Saltiel Theatre Company, as part of the 2018 Edinburgh Festival Fringe.
Appendix 16: Poster Presentation for BSG

Cirrhosis Screening with a Portable Fibroscan® Device in a Community Alcohol Support Service Feasibility Study

Karen Matthews1,2, Alastair MacGilchrist1, Margaret Coulter Smith2, Roseanne Cetnarskyj3,
1 = Royal Infirmary of Edinburgh; 2 = Queen Margaret University; 3 = Glasgow Caledonian University

Introduction
Alcohol misuse is the major cause of the increase in deaths from liver disease in the UK, particularly in Scotland® and particularly in areas of social deprivation. Liver disease usually presents late, with advanced liver disease and cirrhosis often asymptomatic®. Patients with alcohol misuse in areas of social deprivation are a “hard to reach” population. This study assessed the feasibility of using a portable Fibroscan® to measure transient elastography (TE), a non-invasive method of assessing hepatic fibrosis, as a screening tool within a community alcohol support service. The study monitored the uptake of a Fibroscan® in individuals accessing one community alcohol support service in a deprived area; determined the apparent prevalence of undiagnosed fibrosis/cirrhosis in participants over a 6 month period; and monitored engagement following referral to specialist liver services of those individuals with TE ≥7 kPa.

Method
The project was advertised at a drop-in centre in a deprived area of North Edinburgh for people with alcohol problems, individuals who self-identified as harmful drinkers and wished to have a Fibroscan were given information packs and invited back for a Fibroscan. Those with a TE ≤7 kPa were given advice on alcohol and liver disease. Those with a TE >7 kPa were referred to a nurse-led clinic within the community service for further tests, results of which determined onward referral to liver specialist. Participants were monitored for compliance with appointments and follow-up interventions.

Results
118 research packs issued with 79 participants, an uptake of 67%. 3 Fibroscan® results were unreliable. 20 of 76 (26%) participants had a reading >7 kPa requiring referral to nurse-led service. 12 (16%) with indications of significant liver disease requiring onward referral to liver specialist including 5 (7%) with suspected cirrhosis. Following medical assessment this increased to 6 (8%) with cirrhosis. 19/20 (95%) participants requiring referral to nurse led service attended for further investigations. 11/12 (92%) participants requiring onward referral to specialist services attended initial appointment.

References
2. SCOTTISH PUBLIC HEALTH OBSERVATORY, 2015. Public Health Information for Scotland

Impact
A 67% uptake suggests a nurse led Fibroscan® service in a community alcohol setting, targeting a hard to reach population, is acceptable. Early indications show a high compliance with liver services offering potential for early intervention and improved health outcomes.
A nurse-led FibroScan® outreach clinic encourages socially deprived heavy drinkers to engage with liver services

Karen Matthews1,2,3 | Alastair MacGilchrist1 | Margaret Coulter-Smith3 | Jacklyn Jones4 | Roseanne Cetnarsky5

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2Department of Nursing, Centre for Applied Social Sciences, Queen Margaret University, Musselburgh, UK
3Department of Nursing, Queen Margaret University, Musselburgh, UK
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5Department of Adult Nursing, Glasgow Caledonian University, Glasgow, UK

Correspondence
Karen Matthews, Centre for Liver and Digestive Disorders, Royal Infirmary of Edinburgh, Edinburgh, UK and Department of Nursing, Centre for Applied Social Sciences, Queen Margaret University, Musselburgh, UK. Email: karen.matthews@sms.ac.uk or karen.matthews@btinternet.com

Funding Information
NHS Lothian Innovation Board provided £6200 funding for rental of the FibroScan® device for the six-month duration of the study.

Abstract
Aims and objectives: To determine whether a portable FibroScan® device can be an acceptable screening tool for chronic liver disease in a community alcohol support service, through recording uptake, determining apparent prevalence of undiagnosed fibrosclerotic in participants and report engagement following referral to specialist liver services of those individuals referred because of a FibroScan® reading ≥ 7.1 kilopascals (kPa).

Background: Alcohol-related liver disease, including cirrhosis, is a major cause of death in the UK. Liver disease is silent and usually presents late. Socially deprived patients with alcohol-related liver disease are a “hard to engage” population and at higher risk of death than less deprived. A FibroScan® device is a non-invasive tool for measuring liver stiffness. A result of ≥ 7.1 kPa can indicate possible chronic liver disease.

Design: Prospective observational study.

Method: Individuals who self-identified as harmful drinkers were recruited. Consented individuals attended for a liver FibroScan®. Those with a reading ≥ 7.1 kPa were referred to a nurse-led liver clinic for further investigations, results of which determined referral to a liver specialist in secondary care. Participants referred were monitored for compliance over a 6-month period.

Results: Seventy-nine consented individuals participated, an uptake of 67% of those informed of the study. Of the 79 scans performed, three were unreliable leaving 76 participants. After scanning, 20/76 (26%) had a FibroScan® ≥ 7.1 kPa requiring referral to the nurse-led clinic. All 20 (100%) engaged in further assessment. Of those, 12 required onward referral to specialist services. Subsequent compliance with specialist services in this sample (n = 12) was ≥ 90%.

Conclusions: A nurse-led FibroScan® outreach clinic encourages socially deprived drinkers to engage with liver services.

Relevance to clinical practice: A 57% uptake suggests a nurse-led FibroScan® service in a community alcohol service is acceptable. High engagement gives potential for early intervention and improved health outcomes.

