Topic information	
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Executive summary

Viral hepatitis is inflammation of the liver due to a viral infection. There are several types of hepatitis viruses including types A, B, C, D and E. Hepatitis B and C are known as blood borne viruses (BBVs) as they are spread via blood or other body fluids. They can both result in chronic disease which can lead to liver cirrhosis and failure. This can lead to considerable cost to the individual's health and cost to health care services.

Hepatitis A and E are spread through consumption of food or water contaminated with faeces of an infected person. Hepatitis A and E usually resolve on their own, however outbreaks of the condition can lead to economic loss. A small number of people may develop more serious health complications. (NIDDK, 2012)

HDV is considered to be a sub viral satellite because it can propagate only in the presence of the hepatitis B virus (HBV).

Unmet need and gaps

- There is lack of awareness amongst health care professionals regarding hepatitis B and C and their risk factors.
- Chronic viral hepatitis remains strongly linked to social deprivation, hepatitis C because of its primary risk factor previous injecting drug use and hepatitis B because it is primarily a disease of migrant populations where it is spread by maternal transmission or poor health care. There is lack of targeted prevention activities amongst these groups.
- There is lack of knowledge amongst the public and vulnerable disadvantaged groups with regards to risk factors for hepatitis A, B, C and E.
- At present there are no targets for testing of hepatitis B and C or vaccination completion for hepatitis B.
- There are now new and highly effective oral medications for hepatitis C (cure rates of 97% or greater). The major challenges are under-diagnosis and lack

of awareness in those who have a diagnosis which means they may not seek therapy.

- Prison services still require enhancement to every aspect of HCV care including increased testing rates and provision of therapy.

- Those living in Nottinghamshire County do not have access to treatment as readily as those in Nottingham City. There are no nurse led specialist viral hepatitis services at King's Mill Hospital like there are at Nottingham University Hospitals. The distances that patient's may need to travel act as a barrier to accessing treatment, particularly for vulnerable groups such as people who inject drugs or the homeless.

Recommendations for consideration by commissioners

- Promote harm reduction and awareness of viral hepatitis in different health settings.
- Promote hepatitis A and B vaccination for all at risk and eligible groups.
- Implement awareness programmes amongst the general population to help bring forward those people who are unaware that they may be at risk of viral hepatitis.
- Educate professionals and healthcare workers who come into contact with people who are at increased risk of viral hepatitis so that they are aware of testing opportunities.
- Support prison staff in continued opt-out testing of BBVs within prisons.
- Address the barriers to testing for hepatitis B and C within substance misuse services within Nottinghamshire County so that a more consistent routine approach is taken.
- Develop computer software for GPs to help identify patients at risk and provide prompting for testing.
- Continue to monitor and retest individual who further put them-selves at risk.
- Improve engagement in hepatitis treatment services through providing geographically appropriate services. This may include pharmacies, substance misuse services and hostels.
- Support for addiction services, sexual health services and GPs from commissioners to support people who need more active help in engaging with hepatitis treatment services.
- Consideration within viral hepatitis services and for discussion with CCGs for improved viral hepatitis services and access to services from those in Nottinghamshire County.
- Continued oversight from NUH Hepatology and ODN leadership with regards to progress made within this area.
- Close communication with neighbouring areas within the shared operational delivery network (ODN) to ensure fair and effective reaching of hepatitis C treatment targets.

Nottinghamshire Health & Wellbeing Board

Full JSNA report

What do we know?

1) Who is at risk and why?

Viral hepatitis is an infection of the liver caused by a virus. This assessment will focus on the four viral hepatitis groups A, B, C and E. This section summarises key features of each virus. Hepatitis D can only occur with hepatitis B virus and when a patient is co-infected with both it can lead to a more severe infection than if infected with hepatitis B alone. As it is relatively uncommon in the UK it has not been included in this JSNA chapter.

1.1 Hepatitis B

What is it?

Hepatitis B is a blood borne virus which can cause long term liver damage. It is preventable through vaccination but there is no current treatment. Symptoms of acute infection may include jaundice (yellow skin), fatigue, abdominal pain, nausea, vomiting and low grade fever, although often there are no symptoms and therefore cases can go undiagnosed.

Disease progression

95% of adults may clear the virus after an acute infection and also acquire immunity to a further infection. However in children 95% of infections lead to chronic disease. The remainder who develop a chronic infection have a 20% risk of progressing to liver cirrhosis and 10% of those with liver cirrhosis will acquire liver cancer. Cirrhosis is irreversible with a high risk of mortality.

Transmission/Those at risk

It is transmitted through contact with infected blood or body fluids. Some examples of people who are therefore at risk include babies born to mothers who have hepatitis B infection, particularly in migrant populations from hyper-endemic areas of the world, people who inject drugs (PWID) and sexual contacts of people with hepatitis B. Figure 1 gives other examples of those at risk. Around one in 200 PWID are living with hepatitis B in the UK (PHE, 2016).

National/ International picture

The UK is classed as a low prevalence country, less than 1% of the population of Western Europe and North America is chronically infected. (WHO, 2016)
In 2016 the World Health Organisation (WHO) reported that 240 million people are chronically infected with hepatitis B worldwide. It is estimated that over 686 000 people die every year due to complications of hepatitis B, such as cirrhosis and liver cancer. The prevalence of hepatitis B is highest in sub-Saharan Africa and East Asia where between 5-10% of the adult population is chronically infected.

1.2 Hepatitis C

What is it?

Hepatitis C is a blood borne virus which can cause long term liver damage. There is no vaccine to prevent it, but there are other methods to reduce this risk of transmission and there are treatments available with a cure rate of as high as 95%. However even if treated, those previously infected can still be re-infected if transmission occurs. Most people who contract hepatitis C do not have any symptoms. In the first 6 months, known as the acute

stage of hepatitis C about one in every three to four people will develop general flu like symptoms such as fever, tiredness or nausea.

Disease progression

Approximately 60-80% of people with acute hepatitis C develop chronic hepatitis and the rest clear the infection spontaneously. 5-20% of people who are chronically infected develop liver cirrhosis after 20 years. A number of factors can lead to the faster progression of serious liver disease including, alcohol consumption, male gender and co-infection with hepatitis B or HIV. (DH, 2004)

Transmission/ Those at risk

The main route of transmission for hepatitis C in the UK is through sharing equipment when injecting drugs. About half of people who inject drugs are thought to be infected with HCV in the UK (PHE, 2016). Mother to baby transmission and sexual transmission is also possible, but uncommon. (DH, 2004) Figure 1 summarises some of the other groups at risk of contracting hepatitis C.

International/National picture

It is considered a major public health threat in the UK by Public Health England with around 160 000 chronically infected. The majority of people infected in the UK are from marginalised groups in society such as people who inject drugs (PHE, 2017a). It is estimated that 130-150 million people have chronic hepatitis C infection globally. Approximately 700 000 people die each year from hepatitis C related liver disease. Countries with the highest prevalence of hepatitis C include Africa and Central and East Asia. (WHO, 2016a) However it is prevalent in all parts of the world.

Listed in the table below are some of the main at risk groups of hepatitis B and C.

