CDC Division of Global Migration and Quarantine

IOM Committee: Measures to Enhance Effectiveness of Q-Station Expansion Plan

Martin S. Cetron, MD
Director, DGMQ
DGMQ Mission

- Prevent importation, transmission, or spread of communicable diseases from foreign countries into the United States
  (Statutory responsibility to make and enforce regulations as necessary)

- Decrease morbidity and mortality among globally mobile populations entering the United States
  (Public health responsibility)
Immigration and Nationality Act

- Required health evaluation
- Inadmissible conditions
  - HIV, TB, Hansen’s disease, STDs, harmful behavior, drug abuse
- Waivers

Refugee Act

- Diseases of public health significance
- Monitor quality of health screening
- Meet at ports of entry
- Notify state/local health dept

42 CFR

- Prevent importation and spread
Executive Order 13295:
Revised List Of Quarantinable Communicable Diseases

(a) Cholera; Diphtheria; infectious Tuberculosis; Plague; Smallpox; Yellow Fever; and Viral Hemorrhagic Fevers (Lassa, Marburg, Ebola, Crimean-Congo, South American, and others not yet isolated or named).

(b) Severe Acute Respiratory Syndrome (SARS), which is a disease associated with fever and signs and symptoms of pneumonia or other respiratory illness, is transmitted from person to person predominantly by the aerosolized or droplet route, and, if spread in the population, would have severe public health consequences.

President George W. Bush
April 4, 2003
Awaiting the Cholera

Figure 4.1. “They Come Arm in Arm.” Judge 23 (1892).
Typhus Fever Epidemic, 1892

Figure 1.3. SS Massilia. Collection of the Peabody Essex Museum, Salem, Mass.
History of Quarantine & U.S. Public Health Service

- Quarantine preceded CDC
- Legislation 1st enacted at turn of 20th cent as spread of disease perceived as resulting from travel (immigration)
The Public Health Service & The Rise of Quarantine

- Prevent introduction of diseases such as yellow fever, smallpox, cholera, and plague into US
- No mandate to address health issues of those leaving US
U.S. Quarantine Program

DHEW 1953
- 52 seaports
- 41 airports
- 17 border stations
- 33 territory stations
- Panama Canal
- 41 U.S. consulates
- 50 maritime vessels

CDC 1967-70 RIF
- 6 airports

DGMQ 2004
- 8 airports
Charge to IOM:
Assist DGMQ in strategic planning to re-build Q-station infrastructure in order to accomplish mission

• How should the current role of the QS evolve to meet 21st century challenges
• What are the types & numbers of public health professionals and appropriate skill sets necessary
• What are the optimal locations for efficient and sufficient monitoring and response
• How do we ensure surge capacity for PH emergencies (e.g. SARS, Pandemic Flu, Mass migrations)
• How should QS staff best collaborate with partners
  - State and Local Health Dept.
  - Other Federal Agencies and Inspection Services
  - International partners e.g. WHO, MOH and NGOs
Prior to 1996

Division of Quarantine, CPS/CDC

OFFICE OF THE DIRECTOR

PROGRAM OPERATIONS BR

QUARANTINE STATIONS (7)-

TRAVELERS' HEALTH

MEDICAL SCREENING AND HEALTH ASSESSMENT BR

MEDICAL SCREENING

HEALTH ASSESSMENT
Division of Global Migration and Quarantine
Proposed Reorganization (2003-4)
Division of Global Migration and Quarantine
Proposed Reorganization (2003-4)

- Administration Team
- Geographic Medicine & Health Promotion Branch
- Immigrant Refugee & Migrant Health Branch
- Quarantine & Border Health Services Branch
- Office of Policy, Preparedness & Emergency Response
- Surveillance & Epidemiology
- Program & Evaluations

Quarantine Stations
11 POEs → 25 POEs?
International Ports?
Quarantine Stations

Current and Proposed

CA OR NV NM WA AZ UT ID CO WY ND MT NE SD MN OK IA TX KS AR MO WI IL IN OH WV VA NC NY MI PA ME VT NH RI CT MA ME HI AK

Tier 1 City - 83

Airports: > 1 million travelers
Seaports: >100k travelers
Land Borders: >5 million crossings
Imigrants:
Percent of U.S. Population

*Camarota SA January 2001. Center for Immigration Studies*
Number of Foreign-Born Persons Living in the U.S.

Source: Center for Immigration Studies, 2001
Estimated Annual International Arrivals, U.S.A.

