West Nile Virus infection outbreaks at the European level

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Overview

- The virus
- The epidemiology
  - Situation in Europe
- Challenges for outbreak management:
  - Surveillance
  - Blood and tissue safety
  - Coordination
West Nile virus

- Family Flaviviridae, Genus *Flavivirus*

- Enveloped single stranded positive RNA

- Different lineages

Bakonyi T et al EID 2006 April
West Nile fever

History
- 1937 - first identified in Uganda
- 1950s – first recorded epidemics in Israel

Transmission cycle
- Vector-borne disease
- Natural cycle between birds and mosquitoes
- Asymptomatic infections
- Sporadic disease outbreaks in humans and horses in Africa, Europe, Asia and Australia
Three clinical categories of West Nile virus infection

- West Nile neuro-invasive disease (<1%)
  - Encephalitis
  - Aseptic meningitis
  - Acute flaccid paralysis

- West Nile fever (~20%)
  - “benign” influenza-like illness

- Asymptomatic (~80%)
Epidemiological situation in North America

Canada 2007: 217 neuro-invasive cases 12 deaths
2008: 5 neuro-invasive cases

Since 1999 in the USA:
More than 11,000 neuro-invasive illness cases (1092 deaths)

2007
1217 neuro-invasive cases
124 deaths

2008
640 neuro-invasive cases
37 deaths
## WNV outbreak in Europe and North Africa

<table>
<thead>
<tr>
<th>Year</th>
<th>Months</th>
<th>Country</th>
<th>Group</th>
<th>Cases</th>
<th>Deaths</th>
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<td>1996</td>
<td>Aug-Oct</td>
<td>Morocco</td>
<td>Eq &amp; Hu</td>
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</table>
Spain (2007) 1 case

Hungary (2003-07) 14 cases
(2008) 14 cases
(mid August [8], end Sept [6])

France (2003) 4/7 cases

Italy (2008) 3 or 4 cases
(sept)

Romania (2008) 2 cases
(Aug 3, Sept 12)

Portugal/Ireland (2004) 2 cases

Spain (2007) 1 case

Human neuro-invasive cases
Epidemiological situation in Europe

Horses

* Lineage 1 virus

Italy (1998, 2008)
Lineage 1 virus
Epidemiological situation in Europe

Spain (2007)
3 eagles
Lineage 1 virus

Hungary (2004-2005)
Austria (2008-Sept)
sparrow, hawks
Lineage 2 virus

France (2004)
magpie, sparrow
Lineage 2 virus

Italy (2008-Sept/Oct)
several birds
Lineage 1 virus

Birds
West Nile Virus infection - Europe 2008
Neuroinvasive disease

- Hungary
  - 19 cases reported throughout the country
  - Due to Lineage 2 WNV

- Romania
  - 2 cases confirmed between August and September
  - 1 case was a resident in Budapest

- Italy
  - 6 human cases confirmed
  - Large outbreak in horses at same time
Human Surveillance at the European level

- Since 2002 – all events of public health importance within the EU should be communicated through: “Early Warning and Response System” (EWRS)

- Since 2008 – standardized case definition for WNV infection, focused on neuroinvasive disease

- Challenges:
  - Clinician awareness not high – especially in ‘new’ areas of WNV transmission
  - Laboratory capacity highly variable throughout EU
  - Underreporting at sub-national and national level
  - Underreporting and delays at EU level
But... not only human surveillance...
Challenges in other surveillance needs

- **Mosquitoes**
  - Limited entomologists
  - Not useful for ‘early warning’
  - Low yield of infected pools of mosquitoes
  - Necessary to assess risk of affected areas

- **Birds**
  - Active surveillance for sick birds is expensive and labour intensive
  - Bird mortality surveillance:
    - Easier to implement
    - Can be combined with other disease surveillance programmes (eg. H5N1)

- **Equine**
  - Good sentinel for human infection
  - Diagnosed horses are notifiable at the EU level
Other implications at EU level

- Any infectious disease outbreak that may impact on blood and tissue safety:
  - Member state should inform Commission of measures implemented to ensure safety

- Specifically for West Nile fever:
  - Blood deferral from any person who has visited an affected area for 28 days

- Therefore in ongoing outbreak, blood donations should be deferred from the whole ‘affected area’
  - What is the impact on blood supplies
  - Can loss in blood supplies be offset by screening or other methods?
WNV preparedness at National level

- **Coordination**
  - National stakeholders: human public health, veterinary public health, entomologists, bird specialists, blood authorities, blood recipients, residents in affected area
  - European stakeholders: EFSA, ECDC, SANCO C3, SANCO C6 etc.

- **Establish working groups:**
  - At National level
  - At local level – where outbreaks occur

- **Regular and timely exchange of information:**
  - Local
  - National
  - International level
Assessing the risk for humans

- Which stakeholders should be included?

- Which surveillance data will trigger which response?
  - Infected mosquitoes
  - Dead bird diagnosed with WNV infection
  - Sick or dead horse
  - Human cases of WN fever or neuroinvasive disease

- Which geographical area can we call ‘affected’?

- What is impact of control measures:
  - Increasing clinician awareness
  - Improving diagnostic capacity
  - Vector control
  - Blood and tissue deferrals
  - Blood screening
  - Raising public awareness
Conclusion

- WNV infection still has limited public health impact in Europe

- Unsure whether epidemiologically will be similar to the situation in North America in the near future

- Preparedness and outbreak response require:
  - Multisectoral approach
  - Strong central coordination at national and local level
  - At EU level:
    - coordination with scientific agencies for scientific advice and risk assessment
    - Coordination with EC for control measures and risk management