Figure 1. At risk groups for hepatitis B and C

Groups at increased risk of infection	Hepatitis B	Hepatitis C
People born or brought up in a country with an intermediate or high prevalence of chronic hepatitis B/C	X	X
Babies born to mothers infected with hepatitis B	X	
Babies born to mothers infected with hepatitis C		X
People who have ever injected drugs	X	X
Men who have sex with men	X	
Anyone who has had unprotected sex, particularly: • people who have multiple sexual partners • people reporting unprotected sexual contact in areas of	X	

intermediate and high prevalence • people presenting at sexual health and genitourinary medicine clinics • people diagnosed with a sexually transmitted disease • commercial sex workers		
Looked after children and young people including those living in care homes	X	X
Prisoners, including young offenders	X	X
Immigration detainees	X	
Close contacts of someone known to be infected with hepatitis B	X	
Close contacts of someone known to be infected with hepatitis C		X
People living in hostels for the homeless or sleeping on the streets		X
HIV-positive men who have sex with men		X
People who received a blood transfusion before 1991 or blood products before 1986		X

(NICE, 2013)

1.3 Hepatitis A

What is it?

Hepatitis A is a virus that infects the liver and is spread through the faecal-oral route. Symptoms usually last from a few days to a couple of weeks and may include a mild fever, nausea and vomiting, bowel disturbance and joint and muscle pains. (NHS choices, 2016) Jaundice occurs in 70-80% of people. Once a person is infected they will usually develop life-long immunity to further hepatitis A infections. Most people make a full recovery as it does not cause chronic hepatitis like HBV and HCV do. However there is a risk of it causing acute liver failure known as fulminant hepatitis, which can be life threatening. When epidemics occur they can be disruptive to communities and cause significant economic loss. (WHO, 2016b)

Disease progression

Hepatitis A usually is cleared from the system within 2 months, however around 1 in 7 people infected may have recurring symptoms for up to 6 months before it goes completely. Liver failure develops in less than 1 in 250 people (NHS choices, 2016). It can be fatal particularly in older people or those with pre-existing liver disease (GOV, 2013).

Transmission/ Those at risk
Transmission is via the faecal-oral route and therefore there is higher prevalence amongst countries or areas with poor sanitation and where drinking water may be contaminated. Therefore in the UK people who travel to those countries are at risk.

Hepatitis A is a risk for men who have sex with men (MSM) and people who have risky sexual behaviours. For example those whose sexual practices involve oral-anal or digital-rectal contact and those who have multiple sexual partners, anonymous partners, sex in public spaces and group sex. There have been a number of hepatitis A outbreaks recorded in five different European Union countries in 2016 amongst men who have sex with men. (ECDC, 2016)

There is also an occupational risk of hepatitis A, for example those who work with raw untreated sewage, people working in large residential institutions and also people working with primates.
People who inject drugs (PWID) and their close contacts and people with clotting disorders who may receive contaminated blood products are also at risk. (NICE CKS, 2014)

It is recommended that all these at risk groups are offered hepatitis A vaccination. (GOV, 2013)

International/ National picture
The UK is classed as an area with low levels of infection as there is good sanitation and hygiene. Outbreaks tend to be within the at risk groups as described above. However outbreaks tend to die out quickly due to good levels of hygiene preventing further spread. (WHO, 2016b)
Globally, areas with high levels of hepatitis A virus tend to be developing countries with poor sanitary conditions or poor hygienic practices. 90% of children in areas of this description have been infected with hepatitis A before 10 years of age. However this means that outbreaks are rare amongst adult populations as they are already immune. In countries with transitional economies, sanitation conditions can vary. Although childhood infection rates are lower, this means that they do not develop immunity allowing for larger outbreaks in older age groups.

1.4 Hepatitis E

What is it?
Hepatitis E is a zoonoses (infectious disease that can be spread from animals to humans) and in the UK is likely contracted via contaminated pork. In its endemic form in the subcontinent it is transmitted via the faecal-oral route. The virus is shed in the stools of the infected person. Typical symptoms again include a mild fever, nausea and vomiting, joint pains, itching and jaundice. The illness can last between 1-6 weeks. (WHO, 2016c). It is now by far the commonest cause of acute symptomatic viral hepatitis in the UK.

Disease progression
In most cases hepatitis E is self- limiting. Chronic hepatitis E is rare but can occur in people who are immunosuppressed. Fulminant hepatitis or acute liver failure is also rare, but more common if it occurs during pregnancy, particularly for women in their second or third trimester where it can also cause foetal loss and mortality. For women in their third trimester there have been fatality rates as high as 20-25%. (WHO, 2016c) However, anecdotally the

HEV genotype that is spread via pork products in the UK is less likely to lead to these complications.

Transmission/ Those at risk

There has been an increase in the number of infections in the UK and the majority are related to consumption of undercooked pork products. (PHE, 2017) Studies have shown that there is a strong link between Hepatitis E and consumption of pork products such as pork pies, ham or sausages. (Said et al. 2014) Over 90% of UK pigs have also been shown to have HEV antibodies at the time of slaughter, meaning most pigs have been infected with HEV at some point in their lives. (Grierson et al. 2015) Despite these findings the causes of hepatitis E transmission is still not fully understood. The pattern of disease in the Indian subcontinent is different where Hepatitis E is transmitted via the faecal-oral route, through faecal contamination of drinking water. Those at higher risk of hepatitis E include those who travel to areas where there may be faeco-oral contamination of drinking water.

National/International picture

Hepatitis E infection occurs worldwide. In resource-limited countries with limited access to clean drinking water, outbreaks and sporadic cases can occur. Large outbreaks affecting several thousands of people can occur in areas of conflict and humanitarian emergencies. Sporadic cases account for 20 million infections and 3.3 million acute cases annually worldwide. 56 600 deaths are estimated as a result of this. In areas with clean drinking water and good sanitation such as the UK, hepatitis E is less common, with most cases being through consumption of under cooked meat. (WHO, 2016c)

2) Size of the issue locally

It is difficult to ensure local data for viral hepatitis is accurate or representative because often those infected do not have any symptoms and are not diagnosed. If they do have symptoms they are often transient or non-specific. A number of sources have been used to find the extent of the issue within Nottingham City and Nottinghamshire County.

People who inject drugs

Given that those who misuse substances via intravenous injection are at the most risk of contracting viral hepatitis within the UK it is helpful to know the extent of intravenous drug misuse within the local area. Nottingham and Nottinghamshire have similar numbers of people who inject drugs compared to the other areas in the East Midlands (Figure 2). The rate of those who inject drugs is relatively high compared to the England and East Midlands average.

Figure 2. People who inject drugs in 2011/12 – crude rate per 1000

Area	Value	Lower CI	Upper CI
England	2.49*	2.44	2.58
East Midlands region	2.62*	2.35	2.90
Derby	4.89*	4.01	6.18
Derbyshire	2.71*	1.88	3.53
Leicester	2.72*	2.33	3.35
Leicestershire	0.96*	0.80	1.25
Lincolnshire	2.48*	1.61	3.27
Northamptonshire	1.99*	1.13	2.83
Nottingham	3.53*	2.68	4.34
Nottinghamshire	3.58*	2.73	4.39
Rutland	0.26*	0.04	1.11

Source: Calculated by Public Health England: Knowledge and Intelligence Team (South West) from data from the National Treatment Agency (NTA) and Office for National Statistics (ONS) - Mid Year Population Estimates

(PHE, 2017b)

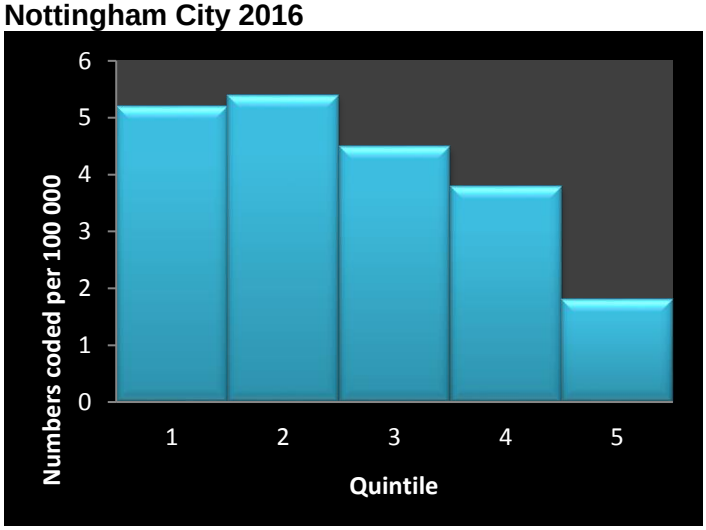
Hospital Episode Statistics

The Nottingham City and County Hospital Episode Statistics (HES) gives an idea of numbers of people who are admitted to hospital with a primary diagnosis of viral hepatitis. The HES is a warehouse of NHS data which contains details of all admissions, outpatient appointments and A&E attendances at NHS hospitals in England.