- Refugees: 70-90,000
- Immigrants: 1,000,000
- International Travelers: Foreign 60 M / U.S. 60 M
- U.S.-Mexico Border Crossings: 400M?
Annual Estimate Migrants “Entering” U.S.

Visitors without visas  
~ 30,000,000

Non-immigrant visas  
27,907,139

Immigrants and refugees  
411,266

Undocumented migrants  
~ 275,000 ????

N= ~ 60 million / Yr

Speed of Global Travel in Relation to World Population Growth

WHO Report on Infectious Diseases 1999
“Removing Obstacles to Healthy Development”

Frequent flyers
Most popular air routes between continents, 1997

Percentage increase in international arrivals, 1993 to 1997

Source: World Tourism Organization/International Civil Aviation Organization
Major Migration Flows: 1960-75

Source: Population Action International 1994
Major Migration Flows: 1990s

4 x increase in volume as compared to 1960-75

Source: Population Action International 1994
Cruise ship passengers 2000:
7 million/year, North America
Grand Princess and U.S. Capitol
The Cruise Ship

A unique environment for disease transmission, amplification, and dispersal
Cruise Ship Paradigm

Amplification

Dissemination

Convergence
Cruise Destinations, 1987

= 500,000 passenger bed-days
Expanding Cruise Destinations, 1997

= 500,000 passenger bed-days

= New destinations (<500,000 passenger bed-days)
Alaska Cruise Ship Sailing Routes

Cruise ship routes along coast
War on Disease

Just a few years ago medicine seemed to be winning the fight against disease. But now old adversaries are coming back and new infections are emerging, exposing us all to serious, sometimes unexpected, threats.
Unexpected outbreaks

Examples of emerging and re-emerging infectious diseases 1994-1999

- Anthrax
- Brucellosis
- Cholera
- Crimean-Congo haemorrhagic fever
- Cryptosporidiosis
- Dengue haemorrhagic fever
- Diphtheria
- Ebola haemorrhagic fever
- E.coli O157
- Echinococcosis
- Encephalitis
- Epidemic meningitis
- Hendra
- Human monocytes
- Influenza A (H5N1)
- Influenza A (H9N2)
- Lassa fever
- Leptospirosis
- Lyme borreliosis
- Malaria
- New variant CJD
- Nipah
- Omsk haemorrhagic fever
- O’nyong-nyong fever
- Plague
- Poliomyelitis
- Reston virus
- Rift Valley fever
- Ross River virus
- Typhoid
- Venezuelan equine encephalitis
- West Nile fever
- Yellow fever

SOURCE:WHO
A Decade of Global Infectious Disease Challenges

1993  Hantavirus pulmonary syndrome (USA)
1994  Plague (India)
1995  Ebola hemorrhagic fever (Zaire)
1996  New variant Creutzfeldt-Jakob disease (UK)
1997  H5N1 influenza (Hong Kong)
       Vancomycin-intermediate *Staphylococcus aureus* (Japan, USA)
1998  Nipah virus encephalitis (Malaysia, Singapore)
## A Decade of Global Infectious Disease Challenges (cont.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Disease/Outbreak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>West Nile encephalitis (Russia, USA)</td>
</tr>
<tr>
<td>2000</td>
<td>Rift Valley fever (Kenya, Saudi Arabia, Yemen)</td>
</tr>
<tr>
<td></td>
<td>Ebola hemorrhagic fever (Uganda)</td>
</tr>
<tr>
<td>2001</td>
<td>Foot and mouth disease (UK)</td>
</tr>
<tr>
<td></td>
<td>Anthrax (USA)</td>
</tr>
<tr>
<td>2002</td>
<td>Vancomycin-resistant <em>S. aureus</em> (USA)</td>
</tr>
<tr>
<td>2003</td>
<td>SARS (&gt;25 countries)</td>
</tr>
<tr>
<td></td>
<td>Monkeypox (Midwestern US)</td>
</tr>
<tr>
<td>2004</td>
<td>Avian Influenza (H5N1) (9 Asian countries)</td>
</tr>
</tbody>
</table>
Recent Infectious Threats

Bird flu’s potential danger nightmarish

Boston, but the infection raced across the country on every road and railroad. In two weeks, Florida. In a month, California. In a single week, never seen before. Within 11 months it killed 675,000 Americans, and as many as 50 million people around the world.

