A systematic review of the effectiveness & cost-effectiveness of interventions aimed at raising awareness and engaging with groups who are at an increased risk of hepatitis B and C infection

Final report

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Executive summary

Background

Hepatitis B and C virus infections represent a major public health problem. In England, and elsewhere in the UK, injecting drug use is the major risk factor for acquiring hepatitis C infection. Injecting drug use is also a risk factor for hepatitis B infection, but over the last decade there has been a decline in its prevalence among injecting drug users (IDUs) as an increase in the provision of hepatitis B vaccination in prisons has provided an important route for accessing IDUs. Mortality and morbidity from chronic hepatitis B and C is rising disproportionately among people from ethnic minorities living in England, demonstrating a growing disease burden from chronic viral hepatitis in immigrant communities.

Objectives

The purpose of the effectiveness review was to examine the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing with groups who are at an increased risk of hepatitis B and C infection and practitioners on:

- testing uptake;
- knowledge, attitudes and intentions towards case finding and testing;
- uptake of, or adherence to, follow-up services and/or treatment; and
- changes in the number and/or types of venues where testing is offered.

The PICO mnemonic was used to formulate a series of review questions focusing on:

Population	Groups identified to be at a high risk of hepatitis B and C infection, their close contacts, and practitioners
Intervention	Any intervention or activity that aims to raise awareness of, or engagement in, case finding and testing
Comparison	No intervention or another type of intervention
Outcomes	Measures of testing uptake; knowledge, attitudes and intentions towards case finding and testing; uptake of, or adherence to, follow-up services and/or treatment; and changes in the number and/or types of venues where testing is offered Costs (regardless of how estimated) and outcomes (regardless of how specified)

Methods

The methods of the effectiveness and cost-effectiveness review followed NICE protocols for the development of NICE Public Health Guidance. Seventeen databases were searched for effectiveness and cost-effectiveness studies published since 1990. All data extraction and quality assessment was undertaken by one reviewer and checked for accuracy by a second reviewer. Each study was also graded (++, + or -) based on the extent to which the design and execution of the study minimised the potential sources of bias. Results of the data extraction and quality assessment for each study were presented in structured tables and as a narrative summary.

Findings

Fifty studies were identified for inclusion in the review of effectiveness and cost-effectiveness, of which, 41 studies examined the effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis B and C infection. Nine studies examined interventions targeting the uptake of hepatitis B testing. All nine studies were conducted in North America (USA or Canada) and targeted uptake of testing among migrant populations. Twenty-five studies examined interventions targeting the uptake of hepatitis C testing and six studies examined interventions targeting the uptake of hepatitis B and C testing. Across these 31 studies, 14 were conducted in North America, eight in the UK, six in France, two in The Netherlands and one each in Australia and Ireland, Nine publications of five economic evaluation studies examined the cost-effectiveness of screening and case finding in different settings. One study examined the cost-effectiveness of screening and early treatment of migrants in The Netherland for chronic hepatitis B and seven publications reported on four studies that examined the cost-effectiveness of screening and/or case finding targeting current and/or former IDUs in the UK for hepatitis C infection.

The quality of the studies included in the effectiveness review was mixed. The majority of studies identified were based on observational study designs, and 25 studies did not include a control or comparison group. Although these studies were informative, their results should be treated with caution, as without a control or comparison group it is not possible to know what would have happened in the absence of the intervention. Nine randomised controlled trials (RCTs) and three non-randomised controlled trials (NRCTs) were identified for inclusion and on the whole the quality of these studies was good. The quality of the economic evaluation studies included in the review was high. All five studies were well-reported, posed a clearly defined question and achieved a high reporting standard for the analysis and interpretation of results. The main limitation that hampered all of the included economic evaluation studies was a lack of robust evidence to inform the assumptions made about the effectiveness of screening and treatment approaches.

Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection

Raising awareness or encouraging use of testing services

Six studies examined the effectiveness of interventions that were designed to raise awareness or encourage use of hepatitis B testing services. All six studies targeted North American migrant populations. As migrants are not a homogenous group of people and a range of individual experiences and socio-cultural beliefs will influence their knowledge and beliefs relating to hepatitis B, the findings of the studies included in this review may not be applicable to the UK.

A hepatitis B English as a Second Language educational curriculum and a lay health worker intervention for Asian migrants were both found to result in an overall low level of testing uptake among participants. Although evaluations of both programmes demonstrated improvements in knowledge, this did not translate into a convincing impact on testing uptake. Barriers to testing identified in the review of qualitative research included an absence of clear symptoms of infection, and time constraints, and language and cultural barriers, and it may be that neither intervention adequately addressed these types of barriers. Participation in a culturally targeted intervention providing education and free testing was associated with a relatively high uptake of follow-up care among patients identified with chronic hepatitis B. The majority of participants were also motivated to encourage family and friends to get tested.

Evidence statement 1: Raising awareness or encouraging use of hepatitis B testing services

(i) There is moderate evidence from three RCTs (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT ++]; Taylor et al., 2011 [RCT +]) and one uncontrolled study (Hsu et al., 2007; 2010 [UBA –]) to suggest that providing information and education on hepatitis B to migrant populations may improve their knowledge about risk, screening and prevention.

(ii) There is moderate evidence from three RCTs (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT ++]; Taylor et al., 2011 [RCT +]) to suggest that providing information and education on hepatitis B to migrant populations does not improve testing uptake.

(iii) There is weak evidence from one case series (Chao et al., 2009 [CS –]) to suggest that testing supplemented with culturally appropriate education may encourage the uptake of follow-up care among migrant populations.

Applicability

This evidence may not be applicable to the UK as all studies targeted migrant populations in North America. In addition, factors particular to the healthcare system in North America may further limit applicability as medical providers may be reluctant to diagnose hepatitis B when affordability of care is considered an issue.

Aimed at professionals

Two studies examined interventions aimed at improving professional practice in relation to hepatitis B testing among migrant populations. A strategy to promote cancer prevention activities among Vietnamese doctors had a limited effect on hepatitis B testing and although an annual symposium on the prevention of hepatitis B infection improved knowledge among complementary and alternative medicine practitioners, the wider impact of this change in knowledge on their practices was not clear. The review of qualitative research identified that financial constraints in the US healthcare system posed significant problems not only for uptake of testing but for subsequent care as well, as medical providers were reluctant to diagnose hepatitis B when affordability of care was an issue.

Evidence statement 2: Aimed at professionals undertaking hepatitis B testing

(i) There is moderate evidence from one RCT (Nguyen et al., 2000 [RCT +]) to suggest that a strategy to promote cancer prevention activities among doctors serving migrant populations does not improve their practices in relation to hepatitis B testing.

(ii) There is weak evidence from one UBA study (Chang et al., 2007 [UBA –]) to suggest that providing information and education on hepatitis B to complementary and alternative medicine practitioners (including those practising traditional Chinese medicine and acupuncture) may improve their knowledge about risk, screening and prevention. However, the wider impact of this change in knowledge on their practices regarding referral for testing is not clear.

Applicability

This evidence may not be applicable to the UK as all studies targeted migrant populations in North America. In addition, factors particular to the healthcare system in North America may further limit

applicability as medical providers may be reluctant to diagnose hepatitis B when affordability of care is considered an issue.

Partner notification

A partner notification service for sex and needle sharing partners of people with chronic hepatitis B was associated with a relatively low partner index compared to partner notification for other BBVs, and overall few case patients with hepatitis B infection accepted partner notification services.

Evidence statement 3: Partner notification

There is weak evidence from one case series (Gunn et al., 2006 [CS –]) to suggest that partner notification services based on a BBV model that target sex and needle sharing partners of people with chronic hepatitis B (excluding migrant populations) may achieve a low rate of case detection.

Applicability

This evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis B infection in the UK.

Cost-effectiveness of screening for hepatitis B among migrants

One economic evaluation, that examined community-based screening and treatment for hepatitis B among migrants, demonstrated this approach to be cost-effective. However, as the study was conducted in The Netherlands the assumptions made about the rates of participation in the screening programme and the proportion of patients who are successfully referred to specialist care may have limited generalisibility to other settings.

Evidence statement 11: Cost-effectiveness of screening for hepatitis B among migrants

There is moderate evidence from one CUA (Veldhuijzen et al., 2010 [CUA +]) to suggest that community-based screening and treatment for hepatitis B among migrant populations is cost-effective.

Applicability

This evidence may only be partially applicable to the UK as the study was undertaken from the perspective of the Dutch healthcare system. In addition, a lack of reliable assumptions about rates of participation in the screening programme and successful referral may further limit the applicability of the evidence.

Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis C infection

Offering acceptable or alternative methods of testing

Two UK studies found increases in testing uptake in drug services and prisons offering dry blood spot (DBS) testing alongside other means of testing such as venipuncture, compared to services offering venipuncture only. However, an RCT demonstrated that the size of the treatment effect may vary, and whilst reasons for variation in treatment effect were not immediately clear, appeared to be linked to the level of 'interest' among staff in providing hepatitis C services at individual sites. The

qualitative review identified that trust and rapport between clients and drug treatment staff, and support and encouragement, acted as motivators for testing.

Evidence statement 4: Offering acceptable or alternative methods of testing

(i) There is moderate evidence from one RCT (Hickman et al., 2008 [RCT +]) and one CBA study (Craine et al., 2009 [CBA –]) to suggest that offering DBS testing to IDUs attending substance misuse services may increase uptake of hepatitis C testing compared to venipuncture alone being offered. The increase in uptake may reflect an increase in testing availability, as more staff can be trained to deliver DBS testing than venipuncture, as well as higher acceptability to IDUs.

(ii) There is weak evidence from one CS study (Rainey et al., 2005 [CS –]) to suggest that providing high-risk groups with access to DBS testing kits via a telephone hotline is not an effective use of resources compared to testing via state laboratories.

Applicability

(i) This evidence is directly applicable to the UK as both studies were conducted in drug services and prisons in the UK.

(ii) This evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis C infection in the UK.

Enhancing case finding in primary care

Three studies examined interventions designed to enhance the uptake of testing in primary care. Although training and assistance with screening for GPs, through the provision of patient information in waiting rooms, was associated with an increase in patient requests for testing compared with training only, there was no impact on the overall number of patients tested for hepatitis C. Two UK studies found that targeted case finding in primary care for patients with a history of injecting drug use had a positive impact on the number of patients offered and accepting a test. However, as noted by the authors of these studies the process of offering a test and obtaining a sample may be time consuming and multiple appointments may be required to complete the process. In a UK study of GPs' experience of testing, included in the review of qualitative research, workload pressures and impersonal relations between GPs and patients with a history of injecting drug use were felt to lead to shortcomings in hepatitis C provision. The two UK studies suggested a mixed impact of case finding on the number of patients starting treatment following referral. The qualitative review highlighted that a number of barriers may prevent IDUs from engaging with treatment ranging from a fear of side effects, to adverse socioeconomic and family circumstances, and therefore, further support may need to be provided beyond the case finding intervention to address patient's failure to attend appointments with follow-up services.

Evidence statement 5: Enhancing case finding and testing uptake in primary care

(i) There is moderate evidence from one RCT (Roudot-Thoraval et al., 2000 [RCT +]) to suggest that although providing GPs with both training and assistance with screening (through the use of patient-targeted materials) may increase patient requests for testing is does not impact upon the number of patients tested for hepatitis C overall.

(ii) There is moderate evidence from two NRCTs (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) to suggest that targeted case finding in primary care for patients with a history of injecting drug use may have a positive impact on the number of patients who are offered and accept a hepatitis C test. Although the level of referral of patients identified with infection was relatively high, the number of subsequent dropouts prior to treatment indicates that there is a need for further support beyond the intervention offered in these studies.

Applicability

(i) This evidence may only be partially applicable to the UK as the study was conducted in a region of France subject to a national hepatitis C campaign during the study period.

(ii) This evidence is directly applicable to the UK as both studies were conducted in general practices in the UK. However, it should be noted that settings were selected on the basis of high IDU and hepatitis C prevalence and therefore the evidence may not be applicable to settings with low prevalence.

Increasing the type of settings that provide hepatitis C services

Nine studies examined whether provision of testing in different services increased access to testing and follow-up services. Integration of testing services within community settings, specifically within a mental health programme, drug services and opiate substitution clinics in primary care, was found to have a positive effect on testing uptake. A French study that examined the provision of outreach testing onsite in social housing/shelters demonstrated that it improved testing uptake among at-risk populations (primarily migrants), and one study of the provision of hepatitis services within sexual health clinics considered the service to have attracted IDUs to attend for testing. Two uncontrolled studies (including one UK study) demonstrated that a multidisciplinary or shared care approach to hepatitis C testing and treatment in community settings targeting IDUs was associated with a relatively high uptake of follow-up services and treatment outcomes comparable with those seen in non-drug using populations. This corresponds to the finding of the review of qualitative research, which identified that opportunistic testing and a 'one-stop shop' approach for all hepatitis C services was regarded as convenient approach among IDUs. It should be noted that in some drug services in the USA, hepatitis testing may be added to routine blood work undertaken on entry to programmes and thus patients may not be asked to explicitly consent to be been tested for hepatitis C. The findings of the qualitative review indicated that although some patients and health professionals do not perceive this to be problematic as it increases testing compliance, others have raised concerns that it restricts patient choice.

Findings from the study of a prison outreach clinic suggested that it resulted in a relatively low numbers of prisoners accepting a hepatitis C test. The review of qualitative research identified that imprisonment was viewed by health professionals as both a barrier and a facilitator to the management of hepatitis C. Barriers to testing included institutional (e.g. long waiting times, lack of information provision, prioritisation of detoxification and withdrawal) and personal (e.g. fear and lack of knowledge about hepatitis C, low motivation for testing, concerns about confidentiality and stigma) factors. Transportation of prisoners between prisons and length of sentence were viewed as interfering with the treatment process whereas the structured environment of prison and availability of peer support during treatment were regarded as beneficial.

Evidence statement 6: Increasing the type of settings that provide hepatitis C services

(i) There is moderate evidence from one RCT (Rosenberg et al., 2000) and two case series (Lindenberg et al., 2011 [CS –]; Jack et al., 2009 [CS –]) to suggest that providing hepatitis C services in community settings may have a positive impact on testing acceptance and uptake. In particular, there is weak evidence from two case series (Lindenberg et al., 2011 [CS –]; Jack et al., 2009 [CS –]) to suggest that a multidisciplinary or shared care approach to hepatitis C testing and treatment for IDUs is associated with high uptake of follow-up services and treatment outcomes comparable with non-drug using populations. In two studies conducted in the USA (Harris et al., 2010 [CS –]; Hagedorn et al., 2007 [CS –]), hepatitis testing was added to routine blood work undertaken on entry to drug services and therefore a high testing rate was inevitable.

(ii) There is moderate evidence from one RCT (Sahajian et al., 2011 [RCT +]) to suggest that the provision of testing services via outreach may have a positive impact on testing acceptance and uptake. The impact may be greatest when testing is offered on-site rather than by referral.

(iii) There is weak evidence from one UBA study (Skipper et al., 2003 [UBA –]) to suggest that the provision of hepatitis C outreach services for new prisoners may lead to relatively low uptake of testing.

Applicability

(i) This evidence may only be partially applicable to the UK as studies were conducted in the context of healthcare systems in The Netherlands and USA.

(ii) This evidence is not likely to be applicable to the UK. This study was conducted in France and the study population included a high proportion of migrants in a shelter setting bearing similarities to social housing.

(iii) This evidence is directly applicable to the UK as the study was conducted in UK prisons.

Other methods of enhancing access to testing services

One study evaluated the impact of a peer outreach worker offering testing and education to IDUs. The study evaluated the impact on knowledge outcomes only and reported positive intervention effects on knowledge about transmission about hepatitis C. One study that evaluated the impact of offering FibroScan, a non-evasive liver evaluation technique, to IDUs in street outreach programmes found that FibroScan was acceptable to IDUs and aided the facilitation of testing for hepatitis C.

Evidence statement 7: Other approaches to enhance access to hepatitis C testing

(i) There is weak evidence from one case series (Foucher et al., [CS –]) to suggest that offering a non-invasive liver evaluation technique in outreach settings provides an opportunity to subsequently test IDUs for hepatitis C.

(ii) There is weak evidence from one case series (Aitken et al., 2002 [CS –]) that education by a peer outreach worker may improve short-term knowledge about hepatitis C transmission among IDUs.

Applicability

(i) This evidence is only partially applicable to the UK as the study was conducted in France where non-invasive techniques such as Fibroscan are recommended for the initial evaluation of liver fibrosis.

(ii) This evidence is only partially applicable to the UK as the study was conducted in Australia.

Aimed at professionals

Three studies, that evaluated complex interventions that included support and training for primary care practitioners, found positive intervention effects on testing uptake. A national awareness campaign appeared to have had positive effects on testing uptake, but the authors of this study noted that a reduction in the proportion of positive tests indicated that testing of inappropriate populations may have taken place. Three studies reported outcomes relating to uptake of treatment and follow-up services. Few clear intervention effects were found suggesting that the impact of the interventions was limited; however, one study of a complex intervention to support the implementation of guidelines for hepatitis C management in primary care reported increases in some referral and treatment outcomes. One study found that although associated with increases in testing uptake, there were no effects of a national campaign on follow-up or management of drug users following testing for hepatitis C.

Three studies of educational interventions for practitioners reported short-term positive effects on knowledge about hepatitis C. However, the authors of a UK study noted that the education sessions may be poorly attended by health professionals. In addition, there was no clear evidence that increases in knowledge led to an improvement in hepatitis C management. One study of a CME programme found limited effects of the intervention on testing uptake.

Evidence statement 8: Aimed at professionals undertaking hepatitis C testing

(i) There is moderate evidence from one RCT (Cullen et al., 2006 [RCT ++]), one NRCT (Helsper et al., 2010 [NRCT +]) and one UBA study (Sahajian et al., 2004 [UBA –]) to suggest that complex interventions that provide support to primary care professionals in offers of hepatitis C testing may have a positive impact on testing acceptance and uptake. One repeated CSS (Defossez et al., 2008 [CSS +]) demonstrated that without support, offers of testing may increase, but not within the desired high-risk groups.

(ii) There is weak evidence from three UBA studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]) to suggest that educational interventions aimed at health professionals may have short-term benefits on knowledge about hepatitis C. However, there is no clear evidence that an increase in knowledge leads to increase in testing. Weak evidence from one UBA study (Garrard et al., 2006 [UBA –]) suggested that a CME programme had a limited impact on testing uptake.

(iii) There is mixed evidence from two studies (Cullen et al., 2006 [RCT ++]; Defossez et al., 2008 [CSS +]) that examined the effectiveness of interventions aimed at professionals on treatment initiation. There is moderate evidence from a repeated cross-sectional study (Defossez et al., 2008 [CSS +]) that a national campaign had no impact on the management of drug users following a positive hepatitis C test. However, there is strong evidence from one RCT (Cullen et al., 2006 [RCT ++]) that a complex intervention providing support in primary care had a positive impact on number of referrals and attendance at follow-up appointments after testing.

Applicability

(i) This evidence may only be partially applicable to the UK as studies were conducted in Ireland, The Netherlands and France. In addition, studies conducted in The Netherlands and France took place during the delivery of national hepatitis C campaigns.

(ii) This evidence may only be partially applicable to the UK as two of the three studies were conducted in the USA where affordability of care may be a limiting factor.
(iii) This evidence may only be partially applicable to the UK as studies were conducted in Ireland, and France.

Enhancing access to follow-up services and treatments

Six studies evaluated interventions designed to enhance IDUs access to treatment and follow-up services. Two studies of the provision of hepatitis C treatment to IDUs in community settings, including one UK study, demonstrated positive effects of the intervention approach on treatment initiation and outcomes. One study demonstrated that attending a mandatory hepatitis C education session prior to attending a liver clinic was associated with positive short-term effects on knowledge, which was maintained at medium-term follow up, and an increased interest in treatment. This study also found that the education session had a positive effect on compliance with liver clinic attendance. In addition, two studies of a weekly support group demonstrated positive effects on initiation of treatment. Evidence from one study suggested there were benefits of allowing clients to self-refer for assessment at liver clinics. Those attending for assessment based on self-referral differed little from those referred by health professionals in terms of attendance at appointment and in treatment uptake and completion.

Evidence statement 9: Enhancing access to follow-up services and treatment for hepatitis C

(i) There is weak evidence from one CBA study (Moussalli et al., 2010 [CBA –]) and one case series (Wilkinson et al., 2008 [CS –]) to suggest that the provision of hepatitis C treatment in community settings for IDUs had a positive effect on treatment initiation and outcomes.
(ii) There is weak evidence from two case series (Grebely et al., 2007; Grebely et al., 2010 [both CS –]) that attendance at a support group for hepatitis C may have a positive effect on treatment initiation. However, it was unclear due to the study design used whether attendance at the support group was higher amongst more highly motivated individuals who may have been more likely to initiate treatment regardless of their attendance at the group.
(iii) There is weak evidence from one cohort study (Doucette et al., 2009 [CO –]) to suggest that allowing patients, such as those who have not been referred by their doctor, to self-refer to speciality liver clinics for assessment was associated with treatment uptake and completion at rates similar to those referred by health professionals.
(iv) There is weak evidence from a CBA study (Surjadi et al., 2011 [CBA –]) to suggest that ensuring patients receive education about hepatitis C prior to referral appointments may have a positive effect on attendance at follow-up appointments, and on short to medium-term knowledge.

Applicability

(i) This evidence is directly applicable to the UK as one study was conducted in drug services in the UK. In addition, the setting and population examined in the second study conducted in France were comparable to drug services in the UK.
(ii) This evidence may only be partially applicable to the UK as the studies were conducted in the context of the Canadian healthcare system.
(iii) This evidence may only be partially applicable to the UK as the study was conducted in the context of the Canadian healthcare system.

(iv) This evidence may only be partially applicable to the UK as the study was conducted in the context of the USA healthcare system.

Contact tracing

Outcomes relating to testing uptake as a result of a contact tracing study were examined in one case series, which reported that although the majority of participants agreed to refer injection partners, the number of partners tested represented a very low proportion of all identified partners.

Evidence statement 10: Contact tracing

There is weak evidence from one case series (Brewer & Hagan, 2009 [CS –]) to suggest that IDUs may be willing to engage in contact tracing of injection partners, but that uptake of testing in identified partners may be low.

Applicability

The evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis B and C infection in the UK.

Cost-effective of screening for hepatitis C

Four studies examined screening and treatment for hepatitis C across a range of settings including drug services, primary care, GUM clinics and prisons. All studies were conducted from the perspective of the NHS and were therefore highly applicable. One study found that screening for non-current IDUs in drug services and GUM clinics was likely to be moderately cost-effective. The cost-effectiveness of case finding within drug services was supported by further studies, which also identified case finding in prisons and general practice as likely to be considered cost-effective by NHS commissioners. Two economic evaluation studies provided additional evidence on the cost-effectiveness of case finding in prisons. In a cost-utility analysis extending the work undertaken previously, screening and treatment for hepatitis C within the prison setting was found to be unlikely to be considered cost-effective. However, the model was found to be sensitive to various parameters, of which reliable estimates robust estimates were lacking.

Evidence statement 12: Cost-effective of screening for hepatitis C

There is moderate evidence from two CUAs (Stein et al., 2002; Stein et al., 2003; Stein et al., 2004; Castelnuovo et al., 2006; Thompson Coon et al., 2006; [both CUA ++]) to suggest that case finding for hepatitis C may be cost-effective in a range of settings including drug services and general practice. However, evidence from one CUA (Sutton et al., 2008 [CUA ++]) suggests that extending case finding for testing and treatment to the prison setting is unlikely to be cost-effective. Two economic evaluation studies (Sutton et al., 2006; Sutton, 2006 [CEA +]; Sutton et al., 2008 [CUA ++]) provided equivocal evidence for the cost-effectiveness of screening in prison; evidence from a more recent CUA (Sutton et al., 2008 [CUA ++]) suggests that extending case finding for testing and treatment to the prison setting is unlikely to be cost-effective.

Applicability

This evidence is directly applicable to the UK as all studies were undertaken from the perspective of the UK health service. However, all studies were hampered by a lack of robust evidence for the

effectiveness of screening and treatment approaches, therefore limiting the generalisibility of the findings beyond the individual studies.

Conclusions

Recommendations for practice

The results of this review provide limited evidence that interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection can increase testing uptake; knowledge, attitudes and intentions; or uptake of follow-up services and treatment. It is not clear why improvements in knowledge, although demonstrated for some educational interventions, did not translate into convincing impacts on testing uptake but there is the potential that such approaches may not adequately address barriers to testing in migrant populations. The provision of testing supplemented by culturally appropriate education could be considered a promising approach that may warrant further evaluation in different settings.

Current evidence suggests that some interventions aimed at raising awareness and engaging with groups at risk of hepatitis C infection may increase testing uptake and uptake of follow-up services and treatment. Drugs services and primary care were identified as settings in which intervention delivery could effectively increase uptake of testing, and for settings providing complete hepatitis C services, increase in the uptake of, and adherence to, follow-up services. However, careful attention should be paid to the resource implications of interventions and of the potential of interventions to improve outcomes across the continuum of care once a positive diagnosis of hepatitis C has been made.

Recommendations for research

Further studies on the effectiveness and cost-effectiveness of interventions targeting groups at risk of hepatitis B are required. Future evaluations should be based on more rigorous research designs where possible and consider the long term impact of interventions on treatment initiation and outcome. New studies should be conducted with a broader range of groups at risk of hepatitis B infection and within different community settings.

Future evaluations of interventions targeting groups at risk of hepatitis C should be based on more rigorous research designs where possible. In addition, the feasibility of the collection of data on costs to enable cost-effectiveness analysis should be considered in the design of all new research studies. New research studies should also examine the effectiveness and cost-effectiveness of interventions delivered in prisons.

1 Introduction

1.1 Aims and objectives

This review was undertaken to support the development of guidance by the National Institute for Health and Clinical Excellence (NICE) on the most cost-effective ways of offering tests to those at risk of infection from hepatitis B and C.

The purpose of the effectiveness review was to examine the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing with groups who are at an increased risk of hepatitis B and C infection and practitioners on:

- testing uptake;
- knowledge, attitudes and intentions towards case finding and testing;
- uptake of, or adherence to, follow-up services and/or treatment; and
- changes in the number and/or types of venues where testing is offered.

The purpose of the cost-effectiveness review was to assess the cost-effectiveness of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing with groups who are at an increased risk of hepatitis B and C infection compared with no intervention or another type of intervention.

1.2 Research questions

Box 1. PICO framework	
Population	Groups identified to be at a high risk of hepatitis B and C infection, their close contacts, and practitioners
Intervention	Any intervention or activity that aims to raise awareness of, or engagement in, case finding and testing
Comparison	No intervention or another type of intervention
Outcomes	Measures of testing uptake; knowledge, attitudes and intentions towards case finding and testing; uptake of, or adherence to, follow-up services and/or treatment; and changes in the number and/or types of venues where testing is offered Costs (regardless of how estimated) and outcomes (regardless of how specified)

Using the PICO mnemonic (see Box 1), a series of five research questions were developed:

1: What are the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing with groups who at an increased risk of hepatitis B and C infection, their close contacts and practitioners on measures of testing uptake?

2: What are the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing on knowledge, attitudes and intentions among groups who are at an increased risk of hepatitis B and C infection, their close contacts and practitioners?

3: What are the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing on uptake of, or adherence to, follow-up services and/or treatment among groups who at an increased risk of hepatitis B and C infection?

4: What are the effects of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing on increasing or improving access among groups who at an increased risk of hepatitis B and C infection?

5: What are the cost-effectiveness of interventions or activities aimed at raising awareness of, and/or increasing engagement in, case finding and testing with groups who are at an increased risk of hepatitis B and C infection compared with no intervention or another type of intervention?

2 Methodology

2.1 Search strategy

The search approach taken for the reviews of effectiveness and cost-effectiveness was comprehensive and aimed to identify all the potentially relevant studies. All searches were conducted in accordance with the second edition of *Methods for the development of NICE public health guidance*.

2.2 Electronic sources

The following electronic sources were searched:

- ASSIA (Applied Social Science Index and Abstracts) via Proquest
- British Nursing Index via EBSCOhost
- CINAHL (Cumulative Index of Nursing and Allied Health Literature) via EBSCOHost
- Cochrane Library via Wiley (CENTRAL, CDSR, DARE)
- EMBASE via NHS Evidence Health Information Resources
- EPPI Centre databases
- ETHOS (Electronic Theses Online Service)
- King's Fund catalogue
- MEDLINE via Ovid
- MEDLINE In Process via Ovid
- PsycINFO via EBSCOHost
- Social Care Online via www.scie-socialcareonline.org.uk/
- Social Science Citation Index via Web of Science
- Sociological Abstracts via Proquest

The search strategy developed for the effectiveness review was adapted for use in the following major health economics databases:

- NHS Economic Evaluation Database (NHS EED)
- Health Economic Evaluation Database (HEED)
- EconLit

Search strategies were developed for each database using a combination of free text and thesaurus terms as appropriate. An example Medline strategy is presented in Appendix 1.

2.3 Additional sources

In addition to searching the electronic sources listed above, the following additional strategies were incorporated to identify relevant references.

- Citation searching and reference checking of included studies and key review articles;
- Searching relevant websites;
  - British Association for the Study of the Liver
  - British Liver Trust
  - European Association for the Study of the Liver

- Foundation for Liver Research
- Health Protection Agency
- Hepatitis C Trust
- Institute of Hepatology
- Mainliners
- US Centers for Disease Control and Prevention
- World Health Organisation
- World Hepatitis Alliance
- NHS Evidence specialist collections (gasteroenterology and liver diseases, infections, ethnicity and health and public health)

- Recommendations were sought from PDG members and other experts as appropriate;
- Articles or other sources of evidence that were identified during the conduct of the other evidence reviews that appeared to be potentially relevant were considered for inclusion.

2.4 Inclusion and exclusion criteria

2.4.1 Types of studies

Randomised controlled trials, controlled non-randomised studies, controlled before and after studies and interrupted time series studies[1] that compared an intervention against no intervention or another type of intervention (e.g. continuation of current testing practice) were considered for inclusion. Initially only studies that reported pre- and post-intervention data and a control or comparison group were considered eligible for inclusion but these criteria were subsequently broadened to include uncontrolled before and after (UBA) studies, case series and repeated cross-sectional studies.

For the assessment of cost-effectiveness, full economic evaluation studies (i.e. cost-effectiveness, cost-benefit, or cost-utility analyses) that compared an intervention against no intervention or another type of intervention were considered eligible for inclusion.

2.4.2 Types of interventions

All interventions targeted at groups who are at an increased risk of hepatitis B and C infection, healthcare professionals or the provision of testing services that aim to raise awareness of, or engagement in, case finding and testing were considered relevant. Interventions were grouped as follows:

- To raise awareness among, or to encourage, people from high risk groups and their 'close contacts' to use testing services, for example, interventions using educational materials; group education; programmes addressing stigma, cultural or language barriers; media campaigns; social marketing; incentives for participants; contact tracing or other methods of partner referral.
- To enhance access to testing services, for example, by increasing the number and/or type of settings in which services provide testing; increasing the number of hours or days that facilities open; transferring responsibilities to other professional groups (e.g. from consultants to clinical

[1] Only studies that included a clearly defined point in time when the intervention occurred, and at least three data-points before and after the intervention were included as interrupted time series (http://epoc.cochrane.org/sites/epoc.cochrane.org/files/uploads/inttime.pdf)

nurse specialists; peer/lay delivery); offering acceptable or alternative methods of testing (e.g. dried blood spots)

- Aimed at professionals, for example, interventions to change beliefs and attitudes among professionals; to increase professional behaviours (e.g. identifying high risk patients; ensuring 'close contacts' take a test); educational sessions and meetings; continuing medical/nursing education

Studies of people who inject drugs that focused on changing behaviours in relation to injection or sharing practices, but without reference to case finding and testing, were not eligible for inclusion.

2.4.3 Types of participants

Studies of groups who are at an increased risk of hepatitis B or C infection including current and former IDUs and first generation immigrants from countries with a high prevalence of hepatitis B or C [2,3] were considered eligible for inclusion. Relevant populations also included, for IDUs, their sharing partners, and for first generation immigrants, sexual partners or family members.

Studies of professionals involved in the promotion or provision of testing services, follow-up services and/or treatment (e.g. doctors, nurses, pharmacists, drug treatment workers) were also eligible.

2.4.4 Types of outcome measure

Outcome measures of relevance to the review were grouped across four domains:

Measures of testing uptake

- Changes in the number of people from at risk groups requesting or accepting a test
- Changes in the number of people from at risk groups tested
- Changes in the number of positive tests
- Changes in the number of people from at risk groups referred to treatment

Knowledge, attitudes and intentions towards case finding and testing

- Knowledge and attitudes among the target populations and healthcare professionals
- Intention to take up testing
- Awareness of testing facilities among the target populations
- Awareness of HBV and HCV among healthcare professionals

Uptake of, or adherence to, follow-up services and/or treatment

- Changes in the number of people from at risk groups testing positive who engage in follow-up services and/or treatment

Other effectiveness outcomes

- Changes in the number and/or types of venues where testing is offered

[2] According to WHO, prevalences of >8% are typical of highly endemic areas and prevalences of 2–7% are found in areas of intermediate endemicity.

[3] Areas of high endemicity for hepatitis B include Southeast Asia and the Pacific Basin (excluding Japan, Australia, and New Zealand), China, sub-Saharan Africa, the Amazon Basin, parts of the Middle East, the Arctic, and the central Asian Republics. Areas of intermediate endemicity for hepatitis B include the Mediterranean and Eastern Europe.

Studies reporting both costs (regardless of how estimated) and outcomes (regardless of how specified) were eligible for inclusion in the review of cost-effectiveness. Outcomes of interest included, but were not be limited to:

- Incremental costs per case of hepatitis B or C infection detected
- Incremental costs per case of hepatitis B or C infection prevented
- Incremental costs per additional QALY gained

2.5 Study selection

Due to the volume of references retrieved from the searches of electronic sources, titles and abstracts were initially screened by one reviewer from a team of four (LJ, EMC, GB and AL) to identify relevant references based on the inclusion criteria for types of interventions and participants. In addition, the lead reviewer (LJ) independently second screened approximately a third of the references screened by the other members of the review team.

Titles and abstracts of potentially relevant articles identified in the first round of screening were then independently screened by two reviewers. Potentially relevant articles identified at this stage were retrieved as full text publications and screened by two reviewers independently to determine whether the study met the inclusion criteria.

2.6 Data extraction and quality assessment

Data relating to both study design and quality was extracted by one reviewer into an Access database and independently checked for accuracy by a second reviewer. Two reviewers independently assessed the quality of the individual studies and the results entered into an Access database. Disagreements were resolved through consensus and when necessary a third reviewer was consulted.

The following data were extracted from the included effectiveness studies: author; year of publication; country of origin; research funding source; study objectives; study design and characteristics (e.g. eligibility criteria, recruitment procedures); population details (e.g. age, gender, ethnicity); intervention details; analysis/outcomes measured; results; limitations identified by authors.

For studies included in the review of cost-effectiveness, the following data were: year of publication; country/currency base; economic study type; hypothesis/study question; study population; intervention(s); setting; perspective; source of effectiveness data; source of cost data; methods of estimation for benefits/costs; intervention effect(s); intervention cost(s); results; results of sensitivity analyses; confounders/potential sources of bias.

The quality of both effectiveness and cost-effectiveness studies was assessed according to criteria set out in the NICE Centre for Public Health Excellence Methods Manual. This information was tabulated and summarised within the text of the report. Each study was graded using a code, ++, + or – based on the extent to which the potential sources of bias have been minimised as outlined in the NICE Public Health Methods Manual (2009).

2.6.1 Methods of analysis/synthesis

Review of effectiveness

For each research question the results of the data extraction and quality assessment for each study are presented in evidence tables and as a narrative summary. The possible effects of study quality on the effectiveness data and review findings are discussed, and successes and barriers to implementation are explored. The evaluation of evidence for the effectiveness of public health interventions should distinguish between the fidelity of the evaluation process in detecting the success or failure of an intervention, and the relative success or failure of the intervention itself.[4] Therefore, studies which reported no, insignificant or adverse effects were examined further to determine whether the intervention was unsuccessful because of failure of the intervention concept or theory (i.e. the intervention was inherently faulty), or because the intervention was poorly delivered or implemented. Studies were grouped according to the population and infection focus of the study, and by the type of intervention examined.

Review of cost-effectiveness

The results of the data extraction and quality assessment for each economic evaluation study are presented in evidence tables and in more detail as a narrative summary. The possible effects of study quality on the review findings are discussed.

Strength of the evidence

The overall strength of the evidence was summarised according to the following terms outlined in the NICE Public Health Methods Manual (2009):

Weak evidence: Consistent findings across two or more studies rated – for quality, or generally consistent findings across a group of studies rated – or + for quality.

Moderate evidence: Consistent findings across two or more studies rated + for quality, or generally consistent findings across a group of studies rated + or ++ for quality.

Strong evidence: Consistent findings across two or more studies rated ++ for quality.

Inconsistent evidence: Variable findings across two or more studies rated of a similar quality.

2.6.2 Addendum

An addendum was prepared to incorporate additional evidence presented at the Programme Development Group (PDG) meeting on 27th October 2011. This summarises the findings of additional searches conducted of conference abstracts from the annual meetings of the British Society of Gastroenterology (BSG) and the British Association for the Study of the Liver (BASL), and details of a research study provided by a member of the PDG.

In addition, a series of tables were prepared: (i) to summarise rates of testing uptake and treatment outcomes across the included studies and additional evidence; and (ii) to identify where evidence identified in the review of effective and cost-effectiveness addressed recommendations for interventions as identified from the review of qualitative research.

[4] Rychetnik, L., Frommer,M., Hawe,P., Shiell,A. 2002. Criteria for evaluating evidence on public health interventions. Journal of Epidemiology and Public Health 56, 119–127.

3 Summary of study identification

3.1 Results of study selection

The process of study selection in summarised in Figure 1.

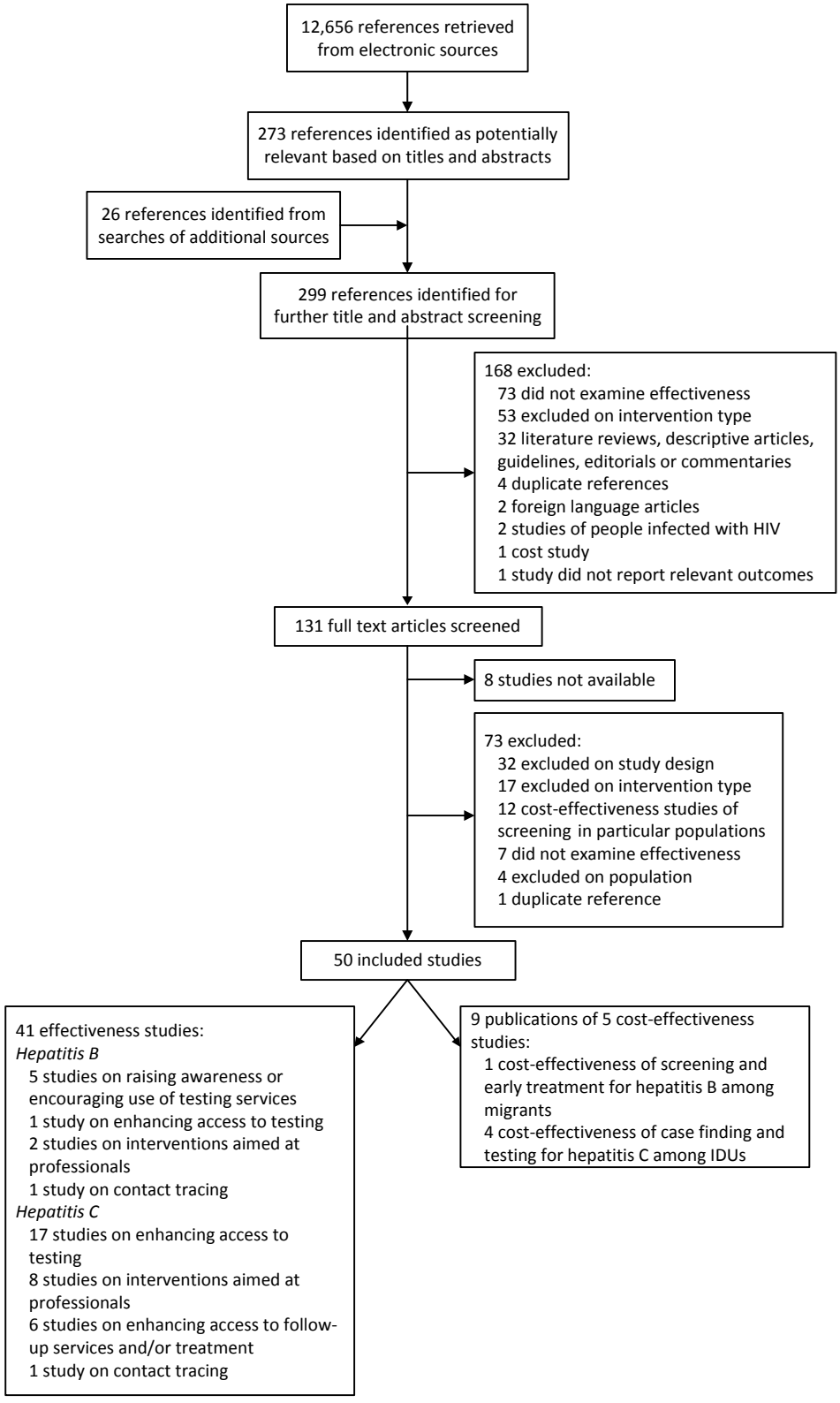

Figure 1. Summary of study selection

A total of 12,656 references were identified through the searches of electronic sources. Based on the initial screening of titles and abstracts by one reviewer, 273 articles were identified as potentially relevant from the electronic sources and a further 26 references were identified from searches of additional sources.

3.2 Initial round of screening

Titles and abstracts of the 299 articles identified as potentially relevant were reviewed by a second member of the research team (LJ, GB, EMC or AL) and 168 articles were excluded. Bibliographic details and reasons for exclusion of these studies are presented in Appendix 2. Twenty-three of the excluded articles were from the UK. Seven articles were excluded as they were an editorial, commentary, non-systematic review or descriptive article. Six articles were excluded as they did not examine case finding or uptake of testing among high risk groups (one study examined antenatal testing; three examined vaccination strategies; one examined harm reduction approaches; and one examined sexual health services in prisons). Ten studies were excluded as they did not examine the effectiveness of an intervention aimed at raising awareness of, and/or increasing engagement in, case finding and testing.

3.3 Full text screening

Following full text screening of 131 articles, 51 were selected for inclusion and 72 were excluded. A further eight studies were not available during the timescales for the preparation of the review. The bibliographic details of the studies awaiting assessment are presented at the end of Appendix 2.

The reasons for exclusion of the 73 studies were as follows: 32 studies were excluded as they did not meet the study design inclusion criteria for the review; 29 studies (including 12 cost-effectiveness studies) were excluded on intervention type as they did not examine the effectiveness or cost-effectiveness of an intervention aimed at raising awareness of, and/or increasing engagement in, case finding and testing; seven studies did not examine effectiveness; four studies were excluded as they did not examine uptake of testing in a high risk population (three studies examined interventions targeting men who have sex with men [MSM] and one study examined a universal screening programme in a Veteran's Association medical centre); and one study was identified as a duplicate reference. Bibliographic details and reasons for exclusion of these studies are presented in Appendix 2.

3.4 Included studies

A total of 50 studies were selected for inclusion in the review. Forty-one studies were included in the review of effectiveness and nine publications of five economic evaluation studies were identified for inclusion in the review of cost-effectiveness.

3.4.1 Review of effectiveness

Of the 41 studies included in the review of effectiveness:

- Nine studies examined interventions targeting the uptake of hepatitis B testing and are summarised in Section 4;
- 26 studies examined interventions targeting the uptake of hepatitis C testing and are summarised in Section 5; and

- Six studies examined interventions targeting the uptake of hepatitis B and C testing and are summarised in Section 5.

3.4.2 Review of cost-effectiveness

Of the nine publications included in the review of cost-effectiveness:

- One study examined the cost-effectiveness of screening and early treatment of migrants in The Netherland for chronic hepatitis B and is summarised in Section 6.2;
- Seven publications reported on four studies that examined the cost-effectiveness of screening and/or case finding for hepatitis C and are summarised in Section 6.3.

4 Review of effectiveness: interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection

Nine studies of eight unique evaluations were identified that examined interventions targeting the uptake of testing for hepatitis B. Five studies examined interventions that were designed to raise awareness of, or encourage use of testing services (see Section 4.1) and two studies examined interventions that aimed to improve professional practices for hepatitis B testing among healthcare practitioners (see Section 4.2). In addition, one study examined partner notification for high risk people diagnosed with chronic hepatitis B (see Section 4.3). A summary of the characteristics of the included studies in presented in Tables 1 to 3.

Table 1. Summary of study characteristics: raising awareness or encouraging use of hepatitis B testing services

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Chao, et al., 2009 CS – [+] USA	Community N=476 Chinese Americans Country of birth: 98% China or other Asian country; 2% USA	Free HBV screening and doctor-led educational seminars in Mandarin and English on detection, management and prevention.	●		●	78% advised family and friends to be tested for hepatitis B 67% (26/39) with chronic HBV went to see their doctor in the year following the screening and had liver cancer screening
Hsu, et al., 2007;2010 UBA – [–] USA	Community N=807 members of the Asian community Asian Indian 11%; Chinese 36%; Korean 25%; Other 14%; Vietnamese 13%	One-off session of culturally tailored lectures on prevention delivered by community health promoters.	●			All ethnicity groups had statistically significant improvements in knowledge of HBV prevention (pre vs. post, $p<0.001$)
Taylor, et al., 2009a RCT + [++] Canada	Community N=325 Chinese community members; 298 completed study, 141 received intervention and 157 acted as controls Country of birth: 86% China; 14% other	English as a second language curriculum addressing hepatitis B incorporating standard ESL teaching methods. Delivered by regular ESL teachers and project staff	↑ 9/10 variables			Significantly higher levels of knowledge among intervention students compared to control group for 9/10 knowledge variables.

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Taylor, et al., 2009b RCT + [+] USA & Canada	Community (at home) N=460 Chinese community members; 231 received intervention and 229 acted as controls <50% of life in North America: 61%	Educational and motivational home visit delivered by trained lay health worker. Materials included a video and pamphlet about the importance of HBV testing	↑ 2/5 variables	↑ verified testing		Intervention group participants significantly more likely than controls to know hepatitis B can be spread by razors and sexual intercourse. No difference on other knowledge variables No difference in self reported testing (intervention 11% vs. control 6%). Greater uptake of verified testing in intervention group compared to controls; 6% vs. 2%.
Taylor, et al., 2011 RCT + [+] Canada	Community N=218 Asian community members in 80 ESL classes; 40 intervention classes and 40 control classes Country of birth: 51% China 51%; 17% India; 13% Iran; 19% other	ESL curriculum addressing HBV incorporating standard ESL teaching methods. Delivered by regular ESL teachers and project staff	↑ 4/5 variables	↑ verified testing		Significantly greater knowledge about HBV among intervention group on 4/5 measures compared to controls. No difference in self reported testing (intervention 11% vs. control 6%). Greater uptake of verified testing in intervention group compared to controls; 6% vs. 0%.

The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; CS = case series; UBA = uncontrolled before and after study; ESL = English as a second language; HBV = hepatitis B virus

Table 2. Summary of study characteristics: interventions aimed at professionals undertaking hepatitis B testing

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Chang, et al., 2007 UBA – [–] USA	Community N=686 CAM practitioners (traditional Chinese medicine practitioners and acupuncturists)	Annual symposium. Education about HBV including prevention, testing and treatment through lectures and activities. Encouraged to refer patients to free testing services.	●	●		Knowledge improved significantly each year from pre- to post-symposium. Referral of 160 patients to free testing services.
Nguyen, et al., 2000 RCT + [+] USA	Private medical practices N= 20 Vietnamese doctors; 9 received the intervention, 11 acted as controls	Cancer prevention reminder system, series of continuing medical education seminars, and education materials to assist with counselling patients		↔		Higher performance rates for HBV testing in intervention doctors compared to control; 30% vs. 22%.

The quality rating for external validity for each study is provided in square brackets following the study type and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; UBA = uncontrolled before and after study; HBV = hepatitis B virus; CAM = complementary and alternative medicine

Table 3. Summary of study characteristics: partner notification

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Gunn, et al., 2006 CS – [–] USA	Community N=129 persons with chronic HBV 40 low risk; 89 high risk (69% MSM; 29% IDU; 13% MSM + IDU; 5% other)	Partner notification service. HBV screening and vaccination offered to all sex and needle sharing partners at an STD clinic. Delivered by communicable disease investigators		●		81% (38/47) of named partners received PN services. 15 susceptible and 14 started (9 completed) vaccination series. 1 partner identified with chronic HBV infection.

