Is your IR service ready for COVID-19?

Dr Kiang Hiong Tay
Covid-19 Cases

As of 20 Mar 2020

China
80,928 cases

125 countries
163,871 cases

244,799 cases
10,030 deaths
Covid-19 Cases

As of 20 Mar 2020

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<tr>
<th>Country, Other</th>
<th>Total Cases</th>
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244,799 cases
10,030 deaths
Severe Acute Respiratory Syndrome (SARS) 2003

World
- 8099 probable cases
- 774 deaths
- Case fatality rate 9.6%

Singapore
- 238 probable cases
- 41% HCW (incl 3 radiographers)
- 33 deaths (incl 2 doctors)
- Case fatality rate 14%
- Cross infection of an inpatient to outpatients and visitors in Radiology

Source: WHO CSR and MOH Singapore websites
Strengthening of infectious disease outbreak preparedness after SARS

• Significant expansion of number of negative pressure isolation beds throughout the public hospital system
  • Purpose built National Centre for Infectious Diseases (NCID) has 330 negative pressure double door isolation rooms

• Segregation of inpatient and outpatient facilities

• National stock piling of masks and PPE

• Establish formal platforms for multi-Ministry and cross-agency coordination

• Develop strong contact tracing capability

• Training of health professionals in infection prevention and correct use of PPE

• National Healthcare Staff Surveillance System (S3)

• Major investments in biomedical science with significant focus on building expertise in infectious diseases.
Coronavirus: Singapore scientists aim to test vaccine in as soon as 4 months

SINGAPORE - Singapore scientists say they are working with international partners to develop a vaccine for the coronavirus, with plans to begin testing it in as soon as four months.

At the same time, promising anti-viral drugs such as those used to treat HIV are being used on patients here, in efforts to locate a "magic drug" against the virus.

The Health Ministry's (MOH) chief health scientist, Professor Tan Chorh Chuan, said that Duke-NUS Medical School is working with the Coalition for Epidemic Preparedness Innovations (CEPI) to roll out a vaccine trial here.

A couple of hundred people in Singapore were infected with Sars in 2003 and this "shadow of Sars," says Professor Wang Lin Fa of Duke-NUS Medical School, gives the Republic a problem in testing for Covid-19 as the two coronaviruses are 80 per cent similar. Targeting the remaining 20 per cent that is different was key in the tests. (PHOTO: KEVIN LIM)

Test for Covid-19 antibodies a world first for Singapore

Duke-NUS professor behind test to successfully trace infected person who has recovered

Nothing is as important as speed and accuracy when it comes to testing for Covid-19.

It was a test developed locally that helped Singapore trace the source of infection of two Covid-19 clusters here – one where infection was known to have been transmitted by patients from Wuhan.

The link was a woman who had become infected at the Life Church and Missions Singapore, gone to a Chinese New Year gathering where testing showed she was infected, and later in the

Instead of working on a test for the virus, Prof Wang and his team worked to develop a test for antibodies. The virology test indicates if a person has the virus. But once the person has recovered, the virus will not be in the body and he would have developed antibodies. (PHOTO: KEVIN LIM)
Flatten the epidemic curve: containment strategies

- Limit imported cases
  - Travel advisories
  - Border restrictions
  - Temperature screening at ports of entry

- Break chain of transmission
  - Detect (Enhanced surveillance with expanded suspect case definition)
  - Isolate and treat
  - Rigorous contact tracing
  - Quarantine of contacts

- Social distancing
  - No large scale events

- Social responsibility

- Open/transparent public communications
DO NOT WEAR A MASK IF YOU ARE WELL

There are sufficient masks in the government's stockpiles, if used responsibly.

WEAR A MASK ONLY IF

- You have a FEVER, COUGH OR RUNNY NOSE
- You are RECOVERING FROM ILLNESS

HOW TO WEAR A MASK?

1. COVER YOUR MOUTH, NOSE AND CHIN, with the coloured side facing outwards.
2. PINCH THE METAL EDGE OF THE MASK so that it presses gently on your nose bridge.
3. Remove a used mask by HOLDING ONLY THE EAR LOOPS.

WASH YOUR HANDS REGULARLY WITH SOAP AND WATER.

LET'S ALL DO OUR PART

1. Wash your hands frequently with soap
2. Monitor your temperature twice daily
3. AVOID touching your face with your hands
4. Keep your home and surroundings clean and well-ventilated

Be socially responsible

1. Cover your mouth with tissue paper when sneezing or coughing
2. Wear a mask if you are sick and see a doctor promptly
3. If you are sick, AVOID crowded places and stay at home
4. Comply with Home Quarantine Orders and Leaves of Absence and stay at your designated locations

WE WILL GET THROUGH THIS!

