Hepatitis C Screening Guideline Development Group
Background to recommendation 1: Antenatal screening

The purpose of this document is to provide the background information to the formulation of recommendations by the Guideline Development Group (GDG).

Not all evidence presented in this document is presented in the National Clinical Guideline.

The National Clinical Guideline is available from: http://health.gov.ie/national-patient-safetyoffice/ncec/national-clinical-guidelines/

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Contents

History of development of the recommendation

Date	Process	Outcome
02/06/2015	Recommendations from quality appraised national and international guidelines reviewed	Agreed to augment evidence from existing guidelines literature on HCV in pregnant women in Ireland
14/12/2016	GDG subgroup meeting to undertake considered judgement process	Formulation of recommendation
24/01/2017	Review of subgroup recommendation by GDG	Recommendation accepted
25/04/2017	Consultation feedback reviewed by GDG	No changes to recommendation
June – July 2017	Editing	Recommendation reworded in final editing process

Considered judgement process

The considered judgment form completed by the GDG subgroup in formulating the recommendations is presented below. Please note the final wording of the recommendation may have changed after review of the GDG, after the consultation process, or during the editing process.

Date of meeting: 14/12/2016
Attendees: ER, PF, LT, CDG, OC, JL, SD
Not in attendance but reviewed evidence and provided commentary: RD

Table 1: Considered judgement form

What is the question being addressed? Present PICO if relevant
Q2. Who should be offered screening for hepatitis C (HCV)? b. Should the following specified groups be offered screening? v. Pregnant Women
What evidence is being considered to address this question and why? (This section will explain the approach taken to address this question and what GDG members are being asked to consider)
Relevant guidelines – quality appraised (section 3) Additional literature relevant to Irish context (section 5) GDG members are asked to consider the following: • the level of risk of vertical transmission • the advantage to the pregnant woman and baby of prenatal diagnosis • whether there are effective interventions to reduce the risk of transmission to the baby of a woman who has screened positive for HCV infection
What is the body of evidence? Source of evidence: (tick all that apply) Guidelines ✓ Primary literature □ Other ✓ ; specify: Economic literature; Cochrane Review 2010

Current Guidelines

WHO 2017 Routine testing of pregnant women for HCV infection is currently not recommended (WHO 2017 *Guidelines on hepatitis B and C testing* (1))

NICE, 2016 Pregnant women should not be offered routine screening for HCV virus because there is insufficient evidence to support its effectiveness and cost effectiveness [C] (NICE, 2016 Antenatal care routine care for the healthy pregnant woman, clinical guideline, March 2008, updated March 2016)

NICE, 2013 Staff providing antenatal services, including midwives, obstetricians, practice nurses and GPs, should ask about risk factors for HCV during pregnancy and offer testing for HCV to women at increased risk. (The National Institute for Health and Care Excellence, *Hepatitis B and C: Ways to Promote and Offer Testing to People at Increased Risk of Infection* (2)). *HIQA Quality Score of 148*

SIGN 2013 Pregnant women who are HCV RNA negative do not pose a risk of transmission to their child. The risk of women who are HCV infected and RNA positive transmitting infection to their babies in utero or during parturition is approximately 5%; the rate is twice as high for those co-infected with HIV. The baby's risk of acquiring HCV from a mother infected with HCV is not increased by mode of delivery or breast feeding. One prospective study has indicated that fetal scalp monitoring may increase the risk of mother to child transmission. A large retrospective study did not demonstrate any excess risk. Vaginal delivery may increase the risk of HCV transmission if the mother is co-infected with detectable HIV viral load. In pregnant women knowledge of HCV RNA positive status should not influence obstetric management or standard advice regarding breast feeding. (Scottish Intercollegiate Guidelines Network, Management of Hepatitis C A National Clinical Guideline (3)). *HIQA Quality Score of 127.7*

UK National Screening Committee, 2011 Universal screening for HCV in pregnancy is not recommended. There are currently no interventions which have been shown to significantly reduce the risk of transmission to the baby. The exception to this is the small group of women with HIV / HCV coinfection. In addition there is insufficient information on the prevalence of HCV in the pregnant population and on the natural history of vertically acquired infection. Recent developments in the treatment of HCV have changed the terms of the debate about screening for HCV in pregnancy. This is a rapidly evolving area with discussion shifting to focus on a postnatal screening strategy and the identification of children who would benefit from early intervention. However, the effectiveness of new treatment regimens in the paediatric population and their impact on the assessment of screening are currently insufficiently understood to recommend that all pregnant women should be offered screening. (The UK National Screening Committee recommendation on hepatitis C screening in pregnancy (4))

