Quarantine: Community Response and Containment for SARS

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Outline

- Definitions
- Principles of quarantine
- Strategies used in early 2003 SARS response
  - United States
  - Elsewhere
- Planning and preparedness activities

Definitions

- Isolation
  - Separation of ill persons with contagious disease
  - Often in a hospital setting
  - Applied to individual level
- Quarantine
  - Restriction of persons presumed exposed
  - Applied at the individual or community level
  - May be voluntary or mandatory

Definitions

- Contact surveillance
  - Monitoring for signs and symptoms in well person(s) exposed to a contagious disease
  - May be passive or active
  - May be done with or without quarantine

Historic Roots of Quarantine

- Biblical accounts of quarantine practices for persons with leprosy
- Epidemic plague in 14th century Europe had profound impact on commerce
  - 1348: System for treatment of infected ships, travelers, and merchandise
  - 1485: Venice established 40-day (Latin *Quadragina*) harbor detention or quarantine

Quarantine Dichotomy

- "Quarantine" may have negative connotations
  - Black Death, Yellow fever, Pandemic Flu
  - Detention camps equate disease with crime
  - Stigmatizes victims (e.g., foreign born)
  - Historical abuses of power
- Quarantine works
  - Effective tool to prevent spread of contagion
  - As good or better than other tools in the box

Quarantine

A collective action for the common good

Public good **Individual liberties**

Paramount to meet needs of individuals infected and exposed

Principles of Modern Quarantine (1)

Modern Quarantine is used when:

- A person or group of people has been exposed to a highly dangerous and contagious disease
- Resources are available to implement and maintain the quarantine
  - Provide essential services
  - Provide care for those in quarantine

Principles of Modern Quarantine (2)

Modern quarantine encompasses a range of strategies:

- Short-term, voluntary home curfew
- Suspension or restrictions on group assembly
- Cancellation of public events
- Closure of mass public transit
- Closing of public places
- Restriction of travel
- “Snow days” or “shelter-in-place”
- *Cordon sanitaire (*sanitary barrier erected around an area)

Ways to Increase Effective Social Distance

- Implement “Snow Day” restrictions (shelter-in-place)
  - Close schools, daycare centers, etc.
  - Cancel large public gatherings (concerts, theaters)
  - Minimize other exposures (markets, churches, public transit)
- Encourage non-essential workers to stay home
  - Telecommuting can minimize economic impact
- Consider additional measures
  - Distribution of surgical masks?
  - Scaling back transportation services (holiday schedule)

Advantages of "Snow Day" Approach

- Intuitive
- Leverages the public's instinct for self-preservation
  - Cordon sanitaire *conflicts* with this instinct
- Can be implemented instantaneously
- Does not require similar level of dedicated resources as full-scale quarantine

Principles of Modern Quarantine (3)

Modern quarantine is used in combination with other interventions

- Enhanced disease surveillance and symptom monitoring
- Rapid diagnosis and treatment for those who become ill
- Preventive interventions, including vaccination or prophylactic antibiotics

Principles of Modern Quarantine (4)

Quarantined persons must be among the first to receive all available disease-preventing interventions

- Vaccination (e.g., smallpox)
- Antibiotics (e.g., plague)
- Early and rapid diagnostic testing and symptom monitoring
- Early treatment if symptoms appear

Principles of Modern Quarantine (5)

Modern quarantine lasts only as long as necessary to ensure that quarantined persons do not become ill