The HES data for admissions with the primary diagnosis as viral hepatitis show that in the year 2016 there were 130 admissions from Nottingham City. From Nottinghamshire County there were 100. This includes admissions with diagnoses for acute and chronic hepatitis B, chronic viral hepatitis C, unspecified acute viral hepatitis, hepatitis A and acute hepatitis E. There are limitations to this data as accuracy is dependent on the clinician who codes the diagnosis and the patient may have been admitted for other reasons in addition. It also only includes hospital admissions and not those who have been seen in A&E. Most people with viral hepatitis will never be admitted to hospital. Despite this, HES is useful for examining trends.

According to the data within Nottingham City, there appears to be a strong relationship between viral hepatitis and deprivation, with individuals in the most deprived quintiles almost three times as likely to be admitted for viral hepatitis compared to individuals in the least deprived quintile (Figure 3).

Figure 3. No. of viral hepatitis admissions per 100,000 by deprivation quintile in Nottingham City 2016



Source: Hospital Episode Statistics

Nottingham city has the highest rate of viral hepatitis hospital admissions and Rushcliffe the lowest. Within Nottingham, the Arboretum, Radford and Park, Berridge and the Dales had the highest number of episodes. The table below shows the rate of hospital admission episodes with viral hepatitis as a primary diagnosis according to the local area.

Figure 4. Rate of hospital admission episodes for viral hepatitis according to area within Nottingham and Nottinghamshire

Area/ Clinical commissioning group	Hospital episodes 2015	Population of area (mid 2015 ONS population)	**Rate: Hospital episodes per 100 000 population per year**
Ashfield	10	123574	**8**
Broxtowe	10	112253	**9**
Gedling	17	115889	**15**
Mansfield	14	106556	**13**
Newark and Sherwood	21	118569	**18**
Nottingham	120	318901	**38**
Rushcliffe	18	114474	**7**

Source: Hospital Episode Statistics

2.1 Hepatitis B

The UK is known as a low-endemicity country with less than 2% of the population being affected. (GOV, 2016)

The majority of hepatitis B cases are chronic. 83% of 11 708 confirmed hepatitis B infections nationally in 2015 reported to the Second Generation Surveillance System (SGSS) were chronic cases (PHE, 2016a). Within the East Midlands in 2015, Nottingham and Leicester have the highest number of residents with acute or chronic HBV (figure 5). The most common age group within the East Midlands to have the infection was 25-34 years. 86% of cases were between the ages 15-54 and the majority were male. However there may have been reporting issues given that there were less than 5 reports in Nottingham in 2006 with a sudden increase to 127 in 2007. (PHE, 2015)

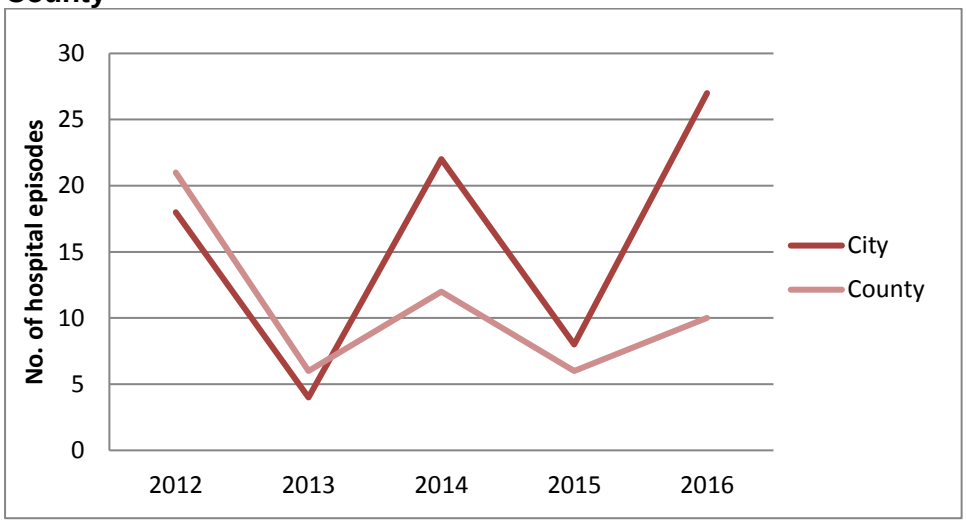
Figure 5. Number of laboratory reports of hepatitis B (acute and chronic), residents of PHE East Midlands by upper tier local authority, 2005-2015

Upper tier local authority of residence	Number of laboratory reports										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Derby	8	26	16	25	11	*	*	*	10	*	22
Derbyshire	*	*	8	7	6	*	8	9	13	15	26
Leicester	101	108	101	105	132	114	99	93	81	78	*
Leicestershire	*	*	9	*	*	15	43	29	26	25	13
Lincolnshire	15	23	33	50	40	34	43	45	43	67	58
Northamptonshire	48	25	21	23	18	9	5	13	16	36	40
Nottingham	7	*	127	142	131	28	80	43	101	89	121
Nottinghamshire	7	5	53	48	28	5	40	39	54	41	38
Rutland	0	0	*	*	*	*	*	*	0	*	*
Total	191	194	370	407	369	210	321	274	344	361	321

*Data removed to prevent deductive disclosure of numbers <5. Data for Leicester/shire are incomplete due to reporting issues.
(PHE, 2015)

HES data shows the number of hospital admissions with regards to chronic hepatitis B for the City and County with no clear trends, but episodes were at their highest in the City last year.

Figure 6. Hospital admissions for chronic hepatitis B from Nottingham City and County



Source: Hospital Episode Statistics

Hepatitis B related end-stage liver disease
The under 75 mortality rate from hepatitis B related end-stage liver disease or hepatocellular carcinoma in Nottingham City and Nottinghamshire County is similar to the England average (Figure 7).

Figure 7. Under 75 mortality rate from hepatitis B related end-stage liver disease/hepatocellular carcinoma 2013-15. (Rate per 100 000)

Area	Value	Lower CI	Upper CI
England	0.129	0.111	0.148
East Midlands region	0.063	0.027	0.123
Nottingham	0.000	0.000	0.414
Nottinghamshire	0.137	0.028	0.400

Source: Public Health England (based on ONS source data)
(PHE, 2017b)

2.2 Hepatitis C

Cases of acute hepatitis C are difficult to estimate as people are often asymptomatic and therefore it can go undiagnosed. 214 000 were thought to be living with hepatitis C in the UK in 2016. 160 000 of those are in England alone. Most of the new cases found were in those who inject drugs. (PHE, 2016b)

According to the Nottinghamshire ODN (Operational Delivery Network) data, roughly 814 people have been newly diagnosed with hepatitis C in the past 5 years. This is extrapolated from data from 2 years. Between May 2015 and July 2017, Nottingham University Hospital has started 408 people on treatment.