Do not spread rumours. Get the latest on the COVID-19 by signing up for the Gov.sg WhatsApp channel (www.gov.sg/whatsapp) or at the MOH website (www.moh.gov.sg)
COVID-19: 11 Mar Update

As of 12pm:
New cases: 12
Total cases in Singapore: 178
Discharged today: 3
Total discharged: 96
Total remaining in Hospital: 82

Of the new cases, 1 is part of the SAFRA Jurong cluster, 8 are imported cases, 1 is linked to an imported case, and 2 are unlinked.

Most in hospital are stable or improving. 9 are in the intensive care unit – three less than yesterday.

go.gov.sg/moh11mar
Most western countries are on the same coronavirus trajectory. Hong Kong and Singapore have limited the spread; Japan and S Korea have slowed it.

Cumulative number of cases, by number of days since 100th case

- **China** had 58,761 cases at 25 days
- **Italy**: 12 days, 5% daily increase
- **Spain**, **Iran**, **US**, **Germany**, **France**, **Switzerland**, **UK**, **Sweden**, **Belgium**, **Netherlands**, **Norway**, **Sweden**, **Belgium**, **Denmark**, **Austria**, **Canada**, **Israel**, **Bahrain**, **Iceland**, **Australia**, **Malaysia**, **Hong Kong**: strict quarantine rules & contact tracing
- **Singapore**: school closures, quarantine, strong community response
- **Japan**: isolation of the elderly

UK's current trajectory:
- Spread has slowed from initial pace

FT graphic: John Burn-Murdoch / @jburnmurdoch
Source: FT analysis of Johns Hopkins University, CSSE; Worldometers. Data updated March 16, 20:00 GMT
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Severe Acute Respiratory Syndrome: 11 Years Later—A Radiology Perspective

OBJECTIVE. Severe acute respiratory syndrome (SARS) was a highly virulent atypical pneumonia caused by a novel coronavirus that resulted in a pandemic in 2003. Singapore was one of the most severely affected countries, and SARS took a heavy toll on our health care system. The lessons learned during the pandemic shaped our national contingency response plan and have proved valuable in subsequent epidemics. We describe the lessons learned for the radiology department.

CONCLUSION. Our experience with SARS has shaped and changed our daily practice of radiology.

Severe acute respiratory syndrome (SARS) was an atypical pneumonia caused by a novel coronavirus that was termed the “SARS-CoV.” The SARS-CoV began in Guangdong Province, China, in November 2002 and had a high transmission rate [1]. The index patient for Singapore, a previously healthy 23-year-old female Chinese Singaporean, contracted the illness during a visit in Hong Kong where she had stayed on the same boat as a traveler from southern China who was carrying the virus. She was initially admitted to the general ward for the first 6 days of hospitalization because the highly infectious nature and clinical features of SARS were not known. During that time, several healthcare workers who attended to her, patients in adjacent beds, and hospital visitors contracted the SARS-CoV. The incubation period for the virus ranged from 2 to 12 days, and the median period from the onset of symptoms to hospital admission was 6 days. The lack of a reliable test kit added to diagnostic uncertainty and led to a great emphasis on clinical diagnosis, contact tracing, and radiologic signs [2].

Globally, more than 8000 cases of SARS were reported in 26 countries, with Singapore having the second largest number of reported cases outside of China. Of a total of 218 probable cases of SARS reported in Singapore, 33 patients (14%) died (case fatality ratio = 14%) [2]. The pandemic served as a wake-up call for the medical services, which had to respond and reconize quickly to meet the rapidly developing clinical situation. The lessons learned during the epidemic have formed the basis of a contingency response plan that is still in use today and proved valuable in combating the more recent novel influenza A H1N1 outbreak in 2009 and Middle East respiratory syndrome coronavirus threat in 2013.

Detailed accounts of the SARS and H1N1 viral epidemics and the measures instituted are available in several articles [1–7] for the interested reader. In this article, we discuss how the lessons learned during these epidemics have changed the way we organize our radiologic services and how measures have been applied to our daily practice to factor in infection control.

Learning Points
A Chain Is No Stronger Than Its Weakest Link: Infection Control Is Essential for All Radiology Staff

One of the key lessons from SARS was that hospitals are major amplifiers of disease transmission. The SARS-CoV—once introduced in the hospital setting—spreads rapidly among healthcare workers and other patients and spreads out to other hospitals and even led to a cluster of cases in the community [4]. Of all the cases, 40.8% were among health care workers and a health care institution was the source of infection in 73.5% of cases [4]. Notably, 10 cases were directly attributed to the radiology department: four staff members and six visitors or outpatients of the department [8].
Radiology’s response –
Radiology Disease Outbreak Taskforce (RDOTF)

- Meets daily
- Sort out any Covid-19 related issues
- Review manpower status, staff sick leave and temperature surveillance
- Track logistics (imaging equipment downtime, PPE usage rates and available stocks)
- Update intel (case definitions, MOH/hospital instructions and directives, PPE requirements etc)
- Monitor workload and capacity
- Daily walkabout / audit
- Members embedded in hospital taskforce and ID teams

Staff temperature surveillance
2x a day using the nation wide Staff Surveillance System (S3)
Radiology’s response – People