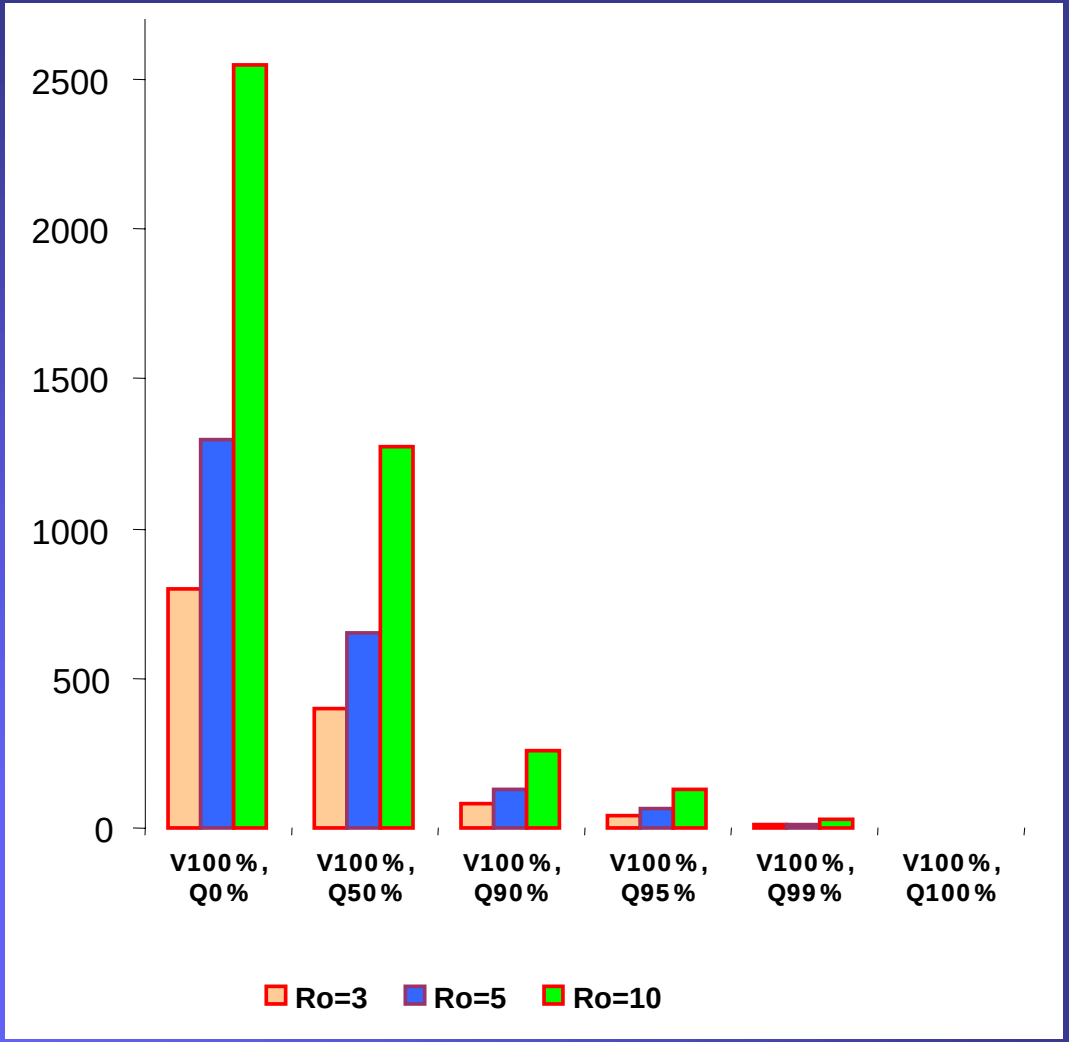
- Maximum quarantine duration related to the incubation period of disease
- “Due process” rights among those subjected to quarantine restrictions

Principles of Modern Quarantine (6)

Modern quarantine does not have to be absolute to be effective

- Even partial or “leaky” quarantine can reduce disease spread
- Partial quarantine can be an effective supplement to vaccination

Impact of Varying Transmission Rates R_0 on Total Smallpox Cases*



*Kakoli Roy et.al., preliminary results (unpublished), **aerosol R_0 inside plane = 500**

Principles of Modern Quarantine (7)

Modern quarantine is more likely to involve small numbers of exposed persons in small areas

- Exposed persons on conveyance containing ill passenger(s)
- Exposed persons in a theater where an intentional release has been announced
- Close contact to a person with smallpox whose source of exposure is unknown

Principles of Modern Quarantine (8)

Implementation of modern quarantine requires—

- clear understanding of public health roles at local, state, and federal levels
- well-understood legal authorities at each level

Principles of Modern Quarantine (9)

Implementation of modern quarantine requires coordinated planning by many partners:

- Public health practitioners
- Health-care providers
- Transportation authorities
- Emergency response teams
- Law enforcement
- Security / Credentials for personnel

Principles of Modern Quarantine (10)

Implementation of modern quarantine requires trust and participation of the general public

- Informed of the dangers of quarantinable diseases before a bioterrorist event occurs
- Informed of the justifications for quarantine when an event is in progress