Progressive liver disease

On the NUH patient management system "HepCare", of those with active HCV, 16.3% have liver cirrhosis. When comparing local numbers of hepatitis C end stage liver disease and/or hepatocellular carcinoma, Nottingham and Nottinghamshire have similar numbers to the England average (Figure 8).

Figure 8. Under 75 mortality rate from hepatitis C related end-stage liver disease/hepatocellular carcinoma 2013-15 (rate per 100 000)

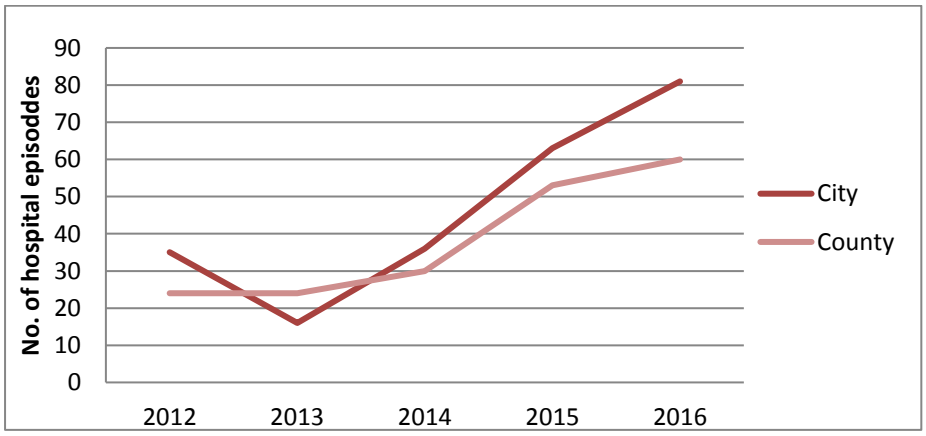
Area	Value	Lower CI	Upper CI
England	0.67	0.63	0.71
East Midlands region	0.64	0.51	0.80
Nottingham	0.67	0.25	1.47
Nottinghamshire	0.46	0.22	0.84

Source: Public Health England (based on ONS source data)
(PHE, 2017b)

Admissions

HES data shows that over the past few years hospital admissions for people with a primary diagnosis of chronic hepatitis C has been increasing annually.

Figure 9. Chronic hepatitis C hospital admissions from Nottingham City and County



Source: Hospital Episode Statistics

2.3 Hepatitis A

There have been outbreaks of hepatitis A in England over the past year. Between July 2016 and January 2017 there were 12 reported cases of hepatitis A within the East Midlands. 8 of the cases were amongst MSM. 3 were a cluster transmitted via a factory from environmental exposure. Out of 10 regions in England and Northern Ireland, the East Midlands had the second highest number of reported cases (second to London). (Beebeejaun, 2017)

2.4 Hepatitis E

The number of confirmed Hepatitis E cases in the UK has increased significantly since 2010. Public Health England reported a total of 1265 cases in 2016, which is more than three times the number in 2010. (PHE, 2017)

Figure 10. Number of hepatitis E cases by year confirmed by reference laboratories and SGSS (second generation surveillance system) reported cases combined after de-duplication

Year	No. of cases
2010	370
2011	550
2012	734
2013	876
2014	1109
2015	1279
2016	1265

(PHE, 2017)

3) Targets and performance

3.1 Hepatitis B

The Public Health Outcomes Framework (PHOF) includes outcome measures for hepatitis B vaccination in eligible infants. In 2015 to 2016, 100% of eligible children under one years old received 3 doses of hepatitis B vaccine at any time by their first birthday in Nottingham City. There is no comparable data for Nottinghamshire County for the same year but in the previous year 2014 to 2015, there was also 100% completion in Nottinghamshire. 95% received 4 doses of the vaccine at any time by their second birthday in Nottingham City and 100% in Nottinghamshire (Figure 11) (PHE, 2017b). These figures are generally similar or better than other neighbouring areas within the East Midlands. Since August 1st 2017 however, all babies born in the UK will be eligible for hepatitis B vaccine.

Figure 11. Public Health Outcomes Framework indicator 3.03i

3.03i - Population vaccination coverage - Hepatitis B (1 year old) 2015/16 — Proportion - %

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
Nottingham	→	20	100	83.9	100

3.03i - Population vaccination coverage - Hepatitis B (1 year old) 2014/15 — Proportion - %

Area	Count	Value	95% Lower CI	95% Upper CI
Nottinghamshire	12	100*	75.8	100

3.03i - Population vaccination coverage - Hepatitis B (2 years old) 2015/16 — Proportion - %

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
Nottingham	→	19	95.0	76.4	99.1
Nottinghamshire	–	12	100	75.8	100

(PHE, 2017b)

In Nottingham City, the percentage of eligible people completing a course of hepatitis B vaccination for those who have entered substance misuse treatment is double the England

average, where as in Nottinghamshire County the percentage is roughly the same as the England average (Figure 12).

Figure 12. Percentage of eligible persons completing a course of hepatitis B vaccination for those who have entered substance misuse treatment 2014/15

Area	Value	Lower CI	Upper CI
England	8.7	8.4	8.9
East Midlands region	6.1	5.4	6.9
Nottingham	17.5	14.6	20.8
Nottinghamshire	8.6	6.6	11.1

Source: Public Health England, National Drug Treatment Monitoring System (NDDTMS) (PHE, 2017b)

3.2 Hepatitis C

Public Health England indicators show that for hepatitis C testing within a substance misuse treatment setting, that Nottingham and Nottinghamshire substance misuse services are slightly above the England and East Midlands average for hepatitis C testing.

Figure 13. Persons in substance misuse treatment who inject drugs – Percentage of eligible persons who have received a hepatitis C test 2014/15

Area	Value	Lower CI	Upper CI
England	81.5	81.2	81.7
East Midlands region	81.3	80.5	82.1
Nottingham	86.2	83.8	88.3
Nottinghamshire	87.0	85.4	88.4

Source: Public Health England, National Drug Treatment Monitoring System (NDDTMS) (PHE, 2017b)

Treatment Targets

In terms of treatment targets, NHS England has set a National target to cure 95% of patients with HCV. This is since newer hepatitis C medications have been developed which have better cure rates and fewer side effects than the traditional medications. These novel antiviral treatments for hepatitis C are expensive but NICE deems them to be cost effective, because the cost of complications with advanced liver disease is much greater. Hepatitis C alone accounts for a loss of up to £367 million per year in the UK, however studies in Europe have shown savings of hundreds of millions annually in terms of work productivity when the new hepatitis C medications were used. (Foundation for Liver Research, 2017)

At present hepatitis C treatment services are commissioned centrally by NHS England through operational delivery networks (ODNs). There is funding for 12 500 patients in England for 2017/18 with plans to increase this number to 15 000 the year after. There are 22 ODNs in England. Nottingham City and County are part of the East Midlands ODN, covered by the same region as Lincolnshire and Derbyshire. Nottingham is the lead and Nottingham University Hospitals NHS Trust has a CQUIN (commissioning for quality and innovation) to ensure that delivery of this high cost therapy hits patients numbers required by NHS England Specialised commissioners but also that quality outcomes (cure rates) remain at the levels seen in clinical trials (>95%).