The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; CS = case series; PN = partner notification; HBV = hepatitis B virus; STD = sexually transmitted disease; MSM = men who have sex with men; IDU = injecting drug users

4.1 Raising awareness or encouraging use of hepatitis B testing services

4.1.1 Summary of identified studies

Six studies were identified that examined interventions designed to raise awareness of, or encourage the use of, testing services for hepatitis B. All studies targeted immigrant populations and were carried out in Canada (Taylor et al., 2009a [RCT +]; Taylor et al., 2011 [RCT +]) and the USA (Chao et al., 2009 [CS –]; Hsu et al., 2007 [UBA –]; Hsu et al., 2010 [UBA –]) or both (Taylor et al., 2009b [RCT +]). Two of the studies were cluster RCTs (Taylor et al., 2009a [RCT +]; Taylor et al., 2011 [RCT +]) one was an RCT based on individual randomisation (Taylor et al., 2009b [RCT +]) and three studies were observational; incorporating a case series (Chao et al., 2009 [CS –]) and two uncontrolled before and after (UBA) studies (Hsu et al., 2010; Hsu et al., 2007 [both UBA –]). Five studies reported changes in hepatitis B related knowledge (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT +]; Taylor, et al., 2011 [RCT +]; Hsu et al., 2007 [UBA –]; Hsu, et al., 2010 [UBA –]), two studies reported changes in testing uptake (Taylor et al., 2009b [RCT +]; Taylor et al., 2011 [RCT +]) and one study examined the impact on uptake of follow up services (Chao et al., 2009 [CS –]).

Two studies evaluated a hepatitis B English as a second language (ESL) educational curriculum for Asian immigrants (Taylor et al., 2009a; Taylor et al., 2011; both [RCT +]). The earlier publication by Taylor and colleagues (2009a [RCT +]) focused on participants of Chinese descent and the most recent publication (Taylor et al., 2011 [RCT +]) on participants of Asian, including Chinese Indian and Iranian, descent. The curriculum involved a three hour ESL lesson delivered by ESL teachers and included information about the importance of testing and aimed to improve knowledge and motivate participants to attend for testing. Both studies utilised a control group; participants took part in a three hour ESL lesson that involved information about physical education (rather than hepatitis). Both groups were followed up 6 months after the intervention. Taylor and colleagues (2009b [RCT +]) also examined a hepatitis B lay health worker designed for Chinese Americans/Canadians. All participants were Chinese and around 60% had spent less than half of their life in North America. The intervention was conducted in participants' homes via a trained lay worker or by mail when an appointment could not be made. The intervention included a video and pamphlet emphasising the importance of testing for the Chinese community and the control group received a direct mailing of physical education materials. Participants were followed up 6 months after the intervention via self report and a review of medical records.

Chao and colleagues (2009 [CS –]) assessed a culturally targeted intervention which provided hepatitis B prevention education and free screening to a Chinese American population. Hepatitis screening and doctor-led educational seminars on detection, management and prevention and culturally targeted brochures were made available via a 5 hour clinic conducted over one day. Participants were followed up a year later through telephone interviews.

Two studies by Hsu and colleagues (2007; 2010 [UBA –]) examined the effectiveness of a hepatitis B educational and screening programme for Asian Americans. The programme was provided in community and faith settings, including schools, churches and at health events. The programme provided culturally tailored lectures focusing on hepatitis B, people at risk, cultural myths, screening and prevention and was delivered via presentations by community health promoters. Participants completed a post-test survey immediately after the intervention.

Two studies by Taylor and colleagues (2009a; 2011; both [RCT +]) were based on an RCT cluster design and rated [+] overall for the internal validity of the study results. Although both studies were well reported there were elements of the method of allocation and analyses that may have introduced bias. In particular, both studies reported study group characteristics for participants who completed the follow-up survey only. The methodology for the study conducted by Taylor and colleagues (2009b [RCT ++]) was reported in detail; the process of randomisation was clear, and interviewers were blind to randomisation assignments at follow up. An intention to treat analysis was utilised, appropriate statistical analyses were used and techniques were used to adjust for potential confounders. The remaining studies were based on uncontrolled, observational designs (Chao et al., 2009 [CS –]; Hsu et al., 2007; 2011 [UBA –]) and they therefore had limited internal validity due to a range of biases.

4.1.2 Effects on measures of testing uptake

Two studies examined intervention effects on measures of testing uptake (Taylor et al., 2000b [RCT +]; Taylor et al., 2011 [RCT +]). Taylor and colleagues (2009b [RCT +]) found no significant difference in self reported testing rates between the intervention and control groups (intervention, 22 [15%] vs. control, 17 [10%]; p=0.21). However the intervention group had a significantly higher number of participants whose medical records data verified testing[5] (intervention 9 [6%] vs. control 3 [2%]; p=0.04). There was a significant difference between the proportion of intervention participants who received an ESL curriculum on hepatitis B and controls completing HBV testing but only according to medical records data (Taylor et al., 2011 [RCT +]); however uptake was very low in both groups in this study. Nine (11%) of the experimental and six (6%) of the control group self-reported that they had received HBV testing in the 6 months following the intervention (p=0.28). Medical records verified testing for 5 (6%) and 0 (0%) of intervention and control participants, respectively (p=0.02 for comparison).

4.1.3 Effects on knowledge, attitudes and intentions

Six studies examined intervention effects on knowledge, attitudes and intentions (Taylor et al., 2009a; Taylor et al., 2009b; Taylor et al., 2011; Hsu et al., 2007; Hsu et al., 2010; Chao et al., 2009). Two studies of an ESL curriculum found that intervention group students had significantly greater knowledge ($p<0.05$) about HBV at follow-up on all but one measure compared to controls (Taylor et al., 2009a; Taylor et al., 2011 [both RCT +]). Taylor and colleagues (2011 [RCT +]) reported that mean knowledge scores were significantly higher at follow-up among participants in the intervention group (3.68) than the control group (2.87; $p<0.001$ for comparison) and that this finding remained highly significant ($p<0.001$) after adjustment for other variables.

Hsu and colleagues (2007; 2010 [both UBA –]) reported that across all five Asian groups, participants had statistically significant improvements in knowledge of prevention against HBV ($p<0.001$ for pre- and post-test comparison). Korean, Indian and Vietnamese participants had lower improvements in knowledge compared with other Southeast Asian groups and Chinese participants ($p<0.01$ for pre- and post-test comparison).

[5] The authors noted that for three intervention group and two control group participants' medical records were not accessible.

Taylor and colleagues (2009b [RCT +]) reported that intervention group participants were significantly more likely than controls to know hepatitis B can be spread by razors ($p<0.001$) and sexual intercourse ($p=0.03$) but there were no differences for knowledge outcomes about hepatitis B being more common amongst Chinese, being spread during childbirth or that hepatitis B can cause liver cancer. When adjusted for demographic variables, only knowledge that hepatitis B could be spread by razors remained significant (odds ratio [OR] 2.66; 95% CI 1.57-4.51; $p<0.001$).

Chao and colleagues (2006 [CS –]) reported that 78% of participants who participated in a screening and education event had advised family and friends to be tested for hepatitis B. Of these, 17% reported that a family or friend had subsequently tested positive.

4.1.4 Effects on uptake of, or adherence to, follow-up services and/or treatment?

One study examined intervention effects on uptake of, or adherence to, follow up services. Chao and colleagues (2009 [CS –]) reported that 26 (67%) participants with chronic hepatitis B went to see their doctor in the year following the screening and had liver cancer screening (80% or higher reported normal results for different tests (ultrasound 95%; alanine aminotransaminase/aspartate transaminase [ALT/AST] 80%; alpha-fetoprotein [AFP] 88%)). Of those testing negative, 30% visited a physician for further advice and 19 subsequently received the hepatitis B vaccine. Two hundred and forty one (78%) of all interviewed participants recommended testing to family members (including 12% who had children vaccinated) and 17% reported at least one family member tested positive.

4.1.5 Summary and evidence statements

A total of six studies were identified that examined raising awareness or encouraging the use of hepatitis B testing services. Outcomes measured included the effects on measures of testing uptake, effects on knowledge, attitudes and intentions and effects on uptake of (or adherence to) follow up services and/or treatment. All studies targeted immigrant populations and were conducted outside of the UK, in North America. As migrants are not a homogenous group of people and a range of individual experiences and socio-cultural beliefs will influence their knowledge and beliefs relating to hepatitis B, the findings of the studies included in this review may not be applicable to the UK.

Three studies (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT +]; Taylor et al., 2011 [RCT +]) that evaluated a hepatitis B English as a second language (ESL) educational curriculum and a lay health worker intervention for Asian immigrants found an overall low level of testing uptake among participants. Although the ESL curriculum was shown to increase knowledge of hepatitis B, this did not translate into a convincing impact on testing uptake (Taylor et al., 2009a [RCT +]; Taylor et al., 2011 [RCT +]). In addition, the lay health worker intervention had an inconsistent impact on knowledge was and any knowledge gains reported did not translate into significant increases in testing uptake (Taylor et al., 2009 [RCT +]). Two UBA studies of the same intervention also demonstrated that educational programmes could improve knowledge (Hsu et al., 2007; 2010 [both UBA –]). One study (Chao et al., 2009 [CS –]) that assessed a culturally targeted intervention providing hepatitis B education and free screening indicated a relatively high uptake of follow-up care among patients identified with chronic hepatitis B. The majority of participants were also motivated to encourage family and friends to get tested.

Evidence statement 1: Raising awareness or encouraging use of hepatitis B testing services

(i) There is moderate evidence from three RCTs (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT +]; Taylor et al., 2011 [RCT +]) and two UBA studies (Hsu et al., 2007; 2010 [both UBA –]) to suggest that providing information and education on hepatitis B to migrant populations may improve their knowledge about risk, screening and prevention.

(ii) There is moderate evidence from three RCTs (Taylor et al., 2009a [RCT +]; Taylor et al., 2009b [RCT +]; Taylor et al., 2011 [RCT +]) to suggest that providing information and education on hepatitis B to migrant populations does not improve testing uptake.

(iii) There is weak evidence from one case series (Chao et al., 2009 [CS –]) to suggest that testing supplemented with culturally appropriate education may encourage the uptake of follow-up care among migrant populations.

Applicability

This evidence may not be applicable to the UK as all studies targeted migrant populations in North America. In addition, factors particular to the healthcare system in North America may further limit applicability as medical providers may be reluctant to diagnose hepatitis B when affordability of care is considered an issue.

4.2 Aimed at professionals

4.2.1 Summary of identified studies and quality assessment

Two studies that examined interventions aimed at professionals were identified. Both studies were conducted in the USA and targeted healthcare professionals serving immigrant populations. One study was an RCT (Nguyen et al., 2000 [RCT +]) and the other a UBA study (Chang et al., 2007 [UBA –]). Both studies reported outcomes relating to testing uptake and one paper also examined knowledge of hepatitis B (Chang et al., 2007 [UBA –]).

Nguyen and colleagues (2000 [RCT +]) examined the effectiveness of a strategy to promote cancer prevention activities among Vietnamese physicians. The intervention was designed to promote smoking cessation counselling, routine check-ups, breast and cervical cancer screening, and hepatitis B screening and vaccination. The intervention included a cancer prevention reminder system and a series of continuing medical education seminars. The education seminars were carried out at physician offices and included Vietnamese language education materials (booklets, posters and videos) to assist counselling of patients, newsletters and enrolment in an oncology programme. The intervention was conducted over three years and 19 physicians were followed up three years after implementation via an audit of medical records.

Chang and colleagues (2007 [UBA –]) examined an annual symposium designed to develop partnerships between Western and non-Western health care practitioners, specifically complementary and alternative medicine (CAM) practitioners (including those practicing traditional Chinese medicine and acupuncture). The seminars focused on education including prevention, testing and treatment and were delivered over one day (annually, over three years) through lectures and activities, including games and case studies. CAM practitioners were encouraged to refer their patients for free testing. Participants completed a post-symposia survey following the intervention and following the 2006 symposium, patient referrals for testing were tracked using vouchers. Almost

1,000 participants attended the symposium annually over the four years combined; this included over 300 in 2004, 204 in 2005, 160 in 2006 and 322 in 2007).

Nguyen and colleagues (2000 [RCT +]) reported detailed study methodology. The intervention and materials used were well described and appeared to be appropriate. Some details of the randomisation process were lacking, for example it was not clear whether the researchers were blinded to the randomisation assignment. Appropriate analytical methods were used and methods were used to estimate the net effects of the intervention on performance rates. The methodology of the study conducted by Chang and colleagues (2007 [UBA –]) was rated poorly; follow-up surveys were based on post-test only and outcomes were limited.

4.2.2 Effects on measures of testing uptake

Both studies examined intervention effects on testing uptake (Chang et al., 2007 [UBA –]; Nguyen et al., 2000 [RCT +]). Chang and colleagues (2007 [UBA –]) reported that based on pre-symposia surveys, 'fewer than half' of practitioners routinely recommended hepatitis B testing to their patients. Following the symposium in 2006, 106 patients were subsequently referred by symposium participants to receive free hepatitis B testing at a community event; 9% of whom tested positive for chronic hepatitis B infection. Nguyen and colleagues (2000 [RCT +]) utilised performance rates (percentage of eligible patients tested at least once divided by the number of patients who should have been tested) to determine testing uptake. Performance rates for hepatitis B testing were higher in the intervention group than controls, but not significantly so (30% vs. 22%; p=0.22).

4.2.3 Effects on knowledge, attitudes and intentions

Chang and colleagues (2007 [UBA –]) reported that knowledge was low prior to each symposium regarding the worldwide burden of HBV, ways to prevent transmission, risk of death without monitoring or treatment of chronic HBV, the age group most likely to develop chronic HBV and the diagnostic blood test for chronic HBV infection (all under 50% correct in pre-intervention survey). Knowledge improved significantly across each of these questions every year between pre- and post-test ($p<0.05$). In 2005, test scores increased from 59% to 76% ($p<0.001$), in 2006 from 56% to 78% ($p<0.001$), and in 2007 from 55% to 82% ($p<0.001$).

4.2.4 Summary and evidence statements

Two studies were identified that examined interventions aimed at improving professional practice among those providing healthcare services to immigrant populations. One study (Nguyen et al., 2000 [RCT +]) examined the effectiveness of a strategy to promote cancer prevention activities among Vietnamese doctors, but found a limited effect of the intervention on hepatitis B testing. An annual symposium on the prevention of hepatitis B infection (Chang et al., 2007 [UBA –]) was shown to have improved knowledge among CAM practitioners, but the wider impact of this change in knowledge on their practices was not clear from the outcomes reported in the study. As both studies were conducted in the context of the US healthcare system and as migrants' experiences and socio-cultural beliefs may influence their knowledge and beliefs relating to hepatitis B, findings may not be applicable to the UK.

Evidence statement 2: Aimed at professionals undertaking hepatitis B testing

(i) There is moderate evidence from one RCT (Nguyen et al., 2000 [RCT +]) to suggest that a strategy to promote cancer prevention activities among doctors serving migrant populations does not improve their practices in relation to hepatitis B testing.

(ii) There is weak evidence from one UBA study (Chang et al., 2007 [UBA –]) to suggest that providing information and education on hepatitis B to CAM practitioners (including those practising traditional Chinese medicine and acupuncture) may improve their knowledge about risk, screening and prevention. However, the wider impact of this change in knowledge on their practices regarding referral for testing is not clear.

Applicability

This evidence may not be applicable to the UK as all studies targeted migrant populations in North America. In addition, factors particular to the healthcare system in North America may further limit applicability as medical providers may be reluctant to diagnose hepatitis B when affordability of care is considered an issue.

4.3 Partner notification

4.3.1 Summary of identified studies and quality assessment

One study that examined contact tracing was identified (Gunn et al., 2006 [CS –]). The study was a case series, carried out in the USA and targeted high risk groups.

Gunn and colleagues (2006 [CS –]) examined a partner notification service for high risk people (including MSM and injecting drug users [IDUs]) with chronic hepatitis B identified through laboratory reports notified to the regional health department. The intervention involved interviews with participants about their partners during the one month before their diagnosis to develop a partner contact index. Hepatitis B screening and vaccination was then offered to all sex and needle sharing partners. Interviews were conducted by Communicable Disease Investigators and participants were followed up after 15 months. The study was based on a case series design, and the internal validity of the study was rated [–] as no control or comparison group was included. In addition, interview topics were not detailed and the consistency of interviews was not reported.

4.3.2 Effects on measures of testing uptake

Gunn and colleagues (2006 [CS –]) reported that among 129 eligible cases[6], 89 patients (69%) were classified as high risk patients[7]; all other patients were classified as low risk. No needle sharing partners were reported, but 85 patients reported having had at least one sex partner in the 1-month period before testing. Of these, 46 (54%) patients accepted the partner notification service, and information was provided to locate 47 partners. The resulting partner index was 0.36 (47/129), indicating that one potential locatable partner was identified for every three patients interviewed. Low risk patients were more likely than high risk patients to accept partner notification services (73% compared to 46%; p=0.02). Of the 47 partners named, 38 (81%) received partner notification

[6] Aged 15-45 years, living in high-risk area for sexually transmitted infections (STIs), and had a non-Asian surname.

[7] MSM, IDUs, exchanged sex for drugs or money, had ≥15 lifetime sex partners, had ≥2 sex partners in last 6 months, or ≥2 STIs in the last 5 years.

services; 15 (39%) were susceptible to hepatitis B infection and 14 started (and nine completed) the vaccination series. One partner was identified with chronic HBV infection.

4.3.3 Summary and evidence statements

One study examined a partner notification service for sex and needle sharing partners of people with chronic hepatitis B (Gunn et al., 2006 [CS –]). The study was conducted in the USA and the finding may therefore not be applicable to the UK. The study design used to assess the impact of the intervention was limited as there was no control group utilised for comparison. The authors noted that a relatively low partner index was achieved compared to partner notification for syphilis, and that overall few case patients with hepatitis B infection accepted partner notification services.

Evidence statement 3: Partner notification

There is weak evidence from one case series (Gunn et al., 2006 [CS –]) to suggest that partner notification services based on a BBV model that target sex and needle sharing partners of people with chronic hepatitis B (excluding migrant populations) may achieve a low rate of case detection.

Applicability

This evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis B infection in the UK.

5 Review of effectiveness: hepatitis C

Thirty-two studies were identified that examined interventions targeting the uptake of testing for hepatitis C. A summary of the characteristics of the included studies are presented in Tables 4 to 10.

Of the included studies:

- 3 studies examined interventions based on offering acceptable or alternative methods of testing (see Section 5.1 and Table 4);
- 3 studies examined interventions that were designed to enhance case finding and testing uptake in primary care (see Section 5.2 and Table 5);
- 9 studies examined the impact of increasing the type of settings that provide hepatitis C services (see Section 5.3 and Table 6);
- 2 studies examined other types of intervention approaches designed to increase access to hepatitis C testing (see Section 5.4 and Table 7);
- 8 studies examined interventions that aimed to improve professional practices for hepatitis C testing among healthcare practitioners (see Section 5.5 and Table 8);
- 6 studies examined interventions designed to enhance access to follow-up services and treatment for hepatitis C (see Section 5.6 and Table 9);
- 1 study examined contact tracing for hepatitis B and hepatitis C aimed at sharing partners of IDUs (see Section 5.7 and Table 10).

Table 4. Summary of study characteristics: offering acceptable or alternative methods of testing

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Craine et al., 2009 CBA – [–] UK (Wales)	Community; Substance misuse service Clients tested during first year of routine DBS testing compared to clients tested in the previous year.	DBS testing delivered by drugs workers.		●		226 clients tested (202 DBS and 24 venipuncture); 34% of all clients. 35 clients tested in previous year (all venipuncture)

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Hickman et al., 2008 RCT + [+] UK (England & Wales)	Drug treatment clinics (n=22) and prisons (n=6) IDUs attending 28 clinics; 14 clinics received the intervention and 14 clinics acted as controls.	DBS testing delivered by drugs workers. Staff received training prior to intervention start and HCV specialist nurses provided ongoing support.		↑		Significantly higher increase in testing in 13 out of 14 intervention and control pairs (average 12% vs. 2%; p=0.002).
Rainey et al., 2005 CS – [+] USA	Community; Various settings 19,377 clients tested using DBS testing kit via hotline, methadone and outreach programmes and other health and community services; 23,351 tested via state laboratory	Free DBS testing kits available via telephone hotline, methadone and outreach programmes and other health and community services		●		52% and 53% of clients who received a DBS testing kit via the hotline or other health and community services received their test results compared to 74% tested via the state laboratory. Number receiving tests in methadone/outreach clinics was not known (assumed 100% and 87%, respectively).
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control (p<0.05); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; CS = case series; CSS = cross-sectional study; UBA = uncontrolled before and after study; HBV = hepatitis B virus; HCV = hepatitis C virus; DBS = dry blood spot;						

Table 5. Summary of study characteristics: enhancing case finding and testing uptake in primary care

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Anderson et al., 2009 NRCT + [+] UK (Scotland)	Community; General practice N=2,079 current and former IDUs; 1,165 were patients in the intervention practice and 914 were patients in the control practice.	Opportunistic, age criterion based HCV screening intervention. Eligible individuals attending for a non-urgent appointment with a GP or practice nurse offered HCV screening and given HCV information leaflet.		●		In the intervention practice, 72% (421/584) of eligible attendees, offered and 28% (117/421) accepted testing; 13% (15/117) tested positive for HCV. No individuals in control practice tested for HCV.

Cullen et al., 2011 NRCT + [++] UK (Scotland)	Community; General Practice Former IDUs in 16 practices; 8 intervention practices and 8 control practices.	Eligible individuals provided with information and offered a HCV test. Patients received pre- and post-test discussion from a GP or nurse. Individuals testing positive offered referrals for specialist evaluation and treatment.		●		In intervention practice: 218 offered a test, 121 accepted and 105 tested. Of practice population, 0.81% tested. In control practices: 0.25% of practice population tested (n=36).
Roudot-Thoraval et al., 2000 RCT + [+] France	Community; General practice 184 GPs; 94 GPs received assistance in their screening approach and 90 GPs acted as controls.	HCV testing prescribed if risk factors for infection identified during questioning of patients; GPs were assisted in their screening approach by posters and leaflets on the risk factors of HCV, available in the waiting room.		↑ patient requests		No significant difference in number of HCV tests prescribed by GPs in the intervention and control conditions (n=294 vs. n=323). HCV testing at the request of patient significantly greater in intervention than control condition (35.7% vs. 19.5%).
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; NRCT = non-randomised controlled trial; HCV = hepatitis C virus; GP = general practitioner; IDU = injecting drug user						

Table 6. Summary of study characteristics: increasing the type of settings that provide hepatitis C services

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Hagedorn et al., 2007 CS – [+] USA	Community; Drugs service 275 veterans with HCV infection scheduled to attend a Healthy Liver Group session; 171 patients attended a session.	Healthy Liver Program. Testing for HBV and HCV added to routine blood work for patients attending the service, and all patients scheduled to attend a Healthy Liver Group session (educational session plus individualised nurse appointment to review screening results).			●	67% (115/171) attended group session; 113 had testing results. 17% tested positive for HCV antibody and 12% had confirmed infection. 78% (7/9) attended their intake appointment.
Hagedorn et al., 2010 UBA – [+] USA	Community; Drugs service 102 veterans receiving substance use services	Healthy Liver Group. Participants received basic information about liver health and hepatitis and individualised review of testing results with a nurse.	●	●		Increase in basic knowledge of hepatitis; pre 55.8% *vs*. post 79.4%. Statistically significant changes in knowledge on all questions. Increase in % participants that would get tested that day: pre 23.5% *vs*. post 72.5%

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Harris et al., 2010 CS – [+] USA	Community; Drugs services 291 patients attending drugs services; 21 received treatment on-site and 63 off-site	HCV clinical protocol. Comprehensive on-site hepatitis C service including testing, vaccination and treatment.		●		99% patients received HCV-antibody testing and basic HCV counselling. 188 (65%) patients had positive HCV antibody tests. 21 patients initiated on-site treatment at time of review. SVR achieved in 8 patients.
Hennessy et al., 2007 UBA – [+] USA	Community; Sexual health clinic IDUs attending for services at an STD clinic (~46,000 visits to the clinic).	Hepatitis service integration. New protocols and pathways agreed, educational material displayed in the clinic, staff training carried out, new data system developed.		●		>2,800 clients were tested for HCV (8% positive). In first year of integration, no significant differences in number of clinician visits or HIV tests performed compared with previous year; 13% increase in total client visits to the clinic.
Jack et al., 2008 CS – [–] UK (England)	Community; General practice 353 patients attending opiate substitution clinics	Clients referred to a clinical nurse specialist in hepatitis before or after seeing their GP/drug worker. Derived a set of criteria for the safe treatment of IDUs to identify suitable clients.		●	●	266/353 patients agreed to HCV testing; 118 met treatment criteria; 2 patients underwent liver biopsy. 30/118 commenced on combination therapy and 21 reached an end point; 13 achieved SVR.
Lindenburg et al., 2011 CS – [+] The Netherlands	Community; Drugs service 578 drug users; 497 ACS participants; 81 referred from methadone clinics and other addiction clinics.	Multidisciplinary unit linking doctors and nurses with a liver specialist, psychiatrist, and virologist and with addiction specialists and case-load managers. HCV testing and treatment provided on-site for drug users.		●	●	528 (91%) patients accepted testing for HCV. 58 patients initiated treatment. 57 individuals had sufficient follow-up, 37 achieved SVR.
Rosenberg et al., 2010 RCT + [+] USA	Mental health programme 236 patients with co-occurring mental health and substance use disorders; 118 received STIRR intervention and 188 acted as controls and were directed to off-site services.	Direct provision of BBV services (STIRR). Three intervention sessions over 3 months covering BBV education, HBV/HCV/HIV testing, pre/post counselling, HAV/HBV vaccination, risk reduction education and medical referral as required. Clinical staff trained to deliver the intervention.	↑	↑	●	STIRR participants reported greater knowledge about hepatitis and risk factors than controls. STIRR participants had higher rates of acceptance than controls for HBV testing (86% vs. 19%) and HCV testing (86% vs. 15%). No difference in number of medical visits between STIRR and control participants self-reporting HCV positive status (81% vs. 75%).

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Sahajian et al. 2011 RCT + [–] France	Community; Shelters 2,636 participants from 18 shelters; 12 shelters received the intervention (6 testing by referral [S1]; 6 shelter-based testing [S2]) and 6 shelters acted as controls	Outreach screening programme: group information session about the benefits of screening followed by individual consultation. (S1) Testing and results by referral or (S2) testing undertaken in the shelter.		↑		Screening completion significantly higher in: S1 *vs*. controls (OR 49.8; 95% CI 26.1-102.1) S2 *vs*. controls (OR 98.5; 95% CI 51.9-200.8). S2 *vs*. S1 (OR 2.0; 95% CI 1.3-2.9).
Skipper et al., 2003 CS – [+] UK (England)	Prison health clinic 1,618 new prisoners	Health awareness lecture on reception into prison; invited to attend clinic for pre/post test counselling and testing for HBV, HCV and HIV. Patients testing positive followed a prescribed pathway including treatment if eligible.		●	●	137 (9%) prisoners requested testing for HCV. 58 (42%) HCV antibody positive; 41 (30%) HCV RNA positive.
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; NRCT = non-randomised controlled trial; CS = case series; CBA = controlled before and after study; UBA = uncontrolled before and after study; GP = general practitioner; HBV = hepatitis B virus; HCV= hepatitis C virus; IDU = injecting drug users; ACS = Amsterdam Cohort Study; STIRR = Screen, Test, Immunize, Reduce risk, and Refer						

Table 7. Summary of study characteristics: other approaches to increase access to hepatitis C services

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Aitken et al., 2002 CS – [+] Australia	Community; Needle and syringe programme N=47 current IDUs tested for HCV; 20 IDUs followed up.	Free HCV testing and pre- and post-test structured counselling. Delivered by peer outreach worker (accredited HIV and HCV test counsellor and trained venepuncturist). IDUs were informed of the intervention through advertisements in the service and a local hepatitis C publication and by staff.	●			Correct responses regarding transmission risks were significantly greater at follow-up (means 2.4 vs. 5.4; $p<0.005$ for pre vs. post).

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Foucher et al., 2009 CS – [+] France	Community; Outreach 298 drug users in two street-based outreach services.	Offered non-invasive evaluation of liver fibrosis with FibroScan by outreach workers. Participants also offered counselling and testing for HIV, HBV and HCV and a meeting with a hepatologist in a centre in the city.		●		100% accepted Fibroscan. 76% had blood sample taken; FibroScan led to 8.6% new diagnosis of HCV infection.

The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; NRCT = non-randomised controlled trial; CS = case series; CBA = controlled before and after study; UBA = uncontrolled before and after study; GP = general practitioner; HBV = hepatitis B virus; HCV= hepatitis C virus; IDU = injecting drug users; ACS = Amsterdam Cohort Study; STIRR = Screen, Test, Immunize, Reduce risk, and Refer

Table 8. Summary of study characteristics: interventions aimed at professionals undertaking hepatitis C testing

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Cullen et al., 2006 RCT ++ [++] Ireland	Community; General practices Health professionals and their patients identified as current or former drug users in 25 practices; 13 intervention practices and 12 control practices	Implementation of clinical guidelines for the management of HCV supported by practice based educational consultation sessions and nursing support.		↑	●	Intervention patients significantly more likely than controls to have been screened for HCV (49% vs. 27%; AOR 3.76 95% CI 1.3-11.3; p=0.02). Intervention patients more likely than controls to have been referred to a hepatology clinic for assessment, (60% vs. 32%; AOR 3.15 95% CI 0.9-10.7; p=NS)
Defossez et al., 2008 Repeated CSS + [+] France	One healthcare region Trends in screening practices among at-risk populations; 1997, N=69; 2000, N=58; 2003, N=96	Implementation of national priorities through HCV management guidelines, media campaigns, creation of a monitoring network and two consensus conferences.		●		Annual screening coverage rate increased (40%) during the study period; number of positive tests fell (53%). No significant change in patient management for liver biopsy or adherence to guidelines.
D'Souza et al., 2004 UBA – [–] UK (England)	Community; Primary care Health professionals; 43 attended educational sessions and 164 completed a postal information sheet	Educational programme consisting of lunch-and-learn sessions.	●			Significant improvement in % correct responses on all eight knowledge questions. % correct responses following post test were all > 85%.

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Fischer et al., 2000 UBA – [+] USA	Community; primary care Health professionals (primary care doctors and nurses) in 17 clinics; N=1,131 staff	Brief educational sessions, including presentations on: general information about HCV, predictive factors, therapy, treatment response and types of treatment.	●			84% (501/597) staff attended sessions on HCV screening. 13% vs. 72% attendees answered all 3 questions correctly, at pre- and post-test, respectively.
Garrard et al., 2006 UBA – [–] USA	Veterans Affairs Medical Centres 54 health professionals from 28 sites.	Continuing medical education; 6-week needs assessment and 2-day CME programme. Included developing an action plan: setting goals, creating an integrated HCV clinic, identifying resources and barriers.	●	●	●	Participants' knowledge ($p<0.001$) about HCV and confidence ($p<0.01$) about screening, diagnosis, treatment and follow up increased significantly. HCV screening increased in 15% sites after 1 month; 27% sites reported an increase in the number of patients receiving antiviral treatment at 6 months.
Helsper et al., 2010 NRCT + [+] The Netherlands	Community; Primary care Health professionals in two healthcare regions; 1 region received intervention (support programme + public campaign) and 1 region acted as a control (public campaign only).	Support programme for primary care; distribution of educational materials, educational sessions for GPs on HCV management, in-practice support. Public campaign consisted of radio and newspaper ads and information material distributed at public places.		●		Increase in testing in intervention region, 2.2 times (95% CI 1.5-3.3) as high as control region. Non-significant increase in % positive tests in intervention vs. control regions: 2.6% (95% CI –0.7% to 5.8%).
Sahajian et al., 2004 UBA – [+] France	Community; Primary care 1,433 GPs and 1,619 'specialists'.	Help guide on HCV screening sent to all private practitioners. Screening workshops also provided. 1-year public screening campaign ran alongside.		●	●	15,952 HCV serology tests prescribed by 59% (1,798/3,052) practitioners. Overall the number of tests increased significantly (pre: 13,799 *vs*. post: 15,952; +15.6%) Increase in number of HCV RNA tests performed during the campaign (GPs: pre 135 vs. post 173; specialists: pre 96 vs. post 103)
Zdanuk et al., 2001 CBA – [–] Canada	Community; Primary care 10 doctors in rural areas; 6 doctors had used the CD and 4 had not.	Questionnaire and HCV CD-ROM programme.	●			Increases in physician confidence ranged from a 1.7 to 15.2 fold higher increase in users compared to non-users.

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control ($p<0.05$); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; NRCT = non-randomised controlled trial; CBA = controlled before and after study; UBA = uncontrolled before and after study; HBV = hepatitis B virus; HCV = hepatitis C virus; IDU = injecting drug users; CME = continuing medical education; RNA = ribonucleic acid						

Table 9. Summary of study characteristics: enhancing access to follow-up hepatitis C services and treatment

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Douchette et al., 2009 CO – [+] Canada	Secondary care services 1,563 patients referred to a hepatitis support programme; 336 patients were self-referrals	Alternative remuneration plan whereby testing service could accept self-referrals			↔	326 (34.3%) participants received treatment (66 self- vs. 260 health professional-referred; p=0.5).
Grebely et al., 2007 CS – [–] Canada	Community; Primary care 80 former and current IDUs with HCV infection	Weekly support group for current and former IDUs with HCV infection. Group discussion facilitated by addiction counsellors (nurses and research staff)			●	26% had initiated or completed treatment for HCV infection; 18 received care on site, 12 patients completed or discontinued treatment; 67% responded to therapy.
Grebely et al., 2010 CS – [–] Canada	Community; Primary care 204 IDUs with HCV infection	Weekly HCV support group at a health clinic. one-on-one, medical assessments, HCV laboratory testing, treatment education and ongoing assessments during antiviral therapy			●	53% assessed for HCV infection, 57 initiated treatment after accepting referral to the HCV group.
Moussalli et al., 2010 CBA – [+] France	Community; Drugs services 337 patients attending addiction services; 224 underwent evaluation at the centre and 113 referred to hospital acted as historical controls	HCV patients attended on-site for treatment with a multidisciplinary team rather than receiving referral to hospital			↑	85/224 patients were treated onsite for HCV: 38% compared to 2% treatment uptake before the intervention ($p<0.001$).

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Surjadi et al., 2011 UBA – [+] USA	Secondary care 201 HCV-infected individuals within San Francisco's safety net healthcare system	HCV diagnosis made in primary care and individuals referred for HCV education delivered by a Hepatology nurse practitioner prior to a scheduled appointment at liver speciality clinic.	●		↑	Overall mean percent knowledge score at baseline = 61 points. Increase in knowledge following HCV education (mean change % score = 14 points; p<0.0001). After education, 94% participants indicated an interest in HCV treatment and referral to a liver specialist. Significantly greater attendance following referral in intervention group compared to historical controls (64% vs. 39%).
Wilkinson et al. 2008 CS – [+] UK (England)	Community; outreach clinic 441 IDUs testing positive for HCV	Patients offered appointments at local liver unit. Monthly outreach clinics established to tackle poor attendance. Patients who expressed interest in anti-viral therapy were reviewed.			●	19% patients attended outreach liver clinic for consideration of treatment. 58 patients completed treatment; 47 (81%) compliant. 51% (25/49) patients achieved SVR.
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control (p<0.05); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; CS = case series; UBA = uncontrolled before and after study; HCV = hepatitis C virus; IDU = injecting drug users; SVR = sustained viral response						

Table 10. Summary of study characteristics: Contact tracing

Study	Target population	Intervention components	Results			
			Knowledge	Testing uptake	Follow-up services	Notes
Brewer & Hagan, 2009 CS – [–] USA	Community 26 IDUs who were positive for HBV or HCV infection Mean injecting partners: 17 (range 2-58; median 16)	Contact tracing and partner referral. Participants asked to list injection partners in the past year and given vouchers worth $5-15 to give to partners.			●	23/26 cases agreed to refer one or more partners. 36% (160/447) of elicited partners sought for referral. 10% referral vouchers were redeemed (linked to 9 cases); 8 vouchers were matched to a partner sought for referral by the index case.
The quality rating for external validity for each study is provided in square brackets following the study and quality rating for internal validity. Abbreviations: ↑ = significant increase relative to control (p<0.05); ↔ = no change or non-significant change; ● = no control group for comparison or significance relative to control not reported; RCT = randomised controlled trial; CS = case series; UBA = uncontrolled before and after study; HBV = hepatitis B virus; HCV = hepatitis C virus						

5.1 Offering acceptable or alternative methods of testing

5.1.1 Summary of identified studies and quality assessment

Three studies that examined interventions designed to enhance access to testing through offering alternative methods of testing were identified for inclusion. Two studies (Craine et al., 2009 [CS –]; Hickman et al., 2008 [RCT +]) were from the UK and examined the impact of offering dried blood spot (DBS) testing as an alternative to venipuncture in substance misuse services (Craine et al., 2009 [CBA –]) and in drug clinics and prisons (Hickman et al., 2008 [RCT +]). The study by Craine and colleagues (2009 [CBA –]) was based on a clinical audit and compared testing uptake during the period in which DBS testing was introduced to the previous year. Hickman and colleagues (2008 [RCT +]) randomised services to offer DBS testing undertaken by drugs workers or testing as usual. In addition, one study (Rainey et al., 2005 [CS –]) examined the provision of DBS testing kits for high-risk groups, particularly IDUs. DBS testing kits were obtained via a telephone hotline, through methadone and outreach programmes, or health and community organisations.

Of the included studies one was a cluster RCT (Hickman et al., 2008), one was defined as a CBA study (Craine et al., 2009), and one was a case series (Rainey et al., 2005). The RCT was rated [+] quality and the remaining two studies, [–] quality. The internal validity of the RCT (Hickman et al., 2008) was potentially affected by inconsistency in exposure to the intervention, however, this is likely to reflect 'real world' practices in services. Additionally, the authors questioned whether the study was adequately powered to detect an intervention effect. The CBA (Craine et al., 2009) utilised a retrospective comparison group rather than a true control group and was therefore limited in the extent to which an intervention effect could be established. The study by Rainey and colleagues (2005) also lacked a comparison group and the purpose of the study was to describe the programme rather than determine effectiveness.

5.1.2 Effects on measures of testing uptake

All three studies examined the impact of offering alternative methods of testing on testing uptake. Hickman and colleagues (2008 [RCT +]) found a significant positive effect on the proportion of clients tested at drug clinics in the community and prisons in 13 out of 14 matched pairs of intervention and control sites ($p<0.01$). A significant overall positive effect of introducing DBS testing was reported when all intervention sites were compared to the control sites (10.8%; 95% CI: 0.1% to 21%; $p<0.05$). However, the authors noted that the size of the difference of the treatment effect varied considerably between intervention and control sites (ranging from -0.5% to 69.4% across paired sites). The author noted that the two sites with the highest difference in treatment effect (65.2% and 69.4%) attributed the increase "simply to an interest in HCV" (Hickman et al., 2008 [RCT +]; pg. 253). Craine and colleagues (2009 [CBA –]) found that the number of IDUs tested for hepatitis C after DBS testing was introduced (n=202) was nearly six times greater than the number tested off-site by venipuncture in the previous year (n=35; p value for comparison not reported).

The evaluation of four programmes providing access for IDUs to DBS testing kits (Rainey et al., 2005 [CS –]) found that in total, 67% of 11,215 clients requesting a testing kit returned their kit and received test results (range 52% to 100%). Those clients represented 39% of 19,377 clients who contacted any of the programmes during the study period and were assessed for whether they needed to be tested. In comparison, 74% of people tested via the state laboratory received their test

results. Testing resulting from hotline contact was highest during media campaigns, which appeared to be particularly effective for the targeted high risk groups.

5.1.3 Summary and evidence statements

Three studies (Craine et al., 2009; Hickman et al., 2008; Rainey et al., 2005) were identified that aimed to enhance access to testing by offering alternative methods of hepatitis testing. These studies evaluated the impact of the provision of DBS testing available in substance misuse services in the community (Craine et al., 2009 [CBA –]; Hickman et al., 2008 [RCT +]; Rainey et al., 2005), in prisons (Hickman et al., 2008 [RCT +]) and via a telephone hotline (Rainey et al., 2005). All three studies examined outcomes relating to testing uptake. The RCT (Hickman et al., 2008 [RCT +]) reported that a significant increase in the average rate of testing was observed in services that offered DBS testing compared to controls. However, the authors noted that the size of the treatment effect varied across the paired intervention and control sites examined. Craine and colleagues (2009 [CBA –]) found that compared to number of tests carried out in the previous year, there were increases in numbers tested after the introduction of DBS testing into the drug services examined. The authors suggest that the increase may be due in part to an increase in test availability, as well as the 'simplicity' of the DBS testing method. Providing high-risk groups with access to the DBS testing kits for hepatitis C was not viewed by the study authors (Rainey et al., 2005 [CS –]) as a particularly effective use of resources compared to testing via the state laboratories.

Evidence statement 4: Offering acceptable or alternative methods of testing

(i) There is moderate evidence from one RCT (Hickman et al., 2008 [RCT +]) and one CBA study (Craine et al., 2009 [CBA –]) to suggest that offering DBS testing to IDUs attending substance misuse services may increase uptake of hepatitis C testing compared to venipuncture alone being offered. The increase in uptake may reflect an increase in testing availability, as more staff can be trained to deliver DBS testing than venipuncture, as well as higher acceptability to IDUs.

(ii) There is weak evidence from one CS study (Rainey et al., 2005 [CS –]) to suggest that providing high-risk groups with access to DBS testing kits via a telephone hotline is not an effective use of resources compared to testing via state laboratories.

Applicability

(i) This evidence is directly applicable to the UK as both studies were conducted in drug services and prisons in the UK.

(ii) This evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis C infection in the UK.

5.2 Enhancing case finding and testing uptake in primary care

5.2.1 Summary of identified studies and quality assessment

Three studies evaluated interventions designed to enhance case finding and testing uptake in primary care. A study conducted in France (Roudot-Thoraval et al., 2000 [RCT +]) examined the impact of training for general practitioners (GP) on hepatitis C and initiation of a hepatitis C screening programme. In the intervention arm of the study, GPs were assisted with the screening programme through the provision of information (posters and leaflets) in surgery waiting rooms.

Two studies from the UK (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) evaluated opportunistic case finding in general practices in areas of high injecting drug use and hepatitis C prevalence. Both case finding interventions targeted individuals aged 30 to 54 years attending for non-urgent appointments with a GP or practice nurse, but the intervention examined by Cullen and colleagues (in press [NRCT +]) also limited case finding to individuals with indicators of past injecting drug use. In addition, as part of this intervention, GPs were offered remuneration for each individual they offered a test to.

Of the three studies, one was an RCT based on individual randomisation (Roudot-Thoraval et al., 2000) and two were NRCTs (Anderson et al., 2009; Cullen et al., in press). The RCT by Roudot-Thoraval and colleagues (2000) was rated [+] quality with adequate detail reported on all aspects of the quality assessment. Both NRCTs (Anderson et al., 2009; Cullen et al., in press) were rated [+] quality also; for both studies, estimates of effect size were not reported and were not calculable. In addition, levels of significance were only presented or calculable for some outcomes.

5.2.2 Effects on measures of testing uptake

All three studies examined outcomes relating to uptake of testing. The RCT (Roudot-Thoraval et al., 2000 [RCT +]) found that there was no significant difference in the number of tests carried out in general practices with and without assistance with the screening programme (GPs with assistance: n=294 vs. GPs without assistance: n=323). In practices that received assistance, however, a significantly higher proportion of tests were initiated at the patients request, rather than following invitation to be tested by the GP (GPs with assistance: 35.7% vs. GPs without assistance: 19.5%; $p<0.001$). However, as noted by the authors, although this demonstrated the value of providing information to patients, the increase in patient requests for testing did not lead to an increase in testing overall. Two NRCTs (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) evaluated the impact of opportunistic case finding on testing uptake within general practices in Scotland. Anderson and colleagues (2009) found that of 584 patients meeting the eligibility criteria during the study period, 72% (n=421) were offered testing[8]. Overall, 28% (117/421) of patients offered testing at the intervention practice were tested, while no individuals in the comparison practice were tested during the study period. The case finding intervention examined by Cullen and colleagues (in press [NRCT +]) specifically targeted former IDUs but reported broadly similar findings to the previous study (Anderson et al., 2009 [NRCT +]). In intervention practices, of 422 patients eligible within the study period, 218 were offered testing (52%, range 5% to 88%). Reasons for the non-offer of testing were not reported. Of patients offered a test, 121 accepted[9] and 105 patients (25%) were tested. Poor venous access prevented testing in 13 patients. Within control practices, 36 individuals representing 0.25% of the total practice population aged 30 to 54 years were tested for hepatitis C during the study period; the comparable rate in intervention practices was 0.8%.

[8] The authors report that the main reasons for the non-offer of testing (available for around 70% of patients not offered testing) were: that the GP "forgot to offer" (31%); patient had mental health problems, including problem alcohol use (21%); the offer was judged to be inappropriate at the time (16%); doctors had "insufficient time" (13%); the patient was already known to be infected and in secondary care follow-up (10%); and the patient was "unstable/intoxicated" (9%).

[9] The authors report that the four most common reasons for test refusal were: had never injected drugs (15%); poor venous access (13%); patient was already attending an HCV specialist (12%); and patient had previously received an HCV positive diagnosis (13%).

5.2.3 Effects on uptake of, or adherence to, follow-up services and/or treatment

Two UK studies (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) examined the impact of opportunistic case finding in Scottish general practices on follow-up outcomes within the intervention arm of the study. Anderson and colleagues (2009 [NRCT +]) reported that 73% (n=11/15) of patients testing positive accepted referral to a specialist clinic and all attended at least one appointment. However, 72% (n=8/11) dropped out before undergoing liver biopsy or prior to treatment being initiated. Cullen and colleagues (in press [NRCT +]) reported that 52% (n=13/25) of patients referred to specialist clinics after a positive test failed to attend. Neither study examined reasons for non-attendance at follow-up appointments.

5.2.4 Summary and evidence statements

Three studies (Anderson et al., 2009; Cullen et al., in press; Roudot-Thoraval et al., 2000) were identified that evaluated interventions designed to enhance the uptake of testing in primary care. One study (Roudot-Thoraval et al., 2000 [RCT +]) found that there was no difference in the number of patients tested for hepatitis C among GPs who received training and assistance with screening compared with GPs receiving training only. The number of patient requests for testing was significantly greater in the practices that received assistance with screening but this did not impact on the overall numbers tested. Two studies (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) suggested that targeted case finding in primary care had a positive impact on the number of patients offered and accepting a test. These studies (Anderson et al., 2009; Cullen et al., in press [both NRCT +]) also examined the effect of case finding on the uptake of follow-up services and treatment, suggesting a mixed impact of interventions on numbers of clients starting treatment after a referral. Cullen and colleagues (in press [NRCT +]) noted that further support may need to be provided to address patient's failure to attend appointments with follow-up services.

Evidence statement 5: Enhancing case finding and testing uptake in primary care

(i) There is moderate evidence from one RCT (Roudot-Thoraval et al., 2000 [RCT +]) to suggest that although providing GPs with both training and assistance with screening (through the use of patient-targeted materials) may increase patient requests for testing is does not impact upon the number of patients tested for hepatitis C overall.

(ii) There is moderate evidence from two NRCTs (Anderson et al., 2009 [NRCT +]; Cullen et al., in press [NRCT +]) to suggest that targeted case finding in primary care for patients with a history of injecting drug use may have a positive impact on the number of patients who are offered and accept a hepatitis C test. Although the level of referral of patients identified with infection was relatively high, the number of subsequent dropouts prior to treatment indicates that there is a need for further support beyond the intervention offered in these studies.

Applicability

(i) This evidence may only be partially applicable to the UK as the study was conducted in a region of France subject to a national hepatitis C campaign during the study period.

(ii) This evidence is directly applicable to the UK as both studies were conducted in general practices in the UK. However, it should be noted that settings were selected on the basis of high IDU and hepatitis C prevalence and therefore the evidence may not be applicable to settings with low prevalence.

5.3 Increasing the type of settings that provide hepatitis C services

5.3.1 Summary of identified studies and quality assessment

Nine studies were identified for inclusion that examined whether provision of hepatitis C services in different settings increased access to testing, follow-up and treatment. Five of the seven studies (Hagedorn et al., 2007; Hagedorn et al., 2010; Harris et al., 2010; Hennessy et al., 2007; Rosenberg et al., 2010) were conducted in the USA, two in the UK (Jack et al., 2009; Skipper et al., 2003) and one each in France (Sahajian et al., 2011) and The Netherlands (Lindenberg et al., 2010). Studies examined the provision of services:

- for current and former IDUs at an addiction centre (Lindenberg et al., 2010 [CS –]);
- within Shared Care clinics (general practices with a special interest in substance misuse) (Jack et al., 2009 [CS–]);
- within methadone maintenance treatment services (Harris et al., 2010 [CS –]);
- for veterans with substance misuse disorders (Hagedorn et al., 2007 [CS –]; Hagedorn et al., 2010 [UBA –]);
- for underprivileged people in city homeless shelters (Sahajian et al., 2011 [RCT +]);
- for new prisoners on reception into prison (Skipper et al., 2003 [CS –]);
- within a sexual health clinic (Hennessy et al., 2007 [UBA –]); and
- at mental health treatment sites for patients with co-occurring mental health and substance abuse disorders (Rosenberg et al., 2010 [RCT +]).

