Emerging Infectious Diseases in the Middle East –

Public Health Importance and Epidemiologic Research Opportunities

Rana A. Hajjeh, M.D.
CDC & JHSPH
Institute of Medicine

• March 2003 IOM Report
  – Important 3rd release on Emerging Infections
Factors in Emergence

- Microbial Adaptation and Change
- Human Vulnerability
- Climate and Weather
- Changing Ecosystems
- Economic Development and Land Use
- Human Demographics and Behavior

- International Travel and Commerce
- Technology and Industry
- Breakdown of Public Health Measures
- Poverty and Social Inequality
- War and Famine
- Lack of Political Will
- Intent to Harm
Eastern Mediterranean Region – High Risk for Emerging & Epidemic Diseases

- Center of International travel
- Diversity in socio-economic development
- Wars and displacement of populations
- Economic embargoes
- Rapid urbanization
- Population structure
- Variation in availability & quality of health care
- Variation in quality and accuracy of surveillance data, and response systems
Major Emerging, Reemerging, and Other Infectious Diseases of Concern - EMR

- Meningitis
- Foodborne/waterborne diseases
- Viral haemorrhagic fevers
- Healthcare associated infections
- Blood borne pathogens
- Antimicrobial Resistance
Perinatal infections burden

• Pregnant and post-partum women
  – Pregnant women at increased risk for infections or infectious complications (eg, influenza)
  – 78% of childbirth-related prolonged hospitalizations are due to infection*

• Neonates
  – Perinatal sepsis among top 10 causes of death
  – Infection contributes to preterm delivery
  – Early infections contribute to severe lifelong morbidity

*Hebert et al., Obstet Gynecol. 1999. 94:942-7
Bacterial Meningitis Outbreaks 1999-2002

1999: 33,035 cases  
2,374 deaths

2000: 4,031 cases  
328 deaths

2002: 580 cases  
72 deaths

2004: 580 cases  
72 deaths

2000, 2001: W135

2000:

2001:

2002:

CSR/EMRO
Meningococcal disease during the 2000 Hajj: Jeddah, Mecca, and Medina, Jan.24–June 5, 2000*

*The number of cases of serogroup-specific meningococcal disease is shown by date. The duration of the 2000 Hajj is indicated.

Serogroup W-135 (37%)
Serogroup A (24%)
Serogroup B and C
Serogroup unknown

n=253
Blood Borne Diseases in EMR

- Hepatitis B
- Hepatitis C
- HIV
Human Immunodeficiency Virus

- Significant underreporting
- Epidemics in Djibouti, Somalia, Sudan
### HIV-1 Detected Subtypes

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>AB</th>
<th>AG(IbNG)</th>
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<td>Lebanon</td>
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<td>Djibouti</td>
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<td>Kazakhstan</td>
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<td>Uzbekistan</td>
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<td>Kyrgyzstan</td>
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## Important Haemorrhagic Fevers in the EMR

<table>
<thead>
<tr>
<th>Disease</th>
<th>Countries</th>
<th>Recent Outbreak</th>
<th>Epidemic Potential</th>
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</thead>
<tbody>
<tr>
<td>Dengue</td>
<td>Djibouti, Pakistan, Saudi Arabia, Somalia, Sudan, Yemen, others?</td>
<td>Yes (200, 2005)</td>
<td>Mod. - High</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>Sudan</td>
<td>No</td>
<td>Low - Mod.</td>
</tr>
<tr>
<td>Ebola</td>
<td>Sudan</td>
<td>No (1979)</td>
<td>Low</td>
</tr>
</tbody>
</table>
Dengue Fever in Yemen, March 2005
Figure 2. The distribution of dengue fever cases in Al-Hudaydah, Yemen, based on date of onset, Dec. 2004 to March 28, 2005 (n= 141 confirmed cases)
REVENGE OF THE
Killer Microbes
Are we losing the war against infectious diseases?
Antimicrobial Resistance

• Worldwide problem
• Dramatic increase in antimicrobial-resistant community-acquired and nosocomial pathogens
• Major risk factors:
  Antimicrobial use (misuse)
  Infection control practices (noncompliance)
Antimicrobial resistance – Lebanon and the ME region

- Leblebicioglu H, Esen S; Turkish Nosocomial Urinary Tract Infection Study Group.