Source: NHS England

Figure 14. The 22 ODNs in England (Nottingham ODN is number 10 on the map)

Nottingham has had higher treatment numbers, partly because of its higher known prevalence and because of the better developed community services to detect infection and engage patients with HCV. (HCV Action, 2017) The treatment targets are set quarterly, with the number to be treated increasing by one each quarter. In July 2017 the target for the East Midlands was to treat 37 patients a month. The National plan for eradication of HCV (signed up to by NHS England) will require significant expansion of community and outreach services into high risk populations (substance misuse services and prisons) as well as case finding in primary care and emergency departments. Currently most patients who have been diagnosed and who were in contact with secondary care have been treated. Without a change in provision, NUH will fail to hit the targets required for eradication of this virus from the local population. This has a financial effect as the values of the NUH CQUIN is £3.2 million which will be lost from the NUH budget if the targets are not hit with its consequent impact on the health economy.

From 1/1/16 to 31/12/16, 186 patients with HCV were treated by the Nottingham University Hospitals' team. From May 2015 – July 2017 there has been 408 started on treatment. Because the more recent medications have good cure rates this means that case finding is becoming more difficult as more people are cured.

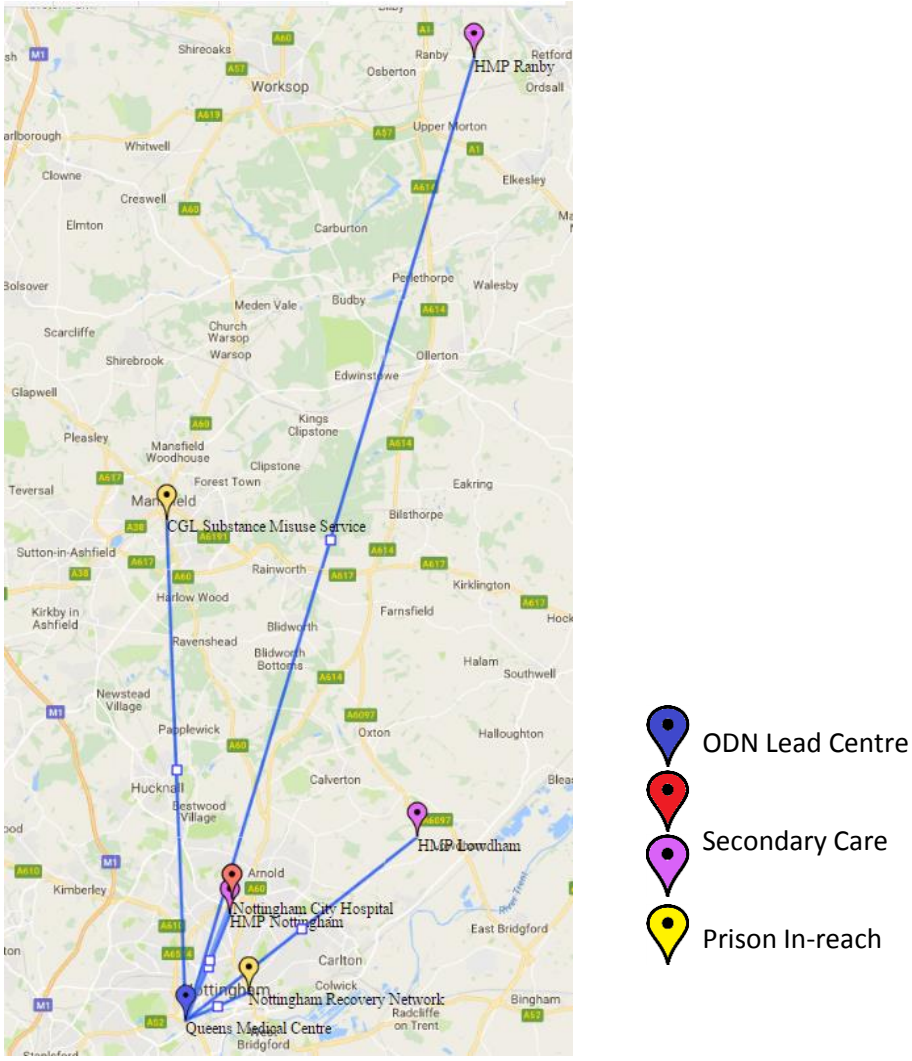
3.3 Hepatitis A and E

At current there are no targets for hepatitis A and E.

4) Current activity, service provision and assets

In Nottingham City and County there are a number of processes and activities to prevent, identify and treat people with viral Hepatitis. Figure 15 shows where hepatitis B and C are tested and treated within Nottinghamshire. In addition, sexual health services promote and deliver hepatitis A and B vaccination with a particular focus on key target groups. They will also carry out hepatitis C testing, advise and refer if necessary.

Figure 15. In-reach and outreach hepatitis services in Nottinghamshire



(East Midlands ODN, 2017)

4.1 Prevention

4.1.1 Hepatitis B

Hepatitis B vaccination is at current considered for people who are at high risk which includes, people who inject drugs or have a partner who injects drugs, people who change their sexual partners frequently, men who have sex with men, babies born to infected mothers, close family and sexual partners of someone with hepatitis B, anyone who receives regular blood transfusions or blood products, people with any form of liver disease, people with chronic kidney disease, people travelling to high-risk countries, male and female sex workers, health care staff or people who work where there is risk of contact with blood or

body fluids, prisoners and families adopting or fostering children from high-risk countries. (NHS choices, 2015)

In Nottingham and Nottinghamshire, GP practices can opportunistically offer the vaccine to at risk groups. Substance misuse services across Nottingham and Nottinghamshire also offer the vaccine. This includes "The Health Shop" in Nottingham City – a service which provides advice on sexual health and substance misuse. Prison services will also offer the vaccination. Other services that come into contact with people at risk who do not offer it can sign post to their GP or genito-urinary medicine (GUM)/sexual health for the vaccination. Community sexual health clinics across Nottingham and Nottinghamshire tend to refer the client to the central GUM service for the hepatitis B vaccine.

Since 1st August 2017, all babies born on or after this date are offered immunisation for hepatitis B vaccination. Previously the HBV antenatal and new born immunisation programme offered all pregnant women screening for hepatitis B and babies of mothers who test positive were provided with HBV vaccination. (PHE, 2017c)

Four doses of the vaccine are given. The first is given within 24 hours of birth, the second at one month, the third at two months and the fourth at 12 months. Babies born to mothers with acute hepatitis B or displaying a higher risk of infectivity on the blood test, are given immunoglobulins as well which further helps prevent the disease. (NHSE, 2011)

4.1.2 Hepatitis C

There is no vaccination for hepatitis C. However harm reduction is promoted at the "Health Shop" (drugs and sexual health clinic) in Nottingham City. Programmes such as needle and syringe exchange help reduce the risk for PWID. They also provide gloves and condoms and also give advice and support around substance use, blood borne virus testing and hepatitis B vaccinations. (NHS Nottinghamshire healthcare NHS Foundation Trust, 2017)

The RCGP (Royal College General Practitioners) provides updates on knowledge and guidance on the management of Hepatitis C and B via online learning. (RCGP, 2017)

4.1.3 Hepatitis A

Hepatitis A vaccination isn't routinely offered to people in the UK as the risk of it is still relatively low. However it is given to close contacts of someone with hepatitis A, people who are travelling to countries where there is a high prevalence of hepatitis A, people with long-term liver disease, men who have sex with men, PWID and those who work in areas where they may be exposed to hepatitis eg. Sewage works, zoos or people with poor hygiene. (NHS choices, 2016a) Hepatitis A vaccination is available at GP practices, hospitals and some sexual health clinics.