Officials Scramble to Contain Monkeypox

Outbreak of Virus in Midwest Is the First Reported in Western Hemisphere

Drug-resistant bugs now are among us

Staph cases not confined to hospitals

Recent outbreaks of drug-resistant staph infections among prison inmates, athletes, other groups have raised the specter of a rise in nosocomial infections, or infections outside hospitals, that might result from contact with newly discharged patients or an exposed health care worker.

CDC reports third case of VRSA

The case appears unrelated epidemiologically to previous cases in Michigan and Pennsylvania.

West Nile along the Front Range

In its second year in Colorado, the virus has been found in three counties — Adams, Boulder and Larimer — and in the Denver metropolitan area. The virus has been found in mosquitoes in Colorado, but not in humans, as of Aug. 20. About 1,000 cases of West Nile virus infection have been reported in the United States.

SARS What You Need to Know

The New Age of Epidemics

Clifford McDonald, MD, a medical officer with the division of health care quality promotion of the CDC, said he knew it was not just a matter of having a vaccine for the disease. He knew it was not just a matter of having a vaccine for the disease. He knew it was not just a matter of having a vaccine for the disease. He knew it was not just a matter of having a vaccine for the disease.
Infectious Diseases
New Public Health Perspective

- Infectious disease outbreaks can impact national security and global economy
- Local outbreaks/problems now recognized as having much wider implications
- Rapid and collaborative response essential and expected
“SARS has become the new paradigm for the global havoc that can be produced by emerging infectious diseases.”
Data as of March 28, 2003

* 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.
*Measures usually voluntary, but can be mandatory; legal quarantine authority covers “isolation” and “quarantine” tools.
21st Century Quarantine

A collective action for the common good predicated on aiding individuals infected or exposed to infectious agents while protecting others from the dangers of inadvertent exposure.
Quarantine - Definition

The restriction of movement of a person who has been exposed to an infectious disease for a period of time not longer than the longest incubation period of the disease to prevent effective contact with those who have not been exposed to the infective agent.
Secondary Cases of SARS by Number of Days to Isolation of the Source Case

*Reported as of April 15, 2003.
Available at:  http://www.who.int/csr/sars/en/index.html
Range of Responses to SARS at the National, State, and Community Level

Public Health Criteria for Community Response

- Number of cases/exposed
- Exposure category
  - Known
    - Travel
  - Close contact
    - Health care-related
    - Household
  - Unknown (unlinked)
- Type of transmission
- Generations of transmission
- Morbidity and mortality
- Ease/rapidity of spread
- Movement in/out of community
- Resources
- Need urgent public health action
- Risk of public panic

No restrictions

Targeted restrictions
  - Population-specific
    (i.e., congregate settings or group gatherings)

- Voluntary general movement restrictions
  - “Shelter in Place” or “Snow Day”
  - Closing of public places
  - Suspension of public gatherings
  - Restriction of mass transit schedules

- Compulsory movement/activity restrictions
  - Curfews on activities
  - Closing of mass transit
  - Closing access routes
    - Roads, Airports, Seaports
  - Closing borders
    - Border surveillance/monitoring
      - “SARS checkpoints”
      - Travel permits
Range of Responses to SARS at Borders

Public Health Criteria for Border Response

- Number of global cases/exposed
- Adequacy of global surveillance/control
- Volume of travel
- Morbidity and mortality
- Ease/rapidity of spread
- Characteristics of local outbreaks
- Community response levels
- Border and local resources
- Need urgent public health action
- Risk for public panic

- Travel alerts, advisories, press releases
- Meet all SARS-affected arriving flights
  - Visual inspection
  - Disembarkation notices
  - HAN distribution
- Triage ill passengers
  - Contact follow-up and surveillance

- Intensified arrival screening
  - Questionnaire
  - Temperature monitoring
  - Active registration with local health department
  - Health certification
- Pre-departure screening

- Restrict departures and flights
- Suspend travel and other visa issuance
- Quarantine any arrivals from affected areas
- Close borders?
Travel Measures to Prevent Spread

1. Pre-departure Screening
2. Suspected SARS Aboard Conveyances
3. Disembarkation Notices
David Fitzsimmons, Arizona Daily Star, 4/22/03
Pre-departure Screening: 
Symptoms 
Temperature
Transmission of the Severe Acute Respiratory Syndrome on Aircraft

