Novel Coronavirus, (COVID-19), update: Implications for Primary Care

Grand Rounds

Department of Family Medicine

Western University

March 4th, 2020

Faculty/Presenter Disclosure

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Schulich MEDICINE & DENTISTRY

Western

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No member of the planning committee has disclosed a potential conflict of interest.

Schulich MEDICINE & DENTISTRY

Western

Objectives

- Review the current epidemiology and clinical signs/symptoms of COVID-19
- Describe the recommended infection control precautions for COVID-19 in Primary Care Settings
- Outline the Testing process for COVID-19 in Primary Care Settings

Where is Wuhan?

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Published Date: 2020-01-02 09:25:07
Subject: PRO/AH/EDR> Undiagnosed pneumonia - China (HU) (01): wildlife sales, market closed, RFI
Archive Number: 20200102.6866757

UNDIAGNOSED PNEUMONIA - CHINA (HUBEI) (01): WILDLIFE SALES, MARKET CLOSED, REQUEST FOR INFORMATION
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A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Date: 1 Jan 2020
Source: South China Morning Post [edited]
https://www.scmp.com/news/china/politics/article/3044207/china-shuts-seafood-market-linked-mystery-viral-pneumonia

World Health Organisation in touch with Beijing after mystery viral pneumonia outbreak
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The World Health Organisation said it is in ongoing contact with authorities in China over an unidentified outbreak of viral pneumonia in the central city of Wuhan, amid concern it may have been transmitted from animals.

Wuhan health authorities on Tuesday [31 Dec 2019] said 27 people - most of them stallholders at the Huanan Seafood Wholesale Market - had been treated in hospital, with 7 said to be in serious condition. Pathology tests were under way to try and identify the virus, officials said. Hong Kong medical authorities were also on alert.

Wuhan authorities ordered the closure of the market on Wednesday [1 Jan 2020]. Local media said the market sold other animals, including birds, raising concern after the 2002-03 outbreak of severe acute respiratory syndrome (Sars) in China killed several hundred people and is thought to have jumped from animals to humans.

Officials in China and at the WHO said the virus in Wuhan had yet to be identified. "Investigations are still being carried out and authorities cannot yet confirm what pathogen is causing this illness," said Paige Snider, a senior adviser with the WHO in China, adding that the organisation had been in contact with Chinese authorities.

"There are many potential causes of viral pneumonia, many of which are more common than severe acute respiratory syndrome coronavirus [SARS-CoV]. WHO is closely monitoring this event and will share more details as we have them," she said.