Keywords
Alcohol, FibroScan®, liver cirrhosis, nursing assessment, screening, transient elastography.
Appendix 17.01: JoCN Manuscript

2

WILEY—Clinical Nursing

1

INTRODUCTION

Liver disease, including cirrhosis, is the third commonest cause of premature death in the UK, and mortality rates have increased by approximately 50% in those under the age of 65 years since 1970 (Williams et al., 2014). As such, it stands as an exception to the improved prognosis of those with other chronic illnesses such as chronic heart disease, stroke and some cancers (Williams et al., 2014). Deaths from chronic liver disease (CLD), including cirrhosis, increased globally between 1990 and 2013 from 1.5 million to 2.1 million (Covelli et al., 2015). Within the European Union, standardized death rates from chronic liver disease were 13 per 10^5 in 1990 compared to 16 per 10^5 in the UK alone (WHO, 2017). Alcohol-related liver disease (ALD) is a major contributor to morbidity and mortality in the UK. Current data for death rates due to alcohol in the UK, including ALD, report rates at 34 per 10^5 since 2012 (Scottish Health Statistics, 2017). This pattern is mirrored in Scotland, but with rates higher than in the rest of the UK. Death rates in men are 30 per 10^5 in Scotland and 18 per 10^5 in England and for Scottish women are 13.3 per 10^5 and 9.5 per 10^5 in England (ONS, 2017). In 2015, mortality rates from CLD in Scotland in the most deprived decile were six times those of the least deprived (3.6 v 6 per 10^5) and mortality rates were five times higher (435 v 88 per 10^5) (Scottish Health Statistics, 2017). These data demonstrate the impact deprivation, and health inequality issues have on CLD.

Cirrhosis is often asymptomatic, and, in most cases, treatable liver disease goes undiagnosed and untreated. This can result in most patients with liver disease presenting at an advanced stage (Williams et al., 2014). The three main causes of cirrhosis are obesity, viral hepatitis or excess alcohol consumption (BASL-BSC, 2009). Excessive alcohol consumption can cause inflammation of the liver and an accumulation of fat within the liver cells which, if persistent, can lead to fibrosis before development of cirrhosis through an inelastic process of replacement of liver cells with connective tissue (Sargent, 2009). Fibrosis is often a precursor to cirrhosis. If the cause of liver damage continues, identification of fibrosis therefore plays an important part in the early detection of the disease process.

Long-term complications of cirrhosis include esophageal varices, secondary to portal hypertension, the most common lethal complication of cirrhosis through gastrointestinal bleeding (Garcia-Tsao, Sanyal, & Carey, 2007). Further complications include liver failure and hepatocellular carcinoma (hepatoma), a primary liver cancer (Muir, 2015). Early diagnosis of cirrhosis triggers assessment for complications, initiation of regular haematoma and varical surveillance, treatment and lifestyle changes to prevent progression of the disease, thus improving survival, even in advanced cases of cirrhosis (Verrill, Markham, Templeton, Cari, & Sheren, 2009). Early identification and prevention of liver disease are also key in reducing the financial burden to the NHS, where the cost of alcohol-related health problems alone is predicted to be around £17 billion (Foundation for Liver Research, 2017).

What does this paper contribute to the wider global clinical community?

- Findings from this study should instil confidence in centres planning to deliver early intervention through noninvasive screening for chronic liver disease with a portable FibroScan® device in community settings.
- These findings should inform future research in this area.

1.1 Screening for chronic liver disease

While liver biopsy is considered the gold standard diagnostic tool for cirrhosis (Castany, 2013), the invasive nature and risk of complications renders it unavailable for use as a screening tool in community settings. A range of less invasive and non-invasive methods are available for the detection of fibrosis or cirrhosis, ranging from blood tests to more sophisticated methods including magnetic resonance imaging (MRI) (EASL-ALEH, 2015). Of these, liver function tests (LFTs) are the most commonly used blood tests. Many of these tests rely on biochemical changes induced by altered liver function. In a large population-based retrospective cohort study (n = 95,977), the link to outcomes of liver disease and mortality from a large database in primary care in Tayside from 1989-2003 suggested that, while specificity of these tests was generally high, sensitivity was low with gamma glutamyl transferase (GGT) having the best sensitivity at 72% (Domin et al., 2007). Interest in interpretation of LFTs can be difficult and confusing for non-liver specialists. Referral to specialist liver services often relies on the GP or health practitioners’ ability to interpret these results (Cook et al., 2015). Due to the size and cost of MRI equipment, this method of screening is not appropriate in a non-acute setting.

Cirrhosis develops because of increased fibrotic tissue and, as a result of this, liver stiffness increases (Muir, 2015). Several liver fibrosis scoring systems have been derived, the two most commonly used being MELD (F0-F4) and Ishak (F0-F6). Although these are derived from histological features on liver biopsies, the following terminology is widely used in non-invasive assessment techniques:

- F0 = no fibrosis
- F1 = mild fibrosis
- F2 = regenerative fibrosis
- F3 = severe fibrosis
- F4 = cirrhosis

Non-invasive assessment of liver fibrosis can be based on blood tests or imaging techniques (Sargent, 2009). Hyaluronic acid (HA) is one such blood test used in specialist services but is non-specific for the liver and can be raised in cases of arthritis (Adams, 2011).

Transient elastography (TE), measured by a FibroScan® device, is a non-invasive imaging test of fibrosis which is currently used in specialist centres as a screening and diagnostic tool for liver disease. It measures liver stiffness in kilopascals (kPa), using the propagation of an elastic shear wave through liver tissue from an ultrasonic transducer probe. This is a quick, painless, non-invasive assessment for cirrhosis using liver stiffness measurements (LSM) which gives an
Appendix 17.02: JoCN Manuscript

MATTHEWS et al.

