



Public Health
England



Hantavirus in England

A sero-surveillance study undertaken
by Public Health England, Porton Down



Tracey Jolliffe, BMS, NHS Fife.



Rare & Imported Pathogens Laboratory

- **Public Health England**

- 3000 staff in 18 locations

- **Porton Down**

- Research facility
- RIPL – Diagnostic Service
 - Biological warfare agents e.g. Anthrax
 - Rare endemic pathogens e.g. Lyme disease
 - Imported pathogens e.g. VHF, Dengue





What are Hantaviruses?

Group of viruses found worldwide

- Old world (Europe and Asia) – HFRS
- New world (N and S America) – HCPS

Disease first identified in UN troops in Korea in 1951

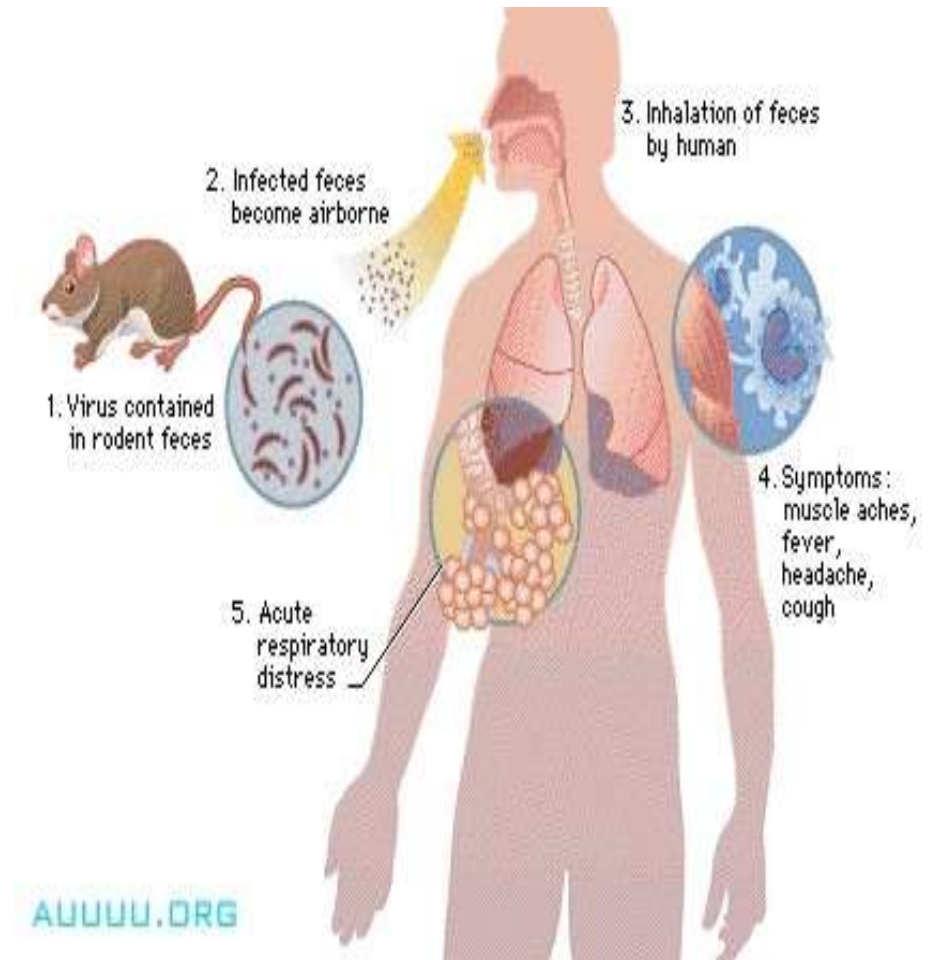
- Virus not isolated until 1976

Hantaviruses are naturally carried by rodents

- Asymptomatic
- Shed virus++ in their urine, faeces, and saliva

Humans become infected

- Direct contact by handling rodents/biting
- Indirectly via inhalation of virus in aerosolised excreta



