Clinical Aspects of Severe Acute Respiratory Syndrome (SARS), 2003

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CDC

Clinical Aspects of Severe Acute Respiratory Syndrome (SARS)

- Incubation period 2-10 days
- Onset of fever, chills/rigors, headache, myalgias, malaise
- Respiratory symptoms often begin 3-7 days after symptom onset

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Symptoms Commonly Reported By Patients with SARS[1-5]

Symptom	Range (%)
Fever	100
Cough	57-100
Dyspnea	20-100
Chills/Rigor	73-90
Myalgias	20-83
Headache	20-70
Diarrhea	10-67

1. Unpublished data, CDC. 2. Poutanen SM, et al. NEJM 3/31/03. 3. Tsang KW, et al. NEJM. 3/31/03 4. Peiris JSM, et al. Lancet 4/8/03 5. Lee N. et al NEJM 4/7/03

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Symptoms Reported by Patients With Diagnostic SARS-CoV Laboratory Testing, United States, 2003

Symptom	Coronavirus Positive (n=6) %	Coronavirus Negative (n=28) %
Fever	100	96
Cough	100	93
Dyspnea	**100**	**61***
Myalgias	83	75
Chills/Rigor	83	68
Headache	67	68
Diarrhea	**67**	**25***
Coryza	17	43
Sore Throat	17	43

*p=.07

Common Clinical Findings in Patients with SARS[1-5]

Finding	Range (%)
Examination	
Rales/Rhonci	38-90
Hypoxia	60-83
Laboratory	
Leukopenia	17-34
Lymphopenia	54-89
Low platelet	17-45
Increased ALT	23-78
Increased LDH	70-94
Increased CPK	26-56

1. Unpublished data, CDC. 2. Booth CM, et al. JAMA 5/6/03. 3. Tsang KW, et al. NEJM. 3/31/03 4. Peiris JSM, et al. Lancet 4/8/03 5. Lee N. et al NEJM 4/7/03

CDC

Clinical Findings in Patients With Diagnostic SARS-CoV Laboratory Testing, United States, 2003

Symptom	Coronavirus Positive (n=6) %	Coronavirus Negative (n=28) %
Examination		
Rales/rhonci	**83**	**23***
Hypoxia	**83**	**29***
Infiltrates	**100**	**30***
Laboratory		
Leukopenia	17	5
Lymphopenia	83	53
Low platelets	17	5
Increased ALT	60	17