146

in spirit. TE has been validated as a reliable marker for fibrosis and cirrhosis in a heavy alcohol using group (Nguyen-Khoa et al., 2009; Thie et al., 2015). The FibroScan® device is available in portable form which, if used in a community setting, could reduce the need for attendance at specialist centres. The portable FibroScan® has been demonstrated to elicit equivalent readings when compared to a static FibroScan® (Pirrás-Ruiz et al., 2014). Nsuris trained in the use of FibroScan® have been shown, through research, to elicit comparable readings to their medical colleagues (McCrory et al., 2015). This evidence suggests that FibroScan® could be used by nurses in the community.

A subject which continues to foster debate in the literature is the agreement on the lower cut-off measurement for FibroScan® readings which corresponds to any degree of hepatic fibrosis (F1-F4). This lower cut-off measurement determines whether someone is discharged or requires further clinical investigation. Recent studies have used 8.0 kPa as the lower measurement (Harman et al., 2015; Rosini et al., 2015); however, the threshold can vary depending on the cause of fibrosis. A small study comparing FibroScan® with liver biopsy in AILD suggested a lower cut-off for severe fibrosis (F3) of 12.9 kPa (Nanino et al., 2006). When offering this intervention in a community alcohol support setting, as the sole initial screening test, without the backup of additional tests for those on or below the low cut-off, it was considered best to abide by the lower cut-off of for any degree of liver fibrosis (F1-F4), of 7.1 kPa as suggested by Can- tera, Forner, and Albert (2008) to increase the likelihood that fibrosis is detected whatever the cause whether it be alcohol, obesity, viral hepatitis or other, less common, causes. Setting a lower cut-off should also reduce the risk of non-detection in borderline cases. Setting this cut-off also allows for the opportunity to add to the literature for detection of fibrosis with readings ≥7.1 kPa and <8.0 kPa.

1.2 | Research context

The World Health Organisation (WHO) (2011) pledged to address health inequalities through developing policies to promote effective partnerships with health and other sectors in achieving health through policies and actions on social determinants of health, specifically targeting vulnerable and high-risk groups. In Scotland, the Public Bodies (Joint Working) Scotland Act (Scottish Government, 2014) introduced a statutory duty for NHS Boards and Councils to integrate planning and delivery of health and social care services, strengthening the Scottish Government’s commitment to community-based anticipatory care (Audit Scotland, 2015). This care is to be provided jointly between the NHS, statutory and non-statutory social care providers with the aim of reducing the number of patients with long-term conditions being admitted to acute services (Audit Scotland, 2015).

Nurse-led clinics aim to provide, facilitate and expand access to quality care to an often vulnerable population who may not otherwise access care in mainstream services (Kleinpell et al., 2014). Feedback from users of such services is generally very positive, with patients valuing the improved access to care and their increased opportunity to become partners in managing their condition through the person-centred approach. They value the time afforded to them during their consultation with the nurse, where an open, non-judgmental dialogue prioritises the patient’s story, a characteristic of advanced practice (Kucerka, Higgins, & McMillan, 2010).

As over 90% of cases of hepatitis C have been acquired through injecting drug use (Scottish Government, 2015), nurse-led services were set up in both community and acute settings in Scotland to increase the screening for and treatment of hepatitis C, as supported by the Sexual Health and BBV Framework (Scottish Government, 2015).

Those infected with hepatitis C have a defined diagnosis elicited through a specific screening blood test, followed up by a confirmatory blood test which amplifies the hepatitis C virus through polymerase chain reaction (Sargent, 2009). As screening tests for CLO with blood tests can be unreliable (Muir, 2015) and would not be wholly relied upon in its diagnosis, those with AILD do not benefit from the same quality of screening. They may, however, benefit from nurse-led services where screening for liver disease is offered. At time of review and to date, there is no full test published literature on screening for liver disease with a FibroScan® device in a population of high alcohol consumption utilizing community alcohol support services.

Foucher et al. (2009), Marshall et al. (2015) and Thurber et al. (2015) conducted prospective cohort studies which targeted People Who Inject Drugs (PWID), with Hepatitis C, to examine the feasibility, acceptability, and uptake of screening for liver disease with a FibroScan® device in community settings, including drug support centres in France (Foucher et al., 2009), 235 (Marshall et al., 2015) and 625 (Thurber et al., 2015). Foucher et al. (2009) demonstrated an increased uptake in engagement of hepatitis C treatment services for the duration of the study and concluded that uptake of screening and engagement with treatment for hepatitis C was a direct result of having a FibroScan®. However, it is unclear how participants were recruited either the that they were offered a FibroScan®. If they relied upon the clinicians directly delivering the services or those running the study to recruit participants, it is possible that the motivation of the participants could be influenced by the motivation of the recruiting clinicians to engage this group over the study period and this may, substantially, have influenced the outcome; this needs further clarification. Marshall et al. (2015) offered participants a voucher to the value of £20 for their participation which may have influenced their choice in taking part and positively their attitude towards the acceptability of the FibroScan®.

Thurber et al. (2015) also sought to compare disease prevalence between tertiary clinics, community clinics, clinics for PWID, and regional clinics. Results showed that FibroScan® was feasible as a screening tool within a community setting and that a higher level of more advanced liver disease was found in what were described as “regional clinics”; a term not clarified further. Hepatitis C was a known factor with this group; however, while alcohol use was
Appendix 17.03: JoCN Manuscript

**1.3 Aims and objectives**

The main aim of this pilot study was to determine the acceptability of a service providing screening for CLD, with a portable FibroScan® device, to a group concerned about the health of their liver due to elevated levels of alcohol consumption.