Study designs utilised across the nine studies included two RCTs based on individual (Rosenberg et al., 2010 [RCT +]) and cluster (Sahajian et al., 2011 [RCT +]) randomisation, two UBA studies (Hagedorn et al., 2010; Hennessy et al., 2007 [UBA –]) and five case series (Hagedorn et al., 2007 [CS –]; Harris et al., 2010; Jack et al., 2009; Lindenberg et al., 2010; Skipper et al., 2003). Both RCTs (Rosenberg et al., 2010 [RCT +]; Sahajian et al., 2011 [RCT +]) were rated [+] quality; both studies were reported clear and based on appropriate methodology and analyses. However, Sahajian and colleagues (2011) did not provide sufficient detail about the sample, the content of the educational aspects of the intervention. The two UBA studies (Hagedorn et al., 2010; Hennessy et al., 2007 [UBA –]) were rated [–] quality on the basis of the uncontrolled study design and poor reporting of analysis items. In addition, the study by Hennessy and colleagues (2007 [UBA –]) did not clearly report the number of eligible participants. Five case series (Hagedorn et al., 2007 [CS –]; Lindenberg et al., 2010 [CS –]; Harris et al., 2010 [CS –]; Jack et al., 2009 [CS –]; Skipper et al., 2003 [CS –]) were rated [–] quality as they lacked a control or comparison group. However, in all studies other aspects of the methodology, outcomes and analyses were generally adequate.

5.3.2 Effects on measures of testing uptake

Three studies evaluated the impact of integrating testing and treatment for hepatitis within substance use clinics on uptake of testing. An uncontrolled evaluation of a multidisciplinary unit providing hepatitis C treatment and testing for current and former drug users within addiction service (Lindenberg et al., 2010 [CS –]) found that among clients accessing the service, testing was accepted by 91% of clients. Hagedorn and colleagues (2007 [CS –]) examined the impact of the Healthy Liver Programme on veterans attending substance use disorder clinics. The study found that introducing routine testing for hepatitis B and C improved uptake amongst new clients: (1) from 72%

at baseline to 98% at post-test for hepatitis C testing; and (2) from 14% to 98% for hepatitis B antibody testing. Harris and colleagues (2010) found that following the integration of hepatitis C management and treatment within methadone maintenance services, 289 (99%) clients admitted to the service received testing for hepatitis C. Jack and colleagues (2009 [CS –]) examined the impact of a primary care-based model for hepatitis C services. Clients attending Shared Care clinics were referred to a nurse specialising in hepatitis as part of a shared care pathway with drug workers and GPs. During the study period, 75% (n=266) of clients attending the clinic were tested for blood borne viruses including hepatitis C.

Rosenberg and colleagues (2010 [RCT +]) found that participation in the STIRR programme within mental health treatment sites was associated with significantly higher acceptance of testing for hepatitis B and hepatitis C among patients compared to control sites (hepatitis B testing: 86% vs. 19%; hepatitis C testing: 86% vs. 15%; $p<0.001$).

The RCT by Sahajian and colleagues (2011 [RCT +]) found that uptake of hepatitis C testing was significantly higher among participants who received testing on-site in the shelters compared to the intervention group referred externally for testing (OR 2.0; 95% CI: 1.3 to 2.9), and in comparison to a control group (OR 98.5; 95% CI: 51.9 to 200.8). The rate of testing in the intervention group referred externally was also significantly higher than in the control group (OR 49.8; 95% CI: 26.1 to 102.1). The authors suggested that the positive effects seen in the group receiving on-site testing was most likely due to the close proximity of the testing offer. Providing a group information session and individualised counselling were also thought to have encouraged testing uptake. However, the authors noted that 30% of those accepting a test did not complete one; participants often changed their minds because of a fear of having blood taken.

The evaluation of testing in UK prison health clinics (Skipper et al., 2003 [UBA –]) found that 8.5% (n=137) of new prisoners requested testing for hepatitis C during the 1-year study period. Of 58 prisoners who tested positive for hepatitis C, 24 (41%) had not previously been tested and of the remainder, “few” were aware what the results of previous testing had been or what the results had meant.

Hennessy and colleagues (2007 [UBA –]) evaluated whether the integration of hepatitis services within an STD clinic attracted IDUs to service. They reported that 8,778 clients received at least one hepatitis service over the 46-month study period and 2,800 clients were tested for hepatitis C. Of those tested, 279 (3%) were IDUs. Among IDUs, 58% reported coming to the clinic specifically for hepatitis services.

5.3.3 Effects on knowledge, attitudes and intentions

One study (Rosenberg et al., 2010 [RCT +]) that examined the impact of the direct provision of BBV services in a mental health programme (STIRR) intervention reported intervention effects on knowledge. The study found that knowledge about hepatitis and risk factors, as measured on a 12-point survey, increased significantly among patients receiving the STIRR education programme at mental health treatment sites in comparison to controls ($p<0.001$). Hagedorn and colleagues (2010 [UBA –]) also examined intervention effects on knowledge. An education group for veterans with substance use disorders was found to have short-term benefits on knowledge about hepatitis B and C. A significantly higher number of veterans provided correct answers for all but one question (about

hepatitis C treatment) on the 11-point knowledge survey (all p<0.01) following the intervention. The authors noted that while the education group increased knowledge in several areas, information about hepatitis and sexual contact may not have been communicated effectively.

5.3.4 Effects on uptake of, or adherence to, follow-up services and/or treatment

Five studies reported outcomes relating to the uptake of follow up services or treatment. Of 102 patients tested for hepatitis C after receiving the STIRR intervention (hepatitis services offered at mental health treatment sites; Rosenberg et al., 2010 [RCT +]), 101 (99%) returned to the service to receive their results and post-test counselling. There were no significant differences, however, between intervention and control sites in the number of referrals to secondary care amongst hepatitis C positive patients (81% *vs*. 75%). Lindenberg and colleagues (2011 [CS –]) found that of 76 clients accessing a multidisciplinary unit for drug and hepatitis services and eligible for hepatitis C treatment, 58 (76%) accepted and 18 (24%) refused treatment and were lost to follow-up. Among 57 clients with sufficient follow-up, 37 had achieved a sustained virological response (SVR). Hagedorn and colleagues (2007 [CS –]) evaluated the impact of a Healthy Liver group session for hepatitis C antibody positive veterans attending a drug service. One hundred and seventy one clients were given appointments for the group, and 67% (n=115) attended during the study period. Nine patients with newly identified chronic hepatitis C infection subsequently received a referral for evaluation in a hepatitis clinic; 78% (n=7) attended their intake appointment. In a third study in a drug treatment setting, Harris and colleagues (2010) found that integration of hepatitis C services resulted in onsite evaluation for 63% (n=118) of clients who tested positive. Of 83 patients identified with chronic hepatitis C infection, 21 initiated treatment, with eight patients achieving an SVR. In a UK study of a primary-care-based model of service delivery, Jack and colleagues (2009) reported that of 43 clients, who met criteria for treatment, two underwent liver biopsy, 30 initiated therapy and 21 clients reached an end point, including 13 clients who achieved SVR.

5.3.5 Summary and evidence statements

Nine studies examined whether provision of testing in different services increased access to testing and follow-up services (Hagedorn et al., 2007 [CS –]; Hagedorn et al., 2010 [UBA –]; Harris et al., 2010 [CS –]; Hennessy et al., 2007 [UBA –]; Jack et al., 2009 [CS –]; Lindenberg et al., 2010 [CS –]; Rosenberg et al., 2010 [RCT +]; Sahajian et al., 2011 [RCT +]; Skipper et al., 2003 [CS –]).

Five studies (Rosenberg et al., 2010 [RCT +]; Lindenberg et al., 2010 [CS –]; Harris et al., 2010 [CS –]; Hagedorn et al., 2007 [CS –]; Jack et al., 2009 [CS –]) found that integration of testing services within community settings, specifically within a mental health programme, drug services and opiate substitution clinics in primary care, had a positive effect on testing uptake. Although uncontrolled, all four studies set within community drug services (Jack et al., 2009 [CS –]; Lindenberg et al., 2010 [CS –]; Harris et al., 2010 [CS –]; Hagedorn et al., 2007 [CS –]) reported a relatively high uptake of testing; however, it should be noted that hepatitis testing was added to routine blood work in the studies by Hagedorn and colleagues (2007 [CS –]) and Harris and colleagues (2010 [CS –]) and therefore a high testing rate was inevitable. Providing outreach testing in shelters (Sahajian et al., 2011 [RCT +]) was also shown to improve testing uptake among at-risk populations, and providing hepatitis services within sexual health clinics (Hennessy et al., 2007 [UBA –]) was considered to have attracted IDUs to attend for testing. Findings from the study of a prison outreach clinic (Skipper et al., 2003 [UBA –]) suggested that it resulted in a relatively low numbers of prisoners accepting a hepatitis C test. .

Five studies (Hagedorn et al., 2007 [CS –]; Harris et al., 2010; Jack et al., 2009; Lindenberg et al., 2010 [CS –]; Rosenberg et al., 2010 [RCT +]) reported outcomes relating to uptake of follow-up services and treatment. Only one study (Rosenberg et al., 2010 [RCT +]) included a control group for comparison, finding that integration of services within a mental health programme did not significantly improve referrals for patients testing positive for hepatitis C. Two uncontrolled studies (Jack et al., 2009 [CS –]; Lindenberg et al., 2011 [CS –]) demonstrated that a multidisciplinary or shared care approach to testing and treatment for hepatitis C in community settings was associated with a relatively high uptake of follow-up services and good treatment outcomes for IDUs. Lindenberg and colleagues (2011) reported that the SVR rate seen in their study was comparable with that in non-drug using populations.

Evidence statement 6: Increasing the type of settings that provide hepatitis C services

(i) There is moderate evidence from one RCT (Rosenberg et al., 2000) and two case series (Lindenberg et al., 2011 [CS –]; Jack et al., 2009 [CS –]) to suggest that providing hepatitis C services in community settings may have a positive impact on testing acceptance and uptake. In particular, there is weak evidence from two case series (Lindenberg et al., 2011 [CS –]; Jack et al., 2009 [CS –]) to suggest that a multidisciplinary or shared care approach to hepatitis C testing and treatment for IDUs is associated with high uptake of follow-up services and treatment outcomes comparable with non-drug using populations. In two studies conducted in the USA (Harris et al., 2010 [CS –]; Hagedorn et al., 2007 [CS –]), hepatitis testing was added to routine blood work undertaken on entry to drug services and therefore a high testing rate was inevitable.

(ii) There is moderate evidence from one RCT (Sahajian et al., 2011 [RCT +]) to suggest that the provision of testing services via outreach may have a positive impact on testing acceptance and uptake. The impact may be greatest when testing is offered on-site rather than by referral.

(iii) There is weak evidence from one UBA study (Skipper et al., 2003 [UBA –]) to suggest that the provision of hepatitis C outreach services for new prisoners may lead to relatively low uptake of testing.

Applicability

(i) This evidence may only be partially applicable to the UK as studies were conducted in the context of healthcare systems in The Netherlands and USA.

(ii) This evidence is not likely to be applicable to the UK. This study was conducted in France and the study population included a high proportion of migrants in a shelter setting bearing similarities to social housing.

(iii) This evidence is directly applicable to the UK as the study was conducted in UK prisons.

5.4 Other methods of enhancing access to testing services

5.4.1 Summary of identified studies and quality assessment

Two studies were identified that examined other methods of enhancing access to testing services were identified for inclusion. One study from Australia (Aitken et al., 2002 [CS –]) evaluated the impact of a peer outreach worker who offered testing for hepatitis C and pre- and post-test counselling and education to current IDUs at a needle and syringe programme (NSP). One study from France (Foucher et al., 2009 [CS –]) examined the role of FibroScan (a non-invasive method for the assessment of liver fibrosis that has been developed to replace liver biopsy) on hepatitis C screening

and management in an outreach setting. In France, such methods have been recommended for the initial evaluation of liver fibrosis in hepatitis C treatment-naïve patients. Following FibroScan and regardless of FibroScan results, clients were offered blood testing for hepatitis C.

The study by Aitken and colleagues (2002 [CS –]) was a case series with no comparison group and consequently was rated [–] quality. The case series of Fibroscan in an outreach setting was also rated [–] quality. Although in general sufficient detail was provided on methodology and outcomes, the study was limited through not utilising a comparison group.

5.4.2 Effects on measures of testing uptake

Foucher and colleagues (2009 [CS –]) evaluated the impact of offering FibroScan to IDUs in street outreach programmes on uptake of hepatitis C testing. The study found that all individuals offered FibroScan (n=298) in an outreach setting accepted and that the vast majority (98%) also accepted the offer of blood testing for hepatitis C; 221 clients (76%) were subsequently tested. Of those tested, 18% had either not or could not recall having previously been tested for hepatitis C. One hundred and ninety-eight patients reported a past history of negative or unknown hepatitis C status and of these 9% (n=17) were identified as hepatitis C positive.

5.4.3 Effects on knowledge, attitudes and intentions

One study (Aitken et al., 2002) evaluating the impact of transferring responsibility of testing to an outreach worker to enhance access to testing reported outcomes related to knowledge about hepatitis C. IDUs' knowledge about hepatitis C transmission was significantly greater at follow up ($p<0.01$), following education counselling by an outreach worker at a needle exchange program before and after testing for hepatitis C.

5.4.4 Summary and evidence statements

One study (Aitken et al., 2002) was identified that examined enhancing access to testing through transferring responsibility of testing to another professional group. The study evaluated the impact of a peer outreach worker offering testing and education to IDUs, who were prompted to the service through advertisements and by staff in a needle exchange program. The study evaluated the impact on knowledge outcomes only and reported positive intervention effects on knowledge of hepatitis C transmission.

One study (Foucher et al., 2009) was identified that evaluated the impact of offering FibroScan to IDUs in street outreach programs and reported outcomes relating to testing uptake only. Foucher and colleagues (2009) reported that FibroScan was acceptable to IDUs and following FibroScan over three-quarters of participants were tested for hepatitis C.

Evidence statement 7: Other approaches to enhance access to hepatitis C testing

(i) There is weak evidence from one case series (Foucher et al., [CS –]) to suggest that offering a non-invasive liver evaluation technique in outreach settings provides an opportunity to subsequently test IDUs for hepatitis C.

(ii) There is weak evidence from one case series (Aitken et al., 2002 [CS –]) that education by a peer outreach worker may improve short-term knowledge about hepatitis C transmission among IDUs.

Applicability

(i) This evidence is only partially applicable to the UK as the study was conducted in France where non-invasive techniques such as Fibroscan are recommended for the initial evaluation of liver fibrosis.

(ii) This evidence is only partially applicable to the UK as the study was conducted in Australia.

5.5 Aimed at professionals

5.5.1 Summary of identified studies and quality assessment

Eight studies were identified that evaluated interventions designed to improve health professionals' practice in relation to hepatitis C. Three studies were from North America (USA: Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]; and Canada: Zdanuk et al., 2001 [CBA –]), two were from France (Defossez et al., 2008 [CSS +]; Sahajian et al., 2004 [UBA –]), and one study each was from the UK (D'Souza et al., 2004 [UBA –]), Ireland (Cullen et al., 2006 [RCT ++]), and The Netherlands (Helsper et al., 2010 [NRCT +]). Four studies evaluated interventions that targeted GPs only (Cullen et al., 2006 [RCT ++]; D'Souza et al., 2004 [UBA –]; Helsper et al., 2010 [NRCT +]; Zdanuk et al., 2001 [CBA –]), one study focused on GPs and specialists (Sahajian et al., 2004 [UBA –]) and two studies examined interventions targeting a range of health care professionals in primary care settings (Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]). Defossez and colleagues (2008 [CSS +]) examined the impact of a national campaign to improve uptake of testing and management of hepatitis C in high risk populations, including IDUs. Although the target of the campaign was not clear reported, it's main focus appeared to be improving professional practice.

Three studies (Sahajian et al., 2004; Cullen et al., 2006; Helsper et al., 2010) evaluated complex interventions. Sahajian and colleagues (2004 [UBA –]) evaluated a programme of educational workshops and a help guide that ran alongside a public information campaign. As part of the intervention, practice risk assessments were carried out. Cullen and colleagues (2006 [RCT ++]) reported on a nurse-led 6-month intervention to support the implementation guidelines on the management of hepatitis C in primary care for IDUs. Helsper and colleagues (2010 [NRCT +]) examined an intervention providing educational materials and education sessions for general practitioners in support of a public campaign on increasing awareness of hepatitis C.

Four studies (Fischer et al., 2000 [UBA –]; D'Souza et al., 2004 [UBA –]; Zdanuk et al., 2001 [CBA –]; Garrard et al., 2006 [UBA –]) evaluated education interventions. One study (Fischer et al., 2000 [UBA –]) evaluated an educational outreach programme about hepatitis C consisting of brief education sessions and one study (D'Souza et al., 2004 [UBA –]) evaluated the impact of taking part in a brief hepatitis C education session for GPs. Additionally, Zdanuk and colleagues (2001 [CBA –]) reported on the impact of mailed CD-based programme on hepatitis C care for rural GPs and Garrard and colleagues (2006 [UBA –]) examined an intervention to bring about organisational change in Veterans Affairs Medical Centres. The intervention included a 6-week needs assessment and two day continuing medical education (CME) programme.

Of the eight studies included there was one cluster RCT (Cullen et al., 2006 [RCT ++]), one NRCT (Helsper et al., 2010 [NRCT +]), one CBA (Zdanuk et al., 2001 [CBA –]), four UBA studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]; Sahajian et al., 2004 [UBA –]) and one repeated cross-sectional survey (CSS; Defossez et al., 2008 [CSS +]). The RCT (Cullen et al.,

2006 [RCT ++)) was rated [++] quality for presenting a good research design and well-reported methodology and outcomes. The NRCT (Helsper et al., 2010 [NRCT +]) was rated [+] quality and was also clearly presented. The CBA study (Zdanuk et al., 2001 [CBA –]) was rated [–] quality as study was based on a small sample and the control group study consisted of general practitioners who self-selected not to take part in the intervention. The four UBA studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]; Sahajian et al., 2004 [UBA –]) were all rated poor quality based upon study design and not utilising a control group, although one study (Sahajian et al., 2004 [UBA –]) reported well presented methodology and outcomes. The study by D'Souza and colleagues (2004 [UBA –]) was a brief letter containing insufficient detail to judge whether methodology and analyses were appropriate. The evaluation based on a repeated CSS was rated [+] for quality (Defossez et al., 2008 [CSS +]]. Although outcomes were considered to have been reported well, the evaluation lacked a concurrent comparison group.

5.5.2 Effects on measures of testing uptake

Five studies (Cullen et al., 2006 [RCT ++]; Helsper et al., 2010 [NRCT +]; Sahajian et al., 2004 [UBA –]; Garrard et al., 2006 [UBA –]) examined intervention effects on testing uptake. Cullen and colleagues (2006 [RCT ++]) found that an intervention to support the implementation of clinical guidelines in primary care improved screening rates for hepatitis C amongst patients on methadone maintenance treatment in comparison to controls (intervention: 49% *vs*. control: 27%; AOR 3.76 95% CI 1.3 to 11.3; $p<0.05$). However, the authors noted that the intervention was likely to have considerable resource implications for primary care. Helsper and colleagues (2010 [NRCT +]) found that the intervention region (where an additional support programme was provided) experienced a greater proportional increase in hepatitis C testing compared to the control region (2.2 times; 95% CI 1.5 to 3.3; p value for comparison not reported). The authors suggest that the findings were likely to be due to increased awareness among GPs and practice nurses and improved participation in the public campaign. Evaluation of a complex programme targeting French GPs and specialists (Sahajian et al., 2004 [UBA –]), found that the number for hepatitis C tests increased significantly during the intervention period (by 15.6%; significant according the Poisson distribution test). Increase was greatest in those practitioners who had taken part in the training workshops. Defossez and colleagues (2008 [CSS +]) reported that following a national campaign, the testing rate in the study region (based on the proportion of the total population tested) increased from 2.3% to 3.7% during the six-year study period; representing a 40% increase in the testing rate. However, the proportion of patients testing hepatitis C positive dropped by 40%. Although the authors attributed this to a reduction in the incidence of hepatitis C, they also recognised that other factors such as inappropriate patients being targeted for testing in some cases may have contributed to the decline in the number of positive tests.

Results from one uncontrolled study (Garrard et al., 2006 [UBA –]) suggested a limited and mixed impact of a continuing medical education (CME) programme on testing uptake, finding that at 1-month after the intervention, participant self-report suggested that screening had increased in four out of 26 intervention sites (15%) and did not change in the remainder. At 6-month follow up, seven out of 26 (27%) sites reported an increase in the number of patients receiving antiviral treatment.

5.5.3 Effects on knowledge, attitudes and intentions

Four studies (Fischer et al., 2000 [UBA –]; D'Souza et al., 2004 [UBA –]; Garrard et al., 2006 [UBA –]; Zdanuk et al., 2001 [CBA –]) examined intervention effects on knowledge and attitudes. Two studies evaluated the impact of a short education session on knowledge of health professionals about hepatitis C. Fischer and colleagues (2000 [UBA –]) examined the impact of brief educational sessions for primary care doctors and nurses. The study found short-term improvements in knowledge following the sessions; at post-test, 72% of attendees answered three questions correctly, compared to 13% at pre-test. D'Souza and colleagues (2004 [UBA –]) found that knowledge improved amongst GPs immediately following an educational 'lunch and learn' session compared to pre-test results. Correct responses on eight knowledge questions were given by 85% of respondents or greater at post-test. However, the authors noted that the sessions were relatively poorly attended; only 29% (n=43) of GPs invited to the sessions attended. The evaluation of a two-day CME programme (Garrard et al., 2006 [UBA –]) found that the intervention increased pre- to post-test knowledge about hepatitis C ($p<0.001$) and confidence about screening, diagnosis, treatment and follow-up ($p<0.01$). Zdanuk and colleagues (2001 [CBA –]) found that a CD-based intervention improved GP confidence in all six examined areas of hepatitis C management by 150-300% and increased significantly two areas: initiating/sharing treatment delivery ($p<0.05$) and providing follow up ($p<0.05$). Participants who had used the CD were found to be more confident than those who had not used the CD in all areas at follow-up.

5.5.4 Effects on uptake of, or adherence to, follow-up services and/or treatment

Three studies reported outcomes related to uptake of follow-up services and treatment. Cullen and colleagues (2006 [RCT ++]) found positive, but mainly insignificant, effects of an intervention designed to support the implementation of guidelines in primary care. In comparison to controls, patients from intervention group general practices were significantly more likely to have attended the hepatology clinic ($p<0.05$) and to have had at least one hepatitis B vaccine ($p<0.05$). In addition, although they were more likely to have had a referral to a hepatology clinic initiated following a positive test, a liver biopsy, antiviral therapies initiated, or have completed a course of hepatitis B vaccinations, none of these findings reached significance compared to controls. The authors suggested that this may be explained by the short duration of the study. Garrard and colleagues (2006 [UBA –]) found that reports from participants suggested that of the 26 Veterans Medical Affairs sites receiving the intervention, the number of patients receiving hepatitis C treatment had increased in 27% sites at 6 months follow-up. Defossez and colleagues (2008 [CSS +]) found that follow-up of drug users to treatment after a positive test for hepatitis C did not improve significantly following the national campaign. There was a non-significant improvement in the proportion of drug users managed by doctors as recommended in the guidelines for hepatitis C management (53% managed correctly in 2003 compared to 43% in 1997), but the proportion lost to follow-up by their doctor did not change significantly (from 31% lost in 1997 to 37% in 2003). There was no significant change in the rates of liver biopsies.

5.5.5 Summary and evidence statements

Eight studies were identified that evaluated interventions aimed at health professionals. Four studies (Cullen et al., 2006 [RCT ++]; Helsper et al., 2010 [NRCT +]; Sahajian et al., 2004 [UBA –]; Garrard et al., 2006 [UBA –]) reported outcomes related to testing uptake. Three studies evaluated complex interventions. Positive intervention effects on testing uptake were seen in two studies

(Cullen et al., 2006 [RCT ++]; Sahajian et al., 2004 [UBA –]) and improvements in the numbers of tests in one study (Helsper et al., 2010 [NRCT +]). A national awareness campaign appeared to have had positive effects on testing uptake (Defossez et al., 2008 [CSS +]), but the authors noted that a reduction in the proportion of positive tests indicated that testing of inappropriate populations (i.e. those at low risk of infection) may have taken place. One study of a CME programme (Garrard et al., 2006 [UBA –]) found limited effects on testing uptake across multiple sites.

Three studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]) reported outcomes related to knowledge about hepatitis C. Garrard and colleagues (2006 [UBA –]) reported positive intervention effects of a CME programme on participants' knowledge about hepatitis C. Two studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]) reported short-term improvements in knowledge following brief educational sessions. However, the authors of the UK study (D'Souza et al., 2004 [UBA –]) noted that the education sessions were relatively poorly attended. Two studies (Garrard et al., 2006 [UBA –]; Zdanuk et al., 2001 [CBA –]) reported positive effects of education interventions on GPs' confidence about managing hepatitis C patients.

Three studies (Cullen et al., 2006 [RCT ++]; Garrard et al., 2006 [UBA –]; Defossez et al., 2008 [CSS +]) reported outcomes relating to uptake of treatment and follow-up services. Few clear intervention effects were found suggesting that the impact of the interventions was limited, However, Cullen and colleagues (2006 [RCT ++]) reported increases in some referral and treatment outcomes and initiation of treatment increased in a small number of Veterans Medical Affairs sites (Garrard et al., 2006 [UBA –]). One study (Defossez et al., 2008 [CSS +]) found that although associated with increases in testing uptake, there were no effects of a national campaign on follow-up or management of drug users following testing for hepatitis C.

Evidence statement 8: Aimed at professionals undertaking hepatitis C testing

(i) There is moderate evidence from one RCT (Cullen et al., 2006 [RCT ++]), one NRCT (Helsper et al., 2010 [NRCT +]) and one UBA study (Sahajian et al., 2004 [UBA –]) to suggest that complex interventions that provide support to primary care professionals in offers of hepatitis C testing may have a positive impact on testing acceptance and uptake. One repeated CSS (Defossez et al., 2008 [CSS +]) demonstrated that without support, offers of testing may increase, but not within the desired high-risk groups.

(ii) There is weak evidence from three UBA studies (D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]) to suggest that educational interventions aimed at health professionals may have short-term benefits on knowledge about hepatitis C. However, there is no clear evidence that an increase in knowledge leads to increase in testing. Weak evidence from one UBA study (Garrard et al., 2006 [UBA –]) suggested that a CME programme had a limited impact on testing uptake.

(iii) There is mixed evidence from two studies (Cullen et al., 2006 [RCT ++]; Defossez et al., 2008 [CSS +]) that examined the effectiveness of interventions aimed at professionals on treatment initiation. There is moderate evidence from a repeated cross-sectional study (Defossez et al., 2008 [CSS +]) that a national campaign had no impact on the management of drug users following a positive hepatitis C test. However, there is strong evidence from one RCT (Cullen et al., 2006 [RCT ++]) that a complex intervention providing support in primary care had a positive impact on number of referrals and attendance at follow-up appointments after testing.

Applicability

(i) This evidence may only be partially applicable to the UK as studies were conducted in Ireland, The Netherlands and France. In addition, studies conducted in The Netherlands and France took place during the delivery of national hepatitis C campaigns.

(ii) This evidence may only be partially applicable to the UK as two of the three studies were conducted in the USA where affordability of care may be a limiting factor.

(iii) This evidence may only be partially applicable to the UK as studies were conducted in Ireland, and France.

5.6 Enhancing access to follow-up services and treatment

5.6.1 Summary of identified studies and quality assessment

Six studies were identified that evaluated interventions that aimed to enhance assess to follow-up services and treatment for hepatitis C among high-risk populations. Three studies were conducted in Canada (Doucette et al., 2009 [CO –]; Grebely et al., 2007 [CS –]; Grebely et al., 2010 [CS –]) and one each in the USA (Suradji et al., 2011 [UBA –]), UK (Wilkinson et al., 2008 [CS –]) and France (Moussalli et al., 2010 [CBA –]).

Two studies (Grebely et al., 2007; 2010 [both CS –]) evaluated the impact of referring current and former IDUs with diagnosed hepatitis C infection to a weekly support group at a health clinic. Moussalli and colleagues (2010 [CBA –]) examined the impact of providing total care in an addiction centre, rather than making referrals for hepatitis C treatment to hospital. Wilkinson and colleagues (2008 [CS –]) examined the impact of an outreach clinic at an addiction service. In addition, one study (Surjadi et al., 2011 [UBA –]) evaluated the effects of an education session prior to a scheduled appointment at a liver clinic for hepatitis C infected patients (of whom over 60% had a history of injecting drug use). Doucette and colleagues (2009 [CO –]) examined the impact of allowing hepatitis C infected patients (of whom 50% had a history of drug use) to self-refer for specialist care compared to referrals by health professionals.

The design of all six studies was limited, incorporating one cohort study (Doucette et al., 2009 [CO –]), one CBA study (Moussalli et al., 2010 [CBA –]), one UBA study (Surjadi et al., 2011 [UBA –]) and three case series (Grebely et al., 2007; 2010; Wilkinson et al., 2009 [all CS –]). Both the cohort and CBA study (Doucette et al., 2009 [CO –]; Moussalli et al., 2010 [CBA –]) were rated [–] quality as neither study utilised a true control group. In the cohort study (Doucette et al., 2009) controls consisted of clients who chose not to self-refer to the Hepatitis Support Programme. Moussalli and colleagues (2010) generally reported sufficient detail on many aspects of the quality assessment but the control group included in the study was made up of a retrospective cohort of patients from before the intervention was implemented. The UBA study and three case series (Surjadi et al., 2011; Grebely et al., 2007; 2010; Wilkinson et al., 2009) were rated [–] quality based upon study design. The three case series generally reported adequate information and study detail but quality was limited due to the lack of a control or comparison group.

5.6.2 Effects on knowledge, attitudes and intentions

One study (Surjadi et al., 2011) examined the impact of an education session for hepatitis C infected patients on knowledge and attitudes. Mean knowledge score[10] increased significantly from a baseline score of 61% to 75% at immediate post-test ($p<0.001$). Among 19 clients followed up at a median 4-month follow-up (range 1 to 13 months), knowledge scores were not significantly different from post-test scores. Positive attitudes towards treatment remained constant following the intervention, with 97% indicating that they were interested in treatment before and after the educational session.

5.6.3 Effects on uptake of, or adherence to, follow-up services and/or treatment

All six studies examined intervention effects on treatment uptake. A UBA evaluation of the education session (Surjadi et al., 2011 [UBA –]) found that the number of patients referred to liver speciality clinics during the 19-month study period did not differ significantly from the period before the education sessions were initiated (pre: n=322 *vs*. post: n=358). There was, however, a significantly greater clinic attendance rate following referral during the study period (64% *vs*. 39%; $p<0.001$). Doucette and colleagues (2009) examined the impact of allowing clients to self-refer for specialist care. During the study period, 21.5% of patients at the hepatitis C clinic were self-referrals, rather than being referred by health professionals. Among 326 patients treated for chronic hepatitis C after doctor assessment, there was no significant difference in the proportion of self- or clinician-referrals. In addition, treatment outcomes were similar in both groups. The most frequently given reasons for self-referral included lack of a family doctor, being told by their doctor to contact the clinic and wanting additional information after being informed by a their doctor that their hepatitis C could not be treated. Two studies by Grebely and colleagues (2007; 2010 [both CS –]) examined the impact of a weekly hepatitis C support group on initiation of treatment. One evaluation (Grebely et al., 2010 [CS –]) found that 28% (n=57) of clients visiting the support group started treatment, and that a greater median number of visits to the support group was positively and significantly associated with treatment initiation ($p<0.01$). An earlier evaluation of the support group (Grebely et al., 2007) found that 23% (n=18) of those attending the group initiated treatment and an end treatment response was achieved by two thirds of patients, including four patients who completed treatment (5%, 22% of those starting treatment).

Two studies (Moussalli et al., 2010; Wilkinson et al., 2008) evaluated interventions designed to provide hepatitis C treatment in community settings. Moussalli and colleagues (2010) found that providing treatment onsite at an addiction centre in France significantly increased the number of patients treated compared to the period when patients were referred to hospital for treatment (38% *vs*. 2%; $p<0.001$). Wilkinson and colleagues (2008) found that 19% (n=83) of clients chose to attend a liver outreach clinic for consideration of treatment during the study period. Patients who attended the clinic were slightly older than those who chose not to attend (mean 42.2 years vs. 39.6 years; $p<0.01$). Of the clients attending the clinic, 63 initiated treatment, 14 declined treatment, and six delayed treatment. During the study period, 58 completed treatment and for five, treatment was on going. Of those completing treatment, 81% were treatment compliant and 51% (n=25) achieved an SVR.

[10] As assessed according to a 31-question survey covering transmission, diagnosis, general knowledge, history, treatment and health care maintenance relating to hepatitis C.

5.6.4 Summary and evidence statements

Six studies (Doucette et al., 2009; Grebely et al., 2007; Grebely et al., 2010; Moussalli et al., 2010; Suradji et al., 2011; Wilkinson et al., 2008) were identified that evaluated interventions designed to enhance IDUs access to treatment and follow-up. Two studies (Grebely et al., 2007; Grebely et al., 2010) examined the impact of a support group, two studies (Moussalli et al., 2010; Wilkinson et al., 2008) evaluated changes in treatment setting on treatment outcomes. Of the remaining studies, Surjadi and colleagues (2011) evaluated an education session and one study (Doucette et al., 2009) evaluated the impact of allowing self-referral on treatment uptake.

One study (Surjadi et al., 2011) included outcomes relating to knowledge. Attending a hepatitis C education session prior to attending a liver clinic was associated with positive short-term effects on knowledge, which was maintained at medium-term follow up, and an increased interest in treatment. This study (Surjadi et al., 2011) also found that the education session had a positive effect on compliance with liver clinic attendance.

All six studies (Doucette et al., 2009; Grebely et al., 2007; Grebely et al., 2010; Moussalli et al., 2010; Suradji et al., 2011; Wilkinson et al., 2008) reported outcomes relating to uptake of follow-up services and/or treatment. Two studies (Grebely et al., 2007; 2010) of a weekly support group demonstrated positive effects on initiation of treatment and two further studies (Moussalli et al., 2010 [CBA –]; Wilkinson et al., 2008 [CS –]) of the provision of hepatitis C treatment to IDUs in community settings showed positive effects on treatment initiation and outcomes. Evidence from one study (Doucette et al., 2009) suggested there were benefits of allowing clients to self-refer for assessment at liver clinics. Those attending for assessment based on self-referral differed little from those referred by health professionals in terms of attendance at appointment and in treatment uptake and completion.

Evidence statement 9: Enhancing access to follow-up services and treatment for hepatitis C

(i) There is weak evidence from one CBA study (Moussalli et al., 2010 [CBA –]) and one case series (Wilkinson et al., 2008 [CS –]) to suggest that the provision of hepatitis C treatment in community settings for IDUs had a positive effect on treatment initiation and outcomes.

(ii) There is weak evidence from two case series (Grebely et al., 2007; Grebely et al., 2010 [both CS –]) that attendance at a support group for hepatitis C may have a positive effect on treatment initiation. However, it was unclear due to the study design used whether attendance at the support group was higher amongst more highly motivated individuals who may have been more likely to initiate treatment regardless of their attendance at the group.

(iii) There is weak evidence from one cohort study (Doucette et al., 2009 [CO –]) to suggest that allowing patients, such as those who have not been referred by their doctor, to self-refer to speciality liver clinics for assessment was associated with treatment uptake and completion at rates similar to those referred by health professionals.

(iv) There is weak evidence from a UBA study (Surjadi et al., 2011 [CBA –]) to suggest that ensuring patients receive education about hepatitis C prior to referral appointments may have a positive effect on attendance at follow-up appointments, and on short to medium-term knowledge.

Applicability

(i) This evidence is directly applicable to the UK as one study was conducted in drug services in the UK. In addition, the setting and population examined in the second study conducted in France were comparable to drug services in the UK.
(ii) This evidence may only be partially applicable to the UK as the studies were conducted in the context of the Canadian healthcare system.
(iii) This evidence may only be partially applicable to the UK as the study was conducted in the context of the Canadian healthcare system.
(iv) This evidence may only be partially applicable to the UK as the study was conducted in the context of the USA healthcare system.

5.7 Contact tracing

5.7.1 Summary of identified studies and quality assessment

One study (Brewer & Hagan, 2009 [CS –]) was identified that evaluated a contact tracing programme for hepatitis B and hepatitis C aimed at IDUs. The sample was composed of participants who seroconverted to hepatitis B or C during a study into incidence of hepatitis. Participants were interviewed to identify injection partners and coached on how to refer partners for testing.

The study was based on a case series design and reported outcomes for participants who received the contact tracing programme only. The study was rated poor quality as uptake by potential participants was low and there was no comparison available.

5.7.2 Effects on measures of testing uptake

Brewer and Hagan (2009 [CS –]) evaluated the success of their contact tracing study and found that of 447 identified injection partners, of which participants agreed to refer 160 (36%), just eight (2%) partners scheduled appointments for testing. Of 26 participants, 23 agreed to refer injection partners and identified an average of 17 partners (range 2-58, median 16 partners).

5.7.3 Summary and evidence statements

Outcomes relating to testing uptake as a result of a contact tracing study were reported in one case series (Brewer & Hagan et al., 2009 [CS –]), which reported that although the majority of participants agreed to refer injection partners, the number of partners tested represented a very low proportion of all identified partners (n=8, 2%).

Evidence statement 10: Contact tracing

There is weak evidence from one case series (Brewer & Hagan, 2009 [CS –]) to suggest that IDUs may be willing to engage in contact tracing of injection partners, but that uptake of testing in identified partners may be low.

Applicability

The evidence may only be partially applicable to the UK as the study was conducted in the USA. However, the population and setting examined bore some similarities to relevant populations at a high risk of acquiring hepatitis B and C infection in the UK.

6 Review of cost-effectiveness

6.1 Overview of evidence identified

Nine published articles of five full economic evaluation studies were identified for inclusion. One study examined the cost-effectiveness of screening and early treatment of migrants in The Netherlands for chronic hepatitis B (Veldhuijzen et al., 2010) and the remaining seven studies examined the cost-effectiveness of screening and/or case finding for hepatitis C in the context of the NHS in England and Wales. These studies examined the cost-effectiveness of screening in genito-urinary medicine (GUM) clinics (Stein et al., 2002; Stein et al., 2003; Stein et al., 2004), in primary care (Castelnuovo et al., 2006; Thompson Coon et al., 2006), on reception in prison (Castelnuovo et al., 2006; Sutton, 2006; Sutton et al., 2006; Sutton et al., 2008) and in drugs services (Castelnuovo et al., 2006).

6.2 Review of cost-effectiveness evidence for case finding and testing for hepatitis B

6.2.1 Review of Veldhuijzen et al., 2010

Overview

Veldhuijzen and colleagues (2010) assessed the cost-effectiveness of systematically screening migrants in The Netherlands from countries with high or intermediate hepatitis B infection levels (approximately 1.3 million people). The authors developed a Markov chain model to assess the costs and health outcomes of a cohort of patients who either experienced the natural history of hepatitis B infection or received anti-viral treatment over a period of 20 years. A separate model was developed to examine the cost-effectiveness of a systematic screening programme compared to the 'status quo'. The perspective was that of the Dutch health service.

The intervention evaluated consisted of a one-off systematic screening effort and subsequent treatment. People in the target population received a postal invitation with information and a form that they could take to a nearby laboratory to get tested. Reminders were sent 6 weeks later. Test results were sent to the participants and their GP. Hepatitis B surface antigen (HBsAg) positive participants were advised to visit their GP for further management and referral to secondary care if necessary.

Summary of effectiveness data

Effectiveness data were drawn from a study that examined the implementation of guidelines to improve the referral of patients with chronic hepatitis B infection from primary to secondary care (Mostert et al., 2004). This study found an increase from 39% to 58% in the proportion of referred patients who saw a specialist. The authors therefore assumed that within the context of a systematic screening programme, 58% of patients meeting the referral criteria would be successfully referred, with an upper and lower boundary to this estimate of 75% and 39%, respectively. Estimates for participation in screening were taken from a population-based screening study, with the response in this study taken as the lower boundary estimate for the expected response to screening. An upper boundary of 48% was drawn from rates for participation in cervical cancer screening among migrant women and 35% was taken as the base case estimate, as the midpoint between the upper and lower boundaries. Without the intervention, a detection rate of 12.6% was assumed. The number of patients with chronic hepatitis B in the target population was based on published estimates of 3.35%,

corresponding to a total number of 44,117 HBsAg positive individuals. Of these individuals, 10% were expected to have active infection (defined as HBV DNA >10^5 copies/mL [for HBeAg positive patients] or HBV DNA >10^4 copies/mL [for HBeAg negative patients] and ALT at least twice the upper limit of normal). Only 4% of these patients were expected to start treatment, with the remainder following the natural history of hepatitis B infection.

Summary of resource utilisation and cost data

The authors included the following cost estimates: costs of the campaign; test and follow-up costs, including diagnostic test, source and contact tracing, follow-up and referral; and medical management costs including monitoring, compensated and decompensated cirrhosis, hepatocellular carcinoma, liver transplantation and treatment with entecavir. Costs ranged from €500,000 for running the campaign to €2.55 for an ALT test. Costs for medical management of chronic HBV and compensated cirrhosis were not included for patients following the natural history of hepatitis B infection.

Summary of cost-effectiveness data

Under base case assumptions, the incremental costs of the screening programme were €21.8 million and the incremental health costs related to disease progression and treatment were €37.5 million. Comparing the two scenarios of the 'status quo' and implementing the screening intervention, the incremental difference in health gains was 6,614 QALYs, resulting in an incremental cost-effectiveness ratio (ICER) of €8,966 per QALY gained. Discounting costs at 4% and effects at 1.5%, (according to Dutch guidelines) resulted in an ICER of €8,823 per QALY gained.

Univariate sensitivity analyses showed that the ICER for screening varied between €7,936 and €11,705 per QALY gained, with assumptions regarding the proportion of successful referral of patients to specialist care and the proportion of eligible patients who actually start treatment having the largest effect. In the multivariate analyses for treatment effectiveness and disease progression in natural history, ICER estimates ranged from €5,568 to €60,418 per QALY gained. The higher range estimate was associated with the assumption of a relatively slow disease progression in natural history. A probabilistic sensitivity analysis indicated that treatment had a 72% chance of having an ICER of less than €20,000 per QALY gained.

Comments

The authors examined the cost-effectiveness of systematically screening migrants from countries that have high and intermediate levels of HBV infection. The authors note that this study is the first to examine an intervention aimed at identifying and treating eligible patients with chronic hepatitis B. However, a major limitation of the study, as noted by the authors, is the lack of reliable effectiveness estimates available to support their assumptions about rates of participation in the screening programme and for the proportion of patients who are successfully referred to specialist care. The assumption regarding referral was shown to have a relatively large effect on the ICER in univariate sensitivity analyses; the ICER ranged from over €11,000 per QALY gained at the lower boundary to approximately €8,000 per QALY gained at the upper boundary. Overall, as noted by the authors, although a screening programme can achieve sizeable health gains at an acceptable cost, other methods of improving access to testing, referral and treatment need to be examined if a greater proportion of migrants are to benefit from treatment.

6.3 Review of cost-effectiveness evidence for case finding and testing for hepatitis C

6.3.1 Review of Stein et al., 2002; Stein et al., 2003; Stein et al., 2004

Overview

Stein and colleagues (2002; 2003) estimated the cost-utility of screening for hepatitis C infection in two hypothetical cohorts, IDUs in contact with drug services and people attending genitourinary medicine (GUM) clinics, compared to a no screening scenario in which symptomatic individuals with hepatitis C would have presented for treatment 11 years later. The authors integrated an epidemiological model of screening and diagnosis with a Markov model of hepatitis combination therapy with a time horizon of 30 years. The model examined a single round of screening in the two cohorts, but did not take into account the risk of re-infection in screened individuals and did not consider the transmission of hepatitis C within the cohorts. The perspective of the model was the NHS.

The HTA monograph (Stein et al., 2002) considered the cost-effectiveness of both approaches whereas the two journal articles (Stein et al., 2003; Stein et al., 2004) considered the screening model in GUM clinics and drug services separately.

Summary of effectiveness data

For screening and diagnosis the authors examined a single round of screening in hypothetical cohorts from each population. Asymptomatic individuals were offered antibody testing and if accepted, a PCR test to confirm the presence of hepatitis C RNA. For the GUM clinic model, four screening scenarios were considered: universal screening; screening of IDUs only; selective screening of 10% of clients based on eligibility criteria; and selective screening of 20% of clients based on eligibility criteria. In drug services, the authors assumed that only people who were not currently injecting drugs would be considered eligible for screening and treatment. The authors assumed that 49% of clients meeting the eligibility criteria accepted the antibody test based on a study conducted in drugs services. The underlying prevalence of hepatitis C among non-current IDUs was assumed to be 48.6%. For the GUM clinic model, the underlying prevalence of hepatitis C in the universal cohort was assumed to be 1.5%; and 9.9% and 6.2% among the non-IDU population for the selective 10% and 20% eligibility criteria scenarios, respectively.

Summary of resource utilisation and cost data

Costs were estimated from a range of sources and were considered from the perspective of the NHS. The base year for all costs was 2001. Discount rates applied to costs and benefits were 6% and 1.5%, respectively. The following costs were included in the model for screening and diagnosis: assessing eligibility; pre-test counselling; antibody test; PCR test; post-test discussion; and liver biopsy. The cost of screening was an estimated £3.9 million for a universal approach in GUM clinics and estimated £3.6 million in drug services. Costs included in the treatment model were: attendance at general practice; outpatient visit to general medicine; inpatient day in general medical ward; treatment with pegylated interferon and ribavirin; HCC; cirrhosis; chronic hepatitis C infection; ascites; hepatic encephalopathy; variceal bleeds; and liver transplant and follow up care.

Summary of cost-effectiveness data

In drugs services, screening non-current IDUs was associated with additional costs of £8.5 million and a cost per QALY of £28,120. Universal screening in GUM clinics in comparison was associated

with lower additional costs of £4.8 million but a higher cost per QALY of £84,570. For the three selective screening scenarios in GUM clinics, only the criteria of screening IDUs only was associated with a cost per QALY <£30,000. The results of the cost-utility analyses for the five scenarios are summarised in Table 11.

Table 11. Results of cost-utility analyses for four screening scenarios in GUM clinics

Scenario	Number eligible for screening	Underlying prevalence	Cost per QALY	Total cost (in addition to no screening)
Drug services	101,081	48.6%	£28,120	£8,527,013
GUM universal screening	246,636	1.5%	£84,570	£4,808,373
GUM IDUs only	3,912	48.6%	£27,138	£982,832
GUM selective 10%	24,664	9.9%	£34,288	£1,530,547
GUM selective 20%	49,327	6.2%	£39,467	£2,168,860

The drug services model was sensitive to: the proportion of hepatitis C-positive people who accepted a liver biopsy; treatment response; proportion of people eligible for treatment; the mortality rate associated with biopsy complications; the assigning of current IDUs (and, therefore, ineligible for screening) to a follow-up outpatient appointment; quality of life associated with chronic hepatitis C infection; and quality of life associated with successful treatment. However, the authors note that the model was reasonably stable when explored in the one-way sensitivity analyses. The model for universal GUM clinic screening was sensitive to a number of parameters. Multiway sensitivity analyses showed that the cost-utility of the three selective screening scenarios were sensitive to the rate of acceptance of treatment.

Comments

The authors examined the cost-effectiveness of screening in drugs services and universal and selective screening in GUM clinics. Under the assumptions modelled, the authors concluded that screening IDUs in contact with drug services was moderately cost-effective and that the most cost-effective approach in GUM clinics was to restrict screening to clients with a history of injecting drug use. However, they noted that further primary research is required particularly with regard to screening in GUM clinics.

6.3.2 Review of Castelnuovo, et al. 2006; Thompson-Coon et al., 2006

Overview

Castelnuovo and colleagues (2006; Thompson-Coon et al., 2006) undertook a cost-utility analysis of case finding for hepatitis C in three settings, specifically targeted at former IDUs. A decision-analytic Markov model was developed to investigate the impact of the case finding approaches on treatment and progression of hepatitis C disease. The model was run over the total lifetime of two hypothetical cohorts; those subject to systematic case finding in three settings and a comparison group among who only spontaneous presentation occurred. People who were lost to follow-up in the case finding arm of the model after testing or liver biopsy could re-present later for testing and subsequently be considered for treatment. The model did not take into account the risk of re-infection in screened individuals and did not consider the transmission of hepatitis C within the cohorts.