*p<.05

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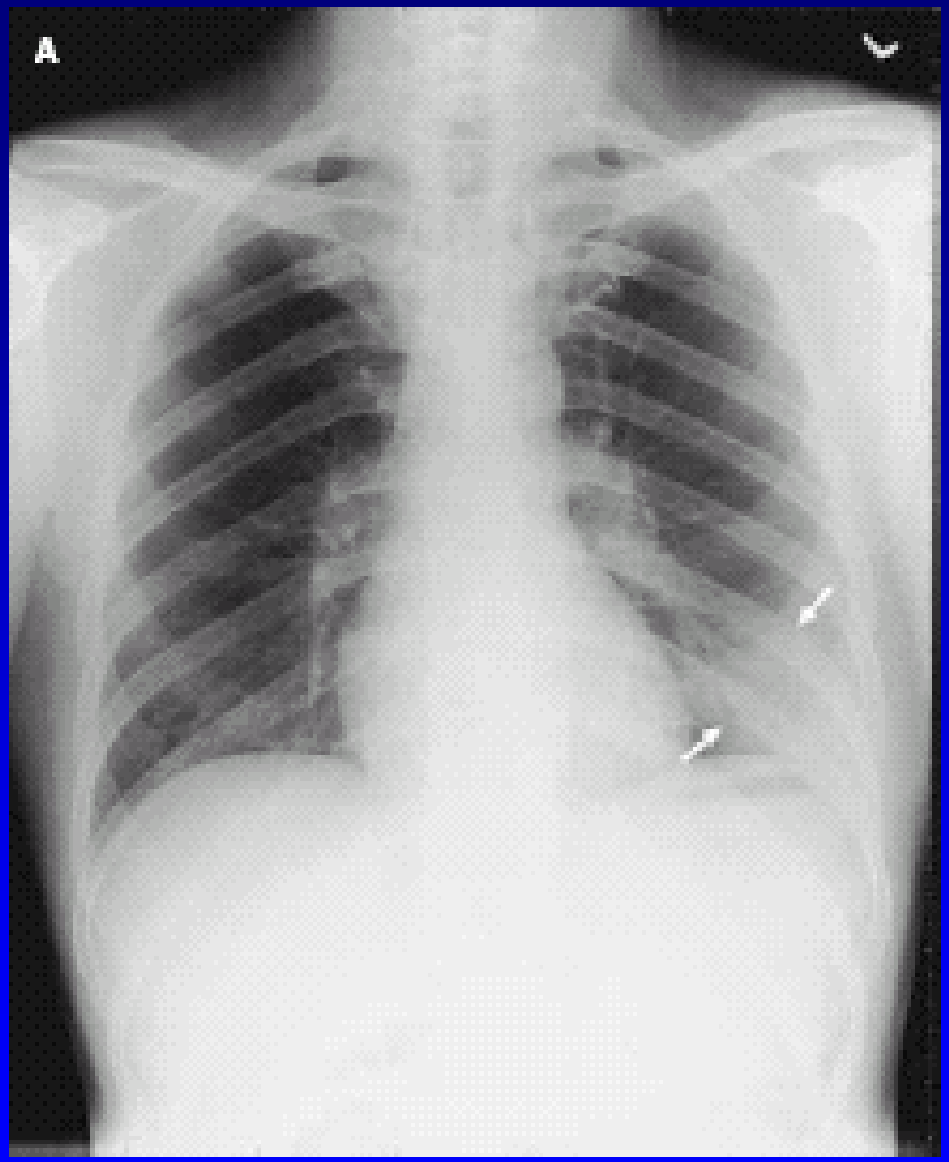
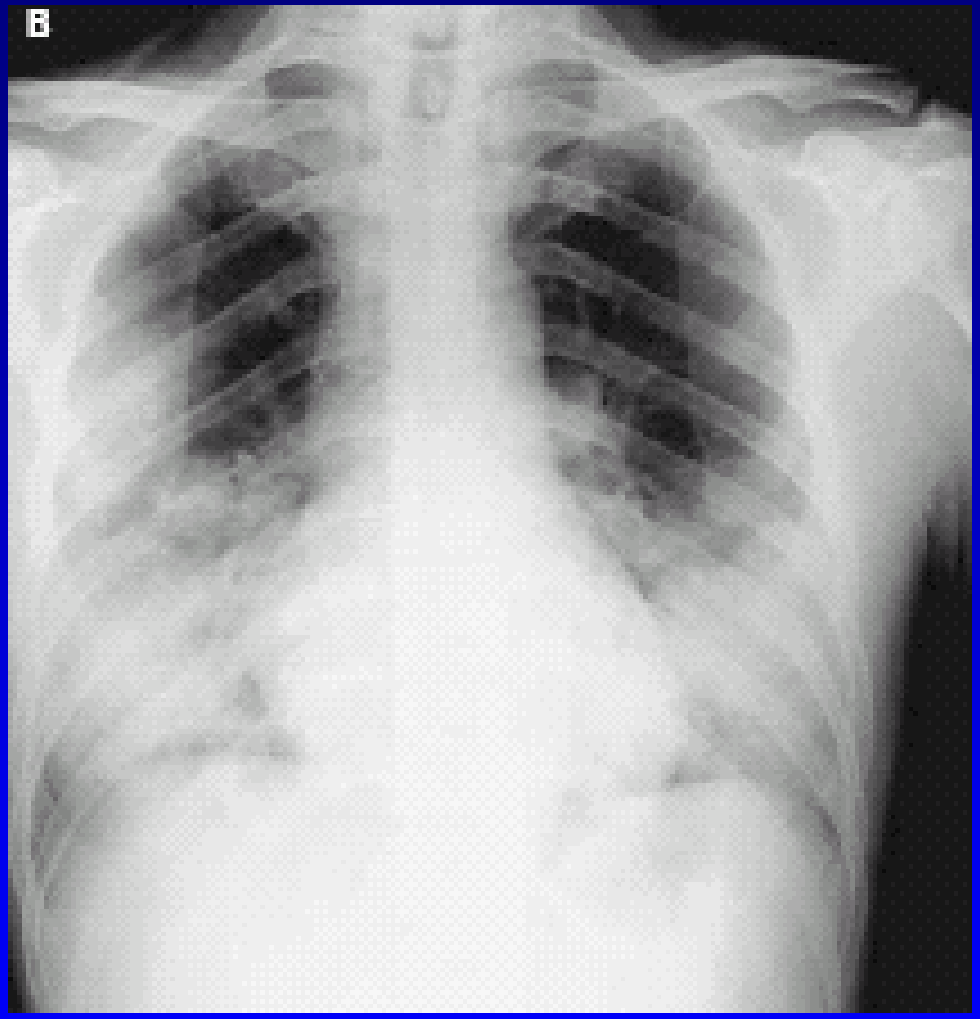
Radiographic Features of SARS