US Preventive Services Taskforce, 2013 The USPSTF found inadequate evidence that labor management and breastfeeding strategies in HCV-positive women are effective at reducing risk for mother-to-child transmission. (United States Preventive Services Taskforce, Screening for Hepatitis C Virus Infection in Adults (5)*). HIQA Quality Score of 117*

KASL, 2014 In Korea, the anti-HCV prevalence rates in pregnant women were reported as 0.49-1.7% and a domestic report investigating over 5,000 pregnant women reported rates of 0.42-0.44%. Among anti-HCV-positive pregnant women, 57-60% were positive for HCV-RNA. Domestic anti-HCV prevalence rate in the IVDU group was reported as 48.4-79.2%. The percentage of perinatal transmission was reported as 1- 6.2%. It was reported as 1.7% when the others were positive for anti-HCV regardless of HCV-RNA-positivity, and as 4.3% (3.9-7.1%) in case of HCV-RNA-positive mothers. The risk of perinatal transmission increased in female infants, HIV-positive mothers, and mothers with high blood HCV RNA levels. Caesarean section is reportedly not a preventative method for HCV transmission and transmission via nursing was very low. Thus, it is not necessary to limit breast-feeding unless nipples are injured or are bleeding. Recommendation: Routine screening for HCV is not recommended for all pregnant women. However, for those with a risk factor, perinatal testing for HCV is

needed. HCV infection does not mean a restriction of breast-feeding or a recommendation of specific delivery, such as Caesarean section. (The Korean Association for the Study of the Liver, KASL Clinical Practice Guidelines: Management of Hepatitis C (6)). *HIQA Quality Score of 111*

CDC, 1998 Routine HCV testing is not recommended. (Center for Disease Control and Prevention, Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease (7)). *HIQA Quality Score of 98*

CDC, 2015 Persons for Whom Routine HCV Testing Is Not Recommended (unless they have risk factors for infection): Pregnant women (Viral hepatitis - hepatitis C information; Testing recommendations [Internet] (8))

NASPGHAN, 2012 Because there are presently no effective strategies to prevent perinatal HCV transmission, universal screening of pregnant women is not recommended. (North American Society for Pediatric Gastroenterology, Hepatology and Nutrition, NASPGHAN Practice Guidelines: Diagnosis and Management of Hepatitis C Infection in Infants, Children, and Adolescents (9)). *HIQA Quality Score of 88*

European Paediatric HCV Network (EPHN), 2005 Mother-to-child HCV transmission can occur before or during delivery. There is no evidence that it occurs postnatally during breastfeeding. HCV infection is not a contraindication for pregnancy. The current best estimate of the risk of vertical transmission is 5%, ranging from 3 to 7%. Maternal HIV co-infection has consistently been associated with an increased risk of HCV transmission, probably through higher HCV viral load due to maternal immuno-suppression. High viral load during pregnancy or at delivery is associated with an increased vertical transmission risk. There is no threshold viral load above which transmission always occurs and below which it never occurs. The recent EPHN analysis found no significant effect of elective caesarean section on risk of HCV vertical transmission in women with or without HIV co-infection. Although routine antenatal screening is not recommended, it is important to identify HCV infected women to enable optimum management of their infection and prevention of transmission to others through sexual or blood contact. The most appropriate time for women to be tested would be before pregnancy, so that treatment can be offered. (European Paediatric HCV Network, The Management of HCV Infected Pregnant Women and their Children (10)). *HIQA Quality Score of 81.3*

BASHH, 2015 (update of 2008 guideline) Vertical (mother to infant) spread also occurs at a low rate (about 5%), but higher rates (7% or more) are seen if the woman is co-infected with HIV In all groups transmission risk correlates with the quantity of detectable HCV-RNA in the mother's blood (United Kingdom National Guideline on the management of the viral hepatitides A, B and C (11))

Economic literature

Three studies reporting on cost effectiveness of HCV screening in the antenatal setting were identified. Studies were from the US, the UK and the Netherlands.