4.1.4 Hepatitis E

There is no vaccination for hepatitis E. There are other preventative measures such as ensuring animal products are cooked thoroughly. Those with known hepatitis E should avoid preparing food for others and limit contact with others when possible. In particular they should avoid pregnant women and those with chronic liver disease. Close contacts of those with hepatitis E should wash their hands thoroughly after contact with an infected person and always wash their hands after going to the toilet, before preparing food and serving and eating food. (PHE, 2017)

4.2 Testing and diagnosis

4.2.1 Hepatitis B and C

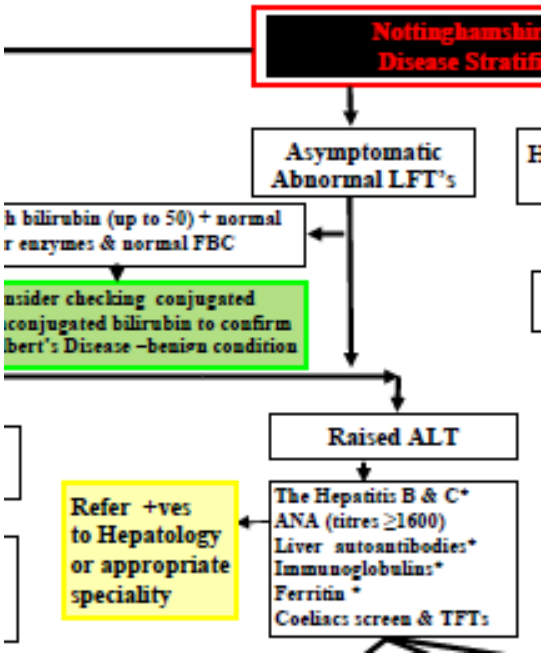
In the general population, testing is opportunistically carried out should a person present to a health care professional with risk factors. This may be in for example, primary care, substance misuse services, prison services, accident and emergency, in-patient or out-patient settings or occupational health.

Figure 16. Mapping of testing services for hepatitis B and C

Service	Provider	
	Nottingham City	Nottinghamshire County
Substance Misuse Service	- Nottingham Recovery Network (NRN)	- CGL (Change Grow Live)
Prison Services	- HMP Nottingham	- HMP Ranby - HMP Lowdham -HMP Whatton
Genito-Urinary Medicine clinics, Sexual Health clinics and Specialist Primary Care based Sexual Health Services	- Nottingham University Hospitals (NUH) Sexual Health Service including Victoria Health Centre and some of their community clinics at primary care sites - The Health Shop	- NUH Sexual Health Service - Bassetlaw TriHealth (Worksop and Retford) - My Sexual Health – based across 9 primary care sites and Kings Mill Hospital
GP practices	- Practices across Nottingham	- Practices across Nottinghamshire
Secondary care departments	- NUH	- NUH - Sherwood Forest Hospitals (SFH)
Occupational health	- Various public and private sector	- Various public and private sector
Lab testing	- NUH	- NUH - SFH

In General Practice or a medical setting a person should also be tested if an abnormality is detected on a routine liver blood test. Looking at the latest Nottinghamshire Adult Liver Disease Stratification Pathway, hepatitis B and C are checked if a particular liver enzyme is raised (see snapshot of relevant part of the pathway below, figure 17).

Figure 17. Nottinghamshire Adult Liver Disease Stratification Pathway



(NUH, 2016)

Dried blood spot testing in infants

There is now an organised pathway for Dried Blood Spot testing for infants who are born to mothers infected with HBV. It is offered at 12 months and should ideally be checked when they are having their fourth dose of the HBV immunisation. (PHE, 2013)

Testing in substance misuse services

All substance misuse services are contracted to test for hepatitis B and C. They can either use venepuncture or dried blood spot testing (DBS) to obtain samples. This is where a lancet is used to get some blood which is applied to a piece of card for testing, rather than the more traditional blood test via a needle. DBS tends to be the preferred method.

The Health Shop in Nottingham, where there are substance misuse and sexual health services in Nottingham also provides testing of blood borne viruses. It is open to all but is particularly helpful for vulnerable groups. Providers and outreach services for homeless people such as “Emmanuel House” will encourage service users to attend the Health Shop for hepatitis testing here.

In Nottingham City drug and alcohol services, known as Nottingham Recovery Network and Last Orders, provide routine venous blood tests or DBS testing is carried out by a resident nurse or key worker. All new clients are tested. The services have not identified any barriers to it. (East Midlands ODN, 2016)

In Nottinghamshire County there are integrated adult substance misuse recovery services in Newark, Mansfield, Ashfield, Worksop and Stapleford where DBS testing is carried out within one to two weeks of the client presenting to services. There are some reported barriers to testing due to inconsistencies. Testing is dependent on whether the member of staff remembers to offer it and sometimes staff forget to rescreen after 3-6 months. In addition a wipe clean floor is needed for taking blood and this space is not always available to them. (East Midlands ODN, 2016)

Testing in prisons
Historically, people in English prisons have a higher prevalence of blood borne viruses (BBV) but are under-tested. In 2014 a national policy for opt-out DBS testing for BBVs including HIV, HBV and HCV was formed. The agreement was made via a formal partnership between Public Health England (PHE), NHS England and the National Offender Management Service (NOMS). (PHE, 2016c)

There are four prisons in Nottingham and Nottinghamshire including HMP Lowdham, HMP Nottingham, HMP Ranby and HMP Whatton. There has been an overall increase in testing as DBS testing is preferred by both staff and prisoners as oppose to a blood test. However there have been some reported difficulties in training prison staff to carry out the testing. Stakeholders have reported difficulties in obtaining an adequate amount of blood as a certain amount is needed for the test. Certain patients may be more difficult to test than others. In addition there is a high turnover of staff within prisons and this increases the tendency for workers to revert to opt-in rather than opt-out testing. (HCV Action, 2017b) Unfortunately the testing rate is therefore still low and DBS testing is still not being universally used.

Testing within primary care
The best way to screen patients for risk factors for hepatitis B and C within primary care is not yet certain. A Department of Health funded study called Hepatitis C – Assessment to Treatment Trial (HepCATT) will be reported later this year and will help inform local strategy. The study aims to develop and conduct a complex intervention within primary care and evaluate its effectiveness. (Roberts et al, 2016)

Within Nottingham City, an HCV “Pop up” prompt tool was piloted on SystmOne. SystmOne is a widely used patient computer management system within primary care. A message for the clinician comes up on the screen if a patient’s record had any coded risk factors for hepatitis C. It reminds them to offer testing or harm reduction advice (HCV Action, 2014). Unfortunately when piloted it was difficult to engage clinicians and the majority did not give feedback.

Testing within sexual health services
Sexual health services across Nottingham City and Nottinghamshire County provide hepatitis B and C testing for those at risk.

4.3 Treatment

4.3.1 Hepatitis B

Acute hepatitis B is usually self- limiting and therefore only symptomatic treatment is given for pain, fever and itching. When the condition persists for longer than 6 months, there is no medication that can cure chronic hepatitis B, however sometimes liver specialists give antiviral medication to prevent the disease from progressing. (GOV, 2014)

4.3.2 Hepatitis C

The drugs used for hepatitis C treatment locally are decided by the regional commissioning agreements. The most cost effective treatment for the patient at the time is given. There are many combinations and treatment lengths vary depending on the genotype of hepatitis C being treated but the therapy is all oral and lasts 8-16 weeks. There are no significant side effects and cure is determined by absence of the virus 12 weeks after completing therapy. Clinics are held at QMC (Queen’s Medical Centre) and NCH (Nottingham City Hospital), but

the majority of patients will be assessed and treated in outreach clinics at a variety of community/prison sites.

