Epidemiology and Prevention of Hepatitis E

30 Dec 2010

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Content

- Hepatitis E and epidemiology of hepatitis E
- Local situation of hepatitis E
- Foodborne hepatitis E in HK
- Prevention of hepatitis E

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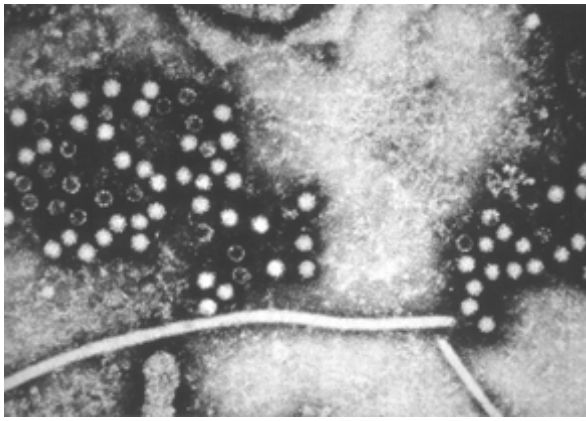
Hepatitis E

- Viral hepatitis is the inflammation of liver caused by virus (A/B/C/D/E)
  - HAV and HEV - contaminated food or water
  - HEV – recognised as an aetiological agent in 1980s
- Symptoms: fever, malaise, anorexia, nausea, abdominal pain, dark urine and jaundice; usually self-limiting and resolves in 2 weeks
- Incubation period: 2 to 9 weeks (Mean 26 to 42 days)



(Source: CDC, USA)

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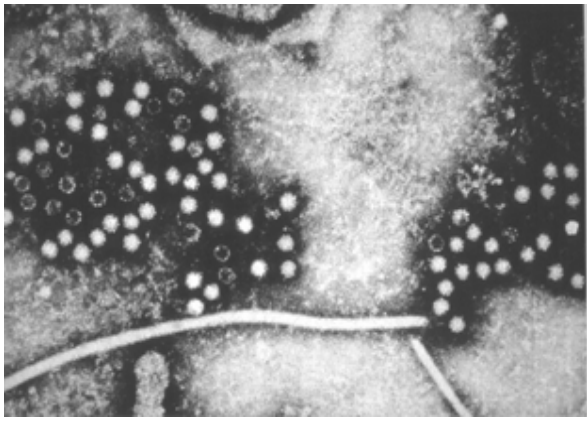
High risk populations

- High risk populations: pregnant women, elderly, patients with chronic liver diseases
  - Pregnant women: death of mother and foetus, abortion, premature delivery

    (Case-fatality rate – 20% in 3rd trimester)
  - Patients with preexisting chronic liver disease: case-fatality rate – 70%



(Source: CDC, USA)

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Transmission route of Hepatitis E

- Faecal-oral route

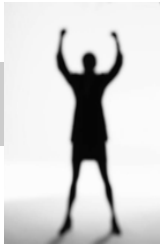
Contaminated water

Pigs

Deer and Boar

Meat or offal

Blood transfusion



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Occupational exposure
e.g. pig farmers, veterinarians

Other animals:
Pigs、boar、deer、
rex rabbit and wild rats, etc.

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Different genotypes of HEV

- Four main genotypes of mammalian HEV
  - **I**: Asia, North Africa, and South America; major cause of water-borne epidemics and significant sporadic disease
  - **II**: Mexico, central Africa, and Nigeria
  - **III**: Wide prevalence in pig population worldwide; sporadic human cases in developed region such as US and several European countries
  - **IV**: Asian countries, including China, Japan, Taiwan and Vietnam; humans and domestic pigs

