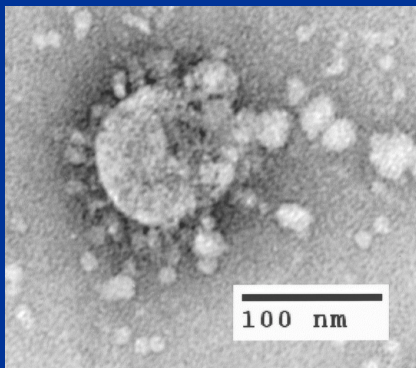
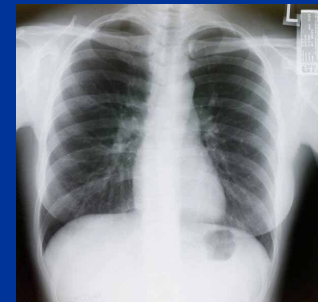


SARS Surveillance:

Preparing for Potential Re-emergence of Disease



October 29, 2003

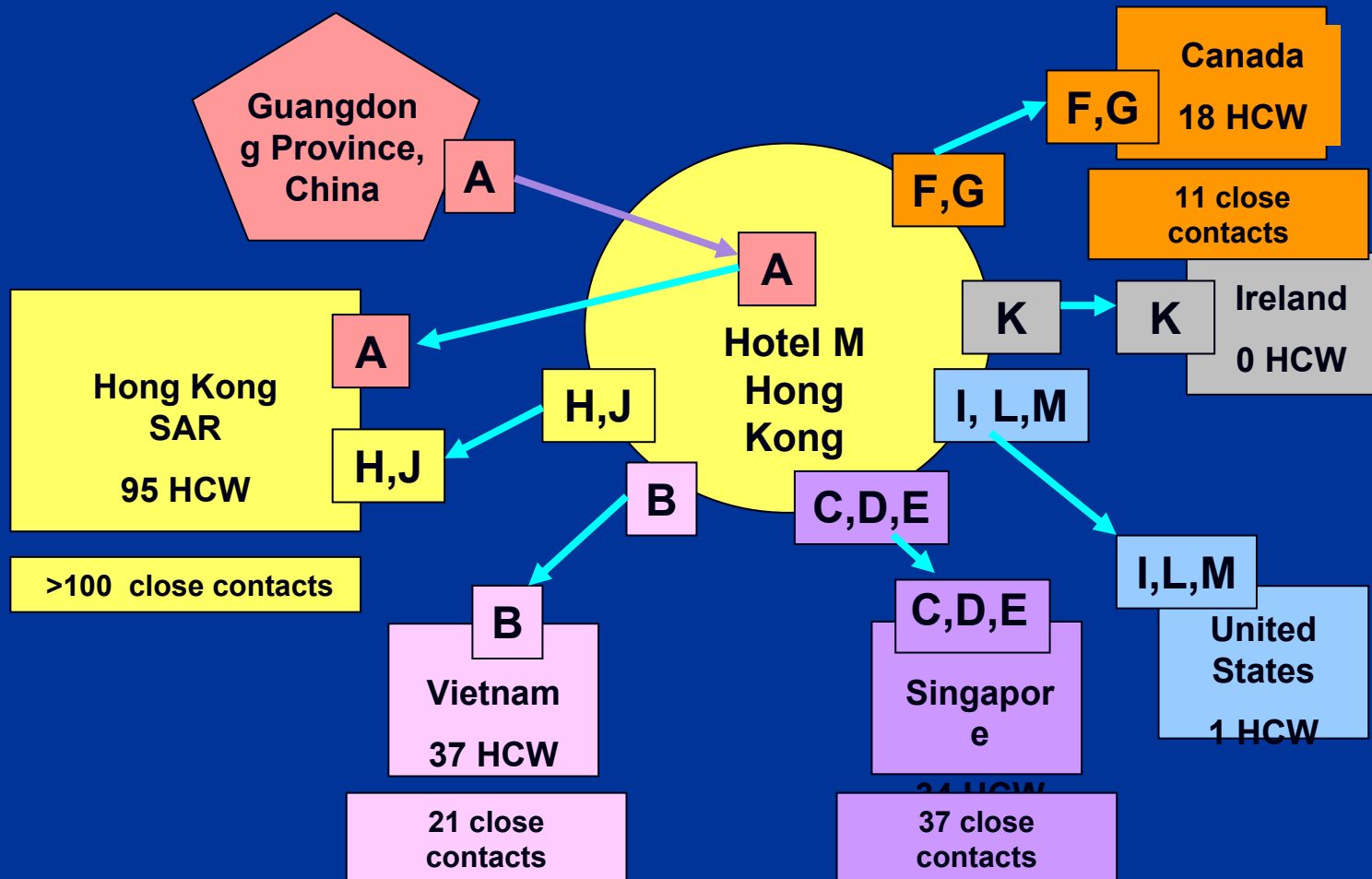


Outline

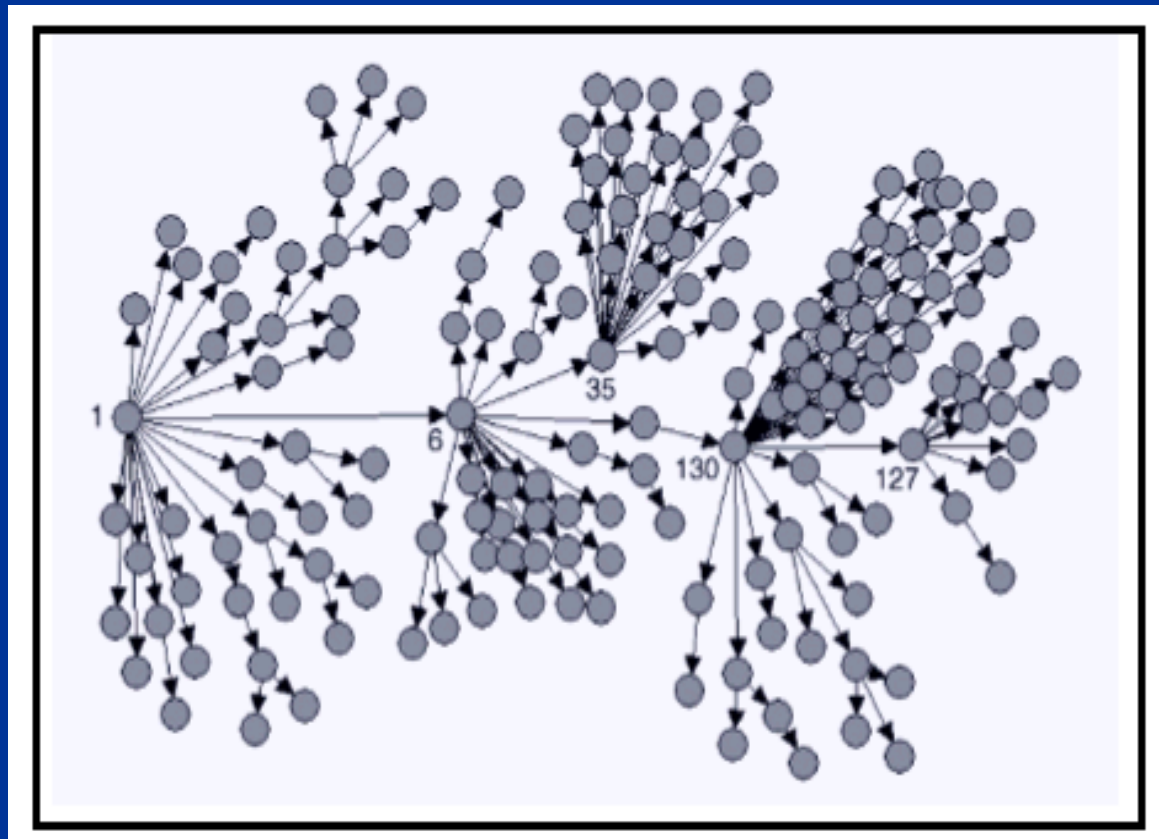
- **Epidemiology of SARS: lessons learned**
- **Surveillance objectives and strategies**
- **Preparing for SARS surveillance in absence of known activity worldwide**
- **Surveillance in presence of SARS activity**
- **Contact tracing**
- **Key surveillance messages**