Plunkett et al. (2005) compared universal screening of low risk asymptomatic pregnant women with and without a caesarean delivery for positive cases to a scenario without screening using a Markov model (12). The study was based on a population of HIV negative women without risk factors receiving routine antenatal care in the US. Positive cases were treated with pegylated-interferon and ribavirin (IFN+RBV). A lifetime time horizon was used, and costs and utilities for both mother and child considered. Costs and utilities were discounted at 3% The base case assumed a prevalence of 1%, a rate of vertical transmission of 0% for elective caesarean section, and 7.7% for emergency section or vaginal delivery. Neither screening scenario was found to be cost effective. Screening followed by caesarean section delivery and treatment of mother had an incremental cost effectiveness ratio (ICER) of $1,170,000 (€1,504,410[1]) per quality adjusted life year (QALY) gained. When examined separately for mother and child, screening followed by caesarean had an ICER of $3019/QALY (€3,882 euro[1]) for the child, but for the mother it added to the cost and decreased the utility due to the disutility of a caesarean. The screening without caesarean section delivery scenario was dominated (more costly and less effective) by the no screening scenario. Sensitivity analysis did not result in the interventions being cost-effective.

In the Netherlands, *Urbanus et al.* (2013) analysed the effect of adding universal screening, or screening of non-Western migrants to current antenatal screening programmes using a Markov model (13). They also considered various subsequent treatment scenarios. Costs were discounted at a rate of 4% and life years at a rate of 1.5%. The base case assumed a prevalence of 0.2% in all women, and 0.43% in non-Western women. The scenario of universal screening and treatment with IFN+RBV for genotypes 2 to 4, with the addition of a protease inhibitor for genotype 1 had an ICER of €52,473 (€58,265[1]) while screening of non-Western migrants had an ICER of €47,113 (€52,314[1]). They reported that is this scenario if treatment costs to €3750 would make both screening options cost effective at a threshold of €20,000. In a different scenario where all genotype received protease inhibitors universal screening had an ICER of €88,162, (€97,894[1]) and screening of non-western migrants had an ICER of €88,005 (€97,720[1]). Sensitivity analysis showed that the ICER for both groups is most sensitive to changes in transition probabilities to cirrhosis, followed by treatment costs and successful treatment outcome.

In the UK, *Selvapatt et al*. (2015) (14)used the results of a 10 year universal screening programme in a London unit to determine the cost effectiveness of this strategy. This programme found that of 35,355 women screened, 136(0.38%) were anti-HCV positive, 78(0.22%) were viraemic with 44(0.12%) new chronic infections were identified. Of these new infections 11 had a history of injecting drug use. It is also reported that 14 were from the UK, 14 from Eastern Europe, three from Western Europe, four from Africa and nine from Asia. The model used a discount rate of 3% for costs and utilities. Based on treatment with IFN+RBV, someprevir+IFN+RBV for all, or someprevir+IFN+RBV for IFN+RBV treatment failures, universal screening was found to be cost effective with ICERs of £2400 (€2,537[1]), £9139 (€11,364[1]) and £3105 (€3,861[1]) respectively. Screening was found to be cost effective under all sensitivity analyses performed. It was most sensitive to the prevalence of infection.

What is the quality of the evidence? To be considered if primary literature was reviewed (also apply where appropriate to guidelines).

How reliable are the studies in the body of evidence?