1. Recorded the uptake of a FibroScan® in individuals accessing one community alcohol support service.
2. Determined the prevalence of undiagnosed CLD in a self-selected, convenience sample of individuals accessing one community alcohol support service.
3. Recorded attendance at 6 months following referral to Royal Infirmary of Edinburgh (RIE) specialist liver services, of those participants referred with a FibroScan® reading ≥ 7.1 kPa.

**1.4 Ethics**

Ethical approval was gained from the South East Scotland Research and Ethics Committee (Reference 14/55/021). NHS Lothian research and development department and Edinburgh Napier University ethics committee.

**2 METHODS**

**2.1 Design**

This was a prospective quantitative observational study. The study was active over the 12-month period from November 2014 until the end of October 2015 with screening with FibroScan® offered during the first six months until April 2015, thereafter engagement with services of those requiring onward referral was monitored.

**2.2 Sample**

The sample was a convenience sample in one community alcohol support setting in Edinburgh. This recovery centre has a catchment area which includes an area of deprivation in Edinburgh (Scottish...
Appendix 17.04: JoCN Manuscript

Government, 2017b); therefore, those at most risk through their liver disease could be targeted (Wilkins et al., 2014).

As this study evaluated the acceptability of the cirrhosis screening intervention in this setting, no specific sample size was determined in advance. The sample size was limited to the number of individuals dropping into the research clinics in a 24-week period after reading the participant information pack (PIP).

Inclusion criteria included individuals over age 14, with the ability to provide informed consent who were attending either the triage facility for assessment of their support needs, or who were currently undergoing alcohol support in the centre. Exclusion criteria included the possibility of or known pregnancy, known to have a pacemaker, scoliosis, any open wound close to right 8th-10th intercostal margins, known cirrhosis and no alcohol history (EASL-ALEH, 2015).

During the recruitment period, 118 PIPs were requested. Of these, 79 service users presented themselves for the study and subsequently provided consent, representing an uptake of 67% of those who requested information.

2.3 | Recruitment

The study was advertised on a rolling TV screen in the reception area, posters in reception and all consultation rooms. Potential participants could then volunteer. The advertising literature was designed to demonstrate that participants were not required to endorse, merely that the upper left quadrant of the abdomen was exposed for access of the FibroScan® probe. In case this assumption was a barrier to participation.

PIPs were numbered and available in the reception area of the service and any staff member could distribute them. To assess uptake, the number of packs issued was recorded to allow response rate to be calculated. The format of writing in these packs was informed by guidelines from NHS Scotland (2014) information aimed at the general public, that is, the line was pitched at a reading age of 7 years and for ease of accessibility, initial font size 13 was used. Staff checked that individuals taking a PIP were given the opportunity to have the information read to them on the premises. If an individual wished to take part in the study, they could return to a research clinic on the same premises at their convenience on a Tuesday or Thursday between 11 and 2 pm. This enabled potential participants to attend on an empty stomach to enhance the quality of the scan (Leemline et al., 2014); a full stomach did not exclude participation in the study, as is current practice in other specialist liver services.

Following discussion of the purpose of the study and an opportunity to ask questions, written consent was taken. Part of this consent requested to share information with the participants’ GP and other health professionals, as appropriate.

2.4 | Data collection

A focused medical and lifestyle history (Saddick, Laing, Macarten, Nicol, & Colletje, 2013) was taken by the hepatology nurse practitioner and principal investigator (KKM) using a data collection tool specifically designed for this study (Appendix U). Development of this tool was adapted from by the four domains of the tool developed by Caneiro et al. (2014), that is, identification, Clinical Data, Physical Exam and Interview, in line with Gordon’s Functional Health Pattern taxonomy (Gordon, 1994). This data collected were weight, height, alcohol, medical, smoking and family history, current medication and possible viral hepatitis risk. Each participant had a FibroScan® screen on day of consent. For the FibroScan®, participants were asked to lie on a couch with their upper left quadrant exposed. The FibroScan® probe was placed between the 8th and 10th intercostal margin in line with operator guidelines (EASL-ALEH, 2015) and, to improve access to the liver through opening the intercostal space, their right arm placed behind their head, if possible. Prior to the scan, the participant was informed they would be given an immediate result at time of screening and their choices for follow-up would be discussed after result.

A lower cut-off measurement of 7.5 kPa for referral to services was used in the study and aims to reduce the risk of non-detection in borderline cases, as discussed earlier. In the event of being unable to elicit a FibroScan® reading the participants GP was informed and asked to refer to the participant's GP to the liver unit at the RIE for further assessment, should they have any concerns regarding their liver health.

The portable FibroScan® device could not support an XL probe, resulting in an increased likelihood that readings from participants with a BMI >30 kg/m² were unreliable with the medium probe (De Ledinghen et al., 2012). Therefore, the participant’s BMI was calculated from reading of weight and height. BMI result could enable a discussion regarding the liver health implications of a raised BMI and discussion from a health promotion aspect.

2.5 | Data analysis

These data were coded using a codebook developed for this study using descriptive statistics within the “Statistical Package for Social Sciences” (SPSS) version 21. Demographic data were reported on the initial 79 participants while subsequent data analysis of FibroScan® results and engagement of those requiring onward referral was undertaken on the 76 participants in whom reliable readings were obtained.