Effect of Travel and Missed Cases on the SARS Epidemic

Spread from Hotel M, Hong Kong

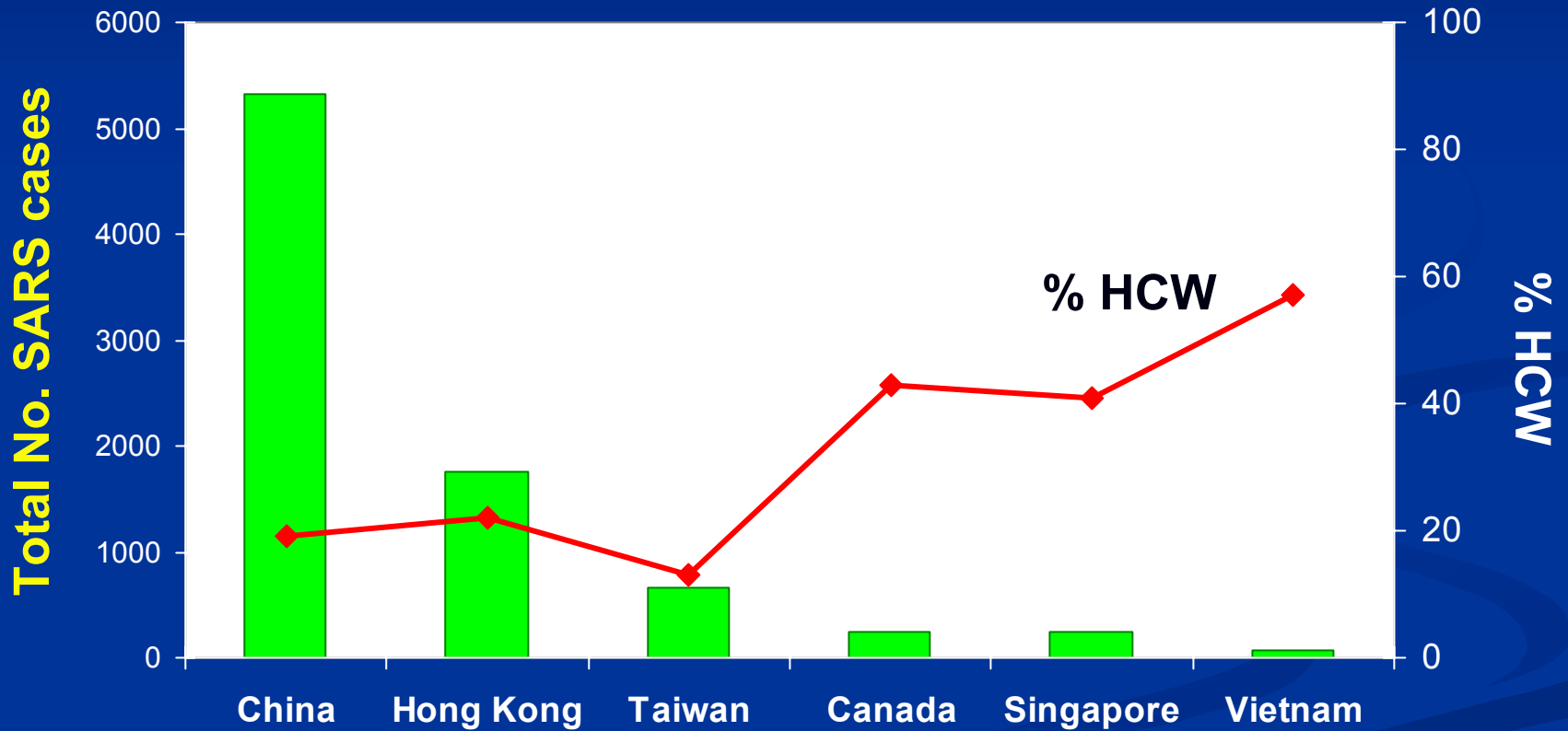


SARS Transmission is Heterogenous



**Probable cases of SARS by reported source of infection,
Singapore, Feb 25 – Apr 30**

Total SARS Cases and % Healthcare Workers by Country

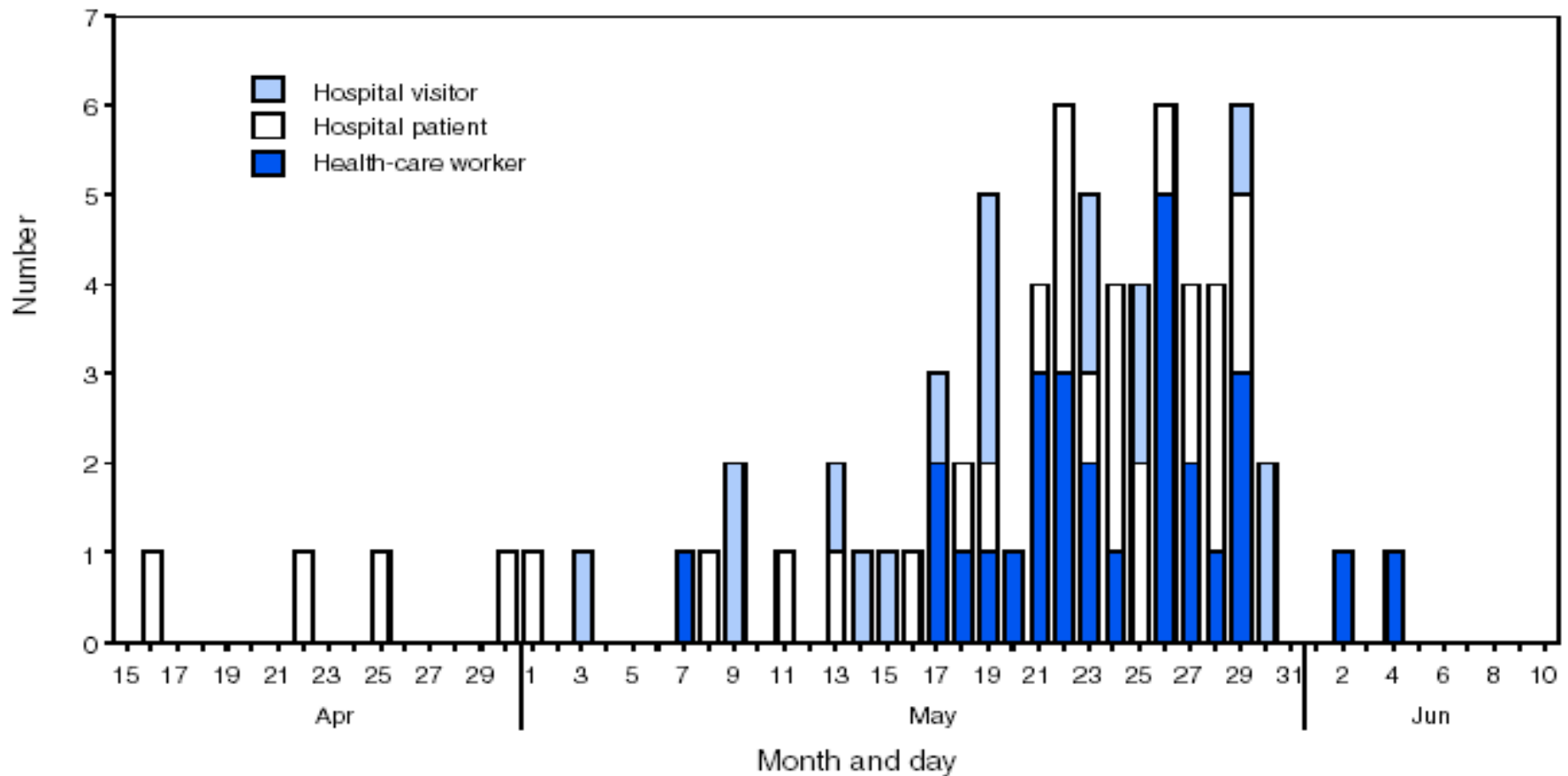


High-risk Populations: Patients and Visitors

- **Greater Toronto Area**
 - **375 total SARS cases (suspect and probable)**
 - **107 (28%) patients or visitors**
- **Taiwan**
 - **668 probable SARS cases**
 - **256 (38%) patients or visitors**

Second Wave of SARS Outbreak in Toronto

FIGURE 2. Number* of reported cases of severe acute respiratory syndrome, by source of infection and date of illness onset — Toronto, Canada, April 15–June 9, 2003



* N = 74.