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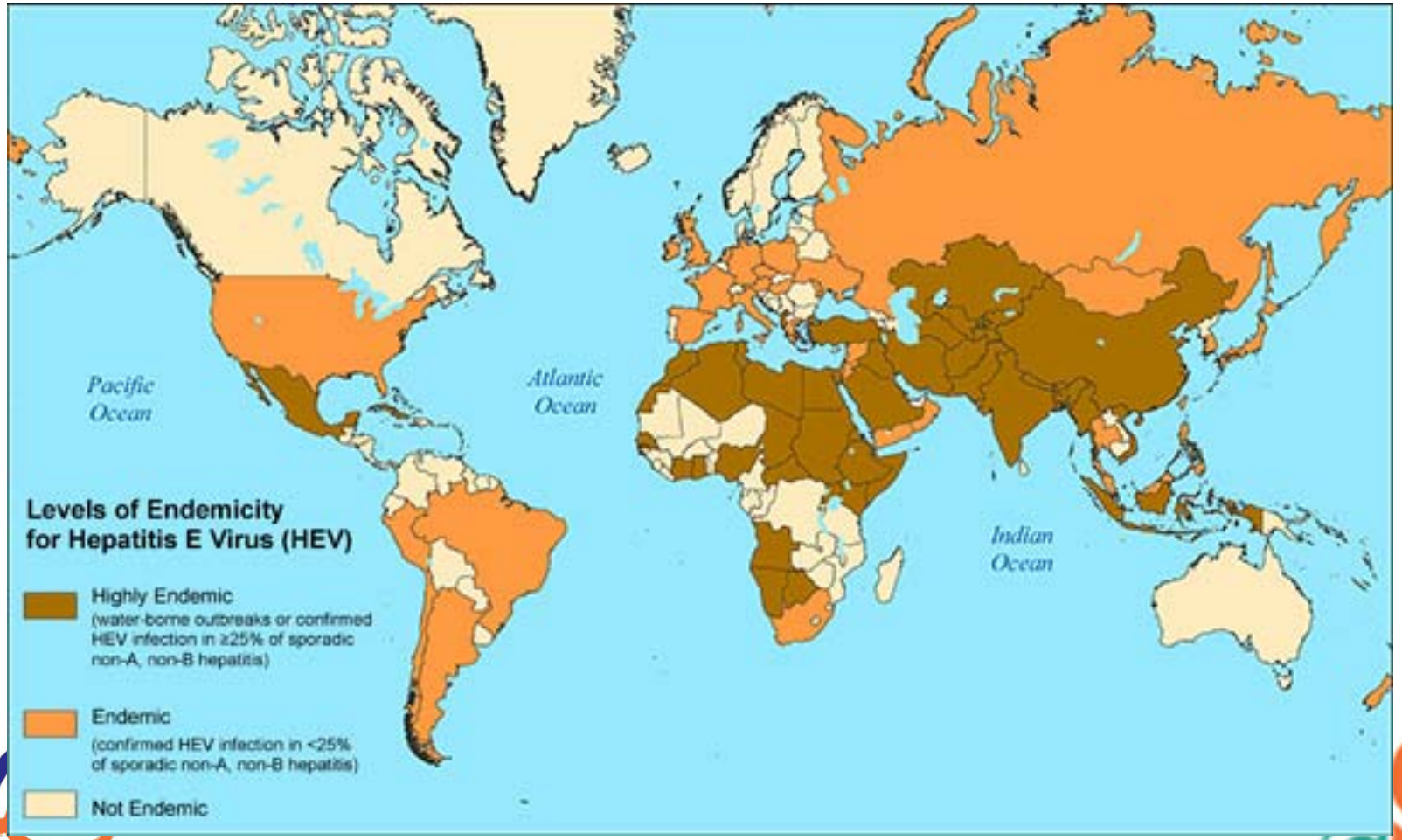
Endemic areas around the world



(Source: CDC, USA)

http://www.cdc.gov/hepatitis/HEV/HEVfaq.htm

Hepatitis E in developing and developed countries

Developing countries / regions

- Peak incidence in sporadic cases → 15 to 35 years old
- Common in developing countries with inadequate environmental sanitation
  - Asia, the Middle East, Africa, and central America

Developed countries / regions

- Autochthonous cases → middle-aged and elderly men (UK: Mean=65 years;
  Japan: Mean=60 years;
  France: Mean=54 years)
- Rare in developed countries; mostly travellers to endemic developing countries
- Increase in report of sporadic cases without travelling has been identified

(Dalton HR, et al., Lancet Infect Dis, 2008)

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Local situation of hepatitis E