• Rapid dissemination of accurate information
  • WhatsApp, Tigertext, email, Workplace@FB
  • Clear and unambiguous instructions

• Ensure infection prevention and control knowledge and practices are up to date and consistently practiced
  • Refresher training in PPE / PAPR use

• Create new hybrid working teams
  • Teams comprising different subspecialties cohorted to different locations to prevent cross infection

• Manage emotions and morale
Radiology’s response – Place and Equipment

- Perimeter control
  - Temperature screening
  - Health declaration
  - Controlled entry for visitors

- PPE
  - Controlled distribution of masks

- Dedicated scanners for isolation / high risk cases

- Detailed workflows for Covid-19 cases

- Portable if possible
  - Clean and “hot” teams

- Reduce workload to cope with increased infection control measures
Radiology’s response – Social Distancing

• Large scale events cancelled
• Cross institution staff movement prohibited
• Non essential face to face meetings curtailed
  • Wear masks if need to meet
• Video conferencing
  • Meetings
  • CME, MDT
• Meal times most vulnerable
  • Not masked
  • Staff encouraged to eat alone
Preparation IR service for Covid-19

- Lessons from SARS still relevant
- Protect patients
- Protect staff
- Prevent cross transmission
- Strict adherence to infection control measures
  - Hand hygiene
  - Proper donning and doffing of PPE
- Business continuity plans
- Rapid sharing of accurate and useful information
- Manage staff emotion and morale

Is Your Interventional Radiology Service Ready for SARS?: The Singapore Experience

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Abstract

The recent epidemic of severe acute respiratory syndrome caught many by surprise. Hitherto, infection control has not been the forefront of radiological practice. Many interventional radiology (IR) services are therefore not equipped to deal with such a disease. In this review, we share our experience from the interventional radiologist’s perspective on the acute measures instituted within our departments and explore the long-term effects of such a disease on the practice of IR.

Keywords: Severe acute respiratory syndrome—Interventional radiology—Infection control

As-apatic techniques have traditionally been practiced in diagnostic and interventional procedures for the purpose of reducing the risk of local and systemic infections in the patient. With the emergence of blood-borne pathogens, notably human immunodeficiency virus and hepatitis B and C viruses, the use of universal precautions for all health care workers (HCW) whenever they may be exposed to a patient’s blood or other body fluids was recommended [1, 2]. These measures have been generally embraced by all, including interventional radiologists, who under the auspices of the Society of Cardiovascular and Interventional Radiology (now known as Society of Interventional Radiology), issued its own set of guidelines in 1997 [3].

The response to nosocomial transmission of an airborne disease like tuberculosis has, however, been more muted [4]. Therefore, when severe acute respiratory syndrome (SARS) swept through many parts of East Asia during the first quarter of 2003, many radiologists were woefully prepared for such an encounter.

Our experience from the interventional radiologist’s perspective, the lessons learned and issues raised in our fight against SARS, are crystallized in this paper. It is our hope that this report will prompt our readers to plan and prepare their radiology service for an outbreak of an infectious disease such as SARS. In so doing, may your response to the question “Is your interventional radiology (IR) service ready for SARS?” be “A Success Story.”

SARS in Singapore

In the 21st century, AD Cullen noted that when many sickness and die at once, one should consider the air that we breathe. This Dr. Carlo Urbani did, which culminated in the World Health Organization (WHO) issuing an unprecedented worldwide alert regarding an outbreak of atypical pneumonia in southern China, Hong Kong and Vietnam on March 14, 2003 [5].

Singapore was affected when 3 Singapore nationals returned to Singapore from Hong Kong on February 25, 2003. While in Hong Kong, those 3 individuals were exposed to an infected patient staying in their hotel [6]. Unfortunately, one of these 3 was highly infectious (a super-infectious), which accounted for the rapid spread of infection to 2 hospitals and threatened the community. In the period between March 1, 2003 and May 31, 2003 when Singapore was declared SARS-free by WHO, there was a total of 106 infections of which 84 involved HCW. Thirty-one deaths were recorded and 9 patients remained in the hospital [7].

Acute Phase Measures Instituted for IR

In many institutions, the interventional/radiography suite is located within the radiology department. Measures instituted for the rest of the radiology department in response to an acute outbreak of an infectious disease [8, 9] are therefore also applicable to the IR service. In this section, we would instead like to emphasize measures and issues that are more germane to the practice of IR.
Droplet vs Airborne

- Large droplets (>100 μm): Fast deposition due to the domination of gravitational force
- Medium droplets between 5 and 100 μm
- Small droplets or droplet nuclei, or aerosols (< 5 μm): Responsible for airborne transmission
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<th>SCENARIO</th>
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<td>Confirmed/Suspected covid-19 patients</td>
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<td>Patients with pneumonia / acute respiratory symptoms</td>
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Take care, keep your distance, stay safe!
COVID-19 cases in Singapore

As of 19 Mar 2020
345 cases
15 in ICU
0 deaths

Source: https://co vid19.sg/