## Healthcare-related Outbreaks in the Middle East

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Pathogen/Type</th>
<th>Location</th>
<th>Risk factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>El-Sayed, JID 2000</td>
<td>HIV</td>
<td>Egypt, dialysis units</td>
<td>Re-use syringes</td>
</tr>
<tr>
<td>Siddiqui, CID 2005</td>
<td><em>Hepatitis E</em></td>
<td>Pakistan</td>
<td>Sharing of IV sets</td>
</tr>
<tr>
<td>Balkhy, AJIC 2005</td>
<td><em>B. cepacia</em></td>
<td>Saudi Arabia</td>
<td>Contam. Albuterol nebulizer solution</td>
</tr>
<tr>
<td>ElShafie, J hosp Inf 2004</td>
<td><em>A. baumanii</em></td>
<td>Qatar</td>
<td>Open suction, poor hand hygiene</td>
</tr>
<tr>
<td>Mah AJIC 2001</td>
<td><em>A. baumanii</em></td>
<td>Saudi Arabia</td>
<td>Improper ICP</td>
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<tr>
<td>Colak JAC 2002</td>
<td>VRE</td>
<td>Turkey</td>
<td>??</td>
</tr>
<tr>
<td>Matar Eur J Epid 1992</td>
<td><em>A. baumanii</em></td>
<td>Lebanon</td>
<td>Improper ICP</td>
</tr>
</tbody>
</table>
Highly Resistant Gram-Negative Bacilli

The next plague?
Healthcare-related Infections

• Emerging as important public health problem throughout the world
  - increase in antimicrobial resistance
  - high cost of health care
  - increased morbidity and mortality

• Particular problem in countries, as in EMR, with rapid development of health care services and introduction of new technology
  - infection control is not a well recognized discipline
  - minimal surveillance data
Guidelines for Preventing Health-Care--Associated Pneumonia, 2003

Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee

Prepared by
Helia C. Tablan, M.D.,¹
Mary J. Anderson, M.D.,²
Richard Besser, M.D.,³
Carolyn Bridges, M.D.,²
Ana Hajjeh, M.D.,³

Division of Healthcare Quality Promotion, National Center for Infectious Diseases
Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases
Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases

Information in this report originated in the National Center for Infectious Diseases, Joseph M. Hughes, M.D., Division of Healthcare Quality Promotion, Denise M. Caro, M.D., Director, and the Division of Bacterial and Mycotic Diseases, Delia L. Cohen, M.D., Director.

Summary

This report updates, expands, and replaces the previously published CDC “Guideline for Prevention of Nosocomial Pneumonia”. The new guidelines are...
Human Demographics and Behavior
Cosmetic Surgery Related Infections
Mycobacterium abscessus
International Travel and Infectious Diseases
SARS 2003:
A Global Microbial Threat
**Chain of transmission among guests at Hotel M—Hong Kong, 2003**

Data as of 3/28/03

* Health-care workers; † All guests except G and K stayed on the 9th floor of the hotel. Guest G stayed on the 14th floor, and Guest K stayed on the 11th floor; § Guests L and M (spouses) were not at Hotel M during the same time as index Guest A but were at the hotel during the same times as Guests G, H, and I, who were ill during this period.
Areas reporting confirmed occurrence of H5N1* avian influenza in poultry and wild birds since 2003

http://www.who.int/csr/disease/avian_influenza/en/
<table>
<thead>
<tr>
<th>Country</th>
<th>H5N1 Cases</th>
<th>Deaths</th>
<th>Case-Fatality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>93</td>
<td>42</td>
<td>45%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30</td>
<td>23</td>
<td>77%</td>
</tr>
<tr>
<td>Thailand</td>
<td>22</td>
<td>14</td>
<td>64%</td>
</tr>
<tr>
<td>China</td>
<td>16</td>
<td>11</td>
<td>69%</td>
</tr>
<tr>
<td>Turkey</td>
<td>12</td>
<td>4</td>
<td>33%</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>7</td>
<td>5</td>
<td>71%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>6</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Egypt</td>
<td>4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Iraq</td>
<td>2</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>192</strong></td>
<td><strong>109</strong></td>
<td><strong>53%</strong></td>
</tr>
</tbody>
</table>

*Reported to WHO through April 6, 2006*
WHO pandemic influenza
draft protocol for rapid response
and containment

Updated draft 17 March 2006

http://www.who.int/csr/disease/avian_influenza/en/
Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guideline for Health Care Facilities

Date of most recent amendment: 9 February 2006

AL QAEDA BREEDING KILLER MOSQUITOES

sending them to attack the U.S.
“The best defense for the human species against elimination by the ever-evolving waves of microbial pathogens are public health measures coordinated with biomedical research”

Anthony S. Fauci