3.5 Hepatitis E

Summary

Number of cases notified, 2016: 90

Number of clinical cases: 56

Crude notification rate clinical cases, 2016: 1.2/100,000 population

Number of cases detected through blood donor screening: 34

Combined clinical and blood donor screening notification rate: 1.9/100,000 population

Percentage of blood donors HEV positive, 2016: 0.044%

Hepatitis E infection is a disease of the liver caused by hepatitis E virus (HEV), a virus which can infect both animals and humans. Most HEV infections are asymptomatic or mildly symptomatic. Therefore, a large proportion of cases are not diagnosed. However, hepatitis E infection can cause liver failure in those with pre-existing liver disease or in pregnant women. Infection is usually self-limiting and resolves in one to five weeks without any treatment. Rarely, chronic hepatitis E infection may develop in people who have a suppressed immune system.[1]

In developed countries, HEV is usually spread from animals to humans through the consumption of undercooked pig and game meat, processed pork or shellfish. It can also be spread directly through handling animals, particularly pigs.[1] A study of pigs in the United Kingdom found that 6% were infected with HEV at the time of slaughter and that 93% had antibodies against HEV (current or past infection).[2] Direct spread of hepatitis E from person to person is very rare, although the virus has passed between people through blood transfusions.[3]

Traditionally, hepatitis E was considered an infection associated with travel to areas with poor sanitation. However, an increasing number of indigenous cases have been identified across Europe in recent years and this led to hepatitis E becoming notifiable in Ireland on December 15th 2015 (Amendment to the Infectious Diseases Regulations, SI 566). The Irish Blood Transfusion Service (IBTS) introduced HEV screening for all blood donations on January 4th 2016.

In order to collect information on the clinical features and risk factors for HEV infection in Ireland, the Departments of Public Health and the IBTS agreed to complete enhanced surveillance forms (ESF) for hepatitis E cases (www.hpsc.ie/a-z/hepatitis/hepatitise/surveillanceforms/) for a one year trial period from the start of July 2016 to the end of June 2017. The IBTS completed the ESF developed by Public Health England from January to June 2016 and

*Table 1. Number and percentage of cases who responded "yes" to each symptom and Fisher's exact test p-value for a difference between clinical and IBTS blood donor screening cases (p≤0.05 indicates a significant difference)**

	Clinical cases		IBTS blood donor screening cases		All		P-value
	Num	%	Num	%	Num	%	
Any symptoms	15	88.2	10	33.3	25	53.2	0.001
Loss of appetite	11	68.8	3	10.0	14	30.4	<0.001
Joint pain	10	62.5	0	0.0	10	21.7	<0.001
Dark coloured urine	8	50.0	1	3.3	9	19.6	<0.001
Fever	7	46.7	2	6.7	9	20.0	0.003
Jaundice	7	43.8	1	3.3	8	17.4	0.001
Weakness of limbs/tingling	6	37.5	0	0.0	6	13.0	0.001
Nausea	5	33.3	2	6.7	7	15.6	0.032
Abdominal pain	4	26.7	3	10.0	7	15.6	0.199
Headaches	4	26.7	0	0.0	4	8.9	0.009
Vomiting	3	18.8	0	0.0	3	6.7	0.039
Diarrhoea	0	0.0	2	6.7	2	5.3	1
Other neurological symptoms	4	30.8	0	0.0	4	9.3	0.006
Other symptoms	9	64.3	7	23.3	16	36.4	0.017

*Information only available for those for whom enhanced forms were completed (17 clinical and 30 IBTS blood donor screening cases, cases with no response for a given question were not included in the denominator for that question)

they provided copies of these forms to HPSC. This form was similar to the one adopted in Ireland in July 2016 and the data collected were comparable. The IBTS also provided data on the total number of blood donors and the number who tested positive for current HEV infection, by age and sex, in 2016.

This is the first report on hepatitis E notifications in Ireland. The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 13th September 2017 and from an in-house database used for enhanced data. HEV notification rates for clinical cases are expressed per 100,000 population and are calculated using the 2016 census. IBTS blood donor denominator data were used for calculating the percentage of blood donors who tested positive for HEV.

