Rapid Responses to Emerging Agents Affecting Blood Products Safety

Jay S. Epstein, MD
CBER, FDA

Improving World Health Through Regulation of Biological Medicines
Seoul, Republic of Korea
1 April 2006
Rapid Responses to Emerging Agents Affecting Blood Products Safety

- General principles
- U.S. response to West Nile virus
- Lessons learned
General Response to Emerging Infectious Diseases (EID’s)

- Types of EID
  - New agents or variants of known agents
  - Known agents with new epidemiology
  - Previously unrecognized agents

- Infrastructure needed to address EID’s
  - Surveillance system
  - Capacity for epidemiological investigations
  - Laboratory infrastructure
  - Risk assessment tools
  - Communication mechanisms
  - Control activities
General Response to Emerging Infectious Diseases (EID’s)

- Stages of the EID response
  - Epidemiological characterization of the agent and its transmissibility
  - Laboratory characterization of the agent
  - Development of options for intervention based on scientific assessments
  - Implementation of control strategies and risk communication
  - Assessment of impacts and outcomes
  - Policy reexamination and adjustment
EID Response Plan

- FDA, CDC, NIH meet routinely to discuss emerging diseases that might impact blood
  - Develop database and periodically review

- Response plan
  - Epidemiology of agent and blood transmission
  - Laboratory investigation
  - Recommendations to blood establishments
  - Emergency communications
Example

- West Nile Virus
West Nile Virus

- WNV is an enveloped single stranded RNA virus
- WNV is a mosquito-borne Flavivirus
  - Primarily infects birds
  - Occasionally infects humans and other animals
- About 80% of human infection is asymptomatic, and 20% develop mild febrile illness (flu-like illness)
- Approximately 1 in 150 infections results in meningitis, encephalitis, acute flaccid paralysis
  - Advanced age is by far the most significant risk factor for severe neurologic disease
- Viremic period can occur up to 2 weeks prior to symptoms and last up to a month from the initiation of the infection
CDC’s ArboNET: National Arbovirus Surveillance System

- Web-based passive system begun in 2000
  - 57 area health departments to DVBID

- Mosquito, bird, horse, other animal surveillance
  - Year, state, county, date of collection

- Human cases
  - Age, sex, race/ethnicity
  - Residence
  - Clinical illness, onset date and outcome
  - Blood or organ donation/receipt
**Response to WNV Epidemic**

**Summer 1999**: First outbreak of WNV in NY area

**August 2002**: The theoretical potential for transmission of WNV by blood transfusion was raised in a publication by CDC

**August 2002**: FDA issues an alert to blood establishments

**September 2002**: Transmission of WNV by transplantation and transfusion confirmed

DHHS and FDA call for test development
Continued.....

**October 2002:** FDA issues guidance to blood establishments on donor deferral and unit management

**November 2002:** FDA sponsored workshop to provide guidance on test development and to facilitate communication between test manufacturers and users

NIH provides development funds

AABB task force – weekly/biweekly meetings

**July 2003:** Nationwide screening of blood donations using minipool NAT under INDs
WNV Human Cases 1999-2005

Total Human Cases  ~20,000
Neuroinvasive Diseases  8,364
Deaths  782
West Nile viremic blood donors, by county of residence, United States, 2005
## Benefits of WNV Screening

<table>
<thead>
<tr>
<th>Year</th>
<th>Units Interdicted</th>
<th>No. T.T. Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>2003</td>
<td>818</td>
<td>6</td>
</tr>
<tr>
<td>2004</td>
<td>221</td>
<td>1</td>
</tr>
<tr>
<td>2005</td>
<td>399</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: CDC update to AABB WNV Taskforce
November 2003: low level viremia identified
  • Identification of ID-NAT-positive and MP-NAT-negative units
  • 6 confirmed cases of WNV transmission by transfusion of MP-NAT-negative units
  • ID NAT testing in high epidemic areas

December 2005 licensure of Procleix WNV Assay

Laboratory investigations- infectious status of ID NAT+/antibody + donations

Guidance on implementation – future
AABB Task force
NIH, FDA, CDC, DOD, manufacturers
Lessons Learned

- **Critical govt’ infrastructure - communicating**
  - Surveillance
  - Laboratory investigation
  - Regulatory authority

- **Cooperation/communication outside govt’**
  - device manufacturers – challenged to make device
  - blood collectors – guidance on donor management
  - state health authorities-reporting WNV cases
  - other countries – infectious agents cross borders

Multiple regulatory approaches to ensure blood safety are needed
Lessons Learned

- We live in a global village!
- Expect the unexpected
- Challenges to industry can be met
- Value of an unprecedented cooperative interaction between government, blood organizations and device manufacturers
- Detection in blood bank setting may have public health value for community intervention
International Relevance

- There are many EIDs that can rapidly affect different parts of the world
  - SARS
  - Monkey pox
  - Pandemic flu

- Cooperation and communication between health authorities will benefit everyone