Outreach

There has been a move away from purely outpatient appointments within a hospital setting over the past 15 years. This is because DNA (did not attend) rates were high in an outpatient setting, particularly amongst newly referred patients. A study in Nottingham showed that between 2000 and 2002, of 256 newly diagnosed people with HCV, 49% were referred to a specialist clinic but only 27% attended. 10% were commenced on treatment. (Irving et al. 2006)

The Nottingham Recovery Network has outreach treatment services in two locations in Nottingham City where a specialist nurse attends. There are also hepatitis C treatment services at the Windmill GP practice in Sneinton, Nottingham.

In Nottinghamshire County a satellite clinic was created at a substance misuse service in Mansfield, Nottinghamshire, in 2002, now called Change Grow Live (CGL). By April 2015 the clinic had expanded from half a day per fortnight to one day a week. (Jack, 2016) If a blood spot test is positive for hepatitis, done by any of the other substance misuse clinics then they are referred to this clinic and results are discussed at weekly MDT meetings at the Queen's Medical Centre (QMC). The service user needs to attend the QMC for their initially appointment and then they are followed up in the satellite clinic. This can be problematic for patients, as they may live far away.

Three of Nottingham City and County's prisons (HMP Nottingham, HMP Ranby and HMP Lowdham Grange) have hepatitis outreach nursing services. Nurses visit the prisons either weekly or fortnightly to provide hepatitis C treatment. This provides a service which would otherwise be difficult for them to receive. There have been reported difficulties within prison outreach due to movement of prisoners between prisons and staffing. Prison services still require enhancement to every aspect of HCV care including increased testing rates and provision of therapy (Jack, 2016).

Figure 18. Mapping of treatment services for hepatitis C

Service	Provider	
	Nottingham City	Nottinghamshire County
NUH	Queen's Medical Centre Nottingham City Hospital	Queen's Medical Centre Nottingham City Hospital
Substance Misuse	NRN	CGL
Prisons	HMP Nottingham	HMP Ranby HMP Lowdham
GP specialist service	The Windmill Practice	--

4.3.3 Hepatitis A

Treatment for hepatitis is to treat symptoms only. Usually the virus will be cleared naturally. If symptoms are severe sometimes the person needs to be admitted to hospital. (NICE CKS, 2014)



4.4.4 Hepatitis E

People with hepatitis E usually clear it without treatment within a few weeks. It is advised however that people avoid alcohol during the illness. Those more susceptible to acute liver failure, such as pregnant woman, older people and people with weaker immune systems may require closer observation to check that their liver function is not being affected. (PHE, 2017)

5) Evidence of what works

5.1 Prevention

Raising Awareness and Reduction of stigma

People with hepatitis C often have no symptoms so are unaware that they might be infected. Increasing awareness particularly amongst at risk groups can help increase testing and early treatment. (PHE, 2017a)

Research has shown that stigma is a barrier to hepatitis C testing, treatment and care. When the qualitative literature was reviewed it was argued that a better relationship and trust between the patient and their health care worker can reduce the effects of stigma. Stigma is often a result of the association of hepatitis C with intravenous drug injection and can undermine the patient's need for support and care. The literature suggests that health services that seek to build positive and non-judgmental relationships with their patients can help reduce the impacts of stigma on patient care. (Treloar, 2013)

Immunisation

New born immunisation for hepatitis B remains an important preventative measure. Mother to child transmission of hepatitis B infection accounts for 21% of newly acquired hepatitis B infections in the UK. It is important to administer timely vaccinations with high coverage of all identified groups. It can prevent over 90% of cases of persistent HBV developing in new born babies who would otherwise have been affected. (NHS England, 2016)

Harm reduction

Needle and syringe sharing is a well-known cause for transmitting blood borne viruses including hepatitis C, B and HIV. In addition there is risk of transmission from other drug injecting paraphernalia such as filters, mixing containers and water, particularly of hepatitis C. Needle and syringe programmes have been implemented amongst specialist drug misuse services across England. Reports of those who shared needles and syringes and in contact with specialist services, decreased from 33 to 14% between 2001 and 2012. Sharing filters, mixing containers and water also declined from 45 to 34%. (NICE, 2014) NICE commissioned Addaction, a UK based drug and alcohol charity, to look at the relevance, use, acceptability and ease of implementation of the revised NICE guidance for Needle and Syringe Programmes. Ten recommendations were made which include Consultation and Involvement of users, practitioners and the local community, monitoring of services, providing a mix of services and providing community pharmacy-based needle and syringe programmes as well as specialist needle and syringe programmes. (NICE, 2014)

Control measures

Control measures for hepatitis A have been recommended by epidemiology and health protection teams in England following national outbreaks of hepatitis A infection in December 2016. For example they encourage enhanced surveillance for MSM associated cases with

an adapted questionnaire, disease information and targeted hygiene advice. Vaccination for those at-risk MSM in outbreak areas is advised. They also suggest liaising with lesbian, gay, bisexual and transgender and sexual health charities, gay-dating apps and gay venues to raise awareness through social media and health promotion visuals. (Beebeejaun et al. 2017)

5.2 Testing

Testing for hepatitis B and C is recommended in NICE guidance to be carried out by primary care, prisons and youth offender institutions, immigration removal centres, drug services and in GUM and sexual health clinics. (NICE, 2013)

There are a number of ways of testing for hepatitis B and C, including from venous blood, a dried blood spot and saliva. New testing technology, including the OraQuick HCV, tests for Hepatitis C produces results within 20-40 minutes. It is developed for use in the community, general practice or mobile clinics and allows for an immediate result and increases access to testing and results. (NICE, 2015) This may be a more effective way of obtaining a sample than DBS. Especially as difficulties have been reported with obtaining enough blood from patients.

Pharmacy involvement

There has been some research into pharmacies testing patients for hepatitis C using DBS testing which reported positive feedback from service users and that staff found the test straightforward and achievable.(Radley et al. 2016)

5.3 Treatment

NICE at current is updating its guidance on hepatitis C treatment. The novel hepatitis C medications have not yet fully been reviewed by NICE. In their guidance it is stated, “NICE has decided that the development of a hepatitis C clinical guideline should continue to be paused until there is stability in the availability of treatments and the cost to the NHS of the drugs”. (NICE, 2016)

NHS England has still commissioned the novel medications despite the NICE guidance being in the process of updating. This is based on evidence of large phase 2 and 3 clinical trials.

Outreach clinics

HCV Action has presented Nottingham Outreach clinics as an example of good outcomes for overall rates of referral, attendance and treatment for those with hepatitis C. Outreach work began in 2002 due to problems with non-attendance. The improvements over a decade in referral, attendance and treatment are shown in the table below.

Figure 19. Difference in referral, attendance and treatment initiation before and after Outreach clinics were established

	2010 to 2012	2000 to 2002
Proportion of people with a diagnosis of hepatitis C referred to a specialist clinic	80%	49%

Proportion of people who attended clinic who were referred	70%	27%
Proportion of people who started treatment who were referred	38%	10%

(HCV Action, 2017a)

6) What is on the horizon?

Since February 2017 there has been a move away from interferon, meaning that effective medications for all types hepatitis C can be taken orally rather than via an injection. With limited supply due to cost, at present people with HCV and liver cirrhosis are given priority to receive the treatment. People with HCV who attend drug and addiction services or are in prison are also given higher priority at present.