Results

There were 90 notifications of hepatitis E in 2016 (1.9/100,000 population). The most likely country of infection was available for 46% (n=41) of cases. Of these, 90% (n=37) were likely to have been infected in Ireland. Country of birth was available for 41% (n=37) and 89% (n=33) of these were born in Ireland. There were no cases notified in females who were pregnant and only a small number of cases reported regular medications or pre-existing serious diseases that would be likely to impact on the severity of their HEV infection.

Clinical cases (n=56)

Sixty two percent (n=56, 1.2/100,000 population) of HEV notifications were clinical cases. These cases were detected because they presented with clinical symptoms or liver function test results consistent with viral hepatitis. Enhanced surveillance forms were available for 71% (n=17) of clinical cases notified since July 2016, of whom 88% (n=15) were symptomatic. The most common symptoms reported were loss of appetite (69%), joint pain (63%), dark urine (50%), fever (47%) and jaundice (44%) (table 1). One patient with HEV died in 2016. His death was not attributed to HEV.

Notification rates for clinical HEV cases were significantly higher in older age groups. Almost two thirds of clinical cases (66%, n=37) were aged 50 years or older and the median age at notification was 57 years (55 years for males and 57 years for females).There were slightly more males than females, with males accounting for 55% (n=31) of clinical cases of HEV (figure 1).

Cases were distributed across all regions but notification rates were lower in HSE SE, S and W (figure 2).

Cases diagnosed through IBTS blood donor screening (n=34)

Thirty eight percent (n=34) of HEV cases notified in 2016 were blood donors detected through routine screening of blood donations. Enhanced surveillance forms were available for 88% (n=30). Cases diagnosed through

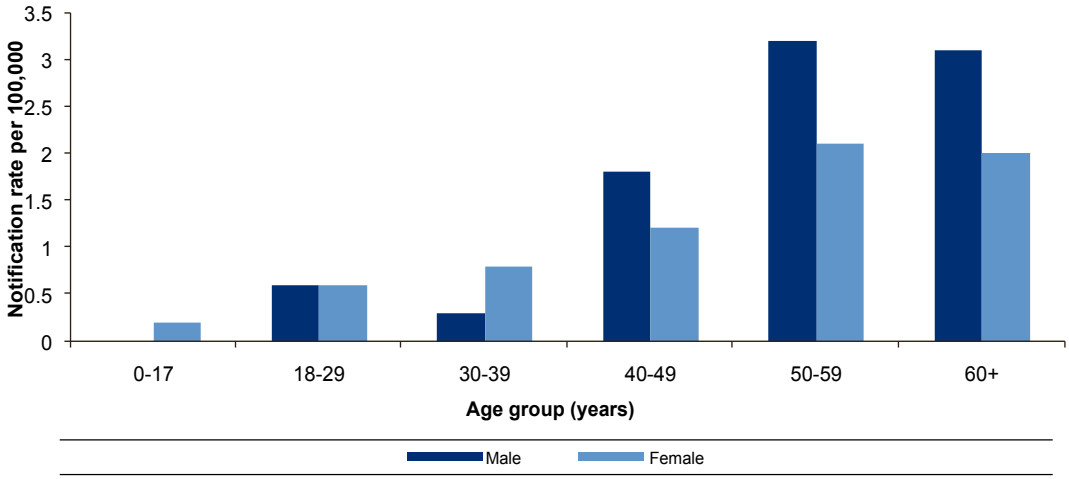

Figure 1. Age and sex specific notification rates per 100,000 population for clinical cases of hepatitis E, 2016