[1] Inflated to 2014 and converted to Irish euro

If there is insufficient evidence to answer the key question go to section 11. Comment here on any issues concerning the quantity of evidence available on this topic and its methodological quality.
A number of high quality guidelines addressed this question
Are the studies consistent in their conclusions – comment on the degree of consistency within the available evidence. Highlight specific outcomes if appropriate. If there are conflicting results highlight how the group formed a judgement as to the overall direction of the evidence
Yes, good consistency between existing guidelines in recommending against universal antenatal HCV screening and in favour of targeted screening based on risk. This is supported by several studies in an Irish population (see section 5.1). There are no current evidence based interventions that reduce transmission from mother to child.
Generalisability – are the patients in the studies similar to our target population for this guideline? is it reasonable to generalise
Yes
Applicability - Is the evidence applicable to Ireland? Is the intervention/ action implementable in Ireland?
Yes
Are there concerns about publication bias? Comment here on concerns about all studies coming from the same research group, funded by industry etc
Not relevant
Additional information for consideration
Additional literature if applicable e.g. Irish literature
In 2007-2008 a cross sectional study determined the seroprevalence of HCV in an unselected, antenatal population (approximately 9000 women, 98.4% uptake) in Ireland to be 0.9% (n=78) (15). Of those women who tested positive for HCV antibodies, 64% were RNA positive. The majority of anti-HCV positive women were Irish (60%). 73% had a self-reported risk factor. 21 (27%) women had no identifiable risk factor, 12 of whom were from Eastern European countries. Multiple regression analysis reported an association between pregnant women infected with HCV and both intravenous drug users ($p<0.001$) and tattooing ($p<0.05$). A study by Gibb et al. 2000 (16), included mother -child pairs from Ireland and the UK. Of 441 mother-child pairs there were 339 vaginal deliveries, 54 emergency c-sections and 31 elective c-sections. The overall transmission rate was 6.7 (95% CI, 4.1-10.2). The transmission rate for vaginal/emergency c-section was found to be 7.4 (95% CI 4.5-11.3) compared to 0 (95% CI, 0-7.4) for elective c-section. After adjustment for other factors, the OR was 0 (95% CI, 0-0.87, P=0.04). However, the HCV status of some infants was not ascertained and analyses were not stratified according to maternal HIV status. A cross sectional study from Ireland determined the prevalence of HCV to be 1.4% (67/4666) in a targeted screening process and the prevalence of HCV to be 0.7% (66/9222) in a universal screening process that occurred the following year (17). It was estimated that one case (1/67, 1.5%) would have not been detected through the targeted screening process. A study was carried out of infants born to women who tested positive for HCV in pregnancy from three Dublin maternity hospitals in the years 1994-1999 (18). The women were tested on the basis of reported risk factors for HCV

(illicit drug use, transfusion of blood/blood product, sexual contact with a HCV positive sexual partner, tattoos/body piercing, history of jaundice), development of jaundice or abnormal liver function test in pregnancy, or if they requested screening. This showed the breakdown of risk factors for infection as follows - IDU 83%, heterosexual exposure 8%, infected blood products 7%, tattoos less than 1%, and no risk identified in 3%.

A study from Healy et al reported on the outcomes of 314 infants born to 296 HCV positive women between 1994-1999 in the three main Dublin maternity hospitals (19). The infants were monitored for a median of 18 months. Infection status was ascertained for 173 babies with 11 found to be infected. The transmission rate calculated based only on those patients of known outcome was 6.4% (95% CI 2.8-10%) and the minimum vertical transmission rate, i.e. where it was assumed that all of indeterminate status or lost to follow up were uninfected, was 3.5% (95% CI 1.5-5.5%). The rate of vertical transmission was 3.4 times higher for HIV co-infected women viral load was generally not available. HCV genotype did not influence transmission risk. No association was found with duration of membrane rupture, mode of delivery and infection rates. The suggestion that c-section prior to membrane rupture might prevent vertical transmission was not proven in this study. However, it is notable that all infected infants were delivery vaginally.

Relevant national policy/strategy/practice

Rainbow Clinic practice guide, 2015 (20)

There are currently no interventions proven to reduce the risk of vertical transmission of HCV. The advent of the directly acting antiviral agents has greatly improved the outlook for those infected with HCV with high clearance rates of genotype 1 achieved. Current HCV treatments are not recommended for use in pregnancy. Overall, HCV will be transmitted to 3–7% of infants born to mothers who are HCV antibody positive. HCV testing is indicated for women with HIV or HBV infection or other HCV risk factors e.g. recreational drug use, tattoos, or a partner with either HCV or history of recreational drug use.

The exact mechanism(s) and timing of perinatal transmission of HCV are not known. Reports of HCV RNA in umbilical cord blood and in infant peripheral blood samples in the first days of life indicate that in-utero transmission can occur.

Post-natal transmission is considered less likely and may be a rare event. HCV RNA can be detected in breast milk but does not appear to be associated with transmission. Reported maternal risk factors for HCV vertical transmission include active HCV infection, higher HCV viral loads, elevated maternal serum transaminases and HIV co-infection. Invasive obstetric procedures, fetal scalp electrodes and prolonged rupture of membranes have also been associated with transmission. Transmission rates for women found to be stably PCR negative in pregnancy, either through spontaneous clearance or treatment is negligible. The highest transmission rates are found in women who are co-infected with HIV with rates as high as 20% reported from co infected women in the pre HAART era. To date, no obstetric intervention has been proven to reduce the risk of vertical transmission and HCV infected women can aim for a normal delivery.

