Recent epidemics

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Dienst algemene inwendige ziekten, infectieziekten en psychosomatiek
Universitair Ziekenhuis Gent
Content

- Number of reported outbreaks 2008
- Noteworthy pathogens
  - Viruses
  - Bacteria
  - Parasites
  - Fungi
- Noteworthy pathogen vectors
# Increasing number of epidemics reported

## Table 4.1.1. Initial sources of information for newly opened threats, by year

<table>
<thead>
<tr>
<th>Number of new threats monitored</th>
<th>2005*</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>Confidential sources</strong></td>
<td></td>
<td></td>
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<tr>
<td>EWGLI</td>
<td>2</td>
<td>30</td>
<td>40</td>
<td>78</td>
<td>150</td>
</tr>
<tr>
<td>EWRS</td>
<td>23</td>
<td>52</td>
<td>42</td>
<td>73</td>
<td>190</td>
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<tr>
<td>WHO</td>
<td>17</td>
<td>14</td>
<td>5</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Information from Member States</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>European surveillance networks</td>
<td>9</td>
<td>11</td>
<td>8</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Other confidential source</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>16</td>
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<tr>
<td><strong>Total</strong></td>
<td>52</td>
<td>114</td>
<td>101</td>
<td>174</td>
<td>441</td>
</tr>
<tr>
<td><strong>Public sources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProMed</td>
<td>36</td>
<td>15</td>
<td>20</td>
<td>9</td>
<td>80</td>
</tr>
<tr>
<td>MedISys</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>GPHIN</td>
<td>4</td>
<td>19</td>
<td>4</td>
<td>1</td>
<td>28</td>
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<tr>
<td>Eurosurveillance</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
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<tr>
<td>Public report published on the internet</td>
<td>5</td>
<td>9</td>
<td>12</td>
<td>17</td>
<td>43</td>
</tr>
<tr>
<td>Other public source</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>47</td>
<td>41</td>
<td>41</td>
<td>53</td>
<td>190</td>
</tr>
<tr>
<td><strong>Overall total</strong></td>
<td>99</td>
<td>163</td>
<td>142</td>
<td>227</td>
<td>631</td>
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</table>

* includes only the second half of 2005.
Lujo virus

- Novel “Old World” Arenavirus
- Hemorraghic fever
- South Africa ex Zambia
- Case fatality: 4/5 (case 5 survived with ribavirin)
- Source/Reservoir remains undetermined
- No cases identified outside of Africa

MOBV, MOPV, and IPPYV (blue) have not been implicated in human disease; LASV (red) can cause hemorrhagic fever. The origin of the LUJV index and secondary and tertiary cases linked in the 2008 outbreak are indicated in gold.

Lujo virus

- **Signs and symptoms**
  - Fever
  - Diarrhea
  - Rash (centripetal)
  - Facial swelling
  - Cerebral edema

- **Lab:**
  - Thrombocytopenia,
  - Leucopenia followed by granulocytosis,
  - Elevated ALT/AST levels

- **Biopsy:**
  - Hepatocyte necrosis and vasculitis compatible with viral hemorrhagic fever

Figure 1. Epidemic curve showing, as appropriate, dates of exposure to infection, onset of illness, admission to hospital, and death or recovery of 5 patients involved in an outbreak of infection with a novel arenavirus, southern Africa, 2008.
Polyomaviruses

- **WU, KI and MC (Merckel cell)**
  - Acute respiratory tract infections
  - Tonsils
  - Diarrhea
  - Neoplasia

- **Infection early on in life**

Nguyen. EID. 2009(15): 1199-205
Parechovirus

- Picornaviridae (HpeV 1 – 8) (6 more to be published)
- HpeVS 1 & 2 = Enteroviruses 22 & 23 (1999)
- Bi annual epidemic - seasonality
- Young children (aged < 3 y)
- Mild disease: gastrointestinal and respiratory symptoms
- Severe disease: (HpeV 3) acute flaccid paralysis (AFP), encephalitis, aseptic meningitis, myocarditis, neonatal sepsis, and Reye syndrome

Linlin. EID 15(2), February 2009
Novel SARS-like and other coronavirus, Kenya

- **Bat reservoir**
  - Asia
  - Europe
  - North America
  - **Africa**
    - Understanding reservoir → detecting new disease introduction in humans

Tong. EID. 2009(15): 482-485

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Do the new viruses matter?