2.6 | Follow-up based on FibroScan® result

For those participants who showed no signs of fibrosis or cirrhosis from their scan (<7.0 kPa), lifestyle advice was measured through literature on the effects of alcohol on the liver offered at the research appointment (Dritikowara, 2013).

Any participants with a FibroScan® reading ≥7.1 kPa were offered an appointment to attend a NHS nurse-led liver clinic within the same community service, on another day. The appointment date and time were given on the day of the FibroScan®. A reminder telephone call for the clinic appointment was also offered, in line with
recommendations for improving engagement in harder to reach and engage groups (Wu, 2013). In the event of a participant having a reading ≤ 7.0 kPa but showing possible signs or symptoms of CILD, such as current abdominal swelling, an appointment for follow-up was also offered (Muir, 2015). No participants, with a FibroScan® ≤ 7.0 kPa, presented with current symptoms of concern.

At the appointment in the NHS nurse-led liver clinic, blood was taken for a full liver profile, including platelets, HA and the liver enzyme alanine aminotransferase (ALT), aspartate aminotransferase (AST). To determine the degree of CILD, those with a FibroScan® result ≥ 8.0 kPa were referred for an ultrasound and clinical evaluation by a consultant hepatologist or senior registrar within the hepatology team. The blood results of participants with a FibroScan® result ≥ 7.5 kPa and < 8.0 kPa were discussed with a consultant Hepatologist, in order to decide whether further investigations and medical assessments were required. Liver biopsy was not required to determine the degree of CILD, and no biopsies were taken in the study period. Regardless of the FibroScan® result and if consent was provided, the CF of each participant was informed of the participant’s recruitment to study, result and follow-up if required.

All onward referral to specialist liver services and adherence to surveillance were monitored through checking participants’ appointment details on Triak (online tracking system used by NHS Lothian for tracking patient appointments and recording attendance) for the duration of the study.

### TABLE 1

<table>
<thead>
<tr>
<th>Participant information</th>
<th>Female (n = 29)</th>
<th>Male (n = 50)</th>
<th>Total cohort (n = 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age in years</td>
<td>46 (SD = 11 years)</td>
<td>46 (SD = 9 years)</td>
<td>46 (SD = 10 years)</td>
</tr>
<tr>
<td>Currently receiving alcohol support at the community service</td>
<td>24 (83%)</td>
<td>45 (90%)</td>
<td>69 (87%)</td>
</tr>
<tr>
<td>Attending binge facility—first step in accessing support</td>
<td>5 (17%)</td>
<td>5 (10%)</td>
<td>10 (13%)</td>
</tr>
<tr>
<td>Previous detox from alcohol</td>
<td>20 (69%)</td>
<td>35 (70%)</td>
<td>55 (70%)</td>
</tr>
<tr>
<td>Pattern of drinking</td>
<td></td>
<td>Daily 22 (76%)</td>
<td>Daily 37 (74%)</td>
</tr>
<tr>
<td>Intermittent</td>
<td>3 (11%)</td>
<td>2 (4%)</td>
<td>5 (6%)</td>
</tr>
<tr>
<td>Levels of drinking in units per week (recommemorated limits) for female and male units for male &amp; female at time of study</td>
<td>1-40</td>
<td>10</td>
<td>1-100</td>
</tr>
<tr>
<td>101-200</td>
<td>11</td>
<td>201-300</td>
<td>21</td>
</tr>
<tr>
<td>201-300</td>
<td>5</td>
<td>301-400</td>
<td>5</td>
</tr>
<tr>
<td>301-400</td>
<td>1</td>
<td>401-500</td>
<td>1</td>
</tr>
<tr>
<td>401-500</td>
<td>0</td>
<td>501-600</td>
<td>0</td>
</tr>
<tr>
<td>Median IQQ: percentile 25, percentile 75 length of drinking in years</td>
<td>10 (7), 20</td>
<td>15 (5), 30</td>
<td>12 (6), 20</td>
</tr>
<tr>
<td>Possible symptoms of CILD</td>
<td>6 (21%)</td>
<td>7 (14%)</td>
<td>13 (16%)</td>
</tr>
<tr>
<td>Reported risks of BPH</td>
<td>32 (41%)</td>
<td>35 (70%)</td>
<td>57 (72%)</td>
</tr>
<tr>
<td>Mean BMI of cohort (n kg/m²)</td>
<td>26.8 (SD = 5.6)</td>
<td>26.6 (SD = 5.2)</td>
<td>26.5 (SD = 5.0)</td>
</tr>
<tr>
<td>Prevalence of cohort obesity (BMI ≥ 30 kg/m²)</td>
<td>8 (28%)</td>
<td>9 (18%)</td>
<td>17 (22%)</td>
</tr>
</tbody>
</table>

### 3 RESULTS

#### 3.1 Uptake of FibroScan®

A total of 79 consented participants took part in the study. A valid FibroScan® reading could not be obtained in three participants; all of whom had a BMI ≥ 30 kg/m². All results presented relate to the 76 participants with a valid FibroScan® reading. Table 1 provides demographic and key information elicited from the data collection tool created for this study.

#### 3.2 Prevalence of undiagnosed cirrhosis

Of the 76 participants, 56 (74%) elicited a FibroScan® reading of ≤ 7.0 kPa, indicating no significant fibrosis and requiring no onward referral for further investigations.