The highest rates for vertical transmission of HCV have been reported for HIV/HCV co-infected women. The use of antenatal antiretroviral therapy in HIV/HCV co-infected women may reduce the risk of HCV transmission. Early reports suggested that, similar to HIV, prolonged rupture of membranes, exposure to maternal blood and amniocentesis increased the risk of HCV transmission and that delivery by caesarean section might reduce that risk. Subsequent studies and systematic review failed to confirm the benefit of ELCS in reducing HCV transmission. As clear data to support the use of caesarean section solely for the prevention of HCV transmission have not yet emerged and, as caesarean section is associated with small additional morbidity, it is no longer routinely recommended for this purpose. RECOMMENDATION: 1. Women with risk factors for HCV infection should be offered HCV antibody testing, 2. Check HCV PCR status (viral load) on all HCV antibody positive women, 3. Newly diagnosed women should be referred to adult hepatitis services, 4. HCV infected women should be screened for co-infection with HBV or HIV (Butler et al 2015).

National HCV strategy, Ireland 2011 The prevalence of HCV in antenatal populations is in the region of one per cent or less. One of the primary aims of universal antenatal testing for infections is to intervene if possible and prevent mother-to-child transmission of infection and adverse outcomes for the child. Antenatal screening for maternal HIV infection is a clear example of the application of this principle. In the case of antenatal screening for HCV, there are no current evidence-based interventions that reduce transmission from mother-to-child. To date insufficient evidence

exists to recommend specific obstetric intervention or to recommend against breastfeeding. No critical HCV RNA titre in the mother has been established which is associated with increased risk of vertical transmission. In addition, treatment of HCV in pregnancy is contra-indicated. (Note: to date in 2016 all current antivirals for HCV are still contraindicated in pregnancy). Recommendations from the document: 1. Continue targeted antenatal screening for those with risk factors for HCV infection AND 2. Regular review of the evidence with regard to universal antenatal screening (National HCV Strategy for Ireland, 2011 (21)). *HIQA quality score 98*

Epidemiology in Ireland if available and applicable

See section 5.1

In a study comparing targeted and universal screening over consecutive years in the Coombe, approximately half of women were screened as part of targeted screening due to the presence of a risk factor(17). Prior history of drug use and tattoos and piercings were the biggest risk factors for HCV in both years. It was estimated that in 2007 when universal screening applied, one woman would not have been detected by targeted screening Universal screening has been in place in the Coombe since 2007. It is estimated that approximately one case of HCV per year is detected with no obvious risk factor (personal communication Orla Cunnigham).

Potential impact of recommendation

Benefit versus harm

What factors influence the balance between benefit versus harm? Take into account the likelihood of doing harm or good. Do the desirable effects outweigh the undesirable effects?

Benefits:

- **General benefits of screening:**
  - Linkage to care and treatment will result in improved quality of life for detected cases.
  - The offer of screening also provides an opportunity to raise awareness and educate on HCV.
  - Promotion and further normalisation of testing may improve uptake and reduce stigma around HCV
  - Detection and treatment of undiagnosed cases will reduce the risk of transmission to others.
- **Benefits specific to antenatal screening:**
  - Antenatal period may be a time where women who would otherwise not attend care are being seen regularly and detection of cases in this period may allow for relationships to be built up which will facilitate treatment after delivery
  - Identifies the children who should be screened after birth
- **Benefits of targeted screening:**
  - Less costly
  - Positive predictive value will be greater
- **Benefits of universal antenatal screening:**
  - Avoids stigma for mothers in declaring risk factors.
  - Will detect cases with no identified or undisclosed risk factor.
  - In some units, depending on the population they serve, a high proportion of women have risk factors and it may be easier to screen all rather than filter out those with risk factors.

Harms:

- Opportunity cost (with 70,000 births per annum and an estimate cost of €10 per antibody test the minimum cost would be €700,000 per annum).
- One of the primary aims of universal antenatal testing is to intervene if possible and prevent mother-to-child transmission as is the case with HIV testing and HIV treatment of the mother with antiretroviral therapy (ART) during pregnancy and the perinatal period; and prophylactic ART for in infant after birth. To date insufficient evidence exists to recommend specific obstetric interventions or to recommend against breastfeeding in order to prevent mother to child transmission. HCV treatment in pregnancy is currently contra indicated. Even if treatment during pregnancy became feasible in the future, the benefit in terms of preventing vertical

transmission would be minimal given the recognised low risk of transmission. This differs from HIV where there is a substantial reduction in MTC transmission with maternal treatment.