- **Brazilian children RTI**
  - 205 children (1 m – 15 yrs)
  - Acute respiratory illness in outpatient and inpatient clinics, urban area
  - Viruses identified 45% (93/205)
    - Influenza A/B
    - Parainfluenza
    - Adenovirus
    - Respiratory syncitial virus
    - *Human metapneumovirus*
    - *Human Bocavirus*
    - *Polyoma virus WU and KI*
    - *Human Coronavirus*

- 36% (74/205)
- 9.2% (19/205)

Albuquerque. EID. 15(5), May 2009
Toscana Virus: Severe presentations

- Bunya viridae
- Pappataci fever
- Surveillance for mild nonneurologic febrile illness
- 7 cases/358 screened
- 4/7 Mild aseptic meningitis
- 3/7 atypical presentation
  - 2/3: persistent infection
    - Meningoencephalitis
    - Ischemic complications
  - 1/3: febrile exanthema
Zika virus

- Flavivirus related to yellow fever, dengue, West Nile virus and Japanse encephalitis virus
- 2007 outbreak: Federated States of Micronesia
- One US student viraemic traveled to US

Hayes. EID. 15(9): 1347 – 1350; Duffy. NEJM. 2009;360:2536-2543
Detection of an Infectious Retrovirus, XMRV, in Blood Cells of Patients with Chronic Fatigue Syndrome

Vincent C. Lombardi,1,* Francis W. Ruscetti,2,* Jaydip Das Gupta,3 Max A. Pfoert,1 Kathryn S. Hagen,1 Daniel L. Peterson,1 Sandra K. Ruscetti,4 Rachel K. Bagni,5 Carl Petrow-Sadowski,6 Bert Gold,2 Michael Dean,2 Robert H. Silverman,3 Judy A. Mikovits1;†

Chronic fatigue syndrome (CFS) is a debilitating disease of unknown etiology that is estimated to affect 17 million people worldwide. Studying peripheral blood mononuclear cells (PBMCs) from CFS patients, we identified DNA from a human gammaretrovirus, xenotropic murine leukemia virus–related virus (XMRV), in 68 of 101 patients (67%) as compared to 8 of 218 (3.7%) healthy controls. Cell culture experiments revealed that patient-derived XMRV is infectious and that both cell-associated and cell-free transmission of the virus are possible. Secondary viral infections were established in uninfected primary lymphocytes and indicator cell lines after their exposure to activated PBMCs, B cells, T cells, or plasma derived from CFS patients. These findings raise the possibility that XMRV may be a contributing factor in the pathogenesis of CFS.
Last but not least: H1N1v Influenza A

- In part Flemish origin...
- Confusing communication
  - Ukraine: high mortality and morbidity
  - De Morgen:
    - ...new deadly reassorted virus... ... bodies of the death internally charred....
  - The New York Times:
    - ... attributed to poor health care system...

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Borrelia hispanica

- Morocco: Detected in 20.5% in patients with unexplained fever

Table. Results of PCR assays for detection of *Borrelia* spp. in 127 patients with unexplained fever in Kenitra, northwestern Morocco

<table>
<thead>
<tr>
<th>Location</th>
<th>16S rRNA seminested PCR</th>
<th>Intergenic spacer sequence nested PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidi Mohamed Lahmar</td>
<td>2/73 (2.7)</td>
<td>15/73 (20.0)</td>
</tr>
<tr>
<td>Had Ouled Jelloum</td>
<td>10/26 (38.5)</td>
<td>11/26 (42.3)</td>
</tr>
<tr>
<td>Idrissi Kenitra</td>
<td>0/8</td>
<td>0/8</td>
</tr>
<tr>
<td>Lalla Mimouna</td>
<td>0/12</td>
<td>0/12</td>
</tr>
<tr>
<td>Mnasra</td>
<td>0/3</td>
<td>0/3</td>
</tr>
<tr>
<td>Sidi Taybi</td>
<td>0/5</td>
<td>0/5</td>
</tr>
<tr>
<td>All</td>
<td>12/127 (9.4)</td>
<td>26/127 (20.5)</td>
</tr>
</tbody>
</table>

Figure 1. Locations in the Kenitra District of Morocco where tick-borne relapsing fever was diagnosed. A, Sidi Mohamed Lahmar; B, Had Ouled Jelloum; C, Idrissi Kenitra; D, Lalla Mimouna; E, Mnasra; F, Sidi Taybi.
Q fever outbreak in the Netherlands

<http://www.rivm.nl/cib/binaries/Qkoorts_per_gemeente_tcm92-60500.pdf#%20class=>.
Aantal gemelde patienten met Q-koorts naar week van ontvangst melding bij de GGD,
periode 01-01-2007 t/m 28-10-2009.