SARS Cases in the United States, Spring 2003

| Type of Case | No. | CoV+* | CoV-* | Pending |
|--------------|-----|-------|-------|---------|
| Probable | 74 | 8 | 38 | 28 |
| Suspect | 344 | 0 | 169 | 175 |

*Based on presence of absence of SARS antibody at ≥ 28 days

Lessons Learned: Key Epidemiologic Features

- SARS can spread rapidly around the world
- Healthcare facilities played central role
- Most cases were spread person-to-person
- Vast majority of febrile respiratory infections in U.S. were not SARS

Goals of SARS Surveillance

- Early detection of SARS-CoV cases with or without recognized re-emergence overseas
- If SARS re-emerges, rapid case identification and reporting to facilitate outbreak control and management
- Rapid identification and monitoring of contacts of SARS cases

Preparing for SARS Surveillance: Key Clinical Concepts

- Non-specific clinical presentation
 - difficult to distinguish from other respiratory diseases
- No rapid diagnostic test exists that can reliably detect infection *early* in the illness
- Nearly all laboratory-confirmed cases have X-ray evidence of pneumonia by day 7 of illness

Preparing for SARS Surveillance: Key Epidemiologic Concepts

- Missed cases can lead to many additional cases: Early case diagnosis and detection can prevent further transmission
- Risk of exposure is KEY to likelihood of SARS diagnosis
- SARS activity is typically facility- and community-specific
- In setting of extensive SARS transmission, consider SARS in anyone with febrile, respiratory illness, even in absence of epidemiologic links

Key Concepts of Public Health Response

- Up-to-date information on global SARS is needed to assess risk of exposure
- Contact tracing: resource intensive but critical to disease containment
- Communication among public health officials and providers—in addition to timely dissemination of information—is critical to outbreak management

Revised SARS Case Definitions

- Backbone of SARS surveillance
- Revised in June CSTE Position Statement
- Rationale for changes: separate cases which are nationally notifiable from those still under investigation
 - Confirmed and probable cases
 - SARS “reports under investigation” include patients whose illness is less severe or whose exposures to SARS-CoV are not definitive

Watch CSTE and CDC websites for final wording

Surveillance Strategies: Levels of SARS activity

- Level of SARS transmission in the community determines risks of exposure
 - Absence of known SARS activity worldwide
 - Presence of known SARS activity



“SARS activity anywhere has global impact”

Strategies Surveillance: Impact of level of SARS activity

- Core surveillance (zero or low-level activity)
 - Based on “classic” clinical SARS presentation
 - Passive surveillance of high risk exposures
 - Rapid reporting and information dissemination
- Enhanced surveillance
 - Screen broader range of clinical presentations
 - Active surveillance of persons in high-risk settings (i.e., hospitals, transportation centers)

Will SARS Re-emerge?

- Potential sources of re-emergence
 - Animal reservoir
 - Humans with persistent infection
 - Unrecognized transmission in humans
 - Laboratory exposure
- SARS most likely to recur outside U.S.
 - Well-established global surveillance is important to recognition of first case

Surveillance: No Known SARS Activity Worldwide

- No epidemiologic links available
- Screen for characteristics associated with persons at increased risk for SARS
 - Severe disease: pneumonia requiring hospitalization
 - Potential exposure to unrecognized SARS cases
 - Travelers
 - Healthcare workers
 - Clusters of unexplained pneumonia

1st Line of Response: Astute Clinician

Screen all persons being hospitalized for
CXR-confirmed pneumonia:



1. In the last 10 days, have you **traveled** to mainland China, Hong Kong or Taiwan*, or been in close contact with other ill persons who have?



2. “Are you employed as a **healthcare worker** with direct patient contact?”



3. “Do you have **close contacts** who have been told they have pneumonia?”