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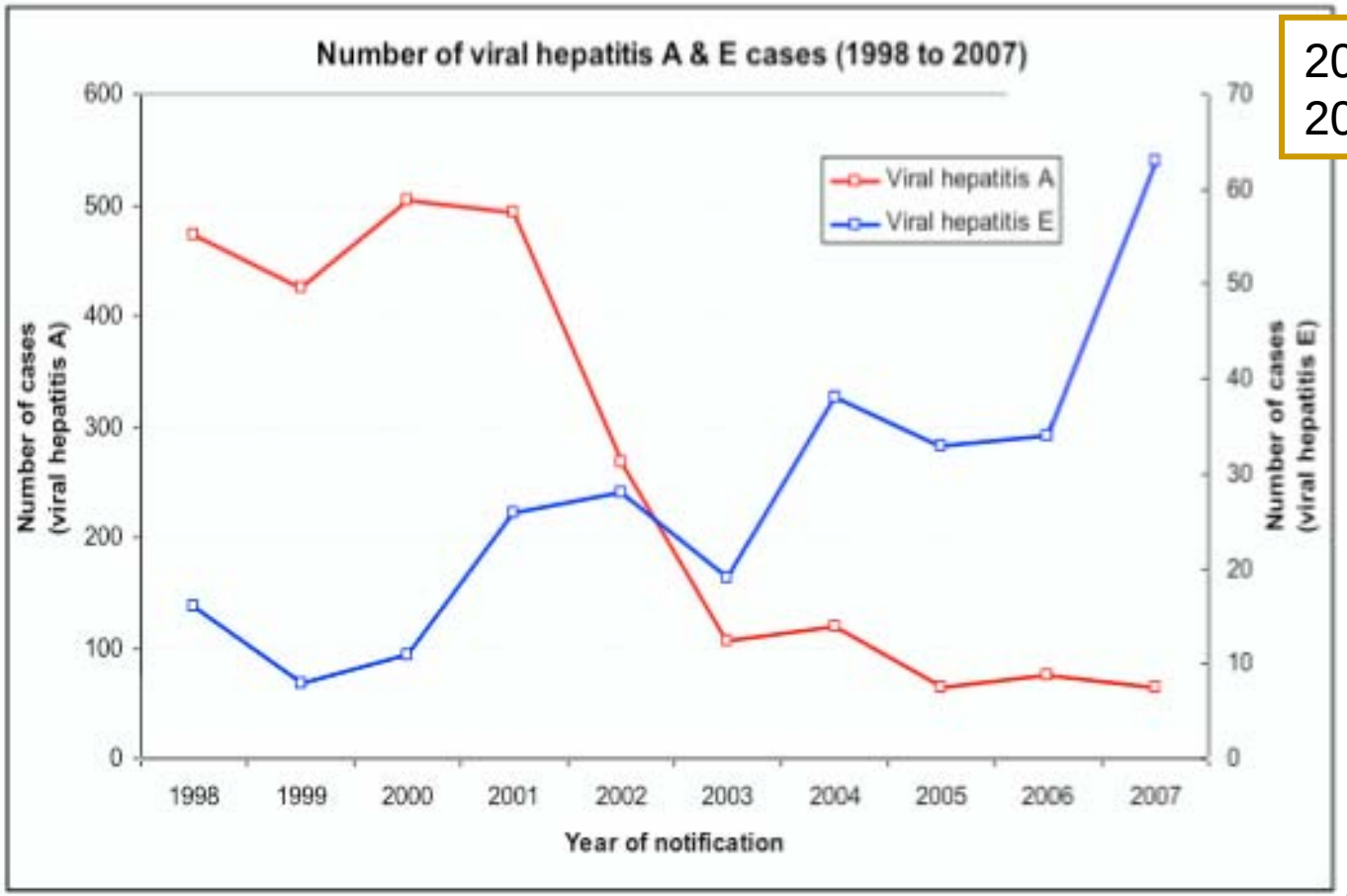
Hepatitis E in HK

Rising trend of hepatitis E cases in recent years



2008: 90
2009: 73

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Centre for Health Protection, 2008

Local hepatitis E cases

- 51 cases analysed, CHP, 2008
  - 65%: no travelling to endemic area
  - Consumed raw or semi-cooked food, e.g. shellfish (33%) or pig offal (26%)
- Most human isolates are genotype IV
- Median age: 49 years old (Review of cases from 1998 to 2008 in HK)

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Foodborne hepatitis E in HK

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Foodborne Hepatitis E in HK

- Faecal-oral route

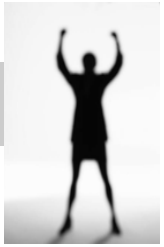
Contaminated water

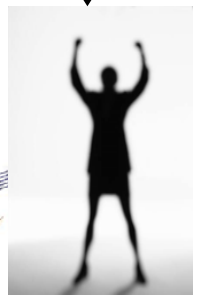
Pigs

Deer and Boar

Meat or offal

Blood transfusion





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Foodborne Transmission ?