SARS Containment Strategy

- Elements of Response
  - **Case management**
  - **Contact management**
  - **Hospital/facility infection control**
  - **Community response and quarantine**
  - **Border responses**
- Levels of Response
  - **Magnitude and scope of outbreak**
  - **Resources**
  - **Community cooperation and trust**

SARS Containment Strategy

- Case management: isolation of ill persons
  - United States
    - Home isolation
    - Hospital isolation if medically necessary
  - Other countries
    - Hospital isolation for all patients

Isolation

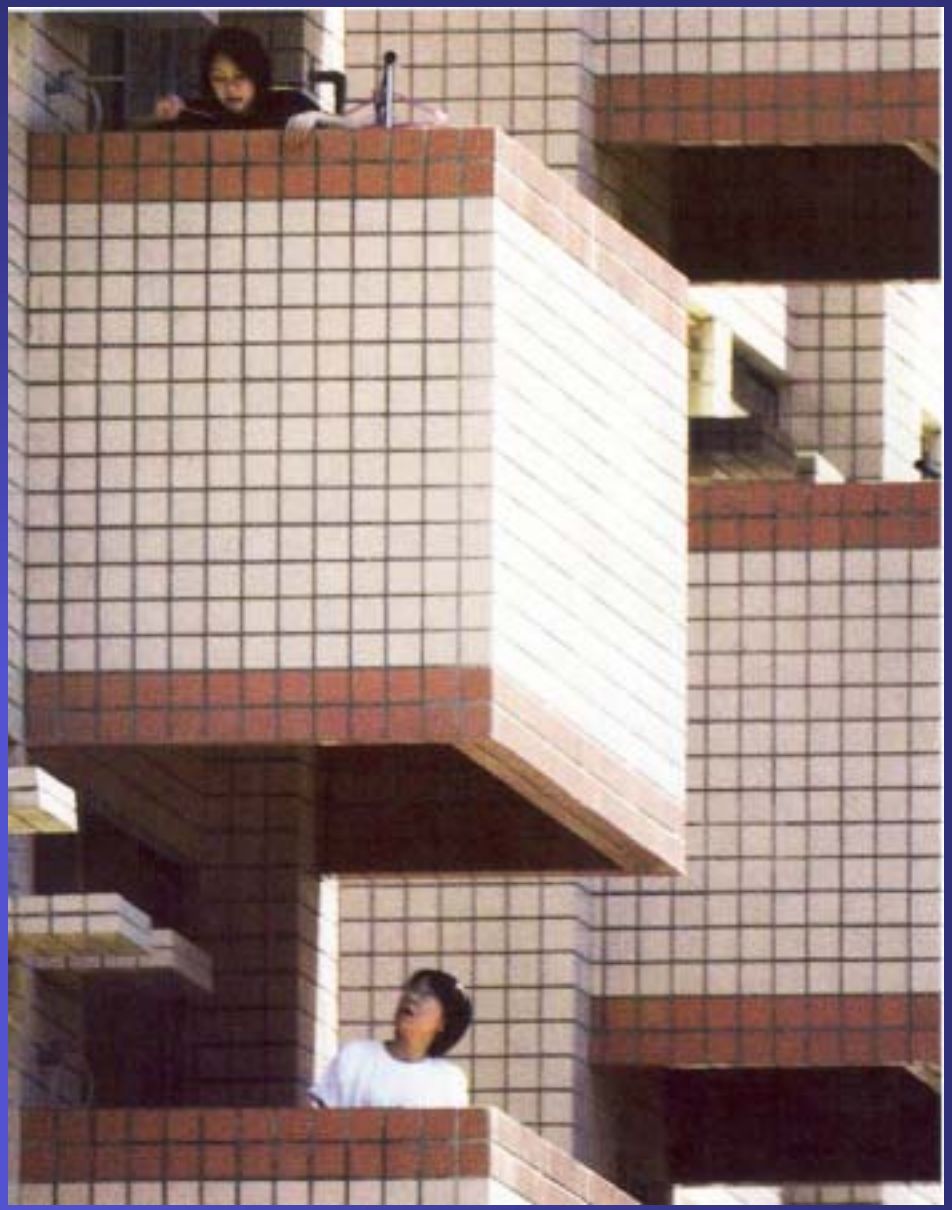

Check with Nurse before entering
STOP
HAND WASHING REQUIRED
Before entering & when leaving room
GLOVES REQUIRED
MASK REQUIRED
EYEWEAR AS NEEDED
GOWN REQUIRED
APRON AS NEEDED
KEEP DOOR CLOSED
DEDICATED EQUIPMENT
STETHOSCOPE ok
"BOTH" DOORS MUST BE KEPT CLOSED AT ALL TIMES
NO VISITORS ALLOWED!
"STRICT" "STRICT" ISOLATION AT ALL TIMES
THANK YOU