****Why Mainland China, Taiwan, and Hong Kong?***

- Mainland China is likely origin of 2002/2003 outbreak
- Neighboring countries: increased volume of travelers from mainland China

What about other affected areas?

- Although less likely, SARS may re-emerge from Hanoi, Singapore or Toronto
- If ill travelers from these areas are *highly suspected* to have SARS, providers should evaluate and report

**If patient hospitalized for pneumonia answers
“yes”
to at least one of three screening questions:**

Providers:

- Notify state or local health department
- Consider SARS testing if no alternative diagnosis found in 72 hours

**If patient hospitalized for pneumonia answers
“yes”
to at least one of three screening questions:**

Providers:

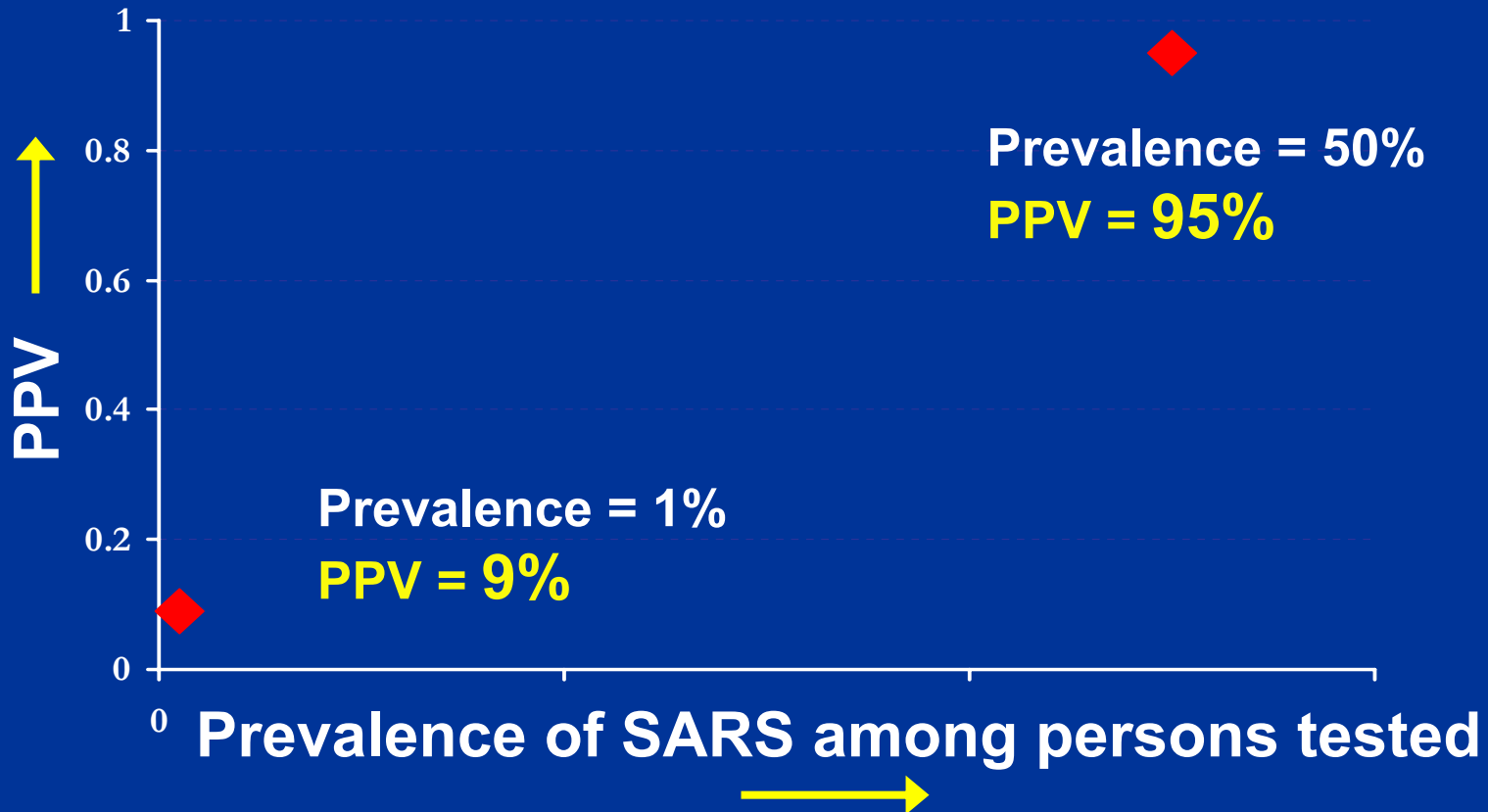
- Notify state or local health department
- Consider SARS testing if no alternative diagnosis found in 72 hours