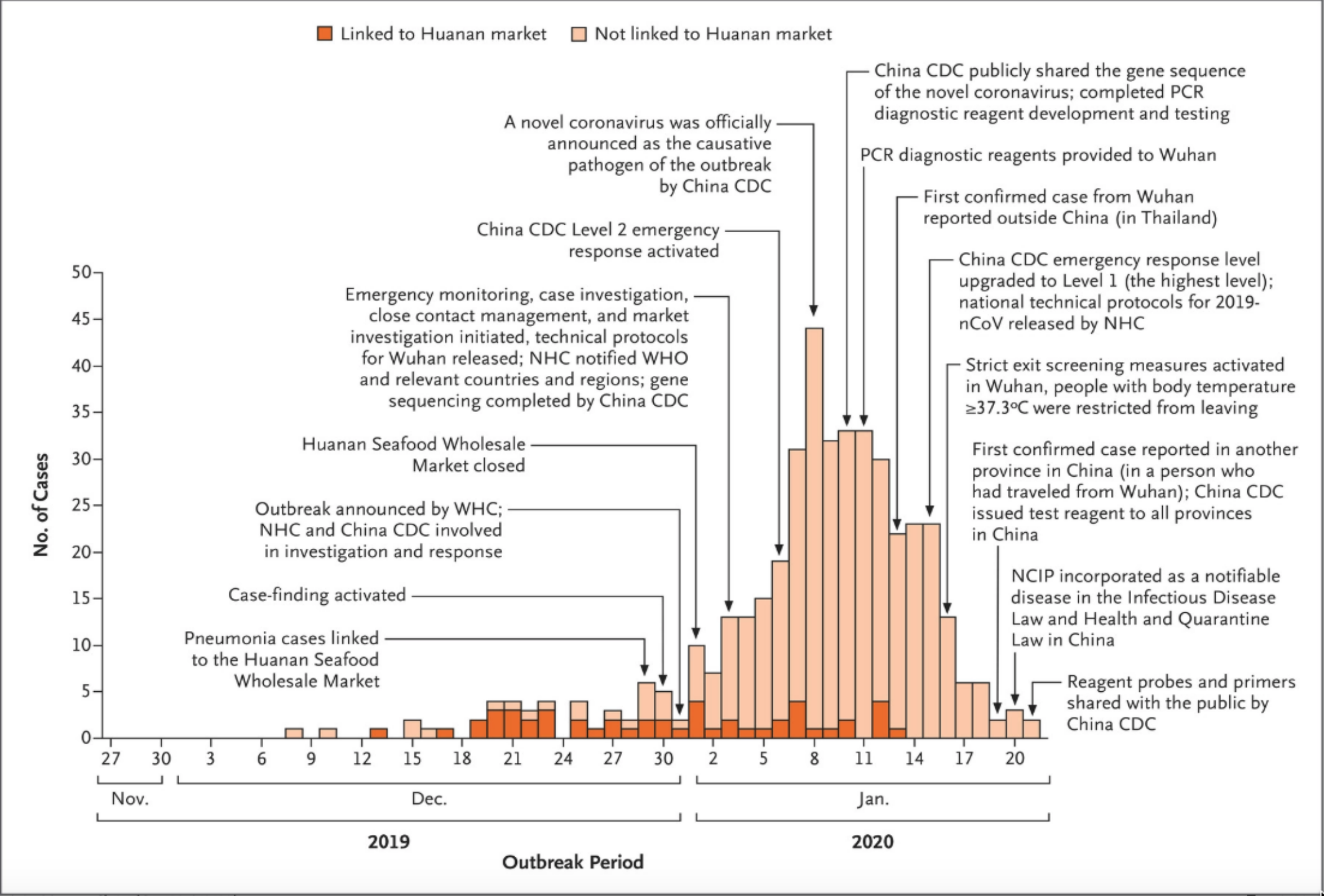
Online news outlet Hongxing, an affiliate of Chengdu Economic Daily, reported late on Tuesday [31 Dec 2019] that the market sold other wildlife, including pheasants and snakes. It also said the organs of rabbits and other animals were found in the market. A seafood vendor confirmed the Hongxing report, saying such animals were available for sale in the market.

Timeline of COVID-19

- On December 31, 2019, the WHO was informed of pneumonia cases in Wuhan, China that appeared to be caused by a novel virus

- Cases linked to Huanan Seafood Wholesale Market
  - Wet market where both dead and live animals (wild or domesticated) are sold
  - Potential for contamination
  - SARS and avian influenza (H5N1) were linked to wet markets

- In January 2020, Chinese officials confirmed a new, novel coronavirus
  - Virus believed to be zoonotic in origin, closely resembling bat coronaviruses, pangolin coronaviruses and SARS-CoV-1



https://www.nejm.org/doi/full/10.1056/NEJMoa2001316

A police officer stands guard outside the now-shuttered Huanan Seafood Wholesale market in Wuhan where the coronavirus was detected. **PHOTO:** HECTOR RETAMAL/AGENCE FRANCE-PRESSE/GETTY IMAGES

https://www.wsj.com/articles/virus-sparks-soul-searching-over-chinas-wild-animal-trade-11580055290

History Rhymes

Police on Jan. 9 look at items seized from a store suspected of trafficking wildlife in Guangde, China. (Anti-Poaching Special Squad/AP)