Old world (Europe & Asia) rodents & viruses



Clethrionomys glareolus
Bank vole
Puumala virus
Tula virus



Rattus norvegicus
Brown rat
Seoul virus



Apodemus peninsulae
Korean field mouse
Amur virus



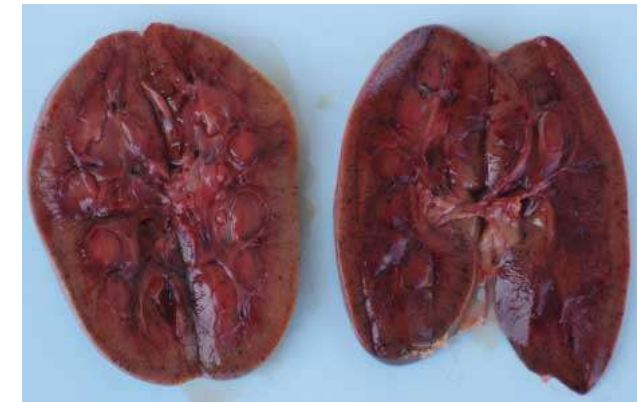
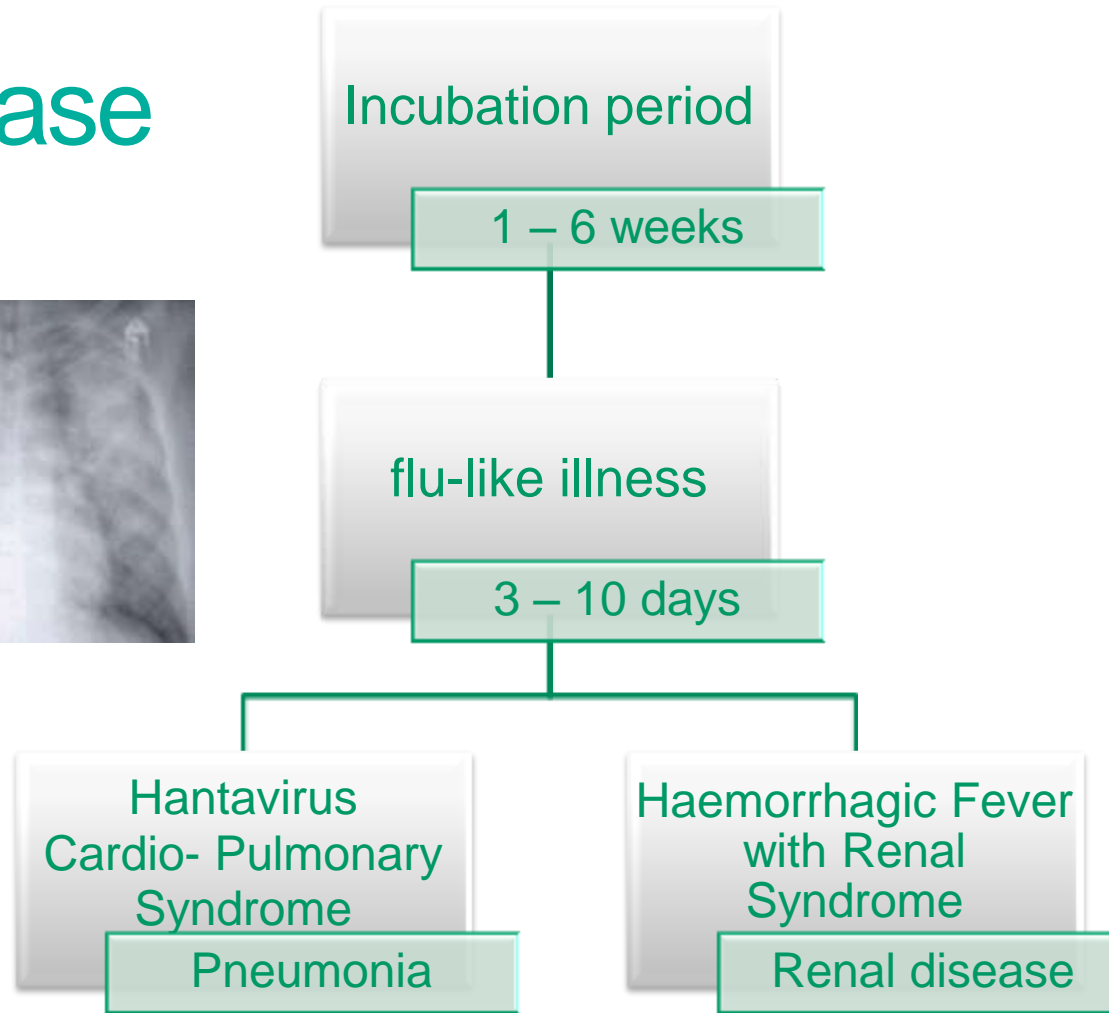
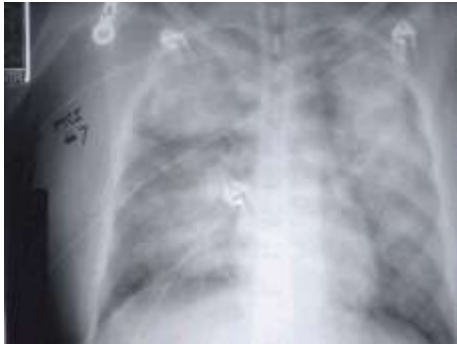
Apodemus flavicollis
Yellow necked field mouse
Dobrava-Belgrade virus