SARS Containment Strategy

- Contact management: Quarantine and surveillance
  - United States
    - “Furlough” of exposed HCWs at home
    - Passive symptom surveillance
  - Other countries
    - Home quarantine for close contacts
    - “Work” quarantine
    - Institutional quarantine in selective settings
    - Range of monitoring and surveillance

Contact Management:

Home Quarantine for Close Contacts



Quarantined residents in Jihe Public Housing project, Taiwan

Contact Management: Institutional Quarantine for selected HCWs and close contacts

SARS Containment Strategy

- Community response and quarantine
  - United States
    - SARS EOC
    - Public information and education
  - Other countries
    - Large-scale quarantine
    - Required fever screening
    - Mandatory masks
    - Population-wide monitoring
    - Disinfection

Community Response:
Required Fever Screening for Public Buildings

Community Response

Mandated mask use for

- Travel on public transport
- Taxi drivers

Community Mobilization:
Population-wide Body Temperature Monitoring Campaign and SARS Hotline

Community Response:

Community Disinfection

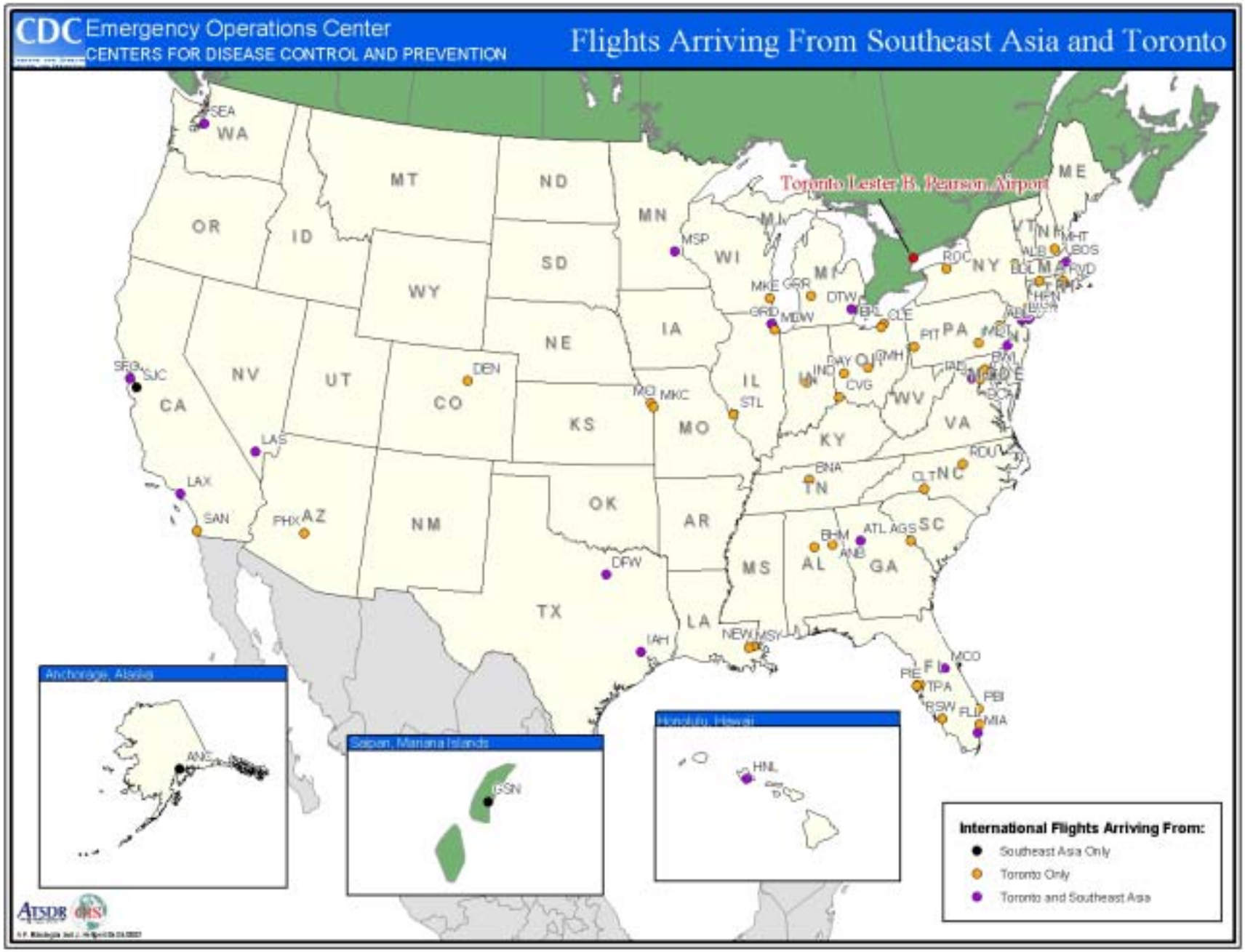
SARS Containment Strategy

- Border and travel response
  - United States
    - Travel advisories and alerts
    - Distribution of health alert notices
    - Responding to ill passengers
  - Other countries
    - Pre-departure and arrival screening
    - Quarantine of travelers from areas with SARS

Travel Alerts and Advisories for SARS, March–July 2003

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

*This change was posted on 7/9/03, retroactive to 7/1/03.


CDC Emergency Operations Center
CENTERS FOR DISEASE CONTROL AND PREVENTION
Flights Arriving From Southeast Asia and Toronto
Toronto Lester B. Pearson Airport
SEA
WA
MT
ND
MN
OR
ID
SD
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MSP
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MKE
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IAH
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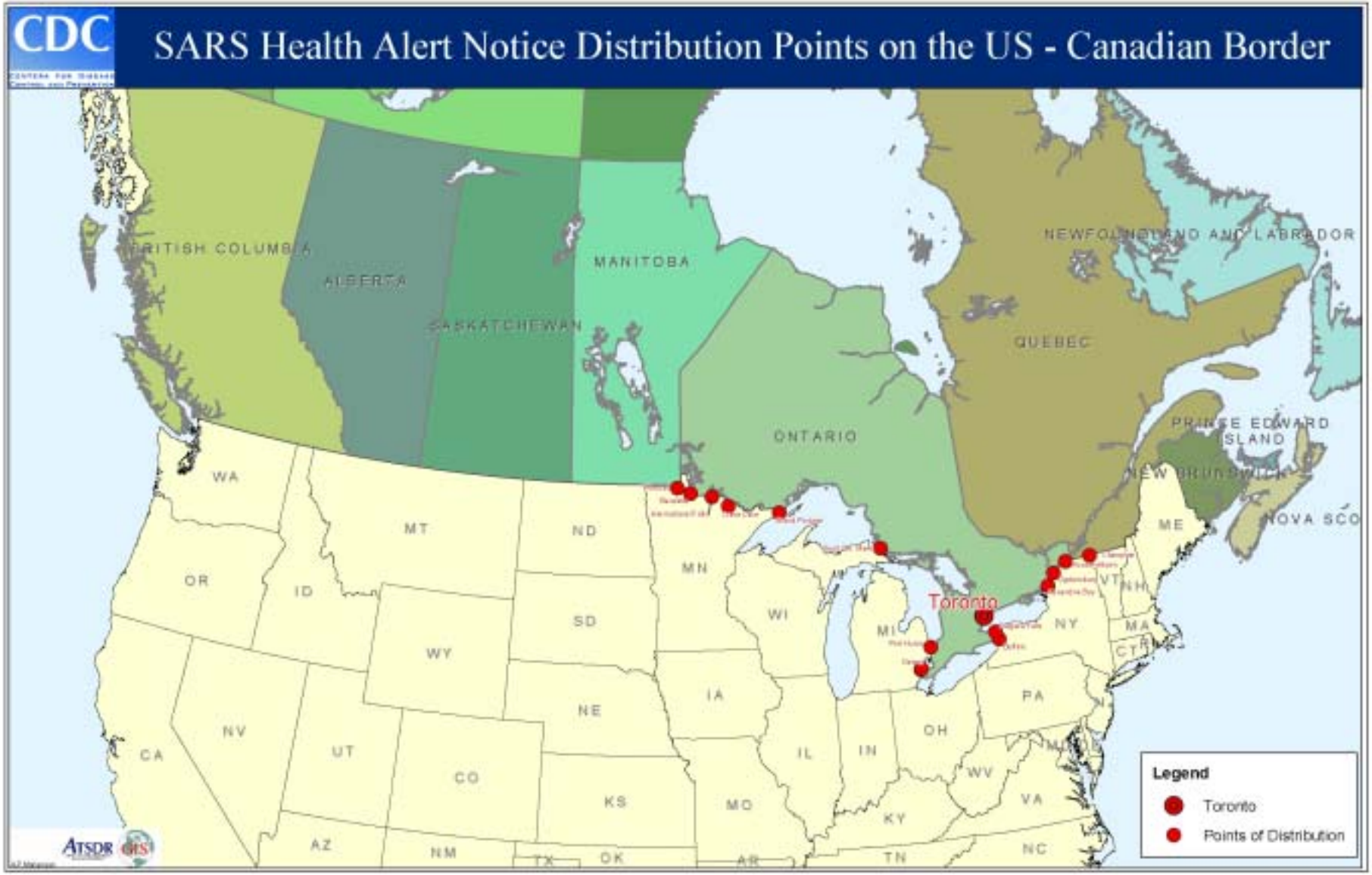
MCO
TPA
FL
MIA
Anchorage, Alaska
ANC
Saipan, Mariana Islands
GSN
Honolulu, Hawaii
HNL
International Flights Arriving From:
Southeast Asia Only
Toronto Only
Toronto and Southeast Asia