- Infiltrates present on chest radiographs in > 80% of cases
- Infiltrates
  - initially focal in 50-75%
  - interstitial
  - Most progress to involve multiple lobes, bilateral involvement



Lee N. et al NEJM 4/7/03

CDC



Lee N. et al NEJM 4/7/03

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Clinical Outcome of Patients with SARS, 2003

	n	Progression to Resp. Failure (%)
U.S.[1]	6	17
Canada[2]	144	14
Hong Kong[3]	10	20
Hong Kong[4]	50	38
Hong Kong[5]	138	14
Singapore[1]	178	12

1. Unpublished data, CDC. 2. Booth CM SM, et al. JAMA 5/6/03. 3. Tsang KW, et al. NEJM. 3/31/03 4. Peiris JSM, et al. Lancet 4/8/03 5. Lee N. et al NEJM 4/7/03

Clinical Outcome of Probable SARS Cases*, 2003

	n	Case Fatality Proportion (%)
U.S.	65	0
Canada	146	15
Hong Kong	1654	12
Singapore	178	13

* http://www.who.int/csr/sarscountry/2003_05_07/en/

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Clinical Features Associated with Severe Disease

- Older Age
- Underlying illness
- ? Lactate dehydrogenase levels
- ? Severe lymphopenia

Analysis of Clinical Specimens of 20 Patients with RT-PCR positive Nasopharyngeal Aspirates (NPA) and Seroconversion to SARS-Associated Coronavirus

Day after onset of Symptoms	10	13	16	19	21
NPA (Positivity rate)	19 / 20 (95%)	18 / 20 (90%)	18 / 20 (90%)	15 / 20 (75%)	9 / 19 (47.4%)
STOOL (Positivity rate)	20 / 20 (100%)	20 / 20 (100%)	19 / 20 (95%)	12 / 15 (80%)	10 / 15 (66.7%)
Urine (positivity rate)	10 / 20 (50%)	9 / 20 (45%)	7 / 20 (35%)	6 / 20 (30%)	4 / 19 (21.1%)

Peiris et. al. www.who.int 5/1/03

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Transmission

- Probable major modes of transmission
  - Large droplet aerosolization
  - Contact
    - Direct
    - Fomite
- Airborne transmission cannot be ruled out
  - ? Role of aerosol-generating procedures
- ? Fecal-oral
- Transmission efficiency may vary among individuals