Jaar en week van ontvangst melding bij GGD

Aantal meldingen

- overige GGD'ën
- GGD Zuid Limburg
- GGD Brabant Zuid Oost
- GGD Hart voor Brabant

Brucellosis, Bulgaria and Balkan region

- No cases since 1958
  - Occupational risk: 80%
    - Exposure to infected animals (abortion/delivery products)
    - Consumption of dairy from family farms
    - Young children

Russo. EID. 2009 (15): 314-316

Figure 2. Human and animal cases of brucellosis in Bulgaria, 1992–2007. In Bulgaria, during 1992–2004, a total of 22 human cases and 0 animal cases of brucellosis were recorded; during 2005–2007, a total of 105 human cases and 635 animal cases of brucellosis were recorded.
Trypanosomiasis, foodborne

- Brazil, Para state
- 13 cases in two weeks time in Belem
- Through ingestion of contaminated food: Acai berry juice
- 2007: Venezuela, Colombia
Diphyllobothriasis

- **Wild pacific salmon**
  - *D nihonkaiense* (*klebanovskii*): Chum, masu and pink (musculature)
  - *D ursi*: sockeye salmon (stomach)
  - *D. latum*: Cultivated Atlantic salmon

Figure 5. Possible distribution area of *Diphyllobothrium nihonkaiense*. Open circle, open square, and open triangle represent brown bears, humans, and Pacific salmon, respectively, from which *D. nihonkaiense* adult worms or plerocercoids were isolated and identified by DNA sequencing (DNA sequences refer to reference 21). Patients in European countries are suspected to have eaten salmon imported from the Pacific coast of North America.

Figure 2. Diphyllobothriasis cases, Department of Medical Zoology of the Kyoto Prefectural University of Medicine (MZ) in Kyoto and Department of Infectious Diseases of the Tokyo Metropolitan Bokutoh Hospital (BH) in Tokyo, Japan, 1988–2008.

Figure 3. Seasonal occurrence of diphyllobothriasis nihonkaiense. 149 cases, Department of Medical Zoology of the Kyoto Prefectural University of Medicine in Kyoto and Department of Infectious Diseases of the Tokyo Metropolitan Bokutoh Hospital in Tokyo, Japan, 1988–2008.
Zygomycosis

Figure 1. Evolution of the incidence of zygomycosis, France, 1997–2006. BMT, bone marrow transplantation.

Table. Distribution of zygomycosis cases and deaths, by underlying disease, France, 1997–2006

<table>
<thead>
<tr>
<th>Known risk factors</th>
<th>No. cases</th>
<th>No. deaths</th>
<th>Case-fatality ratio, %*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone marrow transplantation</td>
<td>33</td>
<td>12</td>
<td>36.4</td>
</tr>
<tr>
<td>Hematologic malignancies</td>
<td>59</td>
<td>21</td>
<td>35.6</td>
</tr>
<tr>
<td>Neutropenia/aplastic anemia</td>
<td>23</td>
<td>11</td>
<td>47.8</td>
</tr>
<tr>
<td>Acute lymphoid/myeloid leukemias</td>
<td>20</td>
<td>6</td>
<td>30.0</td>
</tr>
<tr>
<td>Other lymphoid/myeloid disorders</td>
<td>16</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>Nonhematologic immunodepression</td>
<td>64</td>
<td>8</td>
<td>12.5</td>
</tr>
<tr>
<td>Cancers of the solid organs</td>
<td>28</td>
<td>3</td>
<td>10.7</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>26</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Solid organ transplantions</td>
<td>10</td>
<td>4</td>
<td>40.0</td>
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<tr>
<td>Diabetes</td>
<td>86</td>
<td>8</td>
<td>9.3</td>
</tr>
<tr>
<td>No known risk factor</td>
<td>289</td>
<td>12</td>
<td>4.2</td>
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<tr>
<td>Total</td>
<td>531</td>
<td>61</td>
<td>11.5</td>
</tr>
</tbody>
</table>

*Calculated only for the 61 deaths reported in hospital records for which information about underlying diseases was available.
Biomphalaria tenagophilia

- Established in Romania in 2006
- Vector Shistosomiasis
- No detection of cercaria... so far

Majoros. EID. Nov 08:14(11)