**Testing for SARS-CoV should only be done in
consultation with public health partners**

Rationale for Limiting SARS-CoV Testing

In setting of no or limited SARS activity

IF: Sensitivity of detecting SARS in clinical specimen = 50%
Specificity of test = 95%

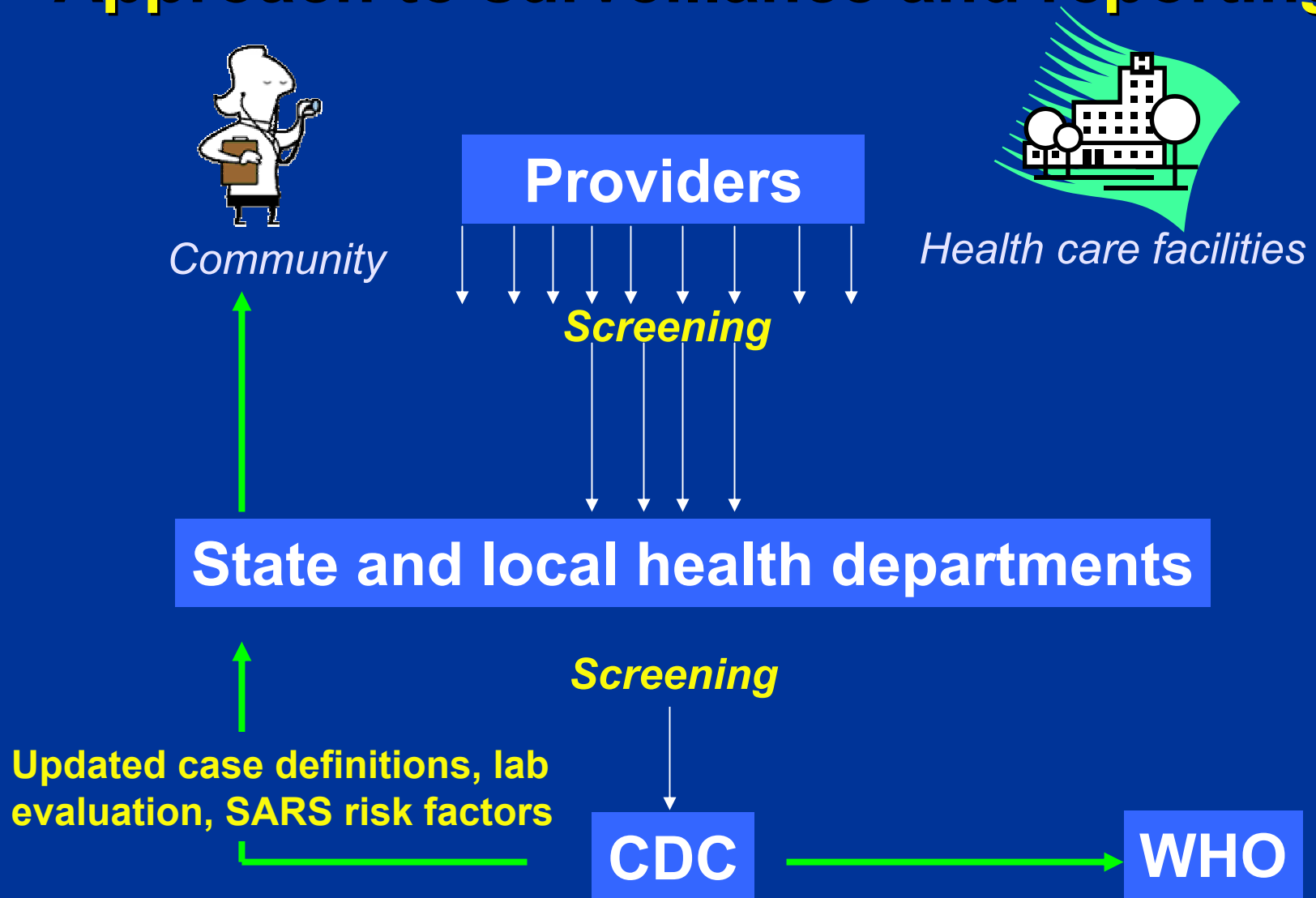


PPV=positive predictive value

Role of state and local public health

- Work with providers to determine if SARS-CoV testing is appropriate
- Review individual reports from providers to further assess likelihood of SARS
 - Detect pneumonia clusters
 - Identify cases raising further index of suspicion for SARS
 - Travelers exposed to person with pneumonia or a healthcare facility
 - Healthcare workers with direct patient contact who are part of unexplained pneumonia cluster

Approach to surveillance and reporting



Surveillance in Presence of SARS Activity

- Probability that respiratory illness is SARS increases
- Up-to-date information on global and local transmission is needed
- Providers should consider SARS in patients with early or mild respiratory illness who have **SARS Risk Factors**
- Quickly report suspicious cases to public health

Presence of SARS activity: Role of provider

- Continue to screen persons hospitalized for pneumonia
- Screen patients with fever *or* respiratory symptoms for **SARS Risk Factors** in 10 days prior onset:
 1. Travel to foreign or domestic location with ongoing unlinked* SARS-CoV transmission
 2. Close contact with a person who has known or suspected SARS infection
- Report all persons suspected to have SARS-CoV infection to public health officials

*unlinked: no known (or identifiable) epidemiologic links or risk factors found among SARS cases in the area. This was formerly termed “local transmission.”

Hospital-based SARS surveillance

- Level of response activities should be adapted to specific situation in local facility
- Triggers for accelerated surveillance:
 - Significant increase numbers of cases
 - Documented or suspected unlinked transmission
 - Changing transmission patterns

Hospital-based SARS surveillance

Options for Enhanced Surveillance