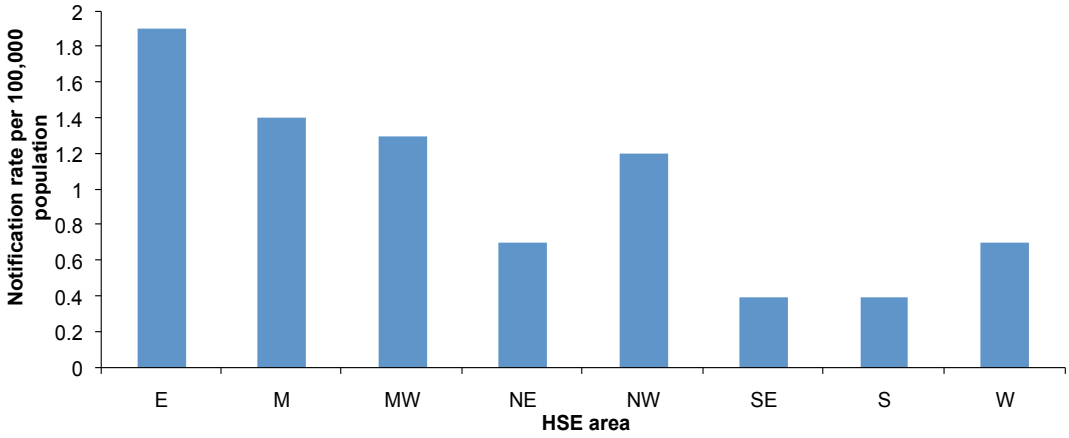

Figure 2. Notification rate for clinical cases of hepatitis E by HSE area, 2016

screening of blood donations were mostly asymptomatic, but one third (n=10) disclosed mild symptoms (mostly fatigue and gastrointestinal symptoms) when questioned post-diagnosis (table 1).

The age and sex distribution of HEV cases diagnosed through blood donor screening is influenced by the age and sex profile of blood donors. The IBTS provided denominator data on the number of blood donors in 2016 so that the percentage of donors testing HEV positive could be calculated. Although the age and sex profile of blood donors is not the same as that of the general population, the percentage who test positive for HEV provides a useful estimate of the incidence and prevalence of acute HEV infection in Ireland. The overall prevalence of HEV in blood donors in 2016 was 0.044%.

Over three quarters (76%, n=26) of HEV notifications detected through blood donor screening were male. The IBTS HEV positivity rate was significantly higher in male blood donors (0.059%) compared to female donors (0.025%) in 2016 (figure 3). The age profile of the blood donors who tested positive for HEV was much younger than that of clinical cases. Eighty five percent of cases identified through donor screening (n=29) were aged between 18 and 49 years and the median age at notification was 37.5 years (41 years for males and 25 years for females). The prevalence of HEV among blood donors aged less than 50 years (0.053%) was more than double that of those aged 50 years or older (0.024%) (figure 3).

*Table 2. Number and percentage of cases who responded "yes" to each exposure in the 9 weeks before illness or HEV diagnosis**

	All	
	Num	%
One or more pork products	44	97.8
Bacon	38	86.4
Pork meat	37	84.1
Pork sausages	37	84.1
Sliced ham, pre-packed	29	74.4
Black pudding	28	65.1
Cured pork e.g. salami	28	63.6
Ham, off the bone/joint	24	61.5
Pork pate	10	23.3
Pork pie	2	4.7
Pork liver	2	4.6
Other pork offal	0	0.0
Other pork products	7	17.5
Undercooked pork	1	3.1
Game	7	15.6
Shellfish	22	48.9
Worked at/visited farm/stable/petting farm/zoo	8	19.1
Physical contact with animals	35	77.8

*Information only available for those for whom food histories on the enhanced forms were completed (15 clinical and 30 IBTS blood donor screening cases, cases with no response for a given question were not included in the denominator for that question)

Food preferences and animal exposures

Food histories were completed for 45 cases of HEV (15 clinical cases and 30 IBTS blood donor screening cases). All but one responded that they were likely to have eaten one or more pork products in the nine weeks before illness or diagnosis (table 2). The most commonly consumed pork products were bacon (86%), pork meat (84%), pork sausages (84%) and sliced ham (74%). Except for cured pork, there were no statistically significant differences in food exposures between clinical and blood donor screening cases.