With the medications being able to be taken orally with few side effects, they could be given in a community rather than in the hospital. An application for this concept to be explored is being made at current, focusing on “hard to reach” populations, with non-specialist professionals carrying out testing and treatment.

NHS England’s ODNs for the commissioning of new hepatitis C medicines is only funded until 2019. Beyond this point the funding for the future of hepatitis C treatments remains unknown.

In order to engage “harder to reach groups” there have been plans to deliver homecare, with blood test forms, leaflets and hepatitis C medications being delivered to the patients home. This would remove barriers to travel for patients that are less likely to be able to do so.The clinical team would make regular contact with the patient in order to aid compliance and discuss results and progress. This service aims to improve access to treatments across the East Midlands and locally it could be particularly helpful for those in areas of Nottinghamshire where they travel further distances to get to specialist services at the Queen’s Medical Centre. A pilot is currently being undertaken within Nottingham. (NHS, 2016)

With newer treatments being safe and effective, there are plans to explore shifting testing and treatment of hepatitis C to non-specialist professionals within Nottingham City though a grant scheme. Drug treatment environments to be explored include shared care in primary care, pharmacies, needle exchanges and drug misuse services.

7) Local Views

Nottingham University Hospitals Hepatitis services

Feedback from hepatitis services in Nottingham is limited because most of the feedback the Operational Delivery Network (ODN) collected for the East Midlands area was predominantly from Derby and Lincoln. One feedback letter to the Nottingham service stated that they were very pleased with the service, that clinics ran on time, were clean and staff were friendly. Most of all they were relieved to be rid of a life threatening condition, which was also a running theme amongst the East Midlands ODN feedback.

Substance misuse services

Substance misuse services within Nottingham City (Recovery in Nottingham and the Health Shop) have reported a number of service users who were reluctant to be referred for HCV treatment because of stories they had heard about the old treatments. The Team Leader of the substance misuse services reported, “despite staff trying their best to discuss the new treatments they (the service user) won’t give consent for a referral to be made.” As a result a buddy type system is being looked into, which intends to link those who have cleared the virus with the new treatment to speak with hesitant service users at the pre-referral stage.

HCV Action Steering Group

HCV Action is a steering group that includes consultant hepatologists, hepatitis C nurse specialists, GPs with a specialist interest in Hepatology, patient and pharmaceutical industry representatives all over the country. At the HCV Action Midlands and East Hepatitis C Educational Event in Feb 2017, the views surrounding ODNs were given from the Nottingham ODN. It was felt that the ODN model meant that there is:

- Better sharing of good practice with a network of colleagues whose experience can be learnt from each other.
- Sharing of resources
- Access to trials.
- Opportunity for small volume centres to continue to see patients locally. Without ODN support there would be more of a struggle.
- An unfortunate additional amount of bureaucracy and it’s cost
- More centralising of services
- More desk top work for viral hepatitis nurses, preventing them from seeing as many patients.

In addition, the Nottingham ODN representative wanted to see an end to limits on the number of patients they can treat as well as an effective web-based database

What does this tell us?

8) Unmet needs and service gaps

Prevention
There is lack of awareness amongst health care professionals regarding hepatitis B and C and their risk factors.
Chronic viral hepatitis remains strongly linked to social deprivation. Hepatitis C is, because of its primary risk factor of previous injecting drug use and hepatitis B because it is primarily a disease of migrant populations where it is spread by maternal transmission or poor health care.
There is lack of targeted prevention activities amongst disadvantaged groups who are vulnerable or socially excluded. For example, homeless people, prisoners and PWID. (HCV Action, 2016/17)

Diagnosis
There is under-diagnosis of viral hepatitis due to lack of awareness amongst disadvantaged and migrant groups (people from countries of high prevalence) about viral hepatitis as well as amongst the public and health professionals.
There is no agreed approach to testing for HBV or HCV in those with risk factors that approach primary care services.
There are no agreed local or national targets for testing of hepatitis B and C.
There are no agreed local or national targets for testing of hepatitis A and E.
There is lack of consistency amongst prison and substance misuse staff as to how (how they ask) and whether they test prisoners/clients for hepatitis B and C.

Treatment
Those living in Nottinghamshire County do not have as accessible treatment services as those in Nottingham City. Longer distances to clinics can act as a barrier to accessing care, particularly for vulnerable groups.
There are now new and highly effective oral medications for hepatitis C (cure rates of 97% or greater) which are readily available and have almost no significant side effects. The major challenges are under-diagnosis and lack of awareness in those who have a diagnosis which means they may not seek therapy.
At present there are limitations to the numbers and types of patients that can be treated with the newest and most effective medication for hepatitis C.
Attitudes and knowledge about the side effects of older hepatitis C medications can put patients off engaging with newer treatments.

9) Knowledge gaps

Local agreement on early diagnosis processes for hepatitis B and C needs to be established. Particularly for groups of people who do not realise they are at risk or do not fall into an obvious risk category. Eg. A person who had a tattoo in a country with high levels of infection and poor infection control standards or a person who had a blood transfusion a few decades ago.

There is lack of knowledge surrounding the numbers of reported cases of hepatitis B and C within the East Midlands. Some laboratory data from hospitals is not reported to PHE.

A better understanding of the spread of hepatitis A within at risk groups eg. MSM communities, is needed and the evidence for promoting safer sex practice is needed.

Hepatitis E, its transmission and disease progression is still not fully understood.

What should we do next?

10) Recommendations for consideration by commissioners

Recommendations		Commissioning responsibility			
		LA	Service providers	CCGs	NHSE
Prevention	Promote harm reduction and awareness of viral hepatitis in health settings.	x	x (GP practice, substance misuse, prisons, sexual health services)	x	
	Promote hepatitis A and B vaccination for all at risk and eligible groups.	x	x (GP practices, sexual health, substance misuse)	x	
Diagnosis	Implement awareness programmes amongst the general population to help bring forward those people who are unaware that they may be at risk of viral hepatitis for testing.	x and PHE			
	Educate professionals and healthcare workers who come into contact with people who are at increased risk of viral hepatitis so that they are aware of testing opportunities.	x	x (GP practices, hospitals, substance misuse, prisons, sexual health services, hostels)	x	
	Support prison staff in continued opt-out testing of BBVs within prisons.	x and PHE	x (prisons)	x	
	Address the barriers to testing for hepatitis B and C within substance misuse services within		x (substance		

	Nottinghamshire County so that a more consistent routine approach is taken.		misuse)		
	Develop computer software for GPs to help identify patients at risk and provide prompting for testing.		x (viral hepatitis services, GP practices)	x	
	Continue to monitor and retest individuals who further put themselves at risk.		x (substance misuse, GP services, sexual health services)	x	
Treatment	Improve engagement in hepatitis treatment services through providing geographically appropriate services. This may include pharmacies, substance misuse services and hostels.	x	x (pharmacies, substance misuse, hostels)	x	
	Support for addiction services, sexual health services and GPs from commissioners to support people who need more active help in engaging with hepatitis treatment services.	x		x	
	Consideration within viral hepatitis services and for discussion with CCGs for improved viral hepatitis services and access to services from those in Nottinghamshire County.		x (viral hepatitis service)	x	
	Continued oversight from NUH hepatology and ODN leadership with regards to progress made within this area.		x (viral hepatitis services)		
	Close communication with neighbouring areas within the shared operational delivery network (ODN) to ensure fair and effective reaching of hepatitis C treatment targets.		x (viral hepatitis services)		x

Key contacts

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