Of those requiring blood tests, 19 of 20 (95%) attended the nurse-led clinic for a full liver blood profile, with one participant failing to attend either of the two initial appointments at the nurse-led clinic but attending their GP for baseline liver bloods and thereafter the nurse-led service for further assessment bloods. Following analysis of the blood results taken at the nurse-led liver outreach clinic, none of the eight participants with a reading ≥ 7.1 kPa and < 8.0 kPa required onward referral for medical assessment. Of the remaining 12 participants, seven (9%) had a reading ≥ 8.0 kPa.
Appendix 17.06: JoCN Manuscript

### Table 2: Diagnostic outcomes following FibroScan® full liver blood profile and specialist liver service appointment

<table>
<thead>
<tr>
<th>Diagnostic outcomes</th>
<th>Cirrhosis</th>
<th>Fibrosis</th>
<th>Discharged following medical assessment</th>
<th>Nurse only assessment no further referral</th>
<th>No diagnosis</th>
<th>No onward referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>FibroScan ≥ 7.1 kPa &lt; 8 kPa (n = 4)</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>8</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>FibroScan ≥ 8 kPa &lt; 13.5 kPa (n = 7)</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>FibroScan ≥ 13.5 kPa (n = 5)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

≥8.0 kPa and <12.5 kPa indicating possible significant fibrosis and five (7%) had readings ≥ 12.5 kPa indicating possible cirrhosis.

On completion of the study, the diagnostic outcomes (Table 2) were monitored for the 20 participants requiring referral to the nurse-led clinic and subsequent onward referral to specialist liver services. Within this group, six (6%) were diagnosed with definitive cirrhosis. One participant was discharged back to their GP following a period of alcohol reduction over a 6-month follow-up period. One participant did not engage with their medical assessment and therefore never received a definitive diagnosis. The remaining four (5%) were diagnosed with fibrosis and remain in follow-up with specialist services.

### Table 3: Engagement of participants in FibroScan® requiring onward referral to specialist services

<table>
<thead>
<tr>
<th>Engagement of FibroScan® requiring onward referral</th>
<th>Expected number</th>
<th>Number attended</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended nurse appointment at the venue</td>
<td>20</td>
<td>19</td>
<td>95%</td>
</tr>
<tr>
<td>Attended first medical appointment at the venue</td>
<td>12</td>
<td>11</td>
<td>92%</td>
</tr>
<tr>
<td>Attended six-month follow-up</td>
<td>10</td>
<td>9</td>
<td>90%</td>
</tr>
<tr>
<td>Attended USS/CT/MRI</td>
<td>12</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.3 Engagement of participants requiring onward referral

Of the 20 participants referred to the nurse-led service clinic within the alcohol service, 19 attended. Of the 12 patients expected to attend the RIE for medical assessment, 11 did so, and of 10 patients expected to attend for six-monthly follow-up, nine did so. All 12 patients referred for abdominal ultrasound attended. This is illustrated in Table 3.

### Discussion

Uptake of routine health screening is low in areas of deprivation (Watt, 2013), suggesting low self-efficacy, that is, the confidence in one’s ability to exert control over their behaviour (Bandura, 1997). This could be attributed to low confidence, poor literacy and financial difficulties which make negotiation through the process of healthcare delivery and travel to appointments difficult (Watt, 2013). Therefore, an uptake of 67% in this screening study for those who received information suggests that this intervention is acceptable to prospective participants in this setting. In addition, this appears to demonstrate a level of self-efficacy in this cohort, as suggested by their current engagement with alcohol support services. According to the Health Belief Model (HBM) perceived susceptibility to disease influences health behaviour (Sharma, 2011) and may be another factor in the level of uptake in this cohort who, by their engagement with alcohol support are likely to be aware of the effects of alcohol on the health of the liver, through access to health promotion materials and consultations with support staff at community alcohol support service. The Theory of Planned Behaviour suggests that intention and self-efficacy are the best predictors of behaviour change in addition to other external control factors, that is, barriers or facilitators to change (Marik, Murray, Evans, & Estacio, 2015). This is a self-selected group who, through their attendance with the alcohol service, demonstrated a level of self-efficacy and motivation to change their behaviour in a setting where specialised support is available and, in this respect, this screening intervention appears to be in the right place at the right time.

As participants were recruited through a “drop in” system, it is beyond the scope of this study to determine the number of potential participants who did not request research information, and their reasons for this, and is acknowledged as a limitation. The study results on acceptability are consistent with other studies demonstrating the acceptability of offering FibroScan® as a screening tool in community drug services (Fouchier et al., 2009; Marshall et al., 2015; Thunshoer et al., 2015) and would appear to show it could be an effective way of encouraging initial engagement with liver services.

At a time when mortality from CLD, including cirrhosis, has increased by 50% since 1970 in the under 65 age group (Williams et al., 2014), the mean age of 46 years in this cohort of participants scores optimal for consideration of screening. With male mortality rates for CLD being almost twice as high as those reported for women (Office for National Statistics (ONS), 2017), the proportion of male to female attendees for 63% to 37% would appear to be representative of this population. Participant alcohol histories confirmed this to be a heavy drinking group, as targeted. Those with a FibroScan® reading ≥11.1 kPa and <12.5 kPa did not require onward referral once their blood profile was assessed by a consultant.
Appendix 17.07: JoCN Manuscript

WILEY-Clinical Nursing

heathcote et al. (2015) found that 10 of the 8.0 kPa (Hamman et al., 2015) and Ronal et al. (2010) and another to the literature regarding the lower cut-off for FibroScan® in general screening.