- The rate of false positive screening results depends on the population being screened. In high risk populations false positive rates are acceptable. However, in low risk populations such as the general antenatal population the positive predictive value of the screening test decreases and may not be acceptable. False-positive test results incur costs and can also cause psychological harm. Confirmatory testing reduces the false-positive rate but increases the cost. If nationwide universal screening were implemented, given the national low prevalence, this may be an issue. The NVRL does an antigen test when a sample tests antibody positive. This is done on the same sample and reported at the same time. This will minimise the potential of a woman being given a false positive result. The practice in other laboratories is not known.
- Detection of cases who may not yet be eligible for treatment may lead to frustration and anxiety.
- Detected cases may suffer from stigmatisation.
- However, if there are clear pathways to care and treatment available, there is limited foreseeable harm for a person knowing they are infected.

What are the likely resource implications and how large are the resource requirements? Consider cost effectiveness, financial, human and other resource implications

As most units are currently offering targeted screening albeit not according to a standardised appraisal of risks, a recommendation for targeted screening only is not likely to have resource implications. In any units which are currently offering universal screening costs may reduce. The process of evaluating risk may lead to some additional costs.

Acceptability – Is the intervention/ option acceptable to key stakeholders?

- It is likely that either targeted or universal screening will be acceptable to most women and healthcare professionals.
- If a recommendation is made for only risk based screening those units which are currently doing universal screening may have difficulty changing.

Feasibility - Is the intervention/action implementable in the Irish context?

Anecdotally, the current practice in most maternity services in Ireland is broadly in keeping with the recommendations of the guidelines cited above i.e. screening offered on the basis of identified risk factor. However the specific approach adopted may vary from unit to unit.

Targeted screening will require a standardised list of risk factors, implemented in all maternity units and GP practices.

What would be the impact on health equity?

Standardised implementation of the recommendation, underpinned by the principle of proportionate universalism[2], will result in a positive impact on health equity (22).

What is the value judgement? How certain is the relative importance of the desirable and undesirable outcomes? Are the desirable effects larger relative to undesirable

[2] Proportionate universalism is the resourcing and delivering of universal services at a scale and intensity proportionate to the degree of need.

Recent advances in treatment options for HCV make treatment more acceptable and more successful. Treatment with the new DAAs which are now available results in cure in the majority of patients with shorter duration of treatment and less side effects than previous treatments. However at present the cost of these treatments is high.

Screening enables early detection, referral for assessment and treatment where indicated. Without screening cases may go undetected for a considerable length of time due to the asymptomatic nature of HCV infection. Individuals often do not present until symptomatic, which is usually indicative of severe liver damage. Early treatment and cure will confer personal, social, and economic benefits. Early treatment and cure will also reduce the risk of transmission to others. A treatment programme exists in Ireland allowing detected cases access treatment.

The beneficial effects of universal screening do not outweigh the potential cost at present as treatment for HCV infection is not available in pregnancy and there are no interventions to reduce transmission to baby. Overall the risk of transmission to the baby is very low. The main benefit in screening during pregnancy at present is identifying cases in women which can be treated after pregnancy.

The overall prevalence of HCV in the maternity population in Ireland is low therefore universal screening over standardised evidence-based targeted risk based screening may not be cost-effective or to identify a significant number of additional cases.

At present screening of pregnant women would be akin to opportunistic general population screening.

Final Recommendations

√Strong recommendation
Conditional/ weak recommendation

Text:
Standardised targeted risk based screening of antenatal women is recommended.
Universal screening of pregnant women is not recommended.
Universal screening may be reconsidered in the future if HCV treatment during pregnancy becomes possible. Also, if national policy progresses to an elimination policy, antenatal screening opportunistic method to reach this particular population cohort.

Justification

The risk of vertical transmission is very low and much lower than for other infections such as HBV and HIV. At present HCV treatment is contra-indicated during pregnancy and there are no evidence-based interventions to reduce vertical transmission. Identification of mothers will therefore not decrease the risk of transmission to babies.
The overall prevalence in the general maternity population in Ireland is likely to be low and standardised implementation of targeted risk-based screening is likely to detect most cases of maternal HCV infection.