- Despite its name, the Huanan market was selling a huge variety of wild animals for consumption, including:
- live cats, dogs, turtles, snakes, rats, hedgehogs and marmots
- Menus and signboards posted online listed foxes, wolf cubs, monkeys and masked palm civets, among other animals
- China imposed ban on wild animal sales on January 26th (Did the same after SARS, lifted one year later)

https://www.washingtonpost.com/world/asia_pacific/china-bans-wild-animal-trade-until-coronavirus-epidemic-eliminated/2020/01/26/0e05a964-4017-11ea-971f-4ce4f94494b4_story.html

The NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

A Novel Coronavirus from Patients with Pneumonia in China, 2019

Na Zhu, Ph.D., Dingyu Zhang, M.D., Wenling Wang, Ph.D., Xinwang Li, M.D., Bo Yang, M.S., Jingdong Song, Ph.D., Xiang Zhao, Ph.D., Baoying Huang, Ph.D., Weifeng Shi, Ph.D., Roujian Lu, M.D., Peihua Niu, Ph.D., Faxian Zhan, Ph.D., Xuejun Ma, Ph.D., Dayan Wang, Ph.D., Wenbo Xu, M.D., Guizhen Wu, M.D., George F. Gao, D.Phil., and Wenjie Tan, M.D., Ph.D., for the China Novel Coronavirus Investigating and Research Team

SUMMARY

In December 2019, a cluster of patients with pneumonia of unknown cause was linked to a seafood wholesale market in Wuhan, China. A previously unknown betacoronavirus was discovered through the use of unbiased sequencing in samples from patients with pneumonia. Human airway epithelial cells were used to isolate a novel coronavirus, named 2019-nCoV, which formed another clade within the subgenus sarbecovirus, Orthocoronavirinae subfamily. Different from both MERS-CoV and SARS-CoV, 2019-nCoV is the seventh member of the family of coronaviruses that infect humans. Enhanced surveillance and further investigation are ongoing. (Funded by the National Key Research and Development Program of China and the National Major Project for Control and Prevention of Infectious Disease in China.)

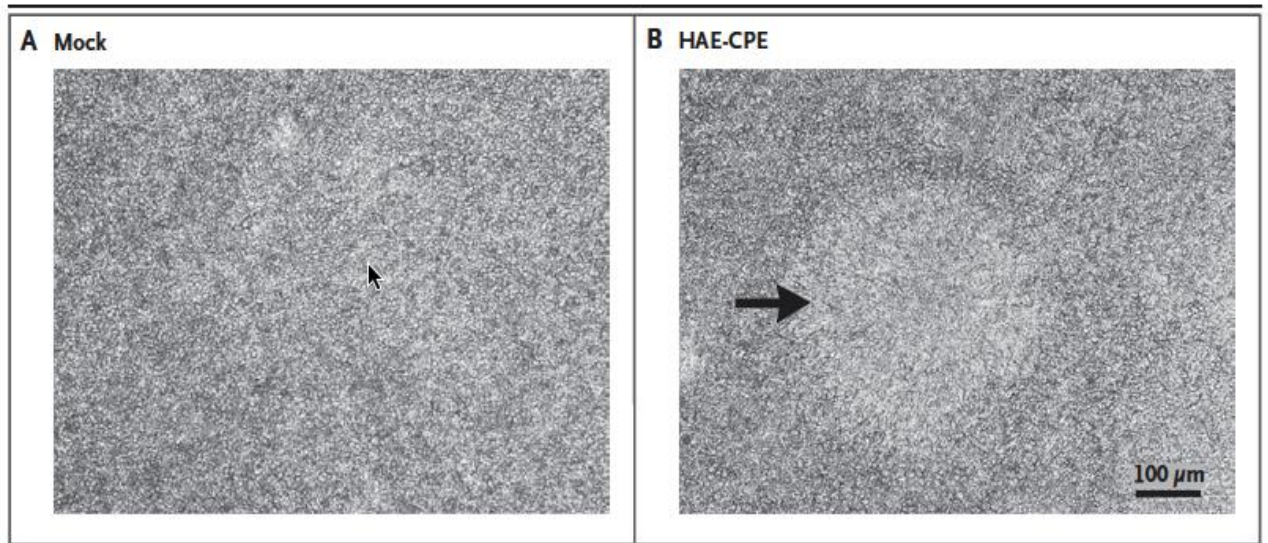


Figure 2. Cytopathic Effects in Human Airway Epithelial Cell Cultures after Inoculation with 2019-nCoV.