Obesity is one of the most common causes of CLD through fatty infiltration of liver cells (Malik, 2015). Levels of obesity are higher for those living in deprived areas (ScottPHO, 2017a,b), often due to poor diet and lack of exercise. Within this cohort, the prevalence of obesity was 21.1%, while the current prevalence of obesity is 29% in the general population of Scotland (ScottPHO, 2017a,b). The portable FibroScan® device used in this study (FibroScan® 402) should support an Xl probe. While only three scans were unreliable, according to criteria in Ref. (Schwida et al., 2015), each of these participants had a BMI higher than 30 kg/m². It would seem advisable, given the level of obesity, that an Xl probe is available in future.

Considering the uptake of screening by FibroScan®, Health Behaviour Theory, suggesting self-efficacy and high motivation in this cohort, supports the encouraging engagement in specialist services for those requiring onward follow-up. In addition, this is in line with the findings from Foucher et al. (2009) who concluded that uptake of hepatocellular carcinoma in a group who previously had not engaged was a direct result of having a FibroScan®. Shenon, Moore, O'Brien, Harris, and Rodgerick (2012) used a serum panel test to screen for liver disease conducted across nine GP surgeries in n = 4408. They found that feedback about liver health may be a useful prompt for behaviour change, with the biggest reductions in drinking being seen in the group with heaviest drinking behaviour up to one year following the intervention. They conclude that combining a screening intervention for liver disease with ongoing support in alcohol recovery could have a positive impact on behaviour change. As Shenon et al. (2013) recruited participants through their GP surgery with an invite letter and a subsequent postal questionnaire, their cohort is not directly comparable to that in this study. Nonetheless, in the light of their findings, the early engagement with assessment and follow-up in specialist services in this study was extremely encouraging as a possible predictor of health behaviour change. However, it is important to continue research beyond this study to determine what, if any, impact this type of intervention has on the longer-term drinking behaviour of this or a similar cohort.

In preparing for implementation of the study, it was important to consider possible facilitators and barriers (Dagoumy & Estabrooks, 2013). The research venue consisted of multiple agencies, playing an important role as the study hosts. As the only room suitable for carrying out a FibroScan® was the largest in the building and the one used for the various therapies on offer in the service, KM was concerned that this had the potential for conflict as the study progressed with possible competing demands for the use of the room. While there will be no randomised control trial following on from this study, guidance in its development was sought using the MRC (2008) guidelines in developing and evaluating a complex intervention. Practical effectiveness, whether the intervention will work in everyday practice, is a key question to consider; therefore, designing the study to be as low maintenance as possible for staff at the venue was considered to be important to developing a sustainable service which would continue beyond the research phase and could be integrated into routine services offered there. Through KM's attendance at staff meetings and informal discussion, in advance of the study, the venue staff were aware of its purpose and able to describe the intervention to service users. Feedback from staff was positive throughout the study, illustrating that staff thought it was a good idea. Their continued willingness to provide the room for screening, moving the time of some of their own activities to accommodate this booking combined with their continued enthusiasm in promoting the intervention through discussion with service users and displaying the study posters demonstrated cognitive participation, collective action and reflexive monitoring, key elements identified in normalisation process theory (NPT) where normalisation is the willingness to integrate a new intervention into everyday practice (May, 2015). The support by venue staff in continuing the intervention beyond the study phase has prompted discussion with the stakeholders involved in the study to consider the possibility of continuing the provision of screening as a service, particularly in view of the unexpectedly high levels of engagement with services for those requiring onward referral in this study. This is currently being piloted as a service delivered by a team of specialist community nurses and is currently being evaluated.

While devising and developing this study required the advanced practice skills of negotiation and leadership (NMC, 2015), in their competency framework for working in liver disease, the RCN (2015) suggest that all nurses, regardless of clinical background, have skills and talents to integrate liver health into routine clinical practice. Public Health England's (PHE) "Make Every Contact Count" (MECC) agenda (PHE, 2016) suggests that nurses are integral in making an impact on liver disease through discussion of possible risks and lifestyle choices to improve liver health. In addition to alcohol intake, healthy eating, keeping to a healthy weight, and being physically active are deemed to be three of the lifestyle issues which can make the greatest improvement to an individual’s health and, as such, are factors which should be included in every patient contact, according to Public Health England (PHE) (2016). This is also in line with the Scottish Government's "2020 vision" where a strong focus on prevention, anticipation and supported self-management is recommended in order to improve the health of the nation (Scottish Government, 2017a,b) and the NHS Scotland Healthcare Quality Strategy (NHS Scotland, 2010) which emphasises the use of the most appropriate interventions and supports in providing quality healthcare. This suggests, therefore, that in the context of an alcohol support centre and with appropriate training, nurses are well placed to deliver not only liver screening but more general lifestyle discussion to a group at high risk of liver and other chronic disease through their alcohol intake and obesity levels.

In complex interventions (Medical Research Council (MRC), 2008), the success, or otherwise, is dependent on many factors and it is important to consider optimisation of the intervention, in order to progress it to an embedded service or further research (Leventhal et al., 2016; Medical Research Council (MRC), 2008). Sennert
Appendix 17.08: JoCN Manuscript

6 | RELEVANCE TO CLINICAL PRACTICE

This study demonstrates that nurse-led screening with a portable FibroScan® device in a community alcohol service assists heavy drinkers to engage in specialist liver services. This suggests it is an acceptable service development for participants, enabling early diagnosis of liver disease. As such, it is an intervention with the potential to be integrated into the practice of nurses working with this population if they receive the appropriate education, preparation and induction in its application, moving towards improving liver health of people in a high-risk group with substantially reduced health cost for liver disease to the NHS.