The Health Technology Assessment (HTA) monograph (Castelnuovo et al., 2006) examined the potential impact of case finding in general practice, prisons and drug services. The article by Thompson-Coon and colleagues (2006) focused on case finding strategies in general practice only.

Summary of effectiveness data

Prison

Findings from two published reports of hepatitis C testing in UK prisons were used to develop two scenarios for case finding in prison (Skipper et al., 2003; Horne et al., 2004). In both scenarios, all new prisoners attend a lecture during the induction programme and are provided with information on blood borne viruses (BBVs), including hepatitis C, by a prison officer on a group basis. However, in the second scenario, the lecture has a specific focus on injecting drug use as a risk factor for hepatitis C.

General practice

Two approaches to case finding were examined: (i) a 'population' approach, an offer of testing to all patients aged 30-54 years attending a general practice for a non-urgent appointment; and (ii) a 'targeted' approach, based on the identification from patient records and offer of testing to those known to be at highest risk of hepatitis C (i.e. patients with a history of current or former injecting drug use). The 'population' approach was based on effectiveness estimates from a then unpublished study of a case-finding initiative conducted in an area of Scotland with high hepatitis C and IDU prevalence (Anderson et al., 2009). The 'targeted' approach was based on the best available UK estimates from the literature as no study of this approach was available. The acceptance rate for testing was assumed based on findings from a study conducted in a drugs service and the prevalence of HCV antibodies in the population was taken from UK estimates of hepatitis C prevalence among IDUs.

Drug services

Studies conducted in drug service in Newcastle and Plymouth provided the basis for a simple scenario for case-finding in drug services, whereby all clients who are assessed by a BBV nurse for hepatitis B vaccination are offered the opportunity for a discussion and testing for hepatitis C.

Table 12. Summary of parameter estimates by setting for case-finding approaches

Setting	Testing acceptance rate (%)	Proportion of positive results (%)
Prison 1	8.5	16
Prison 2	12	42
General practice, targeted	49	49
General practice, population	10	12.5
Drug service	49	68

Treatment

Treatment decisions were based on based evidence from RCTs. Full details of the treatment pathway were reported in the article; briefly treatment was with pegylated interferon at standard doses combined with ribavirin for 48 weeks.

Spontaneous presentation for HCV testing and re-presentation after loss to follow-up

Among individuals in the case-finding arm who had previously refused the offer of testing, the authors assumed that for the first 2 years, the probability of re-presentation was 7.7% (twice that of spontaneous presentation). After 2 years, the rate of re-presentation dropped to 3.8% (same as the spontaneous presentation rate in the non-case-finding arm). The rate of spontaneous presentation in the non-case-finding cohort was assumed to be 3.8%. This estimate was derived from estimates of the total number of cases of hepatitis C in the UK and the assumption that 70% of all cases are currently undiagnosed.

Summary of resource utilisation and cost data

Costs associated with different case-finding settings are summarised in Table 13. Additional costs associated with testing and diagnosis included: PCR test; genotyping; offering biopsy to individuals who are genotype 1 or 4; communicating negative PCR result; communicating PCR result to those who are ineligible for treatment; counselling and harm reduction advice; liver biopsy; communicating non-eligibility after treatment, counselling on harm reduction after liver biopsy (£79); and referral for treatment. All assumptions of resource consumption were costed using recent UK estimates. Treatment costs included outpatient visits, inpatient days, investigations, procedures and drugs (in addition to combination therapy) and were estimated for a range of disease states ranging from mild disease (£138) to disease requiring a liver transplant (£27,330).

Table 13. Costs associated with case finding in different settings

Setting	Parameter	Cost per patient tested
Prison	Provision of health promotion information on a group basis to all new prisoners including offer and scheduling of appointment for pre-test discussion	£48 (scenario 1) £71 (scenario 2)
	Pre-test discussion	£37
	Individual relay of results and post-test counselling	£34 for a positive result £6 for a negative result
General practice	Identification of all patients in the practice with a documented history of current or former injecting drug use and the application of a computer flag for all identified patients (targeted)	£36
	Drafting and preparation of letter to all identified patients (targeted)	£5.50
	Initial discussion of hepatitis C testing with all attending patients within the age range (population)	£15.70
	Pre-test discussion	£11
	Individual relay of results and post-test counselling	£28 for a positive result £2.70 for a negative result
Drug service	Pre-test discussion	£11
	Individual relay of results and post-test counselling	£28 for a positive result £2.70 for a negative result

Summary of cost-effectiveness data

The longer term consequences of hepatitis C were modelled for a cohort of 10,000 individuals over a period of 30 years. Results of the cost-utility analysis for each different setting compared with no case finding are shown in Table 14. Across the different settings the cost-analysis suggested a cost

per QALY ranging from around £15,500 for a population approach in general practice to just over £20,000 for a general BBV lecture in prisons.

Table 14. Results of cost-utility analysis for case finding in a range of settings

	Setting				
	Prison 1	**Prison 2**	**GP targeted**	**GP population**	**Drugs service**
Additional individuals identified per 1,000 as a result of the case-finding strategy	4.3	16	77	4	106
Additional individuals identified per 1,000 after spontaneous (re-)presentation	9	0	25	6	34
Additional individuals achieving SVR per 1,000 at year 30	12	16	39	10	54
Number of cases of decompensation averted per 10,000	11.3	44.8	34.5	8.8	47.9
Number of cases of hepatocellular carcinoma averted per 10,000	5.2	21.9	16	4.1	22.2
Number of cases of deaths due to hepatitis C averted per 10,000	9.5	37.2	29.2	7.4	40.6
Discounted incremental cost per patient	£282	£611	£758	£170	£830
Associated gain in QALYs per patient	0.014	0.037	0.046	0.011	0.047
ICER (£ per QALY)	£20,083	£16,484	£16,493	£15,493	£17,515

One-way sensitivity analyses highlighted the importance of quality of life data in the model. The authors identified that four factors had a particular impact: (i) the decrement in quality of life at presentation; (ii) the decrement in quality of life during treatment; (iii) the improvement in quality of life following SVR in treated individuals; and (iv) the improvement in quality of life due to the avoidance of the long-term consequences of hepatitis C infection. Rates of spontaneous and re-presentation were also found to be important in the model; the authors noted that this was due in part to the relatively high rate of spontaneous presentation assumed. Changes in discount rates for costs and benefits were also shown to have a large impact on the results. For the two approaches in general practices, for example, using a discount rate of 3.5% for both costs and benefits, produced an ICER of approximately £35,000 per QALY for the 'population' strategy and £33,000 per QALY for the 'targeted' strategy (Thompson-Coon et al., 2006). A probabilistic sensitivity analyses for case finding in specific settings showed that at £30,000 per QALY there was a 60 to 80% chance that the case-finding approaches examined were cost-effective.

Comments

The authors examined the cost-utility of different approaches to case finding in prisons, general practice and drugs services. The cost-effectiveness of case-finding across different settings was found to broadly similar and highly likely to be cost-effective if £30,000 per QALY was considered acceptable. However, the absolute costs and benefits varied greatly across settings and the authors identified a lack of published evidence on which to determine reliable effectiveness estimates. As noted by the authors, although case-finding for hepatitis C is likely to be cost-effective across a range of setting, further research is needed to examine the effectiveness of different approaches.

6.3.3 Review of Sutton, 2006; Sutton et al., 2006

Overview

Sutton and colleagues (2006; Sutton, 2006) considered the cost-effectiveness of hepatitis C case-finding scenarios implemented on reception into prison. The authors developed a Markov decision analytic model and comparisons were made between each of the different scenarios by examining the cumulative cost per chronic hepatitis C (RNA positive) case identified and how this varied over time as case-finding coverage expanded. The model was used to estimate the cumulative costs of case-finding over 11 years (between 2006 and 2017). The model used was adapted from a model of hepatitis B vaccination in prisons, which described the flow of individuals through prison and considered the risk of imprisonment for IDUs and non-IDUs and was stratified by injecting status and age. In the current model, the IDU population was further stratified by length of injecting career (<1 year versus >1 year). The force of infection, defined as the per capita rate that susceptible individuals acquire infection, was used as a measure of transmission within the model; but the model was not dynamic as it did not take account of changes in transmission over time.

Four scenarios were compared to a 'do nothing' scenario, and involved a general 1-hour health awareness lecture on risk for BBVs delivered during the induction programme followed by either: (S1) a verbal screen for ever having received a past positive HCV test, and for ever having injected illicit drugs; (S2) a verbal screen for a past positive hepatitis C test only; (S3) a verbal screen for ever having injected illicit drugs only; and (S4) no verbal screen.

Summary of effectiveness data

Effectiveness data for the awareness lecture were drawn from a published study of the Isle of Wight prison cluster (Skipper et al., 2003). Force of infection rates were assumed to be constant over time and independent of prison status. Other data included in the model were drawn from published best estimates (including previous cost-effectiveness studies) or based on assumptions made by the authors.

Summary of resource utilisation and cost data

Costs included in the model were: delivering the BBV lecture to prisoners; delivering verbal tests on reception to prison; pre-test counselling; antibody test; PCR test; post-test counselling for negative and positive tests; counselling for positive PCR test. All costs were presented for the year 2004 with a discount rate for both costs and benefits of 3.5%.

Summary of cost-effectiveness data

The cumulative discounted number of cases of hepatitis identified in 2017 was estimated as follows: 0 for 'do nothing'; 13,413 for a verbal screen for ever having received a past positive HCV test, and for ever having injected illicit drugs; 16,927 a verbal screen for a past positive HCV test only; 13,548 for a verbal screen for ever injecting illicit drugs only; and 17,098 for no verbal screening. Corresponding cumulative discounted costs for each scenario were £0; £28,192,000; £54,670,000; £30,444,000; and £53,123,000, respectively.

Based on the cumulative cost per case detected, the authors identified that scenario 1 (S1), verbally screening for a past positive hepatitis C test, and for ever having injected illicit drugs was the most cost-effective option. The incremental cost-effectiveness per case detected in 2017 was an estimated £2,102 for verbally screening for ever having received a past positive HCV test, and for

ever having injected illicit drugs (S1); £16,625 for verbally screening for ever injecting illicit drugs only (S3); and £6,388 for no verbal screening (S4). The cost-effectiveness ratio was not calculated for a verbal screen for a past positive hepatitis C test only (S2) as the scenario was dominated by no verbal screening. A summary of these results is presented in Table 15.

Table 15. Summary of incremental cost effectiveness analysis for five case finding scenarios

Case-finding scenario	Cumulative discounted cost in 2017 (1,000s)	Cumulative discounted cases of HIV in 2017	ICER
(S1) Verbal screen for past HCV+ test and IDU	£28,192	13,413	£2,102
(S2) Verbal screen for past HCV+ test only	£54,670	16,927	dominated
(S3) Verbal screen for IDU only	£30,444	13,548	£16,625
(S4) No verbal screen	£53,123	17,098	£6,388
(S5) Do nothing	£0	0	-

In one-way sensitivity analyses, parameter variation had little impact on the relative cost-effectiveness of scenario 1 (S1). The parameter with the largest impact on cost-effectiveness was the proportion of prisoners accepting an antibody test; the cumulative cost-effectiveness of scenario 1 (S1) ranged between ~£2,000 to ~£11,000 based on the upper and lower parameter estimates used in the model (10-100%).

Comments

The authors estimated the cost-effectiveness of alternative case-finding strategies with or without verbal screening. Verbally screening for ever injecting illicit drugs and for ever having received a past positive HCV test was identified as the most cost effective approach. However, the cost-effectiveness of this approach was influenced by the parameter values for the proportion of prisoners accepting an antibody test, with a reduction in intake noted by the authors as having a large impact on cost-effectiveness.

6.3.4 Review of Sutton et al., 2008

Overview

Sutton and colleagues (2008) examined the cost-effectiveness of a single round of screening for all prisoners on reception into prison to establish eligibility for treatment. The authors developed a decision-analytic Markov model which compared costs and benefits of case-finding in prison to a scenario in which testing and treatment were only offered in a community setting. The model described the age-specific rate at which individuals flowed through prison and incorporated estimates of infection and progression of hepatitis C within current IDUs, defined as individuals who had injected in the previous 4 weeks, and former IDUs. Although the force of infection was used as a measure of transmission within the model, the model was not dynamic as it did not take account of changes in transmission over time. The time horizon of the model was 80 years and the perspective was that of the health service.

In the case finding arm, to encourage uptake of testing, all prisoners received a 1-hour lecture warning of the risks of BBVs on reception into prison (Skipper et al., 2003). The authors also assumed that individuals in the case finding arm were questioned regarding their current injecting status and

that only those individuals reporting current or former injecting drug use were offered hepatitis C antibody testing.

Summary of effectiveness data

It was assumed that testing and diagnosis took place during a 3-month period. The authors assumed that following case finding intervention, 10.25% of those offered testing in prison accepted based on the midpoint of findings from two studies that examined uptake of hepatitis C testing in prisons. For the non-case finding arm, the spontaneous presentation of infected individuals for testing was assumed to be 3.75% per year. The estimate for uptake of testing in the community was 49% based on a study conducted in drug services.

For the case-finding arm, individuals exposed to the case-finding intervention in prison but lost to follow-up were assumed to re-present for testing at a rate of 7.5% per year.

Summary of resource utilisation and cost data

All costs were presented for 2004 with a discount rate for costs and benefits of 3.5%. Costs considered in the model were: lecture; verbal confirmation of IDU status; antibody test; pre-test counselling; PCR test; communicating positive and negative results; genotyping; offering treatment; treatment; and monitoring during treatment. Treatment for hepatitis C was based on NICE guidance; briefly, any patient testing hepatitis C RNA positive following PCR was considered for treatment with pegylated interferon and ribavirin combination therapy, for 24 weeks for genotypes 2 and 3 and for 48 weeks for all other genotypes. The authors note that it was difficult to estimate the costs associated with monitoring in a prison setting and so monitoring costs were taken from a study conducted in community setting. The net discounted cost of case-finding for testing and treatment in prison was estimated at £8.5 million.

Summary of cost-effectiveness data

Compared with the non-case finding arm representing spontaneous testing in the community, incremental costs of case finding on reception to prison were £275 per patient with associated benefits of 0.005 QALYs per patient. The resulting ICER was £54,852 per QALY.

ICERs were calculated for each successive age category (15-24 year olds; 35+ year olds; and 25-34 year olds) examining the additional costs that each approach imposed over the other compared with the additional benefits that it delivered. Screening prisoners aged 15-24 years was the most cost-effective and least costly scenario of the three presented (£40,227 per QALY) as shown in Table 16.

Table 16. Incremental cost-effectiveness of screening in successive age categories

Scenario	Discounted costs	Discounted benefits	ICER
Screen prisoners aged 15-24 years only	£24,713,870	50,992	£40,227
Screen prisoners aged 25-34 years only	£31,367,229	51,101	£50,048
Screen prisoners aged 35+ years only	£26,678,317	51,007	£128,424

A probabilistic sensitivity analysis showed that prison-based case finding for testing and treatment was only likely to be cost-effective if decision makers were willing to spend more than £58,000 per QALY. In one-way sensitivity analyses, the parameters with the greatest impact on the model were:

treatment SVR at 24 weeks for genotype 2 and 3 patients with mild to moderate disease; treatment adherence at 24 and 48 weeks; the discount rate applied to benefits; chronic hepatitis C progression rates; and the representation rate in the case finding arm. Assuming a 0% representation rate in the case finding arm resulted in the prison screening and treatment programme becoming dominated by the non-case finding scenario. HCV progression rates in the base case scenario were taken from a study of patients who were mainly asymptomatic when identified and recruited by a method independent of disease progression. Assuming a slower rate of disease progression than the base case resulted in the prison programme being dominated by the non-case-finding scenario, and assuming faster progression rates resulted in the programme becoming more cost-effective (£14,503 per QALY).

As a further test of the sensitivity of the model the authors performed scenario analyses. The first analysis examined the impact of variable discount rates on the results of the model. Applying discount rates of 6% for costs and 1.5% for benefits (rather than 3.5% for costs and benefits) resulted in ICER of £13,408. A second scenario analysis examined the impact of varying the utility estimates in the model. To test the impact of knowledge of hepatitis C status on the model results, the authors assumed that knowledge of chronic hepatitis C infection did not decrease an individual's quality of life. The resulting ICERs demonstrated that the assumption that individuals with knowledge of their chronic hepatitis C infection have lower quality of life estimates had a negative impact on model results (no impact on QoL = £38,817 per QALY; impact on QoL = £54,852 per QALY).

Comments

The authors considered the cost-effectiveness of a one-off round of screening and treatment for all prisoners based on case finding on reception into prison over a 3-month period compared with spontaneous screening in the community. Using the base care estimates, the analysis suggested that screening and treatment for hepatitis C was not cost-effective within the prison setting. The authors report that results of the sensitivity analyses suggest that the value of prison screening may come from raising awareness of hepatitis C that may lead to increased representation for screening in the community at a later date. Given the sensitivity of the model to the various parameters, more research appears warranted to establish the effectiveness and cost-effectiveness of screening and treatment for hepatitis C in prisons.

6.4 Summary and evidence statements

A total of five published economic evaluation studies were identified that examined the cost-effectiveness of screening for hepatitis B or C among the high risk groups of interest. All of the economic evaluation studies were hampered by a lack of reliable evidence of the effectiveness of screening and treatment approaches for hepatitis B and C.

One study (Veldhuijzen et al., 2010 [CUA +]) that examined community-based screening and treatment for hepatitis B among migrants demonstrated this approach to be cost-effective. However, this study was conducted in The Netherlands and the assumptions made about the rates of participation in the screening programme and the proportion of patients who are successfully referred to specialist care may have limited applicability beyond the findings of this study.

Four studies examined screening and treatment for hepatitis C across a range of settings including drug services, primary care, GUM clinics and prisons. All studies were conducted from the

perspective of the NHS and were therefore highly applicable. One study (Stein et al., 2002; 2003; [CUA ++]) found that screening for non-current IDUs in drug services and GUM clinics was likely to be moderately cost-effective. The cost-effectiveness of case finding within drug services was supported by further work undertaken by Stein and colleagues (Castelnuovo et al., 2006; Thompson Coon et al., 2006; [CUA ++]), which also identified case finding in prisons and general practice as likely to be considered cost-effective by NHS commissioners. Two economic evaluation studies by Sutton and colleagues (2006; Sutton, 2006 [CEA +]; Sutton et al., 2008 [CUA ++]) provide additional findings on case finding in prisons. In a cost-utility analysis extending the work undertaken by Castelnuovo and colleagues (2003; [CUA ++]), the authors found that screening and treatment for hepatitis C within the prison setting was not likely to be considered cost-effective. However, the model was found to be sensitive to various parameters, of which reliable estimates robust estimates were lacking.

Evidence statement 11: Cost-effectiveness of screening for hepatitis B among migrants

There is moderate evidence from one CUA (Veldhuijzen et al., 2010 [CUA +]) to suggest that community-based screening and treatment for hepatitis B among migrant populations is cost-effective.

Applicability

This evidence may only be partially applicable to the UK as the study was undertaken from the perspective of the Dutch healthcare system. In addition, a lack of reliable assumptions about rates of participation in the screening programme and successful referral may further limit the applicability of the evidence.

Evidence statement 12: Cost-effective of screening for hepatitis C

There is moderate evidence from two CUAs (Stein et al., 2002; Stein et al., 2003; Stein et al., 2004; Castelnuovo et al., 2006; Thompson Coon et al., 2006; [both CUA ++]) to suggest that case finding for hepatitis C may be cost-effective in a range of settings including drug services and general practice. Two economic evaluation studies (Sutton et al., 2006; Sutton, 2006 [CEA +]; Sutton et al., 2008 [CUA ++]) provided inconsistent evidence for the cost-effectiveness of screening in prison; evidence from a more recent CUA (Sutton et al., 2008 [CUA ++]) suggests that extending case finding for testing and treatment to the prison setting is unlikely to be cost-effective.

Applicability

This evidence is directly applicable to the UK as all studies were undertaken from the perspective of the UK health service. However, all studies were hampered by a lack of robust evidence for the effectiveness of screening and treatment approaches, therefore limiting the generalisibility of the findings beyond the individual studies.

7 Discussion

This review examined the effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups who are at an increased risk of hepatitis B and/or C infection. This report is one of a series of reviews on case finding and testing for hepatitis B and C currently being undertaken to inform the development of NICE public health guidance on the most cost-effective ways of offering tests to those at risk of infection. The review described here has been undertaken alongside a systematic review of qualitative research on the views and experiences of groups at a high risk of hepatitis B and C infection (Jones et al., 2011a) and a map of services, interventions and other activities in England that aim to raise awareness among, and/or engage with, groups who are at an increased risk of hepatitis B and C infection (Jones et al., 2011b).

7.1 Overview of evidence identified

Fifty studies were identified for inclusion in the review of effectiveness and cost-effectiveness, of which, 41 studies examined the effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis B and C infection. Nine studies examined interventions targeting the uptake of hepatitis B testing. All nine studies were conducted in North America (USA or Canada) and targeted uptake of testing among migrant populations. Twenty-five studies examined interventions targeting the uptake of hepatitis C testing and six studies examined interventions targeting the uptake of hepatitis B and C testing. Across these 31 studies, 14 were conducted in North America, eight in the UK, six in France, two in The Netherlands and one each in Australia and Ireland, Nine publications of five economic evaluation studies examined the cost-effectiveness of screening and case finding in different settings. One study examined the cost-effectiveness of screening and early treatment of migrants in The Netherland for chronic hepatitis B and seven publications reported on four studies that examined the cost-effectiveness of screening and/or case finding targeting current and/or former IDUs in the UK for hepatitis C infection.

The quality of the studies included in the effectiveness review was mixed. The majority of studies identified were based on observational study designs, and 25 studies did not include a control or comparison group. Although these studies were informative, their results should be treated with caution, as without a control or comparison group it is not possible to know what would have happened in the absence of the intervention. Nine RCTs and three NRCTs were identified for inclusion and on the whole the quality of these studies was good. The quality of the economic evaluation studies included in the review was high. All five studies were well-reported, posed a clearly defined question and achieved a high reporting standard for the analysis and interpretation of results. The main limitation that hampered all of the included economic evaluation studies was a lack of robust evidence to inform the assumptions made about the effectiveness of screening and treatment approaches.

7.2 Summary of findings

7.2.1 Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection

Raising awareness or encouraging use of testing services

Six studies examined the effectiveness of interventions that were designed to raise awareness or encourage use of hepatitis B testing services. All six studies targeted North American migrant populations. As migrants are not a homogenous group of people and a range of individual experiences and socio-cultural beliefs will influence their knowledge and beliefs relating to hepatitis B, the findings of the studies included in this review may not be applicable to the UK.

A hepatitis B ESL educational curriculum and a lay health worker intervention for Asian migrants were both found to result in an overall low level of testing uptake among participants. Although evaluations of an ESL curriculum and an educational programme demonstrated improvements in knowledge, this did not translate into a convincing impact on testing uptake. Barriers to testing identified in the review of qualitative research included an absence of clear symptoms of infection, and time constraints, and language and cultural barriers, and it may be that neither intervention adequately addressed these types of barriers. Participation in a culturally targeted intervention providing education and free testing was associated with a relatively high uptake of follow-up care among patients identified with chronic hepatitis B. The majority of participants were also motivated to encourage family and friends to get tested.

Aimed at professionals

Two studies examined interventions aimed at improving professional practice in relation to hepatitis B testing among migrant populations. A strategy to promote cancer prevention activities among Vietnamese doctors had a limited effect on hepatitis B testing and although an annual symposium on the prevention of hepatitis B infection improved knowledge among CAM practitioners, the wider impact of this change in knowledge on their practices was not clear. The review of qualitative research identified that financial constraints in the US healthcare system posed significant problems not only for uptake of testing but for subsequent care as well, as medical providers were reluctant to diagnose hepatitis B when affordability of care was an issue.

Partner notification

A partner notification service for sex and needle sharing partners of people with chronic hepatitis B was associated with a relatively low partner index compared to partner notification for other BBVs, and overall few case patients with hepatitis B infection accepted partner notification services.

Cost-effectiveness of screening for hepatitis B among migrants

One economic evaluation, that examined community-based screening and treatment for hepatitis B among migrants, demonstrated this approach to be cost-effective. However, as the study was conducted in The Netherlands the assumptions made about the rates of participation in the screening programme and the proportion of patients who are successfully referred to specialist care may have limited generalisibility to other settings.

7.2.2 Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis C infection

Offering acceptable or alternative methods of testing

Two UK studies found increases in testing uptake in drug services and prisons offering DBS testing alongside other means of testing such as venipuncture, compared to services offering venipuncture only. However, an RCT demonstrated that the size of the treatment effect may vary, and whilst reasons for variation in treatment effect were not immediately clear, appeared to be linked to the level of 'interest' among staff in providing hepatitis C services at individual sites. The qualitative review identified that trust and rapport between clients and drug treatment staff, and support and encouragement, acted as motivators for testing.

Enhancing case finding and testing uptake in primary care

Three studies examined interventions designed to enhance the uptake of testing in primary care. Although training and assistance with screening for GPs, through the provision of patient information in waiting rooms, was associated with an increase in patient requests for testing compared with training only, there was no impact on the overall number of patients tested for hepatitis C. Two UK studies found that targeted case finding in primary care for patients with a history of injecting drug use had a positive impact on the number of patients offered and accepting a test. However, as noted by the authors of these studies the process of offering a test and obtaining a sample may be time consuming and multiple appointments may be required to complete the process. In a UK study of GPs' experience of testing, included in the review of qualitative research, workload pressures and impersonal relations between GPs and patients with a history of injecting drug use were felt to lead to shortcomings in hepatitis C provision. The two UK studies suggested a mixed impact of case finding on the number of patients starting treatment following referral. The qualitative review highlighted that a number of barriers may prevent IDUs from engaging with treatment ranging from a fear of side effects, to adverse socioeconomic and family circumstances, and therefore, further support may need to be provided beyond the case finding intervention to address patient's failure to attend appointments with follow-up services.

Increasing the type of settings that provide hepatitis C services

Nine studies examined whether provision of testing in different services increased access to testing and follow-up services. Integration of testing services within community settings, specifically within a mental health programme, drug services and opiate substitution clinics in primary care, was found to have a positive effect on testing uptake. A French study that examined the provision of outreach testing onsite in social housing/shelters demonstrated that it improved testing uptake among at-risk populations (primarily migrants), and one study of the provision of hepatitis services within sexual health clinics considered the service to have attracted IDUs to attend for testing. Two uncontrolled studies (including one UK study) demonstrated that a multidisciplinary or shared care approach to hepatitis C testing and treatment in community settings targeting IDUs was associated with a relatively high uptake of follow-up services and treatment outcomes comparable with those seen in non-drug using populations. This corresponds to the finding of the review of qualitative research, which identified that opportunistic testing and a 'one-stop shop' approach for all hepatitis C services was regarded as convenient approach among IDUs. It should be noted that in some drug services in the USA, hepatitis testing may be added to routine blood work undertaken on entry to programmes

and thus patients may not be asked to explicitly consent to be been tested for hepatitis C. The findings of the qualitative review indicated that although some patients and health professionals do not perceive this to be problematic as it increases testing compliance, others have raised concerns that it restricts patient choice.

Findings from the study of a prison outreach clinic suggested that it resulted in a relatively low numbers of prisoners accepting a hepatitis C test. The review of qualitative research identified that imprisonment was viewed by health professionals as both a barrier and a facilitator to the management of hepatitis C. Barriers to testing included institutional (e.g. long waiting times, lack of information provision, prioritisation of detoxification and withdrawal) and personal (e.g. fear and lack of knowledge about hepatitis C, low motivation for testing, concerns about confidentiality and stigma) factors. Transportation of prisoners between prisons and length of sentence were viewed as interfering with the treatment process whereas the structured environment of prison and availability of peer support during treatment were regarded as beneficial.

Other methods of enhancing access to testing services

One study evaluated the impact of a peer outreach worker offering testing and education to IDUs. The study evaluated the impact on knowledge outcomes only and reported positive intervention effects on knowledge about transmission about hepatitis C. One study that evaluated the impact of offering FibroScan, a non-evasive liver evaluation technique, to IDUs in street outreach programmes found that FibroScan was acceptable to IDUs and aided the facilitation of testing for hepatitis C.

Aimed at professionals

Three studies, that evaluated complex interventions that included support and training for primary care practitioners, found positive intervention effects on testing uptake. A national awareness campaign appeared to have had positive effects on testing uptake, but the authors of this study noted that a reduction in the proportion of positive tests indicated that testing of inappropriate populations may have taken place. Three studies reported outcomes relating to uptake of treatment and follow-up services. Few clear intervention effects were found suggesting that the impact of the interventions was limited; however, one study of a complex intervention to support the implementation of guidelines for hepatitis C management in primary care reported increases in some referral and treatment outcomes. One study found that although associated with increases in testing uptake, there were no effects of a national campaign on follow-up or management of drug users following testing for hepatitis C.

Three studies of educational interventions for practitioners reported short-term positive effects on knowledge about hepatitis C. However, the authors of a UK study noted that the education sessions may be poorly attended by health professionals. In addition, there was no clear evidence that increases in knowledge led to an improvement in hepatitis C management. One study of a CME programme found limited effects of the intervention on testing uptake.

Enhancing access to follow-up services and treatments

Six studies evaluated interventions designed to enhance IDUs access to treatment and follow-up services. Two studies of the provision of hepatitis C treatment to IDUs in community settings, including one UK study, demonstrated positive effects of the intervention approach on treatment initiation and outcomes. One study demonstrated that attending a mandatory hepatitis C education session prior to attending a liver clinic was associated with positive short-term effects on knowledge,

which was maintained at medium-term follow up, and an increased interest in treatment. This study also found that the education session had a positive effect on compliance with liver clinic attendance. In addition, two studies of a weekly support group demonstrated positive effects on initiation of treatment. Evidence from one study suggested there were benefits of allowing clients to self-refer for assessment at liver clinics. Those attending for assessment based on self-referral differed little from those referred by health professionals in terms of attendance at appointment and in treatment uptake and completion.

Contact tracing

Outcomes relating to testing uptake as a result of a contact tracing study were examined in one case series, which reported that although the majority of participants agreed to refer injection partners, the number of partners tested represented a very low proportion of all identified partners.

Cost-effective of screening for hepatitis C

Four studies examined screening and treatment for hepatitis C across a range of settings including drug services, primary care, GUM clinics and prisons. All studies were conducted from the perspective of the NHS and were therefore highly applicable. One study found that screening for non-current IDUs in drug services and GUM clinics was likely to be moderately cost-effective. The cost-effectiveness of case finding within drug services was supported by further studies, which also identified case finding in prisons and general practice as likely to be considered cost-effective by NHS commissioners. Two economic evaluation studies provided additional evidence on the cost-effectiveness of case finding in prisons. In a cost-utility analysis extending the work undertaken previously, screening and treatment for hepatitis C within the prison setting was found to be unlikely to be considered cost-effective. However, the model was found to be sensitive to various parameters, of which reliable estimates robust estimates were lacking.

7.3 Applicability

The majority of chronic hepatitis B infections in England arise from the immigration of hepatitis B carriers from countries where the prevalence of hepatitis B infection is intermediate or high. People emigrating from such countries are not a homogenous group and a range of individual experiences and socio-cultural beliefs will influence their knowledge and beliefs relating to hepatitis B, and their motivation to seek testing and subsequent care and treatment. Across the included studies that examined the effectiveness of interventions and activities targeting people at a high risk of hepatitis B infection, Asian American communities were most commonly the focus of these studies. As Asian Americans have been identified as the racial and ethnic group with the highest rates of chronic hepatitis B in the USA, the focus on this group was unsurprising. In a UK context, important groups at a high risk of being affected by chronic hepatitis B infection[11] include people born in South Asia, sub-Saharan African (e.g. Nigeria, Kenya), countries of the former Soviet Union and the Philippines (Pendleton & Wilson-Webb, 2007). However, none of these groups were represented in the effectiveness studies identified and therefore the findings of this review may have limited applicability to groups at a high risk of acquiring hepatitis B infection in the UK.

In England, as elsewhere in the UK, injecting drug use is the major risk factor for acquiring hepatitis C infection. An increase in the provision of hepatitis B vaccination in prisons has provided an important

[11] Countries that were identified as contributing a high estimated number of people with chronic hepatitis B infection (>10,000) to the overall UK total.

route for accessing IDUs and consequently the last decade has been a decline in its prevalence among this population. The majority of studies identified for inclusion in the effectiveness and cost-effectiveness review focused on intervention targeting management of hepatitis C among IDUs and there were relatively few studies that examined interventions targeting hepatitis B infection in these populations. A quarter of the studies included in the review were conducted with IDU populations in the UK and therefore some of the findings of the review appear to be largely applicable to groups at an increased risk of hepatitis C infection in England. However, a number of caveats should be borne in mind in interpreting the findings of this review. IDUs are not a homogenous group and populations may differ according to the social and demographic patterns of injecting drug use in different countries, by the characteristics of their drug use and according to the availability and reach of harm reduction programmes. For example, injectors of non-opioid drugs (e.g. amphetamine, cocaine/crack) may be less likely to be in with contact services or reluctant to approach heroin-orientated services (Hartnoll et al., 2010). This has important implications for the interpretation of the evidence from this review.

Reviews of health promotion in HIV/AIDS have often considered the breakthrough in treatment with the introduction of HAART as a key turning point, not only for treatment, but also for the effects on prevention and views of HIV/AIDS and sexual health promotion among high risk groups (Rees et al., 2004). In common with HIV/AIDS, effective therapies for the treatment of hepatitis B and C virus infection have emerged within the last decade. However, these are relatively new and the benefits of treatment have not yet been fully realised outside of specialist care (Cowan et al., 2011). This review has therefore not considered as a priority, those interventions whose delivery or implementation was completed during or after the introduction of effective hepatitis treatment.

7.4 Linking to the findings of the systematic review of qualitative research

The aim of the review of qualitative research was to provide a narrative perspective on how groups identified to be at a high risk of hepatitis B and C infection and practitioners view case finding and testing approaches, their experiences of the communication of test results and subsequent treatment, and what they perceive as the barriers and facilitators to participation in these strategies. The evidence identified suggested that there are modifiable factors among groups at a high risk of acquiring hepatitis B and C that could be addressed through interventions that aim to encourage uptake of testing. A matrix of evidence is presented in the Addendum which identifies where evidence identified in the review of effective and cost-effectiveness addressed for interventions as identified from the review of qualitative research.

Appropriate interventions are required to improve knowledge and awareness of hepatitis B and C infection among high risk groups. In particular, it appeared that much could be done to improve the quality and level of information available to high risk groups before and after testing.

No evidence was identified in either review for these implications.

Development of intervention materials should take into consideration how biomedical information can be tailored to incorporate meaning relevant to the socio-cultural context of high risk groups, but without contributing to stigma or increasing fear and confusion.

Based on studies conducted with migrant populations in the USA (predominantly South East Asian communities), the evidence suggests that although educational interventions may increase basic knowledge of hepatitis B transmission they have a limited impact on uptake of testing for hepatitis B

No evidence was identified in the review of interventions aimed at groups at risk of hepatitis C infection for these implications.

Efforts should also be extended to address knowledge and information gaps among healthcare professionals and other providers of healthcare that may be accessed by people from high risk groups (e.g. practitioners of CAM).

There was no evidence on which to make recommendations about the effectiveness of strategies aimed at improving hepatitis B management by health professionals.

The evidence identified in the review of interventions aimed at groups at risk of hepatitis C infection suggested that complex interventions targeted at health professionals can have positive effects on offers of testing, and testing uptake. However, the evidence was less clear with regard to the effects of interventions on the uptake of follow-up services and treatment; further support may need to be provided in addition to the interventions examined in the is review.

There was evidence that educational approaches can improve knowledge among practitioners but there was no clear evidence that increases in knowledge lead to improvements in hepatitis C management.

Due to the stigma associated with hepatitis B and C infection, interventions that aim to increase uptake of testing need to consider how the positive outcomes of testing can be exploited, for example, by promoting the benefits of taking responsibility for not only individual health, but also the health of family and friends, and the wider community.

No evidence was identified in either review for these implications.

Structural factors that discourage uptake of testing and subsequent care and treatment should be addressed by increasing opportunities for people from high risk groups to access testing and other services. In particular, convenient and opportunistic testing appears to be an important facilitator of hepatitis C testing among IDUs.

Although weak, the evidence from the review of interventions targeted towards groups at increased risk of hepatitis B infection suggests that providing testing for migrant populations supplemented by culturally appropriate education may encourage those with chronic hepatitis B to seek follow-up care.

From the review of interventions targeted at groups at increased risk of hepatitis C infection, there was evidence that offering DBS testing as an alternative to venipuncture can increase testing availability, and subsequently uptake, in drug services and prisons.

The evidence from this review also suggested that targeted case finding in general practice on the basis of age and indicators of past injecting drug use can increase the number of patients being offered and accepting a test, but that time and resource implications need to be considered. In addition, there was a mixed impact of targeted case finding on patient initiation of treatment, and further support may need to be provided in addition to the interventions examined in this review.

Further, evidence from the review of interventions targeted at groups at increased risk of hepatitis C infection supported the provision of hepatitis C testing and treatment services within community settings. In particular, a multidisciplinary or shared care approach was associated with a relatively high uptake of testing and follow-up services. There was however, a lack of evidence to draw conclusions about intervention approaches and strategies that aim to improve testing uptake in prisons

Interventions should also focus on building trust and rapport between people from high risk groups and health professionals, for example by addressing cultural and linguistic barriers to care or by targeting stigmatised attitudes to particular high risk groups.

No evidence was identified in either review for these implications.

8 Conclusions and recommendations

8.1 Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection

8.1.1 Conclusions

There was a lack of evidence on which to draw strong conclusions about the effectiveness of interventions and activities targeting groups at an increased risk of hepatitis B infection. Based on studies conducted with migrant populations in the USA (predominantly South East Asian communities), the evidence suggests that although educational interventions may increase basic knowledge of hepatitis B transmission they have a limited impact on uptake of testing for hepatitis B. Although weak, evidence suggests that providing testing for migrant populations supplemented by culturally appropriate education may encourage those with chronic hepatitis B to seek follow-up care.

There was no evidence on which to make recommendations about the effectiveness of strategies aimed at improving hepatitis B management by health professionals and there was a lack of evidence on which to draw conclusions about the cost-effectiveness of community-based screening and treatment for hepatitis B among migrant populations.

8.1.2 Recommendations for practice

The results of this review provide limited evidence that interventions aimed at raising awareness and engaging with groups at risk of hepatitis B infection can increase testing uptake; knowledge, attitudes and intentions; or uptake of follow-up services and treatment. It is not clear why improvements in knowledge, although demonstrated for some educational interventions, did not translate into convincing impacts on testing uptake but there is the potential that such approaches may not adequately address barriers to testing in migrant populations. The provision of testing supplemented by culturally appropriate education could be considered a promising approach that may warrant further evaluation in different settings.

8.1.3 Recommendations for research

Further studies on the effectiveness and cost-effectiveness of interventions targeting groups at risk of hepatitis B are required. Future evaluations should be based on more rigorous research designs where possible and consider the long term impact of interventions on treatment initiation and outcome. New studies should be conducted with a broader range of groups at risk of hepatitis B infection and within different community settings.

8.2 Effectiveness and cost-effectiveness of interventions aimed at raising awareness and engaging with groups at risk of hepatitis C infection

8.2.1 Conclusions

A range of intervention approaches and activities have targeted groups at an increased risk of hepatitis C infection, primarily to improve the identification and management of people currently, or with a history of injecting drug use.

There is evidence that offering DBS testing as an alternative to venipuncture can increase testing availability and subsequently uptake in drug services and prisons. Primary care services are an important setting for identification of hepatitis C infection among individuals with a history of injecting drug. There is evidence from two UK studies that targeted case finding on the basis of age and indicators of past injecting drug use can increase the number of patients being offered and accepting a test. However, these studies also highlight the need to consider the time and resource implications of general practice-based case finding approaches. The evidence suggests a mixed impact of case finding on patient initiation of hepatitis C treatment following referral. A number of barriers may limit uptake of treatment and therefore, further support may need to be provided for those testing positive as result of case finding.

The evidence identified for this review supports the provision of hepatitis C testing and treatment services within community settings. Although weak, the evidence suggests that targeting current IDUs through a multidisciplinary or shared care approach within community settings is associated with a relatively high uptake of testing and follow-up services, and treatment outcomes comparable with those seen in non-drug using populations. Although weak, there is evidence to support the provision of hepatitis C treatment to IDUs in community settings. In addition, there is some evidence to suggest that discrete interventions, such as the provision of peer-led support groups and mandatory education, may have positive effects on treatment initiation. There was a lack of evidence to draw conclusions about intervention approaches and strategies to improve testing uptake in prisons.

For interventions aimed at improving professional practices, the evidence suggests that complex interventions that provide support and training for primary care practitioners can have positive effects on testing uptake. The evidence was less clear with regard to the effects of interventions on uptake of follow-up services and treatment. As noted for general practice-based case finding interventions, it may be that further support needs to be provided in addition to the intervention approaches examined. There is evidence that educational approaches can improve knowledge among practitioners but there is no clear evidence that increases in knowledge lead to improvements in hepatitis C management.

8.2.2 Recommendations for practice

The results of this review suggest that some interventions aimed at raising awareness and engaging with groups at risk of hepatitis C infection may increase testing uptake and uptake of follow-up services and treatment. Drugs services and primary care were identified as settings in which intervention delivery could effectively increase uptake of testing, and for settings providing complete hepatitis C services, increase in the uptake of, and adherence to, follow-up services. However, careful attention should be paid to the resource implications of interventions and of the potential of interventions to improve outcomes across the continuum of care once a positive diagnosis of hepatitis C has been made.

8.2.3 Recommendations for research

Future evaluations of interventions targeting groups at risk of hepatitis C should be based on more rigorous research designs where possible. In addition, the feasibility of the collection of data on costs to enable cost-effectiveness analysis should be considered in the design of all new research

studies. New research studies should also examine the effectiveness and cost-effectiveness of interventions delivered in prisons.

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Appendix 1. Example search strategy

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1948 to Present

#	Search terms
1	Hepatitis, Viral, Human/
2	exp Hepatitis C/
3	exp Hepatitis B/
4	((hepatitis or hep) adj (B or C)).ti,ab.
5	(HBV or HCV).ti,ab.
6	or/1-5
7	exp Mass Screening/
8	exp Population Surveillance/
9	Contact Tracing/
10	Case Management/
11	Diagnostic Tests, Routine/
12	Serologic Tests/
13	"Referral and Consultation"/
14	((case adj3 find*) or (case adj3 manage*) or (contact adj3 trac*)).ti,ab.
15	(surveillance or screen* or test* or diagnos* or prevent* or detect* or treatment or refer*1 or referral*).ti,ab.
16	or/7-15
17	6 and 16
18	exp *Hepatitis B/di, pc
19	exp *Hepatitis C/di, pc
20	*Hepatitis, Viral, Human/di, pc
21	or/18-20
22	17 or 21
23	Health education/ or Patient education as topic/
24	Health Promotion/

25	Primary Prevention/
26	exp Attitude to Health/ or Patient Satisfaction/
27	health services accessibility/ or Access to Information/
28	"patient acceptance of health care"/ or patient compliance/ or treatment refusal/
29	(patient* adj3 (satisfaction or compliance or comply or complie*)).ti,ab.
30	Risk Reduction Behavior/ or Health Behavior/ or Choice Behavior/
31	Knowledge/ or Attitude/ or Intention/
32	"Attitude of Health Personnel"/ or "Nurse's Role"/
33	professional-family relations/ or professional-patient relations/ or nurse-patient relations/ or physician-patient relations/ or patient relationships/
34	Motivation/
35	Program Evaluation/
36	exp "Outcome and Process Assessment (Health Care)"/
37	Politics/ or Public Policy/ or Health Policy/
38	Consumer Health Information/
39	(marketing or advertis$ or publicis$ or publiciz$ or mass media or media campaign*).ti,ab.
40	"Marketing of Health Services"/ or Social Marketing/
41	Mass Media/
42	Counseling/ or Directive Counseling/
43	Social Support/ or Reimbursement, Incentive/
44	((cash or financial or money or monetary or economic) adj3 (benefit* or support or incentive* or assist* or credit)).ti,ab.
45	(reimbursement* or reward* or voucher* or payment* or cash transfer*).ti,ab.
46	Preventive Health Services/ or Community Health Services/ or Urban Health Services/
47	Family Practice/ or Primary Health Care/ or Physicians, Family/
48	((general or family) adj practi*).ti,ab.
49	(primary care or primary health care or family physic* or doctor*1 or general practitioner* or gp or gps).ti,ab.
50	Physician's Practice Patterns/

51	Pharmacies/ or Community Pharmacy Services/
52	(pharmacist* or pharmacy or pharmacies).ti,ab.
53	Outpatient Clinics, Hospital/
54	outpatient clinic*.ti,ab.
55	Ambulatory Care Facilities/
56	((walk-in or walkin or walk in or (drop* adj1 in) or outreach or open access) adj3 (center*1 or centre*1 or service or program* or clinic*1 or assessment*1 or session)).ti,ab.
57	Community Health Centers/
58	(nurs* adj2 (le?d or manag* or direct*)).ti,ab.
59	Nurse Clinicians/ or Nurse Practitioners/
60	(nurse adj (clinician* or specialist*)).ti,ab.
61	Nursing Services/
62	Community Health Nursing/
63	Nurse's Practice Patterns/
64	((genitourinary or genito-urinary or GUM or sexually transmitted infection* or STI or sexually transmitted disease* or STD or sexual health) adj3 (center*1 or centre*1 or service*1 or program* or clinic*1 or assessment*1 or session)).ti,ab.
65	Sexually Transmitted Diseases/
66	(prison* or jail or custody or incarcerat* or correctional or prisoner* or inmate*).ti,ab.
67	Prisons/ or Prisoners/
68	exp Religion/
69	(faith adj2 (based or communit* or organi?ation*)).ti,ab.
70	(church* or mosque* or temple* or chapel* or religio*).ti,ab.
71	Organizations, Nonprofit/ or Voluntary Health Agencies/
72	(voluntary or charit* or third sector or non?profit).ti,ab.
73	Allied Health Personnel/ or Community Health Aides/ or Voluntary Workers/ or Peer Group/
74	((lay or peer or allied or link) adj3 (worker*1 or advocate*1 or helper*1 or professional* or personnel)).ti,ab.
75	(support worker* or (trained adj3 (volunteer*1 or health worker*1 or peer*))).ti,ab.
76	(peer adj2 (outreach or support* or deliver* or educat* or led)).ti,ab.

77	Managed Care Programs/
78	(managed care network* or managed clinical network*).ti,ab.
79	Substance Abuse Treatment Centers/
80	((drug or substance abuse or addiction or methadone or opioid or opiate) adj2 (agenc* or service* or treatment or program* or centre* or center* or scheme* or site*1 or facilities or facility or unit or units)).ti,ab.
81	Needle-Exchange Programs/
82	(NSP or NEP or NSEP or NSPs or NEPs or NSEPs).ti,ab.
83	((needle* or syringe* or inject* or paraphernalia or equipment) adj3 (program* or service* or centre* or scheme* or exchang* or center* or site*1 or facilities or facility or area* or pharmacy or pharmacies or unit or units)).ti,ab.
84	or/23-83
85	22 and 84
86	((surveillance or screen* or test* or diagnos* or prevent* or detect* or treatment or refer* or (case adj3 find*) or (case adj3 manage*) or (contact adj3 trac*)) adj3 (barrier* or facilitat* or hinder* or block* or obstacle* or restrict* or restrain* or obstruct* or inhibit* or impede* or delay* or constrain* or hindrance)).ti,ab.
87	((surveillance or screen* or test* or diagnos* or prevent* or detect* or treatment or refer* or (case adj3 find*) or (case adj3 manage*) or (contact adj3 trac*)) adj3 (campaign* or interven* or program* or activit* or project* or counsel* or advice or advise or advising or engage* or curriculum or curricula or initiative*)).ti,ab.
88	((surveillance or screen* or test* or diagnos* or prevent* or detect* or treatment or refer* or (case adj3 find*) or (case adj3 manage*) or (contact adj3 trac*)) adj3 (uptake or take up or increas* or decreas* or reduc* or impact* or effect* or improve* or enhance* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisfaction or compliance or comply or complie* or refus* or availabl* or provision or provid* or offer or incentive*)).ti,ab.
89	((surveillance or screen* or test* or diagnos* or prevent* or detect* or treatment or refer* or (case adj3 find*) or (case adj3 manage*) or (contact adj3 trac*)) adj3 (educat* or inform* or knowledg* or attitude* or intent* or aware* or opportunit* or opportunist* or behavio?r* or risk*)).ti,ab.
90	or/86-89
91	or/6,18-20
92	90 and 91
93	85 or 92
94	Substance Abuse, Intravenous/

95	Drug users/
96	((substance*1 or drug*1 or stimulant*) adj3 (abuse or misuse or dependen* or use*2 or usage or addict* or inject* or intravenous*)).ti,ab.
97	((opioid* or morphine or heroin or opiate or cocaine or steroid* or PIED* or (performance adj3 enhancing) or methadone) adj3 (abuse or misuse or dependen* or use*2 or usage or addict* or inject* or intravenous*)).ti,ab.
98	Heroin Dependence/ or Morphine Dependence/
99	Substance-Related Disorders/
100	Street Drugs/
101	Opioid-Related Disorders/ or Cocaine-Related Disorders/
102	Anabolic agents/
103	"Emigration and Immigration"/
104	"Emigrants and Immigrants"/
105	"Transients and Migrants"/
106	refugees/
107	(immigrant* or immigration or migrant* or migration or asylum or refugee* or undocumented or foreign born).ti,ab.
108	Vulnerable populations/
109	Risk Factors/
110	((hard* adj2 reach) or (hard* adj2 locate) or (hard* adj2 find) or (hard* adj2 treat) or (difficult adj2 locate) or (difficult adj2 engage) or (difficult* adj2 reach) or (difficult* adj2 find) or (difficult* adj2 treat)).ti,ab.
111	((vulnerable or disadvantaged or neglect* or marginal* or forgotten or non-associative or unengaged or hidden or excluded or transient* or inaccessible or underserved or inequitable or low* or poor* or at risk or high risk) adj4 (people or population* or communit* or neighbourhood* or neighborhood* or group* or area or areas or demograph* or patient* or social* or socio economic* or socioeconomic* or status* or education* or societ* or cohort*)).ti,ab.
112	exp Culture/
113	(culture* or cultural* or acculturat*).ti,ab.
114	Language/ or linguistics/ or communication barriers/
115	((language* or linguistic* or communicat* or English) adj3 (problem* or difficult* or (limited adj2 proficienc*))).ti,ab.
116	(illiteracy or illiterate*).ti,ab.