<table>
<thead>
<tr>
<th>Duration</th>
<th>Aircraft</th>
<th>Illness</th>
<th>No. on Flight</th>
<th>No. (%) Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 hrs</td>
<td>737</td>
<td>Fever/cough (1)</td>
<td>120</td>
<td>22 (18.3)</td>
</tr>
</tbody>
</table>

Distributed to 2.7 million airline passengers; also cruise line and cargo ships, select land borders
Travel Alerts and Advisories for SARS, March–July 2003

<table>
<thead>
<tr>
<th>Region</th>
<th>Advisory Started</th>
<th>Advisory Stopped</th>
<th>Alert Started</th>
<th>Alert Stopped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainland China</td>
<td>3/13/03</td>
<td>6/17/03</td>
<td>6/17/03</td>
<td>7/3/03</td>
</tr>
<tr>
<td>Beijing, China</td>
<td>6/17/03</td>
<td>6/25/03</td>
<td>6/25/03</td>
<td>7/11/03</td>
</tr>
<tr>
<td>Taiwan</td>
<td>6/25/03</td>
<td>6/25/03</td>
<td>6/25/03</td>
<td>7/15/03</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>5/1/03</td>
<td>6/25/03</td>
<td>6/25/03</td>
<td>7/1/03*</td>
</tr>
<tr>
<td>Hanoi, Vietnam</td>
<td>3/13/03</td>
<td>4/29/03</td>
<td>4/29/03</td>
<td>5/15/03</td>
</tr>
<tr>
<td>Toronto</td>
<td>Never had an advisory</td>
<td>Never had an advisory</td>
<td>4/23/03 restarted: 5/23/03</td>
<td>5/20/03 restopped: 7/8/03</td>
</tr>
<tr>
<td>Singapore</td>
<td>3/13/03</td>
<td>5/4/03</td>
<td>5/4/03</td>
<td>6/4/03</td>
</tr>
</tbody>
</table>

*This change was posted on 7/9/03, retroactive to 7/1/03.
Documents Viewed from Travelers’ Health Website, 1995-2003

* Includes travel related documents from SARS website
“The summer now is gone”
Himalayan palm civet
*Paguma larvata*

Chinese Ferret-Badger
*Melogale moschata*

Raccoon-dog
*Nyctereutes procyonoides*

Animal photos courtesy of Dr. Yi Guan
Hong Kong University, and badgers.org.uk

*Science.* July 18, 2003
Experts fear pandemic as bird flu returns

Viruses could merge: If human, avian infections combine, deadly global outbreak could be worse than AIDS.

By M.A.J. McKeown

Bird flu, the poultry disease that health experts fear could morph into a globe-spanning epidemic of severe human illness, has reappeared in Southeast Asia, sweeping through four countries in the past two weeks.

More than 15,000 chickens, ducks and other birds have died in China, Indonesia, Thailand and Vietnam, and 78,000 others have been slaughtered in an attempt to halt the spread of the disease, technically known as avian called pandemics. The worst known flu pandemic was in 1918, when approximately 490,000 Americans and at least 40 million people around the world died in less than a year.

Infection disease experts fear H5N1 because humans have no natural protection against it, leading to worry that the virus could spark another pandemic. For that to happen, the virus would need to change in ways that would allow it to infect humans more easily and also spread from person to person.

Such changes could occur.
Avian Influenza H5N1 Activity in Asia*

Avian Influenza Status
- Red: Confirmed Human Cases
- Orange: Confirmed Avian Cases

Countries mentioned on the map:
- China
- South Korea
- Japan
- Laos
- Hong Kong
- Vietnam
- Thailand
- Cambodia
- Indonesia
China Reports New Outbreaks of Bird Flu

Vietnam still battling to control deadly outbreak

Bird Flu Upends Industry, Livelihoods in Thailand

When people live in close proximity to domestic poultry and pigs, it favors the emergence of antigenic shifts in influenza.

Infect Dis News March 2004
Infectious Disease Mortality in the U. S., 1900 to 1996

Source: Armstrong, et al., JAMA ;1999
"The flu is now arriving at gate 4 ..."
It's time again for everyone's least favorite game... FEAR OF THE WEEK!

Today, we welcome John Smiddlesdorf, a dairy farmer from Wisconsin... John, give 'er a spin!!!
USAMRIID practices evacuation of contagious patient
The more things change…. 

Europe, 1350

Uganda, 2001
IT'S A SMALL WORLD AFTER ALL!... IT'S A SMALL WORLD AFTER ALL!

MODERN GLOBAL MOBILITY

SARS