Implementation considerations

Anecdotally, the current practice in most maternity services in Ireland is broadly in keeping with the recommendations of the guidelines cited above i.e. screening offered on the basis of identified risk factor.
A standardised list of risk factors, including access to an up to date list of endemic countries, should be made available.

Recommendations for research
List any aspects of the question that have not been answered and should therefore be highlighted as an area in need of further research.

Review by GDG

Date: 24/01/2017

Recommendation accepted

Consultation feedback and review by GDG

Please see *Report of the consultation process* for feedback received.

No material change to recommendation.

Final recommendation

Recommendation 1

1.1. Standardised targeted risk based HCV screening of antenatal women is recommended (see Appendix 1 for a list of risk populations).

1.2. Universal HCV screening of antenatal women is **not** recommended.

1.3. Universal antenatal HCV screening may be reconsidered in the future if HCV treatment during pregnancy becomes possible. Also, if national policy progresses to a policy of birth cohort or total population screening, antenatal screening offers an opportunistic method to reach this particular population cohort.

Quality/level of evidence: moderate; good consistency between existing high quality guidelines

Strength of recommendation: strong

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Appendices

Evidence search and results

International and national guidelines

HCV guidelines identified, reviewed, and quality appraised as described in the National Clinical Guideline.

Other guidelines reviewed

The Rainbow Clinic guideline *Preventing perinatal transmission: a practical guide to the antenatal and perinatal management of HIV, hepatitis B, hepatitis C, herpes simplex and syphilis* was identified by expert members of the GDG for inclusion.

Grey literature

Nil used.

Primary literature

The GDG determined that to formulate a recommendation further information was required on the results of HCV screening of pregnant women in Ireland.

PICO

Population: pregnant women attending antenatal services in Ireland
Intervention: screening for HCV
Comparison: no screening, universal screening, targeted screening
Outcome: detection in mother, acceptability, cost/ cost-effectiveness, transmission to child
Other sources: data directly from maternity hospitals in Ireland where available

Search strategy

Sources:

- Medline
- Embase

See table 2 for search terms used in Medline search

Study type/ limits: experimental or observational studies, case studies, case reports; published between 1 January 1990 and 30 June 2015

Inclusion criteria:

- Ireland
- Antenatal population
- Reports on prevalence or incidence of HCV in antenatal population or other outcome of screening such as refarral to care, accepatability, uptake, cost-effectiveness
- HCV status based on blood/ saliva

Exclusion criteria:

- Not Ireland
- Not antenatal population
- Not HCV
- No abstract
- HCV status self reported

Table 2: Search terms used in Pubmed/Medline search

S1	hepatitis c or HCV or hepacivirus or hep c or hepC	Search modes - Boolean/Phrase	76,787
S2	(MM "Hepatitis C+")	Search modes - Boolean/Phrase	41,868
S3	(MM "Hepacivirus")	Search modes - Boolean/Phrase	17,492
S4	S1 OR S2 OR S3	Search modes - Boolean/Phrase	76,787
S5	mass screen* or universal screen*	Search modes - Boolean/Phrase	87,996
S6	(public* or communit* or universal* or widespread or open* or unrestricted or group* or adult*) N3 (screen* or test* or surveillance)	Search modes - Boolean/Phrase	105,845
S7	(MM "Mass Screening")	Search modes - Boolean/Phrase	44,403
S8	(MM "Population Surveillance+")	Search modes - Boolean/Phrase	18,867
S9	(MM "Seroepidemiologic Studies")	Search modes - Boolean/Phrase	191
S10	S5 OR S6 OR S7 OR S8 OR S9	Search modes - Boolean/Phrase	203,175
S11	S4 AND S10	Search modes - Boolean/Phrase	2,120
S12	pregnanc* or pregnant or antenatal or prenatal	Search modes - Boolean/Phrase	847,845
S13	(MM "Pregnant Women")	Search modes - Boolean/Phrase	2,670
S14	S12 OR S13	Search modes - Boolean/Phrase	847,845
S15	S11 AND S14	Search modes - Boolean/Phrase	115
S16	ireland or irish	Search modes - Boolean/Phrase	79,949
S17	(MH "Ireland")	Search modes - Boolean/Phrase	13,834
S18	S16 OR S17	Search modes - Boolean/Phrase	79,949
S19	S15 AND S18	Search modes - Boolean/Phrase	4

Search results

Figure 1: PRISMA flow diagram of review of literature on antenatal HCV screening in Ireland