117	((English adj3 (second language or foreign language)) or ESL).ti,ab.
118	Health Status Disparities/
119	exp Social Behavior/
120	prejudice/ or psychosocial deprivation/ or social values/ or cultural deprivation/
121	Socioeconomic Factors/
122	social class/ or social conditions/ or social control, formal/ or social control, informal/ or social environment/ or social isolation/
123	exp poverty/
124	"Discrimination (Psychology)"/
125	(prejudice or discriminat* or "social value*" or poverty or depriv* or disparit*).ti,ab.
126	(social* adj1 (inclusion or include* or exclude* or exclusion)).ti,ab.
127	Stress, Psychological/ or Adaptation, Psychological/
128	shame/
129	(stigma* or shame* or psychosocial).ti,ab.
130	Risk-taking/
131	or/94-130
132	93 and 131
133	animals/ not humans/
134	132 not 133
135	limit 134 to yr=1990 - current

Appendix 2. Bibliographic details of excluded studies

Bibliographic details of studies excluded in first round of screening (n=168)

Reference	Reason for exclusion
Awofeso, N. (2003) Monitoring of communicable diseases screening and hepatitis B vaccination of prison inmates: a model from Australia. Quality in Primary Care, 11, 325-328.	Not effectiveness
Badiaga, S., Raoult, D. & Brouqui, P. (2008) Preventing and controlling emerging and reemerging transmissible diseases in the homeless. Emerging Infectious Diseases, 14 (9), 1353-1359.	Non-systematic review, descriptive article
*Badrakalimuthu, V. R. & Rumball, D. (2008) Blood-borne virus testing and hepatitis B immunisation in specialist alcohol and drugs service. Psychiatric Bulletin, 32, 153.	Not effectiveness
Baird, J., Barker, M. & Hammond, M. (2003) Implementation of universal antenatal screening for HIV and hepatitis B - lessons for future work. Journal of Public Health Medicine, 25, 171-171-173.	Antenatal screening
Balfour, L., Kowal, J., Corace, K. M., Tasca, G. A., Krysanski, V., Cooper, C. L. & Garber, G. (2009) Increasing public awareness about hepatitis C: Development and validation of the brief hepatitis c knowledge scale. Scandinavian Journal of Caring Sciences, 23, 801-808.	Not effectiveness
Barreto, A. M. E. C., Takei, K. E. C. S., Bellesa, M. A. O., Salles, N. A., Barreto, C. C., Nishiya, A. S. & Chamone, D. F. (2008) Cost-effective analysis of different algorithms for the diagnosis of hepatitis C virus infection. Brazilian Journal Of Medical and Biological Research, 41(2):126-134.	Intervention, not uptake of hepatitis testing
Bastani, R., Glenn, B. A., Maxwell, A. E. & Jo, A. M. (2007) Hepatitis B testing for liver cancer control among Korean Americans. Ethnicity and Disease, 17 (2), 365-373.	Not effectiveness
Batash, S., Khaykis, I., Raicht, R. F. & Bini, E. J. (2008) High prevalence of hepatitis C virus infection among immigrants from the former Soviet Union in the New York City metropolitan area: Results of a community-based screening program. American Journal of Gastroenterology, 103 (4), 922-927.	Not effectiveness
Bottecchia, M., Madejon, A., Puente, S., Garcia-Samaniego, J., Rivas, P., Herrero, D. & Soriano, V. (2011) Detection of hepatitis B virus genotype A3 and primary drug resistance mutations in African immigrants with chronic hepatitis B in Spain. Journal of Antimicrobial Chemotherapy, 66 (3) (pp 641-644).	Not effectiveness
Boutwell, A. E., Allen, S. A. & Rich, J. D. (2005) Opportunities to address the hepatitis C epidemic in the correctional setting. Clinical Infectious Diseases, 40 Suppl 5, S367-72.	Non-systematic review, descriptive article
Boyce, D. E., Tice, A. D., Ona, F. V., Akinaka, K. T. & Lusk, H. (2009) Viral hepatitis in a homeless shelter in Hawai'i. Hawaii medical journal, 68 (5), 113-115.	Not effectiveness
Brady, C. W., Coffman, C. J. & Provenzale, D. (2007) Compliance with referral for hepatitis C evaluation among veterans. Journal of Clinical Gastroenterology, 41 (10), 927-931.	Not effectiveness
*Brant, L. J., Balogun, M. A., Ramsay, M. E., Jalal, H., et al. (2008a) Where are people being tested for anti-HCV in England? Results from sentinel laboratory surveillance. Journal of Viral Hepatitis, 15 (10), 729-739.	Not effectiveness
*Brant, L. J., Ramsay, M. E., Balogun, M. A., Boxall, E., et al. (2008b) Diagnosis of acute hepatitis C virus infection and estimated incidence in low- and high-risk English populations. Journal of Viral Hepatitis, 15 (12), 871-877.	Not effectiveness

Reference	Reason for exclusion
*Brant, L. J., Ramsay, M. E., Tweed, E., Hale, A., et al. (2010) Planning for the healthcare burden of hepatitis C infection: Hepatitis C genotypes identified in England, 2002-2007. Journal of Clinical Virology, 48 (2), 115-119.	Not effectiveness
Brettle, R. P. (1998) Hepatitis C: Universal or selective screening? Sexually Transmitted Infections, 74 (5), 374-375.	Non-systematic review, descriptive article
Brook, G., Soriano, V. & Bergin, C. (2010) European guideline for the management of hepatitis B and C virus infections, 2010. International Journal of STD and AIDS, 21 (10), 669-678.	Guideline
Brown Jr, L. S., Kritz, S. A., Goldsmith, R. J., Bini, E. J., Rotrosen, J., Baker, S., Robinson, J. & Mcauliffe, P. (2006) Characteristics of substance abuse treatment programs providing services for HIV/AIDS, hepatitis C virus infection, and sexually transmitted infections: The National Drug Abuse Treatment Clinical Trials Network. Journal of Substance Abuse Treatment, 30 (4), 315-321.	Not effectiveness
Brown, L. S., Jr., Kritz, S., Goldsmith, R. J., Bini, E. J., Eobinson, J., Alderson, D. & Rotrosen, J. (2007) Health services for HIV/AIDS, HCV, and sexually transmitted infections in substance abuse treatment programs. Public Health Reports, 122, 441-451.	Not effectiveness
Brown, L. S., Jr., Kritz, S., Muhammad, A., Bini, E. J., Goldsmith, R. J., Robinson, J., Alderson, D., Hasin, D. S. & Rotrosen, J. (2009) Disparities in health services for HIV/AIDS, hepatitis C virus, and sexually transmitted infections: role of substance abuse treatment programs. Journal of Addiction Medicine, 3, 95-102.	Not effectiveness
Buccolo, L. S. (2005) Viral hepatitis. Clinics in Family Practice, 7 (1 SPEC. ISS.), 105-125.	Non-systematic review, descriptive article
*Budd, J. & Robertson, R. (2005) Hepatitis C and general practice: The crucial role of primary care in stemming the epidemic. British Journal of General Practice, 55 (513), 259-260.	Editorial, comment
*Budd, J., Copeland, L., Elton, R. & Robertson, R. (2002) Hepatitis C infection in a cohort of injecting drug users: Past and present risk factors and the implications for educational and clinical management. European Journal of General Practice, 8 (3), 95-100.	Intervention, not uptake of hepatitis testing
*Budd, J., Robertson, R. & Elton, R. (2004) Hepatitis B vaccination and injecting drug users. British Journal of General Practice, 54, 444-447.	Intervention, not uptake of hepatitis testing
Buffington, J. & Jones, T. S. (2007) Integrating viral hepatitis prevention into public health programs serving people at high risk for infection: Good public health. Public Health Reports, 122 (SUPPL. 2), 1-5.	Editorial, comment, letter
Busen, N. H. & Beech, B. (1997) A collaborative model for community-based health care screening of homeless adolescents. Journal of Professional Nursing, 13, 316-324.	Intervention, not uptake of hepatitis testing
Calonge, N. & Randhawa, G. (2004) The meaning of the U.S. Preventive Services Task Force grade I recommendation: Screening for hepatitis C virus infection. Annals of Internal Medicine, 141 (9), 718-719.	Guideline
Campbell, B. K., Fuller, B. E., Lee, E. S., Tillotson, C., Woelfel, T., Jenkins, L., Robinson, J., Booth, R. E. & Mccarty, D. (2009) Facilitating Outpatient Treatment Entry Following Detoxification for Injection Drug Use: A Multisite Test of Three Interventions. Psychology of Addictive Behaviors, 23 (2), 260-270.	Intervention, not uptake of hepatitis testing
Carey, W. (2003) Tests and screening strategies for the diagnosis of hepatitis C. Cleveland Clinic Journal of Medicine, 70 (SUPPL. 4), S7-S13.	Non-systematic review, descriptive article
Chamot, E., Hirschel, B., Wintsch, J., Robert, C. F., Gabriel, V., Deglon, J. J., Yerly, S. & Perrin, L. (1990) Loss of antibodies against hepatitis C virus in HIV-seropositive intravenous drug users. Aids, 4 (12), 1275-1277.	Not effectiveness

Reference	Reason for exclusion
Champion, J. K., Taylor, A., Hutchinson, S., Cameron, S., Mcmenamin, J., Mitchell, A. & Goldberg, D. (2004) Incidence of Hepatitis C Virus Infection and Associated Risk Factors among Scottish Prison Inmates: A Cohort Study. American Journal of Epidemiology, 159 (5), 514-519.	Not effectiveness
Chan, D. P. C., Lee, S. S. & Lee, K. C. K. (2011) The effects of widespread methadone treatment on the molecular epidemiology of hepatitis C virus infection among injection drug users in Hong Kong. Journal of Medical Virology, 83 (7), 1187-1194.	Not effectiveness
Chan, G. C., Lim, W. & Yeoh, E. K. (1992) Prevalence of hepatitis C infection in Hong Kong. Journal of Gastroenterology & Hepatology, 7, 117-20.	Intervention, not uptake of hepatitis testing
Chapko, M. K., Sloan, K. L., Davison, J. W., Dufour, D. R., Bankson, D. D., Rigsby, M. & Dominitz, J. A. (2005) Cost effectiveness of testing strategies for chronic hepatitis C. The American Journal of Gastroenterology, 100:607-615.	Intervention, not uptake of hepatitis testing
Chelling, P. K., Borkakoty, B. J., Chetia, M., Das, H. K. & Mahanta, J. (2008) Risk of hepatitis C infection among injection drug users in Mizoram, India. Indian Journal of Medical Research, 128 (5), 640-646.	Not effectiveness
Chen, C. J., Tseng, S. F., Lu, C. F., Lin, H. C., You, S. L., Chen, C. S., Hwang, S. J., Hsieh, S. F. & Hsu, S. T. (1992) Current seroepidemiology of hepatitis D virus infection among hepatitis B surface antigen carriers of general and high-risk populations in Taiwan. Journal of Medical Virology, 38 (2), 97-101.	Intervention, not uptake of hepatitis testing
Chen, W. & Gluud, C. (2005) Vaccines for preventing hepatitis B in health-care workers. Cochrane Database of Systematic Reviews. Chichester, UK, John Wiley & Sons, Ltd.	Not effectiveness
Cheng, J. T., Hsien, C., Sun, H.-E. J. & Tong, M. J. (2006) The emerging importance of chronic hepatitis C infection in Asian Americans. American Journal of Gastroenterology, 101, 2737-43.	Not effectiveness
Cheung, R. C., Cunningham, B. A. & Cooper, A. D. (2006) Effectiveness of a screening program for hepatitis C. Digestive Diseases and Sciences, 51 (5), 976-981.	No testing, knowledge or other outcomes of interest
Choe, J. H., Taylor, V. M., Yasui, Y., Burke, N., Nguyen, T., Acorda, E. & Jackson, J. C. (2006) Health care access and sociodemographic factors associated with hepatitis B testing in Vietnamese American men. Journal of Immigrant and Minority Health, 8 (3), 193-201.	Not effectiveness
Chong, V. H. (2008) Screening blood-borne virus among incarcerated inmates. International Journal of STD & AIDS, 19, 795.	Editorial, comment, letter
Chrusch, C. & Minuk, G. Y. (1991) Public knowledge about hepatitis B related issues in a high risk population. Arctic Medical Research, Suppl, 374-376.	Not effectiveness
Chun, D. S. (2002) An assessment of support group participation on depression and adherence in veterans with hepatitis C. Dissertation Abstracts International: Section B: The Sciences and Engineering, 63, 1557.	Intervention, not uptake of hepatitis testing
Cleveland, J. L. & Cardo, D. M. (2003) Occupational exposures to human immunodeficiency virus, hepatitis B virus, and hepatitis C virus: Risk, prevention, and management. Dental Clinics of North America, 47 (4), 681-696.	Not a high risk group (occupational)
Colin, C., Vergnon, P., Jullien, A. M., Excoffier, S., Matillon, Y., Trepo, C., Aymard, J. P., Bastit, D., Bidet, M. L., Breviere, R., Chenais, F., Hau, F., Houssay, D., Mercadier, A., Maisonneuve, P., Lambert, M., Waller, C., Boudart, D., Cotte, C., Elghouzzi, M. H., Janot, C., Daudet, M., Menault, M., Montcharmont, M., Smilovici, W., Fretz, C., Follana, R., Doillon, M., Le Petit, J. C., Herve, P., Loyer, B. & Mattlinger, B. (1997b) Cost-effectiveness of screening blood donors for hepatitis C and non-A, non-B, non-C hepatitis. European Journal of Clinical Microbiology and Infectious Diseases, 16 (3), 220-227.	Duplicate reference

Reference	Reason for exclusion
Colin, C., Vergnon, P., Jullien, A. M., Excoffier, S., Matillon, Y. & Trepo, C. (1997a) Cost-effectiveness of screening blood donors for hepatitis C and non-A, non-B, non-C hepatitis. The EATHIS Eco Research Group. European Acute Transfusion Hepatitis Interferon Study. European Journal of Clinical Microbiology & Infectious Diseases, 16, 220-7.	Not a high risk group (blood donors)
*Copley, L. (2005) Hepatitis C: the silent killer. Practice Nurse, 29, 41-4.	Non-systematic review, descriptive article
Coppola, A. G., Karakousis, P. C., Metz, D. C., Go, M. F., Mhokashi, M., Howden, C. W., Raufman, J.-P. & Sharma, V. K. (2004) Hepatitis C knowledge among primary care residents: is our teaching adequate for the times? American Journal of Gastroenterology, 99, 1720-5.	Not effectiveness
Cormier, M. (2005) The role of hepatitis C support groups. Gastroenterology Nursing: the official journal of the Society of Gastroenterology Nurses and Associates, 28 (3 Suppl), S4-9.	Non-systematic review, descriptive article
Coronado, G. D., Taylor, V. M., Tu, S. P., Yasui, Y., Acorda, E., Woodall, E., Yip, M. P., Li, L. & Hislop, T. G. (2007) Correlates of hepatitis B testing among Chinese Americans. Journal of Community Health, 32 (6), 379-390.	Not effectiveness
*Coupland, C., Hippisley-Cox, J., Smith, S., Irving, W., et al. (2006) General practice characteristics associated with rates of testing and detection of hepatitis C: cross-sectional study in Nottingham and Derbyshire. British Journal of General Practice, 56, 620-623.	Not effectiveness
Coupland, H., Day, C., Levy, M. T. & Maher, L. (2009) Promoting equitable access to hepatitis C treatment for Indo-Chinese injecting drug users. Health Promotion Journal of Australia, 20, 234-240.	Not effectiveness
Cozzolongo, R., Cuppone, R., Petruzzi, J., Stroffolini, T. & Manghisi, O. G. (2005) Approach of primary care physicians to hepatitis C: An educational survey from a Southern Italian area. Journal of Infection, 51 (5), 396-400.	Not effectiveness
*Craine, N., Walker, M., Carnwath, T. & Klee, H. (2004) Hepatitis C testing and injecting risk behaviour: the results of a UK based pilot study. International Journal of Drug Policy, 15, 115-122.	Not effectiveness
Dolder, N. M., Wilhardt, M. S. & Morreale, A. P. (2002) Justifying a multidisciplinary high-intensity hepatitis C clinic by using decision analysis. American Journal of Health-System Pharmacy, 59, 875-879.	Intervention, not uptake of hepatitis testing
Edlin, B. R., Kresina, T. F., Raymond, D. B., Carden, M. R., Gourevitch, M. N., Rich, J. D., Cheever, L. W. & Cargill, V. A. (2005) Overcoming barriers to prevention, care, and treatment of hepatitis C in illicit drug users. Clinical Infectious Diseases, 40 (SUPPL. 5), S276-S285.	Non-systematic review, descriptive article
*Farrell, M., Battersby, M. & Strang, J. (1990) Screening for hepatitis B and vaccination of injecting drug users in NHS drug treatment services. British Journal of Addiction, 85 (12), 1657-1659.	Not effectiveness
Fischer, L. R., Tope, D. H., Conboy, K. S., Hedblom, B. D., Ronberg, E., Shewmake, D. K. & Butler, J. C. (2000) Screening for hepatitis C virus in a health maintenance organization. Archives of Internal Medicine, 160, 1665-73.	Not effectiveness
Garfein, R. S., Golub, E. T., Greenberg, A. E., Hagan, H., Hanson, D. L., Hudson, S. M., Kapadia, F., Latka, M. H., Ouellet, L. J., Purcell, D. W., Strathdee, S. A. & Thiede, H. (2007) A peer-education intervention to reduce injection risk behaviors for HIV and hepatitis C virus infection in young injection drug users. Aids, 21 (14), 1923-1932.	Intervention, not uptake of hepatitis testing
Germano, F. N., Dos Santos, C. A., Honscha, G., Strasburg, A., Gabbi, B., Mendoza-Sassi, R. A., Soares, E. A., Seuánez, H. N., Soares, M. A. & Martínez, A. M. (2010) Prevalence of hepatitis C virus among users attending a voluntary testing centre in Rio Grande, southern Brazil: predictive factors and hepatitis C virus genotypes. International Journal of STD & AIDS, 21, 466-471.	Not effectiveness
Gibbons, D. & Gallagher, C. M. (2001) Hepatitis B vaccine uptake in a high risk hospital population [2]. Irish Medical Journal, 94 (2), 56-58.	Intervention, not uptake of hepatitis testing

Reference	Reason for exclusion
Gish, R. G. & Locarnini, S. A. (2006) Chronic Hepatitis B: Current Testing Strategies. Clinical Gastroenterology and Hepatology, 4 (6), 666-676.	Non-systematic review, descriptive article
Gish, R. G., Afdhal, N. H., Dieterich, D. T. & Reddy, K. R. (2005) Management of hepatitis C virus in special populations: Patient and treatment considerations. Clinical Gastroenterology and Hepatology, 3 (4), 311-318.	Non-systematic review, descriptive article
Goldberg, R. W., Himelhoch, S., Kreyenbuhl, J., Dickerson, F. B., Hackman, A., Fang, L. J., Brown, C. H., Wohlheiter, K. A. & Dixon, L. B. (2005) Predictors of HIV and hepatitis testing and related service utilization among individuals with serious mental illness. Psychosomatics, 46 (6), 573-577.	Not effectiveness
Gordon, F. D. (1999) Cost-effectiveness of screening patients for hepatitis C. American Journal of Medicine, 107 (6 SUPPL. 2), 36-40.	Non-systematic review, descriptive article
Grau, L. E., Green, T. C., Singer, M., Bluthenthal, R. N., Marshall, P. A. & Heimer, R. (2009) Getting the message straight: Effects of a brief hepatitis prevention intervention among injection drug users. Harm Reduction Journal, 6, 36.	Intervention, not uptake of hepatitis testing
Grebely, J. & Dore, G. J. (2011) Hepatitis C: enhancing treatment for hepatitis C among drug users. Nature Reviews Gastroenterology & Hepatology, 8, 11-13.	Intervention, not uptake of hepatitis testing
*Green, S. T., Kinghorn, G. R., Goldberg, D. J. & Mohsen, A. H. (2002) The value of genitourinary medicine clinics in the recognition and diagnosis of new cases of hepatitis C in the United Kingdom. International Journal of STD & AIDS, 13, 60-2.	Editorial, comment
*Greyson, O. (2009) Best practice in the treatment of hepatitis C. Nursing in Practice, 84-6.	Non-systematic review, descriptive article
Groessl, E. J., Weingart, K. R., Gifford, A. L., Asch, S. M. & Ho, S. B. (2011a) Development of the Hepatitis C Self-Management Program. Patient Education and Counseling, 83 (2), 252-255.	Intervention, not uptake of hepatitis testing
Groessl, E. J., Weingart, K. R., Stepnowsky, C. J., Gifford, A. L., Asch, S. M. & Ho, S. B. (2011b) The hepatitis C self-management programme: A randomized controlled trial. Journal of Viral Hepatitis, 18 (5), 358-368.	Intervention, not uptake of hepatitis testing
Grogan, A. & Timmins, F. (2010) Patients' perceptions of information and support received from the nurse specialist during HCV treatment. Journal of Clinical Nursing, 19 (19-20), 2869-2878.	Not effectiveness
Grytdal, S. P., Liao, Y., Chen, R., Garvin, C. C., Grigg-Saito, D., Kagawa-Singer, M., Liang, S., Mcphee, S. J., Nguyen, T. T., Tran, J. H. & Gallagher, K. M. (2009) Hepatitis B testing and vaccination among Vietnamese- and Cambodian-Americans. Journal of Community Health, 34, 173-180.	Not effectiveness
Guajardo, A. D., Middleman, A. B. & Sansaricq, K. M. (2002) School nurses identify barriers and solutions to implementing a school-based hepatitis B immunization program. The Journal of school health, 72 (3), 128-130.	Intervention, not uptake of hepatitis testing
Gunn, R. A., Murray, P. J., Ackers, M. L., Hardison, W. G. M. & Margolis, H. S. (2001) Screening for chronic hepatitis B and C virus infections in an urban sexually transmitted disease clinic: Rationale for integrating services. Sexually Transmitted Diseases, 28 (3), 166-170.	Not effectiveness
Gunn, R. A., Murray, P. J., Brennan, C. H., Callahan, D. B., Alter, M. J. & Margolis, H. S. (2003) Evaluation of screening criteria to identify persons with hepatitis C virus infection among sexually transmitted disease clinic clients: Results from the San Diego Viral Hepatitis Integration Project. Sexually Transmitted Diseases, 30 (4), 340-344.	Not effectiveness

Reference	Reason for exclusion
Hagan, H., Des Jarlais, D. C., Friedman, S. R., Purchase, D. & Alter, M. J. (1995) Reduced risk of hepatitis B and hepatitis C among injection drug users in the Tacoma syringe exchange program. American Journal of Public Health, 85 (11), 1531-1537.	Intervention, not uptake of hepatitis testing
Hann, H. L. (2007) Hepatitis B virus screening and counseling strategies for general practitioners. Johns Hopkins Advanced Studies in Medicine, 7, 476-481.	Non-systematic review, descriptive article
Hayashi, K., Montaner, J., Kaplan, K., Suwannawong, P., Wood, E., Qi, J. & Kerr, T. (2011) Low uptake of hepatitis C testing and high prevalence of risk behavior among HIV-positive injection drug users in Bangkok, Thailand. Journal of Acquired Immune Deficiency Syndromes, 56 (5), e133-e135.	Not effectiveness
Healy, C. M., Cafferkey, M. T., Butler, K. M., Cahill, I., Mcmorrow, J., Philbin, M., Beckett, M., Mackey, R., Macmathuna, P., Dooley, S., Hall, W. W. & Mckenna, P. (2001) Antenatal hepatitis B screening - Is there a need for a national policy? Irish Medical Journal, 94 (4), 111-114.	Antenatal screening
Heinzerling, K. G., Kral, A. H., Flynn, N. M., Anderson, R. L., Scott, A., Gilbert, M. L., Asch, S. M. & Bluthenthal, R. N. (2007) Human immunodeficiency virus and hepatitis C virus testing services at syringe exchange programs: availability and outcomes. Journal of Substance Abuse Treatment, 32, 423-9.	Not effectiveness
Heseltine, G. & McFarlane, J. (2007) Texas statewide hepatitis C counseling and testing, 2000-2005. Public Health Reports, 122, 6-11.	Non-systematic review, descriptive article
Hislop, T. G., Bajdik, C. D., Teh, C., Lam, W., Tu, S. P., Yasui, Y., Bastani, R. & Taylor, V. M. (2009) Hepatitis B testing and vaccination in immigrants attending English as a second language classes in British Columbia, Canada. Asian Pacific Journal of Cancer Prevention: APJCP, 10 (6), 997-1002.	Not effectiveness
Hislop, T. G., Teh, C., Low, A., Li, L., Tu, S., Yasui, Y. & Taylor, V. M. (2007) Hepatitis B knowledge, testing and vaccination levels in Chinese immigrants to British Columbia, Canada. Canadian Journal of Public Health, 98, 125-129.	Not effectiveness
*Horne, J. A., Clements, A. J., Drennan, P., Stein, K., et al. (2004) Screening for hepatitis C virus in the Dartmoor prison population: an observational study. Journal of Public Health, 26, 372-372-375.	Not effectiveness
Ishizuka, M. (1999) Economic evaluation of health care program for hepatitis C virus antibody screening. Nippon Koshu Eisei, 46(6):447-65.	Foreign Language article
Kaur, S., Rybicki, L., Bacon, B. R., Gollan, J. L., Rustgi, V. K. & Carey, W. D. (1996) Performance characteristics and results of a large-scale screening program for viral hepatitis and risk factors associated with exposure to viral hepatitis B and C: Results of the national hepatitis screening survey. Hepatology, 24 (5), 979-986.	Not effectiveness
Kerr, R. S., Fernando, I., Templeton, K. & Flynn, B. (2009) Hepatitis C screening in genitourinary clinic attendees. International Journal of STD and AIDS, 20 (11), 808.	Editorial, comment, letter
King, L. A., Le Strat, Y., Meffre, C., Delarocque-Astagneau, E. & Desenclos, J. C. (2009) Assessment and proposal of a new combination of screening criteria for hepatitis C in France. European Journal of Public Health, 19 (5), 527-533.	Intervention, not uptake of hepatitis testing
Kung, K., Lam, A. & Li, P. K. (2004) Screening in chronic hepatitis B carriers: a retrospective study in a primary care clinic. Hong Kong Practitioner, 26(5):221-227.	Not effectiveness

Reference	Reason for exclusion
Lapane, K. L., Jakiche, A. F., Sugano, D., Weng, C. S. W. & Carey, W. D. (1998) Hepatitis C infection risk analysis: Who should be screened? Comparison of multiple screening strategies based on the national hepatitis surveillance program. American Journal of Gastroenterology, 93 (4), 591-596.	Not effectiveness
Larcher, V. F., Bourne, J., Aitken, C., Jeffries, D. & Hodes, D. (2001) Overcoming barriers to hepatitis B immunisation by a dedicated hepatitis B immunisation service. Archives of Disease in Childhood, 84, 114-9.	Intervention, not uptake of hepatitis testing
*Leal, P. & Stein, K. (1997) Screening for hepatitis C in intravenous drug users and genitor-urinary clinic attenders: conclusion of the Development and Evaluation Committee. DEC Reports, 1-42.	Non-systematic review, descriptive article
Lee, J., Lok, A. S. & Chen, J. (2010) Hepatitis B prevalence among Asian Americans in Michigan: an assessment to guide future education and intervention strategies. Journal of Community Health, 35, 534-42.	Not effectiveness
Leung, C., Tsoi, E., Burns, G. & Sieverta, W. (2011) An argument for the universal prophylaxis of hepatitis B infection in patients receiving rituximab: A 7-Year institutional experience of hepatitis screening. Oncologist, 16 (5), 579-584.	Intervention, not uptake of hepatitis testing
Levy, J. D., Nguyen, G. T. & Nguyen, E. T. (2010) Factors influencing the receipt of hepatitis B vaccination and screenings in Vietnamese Americans. Journal of Health Care for the Poor & Underserved, 21, 851-861.	Not effectiveness
Liao, K. F., Lai, S. W., Chang, W. L. & Hsu, N. Y. (2006) Screening for viral hepatitis among male non-drug-abuse prisoners. Scandinavian Journal of Gastroenterology, 41 (8), 969-973.	Not effectiveness
Lifson, A. R., Rybicki, S. L., Hadsall, C., Dickinson, S., Van Zyl, A. & Carr, P. (2009) A Training Program for Nurses and Other Health Professionals in Rural-Based Settings on Screening and Clinical Management of HIV and Other Sexually Transmitted Infections. Journal of the Association of Nurses in AIDS Care, 20, 77-77-85.	Non-systematic review, descriptive article
Lin, S. Y., Chang, E. T. & So, S. K. (2007) Why we should routinely screen Asian American adults for hepatitis B: A cross-sectional study of asians in California. Hepatology, 46 (4), 1034-1040.	Not effectiveness
Lin, S. Y., Chang, E. T. & So, S. K. (2009) Stopping a silent killer in the underserved asian and pacific islander community: a chronic hepatitis B and liver cancer prevention clinic by medical students. Asian Pacific Journal of Cancer Prevention: Apjcp, 10, 383-6.	Not effectiveness
Litwin, A. H., Soloway, I. & Gourevitch, M. N. (2005) Integrating services for injection drug users infected with hepatitis C virus with methadone maintenance treatment: Challenges and opportunities. Clinical Infectious Diseases, 40 (SUPPL. 5), S339-S345.	Not effectiveness
Liu, A. J., An, E. I., Murray, H. G., Tetstall, E., Leroi, M. J. & Nanan, R. K. (2009) Screening for hepatitis C virus infection in methadone-maintained mothers and their infants. Medical Journal of Australia, 191, 535-538.	Antenatal screening
Lo Re, V., 3rd (2011) Economic analysis of hepatitis B screening and treatment. Clinical Infectious Diseases, 52(11):1307-1309.	Intervention, not uptake of hepatitis testing
Loubiere, S., Rotily, M. & Moatti, J. P. (2003) Prevention could be less cost-effective than cure: The case of hepatitis C screening policies in France. International Journal of Technology Assessment in Health Care, 19 (4), 632-645.	Intervention, not uptake of hepatitis testing
Loubiere, S., Rotily, M., Portal, I., Bourliere, M. & Moatti, J. P. (1999) Economic evaluation of screening strategies for chronic hepatitis C. Medecine et Maladies Infectieuses, 29:337-344.	Intervention, not uptake of hepatitis testing
Ma, G. X., Fang, C. Y., Shive, S. E., Toubbeh, J., Tan, Y. & Siu, P. (2007a) Risk perceptions and barriers to Hepatitis B screening and vaccination among Vietnamese immigrants. Journal of Immigrant and Minority Health, 9 (3), 213-220.	Not effectiveness

Reference	Reason for exclusion
Ma, G. X., Shive, S. E., Fang, C. Y., Feng, Z., Parameswaran, L., Pham, A. & Khanh, C. (2007b) Knowledge, attitudes, and behaviors of hepatitis B screening and vaccination and liver cancer risks among Vietnamese Americans. Journal of Health Care for the Poor & Underserved, 18, 62-73.	Not effectiveness
Ma, G. X., Tan, Y., Wang, M. Q., Yuan, Y. & Chae, W. G. (2010) Hepatitis B screening compliance and non-compliance among Chinese, Koreans, Vietnamese and Cambodians. Clinical Medicine Insights: Gastroenterology, 3, 1-10.	Not effectiveness
Macalino, G. E., Dhawan, D. & Rich, J. D. (2005) A missed opportunity: hepatitis C screening of prisoners. American Journal of Public Health, 95, 1739-1740.	Not effectiveness
Magriples, U., Bernstein, P., Snyder, E. & Copel, J. A. (1998) Can risk factor screening predict Hepatitis C antibody reactivity? American Journal of Perinatology, 15 (6), 395-398.	Not effectiveness
*Mahto, M. & Zia, S. (2008) Measuring the gap: from Home Office to the National Health Service in the provision of a one-stop shop sexual health service in a female prison in the UK. International Journal of STD & AIDS, 19, 586-589.	Intervention, not uptake of hepatitis testing
Malek, M. & Davey, P. (1993) Economics of Mandatory HIV and Hepatitis B Virus Testing for Healthcare Workers Performing Surgical Procedures. PharmacoEconomics, 4, 401-404.	Not a high risk group (occupational)
Mallette, C., Flynn, M. A. & Promrat, K. (2008) Outcome of screening for hepatitis C virus infection based on risk factors. American Journal of Gastroenterology, 103 (1), 131-137.	Not effectiveness
Mapagu, M. C., Martin, S. J., Currie, M. J. & Bowden, F. J. (2008) Screening for hepatitis C in sexual health clinic attendees. Sexual Health (14485028), 5, 73-76.	Not effectiveness
Matthews, A. M. & Hauser, P. (2008) Hepatitis C screening in bipolar veterans. Addictive Disorders & Their Treatment, 7, 41-45.	Not effectiveness
Mayor, A. M., Fernandez, D. M., Colã³n, H. M., Thomas, J. C. & Hunter-Mellado, R. E. (2010) The effectiveness evaluation of a multimedia hepatitis C prevention program for Hispanic HIV-infected individuals. Ethnicity & Disease, 20, S1-158-62.	Co-morbid HIV and HCV infection
Mayor, A. M., Fernandez, D. M., Colon, H. M., Thomas, J. C. & Hunter-Mellado, R. F. (2008) The feasibility and acceptability of a multimedia hepatitis C prevention program for hispanic HIV-infected persons. Ethnicity and Disease, 18 (2 SUPPL. 2), S2-195-S2-199.	Co-morbid HIV and HCV infection
McCreaddie, M. (2001) The hepatitis viruses. 2. Testing for hepatitis, treatment and prevention. Nursing Times, 97 (48), 41-44.	Non-systematic review, descriptive article
McDermott, C. D., Moravac, C. C. & Yudin, M. H. (2010) The effectiveness of screening for hepatitis C in pregnancy. Journal of Obstetrics & Gynaecology Canada: JOGC, 32, 1035-41.	Antenatal screening
McGinn, T., O'Connor-Moore, N., Alfandre, D., Gardenier, D. & Wisnivesky, J. (2008) Validation of a hepatitis C screening tool in primary care. Archives of Internal Medicine, 168, 2009-2013.	Not effectiveness
Mostert, M. C., Richardus, J. H. & De Man, R. A. (2004) Referral of chronic hepatitis B patients from primary to specialist care: making a simple guideline work. Journal of Hepatology, 41, 1026-30.	Intervention, not uptake of hepatitis testing
Ozkan, S., Atak, A., Bozdayi, G., Turkcuoglu, S. & Maral, I. (2010) Community-based research: cost of the tests used for anti-HBc total seropositivity only and hepatitis B screening. Transactions of the Royal Society of Tropical Medicine and Hygiene, 104, 782-786.	Not a full economic evaluation
Peters, M. G., Weinbaum, C., Tan, L., Baine, W. B., Dienstag, J. L., Liang, T. J. & So, S. (2010) Activity 4: Recommendations for prevention, screening, and diagnosis of HBV and HCV infections. Journal of Family Practice, 59 (SUPPL. 4), S29-S33+S34-S35.	Non-systematic review, descriptive article

Reference	Reason for exclusion
Peterson, D. C. & Palevsky, S. L. (2005) Office-based approach to the implementation of a hepatitis immunization program. American Journal of Medicine, 118 (10 SUPPL.), 90S-95S.	Not uptake of hepatitis testing (vaccination)
*Poll, R. (2007) An overview of the diagnosis, prevention and management of hepatitis C. Gastrointestinal Nursing, 5, 26-34.	Non-systematic review, descriptive article
*Poll, R. (2009) The role of the community nurse in hepatitis C diagnosis and treatment. Br J Community Nursing, 14, 292-6.	Non-systematic review, descriptive article
Pollack, H. A. (2001) Cost-effectiveness of harm reduction in preventing hepatitis C among injection drug users. Medical Decision Making, 21:357-367.	Not uptake of hepatitis testing
Poulin, C., Gyorkos, T. W., Macphee, J., Cann, B. & Bickerton, J. (1992) Contact-tracing among injection drug users in a rural area. Canadian Journal of Public Health, 83, 106-108.	Non-systematic review, descriptive article
Pritchard, D. (2007) Transmission, Screening and Treatment of Hepatitis C. Nursing Times, 103, 26-26-27.	Not a high risk group (occupational)
Pugatch, D., Anderson, B. J., O'Connell, J. V., Elson, L. C. & Stein, M. D. (2006) HIV and HCV Testing for Young Drug Users in Rhode Island. Journal of Adolescent Health, 38, 302-302-304.	Not effectiveness
Quaglio, G., Lugoboni, F. & Mezzelani, P. (2004) HBV vaccination should be performed in service centres for drug users: An Italian experience [4]. Journal of Public Health, 26 (3), 320.	Intervention, not uptake of hepatitis testing
Rainey, J. (2007) An evaluation of a state hepatitis prevention and control program: focus group interviews with clients. Health promotion practice, 8 (3), 266-272.	Not effectiveness
Reimer, J. & Haasen, C. (2009) Need-adapted HCV-treatment setting for injection drug users. Lancet, 373, 2090-2091.	Editorial, comment, letter
Rein, D. B., Lesesne, S. B., Leese, P. J. & Weinbaum, C. M. (2010) Community-based hepatitis B screening programs in the United States in 2008. Journal of Viral Hepatitis, 17 (1), 28-33.	Not effectiveness
Reynolds, G. L., Fisher, D. G., Napper, L. E., Marsh, K. A., Willey, C. & Brooks, R. (2008) Results from a multiple morbidities testing program offering rapid HIV testing bundled with hepatitis and sexually transmitted infection testing. Public Health Reports, 123 (SUPPL. 3), 63-69.	Intervention, not uptake of hepatitis testing
Rifai, M. A. (2010) To screen or not to screen for hepatitis C infection? Psychiatric Services, 61 (3), 325-326.	Intervention, not uptake of hepatitis testing
Rifai, M. A., Moles, J. K., Lehman, L. P. & Van Der Linden, B. J. (2006) Hepatitis C screening and treatment outcomes in patients with substance use/dependence disorders. Psychosomatics, 47 (2), 112-121.	Intervention, not uptake of hepatitis testing
Rotily M, L. S. N. J. B. M. H. P. M. J. P. (1997) Socio-economic analysis of various screening strategies for chronic hepatitis C in a French population. Gastroenterologie Clinique et Biologique, 20:S33-S40.	Foreign Language article
Rotily, M., Loubiere, S., Nixon, J., Bourliere, M., Halfon, P. & Moatti, J. P. (1997) [Should hepatitis C be screened: socioeconomic analysis of various screening strategies for chronic hepatitis C in a French population]. Gastroenterologie Clinique et Biologique, 21, S33-S40.	Intervention, not uptake of hepatitis testing
Russell, M. (2004) Screening in General Health Care. Alcohol Research & Health, 28, 17-22.	Non-systematic review, descriptive article

Reference	Reason for exclusion
Singer, M. E. & Younossi, Z. M. (1999) Screening for hepatitis C: cost-effectiveness of alternative strategies. Medical Decision Making, 19(4):526.	Intervention, not uptake of hepatitis testing
Tepichin, G. H., Fay, Koff, Pongwalanakulsiri, John, Cruz, Salleras, Cianciara, Dittman, N., Da, V., Abraham, Szucs & Violaki, P. (2000) Awareness campaigns: Experience in Mexico. Vaccine, 18 (SUPPL. 1), S90-S94.	Not effectiveness
Thomas, D. L. (2010) Improving the detection and care of people with hepatitis B and C. Gastroenterology and Hepatology, 6 (6), 363-365.	Non-systematic review, descriptive article
Tramarin, A., Gennaro, N., Compostella, F. A., Gallo, C., Wendelaar Bonga, L. J. & Postma, M. J. (2008) HCV screening to enable early treatment of hepatitis C: a mathematical model to analyse costs and outcomes in two populations. Current Pharmaceutical Design, 14(17):1655-1660.	Intervention, not uptake of hepatitis testing
Treloar, C., Newland, J., Rance, J. & Hopwood, M. (2010) Uptake and delivery of hepatitis C treatment in opiate substitution treatment: Perceptions of clients and health professionals. Journal of Viral Hepatitis, 17 (12), 839-844.	Not effectiveness
Trepka, M. J., Zhang, G., Leguen, F., Obiaja, K. & Malow, R. M. (2007) Benefits and adverse effects of hepatitis C screening: early results of a screening program. Journal of Public Health Management & Practice, 13, 263-269.	Intervention, not uptake of hepatitis testing
Trooskin, S. B., Navarro, V. J., Winn, R. J., Axelrod, D. J., Mcneal, A. S., Velez, M., Herrine, S. K. & Rossi, S. (2007) Hepatitis C risk assessment, testing and referral for treatment in urban primary care: Role of race and ethnicity. World Journal of Gastroenterology, 13 (7), 1074-1078.	Not effectiveness
Trubatch, B. N., Fisher, D. G., Cagle, H. H. & Fenaughty, A. M. (2000) Vaccination strategies for targeted and difficult-to-access groups. American Journal of Public Health, 90, 447.	Intervention, not uptake of hepatitis testing
Tu R, S.-P., Li, L., Tsai, J. H.-C., Yip, M.-P., Terasaki, G., Teh, C., Yasui, Y., Hislop, T. G. & Taylor, V. (2009) A cross-border comparison of hepatitis B testing among Chinese residing in Canada and the United States. Asian Pacific Journal of Cancer Prevention: Apjcp, 10, 483-90.	Not effectiveness
Tucker, T., Fry, C. L., Lintzeris, N., Baldwin, S., Ritter, A., Donath, S. & Whelan, G. (2004a) Randomized controlled trial of a brief behavioural intervention for reducing hepatitis C virus risk practices among injecting drug users. Addiction, 99, 1157-1166.	Intervention, not uptake of hepatitis testing
Tucker, T., Fry, C. L., Lintzeris, N., Baldwin, S., Ritter, A., Donath, S. & Whelan, G. (2004b) RESEARCH REPORT: Randomized controlled trial of a brief behavioural intervention for reducing hepatitis C virus risk practices among injecting drug users. Addiction, 99, 1157-1157-1166.	Intervention, not uptake of hepatitis testing
*Tweed, E., Brant, L., Hurrelle, M., Klapper, P., et al. (2010) Hepatitis C testing in sexual health services in England, 2002-7: Results from sentinel surveillance. Sexually Transmitted Infections, 86 (2), 126-130.	Not effectiveness
*Uddin, G., Shoeb, D., Solaiman, S., Marley, R., et al. (2010) Prevalence of chronic viral hepatitis in people of south Asian ethnicity living in England: The prevalence cannot necessarily be predicted from the prevalence in the country of origin. Journal of Viral Hepatitis, 17 (5), 327-335.	Not effectiveness
Udeagu Pratt, C. C. N., Paone, D., Carter, R. J. & Layton, M. C. (2002) Hepatitis C screening and management practices: A survey of drug treatment and syringe exchange programs in New York City. American Journal of Public Health, 92 (8), 1254-1256.	Not effectiveness
Vallabhaneni, S., Macalino, G. E., Reinert, S. E., Schwartzapfel, B., Wolf, F. A. & Rich, J. D. (2006) Prisoners favour hepatitis C testing and treatment. Epidemiology and Infection, 134 (2), 243-248.	Not effectiveness

Reference	Reason for exclusion
Vallejo, F., Toro, C., De La Fuente, L., Brugal, M. T., Barrio, G., Soriano, V., Ballesta, R. & Bravo, M. J. (2008) Hepatitis B vaccination: An unmet challenge in the era of harm reduction programs. Journal of Substance Abuse Treatment, 34 (4), 398-406.	Intervention, not uptake of hepatitis testing
Van Steenbergen, J. E. (2002) Results of an enhanced-outreach programme of hepatitis B vaccination in the Netherlands (1998-2000) among men who have sex with men, hard drug users, sex workers and heterosexual persons with multiple partners. Journal of Hepatology, 37 (4), 507-513.	Intervention, not uptake of hepatitis testing
Van Zandt, S. E., D'lugoff, M. I. & Kelley, L. (2002) A community-based free nursing clinic's approach to management of health problems for the uninsured: the hepatitis C example. Family & community health, 25 (3), 61-70.	Non-systematic review, descriptive article
*Ward, C., Tudor-Williams, G., Cotzias, T., Hargreaves, S., et al. (2000) Prevalence of hepatitis C among pregnant women attending an inner London obstetric department: Uptake and acceptability of named antenatal testing. Gut, 47 (2), 277-280.	Antenatal screening
Weiner, A. J., Truett, M. A., Rosenblatt, J., Han, J., Quan, S., Polito, A. J., Kuo, G., Choo, Q. L., Houghton, M., Agius, C., Page, E. & Nelles, M. J. (1990) HCV testing in low-risk population. Lancet, 336 (8716), 695.	Not effectiveness
White, B., Day, C., Thein, H. H., Doab, A., Bates, A., Holden, J., Van Beek, I. & Maher, L. (2008) Acceptability of hepatitis C virus testing methods among injecting drug users. Drug and Alcohol Review, 27 (6), 666-670.	Not effectiveness
Wiewiora-Pilecka, D. (2000) Cost-benefit analysis of the Polish hepatitis B prevention programme. Vaccine, 18(S52-S54).	Intervention, not uptake of hepatitis testing
*Williams, J. R., James Nokes, D. & Anderson, R. M. (1996a) Targeted hepatitis B vaccination - A cost effective immunisation strategy for the UK? Journal of Epidemiology and Community Health, 50 (6), 667-673.	Intervention, not uptake of hepatitis testing
*Wright, N. M. J. & Tompkins, C. N. E. (2006) A review of the evidence for the effectiveness of primary prevention interventions for hepatitis C among injecting drug users. Harm Reduction Journal, 3:27.	Intervention, not uptake of hepatitis testing
Zuure, F. R., Heijman, T., Urbanus, A. T., Prins, M., Kok, G. & Davidovich, U. (2011) Reasons for compliance or noncompliance with advice to test for hepatitis C via an internet-mediated blood screening service: a qualitative study. BMC Public Health, 11, 293.	Qualitative study
*Denotes a UK study	

Bibliographic details of studies excluded in second round of screening (n=72)

Reference	Reason for exclusion
*Abou-Saleh, M., Davis, P., Rice, P., Checinski, K., et al. (2008) The effectiveness of behavioural interventions in the primary prevention of Hepatitis C amongst injecting drug users: A randomised controlled trial and lessons learned. Harm Reduction Journal, 5.	Intervention, not uptake of hepatitis testing
Anon. (2008) Use of enhanced surveillance for hepatitis C virus infection to detect a cluster among young injection-drug users--new York, November 2004-April 2007. Mmwr, Morbidity and mortality weekly report. 57 (19), 517-521.	Intervention, not uptake of hepatitis testing
*Apoola, A. & Brunt, L. (2011) A randomised controlled study of mouth swab testing versus same day blood tests for HIV infection in young people attending a community drug service. Drug & Alcohol Review, 30, 101-3.	Intervention, not uptake of hepatitis testing
*Arulrajan, A. E. & O'connell, S. (1992) Hepatitis B screening and immunization for people with a mental handicap in Southampton: costs and benefits. Journal of Intellectual Disability Research, 36, 259-259-264.	Intervention, not uptake of hepatitis testing