Facility with no
SARS cases



Be alert for clusters of pneumonia among HCWs

Monitor HCWs taking care of SARS patients
daily for fever, cough or SOB

Screen all visitors

Monitor daily:

healthcare workers

inpatients

**Fever, cough, or
shortness of breath?**

SARS Risk Factors?

Facility with unlinked
nosocomial
transmission

Role of state and local public health

- Disseminate updated information and guidelines to providers
- Review potential cases reported by providers and evaluate for appropriate SARS testing
- Identify and evaluate clusters of unexplained pneumonia
- Report SARS-CoV + cases to CDC immediately
- Conduct contact tracing

Goals of Contact Tracing

- Promptly identify, evaluate and monitor close contacts of SARS cases
- Prevent spread from contacts by monitoring for evidence of infection and the need for isolation

Rapid identification and evaluation of all close contacts of SARS cases is **critical** to stopping disease transmission

Contact Tracing: State and Local Public Health Activities

- Identify all persons exposed to SARS cases
 - **Infectious period:** onset date \leftrightarrow 10 days following symptom resolution
- Prioritize contacts to be monitored if needed, based on:
 - Likelihood of SARS diagnosis in index patient
 - Duration and nature of exposure
 - Contact host factors

SARS Surveillance Plans

- Draft SARS preparedness plans are available:

<http://www.cdc.gov/ncidod/sars/sarsprepplan.htm>

SARS Surveillance Preparedness: Key Messages

1. Early case detection is critical to prevent disease spread
2. Risk of exposure to SARS is key to considering likelihood of diagnosis
3. Rapid contact tracing is essential to disease containment

SARS Surveillance Preparedness: Key Messages

4. Judicious use of SARS-CoV testing is important
5. SARS response should be adjusted to the extent of disease in local community or facility
6. Collaboration between health care providers and public health agencies is critical to SARS preparedness

Acknowledgements

- CDC SARS Preparedness Task Force members
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