Although physical contact with animals was also very common (78% of cases), this was not a likely source of infection as contact was mostly with pets such as dogs and cats. No cases reported contact with pigs.

Discussion

The number of notifications of HEV in Ireland in 2016 was higher than was predicted prior to HEV becoming notifiable. Older males have previously been reported as being at higher risk of HEV infection[4] and indeed notification rates for clinical cases of HEV in Ireland in 2016 were marginally higher in males compared to females, and were significantly higher in those aged 50 years and over. Male blood donors were also more likely to test positive than female blood donors. However, the age profile of cases diagnosed through blood donor screening was very different to that of symptomatic cases, with younger donors more likely to test positive. Overall indications in Ireland are that older age is not associated with higher likelihood of HEV infection, just of symptomatic infection, and that males are more likely to be infected with HEV.

Although pork consumption was almost universal amongst cases of HEV in Ireland in 2016, we cannot definitively state that infection was due to pork consumption as we

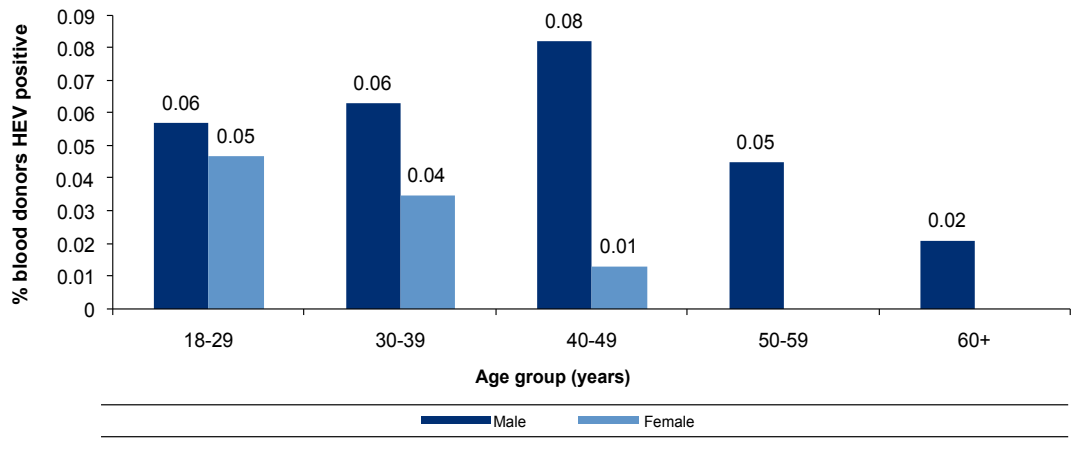

Figure 3. Percentage of blood donors who tested positive for hepatitis E, by age group and sex, 2016 (IBTS data)

do not have data from a comparable general population control group to indicate that pork consumption is higher in cases compared to non-cases. Pork consumption is likely to be very high in the general population in Ireland, particularly over a nine week time period. In a national adult nutrition survey carried out between 2008 and 2010, 1,500 participants were asked to record all food consumed over a four day time period. Meat was consumed by 98% of respondents. Seventy three percent reported consuming bacon or ham and 38% had consumed sausages.[5]

Similarly high levels of pork consumption have been found in other studies. A hepatitis E case control study, carried out in England and Wales in 2011, found that 88% of cases had consumed sausages compared to 75% of controls and that 96% of cases had consumed ham compared to 83% of controls. These differences between cases and controls were not statistically significant. However, a statistically significant association was found between the consumption of sausages and ham purchased at a particular supermarket chain and hepatitis E infection.[6]

Only one HEV case notified in Ireland in 2016 reported consumption of undercooked pork. Results from studies looking at the different combinations of time and temperature required to inactivate HEV in food have varied depending on the food or food substitute used (71°C for between 5 and 20 minutes).[4] The Food Safety Authority of Ireland currently recommends cooking pork thoroughly to a minimum of 75°C in the thickest part of the meat.[7]

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