Reference	Reason for exclusion
*Arumainayagam, J., Grimshaw, R., Acharya, S., Chandramani, S., et al. (2009) Value of targeting at-risk populations at outreach venues: Findings from a local sauna. International Journal of STD and AIDS, 20 (9), 642-643.	Not a high risk group (MSM)
Bailey, M. B., Shiau, R., Zola, J., Fernyak, S. E., et al. (2011) San Francisco hep B free: a grassroots community coalition to prevent hepatitis B and liver cancer. Journal of Community Health, 36, 538-51.	Study design
Bini, E. J., Kritz, S., Brown, L. S., Robinson, J., et al. (2007) Barriers to providing health services for HIV/AIDS, hepatitis C virus infection, and sexually transmitted infections in substance abuse treatment programs in the United States. Gastroenterology, 132, A468-A468.	Not effectiveness
*Bird, S. M., Robertson, R., Beresford, H. & Hutchinson, S. J. (2010) Targets for hepatitis C virus test uptake and case-finding among injecting drug users: in prisons and general practice. Addiction Research & Theory, 18, 421-432.	Not effectiveness
Birkhead, G. S., Klein, S. J., Candelas, A. R., O'Connell, D. A., et al. (2007) Integrating multiple programme and policy approaches to hepatitis C prevention and care for injection drug users: a comprehensive approach. International Journal of Drug Policy, 18, 417-425.	Study design
Blostein, J. & Clark, P. A. (2001) Cost-effectiveness of preimmunization hepatitis B screening in high-risk adolescents. Public Health Reports, 116 (2), 165-168.	Intervention, not uptake of hepatitis testing
Boonwaat, L., Haber, P. S., Levy, M. H. & Lloyd, A. R. (2010) Establishment of a successful assessment and treatment service for Australian prison inmates with chronic hepatitis C. Medical Journal of Australia, 192 (9), 496-500.	Study design
Bradshaw, C. S., Pierce, L. I., Tabrizi, S. N., Fairley, C. K., et al. (2005) Screening injecting drug users for sexually transmitted infections and blood borne viruses using street outreach and self collected sampling. Sexually Transmitted Infections, 81, 53-8.	Study design
Chang, E. T., Sue, E., Zola, J. & So, S. K. (2009) 3 For Life: a model pilot program to prevent hepatitis B virus infection and liver cancer in Asian and Pacific Islander Americans. American Journal of Health Promotion, 23, 176-81.	Study design
Chang, M., Dejong, W., Hsia, R., Hsu, L. D., et al. (2003) Student leadership in public health advocacy: lessons learned from the hepatitis B initiative. American Journal of Public Health, 93, 1250-1250-1252.	Study design
Chou, R., Clark, E. C. & Helfand, M. (2004) Clinical guidelines. Screening for hepatitis C virus infection: a review of the evidence from the U.S. Preventive Services Task Force. Annals of Internal Medicine, 140, 465.	Intervention, not uptake of hepatitis testing
Coronado, G. D., Taylor, V., Acorda, E., Do, H. H., et al. (2005) Development of an English as a Second Language curriculum for hepatitis B virus testing in Chinese Americans. Cancer, 104 (12 SUPPL.), 2948-2951.	Not effectiveness
Coronado, G. D., Taylor, V. M., Hislop, T. G., Teh, C., et al. (2008) Opinions from ESL instructors and students about curricula on hepatitis B for use in immigrant communities. Journal of Cancer Education, 23, 161-166.	Study design
*Davis, P. & Abou-Saleh, M. T. (2008) Developing an enhanced counseling intervention for the primary prevention of hepatitis C among injecting drug users. Addictive Disorders & Their Treatment, 7, 65-75.	Intervention, not uptake of hepatitis testing
De Wit, J. B., Das, E. & Vet, R. (2008) What works best: objective statistics or a personal testimonial? An assessment of the persuasive effects of different types of message evidence on risk perception. Health psychology : official journal of the Division of Health Psychology, American Psychological Association.	Intervention, not uptake of hepatitis testing
Eckman, M. H., Kaiser, T. E. & Sherman, K. E. (2011) The cost-effectiveness of screening for chronic hepatitis B infection in the United States. Clinical Infectious Diseases, 52, 1294-306.	Intervention, not uptake of hepatitis testing
*Fahey, S. (2007) Developing a nursing service for patients with hepatitis C. Nursing Standard, 21, 35-40.	study design

Reference	Reason for exclusion
Fareed, A., Musselman, D., Byrd-Sellers, J., Vayalapalli, S., et al. (2010) Onsite basic health screening and brief health counseling of chronic medical conditions for veterans in methadone maintenance treatment. Journal of Addiction Medicine, 4, 160-166.	Intervention, not uptake of hepatitis testing
*Flowers, P., Hart, G. J., Williamson, L. M., Frankis, J. S., et al. (2002) Does bar-based, peer-led sexual health promotion have a community-level effect amongst gay men in Scotland? International Journal of STD and AIDS, 13 (2), 102-108.	Not a high risk group (MSM)
Gish, R. G. & Cooper, S. L. (2011) Hepatitis B in the Greater San Francisco Bay Area: an integrated programme to respond to a diverse local epidemic. Journal of Viral Hepatitis, 18, e40-51.	Study design
Grogan, L., Tiernan, M., Geogeghan, N., Smyth, B., et al. (2005) Bloodborne virus infections among drugs users in Ireland: A retrospective cross-sectional survey of screening, prevalence, incidence and hepatitis B immunisation uptake. Irish Journal of Medical Science, 174 (2), 14-20.	Study design
Groom, H., Dieperink, E., Nelson, D. B., Garrard, J., et al. (2008) Outcomes of a hepatitis C screening program at a large urban VA medical center. Journal of Clinical Gastroenterology, 42 (1), 97-106.	Not a high risk group
Gupta, K., Romney, D., Briggs, M. & Benker, K. (2007) Effects of a brief educational program on knowledge and willingness to accept treatment among patients with hepatitis C at inner-city hospitals. Journal of Community Health, 32, 221-30.	Study design
Guy, R., Devadason, D., Lim, M., Higgins, N., et al. (2008) Enhanced case detection for newly acquired hepatitis C infection: epidemiological findings and health service implications. Communicable Diseases Intelligence, 32, 250-6.	Intervention, not uptake of hepatitis testing
Honeycutt, A. A., Harris, J. L., Khavjou, O., Buffington, J., et al. (2007) The costs and impacts of testing for hepatitis C virus antibody in public STD clinics. Public Health Reports, 122 (SUPPL. 2), 55-62.	Intervention, not uptake of hepatitis testing
Hutton, D. W., Tan, D., So, S. K. & Brandeau, M. L. (2007) Cost-effectiveness of screening and vaccinating Asian and Pacific Islander adults for hepatitis B. Annals of Internal Medicine, 147:460-469.	Intervention, not uptake of hepatitis testing
Hwang, J. P., Mohseni, M., Gor, B. J., Wen, S., et al. (2010) Hepatitis B and hepatitis C prevalence and treatment referral among Asian Americans undergoing community-based hepatitis screening. American Journal of Public Health, 100, S118-24.	Study design
Jacobson, I. M., Wang, S., Edlin, B. R., Smith, V. K., et al. (2010) Transforming strategies to provide access to care. The Journal of family practice, 59 (4 Suppl), S59-64.	Study design
John, C. & Abou-Saleh, M. (2007) Conducting randomised controlled trials of psychological interventions in the field of drug addiction--Trials and tribulations. Arab Journal of Psychiatry, 18, 70-83.	Study design
Josset, V., Torre, J. P., Tavolacci, M. P., Van Rossem-Magnani, V., et al. (2004) Efficiency of hepatitis C virus screening strategies in general practice. Gastroenterologie Clinique et Biologique, 28 (4), 351-357.	Intervention, not uptake of hepatitis testing
Juon, H., Strong, C., Oh, T. H., Castillo, T., et al. (2008) Public health model for prevention of liver cancer among Asian Americans. Journal of Community Health, 33, 199-205.	Not effectiveness
Kallman, J. B., Tran, S., Arsalla, A., Haddad, D., et al. (2011) Vietnamese community screening for hepatitis B virus and hepatitis C virus. Journal of Viral Hepatitis, 18 (1), 70-76.	Not effectiveness
Kapadia, F., Latka, M. H., Hagan, H., Golub, E. T., et al. (2007) Design and feasibility of a randomized behavioral intervention to reduce distributive injection risk and improve health-care access among hepatitis C virus positive injection drug users: The Study to Reduce Intravenous Exposures (STRIVE). Journal of Urban Health, 84 (1), 99-115.	study design

Reference	Reason for exclusion
*Leal, P., Stein, K. & Rosenberg, W. (1999) What is the cost utility of screening for hepatitis C virus (HCV) in intravenous drug users? Journal of Medical Screening, 6 (3), 124-131.	Intervention, not uptake of hepatitis testing
*Lewis, M., Allen, H. & Warr, J. (2010) The development and implementation of a nurse-led hepatitis C protocol for people with serious mental health problems. Journal of Psychiatric & Mental Health Nursing, 17, 651-656.	Study design
Lowry, D. J., Ryan, J. D., Ullah, N., Kelleher, T. B., et al. (2011) Hepatitis C management: The challenge of dropout associated with male sex and injection drug use. European Journal of Gastroenterology and Hepatology, 23 (1), 32-40.	Intervention, not uptake of hepatitis testing
Moriarty, H., Kemp, R. & Robinson, G. (2001) Hepatitis services at an injecting drug user outreach clinic. The New Zealand medical journal, 114 (1128), 105-106.	Study design
Nakamura, J., Terajima, K., Aoyagi, Y. & Akazawa, K. (2008) Cost-effectiveness of the national screening program for hepatitis C virus in the general population and the high-risk groups. Tohoku Journal of Experimental Medicine, 215 (1), 33-42.	Intervention, not uptake of hepatitis testing
Nguyen, T. T., Taylor, V., Chen, M. S., Jr., Bastani, R., et al. (2007) Hepatitis B awareness, knowledge, and screening among Asian Americans. Journal of Cancer Education, 22, 266-72.	Study design
O'byrne, P. & Dias, R. (2008) Urine drop-off testing: A self-directed method for STI screening and prevention. The Canadian Journal of Human Sexuality, 17, 53-53-59.	Study design
Obel, N. (2001) A review of hepatitis B in relation to immigrants. International Journal of Adolescent Medicine and Health, 13 (2), 111-114.	Intervention, not uptake of hepatitis testing
*Panou, M. & Catt, J. (2009) Raising awareness of hepatitis C infection. Primary Health Care, 19, 16-20.	Study design
*Peate, I. (2009) Hepatitis C: detection in general practice. Practice Nursing, 20, 436.	Study design
Rodriguez-Torres, M. (2008) Chronic hepatitis C in minority populations. Current Hepatitis Reports, 7 (4), 158-163.	Study design
Rosenberg, S., Brunette, M., Oxman, T., Marsh, B., et al. (2004) The STIRR model of best practices for blood-borne diseases among clients with serious mental illness. Psychiatric Services, 55 (6), 660-664.	Study design
Sahajian, F., Vanhems, P., Bailly, F., Fabry, J., et al. (2007a) Screening campaign of hepatitis C among underprivileged people consulting in health centres of Lyon area, France. European Journal of Public Health, 17, 263-271.	Study design
Sahajian, F., Vanhems, P., Bailly, F., Fabry, J., et al. (2007b) Infectious and allergic diseases, cancer, and diabetes: Screening campaign of hepatitis C among underprivileged people consulting in health centres of Lyon area, France. European Journal of Public Health, 17, 263-263-271.	Duplicate article
Schiff, E. R., Maddrey, W. C. & Keeffe, E. B. (2000) A model for a managed care education approach to increase hepatitis awareness: Part. II. Managed Care Interface, 13 (9), 77-79.	Study design
*Scott, C., Day, S., Low, E., Sullivan, A., et al. (2010) Unselected hepatitis C screening of men who have sex with men attending sexual health clinics. Journal of Infection, 60 (5), 351-353.	Not a high risk group (MSM)
Senn, O., Seidenberg, A. & Rosemann, T. (2009) Determinants of successful chronic hepatitis C case finding among patients receiving opioid maintenance treatment in a primary care setting. Addiction, 104, 2033-2038.	Not effectiveness
Sheaves, F., Preston, P., O'neil, E., Klein, G., et al. (2001) That's SIC: mobilising youth for hepatitis C prevention. Health Promotion Journal of Australia, 12, 217-222.	Intervention, not uptake of hepatitis testing

Reference	Reason for exclusion
Sheerin, I. G., Green, F. T. & Sellman, J. D. (2003) The costs of not treating hepatitis C virus infection in injecting drug users in New Zealand. Drug and Alcohol Review, 22 (2), 159-167.	Intervention, not uptake of hepatitis testing
*Sherrard, J., Boss, I. & Law, L. (2007) Experience of setting up a genitourinary medicine in-reach clinic in a male prison. International Journal of STD & AIDS, 18, 228-230.	Study design
Sheu, L. C., Toy, B. C., Kwahk, E., Yu, A., et al. (2010) A model for interprofessional health disparities education: student-led curriculum on chronic hepatitis B infection. Journal of general internal medicine, 25 Suppl 2, S140-145.	Study design
Shtarkshall, R., Soskolne, V., Chemtov, D. & Rosen, H. (1993) A culturally specific educational program to reduce the risk of HIV and HBV transmission among Ethiopian immigrants to Israel. II: Evaluating the effect of the training program on veteran immigrant trainees. Israel Journal of Medical Sciences, 29 (10 SUPPL.), 48-54.	Intervention, not uptake of hepatitis testing
*Shutt, J. D., Robathan, J. & Vyas, S. K. (2008) Impact of a clinical nurse specialist on the treatment of chronic hepatitis C. British journal of nursing (Mark Allen Publishing), 17 (9), 572-575.	Intervention, not uptake of hepatitis testing
Singer, M. E. & Younossi, Z. M. (2001) Cost effectiveness of screening for hepatitis C virus in asymptomatic, average-risk adults. American Journal of Medicine, 111 (8), 614-621.	Intervention, not uptake of hepatitis testing
Sroczynski, G., Esteban, E., Conrads-Frank, A., Schwarzer, R., et al. (2009) Long-term effectiveness and cost-effectiveness of screening for Hepatitis C virus infection. European Journal of Public Health, 19 (3), 245-253.	Intervention, not uptake of hepatitis testing
Steele, R. W. & O'keefe, M. A. (2001) A program description of health care interventions for homeless teenagers. Clinical Pediatrics, 40 (5), 259-263.	Intervention, not uptake of hepatitis testing
Steele, R. W., Ramgoolam, A. & Evans, J. R. (2003) Health services for homeless adolescents. Seminars in Pediatric Infectious Diseases, 14, 38-42.	Intervention, not uptake of hepatitis testing
Stein, M., Soloway, I. & Litwin, A. H. (2009) Student volunteers screen drug users for viral hepatitis. Medical Education, 43 (5), 481-482.	Intervention, not uptake of hepatitis testing
Stopka, T. J., Marshall, C., Bluthenthal, R. N., Webb, D. S. & Truax, S. R. (2007) HCV and HIV counseling and testing Integration in California: an innovative approach to increase HIV counseling and testing rates. Public Health Reports, 122 (Supp 2), 68-73.	Intervention, not uptake of hepatitis testing
Sylvestre, D. L. & Zweben, J. E. (2007) Integrating HCV services for drug users: a model to improve engagement and outcomes. International Journal of Drug Policy, 18, 406-10.	Study design
*Taheri, L. (2010) Testing for hepatitis in pharmacies. Pharmaceutical Journal, 284 (7585), 51-52.	Study design
Taylor, V. M., Coronado, G., Acorda, E., Teh, C., et al. (2008) Development of an ESL curriculum to educate Chinese immigrants about hepatitis B. Journal of Community Health, 33, 217-224.	Not effectiveness
*Tiffen, L. & Sheridan, S. (2002) Improving take-up of hepatitis C services. Nursing Times, 98 (43), 30-32.	Study design
Tramarin, A., Gennaro, N., Compostella, F. A., Gallo, C., et al. (2008) HCV screening to enable early treatment of hepatitis C: a mathematical model to analyse costs and outcomes in two populations (Structured abstract). Current Pharmaceutical Design.	Intervention, not uptake of hepatitis testing
Van Der Veen, Y. J. J., De Zwart, O., Mackenbach, J. & Richardus, J. H. (2010) Cultural tailoring for the promotion of hepatitis B screening in Turkish Dutch: a protocol for a randomized controlled trial. BMC Public Health, 10, 674.	Study design
Walsh, N., Lim, M. & Hellard, M. (2008) Using a surveillance system to identify and treat newly acquired hepatitis C infection. Journal of Gastroenterology & Hepatology, 23, 1891-4.	Intervention, not uptake of hepatitis testing

Bibliographic details of studies awaiting assessment (n=8)

Kang, M., Skinner, R. & Usherwood, T. (2010) Interventions for young people in Australia to reduce HIV and sexually transmissible infections: A systematic review. Sexual Health, 7 (2), 107-128.

Meyer, M. C., Mead, P. B. & Capeless, E. L. (1992) Hepatitis B surface antigen screening in a nonindigent population. The Journal of Reproductive Medicine, 37:953-955.

Myers, R. E. Doing Science in Culture: The Social Organization of HBV Screening among Koreans in the Philadelphia Area.

Myers, R. E., Hann, H.-W. & Hann, R. S. (1991) Social Organization of Church-Based Screening. American Sociological Association.

Sias, J. J. & Bennett, M. S. (2001) A reimbursable education service for patients with hepatitis C. Journal of the American Pharmaceutical Association, 41, 448-53.

Sturrock, C. J., Currie, M. J., Vally, H., O'Keefe, E. J., et al. (2007) Community-based sexual health care works: A review of the ACT outreach program. Sexual Health, 4 (3), 201-204.

Tompkins, C. N. E., Wright, N. M. J. & Sheard, L. (2010) You, me and Hep C - making an educational DVD for prisoners. AIDS and Hepatitis Digest, No. 137, May 2010, pp.1-3.

Walker, H. (2009) Increasing attendance at a Hepatitis C screening clinic: a randomised controlled trial Sheffield, University of Sheffield.

Appendix 3. Evidence tables for effectiveness review

Hepatitis B

Study details	Population	Intervention	Analysis	Results	Comments
Chang et al., 2007 **Country**: USA **Study design**: Uncontrolled before and after study - **Objectives**: To develop partnerships between non-Western and Western health care providers to prevent HBV infection and death from liver cancer in Asian and Pacific Islanders **Funding source**: National Center for Infectious Diseases, Centers for Disease Control and Prevention, Asian Liver Center at Stanford University	**Setting**: Community **Group(s) targeted by intervention**: Complementary and alternative medicine practitioners **Participant details** Total, n (%): total, 686; 2005, 204; 2006, 160; 2007, 322 Intervention, n (%): As above Control, n (%): NA Male, n (%): 329 (48%) Mean age (range): Majority (66%) aged 41-60 years Ethnicity: "most were born in Asia" Other: NR	**Inclusion criteria**: Traditional Chinese Medicine practitioners and acupuncturists attending University based symposia in 3 different cities in California **Exclusion criteria**: NR **Key components**: Annual symposium. Education about HBV including prevention, testing and treatment through lectures and activities e.g. Q&A session, games, case studies. Participants were encouraged to refer their patients to screening events. **Method of delivery**: Lectures, games **Delivered by**: NR **Length**: 1 day; annually for 3 years **Control**: NA	**Time to follow-up**: Post-test **Number completing**: NR **Reason for non-completion**: NA **Data collection method**: Questionnaire surveys **Method of analysis**: Descriptive statistics **Primary outcomes**: Knowledge **Secondary outcomes**: NR	Following the 2006 intervention: 106 patients of participants were referred to receive free HBV testing at a community event (9% tested positive). Knowledge improved significantly each year from pre- to post-symposium. Pre- to Post-Symposium score: 2005 59-76% (p<0.001); 2006 56-78% (p<0.001); 2007 55-82% (p<0.001). Knowledge was low prior to each symposium - particularly about the worldwide burden of HBV, ways to prevent transmission, risk of death without monitoring or treatment of chronic HBV, the age group most likely to develop chronic HBV, the diagnostic blood test for chronic HBV infection (all under 50% correct in pre-intervention survey). Participants reacted positively to the symposia: 82% rated the content as excellent; 18% good. Organisation rated excellent (75%) or good (23%). All participants recommended holding the event again.	Health Professionals were mainly Asian providers of complementary and alternative medicine. No detail on what survey was apart from highlighting areas of poor knowledge - presumably it was the same pre and post survey, testing what had been covered during the day.

Study details	Population	Intervention	Analysis	Results	Comments
Chao et al., 2009 **Country**: USA **Study design:** Case series - **Objectives:** To determine whether culturally targeted information on HBV infection, screening, medical surveillance, and prevention was associated with improved health-seeking behaviours **Funding source:** Asian Liver Center at Stanford University; partial funding from the Stanford University School of Medicine Public Service Medical Scholars Program	**Setting:** Community **Group(s) targeted by intervention:** Chinese American community **Participant details** Total, n (%): n=476 participants Intervention, n (%): As above Control, n (%): NA Male, n (%): 215 (45%)* Mean age (range): <50 years, 61% Ethnicity: Born in China (48%); Taiwan (36%); Hong Kong (6%); USA (2%); other Asian Country (5%) Other, n (%): Chronically infected: 60 (12.6) Non-infected: 257 (54.0) Immune: 72 (15.1) Susceptible: 87 (18.3)	**Inclusion criteria:** Chinese Americans attending a 1-day clinic in July 2001 **Exclusion criteria:** NR **Key components:** Jade Ribbon Campaign. Free HBV screening (HBV surface antigen) and physician-led educational seminars in Mandarin and English on detection, management and prevention. Ethnically and culturally targeted brochures about the risks of HBV were also distributed. Participants could pay for an entire screening panel (HBV surface antibody and HBV core antibody). Specific, tailored recommendations for follow-up were posted to participants based on the test results approximately 4 weeks after screening. **Method of delivery:** Screening, educational seminars. **Delivered by:** As above **Length:** 1 day; 5 hour clinic **Control:** NA	**Time to follow-up:** approximately 1 year after screening **Number completing:** 309 (65%) **Reason for non-completion**: Declined to participate (9%); could not be contacted (57%); had moved/phone disconnected (32%) **Data collection method**: Telephone interviews. Participants were asked about whether or not they followed the specific recommendations detailed in their results letters, barriers to follow-up care and primary sources of information about HBV. **Method of analysis**: Chi-square tests; multivariate logistic regression **Primary outcomes**: NR **Secondary outcomes**: NR	476 clients were screened for HBV including 195 participants who elected to pay for the full screening panel available. 148 clients followed up (48%) reported that they would not have been tested for HBV without the free clinic. 139 (45%) clients followed up reported that the intervention provided them with their first exposure to HBV information. "About 71%" reported they had never previously discussed HBV with a doctor including 50% of chronically infected participants. n=26/39 (67%) with chronic HBV went to see their doctor in the year following the screening and had liver cancer screening: 80% or higher reported normal results for different tests (ultrasound 95%; ALT/AST 80%; AFP 88%). 1 patient placed on liver transplant list. 30% of individuals testing negative visited physicians for further advice and 19 subsequently received the vaccine. 78% (n=241) of all interviewed participants had recommended family members to be tested for HBV; 17% reported at least one family member testing positive; 12% had children vaccinated. 232 followed up clients (75%) reported that they attended the clinic/screening as a result of the media campaign prior to the clinic	

Study details	Population	Intervention	Analysis	Results	Comments
Gunn et al., 2006 **Country**: USA **Study design:** Case series - **Objectives:** To evaluate a partner notification service for high risk persons with chronic HBV **Funding source:** Supported in part by the Research Participation Program at the Centers for Disease Control and Prevention, National Center for HIV, Sexually Transmitted Diseases and Tuberculosis Prevention	**Setting:** STD clinic **Group(s) targeted by intervention:** Persons with chronic HBV identified through laboratory reports **Participant details** Total, n (%): 129 interviewed (68% of those meeting inclusion criteria) Intervention, n (%): As above Control, n (%): NA Male, n (%): 85% Mean age (range): 78% ≥30 years (NR) Ethnicity: 48 % White Other, n (%): High risk grouping MSM: 47 (53) IDU: 26 (29) MSM + IDU: 12 (13) Other: 4 (5) Had exchanged sex for money: 13 (15) ≥15 lifetime sex partners: 29 (33) Rarely or never used condoms: 28 (31) Co-infected with HCV: 15% Co-infected with HIV: 29%	**Inclusion criteria:** Persons aged 15–45 years, living in the high-risk STD area of San Diego **Exclusion criteria:** Asian/Pacific Islander surname; pregnant women **Key components:** Case patients were interviewed and asked about partners during the 1 month before their diagnosis. A partner contact index was calculated. HBV screening and vaccination was offered to all sex and needle sharing partners at the STD clinic. **Method of delivery:** Interview with participant to determine sex and needle sharing partners **Delivered by:** Communicable disease investigators **Length:** One-off interview **Control:** NA	**Time to follow-up:** 15 month evaluation period **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Interview **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	*Case patients* 89/129 clients (69%) classified as high risk patients. 85 of 129 eligible clients reported 136 sex partners between them during the 1 month period before testing. No needle sharing partners reported. 46 (54%) accepted the offer to provide partner notification services. Low risk patients were more likely to accept offer to provide partner notification services: 73% v 46%' p=0.02. The 46 patients named and provided locating information for 47 partners. The most common reasons for declining partner notification included: case patient would inform partner (36%), partners were anonymous (18%), partners already vaccinated (13%), refused (16%), known anti-HBV positive (7%), other (10%). *Partners* Of the 47 partners named, 38 (81%) received PN services. 15 (39%) were susceptible to HBV infection and 14 started and 9 completed the vaccination series. One partner was identified with chronic HBV infection.	

Study details	Population	Intervention	Analysis	Results	Comments
Hsu et al., 2007; Hsu et al., 2010 **Country**: USA **Study design:** UBA - **Objectives**: To evaluate the effectiveness of an educational and screening intervention for HBV **Funding source**: Montgomery County Department of Health and Human Services, Asian American Health Initiative Program, American Cancer Society and Gilead Pharmaceutical Inc.	**Setting**: Community **Group(s) targeted by intervention**: Members of the Asian community **Participant details** Total, n (%): n=807 participants Intervention, n (%): As above Control, n (%): NA Male, n (%): n=321 (40%) Mean age (range): mean age range by ethnicity, 38-52 years Ethnicity: Asian Indian 11%; Chinese 36%; Korean 25%; Other 14%; Vietnamese 13% Other: Education level; employment; Income; residence history; marriage status; Insurance	**Inclusion criteria**: People attending Asian faith-based organisations or community faith-based organisations; analysis included only those who completed screening **Exclusion criteria**: NR **Key components**: Culturally tailored lectures on prevention covering (i) what is HBV, (ii) who is at risk, (iii) how HBV spreads, (iv) cultural myths, (v) screening and prevention, (V) treatment; screening for HBV **Method of delivery**: Educational lectures **Delivered by**: Community health promoters **Length**: One off session **Control**: NA	**Time to follow-up**: Post-test **Number completing**: 711 (88%) **Reason for non-completion**: Failed to complete survey **Data collection method**: pre and post test surveys **Method of analysis**: Paired t-tests **Primary outcomes**: Change in test scores **Secondary outcomes**: Screening outcomes	All five groups had statistically significant improvements in knowledge of HBV prevention ($p<0.001$). Korea, Indian and Vietnamese participants demonstrated lower improvements in knowledge compared with other Southeast Asian groups and Chinese participants.	Little detail on the content of the educational lectures.

Study details	Population	Intervention	Analysis	Results	Comments
Nguyen et al. 2000 **Country**: USA **Study design**: Randomised controlled trial + **Objectives**: To increase professional practice around cancer prevention amongst Vietnamese physicians **Funding source**: National Cancer Institute	**Setting**: Private medical practices **Group(s) targeted by intervention**: Private practice physicians; all participants were in solo practice in general medicine, obstetrics-gynaecology, or family medicine **Participant details** Total, n (%): n=20 Intervention, n (%): n=9 (45%) Control, n (%): n=11 (55%) Male, n (%): NR Mean age (range): NR (NR) Ethnicity: NR Other: NR	**Inclusion criteria**: Members of the Vietnamese Physicians' Associations in California **Exclusion criteria**: NR **Key components**: Cancer prevention reminder system (manual or computerised); series of continuing medical education seminars; Vietnamese language education materials to assist with counselling patients (e.g. booklets, posters, videos); newsletters; enrolment in an oncology programme/network **Method of delivery**: Educational sessions, culturally tailored education materials and organisational change **Delivered by**: NA **Length**: 3 year intervention **Control**: Care as usual	**Time to follow-up**: 3 years since implementation **Number completing**: 19 (95%) **Reason for non-completion**: Not contactable **Data collection method**: Auditing medical records for eight cancer prevention activities including HBV testing **Method of analysis**: Regression analysis to estimate net effects of the intervention on performance rates **Primary outcomes**: Performance rate, calculated as the percentage of eligible patients tested at least once during the study period divided by the number of patients who should have been tested (according to the American Cancer Society recommendations) **Secondary outcomes**: NR	Performance rates for HBV testing were higher in the intervention group than controls, but not significantly (beta coefficient +9.2, p=0.22). The intervention had a significant effect on other performance rates including smoking cessation counselling (P=0.02); Pap testing (p=0.004); pelvic examinations (p=0.01) but had no significant effect on performance of checkups, clinical breast examinations, mammography or HBV immunisations.	

Study details	Population	Intervention	Analysis	Results	Comments
Taylor et al., 2009a **Country**: Canada **Study design:** Randomised controlled trial (cluster) + **Objectives:** To evaluate the effectiveness of a hepatitis B ESL educational curriculum for Chinese immigrants **Funding source:** US National Cancer Institute	**Setting:** Community **Group(s) targeted by intervention:** Chinese community **Participant details*** Total, n (%): 41 classes (n=325 students) Intervention, n (%): NR Control, n (%): NR Male, n (%): 88 (30) Mean age (range): <40 years, 145 (49); ≥40 years, 152 (51) Ethnicity: China, 255 (86%); Other 43 (14) Other, n (%): Years since immigration: <2, 136 (46); ≥2, 162 (54) Years of education: <16, 179 (60); ≥16, 119 (40)	**Inclusion criteria:** Aged 18 or older and of Chinese descent **Exclusion criteria:** NR **Key components:** English as a second language (ESL) curriculum addressing hepatitis B. Included information about the high rate of HBV infection in Chinese Canadian communities, the ways in which HBV can be transmitted from person to person and the potential consequences of HBV infection. **Method of delivery:** The curriculum incorporated standard ESL teaching methods and included commonly used types of ESL lesson exercises. **Delivered by:** Regular ESL teachers and project staff **Length:** 3 hours **Control:** 3-hour ESL curriculum addressing physical activity	**Time to follow-up:** 6 months **Number completing:** Intervention, 91% (n=141); control, 92% (n=157) **Reason for non-completion**: 27 students either refused to complete a follow-up survey or could not be contacted **Data collection method**: Survey (in-person interview) **Method of analysis**: Generalized estimating equations; adjusted for the following variables: ESL organization, class time (day versus evening), country of origin (China versus other), native language, years since immigration, sex, age in years, years of education and marital status **Primary outcomes**: HBV knowledge **Secondary outcomes**: NR	Intervention group students reported higher levels of knowledge than control group students for all but one of the 10 knowledge variables that were examined. Differences between groups were statistically significant (p<0.05) for: Immigrants are more likely to be infected with HBV than people who were born in Canada (AOR 2.0; 95% CI 1.2-3.5; p=0.01) HBV can be spread during sexual intercourse (AOR 2.1; 95% CI 1.2-3.6; p=0.007) HBV can be spread by sharing razors (AOR 9.4; 95% CI 3.1-28.6; p<0.001) HBV is not spread by sharing eating utensils (AOR 4.4; 95% CI 2.4-8.2; p<0.001) HBV infection can cause cirrhosis (AOR 2.9; 95% CI 1.2-7.0; p=0.01) HBV infection can cause liver cancer (AOR 3.1; 95% CI 1.3-7.1; p=0.008). No statistically significant difference in knowledge on the following variable: HBV can be spread during childbirth; HBV is not spread by eating food that was prepared by an infected person; HBV is not spread by coughing; and HBV can cause lifelong infection.	
*Study group characteristics only reported for those who completed the follow-up survey					

Study details	Population	Intervention	Analysis	Results	Comments
Taylor et al., 2009b **Country**: USA and Canada **Study design:** Randomised controlled trial + **Objectives:** To evaluate a hepatitis B lay health worker intervention for Chinese Americans and Canadians **Funding source:** National Cancer Institute; Centers for Disease Control and Prevention	**Setting:** Community (at home) **Group(s) targeted by intervention:** Chinese community **Participant details** Total, n (%): n=460 individuals Intervention, n (%): n=231 (50%) Control, n (%): n=229 (50%) Male, n (%): At FU, 148 (46) Mean age (range): At FU <45 years, 112 (35%) Ethnicity: Chinese Other, n (%): <12 years education: intervention, 49 (35); control, 61 (35) <50% of life in North America: intervention, 87 (61); control, 107 (61) Did not speak English well or at all: intervention, 89 (63); control, 103 (59)	**Inclusion criteria:** Aged 20-64 year; of Chinese descent; able to speak Cantonese, Mandarin or English **Exclusion criteria:** previously tested for HBV **Key components:** Lay health worker intervention. Participants received an educational and motivational home visit where possible. Educational materials included a video and pamphlet emphasising the importance of HBV testing for individuals of Chinese descent, and included key HBV facts. Two visual aids were used, a world map of HBV infection rates and graphs showing liver cancer rates by race/ethnicity. **Method of delivery:** Home visit or mailed materials if person could not be contacted to arrange a visit/ refused a visit **Delivered by:** Lay health worker **Length:** One visit (length not reported) **Control:** Received a direct mailing of physical activity educational materials (pamphlet, fact sheet and pedometer)	**Time to follow-up:** 6 months **Number completing:** n=319 (69%); intervention, n=142 (61%); control, n=177 (77%) **Reason for non-completion**: refused to participate (n=72); no contact (n=43); unable to trace (n=26) **Data collection method**: Self report, in-person interview; medical records review to confirm HBV testing **Method of analysis**: Chi-square tests for differences in proportions; logistic regression to adjust for potential confounders **Primary outcomes**: HBV testing rates; HBV knowledge **Secondary outcomes**: NR	No significant difference in self reported testing between groups (intervention, 22 [15%] vs. control, 17 [10%]; p=0.21), but the intervention group had a significantly higher number of participants whose medical records data verified testing (intervention, 9 [6%] vs. control 3 [2%]; p=0.04) (for 3 intervention group and 2 control group participants - medical records not accessible) Intervention group participants were significantly more likely than controls to know hepatitis B can be spread by razors (p<0.001) and sexual intercourse (p=0.03) but there were no differences for knowledge outcomes about hepatitis B being more common amongst the Chinese, being spread during childbirth or that hepatitis B can cause liver cancer. When adjusted for other variables, only knowledge that hep B can be spread by razors remained significant (p<0.001) Chinese more likely to be infected than whites: OR=1.56 (0.93-2.62), p=0.09 Spread by razors: OR=2.66 (1.57-4.51), p<0.001 Spread during sexual intercourse: OR=1.61 (0.96-2.71), p=0.07 Spread during childbirth: OR=1.34 (0.78-2.31), p=0.29 Can cause liver cancer: OR=1.49 (0.81-2.73), p=0.20	Authors reported that less than 70% of participants watched the video and only a third read the pamphlet.

Study details	Population	Intervention	Analysis	Results	Comments
Taylor et al., 2011 **Country**: Canada **Study design:** Randomised controlled trial (cluster) + **Objectives:** To evaluate a hepatitis B ESL educational curriculum for Asian immigrants **Funding source:** US National Cancer Institute	**Setting:** Community **Group(s) targeted by intervention:** Asian community **Participant details** Total, n (%): 218 students from 80 classes Intervention, n (%): n=95 (44%) from 40 classes Control, n (%): n=123 (56%) from 40 classes Male, n (%): At FU n=57 (32%) Mean age (range): NR (under 40 n=82 (46%)) Ethnicity: Chinese 51%; Indian 17%; Iranian 13%; Afghan 7%; Taiwanese 6%; Korean 4%; Other 3% Other: ever tested for Hep B, educational level, years since immigration, age group, marital status	**Inclusion criteria:** Asian immigrants participating in the English Language Services for Adults programme during 2006 and 2007 **Exclusion criteria:** Previously tested for HBV **Key components:** HBV English as a second language (ESL) curriculum. The curriculum aimed to improve knowledge and motivate students to attend for HBV testing. Included information about importance of testing and high rates of infection in Asian Canadian communities **Method of delivery:** Incorporated standard ESL teaching methods and lesson exercises (e.g. video) **Delivered by:** Regular ESL teachers and project staff **Length:** 3 hours **Control:** 3-hour ESL curriculum addressing physical activity education	**Time to follow-up:** 6 months **Number completing:** n=180 (83%) **Reason for non-completion**: refused to complete follow up; could not be contacted; contact details were no longer correct **Data collection method**: Self report; clinical records to verify testing **Method of analysis**: Generalized Estimating Equations; adjusted for the following variables: ESL organization, class time, country of origin, years since immigration, gender, age in years, years of education, and marital status. **Primary outcomes**: HBV testing and knowledge **Secondary outcomes**: NR	**HBV testing** No significant difference between numbers reporting uptake of testing (intervention, 9 [11%] vs. control 6 [6%]; p=0.28). A significant difference was found between the proportions of intervention and control students completing HPV testing based on medical records data (intervention, 5 [6%] vs. control, 0 [0%]; p=0.02). Uptake was noted to be very low in both groups. **HBV knowledge** Intervention group students had significantly greater knowledge about HBV on all but one measure compared to controls (p<0.05). Mean knowledge scores were significantly higher in intervention students than control students (3.68 vs. 2.87, p<0.001 for comparison). Difference in scores remained highly significant (p<0.001) after adjustment for other variables.	

Hepatitis C

Study details	Population	Intervention	Analysis	Results	Comments
Aitken et al., 2002 [#35] **Country**: Australia **Study design**: Case series - **Objectives**: To report on a pilot project which provided HCV testing and counselling at a needle and syringe programme **Funding source**: National Health and Medical Research Council	**Setting**: Needle and syringe programme **Group(s) targeted by intervention**: Current IDUs **Participant details** Total, n (%): 47 IDUs tested for HCV Intervention, n (%): As above Control, n (%): NA Male, n (%): n=33 Mean age (range): 25.1 years (16-48 years) Ethnicity: NR Other Mean duration of injecting (range): 4.7 years (6 months-20 years)	**Inclusion criteria**: IDUs attending the NSP between August 1999 and the end of January 2000. Never been tested for hepatitis C antibodies, or had tested antibody-negative for more than 12 months prior to contact, and those who had never received or properly understood a test result. **Exclusion criteria**: NR **Key components**: Free hepatitis C testing and pre- and post-test structured counselling. Additional information and support provided as requested. Participants returned to receive their results 10 days after their interview. Service advertised primarily by visual materials and by staff alerting IDUs to its existence. Flyers were also handed out with clean injecting equipment. **Method of delivery**: HCV testing and counselling **Delivered by**: Peer outreach worker; accredited HIV and HCV test counsellor and trained venepuncturist. **Length**: Between August 1999 and January 2000 **Control**: NA	**Time to follow-up:** NA; median time between interviews for 20 IDUs interviewed twice was 73 days (mean 85, range 23± 204). **Number completing**: NA **Reason for non-completion:** NA **Data collection method**: Venous blood samples. Participants invited to complete a questionnaire or interview **Method of analysis:** NR **Primary outcomes**: NR **Secondary outcomes**: NR	47 tested IDUs were given structured educational counselling about hepatitis C. 28 of 47 venous samples (59.6%) had evidence of HCV exposure. 20 IDUs (43%) followed up to ascertain whether counselling had improved their knowledge of HCV and whether risk behaviour and injecting practices had changed. Correct response totals regarding transmission risks were significantly greater in the second interview (means 2.4 vs. 5.4; $p<0.005$). The authors noted that qualitative improvements were also seen across other knowledge outcomes. Mean reported frequency of use of a new needle and syringe improved significantly between interviews (60.0% vs. 84.2%; $p<0.01$) and frequency of hand washing after injecting (27.5% of occasions vs. 43.4%; $p<0.05$) also improved.	Authors noted findings from the counselling of non-tested IDUs; nearly 45% claimed to have received no pre- and post-test counselling when tested.

Study details	Population	Intervention	Analysis	Results	Comments
Anderson et al., 2009 [#34] **Country**: UK (Scotland) **Study design**: Non-randomised controlled trial + **Objectives**: To evaluate an HCV screening intervention designed to increase case detection, referral and management of former IDUs with HCV infection in a general practice setting **Funding source**: Partly funded by Schering Plough	**Setting**: General practices in an area with high HCV and IDU prevalence **Group(s) targeted by intervention**: Current and former IDUs **Participant details** Total, n (%): 2,079 patients Intervention, n (%): 1,165 patients Control, n (%): 914 patients Male, n (%): intervention, 607 (52); control, 502 (55) Mean age (range): NR (30-54 years) Ethnicity: NR Other: NA	**Inclusion criteria**: All 30 to 54 year olds attending a single general practice **Exclusion criteria**: Previously diagnosed HCV infected individuals attending secondary care services for HCV management **Key components**: Opportunistic, age criterion based HCV screening intervention. Eligible individuals attending for a non-urgent appointment with a GP or practice nurse were, where appropriate, offered HCV screening and given an HCV information leaflet. Individuals accepting the offer could immediately attend, or return for, an appointment with a counsellor. The counsellor undertook pre test counselling and obtained blood for testing (oral fluid tests offered where venipuncture proved difficult). Patients received their results from the GP, positive individuals underwent referral to hepatology for further management. **Method of delivery**: NA **Delivered by**: Counsellor, GP and practice nurse **Length**: 6 months **Control**: Care as usual	**Time to follow-up**: 6 months **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Questionnaire, data on test offers and uptake gained from GP **Method of analysis**: Logistic regression **Primary outcomes**: Rates of HCV test offer and uptake, and HCV diagnosis **Secondary outcomes**: Rates of specialist clinic referral uptake, liver biopsy investigation and antiviral therapy administration	**Primary outcomes** The numbers of HCV tests undertaken in the intervention and control practices in the previous 6 months were 2 and 1, respectively. Of 584 eligible attendees, 421 (72%) were offered and 117 (28%) accepted testing in the intervention practice. No individuals in the comparison practice were tested for HCV. 13% (15/117) tested positive for HCV antibody (93% had ever injected drugs). **Secondary outcomes** 11 individuals accepted the offer of referral to a specialist hepatology clinic, all of whom attended at least one appointment. Of these 11 individuals, 8 were lost to follow up, 3 underwent biopsy, 2 received antiviral therapy and one achieved a sustained viral response. Reasons for a not being offered testing were available for 118/163 patients. Main reasons were: forgot to offer (n=31), patient has mental health problems including problem alcohol use (n=21), offer inappropriate at the time (n=16), insufficient time (n=13), patient known to be HCV infected and in secondary care follow up (n=10) and patient unstable/intoxicated (n=9). 5/15 patients who tested HCV antibody positive experienced an 'adverse event'. Four binged on alcohol and two misconceived that the result was positive for other blood borne viruses.	Authors note that limitations of oral fluid approach demonstrated by those tested not returning for blood sampling for HCV RNA testing. Authors note that the study indicates that if optimal diagnosis, referral and treatment outcomes are to be achieved, additional measures need to be introduced e.g. better understanding of HCV testing through awareness raising and making available social and psychological support to individuals (particularly those with a history of problem alcohol use)

Study details	Population	Intervention	Analysis	Results	Comments
Craine et al., 2009 [#128] **Country**: UK (Wales) **Study design:** Case series - **Objectives:** To carry out an audit of the uptake of dry blood spot (DBS) testing for hepatitis B, C and HIV in the first year of DBS testing being routinely offered to clients **Funding source:** DBS testing funded by National Public Health Service for Wales. No specific funding was received for the audit.	**Setting:** Substance misuse service **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): NR Intervention, n (%): NR Control, n (%): NR Male, n (%): Of clients tested by DBS, 69% male Mean age (range): Of clients tested by DBS, mean=32.2 years (NR) Ethnicity: NR Other: NR	**Inclusion criteria:** Single drugs service providing routine DBS testing **Exclusion criteria:** NR **Key components:** DBS testing **Method of delivery:** NA **Delivered by:** Drugs workers **Length:** NA **Control:** Testing in the year prior to DBS testing being introduced.	**Time to follow-up:** First year of routine DBS testing (May 2007 and April 2008) **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Clinical records **Method of analysis**: Descriptive statistics **Primary outcomes**: Number of clients receiving HCV testing **Secondary outcomes**: NR	226 clients were tested (including 202 clients tested by DBS and 24 clients tested by venipuncture), compared to 35 clients tested in total (all by venipuncture) in the previous year. One third (34%) of clients open to the service were tested in this year. Authors note that availability increased as staff in substance misuse clinics were trained to carry out the DBST and tests could be carried out in house rather than via referral.	Authors note that a similar uptake may have been seen with venepunture if tests were available in the substance misuse clinic rather than via referral

Study details	Population	Intervention	Analysis	Results	Comments
Cullen et al., 2006 [#32] **Country**: Ireland **Study design**: Randomised controlled trial (cluster) ++ **Objectives**: To examine a GP based intervention to support the implementation of clinical guidelines for HCV management among IDUs **Funding source**: Health Research Board of Ireland	**Setting**: General practices **Group(s) targeted by intervention**: Health professionals and their patients identified as current or former drug users **Participant details** **Total, n (%)**: 196 patients from 25 practices **Intervention, n (%)**: 104 patients (53%); 13 practices **Control, n (%)**: 92 patients (47%); 12 practices **Male, n (%)**: intervention, 84 (81%); control, 58 (63%) **Mean age (range)**: intervention, 33.1 years; control, 31.8 years **Ethnicity**: NR **Other**: Mean time attending practice for methadone treatment: intervention, 33.2 months; control, 27.8 months Mean age of first using drugs: intervention, 17.1 years; control, 16.9 years Mean age of first injecting: intervention, 20.0 years; control, 19.9 years	**Inclusion criteria**: Patients on methadone maintenance. Practices included if one of the GPs was registered to prescribe methadone and at least 8 patients were currently being prescribed methadone **Exclusion criteria:** GPs involved in developing or reviewing the guidelines **Key components**: Implementation of clinical guidelines for the management of HCV supported by practice based educational consultation sessions and nursing support. Sessions included counselling patients on the implications for testing positive and facilitating subsequent investigations; screening patients **Method of delivery**: Guideline implementation **Delivered by**: Liaison nurse **Length**: 6 months **Control**: GP practices provided usual care for patients	**Time to follow-up**: 6 months **Number completing**: 26 GPs, 196 participants (100%) **Reason for non-completion**: NA **Data collection method**: Clinical records **Method of analysis**: Logistic regression analysis **Primary outcomes**: Proportion of current or former drug users screened for HCV; proportion of HCV positive patients referred to a specialist hepatology department for assessment **Secondary outcomes**: Mortality; proportion prescribed methadone; provided urine sample containing metabolite of any illicit drug; proportion tested for HIV; proportion tested for HBV; proportion receiving HBV vaccination; proportion receiving HAV vaccination Proportion of HCV+ patients: advised on reducing alcohol; tested for the presence of HCV-RNA in serum; attended hepatology clinic; liver biopsy performed; antiviral therapy initiated	**Primary outcomes** Patients in the intervention group were significantly more likely to have been screened for HCV than controls (49% vs. 27%; AOR 3.76, 95% CI 1.3-11.3; p=0.02) Logistic regression analysis considering potentially confounding variables: being in the intervention group was the only variable significantly associated with screening uptake (OR 4.53; 95% CI 1.39-14.78). Although patients in intervention practices were more likely to have been referred to a hepatology clinic for assessment, this finding did not reach significance (60% vs. 32%; AOR 3.15. 95% CI 0.9-10.7; p=0.06) **Secondary outcomes** Intervention group HCV+ patients more likely to have: been tested for HCV-RNA (AOR 4.53; 95% CI 1.02-20.14; p=0.05); advised on reducing alcohol (AOR 12.27; 95% CI 2.70-55.76; p=0.003); attended a hepatology clinic (AOR 5.13; 95% CI 1.1, 23.1; p<0.05); had a liver biopsy (AOR 5.07; 95% CI 1.01, 25.34; p=0.05). No differences in whether antiviral therapy initiated (OR 4.72; 95% CI 0.42, 53.23; p=0.20). Intervention patients were more likely to have had at least one HBV vaccine (AOR 4.66; 95% CI 1.33, 16.32; p<0.05); no significant differences by group on whether patients had completed a course of Hepatitis B vaccination (AOR 3.07; 95% CI 0.94, 10.01; p=0.06).	