SARS Health Alert Notice Distribution Points on the US - Canadian Border



HEALTH ALERT NOTICE

FOR INTERNATIONAL TRAVELERS ARRIVING IN OR RETURNING TO THE USA FROM HONG KONG AND GUANGDONG PROVINCE, PEOPLE'S REPUBLIC OF CHINA, AND HANOI, VIETNAM

TO THE TRAVELER. During your recent travel, you may have been exposed to cases of severe acute respiratory disease syndrome. You should monitor your health for at least 7 days. If you become ill with fever accompanied by cough or difficulty in breathing, you should consult a physician. To help your physician make a diagnosis, tell him or her about your recent travel to these regions and whether you were in contact with someone who had these symptoms. Please save this card and give it to your physician if you become ill.

TO THE PHYSICIAN. The patient presenting this card may have recently traveled to Hong Kong or Guangdong Province in the People's Republic of China or Hanoi, Vietnam, where cases of atypical pneumonia have been identified. If you suspect atypical pneumonia (also being called severe acute respiratory disease syndrome [SARS]), please contact your city, county, or state health officer (see http://www.cdc.gov or call the CDC Emergency Operations Center 770-488-7100).

For public inquiries, call Centers for Disease Control and Prevention (CDC) hotline: English 888-246-2675, Español 888-246-2857, TTY 866-874-2646.

Distributed to >2 million airline passengers

Distributed at 13 US-Canada land crossings and the Toronto airport

Empty jewelry showcases from Hong Kong and Singapore Zurich Trade Fair

Border Responses

- **Travel Alerts**
- **Arrival and departure notices**
- **Pre-departure and arrival fever screening**
- **Required mask use on conveyances (intermittent)**

Range of Responses to SARS at the Local, 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)
- 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?

Preparedness Planning

- General
  - Establish incident command structure
  - Establish relationship with essential partners
  - Plan for monitoring and assessing appropriate response
  - Develop message strategies for various responses and groups

Preparedness Planning

- Case and Contact Management
  - Ensure management protocols up to date
  - Establish supplies for non-hospital management
  - Establish telecommunications plan
  - Plan for ensuring essential services

Preparedness Planning

- Community Containment
  - Ensure that necessary legal authorities and procedures are in place
  - Identify key partners and personnel for quarantine
  - Develop training programs and drills
  - Develop plans for mobilization and deployment

Preparedness Planning

- Non-hospital facility management
  - Identify community-based facilities for quarantine of contacts
  - Ensure procedures for assessment of sites are in place
  - Develop protocols for evaluation and management of arriving ill passengers

www.astho.org

Conclusions

- Modern quarantine
  - Represents a range of interventions
  - Can be resource- and labor-intensive
  - Is an important tool used in conjunction with other containment measures
- Effective implementation of modern quarantine and other containment measures is impossible without planning and preparedness.