Apodemus agrarius
Striped field mouse
Hantaan virus
Saaremaa virus

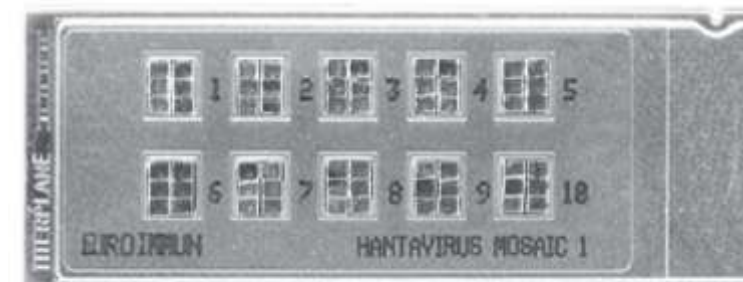
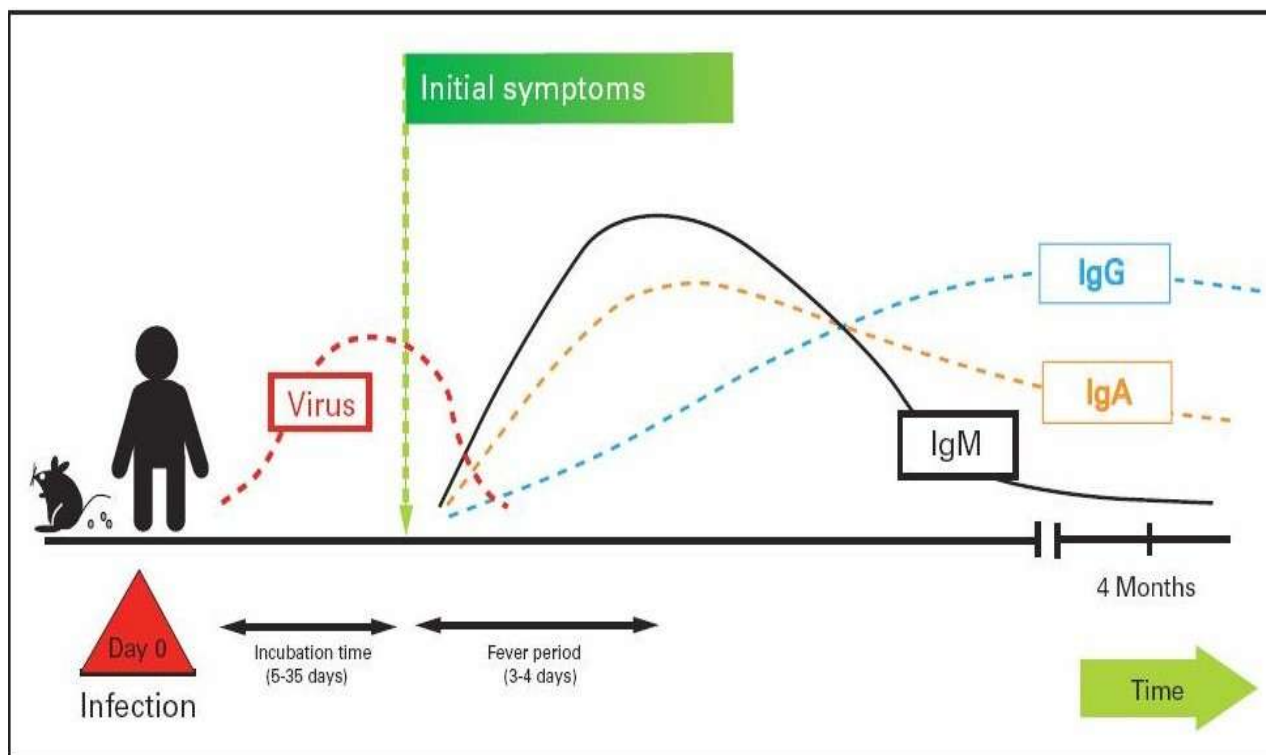