Study details	Population	Intervention	Analysis	Results	Comments
Cullen et al., 2011 [#201] **Country**: UK (Scotland) **Study design:** Non-randomised controlled trial + **Objectives:** To evaluate a general practice-based case-finding initiative, to diagnose and refer chronically infected former IDUs **Funding source:** Not reported	**Setting:** General practice **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): 16 practices Intervention, n (%): 8 practices (50%) Control, n (%): 8 practices (50%) Male, n (%): 51% Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** GPs in areas of high HCV and IDU prevalence. Registered patients; aged 30-54 years; had ceased injecting at least 6 months prior to the intervention **Exclusion criteria:** Individuals considered by GPs to be unsuitable for testing e.g. those with a psychiatric condition **Key components:** Eligible individuals provided with information and offered a test. Patients received pre- and post-test discussion from a GP (pre/post) or nurse (pre only). Individuals testing positive were offered referrals for specialist evaluation and treatment. **Method of delivery:** NA **Delivered by:** GP; practice nurse **Length:** 6 month intervention **Control:** Care as usual	**Time to follow-up:** 6-month intervention period **Number completing:** 100% practices **Reason for non-completion**: NA **Data collection method**: All data recorded by GP/nurse; medical records; face-to-face interviews to determine intervention acceptability **Method of analysis**: Multivariate logistic regression analysis; content analysis of qualitative data **Primary outcomes**: Test uptake and case yield; referral and management **Secondary outcomes**: Intervention acceptability	**Testing uptake** There were 485 eligible patients of which 422 attended one of the intervention practices. 218 were offered a test (52%) and 121 (56%) accepted. 105 (87%) were tested: 11% experienced venipuncture failure due to poor venous access, 2% failed to return for blood sampling. In the control practices, 36 individuals out of a possible 14,335 patients were tested (0.25%). Test uptake and case yield was approximately 3 to 10 times higher in intervention compared to control practices. Most common reasons for not accepting test offer: never having injected drugs (15%), poor venous access (13%), already attending an HCV specialist (12%), having previously received a positive HCV diagnosis (13%). **Referral and management** 25 participants from intervention practices had been referred to HCV specialist centres at 1 year follow up of which 13 (52%) failed to attend an appointment	**Acceptability** Females significantly more likely than males to accept a test OR 2.33 (1.26-4.28), p=0.01 61 participants were interviewed and all responded positively when asked about the acceptability of the intervention, none were offended to be offered the test. Interviews were carried out with practice staff indicated that competing priorities had hindered testing prior to the intervention. Staff in 2 practices where pre-intervention efforts had been made to determine HCV status felt that the intervention could aid the detection of other HCV-infected individuals not previously tested and facilitate the re-referral process for those who had not engaged. Former IDUs were recognised as a hard to reach group as they have ceased injecting and rarely attend their GP. Other identified barriers included the limitations of the patient data coding system, the range of health and social problems facing former IDUs, poor venous access.

Study details	Population	Intervention	Analysis	Results	Comments
Defossez et al., 2008 [#29] **Country**: France **Study design**: Repeated cross-sectional survey + **Objectives**: To document trends in screening practices following a national government plan to encourage HCV screening **Funding source**: French Ministry of Health	**Setting**: One region **Group(s) targeted by intervention**: At-risk populations **Participant details** '97 '00 '03 Total, n= 69 58 96 Male: 57% 62% 59% Mean age: 41.5 48.8 46.1 Ethnicity: NR Drug use: 51% 33% 31%	**Inclusion criteria**: Newly diagnosed cases of HCV **Exclusion criteria**: NR **Key components**: Implementation of national priorities (namely, creation of effective targeted screening and better management of infected patients) through HCV management guidelines, media campaigns, creation of a monitoring network and two consensus conferences. **Method of delivery**: follow-up questionnaire were addressed to physicians who prescribed tests that were positive **Delivered by**: GP delivered test, but GP completed questionnaire **Length**: 2-month periods in 1997 and 2000, 4-month period in 2003. 2003, questionnaire adapted to the 2002 consensus. **Control:**	**Time to follow-up**: Six to twelve months after **Number completing**: Lost to follow-up 18 (26%) 15 (26%) 25 (26%) **Reason for non-completion**: lack of follow-up on the part of the prescribing physician, and active drug addiction **Data collection method**: Number of serological tests via private and public medical laboratories; prescribing physicians sent questionnaire requesting patient information at time of testing and 6-12 months later to follow-up on the status of patients diagnosed with HCV, including results of liver biopsy, cirrhosis, and any antiviral treatment. Patients classified into two categories: (i) patients managed in line with the consensus statements; and (ii) patients whose management was inappropriate. **Method of analysis**: Group comparisons based on non-parametric tests (Kruskall and Wallis); Pearson's chi-squared test or Fisher's exact test for small groups; Cochrane and Armitage trend test **Primary outcomes**: Changes in the characteristics and management of HCV-seropositive patients since 1997 **Secondary outcomes**:	Annual screening coverage rate increased by 40% during the study period, whereas the number of positive tests fell by 53%. The estimated detection rate of new cases decreased from 43 to 26 per 100 000 inhabitants between 1997 and 2003. In 2003, 56% of serological tests were prescribed to patients who already knew that they were HCV-seropositive. No significant change in patient management was observed during the three study periods for liver biopsy (23%, 26%, and 18% of patients in 1997, 2000, and 2003, respectively) or adherence to contemporary guidelines (58%, 67%, and 66%, respectively). The percentage of drug users managed as recommended increased, but not significantly (43% in 1997 vs. 53% in 2000, and 57% in 2003). Proportion lost to follow-up by their family doctor was stable over the three periods, and was significantly than among non-drug users (p=0.05).	Authors report that the two main reasons for inappropriate management were (i) a lack of follow-up on the part of the prescribing physician; and (ii) active drug use (accounting for more than one-third of losses to follow-up).

Study details	Population	Intervention	Analysis	Results	Comments
Douchette et al., 2009 [#28] **Country**: Canada **Study design**: Cohort study (retrospective) - **Objectives**: To compare the baseline characteristics and outcomes of HCV patients who self-referred with those who were referred by a healthcare professional (HCP) **Funding source**: NR	**Setting**: Secondary care services **Group(s) targeted by intervention**: Patients referred to a hepatitis support programme **Participant details** Total, n (%): n=1,563 Intervention, n (%): self-referral, 336 patients (21.5%) Control, n (%): HCP referral, 1,227 patients (78.5%) Male, n (%):self-referral, 191 (56.8%), HCP referral, 761 (62.0%) Mean age (SE): self-referral, 43.0 years (±10.3); HCP referral, 43.9 years (±10.0) Ethnicity: NR Other: NR	**Inclusion criteria**: All patients referred between December 2002 and December 2007 **Exclusion criteria**: NR **Key components**: Alternative remuneration plan whereby physicians could accept not only from physicians but also from other health care providers (e.g. nurse clinicians, public health professionals) as well as self-referrals **Method of delivery**: NA **Delivered by**: Self referral compared to HCP referral **Length**: NA **Control**: HCP referral	**Time to follow-up**: 5 year study **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Database and chart review **Method of analysis**: Chi-squared, Fisher's exact and t-tests **Primary outcomes**: Outcomes of treatment **Secondary outcomes**: NR	Baseline characteristics of participants who self-referred were similar to those who were HCP-referred. ***Nurse and physician appointments*** Similar proportion of patients in the self- and HCP-referred groups attended the initial nursing assessment (77.4% vs. 78.8%; p=0.6). 950 patients (193 [57.4%] self and 757 [61.7%] HCP-referred; p=0.2) attended the initial physician appointment. ***HCV treatment*** 326 (34.3%) participants received treatment (66 self- and 260 HCP-referred; p=0.5). 283 patients were treated with standard therapy (pegylated interferon alfa-2a or pegylated interferon alfa-2b combined with ribavirin). Similar proportions achieved a sustained serological response (57.8% self vs. 49.7% HCP, respectively; NS).	

Study details	Population	Intervention	Analysis	Results	Comments
D'Souza et al., 2004 [#3] **Country**: UK **Study design**: Uncontrolled before and after study - **Objectives**: To improve GPs knowledge of HCV **Funding source**: NR	**Setting**: Primary care **Group(s) targeted by intervention**: Health professionals **Participant details** Total, n (%): education sessions, n= 43; postal info sheet, n=164 Intervention, n (%): As above Control, n (%): NA Further **Participant details** not provided.	**Inclusion criteria**: NR **Exclusion criteria**: NR **Key components**: Educational programme consisting of lunch-and-learn sessions incorporating elements on (i) value to healthcare staff, (ii) incentives, (iii) repeated exposures, (iv) commitment by clinicians and (v) an exceptionally well-organised implementation plan; or one-page information sheet sent by post **Method of delivery**: NR **Delivered by**: NR **Length**: NR **Control**: NA	**Time to follow-up**: Post-test **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Questionnaire survey **Method of analysis**: NR **Primary outcomes**: Knowledge **Secondary outcomes**: NR	**Knowledge** Knowledge assessed included about the nature of HCV infection, high risk groups, disease development and treatment. Significant improvement in the percentage of correct responses on all eight questions. Percentage of correct responses following post test were all greater than 85%. **Other outcomes** 46% of participants "expressed frustration regarding access to reliable information, treatment algorithms, and to linguistically and culturally appropriate patient information". The authors reported poor uptake of the education sessions and that they were 'labour intensive'.	Brief report (letter), little details. Immediate follow up only on topics covered in the intervention

Study details	Population	Intervention	Analysis	Results	Comments
Fischer et al., 2000 [#151] **Country**: USA **Study design:** Uncontrolled before and after study - **Objectives:** To evaluate an educational outreach program about hepatitis C at a managed care organisation **Funding source:** Schering-Plough, Inc.	**Setting:** Health maintenance organisation **Group(s) targeted by intervention:** Health professionals (primary care doctors and nurses) **Participant details** Total, n (%): 17 clinics (n=1,131 staff) Intervention, n (%): As above Control, n (%): NA Male, n (%): NR Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** NR **Exclusion criteria:** NR **Key components:** *Hepatitis C: can you make a difference*? Brief educational sessions including presentations on: general information about HCV, predictive factors, therapy, treatment response and types of treatment **Method of delivery:** Lunch time education session, presentations **Delivered by:** Physicians, Nurse educators **Length:** 1-hour sessions at lunch time, 1-4 sessions per clinic **Control:** NA	**Time to follow-up:** Post-test **Number completing:** 88% **Reason for non-completion**: NR **Data collection method**: Pre- and post-test surveys **Method of analysis**: Descriptive statistics **Primary outcomes**: Knowledge **Secondary outcomes**: Participation; satisfaction	501/597 (84%) staff attended sessions on HCV screening At pretest, only 13% attendees answered all 3 questions correctly, at post-test, 72% answered all questions correctly. Correct responses on survey: Pre-test, Post-test: Tests needed to confirm diagnosis: 25%,87% Adverse side effects of treatment: 66%, 91% Evaluating treatment response: 66%, 89% Correct response on all items: 13%, 72%	Authors note that almost all attendees rated speaker knowledge, effectiveness and overall program as good or excellent. The most important things that participants believed they learned were: a general overview of the topic, how to diagnose and test HCV, risk factors and symptoms, treatment methods.

Study details	Population	Intervention	Analysis	Results	Comments
Foucher et al., 2009 [#173] **Country**: France **Study design:** Case series - **Objectives:** To assess the influence of FibroScan on HCV screening and management in street-based outreach **Funding source:** Roche-Pharma Company	**Setting:** Outreach **Group(s) targeted by intervention:** **Participant details** Total, n (%): 298 Intervention, n (%): As above Control, n (%): NA Male, n (%): 226 (76) Mean age (range): 32 years (SE 8.3) Ethnicity: NR Other, n (%): Ever injected heroin: 204 (68.5) Ever snorted or injected cocaine: 265 (88.9) Ever smoked cannabis: 279 (93.6) Currently in drug treatment: 179 (60.1)	**Inclusion criteria:** Aged 18 years or older; consecutive drug users in two street-based outreaches between January 2006 to January 2007 **Exclusion criteria:** NR **Key components:** Offered non-invasive evaluation of liver fibrosis with FibroScan. Participants offered counseling and testing for HIV, HBV and HCV and a meeting with a hepatologist in a centre in the city. **Method of delivery:** NA **Delivered by:** Outreach workers **Length:** 1 year intervention **Control:** NA	**Time to follow-up:** NA **Number completing:** 100% accepted the scan **Reason for non-completion**: NA **Data collection method**: Face-to-face questionnaire; medical results **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	290 (97.3%) of participants agreed to having a blood test but only 221 (76.2%) had the blood sample taken. Those dropping out said they would return for the test but failed to. Prevalance of HCV was 37.6% (n=83). Of 198 patients with a past history of unknown or negative HCV status, 17 (8.6%) were HCV positive - FibroScan led to 8.6% new diagnosis of HCV infection. 53 (18%) patients who were tested reported no previous blood test for HCV FibroScan results: 298 accepted FibroScan. Majority (80%) of patients had a low FibroScan value meaning low or no liver fibrosis. 5% had a value indicating cirrhosis.	

Study details	Population	Intervention	Analysis	Results	Comments
Garrard et al., 2006 [#178] **Country**: USA **Study design:** Uncontrolled before and after study - **Objectives:** To evaluate the impact of a continuing medical education program on clinicians' knowledge and organisational change **Funding source:** Training program funded by the Veterans Affairs Hepatitis C Resource Centers	**Setting:** Veterans Affairs Medical Centres **Group(s) targeted by intervention:** Health professionals **Participant details** Total, n (%): 54 staff from 28 sites Intervention, n (%): As above Control, n (%): NA Male, n (%): NR Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** Applicants accepted from Veterans Affairs sites that had not sent participants to previous training **Exclusion criteria:** NR **Key components:** Continuing medical education (CME). 6-week needs assessment, 2-day CME programme, 6 month follow up period. CME included developing an action plan: setting goals, creating an integrated HCV clinic, identifying resources and barriers **Method of delivery:** Presentations, case study discussion, Q&A sessions, and discussions. **Delivered by:** NR **Length:** 8 months; including a 2 day education program **Control:** NA	**Time to follow-up:** 1, 3 and 6 months **Number completing:** **Reason for non-completion**: NA **Data collection method**: Self report survey **Method of analysis**: Paired t-tests; content analysis **Primary outcomes**: Change in knowledge; organisational change **Secondary outcomes**: NR	After 1 month, HCV screening increased in 4 of 26 (15%) sites. Participants' knowledge ($p<0.001$) about HCV and confidence ($p<0.01$) about screening, diagnosis, treatment and follow up increased significantly following the training 6 months: at least 7 of 26 (27%) sites reported an increase in the number of patients receiving antiviral treatment Organisational change: 1 month after training all 28 sites reported at least 1 major change related to HCV clinic activities e.g. contacting administration about setting up a clinic or pharmacists about collaborative efforts. After 3 months, 19 sites described continuing positive improvements, 3 sites reported no change and the improvements in 3 sites from 1 month follow up were no longer to be seen. Positive changes included increased referrals to the HCV clinic, increased awareness of the disease and need for screening or treatment. After six months there were definite signs of progress in 17 sites - new resources provided or increased, improved treatment protocols, patient backlogs reduced, number of liver biopsies increased, more complex cases seen, positive changes in clinic structure. Biggest barrier - inadequate administrative support for HCV staff: lack of resources or collaboration, administrative indifference to the need for improved screening and evaluation of patients with HCV.	Authors report additional results around collaboration, staff changes etc. Case studies are also given. Results are presented for clinics rather than individual staff.

Study details	Population	Intervention	Analysis	Results	Comments
Grebely et al., 2007 [#174] **Country**: Canada **Study design:** Case series - **Objectives:** To evaluate the uptake and response to treatment among current and former IDUs infected with HCV enrolled in a weekly support group designed to enhance long-term engagement in medical care **Funding source:** Vancouver Coastal Health, The Vancouver Coastal Health Research Institute, The British Columbia Medical Services Foundation, Schering Canada and Hoffmann-La Roche	**Setting:** Primary care **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): 80 participants Intervention, n (%): As above Control, n (%): NA Male, n (%): 17 (94%) Mean age (range): 42.8 (6.6) (not stated, 19 plus) Ethnicity: not stated Other: body weight, years of infection, methadone maintenance, drug abstinence, beck depression, genotype, HIV status	**Inclusion criteria:** HCV-infected illicit drug users attending an inner city multidisciplinary health clinic. Patients with detectable HCV RNA and an interest in receiving HCV treatment were referred by clinic physicians and addiction counsellors to the group **Exclusion criteria:** NR **Key components:** Weekly support group for HCV infection. Group provided an opportunity for treatment candidates to interact directly with those that were receiving or had completed treatment and to gain insight into the evaluation of liver disease and what to expect during treatment. Patients who qualified for HCV treatment were seen by clinic physicians for evaluation for on-site combination treatment according to guidelines. **Method of delivery:** Group discussion **Delivered by:** Facilitated by addiction counsellors (nurses and research staff supporting) **Length:** Once-weekly group **Control:** NA	**Time to follow-up:** 80 week period of referral **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: **Method of analysis**: Mann–Whitney test used to assess differences in median attendance; Fisher's exact test used to assess differences in proportions **Primary outcomes**: HCV treatment initiation and outcomes **Secondary outcomes**: NR	Of 80 participants referred to the group: 8/80 (10%) had completed or initiated treatment for HCV infection prior to attending the group; 20/80 (25%) were currently under evaluation for treatment of HCV and 21/80 (26%) had initiated or completed treatment for HCV infection. 23/80 (29%) participants were lost to follow-up. Of the 21 subjects who initiated treatment for HCV infection, 18 received care at this site and were enrolled into a prospective observational study of HCV therapy. 10/18 (56%) participants reported illicit drug use in the 6 month preceding therapy; 7 participants were active drug users at the time of treatment initiation. In total, 12 patients completed or discontinued treatment; 67% (8/12) responded to therapy.	

Study details	Population	Intervention	Analysis	Results	Comments
Grebely et al., 2010 [#163] **Country**: Canada **Study design:** Case series **Objectives:** To evaluate assessment and treatment for HCV among IDUs accepting referral to a weekly HCV peer support group **Funding source:** British Columbia Medical Services Foundation, Vancouver Coastal Health, Hoffmann-La Roche and Schering Canada	**Setting:** Primary care **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): 204 participants Intervention, n (%): As above Control, n (%): NA Male, n (%): 170 (83%) Mean age (range): median 47 years (24-62 years) Ethnicity: NR Other: All participants had a history of illicit drug use	**Inclusion criteria:** HCV-antibody positive IDUs attending an inner city multidisciplinary health clinic between March 2005 and March 2008 **Exclusion criteria:** NR **Key components:** Weekly HCV support group at a health clinic. Participants discussed personal experiences of HCV and treatment. Individuals were formally referred to the group by physicians, nurses and addiction counsellors during regular clinic visits; outreach in the community also identified participants. During the group sessions, nurses and physicians would also see patients one-on-one, performing medical assessments to determine treatment eligibility, HCV laboratory testing (phlebotomy provided on-site), treatment education and ongoing assessments during antiviral therapy. **Method of delivery:** Group discussions **Delivered by:** Peers; facilitated by an addiction counsellor; additional support from research staff **Length:** Weekly, 2 hour sessions **Control:** NA	**Time to follow-up:** NA **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Retrospective chart review **Method of analysis**: Descriptive statistics; factors associated with successful assessment for HCV infection evaluated using Chi-square or Fisher's Exact Test **Primary outcomes**: Assessment of HCV infection; HCV treatment uptake; SVR **Secondary outcomes**: NR	204 participants accepted referral to the HCV support group from March 2005-2008. 109 (53%) of clients were assessed for HCV infection, the remainder were lost to follow-up (n=95, 47%). 57 initiated treatment after accepting referral to the HCV group. 14 clients completed/initiated treatment prior to joining the group; 27 deferred treatment or treatment was not medically indicated; 11 were under evaluation for treatment. 19/57 had treatment outcomes available: SVR observed in 12/19 (63%) Median number of group visits was 6, ranging from 1-69 visits. 40% participants attended more than 10 times. Overall attendance at the meetings was 8 persons.	

Study details	Population	Intervention	Analysis	Results	Comments
Harris et al., 2010 [#37] **Country**: USA **Study design**: Case series - **Objectives**: To examine the feasibility and effectiveness of integrating HCV care and methadone maintenance treatment **Funding source**: National Institutes for Health, Center for AIDS Research, New York State Office of Alcoholism and Substance Abuse Services, New York State Department of Health AIDS Institute, Centers for Disease Control and Prevention	**Setting**: Drugs services **Group(s) targeted by intervention**: People attending drugs services **Participant details** Total, n (%): 291 patients Intervention, n (%): 21 treatment on site Control, n (%): 63 off site Male, n (%): 175 (60) Mean age (range): NR Ethnicity: 60% Hispanic; 27% African American; 13% White Other:	**Inclusion criteria**: All patients enrolled in the service from July 2003 to July 2005. **Exclusion criteria**: Patients enrolling after July 2005. **Key components**: HCV clinical protocol. Comprehensive on-site hepatitis C (testing and vaccination, treatment). **Method of delivery**: **Delivered by:** Full-time medical staff; 1 physician trained in internal medicine and 1 physician assistant; part-time on-site psychiatrist. Additional support provided by nurses and substance abuse counsellors (received 1-2 full days in-service training on HCV). Peer support groups available to all patients. All patients were screened for HAV, HBV and HCV on admission and received 'basic' counselling*. Medicaid-insured patients testing positive for HCV antibody were offered further evaluation and treatment on-site (optional referral for liver biopsy); referral to an outside hepatologist was offered to those who declined on-site care, to uninsured patients, and to those with medical insurance not accepted by the service. **Length**: NA **Control**: NA	**Time to follow-up**: 2 years of patient care under the protocol **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Retrospective chart review **Method of analysis**: **Primary outcomes**: NR **Secondary outcomes**: NR	289 (99%) of the patients received HCV-antibody testing and basic HCV counselling. 188 (65%) patients had positive HCV antibody tests. 159 patients were eligible for on-site care, of which 34 chose to pursue care elsewhere. 118 patients had HCV viral load testing and 83 were subsequently diagnosed with chronic HCV infection. 21 patients had initiated on-site treatment at the time of review. SVR was achieved in 8 patients.	

*Consisted of explanation of the patient's HCV serostatus, education about transmission of and prevention from HCV infection, counseling to eliminate or decrease alcohol use, and the need for further evaluation for the diagnosis and treatment of chronic HCV, where appropriate. Also included offer of vaccination for hepatitis A and B, when indicated.

Study details	Population	Intervention	Analysis	Results	Comments
Helsper et al., 2010 [#127] **Country**: The Netherlands **Study design:** Non-randomised controlled trial + **Objectives:** To evaluate the added value of a support programme for primary care complementary to a public HCV campaign **Funding source:** The Netherlands Organisation for Health Research and Development	**Setting:** Primary care practices **Group(s) targeted by intervention:** Health professionals **Participant details** Total, n (%): 2 regions Intervention, n (%): 1 region Control, n (%): 1 region Male, n (%): NR Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** All GPs who were not related to shelters for drug and alcohol addicts were included **Exclusion criteria:** NR **Key components:** Support programme for primary care. Distribution of educational material to all primary care practices developed in collaboration with the Dutch College of General Practitioners; small group and larger plenary educational sessions for GPs on HCV management; and in-practice support for HCV risk assessment via practice facilitators. The public campaign consisted of radio and newspaper ads and information material distributed at public places. **Method of delivery:** public campaign **Delivered by:** **Length:** 4 months **Control:** Public campaign only	**Time to follow-up:** 4-month intervention period **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Regional laboratories for data on HCV tests **Method of analysis**: Crude proportion testing **Primary outcomes**: Number of anti-HCV tests requested by GPs; number of positive tests **Secondary outcomes**: NR	**Number of HCV tests requested by GPs** In the intervention region, the proportional increase in HCV tests was 3.02 (increasing from 57 tests in the previous year to 172 tests during the intervention period). In the control region, the corresponding increase was 1.36 (86 to 118 tests). Increase in testing in intervention region was 2.2 (95% CI 1.5-3.3) times as high as in the control region. **Number of positive tests** In the intervention region, the increase in positive HCV tests was 1.7% (95% CI –0.2% to 3.7%). In the control region, this number decreased (-0.9%; 95% CI –4.1% to 2.3%). Difference between the intervention and control region in increase in the % of positive tests was 2.6% (95% CI –0.7% to 5.8%).	Short courses and the plenary course were attended by 70% of all GPs. Practice facilitators paid visits to all primary care practices twice during the intervention period

Study details	Population	Intervention	Analysis	Results	Comments
Hickman et al., 2008 [#126] **Country**: UK **Study design:** Randomised controlled trial (cluster) + **Objectives:** To test whether offering dry blood spot testing (DBST) could increase uptake of testing for hepatitis C **Funding source:** Department of Health	**Setting:** Drug treatment clinics (n=22) and prisons (n=6) **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): 28 clinics Intervention, n (%): 14 clinics (50%) Control, n (%): 14 clinics (50%) Male, n (%): NR Mean age (range): NR (NR) Ethnicity: NR Other: NR	**Inclusion criteria:** Pairs of study sites selected on the basis that used the same laboratory and were geographically close or were identified by the site as similar **Exclusion criteria:** NR **Key components:** Dry blood spot testing offered in intervention sites. Staff received training prior to intervention start. **Method of delivery:** DBS offered in clinics **Delivered by:** Drug workers, HCV specialist nurses provided ongoing support **Length:** 6 months **Control:** Continued with their current HCV testing practices	**Time to follow-up:** 6-month period before and after **Number completing:** 28 sites **Reason for non-completion**: NA **Data collection method**: Laboratory records of testing **Method of analysis**: Paired t-tests; Wilcoxon matched-pairs signed-rank-test **Primary outcomes**: Average % difference in HCV testing in the 6 months before and during the intervention **Secondary outcomes**: NR	Testing increased by an average 12.2% in intervention sites compared to the previous 6 months; and testing decreased by an average of 2.3% in control sites. The average difference in the proportion of patients tested between intervention and control sites was 14.5% (95% CI 1.3–28%; p=0.033) The treatment effect was positive in 13 out of the 14 pairs (p=0.002). Weighting for activity prior to the study reduced the average difference in the proportion of patients tested: 10.8% (95% CI 0.1–21%; p=0.048).	Authors note that main theme identified for increasing HCV testing reported by intervention sites was for local and national drug policy to give "greater priority to infection control and HCV testing" in order to counter key problems identified by the sites (e.g. 'insufficient patient time' and 'lack of confidence and motivation').

Study details	Population	Intervention	Analysis	Results	Comments
Jack et al. 2008 [#343] **Country**: UK **Study design:** Case series - **Objectives:** To assess the feasibility, safety and efficacy of delivering HCV services in a primary care environment - to enhance access to treatment **Funding source:** Partly funded by educational grant from Roche	**Setting:** Opiate substitution clinics in GP practices **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): 353 clients Intervention, n (%): As above Control, n (%): NA Male, n (%): 256 (72.5%) Mean age (range): 34.7 years (21-53 years) Ethnicity: NR Other: NR	**Inclusion criteria:** NR **Exclusion criteria:** NR **Key components:** Clients referred to a clinical nurse specialist in hepatitis before or after their GP/ drug worker. Derived a set of criteria for the safe treatment of IDUs to identify suitable clients. **Method of delivery:** Individual consultation **Delivered by:** Clinical nurse specialist (hepatitis) **Length:** 3 years **Control:** NA	**Time to follow-up:** After 3 years of the intervention **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Medical records **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	266/353 (75%) clients agreed to be tested for HCV Of 124 chronically infected patients, 118 had not received treatment previously; 43 of these 118 fulfilled the established treatment criteria; 24 disengaged; 8 died and 43 did not meet the treatment criteria. Two patients underwent liver biopsy; 30/118 treatment naive individuals commenced on combination therapy for HCV and 21 reached an end point: 13 (62%) reached sustained virological response, 2 dropped out, 2 were withdrawn due to psychiatric co-morbidity, and 4 did not reach SVR (2 made no response to treatment and 2 made an early SVR but relapsed). Attendance rates for those on therapy at the HCV clinic exceeded 85%; compliance with therapy appeared to be good.	

Study details	Population	Intervention	Analysis	Results	Comments
Lindenburg et al., 2011 [#269] **Country**: The Netherlands **Study design:** Case series - **Objectives:** To present the results of the DUTCH-C project that aimed to offer HCV screening and treatment to drug users in Amsterdam **Funding source:**	**Setting:** Drugs service **Group(s) targeted by intervention:** Drug users **Participant details** Total, n (%): 578 participants; 497 (86%) ACS cohort; 81 (14%) referred from methadone clinics Intervention, n (%): As above Control, n (%): NA Male, n (%): ACS cohort, 342 (68.8) Mean age (range): ACS cohort, 43.9 years (SD 7.6 years) Ethnicity: ACS cohort, Dutch nationality 413 (83.1) Other, n (%): Methadone use on prescription: 379 (76.3)	**Inclusion criteria:** From December 2004, drug users participating in the Amsterdam Cohort Study (ACS); from 2007, drug users referred from methadone clinics and other addiction clinics **Exclusion criteria:** NR **Key components:** Multidisciplinary unit. Collaboration linking two physicians and two nurses with a liver specialist, a psychiatrist, and a virologist from a medical centre and with addiction specialists and case-load managers from methadone clinics. HCV testing and treatment is provided on-site for drug users. HCV treatment was standard for all participants and comprised combination therapy (pegylated interferon alpha 2a or 2b and ribavirin). **Method of delivery:** NA **Delivered by:** medical staff **Length:** NA **Control:** NA	**Time to follow-up:** NR; series of patients participating in project between January 2005 and July 2009 **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Self report, treatment completion **Method of analysis**: Descriptive statistics **Primary outcomes**: HCV testing uptake; HCV treatment uptake **Secondary outcomes**: NR	Testing for HCV was accepted by 90% (449/497) of ACS DU and 98% (79/81) of DU referred from methadone and addiction clinics. 60% (267/449) of the ACS cohort were HCV antibody positive and 67% (183/267) were HCV RNA positive. Corresponding rates in DUs referred from clinics were 92% (73/79) and 90% (66/73) respectively. 58 DU initiated treatment. 16 (27%) with genotype 1 or 4, 42 (72%) with genotype 2 or 3. Of the 57 individuals with sufficient follow-up, 37 (65%) achieved SVR.	

Study details	Population	Intervention	Analysis	Results	Comments
Moussalli et al., 2010 [#18] **Country**: France **Study design**: Controlled before and after study - **Objectives**: To improve access to HCV care by using an onsite multidisciplinary team **Funding source**: NR	**Setting**: Drugs services **Group(s) targeted by intervention**: Patients attending addiction services **Participant details** Total, n (%): 337 HCV patients Intervention, n (%): 224 underwent evaluation at the centre (2003-2004) Control, n (%): 113 referred to hospital (2002) Male, n (%): NR Mean age (range): intervention = 40 years; control = 37 years (NR) Ethnicity: NR *Other* Genotype 2 or 3: intervention, 46%; control; 49% Drug use: intervention, 38 (17%); control, 69 (61%); p<0.001 for comparison Alcohol use: intervention, 83 (37%); control, 45 (40%); NS for comparison Opiate substitution: intervention, 169 (76%); control, 62 (55%); p<0.001 for comparison	**Inclusion criteria**: Patients attending the centre between January 2002 and December 2004 **Exclusion criteria**: NA **Key components**: Beginning in 2003, HCV patients attended onsite for treatment with a multidisciplinary team rather than receiving referral to hospital. All aspects of care and treatment were provided by the team within the drugs service. **Method of delivery**: Change in service configuration **Delivered by**: 5 GPs, hepatologist, psychiatrist, 2 nurses and a health counsellor **Length**: NA **Control**: NA	**Time to follow-up**: 2 year evaluation period **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Medical records **Method of analysis**: Chi-squared test and variance analysis **Primary outcomes**: Disease evaluation and initiation of treatment **Secondary outcomes**: NR	Treatment uptake: 85/224 patients were treated onsite for HCV: 38% compared to 2% treatment uptake before the intervention (p<0.001).	

Study details	Population	Intervention	Analysis	Results	Comments
Roudot-Thoraval et al., 2000 [#302] **Country**: France **Study design:** Randomised controlled trial (individual) + **Objectives:** To improve the detection of patients infected with HCV **Funding source:** Not reported	**Setting:** Primary care **Group(s) targeted by intervention:** Health professionals **Participant details** Total, n (%): 184 GPs Intervention, n (%): 94 GPs Control, n (%): 90 GPs Male, n (%): group 1 56%, group 2 50% Mean age (range): NR Ethnicity: NR Other n, (%): Rural practice: intervention, 28 (30%); control, 32 (36%) Group practice: intervention, 45 (48%); control, 43 (48%)	**Inclusion criteria:** All GPs in two HCV networks **Exclusion criteria:** not stated **Key components:** GPs randomly assigned to one of two screening strategies: (1) GPs prescribed HCV testing if the risk factors for infection were identified during questioning of patients; (2) GPs practitioners were assisted in their screening approach by posters and leaflets on the risk factors of HCV, available in the waiting room. **Method of delivery:** As above **Delivered by:** NA **Length:** 15 months **Control:** GPs assigned to strategy 1 formed the control group	**Time to follow-up:** 15 month intervention period **Number completing:** All GPs followed up **Reason for non-completion**: NA **Data collection method**: Questionnaire **Method of analysis**: Chi-square test; Mann-Whitney **Primary outcomes**: NR **Secondary outcomes**: NR	323 HCV tests were prescribed by GPs in the control condition and 294 by GPs in the intervention condition. HCV testing was prescribed at the request of the patient in 19.5% of cases in the control condition and 35.7% of cases in the intervention condition ($p<0.001$ for comparison). In addition, reasons for testing were significantly more numerous in the intervention group (22.7%) than the control group (22.7% vs. 12.0%, $p=0.001$). There was a similar frequency of detection of positive patients in both the intervention and control groups.	

Study details	Population	Intervention	Analysis	Results	Comments
Sahajian et al., 2004 [#123] **Country**: France **Study design:** Uncontrolled before and after study - **Objectives:** To examine the impact of a campaign to enhance screening for hepatitis C by private practitioners **Funding source:** Caisse Nationale d'Assurance Maladie	**Setting:** Primary care **Group(s) targeted by intervention:** Healthcare professionals and the general public **Participant details** Total, n (%): 1,433 GPs; 1,619 specialists Intervention, n (%): As above Control, n (%): NA Male, n (%): NR Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** Private practice in the administrative district covered by the Lyon public healthcare insurance fund Exclusion criteria: NR **Key components:** Help guide on HCV screening sent to all private practitioners. Screening workshops also provided for practitioners. Information sessions were also developed for laboratory physicians and pharmacists. A press conference was held to describe the screening campaign; included newspaper articles, radio and TV reports, and posters. Debate and public meeting were also organised. **Method of delivery:** As above **Delivered by:** NR **Length:** 12-month campaign **Control:** NA	**Time to follow-up:** following 12 month campaign **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Number of serological tests **Method of analysis**: Chi-square test, Mantel-Haentzel test **Primary outcomes**: Screening activity **Secondary outcomes**: NR	15,952 HCV serology tests were prescribed by 1,798 of the 3,052 physicians (58.9%). The number of HCV RNA tests performed during the campaign increased from 135 (pre-campaign period) to 173 prescribed by general practitioners and from 96 to 103 prescribed by specialists. Using these data, the rate of confirmation of positive serology tests was 1.67% before the campaign and 1.73% during the campaign	

Study details	Population	Intervention	Analysis	Results	Comments
Sahajian et al. 2011 [#124] **Country**: France **Study design:** Randomised controlled trial (cluster) + **Objectives:** To compare two screening strategies and a non-intervention strategy for people in economically or socially underprivileged situations **Funding source:** French National Agency for Research on AIDS and Viral Hepatitis	**Setting:** Community **Group(s) targeted by intervention:** People in economically or socially underprivileged situations **Participant details** Total, n (%): n=2,636 participants from 18 shelters Intervention, n (%): 12 shelters. n=1,825 (69%); S1 6 shelters, n=1,041 (39%), S2 6 shelters, n=784 (30%) Control, n (%): n=811 (31%) Male, n (%): control 90%; S1 84%; S2 81% Mean age (range): NR Ethnicity (country of birth): Mahgreb (46-67%); Black Africa (5-17%); France (9-35%); Eastern Europe (2-17%); Other (4-12%) Other: level of study, professional activity; shelter/WHEC distance; shelter capacity	**Inclusion criteria:** Aged 18 or older; residents of shelters; accepted taking of blood and signed consent form **Exclusion criteria:** Known HBV or HCV positive without medical follow-up **Key components:** Outreach screening programme. Group information session about the benefits of screening followed by individual consultation. S1 intervention testing done and results given externally. S2 intervention delivered on a 4 week cycle, with testing done and results given in the shelter. **Method of delivery:** Mobile team visited shelters **Delivered by:** Mobile team of doctor, nurse and project assistant **Length:** 18 months, monthly intervention (S1); four week cycle (S2): week 1 information/ consultation; week 2 blood sampling and medical check up; week 3 posting results and viral load measure; week 4 viral load results and follow up **Control:** No intervention but offered a screening test during an medical check up	**Time to follow-up:** 18 month intervention period **Number completing:** n=1,276 participated in the study; S1 n=222 (21%); S2 n=243 (31%); control n=811 (100%) **Reason for non-completion**: Did not accept taking of blood or sign consent form; comprehension problems; received screening in previous 3 months; psychiatric disorder **Data collection method**: Individual follow-up of patients and screening activity **Method of analysis**: Odds ratios based on individual analysis of study participants. Chi-square and Fischer's test used to compare differences between proportions. **Primary outcomes**: Screening completion; screening completion rate **Secondary outcomes**: NR	Screening completion was highest among participants in the S2 group, and the S1 group compared to controls. Control n=12 (1.5%); S1 n= 95 (9.1%); S2 n=145 (18.6)% ($p<10^{-6}$) Screening completion was significantly higher in S1 versus control (OR 49.8; 95% CI 26.1-102.1) and S2 versus control (OR 98.5; 95% CI 51.9-200.8). Screening completion was also significantly higher in S2 versus S1 conditions (OR 2.0; 95% CI 1.3-2.9).	Authors note that data analysis by cluster by not possible. May have introduced bias into the assessment. Also authors note that the intervention was interrupted in some shelters, due to building work or insufficient inclusion. Replacement with equivalent shelters breaks randomisation strategy.

Study details	Population	Intervention	Analysis	Results	Comments
Skipper et al., 2003 [#5] **Country**: UK (England) **Study design**: Case series - **Objectives**: To improve the care pathway in prisons for new prisoners with hepatitis C and increase testing **Funding source**: NR	**Setting**: Prison health clinic **Group(s) targeted by intervention**: Prisoners **Participant details** Total, n (%): 1,618 prisoners Intervention, n (%): As above Control, n (%): NA Male, n (%): 100% Mean age (range): NR (NR) Ethnicity: NR Other: NR	**Inclusion criteria**: All prisoners entering three prisons in a 1-year period **Exclusion criteria**: NR **Key components**: Healthwatch Clinic (HWC) and Prison Outreach Clinic (POC). HWC: All new prisoners attended a one hour health awareness lecture including information about BBVs; invited to attend clinic which provides pre- and post-test counselling and testing for HBV, HCV and HIV. POC: Patients testing positive for HCV RNA follow a prescribed pathway including further tests (liver biopsy) and treatment if eligible (delivered in prison where appropriate or via referral if prisoner is due for release or transfer). **Method of delivery**: Lecture; clinical care pathway **Delivered by**: Hepatology clinical nurse specialist or prison doctor **Length**: One-off lecture on prison entry; clinical care pathway as required **Control**: NA	**Time to follow-up**: NA **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: Clinical records **Method of analysis**: NR **Primary outcomes**: Not specified **Secondary outcomes**: Not specified	137 (8.5%) prisoners requested testing for HCV. 58 (42%) were found to have a positive HCV antibody test and 41 (30%) had detectable HCV by PCR test. 24 of the 58 (41%) patients testing positive for the antibody test had not been previously tested and few who had been tested were certain of their previous test results or what their previous results meant. 6 of the 41 patients testing positive were deemed eligible for treatment, but only 3 patients had undergone treatment since the study started due to funding. Biopsy: Prior to the clinics beginning, approximately 5 patients per year were referred to hospital for investigation for HCV. This increased to 78 prisoner referrals in the 16 months after the study began.	

Study details	Population	Intervention	Analysis	Results	Comments
Surjadi et al., 2011 [#301] **Country**: USA **Study design:** Uncontrolled before and after study - **Objectives:** To evaluate the impact of formal HCV education given by liver specialty providers on patient's knowledge of hepatitis C disease **Funding source:** National Institute of Health	**Setting:** Secondary care **Group(s) targeted by intervention:** HCV-infected individuals **Participant details** Total, n (%): See below Intervention, n (%): 201 participants Control, n (%):322 patients referred prior initiation of education sessions Male, n (%): 136 (69) Mean age (range): 49 (SD 10 years) Ethnicity: White 96 (49) Other, n (%): IDU risk factor for HCV: 125 (64)	**Inclusion criteria:** All HCV-infected individuals within San Francisco's safety net healthcare system **Exclusion criteria:** **Key components:** HCV education session. Primary providers made initial diagnosis of HCV and referred patients for HCV education prior to scheduled appointment at liver speciality clinic. Sessions consisted of information on HCV diagnosis, symptoms, transmission, natural history, assessment of severity of liver disease, candidacy for treatment, virologic response rates with combination therapy, adverse effects of treatment, and resources for obtaining further HCV healthcare and speciality access. **Method of delivery:** In-person didactic PowerPoint presentation **Delivered by:** Hepatology nurse practitioner **Length:** Over 18 months - 2-hr standardized education **Control:** Historical controls comprised of patients referred before initiation of the education sessions.	**Time to follow-up:** Post-test **Number completing:** 197 (98%) **Reason for non-completion**: NR **Data collection method**: Pre- and post-education questionnaires **Method of analysis**: Paired t-tests **Primary outcomes**: Change in knowledge scores **Secondary outcomes**: NR	Overall mean percent knowledge score at baseline = 61 points. Following HCV education, mean percent knowledge score improved by 14 points (p<0.0001). Participants gained the most knowledge in 3 categories (mean change in % score): HCV transmission (10, p=0.0003); HCV general knowledge (16, p=0.02); health care maintenance (17, p=0.004). After education, the majority of subjects (94%) indicated that they were interested in HCV treatment and referral to a liver specialist. Prior to initiation of the HCV education class, 322 patients were referred to the liver specialty clinics over a 19-month period. A similar number of patients were referred (n = 358) in the liver specialty clinics during the study period (p = 0.4). Significantly higher show rates in the liver specialty clinics among those referred after initiation of the education class compared to historical controls (64 vs. 39%; p<0.0001).	

Study details	Population	Intervention	Analysis	Results	Comments
Wilkinson et al. 2008 [#342] **Country**: UK **Study design:** Case series - **Objectives:** To enhance access to treatment and services through a community based treatment programme **Funding source:** Not reported	**Setting:** Outreach clinic **Group(s) targeted by intervention:** IDUs **Participant details** Total, n (%): n=441 participants Intervention, n (%): As above Control, n (%): NA Male, n (%): approx 78% Mean age (range): approx 40 years (NR) Ethnicity: NR Other: NR	**Inclusion criteria:** NR **Exclusion criteria:** NR **Key components:** Patients testing positive for HCV offered appointments at the local liver unit. To tackle poor attendance, monthly outreach clinics established. Clients who expressed interest in anti-viral therapy were reviewed. **Method of delivery:** As above **Delivered by:** Hepatologist, nurse **Length:** Monthly clinic **Control:** NA	**Time to follow-up:** 2-year intervention period **Number completing:** 441 participants **Reason for non-completion**: NA **Data collection method**: Medical records **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	83/441 (19%) patients with chronic hepatitis C chose to attend the outreach liver clinic for consideration of anti-viral therapy. 63 patients (14%) agreed to start therapy of whom 58 (13%) patients completed therapy; 5 (1%) patients therapy was ongoing; 20 patients did not start therapy because they were medically unfit (6, 1%) or declined to (14, 3%). Of the 58 patients completing therapy, 47 (81%) were compliant with treatment. Non-compliance was not increased by any of the six major risk factors for non-compliance: replacement therapy, crack and heroin use, benzodiazepine use, being of no fixed abode, duration of drug use and presence of a partner. In 25/49 (51%) patients completing treatment and followed up 6 months after treatment cessation, a sustained virological response was seen.	

Study details	Population	Intervention	Analysis	Results	Comments
Zdanuk et al., 2001 [#240] **Country**: Canada **Study design:** Controlled before and after study - **Objectives:** To determine whether CD based medical informatics enhance rural physicians confidence in the management of chronic HCV **Funding source:** Health Canada; Canadian Royal Society of Rural Physicians	**Setting:** Primary care **Group(s) targeted by intervention:** Health professionals (Rural physicians) **Participant details** Total, n (%): 10 Intervention, n (%): 6 physicians had used the CD Control, n (%): 4 physicians had not used the CD Male, n (%): not stated Mean age (range): not stated (not stated) Ethnicity: not stated Other: not stated	**Inclusion criteria:** All rural physicians listed with the Manitoba College of Physicians and Surgeons **Exclusion criteria:** NR **Key components:** Questionnaire and HCV CD-ROM programme. **Method of delivery:** As above **Delivered by:** Digital media **Length:** One off mailing **Control:** Physician who selected no to use the CD-ROM	**Time to follow-up:** 3 months **Number completing:** 10 physician pre and post responses were matched (3% of physician's targeted) **Reason for non-completion**: NR **Data collection method**: Questionnaire, visual analogue scale used to indicate physician confidence **Method of analysis**: Student's t-test; Wilcoxon signed-rank test **Primary outcomes**: **Secondary outcomes**:	Among physicians for whom baseline and follow-up questionnaires were matched (n=10), confidence in identifying patients with HCV increased 150% (baseline 4.9 ±2.2 vs. follow-up 7.5 ±1.7; p<0.0005). Confidence also increased in laboratory utilisation (NS, p=0.06); counselling (p<0.01); identifying candidates for treatment (p<0.05); initiating or sharing treatment delivery (p<0.005); and providing follow-up (p<0.001). When separated into CD users and non-users, increases in physician confidence ranged from a 1.7 to 15.2 fold higher increase in users compared to non-users (data only available graphically).	

Study details	Population	Intervention	Analysis	Results	Comments
Brewer & Hagan, 2009 [#61] **Country**: USA **Study design**: Case series - **Objectives**: To report an evaluation of a patient referral contact tracing programme for HBV and HCV infection in IDUs **Funding source**: National Institutes of Health	**Setting**: Community **Group(s) targeted by intervention**: IDUs **Participant details** Total, n (%): 26 seroconverters to HBV and/or HCV Intervention, n (%): As above Control, n (%): NA Male, n (%): NR Mean age (range): NR (NR) Ethnicity: NR Other: NR	**Inclusion criteria**: IDUs participating in a prospective cohort study of incident HCV infection **Exclusion criteria**: NR **Key components:** Contact tracing. Participants were asked to list injection partners in the past year; given vouchers worth $5-15 to give to the partners. Participants were trained how to refer partners. Partners who contacted the study were offered testing and counselling for HBV and HCV **Method of delivery**: Interviews to identify partners **Delivered by:** "Trained study staff" **Length**: NA **Control**: NA	**Time to follow-up**: NA **Number completing**: NA **Reason for non-completion**: NA **Data collection method**: NA **Method of analysis**: Descriptive univariate statistics **Primary outcomes**: **Secondary outcomes**:	Index cases reported a mean 17 injecting partners (range 2-58; median 16). 23 of 26 cases agreed to refer one or more partners. Of 447 elicited partners, 160 (36%) were sought for referral. 17 (10%) referral vouchers linked to 9 cases were redeemed - 8 vouchers were matched to a partner sought for referral by the index case. Supplementary elicitation techniques, especially recall cues, increased reporting of injection partners substantially.	

Study details	Population	Intervention	Analysis	Results	Comments
Hagedorn et al., 2007 [#95] **Country**: USA **Study design:** Case series – **Objectives:** To examine whether the Liver Health Initiative improved access to services for the prevention, identification, and treatment of viral hepatitis infections **Funding source:**	**Setting:** Drugs service **Group(s) targeted by intervention:** **Participant details*** Total, n (%): 275 Intervention, n (%): 171 Control, n (%): 104 Male, n (%): 95.7% Mean age (range): 49.2 years (NR) Ethnicity: 58.0% White; 36.2% African American Other: NR * Characteristics based a random sample of 25%	**Inclusion criteria:** 'Intervention' patients were those scheduled to attend a Healthy Liver Group session between January and November 2005. **Exclusion criteria:** NR **Key components:** Healthy Liver Program. Testing for HBV and HCV added to routine blood work for patients attending the service, and all patients scheduled to attend a Healthy Liver Group session (educational session plus individualised nurse appointment to review screening results). **Method of delivery:** testing, education programme **Delivered by:** Registered nurse **Length:** 30-minute group session **Control:** NA	**Time to follow-up:** 11 months after the establishment of the programme **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Chart review **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	**Baseline** 72.1% (75/104) of the patients were tested for HCV antibody at intake. 22.7% (17/75) were positive for HCV antibody and 13.3% (10/75) positive for HCV RNA. Of 6 new HCV diagnoses, only 3 patients indicated that they had received feedback. 19.2% (20/104) and 13.5% (14/104) were tested for HBV surface antigen and HBV surface antibody, respectively, at baseline. No cases of chronic HBV were identified. **Follow-up** 66.9% (115/171) attended the group session, of whom 113 had testing results. 16.8% (19/113) tested positive for HCV antibody and 12.4% (14/113) had confirmed infection; 9 patients had no prior knowledge of their status and 5 were already receiving treatment. All 9 patients with chronic hepatitis C received a referral for evaluation in the hepatitis clinic, 77.8% (7/9) attended their intake appointment.	