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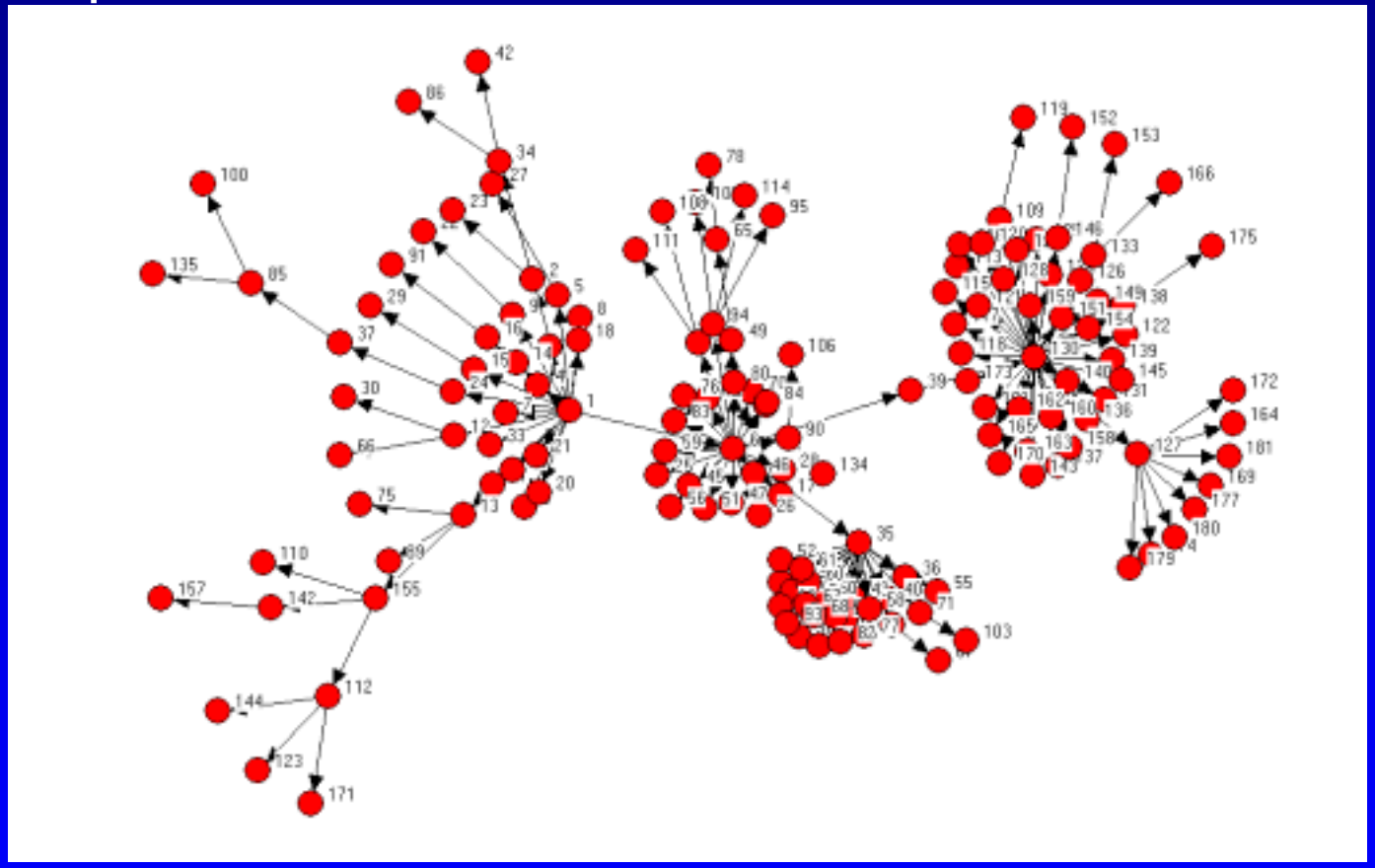
Probable cases of severe acute respiratory syndrome, by reported source of infection,* --- Singapore, February 25--April 30, 2003



*Case 1 = 1; Case 2 = 6; Case 3 = 35; Case 4 = 130; and Case 5 = 127. Excludes 28 cases with either no or poorly defined direct contacts or who were cases translocated to Singapore with no further secondary transmission. MMWR 2003;52:405

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Diagnostic Approach to Patients with Possible SARS

- Consider other etiologies
  - Diagnostic workup
    - Chest radiograph
    - Blood and sputum cultures
    - Pulse oximetry
    - Testing for other viral pathogens (e.g. influenza)
    - Consider urinary antigen testing for *Legionella* spp. and *Streptococcus pneumoniae*

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Diagnostic Approach to Patients with Possible SARS

- Diagnostic workup (continued)
  - Save clinical specimens for possible additional testing
    - Respiratory
    - Blood
    - Serum
  - Acute and convalescent sera (>21 days from symptom onset) should be collected
  - Contact Local and State Health Departments for SARS-CoV testing

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Treatment of Patients with SARS

- Most effective therapy remains unknown
  - Optimize supportive care
- Treat for other potential causes of community-acquired pneumonia of unknown etiology

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Treatment of Patients with SARS

- **Potential Therapies Requiring Further Investigation**
  - **Ribavirin**
  - **?other antiviral agents**
  - **Immunomodulatory agents**
    - **Corticosteroids**
    - **Interferons**
    - **Others?**

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Infection Control

- **Early recognition and isolation is key**
  - **Heightened suspicion**
  - **Triage procedures**
- **Transmission may occur during the early symptomatic phase**
  - **Potentially before both fever and respiratory symptoms develop**

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Infection Control

- **Isolation**
  - **Hand hygiene**
  - **Contact Precautions (gloves, gown)**
  - **Eye protection**
  - **Environmental cleaning**
  - **Airborne Precautions (N-95 respirator, negative pressure)**

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