Clinical disease

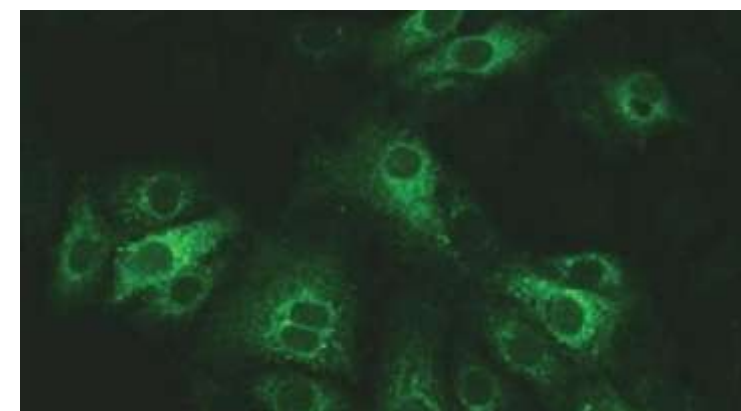




Diagnosis



Hantaan virus (HTNV)			Sin Nombre virus (SNV)
Puumala virus (PUUV)			Dobrava virus (DOBV)
Seoul virus (SEOV)			Saaremaa virus (SAAV)





UK Hantavirus in wild rats

January 2012

- **48 year old Yorkshire farmer**
 - Fever and acute kidney injury
 - Tx for Leptospirosis
 - IgG +ve Seoul Hantavirus (1:10,000)
- **Farm infested with rats (recent increase)**
 - 2/4 rats were PCR +ve (1/2 virus isolated)
 - No +ve from wood mice or bank voles
- **Variant of Seoul virus named Humber**





UK Hantavirus in pet rats

•January 2013

- 28 year old male (diabetic)
- 4/7 hx of flu-like illness
- Admitted with haemorrhagic fever & AKI → ITU
- Ventilated for 38/7 & renal support for 21/7
- IgG +ve for Seoul Hantavirus (1:10,000)

•Girlfriend kept two pet rats

- Girlfriend was seronegative
- Rats – both PCR positive in blood & urine → PTS → PCR +ve lung tissue
- Variant of Seoul Hantavirus named Cherwell

•Rat breeder

- IgG +ve for Seoul Hantavirus (1:100)
- Breeders husband IgG +ve for Seoul Hantavirus (1:10,000)





PHE study

Aim

- Investigate sero-prevalence in high risk groups
- Inform future risk assessments, and allow public health guidelines to be established

Design

Asked to give a blood sample for testing for Hantavirus antibodies, and to fill in a questionnaire.

- (1) Control group – random donors (purchased from National Blood Transfusion Service)
- (2) Pet rat owners
- (3) Occupational exposure to pet rats – Veterinary personnel
- (4) Occupational exposure to wild rats – Farmers, pest control workers, sewage workers



Results

Study group	Nº samples	Nº of positive samples	Seroprevalence (%)
1 – control group	300	10	3.33



Results

Study group	Nº samples	Nº of positive samples	Seroprevalence (%)
1 – control group	300	10	3.33
3 – veterinary staff	170	3	1.76
4 – farmers	120	2	1.76
4 – sewage workers	70	2	2.83
4 – pest control	106	3	2.83



Results

Study group	Nº samples	Nº of positive samples	Seroprevalence (%)
1 – control group	300	10	3.33
2 – pet rat owners	79	26	32.9
3 – veterinary staff	170	3	1.76
4 – farmers	120	2	1.76
4 – sewage workers	70	2	2.83
4 – pest control	106	3	2.83



Outcomes & further work

- Existing leaflet gives sufficient advice
- 450 rat urine collection kits handed out (80 returned), currently being tested at AHVLA
- More work needed with pet rat owners to establish prevalence i.e. fancy rat breeding / showing, and single pets





Public Health
England



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