Study details	Population	Intervention	Analysis	Results	Comments
Hagedorn et al., 2010 [#94] **Country**: USA **Study design:** Uncontrolled before and after study - **Objectives:** To assess the impact of a hepatitis educational group **Funding source:**	**Setting:** Drugs service **Group(s) targeted by intervention:** **Participant details** Total, n (%): 102 veterans receiving substance use services Intervention, n (%): As above Control, n (%): NA Male, n (%): NR Mean age (range): NR Ethnicity: NR Other: NR	**Inclusion criteria:** US veterans seeking care through the Veterans Health Administration and attending the Healthy Liver Group **Exclusion criteria:** NR **Key components:** Healthy Liver Group. First half of programme incorporated materials to convey basic information about liver health and hepatitis (e.g. viewing a video). Second half involved individualised review of testing results with a nurse (information including HBV and HCV status, HAV and HBV immunity, and liver function tests). Nurse would schedule referrals as required. **Method of delivery:** As above **Delivered by:** Registered nurse **Length:** 1 hour **Control:** NA	**Time to follow-up:** Post-test **Number completing:** All completed before and after questionnaires **Reason for non-completion**: NA **Data collection method**: Questionnaire survey; 14 multiple choice questions on basic facts about hepatitis infections, modes of transmission, and risk reduction strategies **Method of analysis**: Descriptive statistics; McNamer test **Primary outcomes**: Knowledge **Secondary outcomes**: Satisfaction, perceived helpfulness	**Intentions** Participants were asked whether they would get tested that day: before intervention 23.5% vs. after visiting lab 72.5%. **Knowledge** Increase in basic knowledge of hepatitis, high levels of patient satisfaction, and strong acceptance of vaccinations for hepatitis A and B. Before attending 55.8% of multiple-choice hepatitis questions correctly, 79.4% after. All of the questions showed statistically significant changes in knowledge in a McNamer test at the .05 level, with the exception of the question pertaining to hepatitis C treatment. Hepatitis causes inflammation of the liver (.000), Risk factor: IV drug use (.004), Risk factor: Snorting (.000), Risk factor: Tattoos (.001), Risk factor: Needle stick injuries (.001), Hepatitis B commonly spread by sexual contact (.000), Hepatitis A commonly spread by food or water (.000), Vaccinations are available for hepatitis A and B (.000), Person with chronic hepatitis may be asymptomatic (.000), Ways to protect one's self from hepatitis (.000), No safe alcohol consumption with liver disease (.004) 77.5% stated they were "very" or "somewhat satisfied" and 11.8% said they were "very dissatisfied" with group	

Study details	Population	Intervention	Analysis	Results	Comments
Hennessy et al., 2007 [#90] **Country**: USA **Study design**: Uncontrolled before and after study - **Objectives**: To evaluate integrated service delivery to IDUs within a public STD clinic **Funding source**:	**Setting**: Sexual health clinic **Group(s) targeted by intervention**: IDUs **Participant details** Total, n (%): ~46,000 visits to the clinic Intervention, n (%): NA Control, n (%): NA Male, n (%): NR Mean age (range): NR (NR) Ethnicity: NR Other: NR	**Inclusion criteria:** Clients attending for services at the STD clinic between May 2000 and March 2004 and self-reporting injecting drug use **Exclusion criteria**: NR **Key components:** Hepatitis service integration. New protocols and pathways agreed, educational material displayed in the clinic, staff training carried out, new data system developed **Method of delivery:** NA **Delivered by:** **Length:** **Control:**	**Time to follow-up:** NA **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Medical records review **Method of analysis**: Descriptive statistics **Primary outcomes**: Number of clinician visits, HIV test visits, overall number of clinic visits in first year of integration vs. previous year **Secondary outcomes**:	>2,800 clients were tested for HCV (8% positive). The clinic implemented guidelines for those who should be offered HCV testing based on risk of infection, as initially testing was offered to all clients. In the first year of integration there were no significant differences in number of clinician visits or HIV tests performed at the clinic compared with the previous year. There was a 13% increase in total client visits to the clinic. There were "approximately 1000" visits per month during the 46 month period: 8,778 individuals received at least one hepatitis service, 3% reported injecting drug use.	

Study details	Population	Intervention	Analysis	Results	Comments
Rainey et al., 2005 **Country**: USA **Study design**: Case series - **Objectives**: To describe the HCV testing venues of the Florida Hepatitis Programme that used the Home Access testing kits **Funding source**: Florida Department of Health; Centers for Disease Control and Prevention	**Setting**: Community **Group(s) targeted by intervention**: IDUs and other high risk populations **Participant details** Total, n (%): (1) 11,359 clients contacted the hotline; (2) 636 clients provided with kits at methadone clinics and 3,903 provided with kits in outreach settings; (3) 3,479 provided with kits through the excess programme Intervention, n (%): As above Control, n (%): 23,351 clients were tested through state laboratories Male, n (%): NR Mean age (range): NR Ethnicity: NR Other:	**Inclusion criteria:** Individuals at high risk for infection using home access testing kits between 2000 and 2003. **Exclusion criteria**: NR **Key components:** Home access testing kits (Enzyme immunoassay [EIA]). Kits were available via (1) a hotline, (2) methadone and outreach services, or were redistributed through (3) health and community services. A media campaign ran alongside these programmes. **Method of delivery:** As above **Delivered by:** Home testing via hotline; in methadone and outreach services staff tested clients **Length:** NA **Control:** Testing via state laboratories	**Time to follow-up:** 3 year study period **Number completing:** NA **Reason for non-completion**: NA **Data collection method**: Data records **Method of analysis**: Descriptive statistics **Primary outcomes**: NR **Secondary outcomes**: NR	39% of all clients (n=7,545 cases) who accessed one of the four programmes received their test results and 67% of all clients who received a home testing access kit in one of the four programs. Hotline program: 11,359 clients contacted the hotline; 3,197 were sent a testing kit; 1,886 (59%) registered their kit; 1,822 (57%) returned the kit for testing and 1,790 (56%) samples returned could be tested. In total, 1,662 of all clients requesting a kit (52%) called the hotline to receive their results, representing 15% of clients who contacted the hotline originally. Testing peaked during media advert campaigns, particularly amongst at-risk populations. Methadone program: 636 clients were provided with testing kits at clinics and 635 (100%) of test results were returned to the clinic* Outreach program: 3,903 clients were provided with kits in outreach settings, of which 3808 (98%) registered their kit and were tested, with 3715 (95%) providing an adequate sample. In total 3404 (87%) of clients had their results reported to the facility* Excess program: 3,479 kits were provided to clients in community and health settings, of which 1,844 (83%) provided an adequate sample to be tested.	
*Cannot say how many clients actually received results					

Study details	Population	Intervention	Analysis	Results	Comments
Rosenberg et al., 2010 **Country**: USA **Study design:** Randomised controlled trial (individual) + **Objectives:** To test an intervention designed to facilitate integrated infectious disease programming in mental health settings **Funding source:** National Institute of Mental Health	**Setting:** Mental health programme **Group(s) targeted by intervention:** Patients with co-occurring mental health and substance use disorders **Participant details** Total, n (%): 236 patients Intervention, n (%): 118 patients Control, n (%): 118 patients Male, n (%): intervention, 70 (59%); control, 76 (64%) Mean age (range): intervention, 47 (SD 9); control 46 (SD 9) Ethnicity: 25% White; 73% African American; 2% other Other, n (%): Schizophrenia: intervention 56 (47); control 54 (46) Drug use scale score: intervention 1.7 (SD 1.1); control 1.6 (SD 1.1)	**Inclusion criteria:** Aged 18-65 years; diagnosed with schizophrenia spectrum disorder, major depressive disorder, or bipolar disorder; current or lifetime diagnosis of a substance use disorder; spoke English; able to give informed consent. **Exclusion criteria:** NR **Key components:** On-site BBV services. First intervention session included infectious disease education, screening for disease risk, pre-test counselling, HIV/HBV/HCV testing, HAV/HBV vaccination, personalised risk-reduction education counselling, and distribution of safety reminders (e.g. condoms). Second intervention session scheduled for 1-month later to provide test results, post-test and risk-reduction counselling, and medical referral as needed. Third and final session scheduled 6-months later, risk level re-assessed and risk reduction reinforced. **Method of delivery:** As above **Delivered by:** Clinical staff **Length:** 6 months **Control:** Enhanced treatment as usual, included information about BBVs and referral (e.g. local community health sources for testing). Directed to off-site services.	**Time to follow-up:** 6-months; 12-months for participants testing positive **Number completing:** 217 (92%) **Reason for non-completion**: NR **Data collection method**: Self report measures, standardised observation, laboratory reports, medical and psychiatric records, and time logs **Method of analysis**: Chi square, logistic regression analyses, ANOVA **Primary outcomes**: Rates of testing, rates of vaccination, referral to medical care **Secondary outcomes**: NR	STIRR participants reported greater knowledge about hepatitis and risk factors on 12 item test. Change in mean % correct: STIRR 14.02 (SD 20.04) vs. control 1.38 (SD 22.51); p<0.001 At 6 months, STIRR participants had higher rates of acceptance for HBV and HCV testing. HCV: STIRR 86% vs. control 15%; p<0.001 HBV: STIRR 86% vs. control 19%; p<0.001 At 6-months, there was no difference having a medical visit among STIRR and control patients self-reporting HCV positive status (STIRR 81% vs. control 75%). At 1-year- follow up data was available for 54% (14/26) of STIRR participants who tested HCV positive. 71% (10/14) had a follow-up medical appointment and 29% (4/14) were newly identified as HCV positive.	

Appendix 4. Quality assessment tables: effectiveness review

Key to questions

1.1 Is the source population or source area well described?
1.2 Is the eligible population or area representative of the source population or area?
1.3 Do the selected participants or areas represent the eligible population or area?
2.1 Allocation to intervention (or comparison). How was selection bias minimised?
2.2 Were interventions (and comparisons) well described and appropriate?
2.3 Was the allocation concealed?
2.4 Were participants and/or investigators blind to exposure and comparison?
2.5 Was the exposure to the intervention and comparison adequate?
2.6 Was contamination acceptably low?
2.7 Were other interventions similar in both groups?
2.8 Were all participants accounted for at study conclusion?
2.9 Did the setting reflect usual UK practice?
2.10 Did the intervention or control comparison reflect usual UK practice?
3.1 Were outcome measures reliable?
3.2 Were all outcome measurements complete?
3.3 Were all important outcomes assessed?
3.4 Were outcomes relevant?
3.5 Were there similar follow-up times in exposure and comparison groups?
3.6 Was follow-up time meaningful?
4.1 Were exposure and comparison groups similar at baseline? If not, were these adjusted?
4.2 Was Intention to treat (ITT) analysis conducted?
4.3 Was the study sufficiently powered to detect an intervention effect (if one exists)?
4.4 Were the estimates of effect size given or calculable?
4.5 Were the analytical methods appropriate?
4.6 Was the precision of intervention effects given or calculable? Were they meaningful?
5.1 Are the study results internally valid (i.e. unbiased)?
5.2 Are the findings generalisable to the source population (i.e. externally valid)?

Hepatitis B

Author (Year)	Study design	Population			Method of allocation										Outcomes						Analyses						Int	Ext
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2
Chang et al., 2007	UBA	+	+	+	NA	++	NA	NA	+	NA	NA	NR	+	+	NR	+	+	++	NA	-	NA	NR	NR	NR	+	+	-	-
Chao et al., 2009	Case series	++	++	++	NA	+	NA	NA	+	NA	NA	++	+	+	-	+	+	++	NA	++	NA	NR	NR	NR	+	+	-	+
Gunn et al., 2006	Case series	++	+	+	NA	+	NA	NA	NR	NA	NA	+	+	+	++	+	+	+	NA	++	NA	NA	NA	NA	+	NA	-	-
Hsu et al., 2007	UBA	+	+	-	NA	++	NA	NA	+	NA	NA	++	+	+	NR	+	+	++	NA	-	NA	NA	NA	+	+	++	-	-
Hsu et al., 2010	UBA	++	+	+	NA	-	NA	NA	+	NA	NA	++	+	-	NR	+	+	+	NA	-	NA	NA	NR	NR	+	NR	-	-
Nguyen et al., 2000	RCT (individual)	+	+	-	+	++	NR	NR	++	NR	NR	++	+	+	++	NR	+	+	++	++	++	NR	NR	++	++	++	+	+
Taylor et al., 2009a	RCT (cluster)	++	++	++	++	+	NR	NR	+	NR	NR	++	+	+	+	++	++	++	++	+	++	-	NR	++	++	++	+	++
Taylor et al. 2009b	RCT (individual)	++	++	++	+	++	NR	NR	+	NR	NR	+	-	+	++	+	+	++	++	+	++	+	NR	+	++	+	++	+
Taylor et al., 2011	RCT (cluster)	++	+	+	++	+	NR	NR	+	NR	NR	+	+	+	++	+	+	++	++	+	++	NR	NR	++	++	++	+	+
UBA = uncontrolled before and after study; RCT = randomised controlled trial																												

Hepatitis C

Author (Year)	Study design	Population			Method of allocation										Outcomes						Analyses						Int	Ext
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2
Aitken et al., 2002	Case series	++	+	+	NA	+	NA	NA	NA	NA	NA	NA	++	++	+	+	+	+	NA	NA	NA	NA	NA	-	+	-	-	+
Anderson et al., 2009	NRCT	+	+	+	NA	+	NA	NA	++	NR	+	NA	++	++	++	++	++	++	+	+	+	NA	NR	NR	+	NR	+	+
Craine et al. (2009)	Case series	+	+	-	NA	++	NA	NA	NA	NA	NR	NA	++	++	++	+	+	++	+	+	NR	NA	NA	NR	+	NR	-	-
Cullen et al., 2011	NRCT	+	+	++	+	+	NR	NR	+	NR	NR	+	++	++	++	+	++	++	++	+	++	NR	NR	NR	++	NR	+	++
Cullen et al., 2006	RCT (Cluster)	+	++	++	++	++	NA	NA	+	NR	NR	++	++	++	++	++	++	++	++	+	++	++	+	++	++	++	++	++
Defossez et al., 2008	Repeated CS survey	-	-	-	NA	+	NA	NA	NA	NA	NA	NA	+	+	+	++	+	+	++	+	NA	NA	NA	NR	++	NR	+	+
Douchette et al., 2009	CBA	+	+	+	NA	-	NA	NA	NA	NA	NA	NA	+	-	++	++	+	+	+	+	++	NA	NA	NR	++	NR	-	+
D'Souza et al., 2004	UBA	NR	NR	NR	NA	-	NA	NA	NR	NA	NA	+	++	++	NR	+	+	+	NA	-	NA	NA	NA	NR	NA	NR	-	-
Fischer et al. (2000)	UBA	+	+	+	NA	++	NA	NA	+	NA	NA	+	+	+	NR	+	+	+	NA	-	NA	NA	NR	-	-	NR	-	+
Foucher et al. (2009)	Case series	+	++	NR	NA	++	NA	NA	+	NA	NA	+	+	+	++	+	+	+	NA	++	NA	NA	NR	+	+	+	-	+
Garrard et al., 2006	UBA	+	+	+	NA	++	NA	NA	NR	NA	NA	+	-	+	NR	+	+	++	NA	+	NA	NA	NA	NR	+	+	-	-
Grebely et al., 2007	Case series	+	++	++	NA	++	NA	NA	NA	NA	NA	NA	+	+	++	++	++	++	NA	+	NA	NA	NR	NR	+	NR	-	-
Grebely et al., 2010	Case series	++	+	+	NA	++	NA	NA	+	NA	NA	+	+	+	+	+	+	+	NA	+	NA	NA	NR	NR	+	+	-	-
Harris et al., 2010	Case series	+	++	+	NA	+	NA	NA	NA	NA	NA	NA	+	-	+	+	+	+	NA	NA	NA	NA	NA	NR	+	NR	-	+
Helsper et al., 2010	NRCT	++	++	+	NR	++	NA	NA	+	NR	++	NA	+	+	++	++	+	++	+	+	++	NA	NR	+	+	+	+	+
Hickman et al., 2008	RCT (cluster)	+	+	NR	++	++	NA	NA	+	NR	NR	++	++	++	++	+	+	++	++	+	++	NA	-	+	++	++	+	+
Hsu et al., 2007	UBA	+	+	-	NA	++	NA	NA	+	NA	NA	++	+	+	NR	+	+	++	NA	-	NA	NA	NA	+	+	++	-	-
Hsu et al., 2010	UBA	++	+	+	NA	-	NA	NA	+	NA	NA	++	+	-	NR	+	+	+	NA	-	NA	NA	NR	+	+	++	-	-
Jack et al. (2008)	Case series	+	++	+	NA	++	NA	NA	+	NA	NA	+	++	+	++	+	+	+	NA	++	NA	NA	NA	NA	NA	NA	-	-

Author (Year)	Study design	Population			Method of allocation										Outcomes						Analyses						Int	Ext
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2
Lindenburg (2011)	Case series	+	+	+	NA	+	NA	NA	+	NA	NR	++	+	+	++	+	+	+	NA	+	NA	NA	NA	+	++	+	-	+
Moussalli et al., 2010	CBA	+	++	++	NA	++	NA	NA	+	NA	NR	+	+	+	++	+	+	++	+	+	NR	NA	NR	NR	+	+	-	+
Roudot-Thorval (2000)	RCT (individual)	+	+	+	+	++	NA	NR	+	NR	++	++	+	-	+	++	+	++	++	+	+	NR	NR	NR	++	+	+	+
Sahajian et al., 2004	UBA	++	++	+	NA	+	NA	NA	NA	NA	NA	NA	+	+	++	++	+	+	+	+	++	NR	NR	NR	++	++	-	+
Sahajian et al., 2011	RCT (cluster)	+	++	-	+	-	NR	NR	NR	++	NR	NA	+	+	++	+	+	++	++	++	NR	+	-	+	-	+	+	-
Skipper et al., 2003	Case series	++	++	++	NA	+	NA	NA	+	NA	NA	+	++	-	+	+	+	++	NA	++	NA	NA	NR	NA	+	NA	-	+
Stopka et al., 2007	CBA	++	++	+	NA	++	NA	NA	NA	NA	-	NA	+	+	++	++	++	+	NA	-	NR	NA	NR	NR	NR	NR	-	+
Surjadi et al., 2011	UBA	+	+	+	NA	+	NR	NA	NA	NA	NA	+	+	+	+	++	+	++	NA	-	NR	NR	NA	NR	+	+	-	+
Wilkinson et al. (2008)	Case series	++	+	+	NA	+	NA	NA	NA	NA	NA	+	++	++	++	+	+	+	NA	++	NA	NA	NA	NR	NA	NA	-	+
Zdanuk et al., 2001	CBA	+	+	-	NA	-	NA	NA	NA	NA	NA	-	-	-	+	+	+	+	NA	-	NA	NA	NR	NR	+	-	-	-
UBA = uncontrolled before and after study; RCT = randomised controlled trial; CBA = controlled before and after study																												

Hepatitis B and C

Author (Year)	Study design	Population			Method of allocation										Outcomes						Analyses						Int	Ext
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2
Brewer & Hagan, 2009	Case series	+	++	-	NA	++	NA	NA	NA	NA	NA	NA	+	+	++	+	++	++	NA	NA	NA	NA	NA	NA	+	NA	-	-
Hagedorn et al., 2007	UBA CBA	++	+	+	NA	++	NA	NA	+	NR	NR	+	-	+	++	++	+	+	NA	+	NR	NR	NR	NR	NR	NR	+	+
Hagedorn et al., 2010	UBA	++	+	+	NA	++	NA	NA	NR	NR	NA	++	-	+	-	++	+	++	NA	-	NA	NA	+	NR	+	++	-	+
Hennessy et al., 2007	UBA	+	++	+	NA	++	NA	NA	NR	NA	NA	-	+	+	++	+	+	+	NA	++	NA	NA	NA	NA	+	NA	-	+
Rainey et al., 2005	Case series	+	++	+	NA	+	NA	NA	NA	NA	NA	NA	+	+	+	NR	-	+	NA	NA	NA	NA	NA	NA	-	NA	-	+
Rosenberg et al., 2010	RCT (individual)	++	++	++	+	++	NR	NR	+	NR	NR	+	+	+	+	++	++	++	++	+	++	NR	NR	++	++	++	++	+

Appendix 5. Evidence tables for cost-effectiveness review

Hepatitis B

Study details	Research question	Methods of estimation for costs and benefits	Results	Confounders, potential sources of bias and other comments
Veldhuijzen et al., 2010 Country/currency: The Netherlands/€ CUA +	Research question: To assess the cost-effectiveness of systematically screening migrants Population: Migrants from countries with high or intermediate hepatitis B infection levels (approximately 1.3 million people) Intervention: One-off systematic screening effort and subsequent treatment. Postal invitation to screening at local laboratory. Perspective: Healthcare	Effectiveness data drawn from a study that examined the implementation of guidelines to improve the referral of patients with chronic hepatitis B infection from primary to secondary care (58%, range 39% to 79%). Estimates for participation in screening taken from population-based screening study; 21% response rate taken as lower boundary estimate and upper boundary of 48% drawn from rates for participation in cervical cancer screening among migrant women. 35% taken as the base case estimate. Without the intervention, detection rate of 12.6% assumed. Included the following cost estimates: costs of the campaign; test and follow-up costs, including diagnostic test, source and contact tracing, follow-up and referral; and medical management costs including monitoring, compensated and decompensated cirrhosis, hepatocellular carcinoma, liver transplantation and treatment with entecavir. Costs ranged from €500,000 for running the campaign to €2.55 for an ALT test. Costs for medical management of chronic HBV and compensated cirrhosis were not included for patients following the natural history of hepatitis B infection.	Base case: Incremental costs of the screening program were €21.8 million and the incremental health costs related to disease progression and treatment were €37.5 million. Comparing the two scenarios of the 'status quo' and implementing the screening intervention, the incremental difference in health gains was 6,614 QALYs, resulting in an incremental cost-effectiveness ratio (ICER) of €8,966 per QALY gained. Discounting costs at 4% and effects at 1.5%, (according to Dutch guidelines) resulted in an ICER of €8,823 per QALY gained.	Information limited on how costs were valued. Lack of reliable effectiveness estimates available to support assumptions about rates of participation in the screening programme and for the proportion of patients who are successfully referred to specialist care.

Hepatitis C

Study details	Research question	Methods of estimation for costs and benefits	Results	Confounders, potential sources of bias and other comments
Stein et al., 2002 (Stein et al., 2003; Stein et al., 2004) Country/currency: UK/£ CUA ++	Research question: To estimate the cost-utility of screening for hepatitis C infection in two hypothetical cohorts Population: IDUs in contact with drug services and people attending genitourinary medicine (GUM) clinics Intervention: Single round of screening in the two cohorts. Asymptomatic individuals were offered antibody testing and if accepted, a PCR test to confirm the presence of hepatitis C RNA. Perspective: Healthcare	GUM clinic model: Four screening scenarios considered: universal screening; screening of IDUs only; selective screening of 10% of clients based on eligibility criteria; and selective screening of 20% of clients based on eligibility criteria. Underlying prevalence of hepatitis C in the universal cohort was assumed to be 1.5%; and 9.9% and 6.2% among the non-IDU population for the selective 10% and 20% eligibility criteria scenarios, respectively. Drug services model: only people who were not currently injecting drugs considered eligible for screening and treatment. 49% of clients meeting the eligibility criteria assumed to accept testing. The underlying prevalence of hepatitis C among non-current IDUs was assumed to be 48.6%. Costs were estimated from a range of sources and were considered from the perspective of the NHS. The base year for all costs was 2001. The following costs were included in the model for screening and diagnosis: assessing eligibility; pre-test counselling; antibody test; PCR test; post-test discussion; and liver biopsy. The cost of screening was an estimated £3.9 million for a universal approach in GUM clinics and estimated £3.6 million in drug services. Costs included in the treatment model were: attendance at general practice; outpatient visit to general medicine; inpatient day in general medical ward; treatment with pegylated interferon and ribavirin; HCC; cirrhosis; chronic hepatitis C infection; ascites; hepatic encephalopathy; variceal bleeds; and liver transplant and follow up care.	Drugs services: Screening non-current IDUs was associated with additional costs of £8.5 million and a cost per QALY of £28,120. Universal screening in GUM clinics: Associated with lower additional costs of £4.8 million but higher cost per QALY of £84,570. For the three selective screening scenarios in GUM clinics, only the criteria of screening IDUs only was associated with a cost per QALY <£30,000.	Lack of reliable effectiveness estimates available to support assumptions.

Study details	Research question	Methods of estimation for costs and benefits	Results	Confounders, potential sources of bias and other comments
Castelnuovo, et al. 2006; Thompson-Coon et al., 2006 Country/currency: UK/£ CUA ++	Research question: To undertake a cost-utility analysis of case finding for hepatitis C in three settings Population: Former IDUs Intervention: Systematic case finding in three settings, prisons, general practice and drug services Prison: In both scenarios, all new prisoners attend a lecture during the induction programme and are provided with information on BBVs, including hepatitis C, by a prison officer on a group basis. Second scenario had a specific focus on injecting drug use as a risk factor for hepatitis C. General practice: (i) 'population' approach, an offer of testing to all patients aged 30-54 years attending a general practice for a non-urgent appointment; and (ii) 'targeted' approach, based on the identification from patient records and offer of testing to those known to be at highest risk of hepatitis C (i.e. patients with a history of current or former injecting drug use). Drug services: Simple scenario for case-finding in drug services, whereby all clients who are assessed by a BBV nurse for hepatitis B vaccination are offered the opportunity for a discussion and testing for hepatitis C. Perspective: Healthcare	Prison: Based on findings from two published reports of hepatitis C testing in UK prisons. General practice: 'Population' approach based on effectiveness estimates from a then unpublished study of a case-finding initiative conducted in an area of Scotland with high hepatitis C and IDU prevalence. 'Targeted' approach based on best available UK estimates from the literature. The acceptance rate for testing assumed based on findings from study conducted in a drugs service and the prevalence of HCV antibodies in the population was taken from UK estimates of hepatitis C prevalence among IDUs. Drug services: Studies conducted in drug service in Newcastle and Plymouth provided basis. Among individuals in the case-finding arm who had previously refused the offer of testing, the authors assumed that for the first 2 years, the probability of re-presentation was 7.7% (twice that of spontaneous presentation). Range of costs associated with different case-finding settings were included. Additional costs associated with testing and diagnosis included: PCR test; genotyping; offering biopsy to individuals who are genotype 1 or 4; communicating negative PCR result; communicating PCR result to those who are ineligible for treatment; counselling and harm reduction advice; liver biopsy; communicating non-eligibility after treatment, counselling on harm reduction after liver biopsy (£79); and referral for treatment. All assumptions of resource consumption were costed using recent UK estimates.	Longer term consequences of hepatitis C modelled for a cohort of 10,000 individuals over a period of 30 years. Across the different settings the cost-analysis suggested a cost per QALY were: Prison 1: £20,038 per QALY Prison 2: £16,484 per QALY GP targeted: £16,493 GP population: £15,493 Drugs service: £17,515 One-way sensitivity analyses highlighted the importance of quality of life data in the model. Rates of spontaneous and re-presentation were also found to be important in the model; the authors noted that this was due in part to the relatively high rate of spontaneous presentation assumed. Probabilistic sensitivity analyses for case finding in specific settings: 60 to 80% chance that the case-finding approaches examined were cost-effective at £30,000 per QALY	Lack of reliable effectiveness estimates available to support assumptions. Relatively high rate of spontaneous presentation assumed.

Study details	Research question	Methods of estimation for costs and benefits	Results	Confounders, potential sources of bias and other comments
Sutton, 2006; Sutton et al., 2006 Country/currency: UK/£ CEA +	Research question: To examine the cost-effectiveness of hepatitis C case-finding scenarios implemented on reception into prison Population: New prisoners Intervention: Four scenarios compared to a 'do nothing' scenario, and involved a general 1-hour health awareness lecture on risk for BBVs delivered during the induction programme followed by either: (S1) a verbal screen for ever having received a past positive HCV test, and for ever having injected illicit drugs; (S2) a verbal screen for a past positive hepatitis C test only; (S3) a verbal screen for ever having injected illicit drugs only; and (S4) no verbal screen. Perspective: Healthcare	Effectiveness data for the awareness lecture were drawn from a published study of the Isle of Wight prison cluster. Force of infection rates were assumed to be constant over time and independent of prison status. Other data included in the model were drawn from published best estimates (including previous cost-effectiveness studies) or based on assumptions made by the authors. Costs included in the model were: delivering the BBV lecture to prisoners; delivering verbal tests on reception to prison; pre-test counselling; antibody test; PCR test; post-test counselling for negative and positive tests; counselling for positive PCR test. All costs were presented for the year 2004 with a discount rate for both costs and benefits of 3.5%.	Cumulative discounted number of cases of hepatitis identified in 2017: 0 for 'do nothing'; 13,413 for a verbal screen for ever having received a past positive HCV test, and for ever having injected illicit drugs; 16,927 a verbal screen for a past positive HCV test only; 13,548 for a verbal screen for ever injecting illicit drugs only; and 17,098 for no verbal screening. Corresponding cumulative discounted costs for each scenario were £0; £28,192,000; £54,670,000; £30,444,000; and £53,123,000, respectively. Based on the cumulative cost per case detected, scenario 1 (verbally screening for a past positive hepatitis C test, and for ever having injected illicit drugs) was the most cost-effective option. In one-way sensitivity analyses, parameter variation had little impact on the relative cost-effectiveness of scenario 1. Parameter with the largest impact on cost-effectiveness was the proportion of prisoners accepting an antibody test.	Lack of reliable effectiveness estimates available to support assumptions. Sensitive to parameter values for the proportion of prisoners accepting an antibody test.

Study details	Research question	Methods of estimation for costs and benefits	Results	Confounders, potential sources of bias and other comments
Sutton et al., 2008 Country/currency: UK/£ CUA ++	Research question: To examine the cost-effectiveness of a single round of screening for all prisoners on reception into prison to establish eligibility for treatment. Population: Current IDUs, defined as individuals who had injected in the previous 4 weeks, and former IDUs. Intervention: All prisoners received a 1-hour lecture warning of the risks of BBVs on reception into prison and questioned regarding their current injecting status. Perspective: Healthcare	Assumed that testing and diagnosis took place during a 3-month period. Following case finding intervention, 10.25% of those offered testing in prison accepted based on the midpoint of findings from two studies that examined uptake of hepatitis C testing in prisons. For the non-case finding arm, the spontaneous presentation of infected individuals for testing was assumed to be 3.75% per year. The estimate for uptake of testing in the community was 49% based on a study conducted in drug services. For the case-finding arm, individuals exposed to the case-finding intervention in prison but lost to follow-up were assumed to re-present for testing at a rate of 7.5% per year. All costs were presented for 2004 with a discount rate for costs and benefits of 3.5%. Costs considered in the model were: lecture; verbal confirmation of IDU status; antibody test; pre-test counselling; PCR test; communicating positive and negative results; genotyping; offering treatment; treatment; and monitoring during treatment. Treatment for hepatitis C was based on NICE guidance; briefly, any patient testing hepatitis C RNA positive following PCR was considered for treatment with pegylated interferon and ribavirin combination therapy, for 24 weeks for genotypes 2 and 3 and for 48 weeks for all other genotypes. The authors note that it was difficult to estimate the costs associated with monitoring in a prison setting and so monitoring costs were taken from a study conducted in community setting. The net discounted cost of case-finding for testing and treatment in prison was estimated at £8.5 million.	Compared with the non-case finding arm representing spontaneous testing in the community, incremental costs of case finding on reception to prison were £275 per patient with associated benefits of 0.005 QALYs per patient. The resulting ICER was £54,852 per QALY. ICERs were calculated for each successive age category (15-24 year olds; 35+ year olds; and 25-34 year olds) examining the additional costs that each approach imposed over the other compared with the additional benefits that it delivered. Screening prisoners aged 15-24 years was the most cost-effective and least costly scenario of the three presented (£40,227 per QALY). Probabilistic sensitivity analysis showed that prison-based case finding for testing and treatment was only likely to be cost-effective if decision makers were willing to spend more than £58,000 per QALY. Model was found to be sensitive to various parameters in one-way sensitivity analyses.	Lack of reliable effectiveness estimates available to support assumptions.

Appendix 6. Quality assessment tables: cost-effectiveness review

Study identification include author, title, reference, year of publication		**Castelnuovo et al., 2006; Thompson Coon et al., 2006**	**Stein et al., 2002; Stein et al., 2003**	**Sutton et al., 2006; Sutton, 2006**	**Sutton et al., 2008**	**Veldhuijzen et al., 2010**
Evaluation criterion						
1.	Was a well-defined question posed in answerable form?	Yes	Yes	Yes	Yes	Yes
2.	Was a comprehensive description of the competing alternatives given (that is, can you tell who? did what? to whom? where? and how often?)?	Yes	Yes	Yes	Yes	Yes
3.	Was the effectiveness of the programmes or services established?	Partially	Partially	Partially	Partially	Partially
4.	Were all the important and relevant costs and consequences for each alternative identified?	Yes	Yes	Yes	Yes	Yes
5.	Were costs and consequences measured accurately in appropriate physical units (for example, hours of nursing time, number of physician visits, lost work-days, gained life-years)?	Yes	Yes	Yes	Not clear	Not clear
6.	Were costs and consequences valued credibly?	Yes	Yes	Yes	Yes	Partially
7.	Were costs and consequences adjusted for differential timing?	Yes	Yes	Yes	Yes	Yes
8.	Was an incremental analysis of costs and consequences of alternatives performed?	Yes	Yes	Yes	Yes	Yes
9.	Was allowance made for uncertainty in the estimates of costs and consequences?	Yes	Partially	Partially	Yes	Yes
10.	Did the presentation and discussion of study results include all issues of concern to users?	Yes	Yes	Partially	Yes	Yes
	OVERALL ASSESSMENT OF THE STUDY	++	++	+	++	+

Addendum

This addendum was prepared to incorporate additional evidence presented at the Programme Development Group (PDG) meeting on 27th October 2011.

Additional references

Additional searches were conducted of conference abstracts from the annual meetings of two organisations, the British Society of Gastroenterology (BSG) and the British Association for the Study of the Liver (BASL), for the following years:

- BSG 2008, 2009, 2010 and 2011
- BASL 2010 and 2011

Three abstracts were identified that provided useful additional information on interventions aimed at raising awareness and engaging with groups at an increased risk of hepatitis B and C infection, particularly with regard to migrant communities:

- Lewis, H., Burke, K., Begum, S., Ushiro-Limb, I. & Foster, G. (2011) What is the best method of case finding for chronic viral hepatitis in migrant communities? British Association for the Study of the Liver Annual Meeting. London.
- Jafferbhoy, H., Miller, M., Mcintyre, P., Mcleod, S. & Dillon, J. F. (2010) Outreach community testing for hepatitis C in an ethnic population. British Society of Gastroenterology Annual General Meeting.
- McPherson, S., Valappil, M., Moses, S., Eltringham, G., Miller, C., Baxter, K., Brown, B., Clapper, P., Chan, A., Hudson, M. & Bassendine, M. (2011) CHASE-B (Chinese Hepatitis Awareness, Surveillance and Education): a pilot of targeted case finding for hepatitis B virus (HBV) in the British-Chinese community. British Association for the Study of the Liver Annual Meeting. London.

In addition, a member of the PDG provided a report of a project to raise awareness of hepatitis C (HCV) among the health professionals and the South Asian community in Bedford.

- Greyson, O. (2011) Hepatitis C: increasing awareness and improving access to testing for the South Asian community in Bedford. Unpublished.

Testing uptake and treatment outcomes across settings

The following tables were prepared to summarise rates of testing uptake and treatment outcomes across the included studies. Except where noted, testing uptake is based on the percentage of all patients who were eligible for testing within a particular setting (i.e. not only those receiving an offer of testing).

Table 17. Testing uptake and treatment outcomes across settings: Drug services

Study	Country	Population	Intervention	Testing uptake %		Test results			Referred	Treatment outcomes
				Baseline	Follow-up	HCV AB	HCV PCR	HBsAg		
Craine et al., 2009	UK	IDUs	DBS testing	-	34%	-	-	-	-	NR
Hickman et al., 2008	UK	IDUs	DBS testing	8%	21%	32%	-	-	-	NR
			Venepuncture only	8%	5%		-	-	-	NR
Hagedorn et al., 2007; 2010	USA	Veterans	Healthy Liver Program	-	98%[a]	17%	12%	1%	100%	Attended appointment 78%
			Before programme	14-72%	-	23%	13%	0%	50%	NR
Harris et al., 2010	USA	Drug users	HCV clinical protocol	-	99%[a]	65%	34%	-	-	Initiated treatment 25% (n=21) Achieved SVR 38% (n=8)
Jack et al., 2008	UK	IDUs	Shared care clinics	-	75%	65%	75%	2%	-	Eligible for treatment 36% (n=43) Initiated treatment 70% (n=30) Achieved SVR 43% (n=13)
Lindenburg et al., 2011	The Netherlands	IDUs	Multidisciplinary team	-	91%[b]	64%	73%	-	-	Eligible for treatment 62% (n=76) Initiated treatment 76% (n=58) Achieved SVR 65% (n=37)
Moussalli et al., 2010	France	Drug users	Off-site treatment	-	-	70%	58%	-	-	Initiated treatment 38% (n=85)
			On-site treatment							Initiated treatment 2% (n=2)
Wilkinson et al., 2008	UK	IDUs	Outreach clinic	-	-	-	-	-	19%[c]	Initiated treatment 14% (n=63) Completed treatment 13% (n=58) Achieved SVR 51% (n=25/49)

[a] Added to routine blood work
[b] % of patients offered a test
[c] % of population attending the drugs service who presented for consideration of treatment (n=441)
DBS = dry blood spot; SVR = sustained virological response

Table 18. Testing uptake and treatment outcomes across settings: General practice

Study	Country	Population	Intervention	Testing uptake %		Test results			Referred	Treatment outcomes
				Baseline	Follow-up	HCV AB	HCV PCR	HBsAg		
Anderson et al., 2009	UK	Former IDUs	Case finding	-	20%	13%	8%	-	73%	Attended appointment 100% Initiated treatment 18% Achieved SVR 7%
			No intervention	-	0%	-	-	-	-	NA
Cullen et al., 2011	UK	Former IDUs	Targeted case finding	-	22%	70%	58%	-	34%	Attended appointment 28% Offered treatment 8%
			No intervention	-	0.3%[a]	22%	14%	-	-	NR
Cullen et al., 2006	Ireland	IDUs	Complex intervention	34%	49%[b]	-	-	-	60%	Attended hepatology clinic 51% Initiated treatment 7%
			Care as usual	26%	27%[c]	-	-	-	32%	Attended hepatology clinic 22% Initiated treatment 3%
Helsper et al., 2010	The Netherlands	At-risk groups	Support programme	n=57[d]	n=172[d]	2%	-	-	-	NR
			Public campaign only	n=86[d]	n=118[d]	1%	-	-	-	NR
Roudot-Thorval et al., 2000	France	High risk groups	Assistance	-	n=294[d]	5%	-	-	-	NR
			No assistance	-	n=323[d]					
Lewis et al., 2011	UK	Migrants	Opportunistic case finding	-	2%	0%	-	0%	-	NR
			Proactive case finding	-	37%[e]	2%	-	1%	-	NR

[a] % of practice population tested, intervention group equivalent = 0.8%
[b] % of random sample of patients tested (n=104)
[c] % of random sample of patients tested (n=92)
[d] Number of tests requested during study period
[e] % of those who could be contacted and were eligible for screening (n=600/1,134)
SVR = sustained virological response

Table 19. Testing uptake and treatment outcomes across settings: Other settings

Study	Country	Setting	Population	Intervention	Testing uptake %		Test results			Referred	Treatment outcomes
					Baseline	Follow-up	HCV AB	HCV PCR	HBsAg		
Chao et al., 2009	USA	Community	Migrants (Asian Americans)	1-day screening clinic + educational seminar	-	n=476[a]	-	-	13%	-	Visited doctor for follow-up 67%
Hennessy et al., 2007	USA	Sexual health clinic	IDUs	Hepatitis service integration	-	13%[b]	8%	-	-	-	NR
Rosenberg et al., 2010	USA	Mental health programme	Co-occurring mental health and substance use disorders	On-site BBV services	15-19%	86%[c]	29%[d]	-	-	81%	None received further testing or treatment
				Off-site services	23%	15%[c]	-	-	-	75%	NR
Sahajian et al., 2011	France	Community	'Under-privileged'	Outreach off-site	-	43%[e]	3%	-	5%	-	Lost to follow-up 25% (n=4) Followed up by doctor 56% (n=9) Initiated treatment 19% (n=3)
				Outreach on-site	-	60%[f]	3%	-	2%	-	
				No intervention	-	2%	0%	-	0%	-	NR
Skipper et al., 2003	UK	Prison health clinic	Prisoners	Health awareness lecture	-	9%[g]	42%	30%	-	-	Eligible for treatment 15% (n=6) Initiated treatment 7% (n=3)
Jafferbhoy et al., 2010	UK	Community (mosques)	Migrants (Pakistani community)	HCV awareness meetings and screening sessions	-	~10%[h]	4%	3%	-	-	NR
Lewis et al., 2011	UK	Community (mosques)	Migrants (Pakistani community)	Distribution of testing cards	-	0%	-	-	-	-	NR
McPherson et al., 2011	UK	Community	Migrants (Chinese community)	Screening sessions	-	n=575[a]	-	-	9%	-	Attended speciality clinic 47% (n=25) Initiated treatment 12% (n=3)
Greyson, 2011	UK	Community (GP surgeries, neighbourhood centre)	South Asian community	Awareness raising, dedicated testing service	-	n=74[a]	4%	4%	-	100%	Initiated treatment (n=1)

[a] Number of tests requested during study period
[b] Increase in patient visits to clinic
[c] % of random sample of patients tested (n=118)
[d] Newly identified as hepatitis C positive
[e] % of those who accepted testing and signed consent form (n=222/1041)
[f] % of those who accepted testing and signed consent form (n=243/784)
[g] % of new prisoners requesting a test (n=1,618)
[h] Representative of Dundee Pakistani population (n=170 tested)

Matrix of evidence from reviews of qualitative and quantitative research

The following tables were prepared to identify where evidence identified in the review of effective and cost-effectiveness addressed recommendation for interventions as identified from the review of qualitative research.

Table 20. Evidence from effectiveness and cost-effectiveness review addressing implications for interventions identified from review of qualitative research: hepatitis B

Implications	Intervention	Linked evidence statements	References
Consider how biomedical information can be tailored to incorporate meaning relevant to the socio-cultural context of high risk groups, but without contributing to stigma or increasing fear and confusion.	English as a second language curriculum addressing hepatitis B. Educational and motivational home visit delivered by trained lay health worker. Free HBV screening and doctor-led educational seminars in Mandarin and English on detection, management and prevention. One-off session of culturally tailored lectures on prevention delivered by community health promoters.	Moderate evidence that providing information and education on hepatitis B to migrant populations may improve their knowledge about risk, screening and prevention. Moderate evidence that providing information and education on hepatitis B to migrant populations does not improve testing uptake. Weak evidence that testing supplemented with culturally appropriate education may encourage the uptake of follow-up care among migrant populations.	Chao, et al., 2009 [CS –]; Hsu, et al., 2007 [UBA –]; Hsu et al., 2010 [UBA –]; Taylor, et al., 2009a [RCT +]; Taylor, et al., 2009b [RCT +]; Taylor et al., 2011 [RCT +]
Efforts should be extended to address knowledge and information gaps among healthcare professionals and other providers of healthcare that may be accessed by people from high risk groups (e.g. CAM practitioners).	Annual symposium. Education about HBV including prevention, testing and treatment through lectures and activities. Cancer prevention reminder system, series of continuing medical education seminars, and education materials to assist with counselling patients.	Moderate evidence that a strategy to promote cancer prevention activities among doctors serving migrant populations does not improve their practices in relation to hepatitis B testing. Weak evidence that providing information and education on hepatitis B to CAM practitioners may improve their knowledge about risk, screening and prevention. Wider impact on practices regarding referral for testing is not clear.	Chang, et al., 2007 [UBA –]; Nguyen, et al., 2000 [RCT +]
Consider how the positive outcomes of testing can be exploited	No intervention identified that addressed this issue	Not applicable	Not applicable

Implications	Intervention	Linked evidence statements	References
Structural factors that discourage uptake of testing and subsequent care and treatment should be addressed by increasing opportunities for people from high risk groups to access testing and other services.	Free HBV screening and doctor-led educational seminars in Mandarin and English on detection, management and prevention. One-off session of culturally tailored lectures delivered by community health promoters and free screening in community settings.	Weak evidence that testing supplemented with culturally appropriate education may encourage the uptake of follow-up care among migrant populations.	Chao, et al., 2009 [CS –]; Hsu, et al., 2007 [UBA –]; Hsu et al., 2010 [UBA –]
Interventions should focus on building trust and rapport between people from high risk groups and health professionals	No intervention identified that addressed this issue	Not applicable	Not applicable

Table 21. Evidence from effectiveness and cost-effectiveness review addressing implications for interventions identified from review of qualitative research: hepatitis C

Implication	Intervention	Linked evidence statements	References
Consider how biomedical information can be tailored to incorporate meaning relevant to the socio-cultural context of high risk groups, but without contributing to stigma or increasing fear and confusion.	No intervention identified that addressed this issue	Not applicable	Not applicable
Efforts should be extended to address knowledge and information gaps among healthcare professionals and other providers of healthcare that may be accessed by people from high risk groups (e.g. CAM practitioners).	Complex interventions combining education, practice support alongside public health campaigns/guideline implementation	Moderate evidence that complex interventions that provide support to primary care professionals in offers of hepatitis C testing may have a positive impact on testing acceptance and uptake. Strong evidence that a complex intervention providing support in primary care had a positive impact on number of referrals and attendance at follow-up appointments after testing.	Cullen et al., 2006 [RCT ++]; Helsper et al., 2010 [NRCT +]; Sahajian et al., 2004 [UBA –]

Implication	Intervention	Linked evidence statements	References
	Education programmes	Weak evidence that educational interventions aimed at health professionals may have short-term benefits on knowledge about hepatitis C. No clear evidence that an increase in knowledge leads to increase in testing uptake or acceptance.	Defossez et al., 2008 [CSS +]; D'Souza et al., 2004 [UBA –]; Fischer et al., 2000 [UBA –]; Garrard et al., 2006 [UBA –]; Zdanuk et al., 2001 [CBA –]
Consider how the positive outcomes of testing can be exploited	No intervention identified that addressed this issue	Not applicable	Not applicable
Structural factors that discourage uptake of testing and subsequent care and treatment should be addressed by increasing opportunities for people from high risk groups to access testing and other services.	Offering DBS testing as an alternative method of testing	Moderate evidence that offering DBS testing to IDUs attending substance misuse services may increase uptake of hepatitis C testing compared to venipuncture alone being offered.	Craine et al., 2009 [CBA –]; Hickman et al., 2008 [RCT +]; Rainey et al., 2005 [CS –]
	Enhancing case finding and testing uptake in primary care	Moderate evidence that targeted case finding in primary care for patients with a history of injecting drug use may have a positive impact on the number of patients who are offered and accept a hepatitis C test.	Anderson et al., 2009 [NRCT +]; Cullen et al., 2011 [NRCT +]; Roudot-Thoraval et al., 2000 [RCT +]
	Increasing the type of settings that provide hepatitis C services	Moderate evidence that providing hepatitis C services in community settings may have a positive impact on testing acceptance and uptake. A multidisciplinary or shared care approach to hepatitis C testing and treatment for IDUs is associated with high uptake of follow-up services and treatment outcomes comparable with non-drug using populations. Weak evidence that the provision of hepatitis C outreach services for new prisoners may lead to relatively low uptake of testing	Hagedorn et al., 2007 [CS –]; Hagedorn et al., 2010 [UBA –]; Harris et al., 2010 [CS –]; Harris et al., 2010 [CS –]; Jack et al., 2008 [CS –]; Lindenburg et al., 2011 [CS –]; Rosenberg et al., 2010 [RCT +]; Sahajian et al. 2011 [RCT +]; Skipper et al., 2003 [CS –]
	Outreach clinics for hepatitis C treatment for people who inject drugs	Weak evidence that the provision of hepatitis C treatment in community settings for IDUs had a positive effect on treatment initiation and outcomes.	Moussalli et al., 2010 [CBA –]; Wilkinson et al. 2008 [CS –]

Implication	Intervention	Linked evidence statements	References
Interventions should focus on building trust and rapport between people from high risk groups and health professionals	No intervention identified that addressed this issue	Not applicable	Not applicable