ACKNOWLEDGEMENTS

The authors would like to thank Prof P Hayes, Dr A Bonthrone and Dr K Simpson, Edinburgh Royal Infirmary, for providing clinical advice and support during the study; Dr Roger Smyth, Edinburgh Royal Infirmary, for his role as impartial contact throughout the study period; Prof I Davidson (deceased), Queen Margaret University, for her academic support with the study; Robert Rush, statistician Queen Margaret University, for support with data analysis for the study; Turning Point Scotland for their support during the study; NHS Lothian Substance Misuse Service for their support during the study; SBV community team, Western General Hospital, Edinburgh, for their support in taking the findings of the study forward to service development and evaluation; and Ms M-Anh Chan and Ms Sharon Cronie, Edinburgh Royal Infirmary for their clerical support.

CONFLICT OF INTEREST

There are no competing interests on the part of the authors.

ORCID

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Medical Research Council (MRC). (2008). Developing and evaluating com-


Appendix 17.10: JoCN Manuscript
## Cirrhosis Screening Proforma

**Clinic Date**

<table>
<thead>
<tr>
<th>Name:</th>
<th>DOB/CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td>Contact Tel:</td>
</tr>
<tr>
<td>GP:</td>
<td>Other agency:</td>
</tr>
<tr>
<td>Time last ate food</td>
<td>Fasted for 3 hours or more Yes/No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>BMI =</th>
</tr>
</thead>
</table>

### Alcohol History

<table>
<thead>
<tr>
<th>Units per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern of drinking</td>
</tr>
<tr>
<td>Previous attempts at detox</td>
</tr>
<tr>
<td>Length of drinking (when started)</td>
</tr>
</tbody>
</table>

### Medical History

<table>
<thead>
<tr>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms of CLD</td>
</tr>
<tr>
<td>History of obesity</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

---

155
<table>
<thead>
<tr>
<th>Name:</th>
<th>DOB/CHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family History</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>History of alcohol misuse</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Medication History</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Past</td>
<td></td>
</tr>
<tr>
<td>Non prescribed/herbal/street</td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>(If yes please state quantity per week)</td>
</tr>
<tr>
<td>Possible Viral Hepatitis Risks</td>
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</tr>
<tr>
<td>IVDU</td>
<td></td>
</tr>
<tr>
<td>Tattoos</td>
<td></td>
</tr>
<tr>
<td>Blood products/Non sterile invasive procedures</td>
<td></td>
</tr>
<tr>
<td>Occupational</td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td></td>
</tr>
<tr>
<td>Sexual</td>
<td></td>
</tr>
<tr>
<td>Result of Fibroscan</td>
<td>Refer to nurse</td>
</tr>
<tr>
<td>YES / NO</td>
<td></td>
</tr>
<tr>
<td>Appointment date and time (if applicable)</td>
<td>Would like an appointment reminder call</td>
</tr>
<tr>
<td>YES / NO</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 18: Participant Pathway for Evaluative Project

Proposed service for Cirrhosis screening at the North East Recovery Hub for those accessing alcohol support services

Fibroscan® offered by BBV nurse specialist using data collection tool from study at the Hub with support and training from liver nurse
- BBV tests and vaccination offered on site to those identified with risk
- Those with scan >7kpa referred to liver unit outreach clinic
- Health promotion information discussed and issued as per study.

Patients referred to nurse led liver outreach clinic (hub) will have full blood profile as per study. Those with scan > 8kpa will be booked for USS also and given medical appointment at the RIE.
- Those < 8kpa will have full bloods and decision on onward referral discussed with Consultant.

Patients attend RIE for medical follow up.
- Engagement monitored as per study

Karen Matthews July 2016
### Cirrhosis Screening Proforma

<table>
<thead>
<tr>
<th>Clinic Date</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td>DOB/CHI</td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td>Contact Tel:</td>
</tr>
<tr>
<td><strong>GP:</strong></td>
<td>Other agency:</td>
</tr>
<tr>
<td><strong>Time last ate food:</strong></td>
<td>Fasted for 3 hours or more Yes/No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height =</th>
<th>Weight =</th>
<th>BMI =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol History</td>
<td>Units per week</td>
<td></td>
</tr>
<tr>
<td>Pattern of drinking (daily, binge, intermittent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous attempts at detox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length (years) of drinking to harmful levels and age when started</td>
<td>Length</td>
<td>Age</td>
</tr>
<tr>
<td>When last drank alcohol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Medical History**
- Diabetes

**Symptoms of CLD**

**History of obesity**

**Other**

Data collection sheet (Version 1) – 2nd June 2014

Page 1
Appendix 20: Competency Sheet in Screening for CLD

Training Schedule for Cirrhosis Screening

(Initial draft)

<table>
<thead>
<tr>
<th>Training</th>
<th>Mode of assessment</th>
<th>Date achieved/attended</th>
<th>Signature of liver specialist staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrying out Fibroscan clinic at RIE (x5)</td>
<td>Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case scenarios</td>
<td>Discussion with liver CNP</td>
<td></td>
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</tr>
<tr>
<td>Shadowing cirrhosis screening clinic (at least 5)</td>
<td>Observation</td>
<td></td>
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<tr>
<td>Shadowing liver outreach clinic (x2)</td>
<td>No assessment</td>
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<tr>
<td>Observing medical liver clinic (x1)</td>
<td>No assessment</td>
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</tr>
<tr>
<td>Shadowing nurse led cirrhosis surveillance clinic (x1)</td>
<td>No assessment</td>
<td></td>
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</table>

Karen Matthews 2016