- Shellfish - Bivalve molluscs
  - Comparison of hepatitis A and hepatitis E cases (2002)
    - Hepatitis A cases: recent history of taking shellfish
    - Hepatitis E cases: travel to endemic area
  - Previous examination of bivalve shellfish did not show that they were the major vehicle locally

- Pig livers
  - HEV in commercial pig liver – US:14/127(11%);Japan: 7/363 (1.9%); Netherlands:4/62 (6.5%)
  - Local - 100 samples were collected from slaughterhouse in 2009

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HEV in Fresh Pig Livers

Types of Pigs	Age	No. of Positive / No. of Sample (Positive rate)
Porker (肉豬)	Around 6 months old	0/49 (0%)
Roaster (燒種豬)	Around 4 months old	16/51 (31%)

- **Only found in Roaster samples (<2% of total admission of pigs from Mainland)**
- **Local live pigs (only porkers) among locally slaughtered pigs: 5%**

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HEV in Fresh Pig Livers

	Sample no.	Source
Cluster 1	Sample 2	Human
	Sample 3	Human
	Sample 4	Human
	Sample 5	Human
	Past case in 2007	Human
	Past case in 2006	Human
	V09-046	Pig
	V09-069	Pig
Cluster 2	Sample 7	Human
	V09-058	Pig
Cluster 3	Sample 6	Human
	V09-035	Pig
	V09-082	Pig
	V09-116	Pig
	V09-117	Pig
Cluster 4	Sample 1	Human
	V09-003	Pig
	V09-079	Pig
	V09-110	Pig

Sequence analysis

- Of 48 human cases with onset from Jan to Jul, 7 isolates had same partial sequence as 10/16 pig isolates
- Of these 7 human isolates, only 3 recalled consumption of pig offal (liver or intestine)

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HEV in developed countries

- HEV from cases acquired locally showed the closest with pig strains from the same region in comparison with those from travel-related cases
- Detection of HEV in commercial pig livers
  - E.g. U.S., Netherlands, Japan
- Detection of HEV in pig samples from farms or slaughterhouses

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Regions	Ages and Positive rates
Hong Kong	~4 months old pigs: 31% (16/51)
Southern France	3 months old pigs: 65% (65/100)
Northern Italy	3-4 months old: 42.2% (27/64)
Japan (20 prefectures)	3 months old pigs: 10% (32/310)
Japan (some prefectures)	3 months old pigs: 15% (113/750)
Korea	3 months: 6.7% (2/30)
Netherlands	Farms positive rate: 55% (53/97) Pooled sample from pigs (mean 20 weeks)
Thailand (two provinces)	2 months old pigs: 27.5% (11/40)

*Different types of samples (serum, bile, stool) were used in studies in other countries

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HEV in Pigs

- Pigs possibly contracted HEV during young age
  - Appear clinically normal
  - Excrete virus in faeces
  - HEV present in pigs for some period of time, i.e. 2 to 3 wks
  - Production of antibodies in response to infection
  - Infected pigs recover without showing symptoms
- HEV was only detected in liver of roaster pigs, but not porker pigs which is around 6 months old

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Transmission to humans

- May present in humans and imported pigs for quite a while
  - Some isolates from present and past cases were found to have same partial sequence as pig isolates
- Pigs could be one possible source, but other potential sources exist:
  - 7/48 cases with same partial sequence as pigs, and only 3 recalled consumption of pig offal
  - Contaminated water, consumption of raw or undercooked shellfish
  - Other transmission routes: blood transfusion and occupational exposure
- Difficult to determine exact source of each case due to the long incubation period

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Prevention of hepatitis E

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Food Safety Advice

- Comparing to bacteria, viruses are more resistant to heat. Need to cook food more thoroughly to kill pathogenic viruses! Esp. hotpot, congee
  - Prepare thin slices
- Pig livers: Boil sliced pig liver at 100°C or stir-fry in hot skillet/wok for at least three to five minutes (depending on thickness and quantity)
- Shellfish:
  - Heating to an internal temperature of 90°C for 90 seconds
  - Boil at 100°C until their shells open; boil for additional three to 5 minutes afterwards
- Use separate chopsticks and utensils for handling raw and cooked foods
  - For hotpot, provide utensils of different colour for raw and cooked food !

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Cooked in boiling water

Cooked in congee

Advice on Personal Hygiene

- Currently, no vaccines

- Wash hands thoroughly with running water and soap for 20 seconds
  - Before handling food and often during food preparation
  - After handling raw meat or offal
  - Before eating

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Advice to Travellers

- Maintain good personal and food hygiene

- Avoid drinking water and/or ice of unknown purity and eating uncooked shellfish, uncooked fruits or vegetables that are not peeled or prepared by the travellers

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Conclusion

- Hepatitis E virus generally causes self-limiting disease, but can cause serious complication in some high risk populations
- Foodborne hepatitis E may contribute to rising trend of hepatitis E in Hong Kong
- Ensure food safety practice to prevent hepatitis E

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Thank you

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