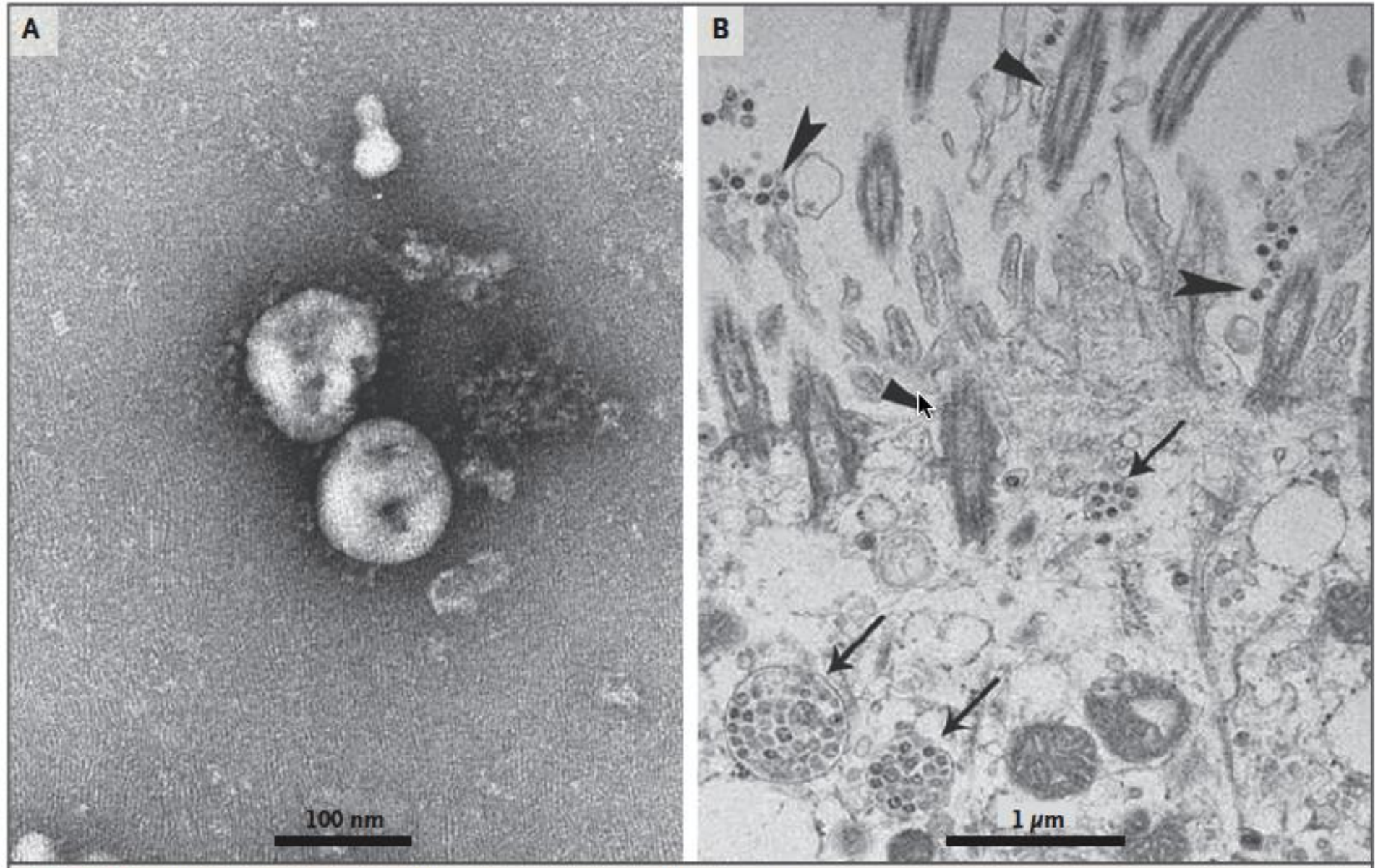
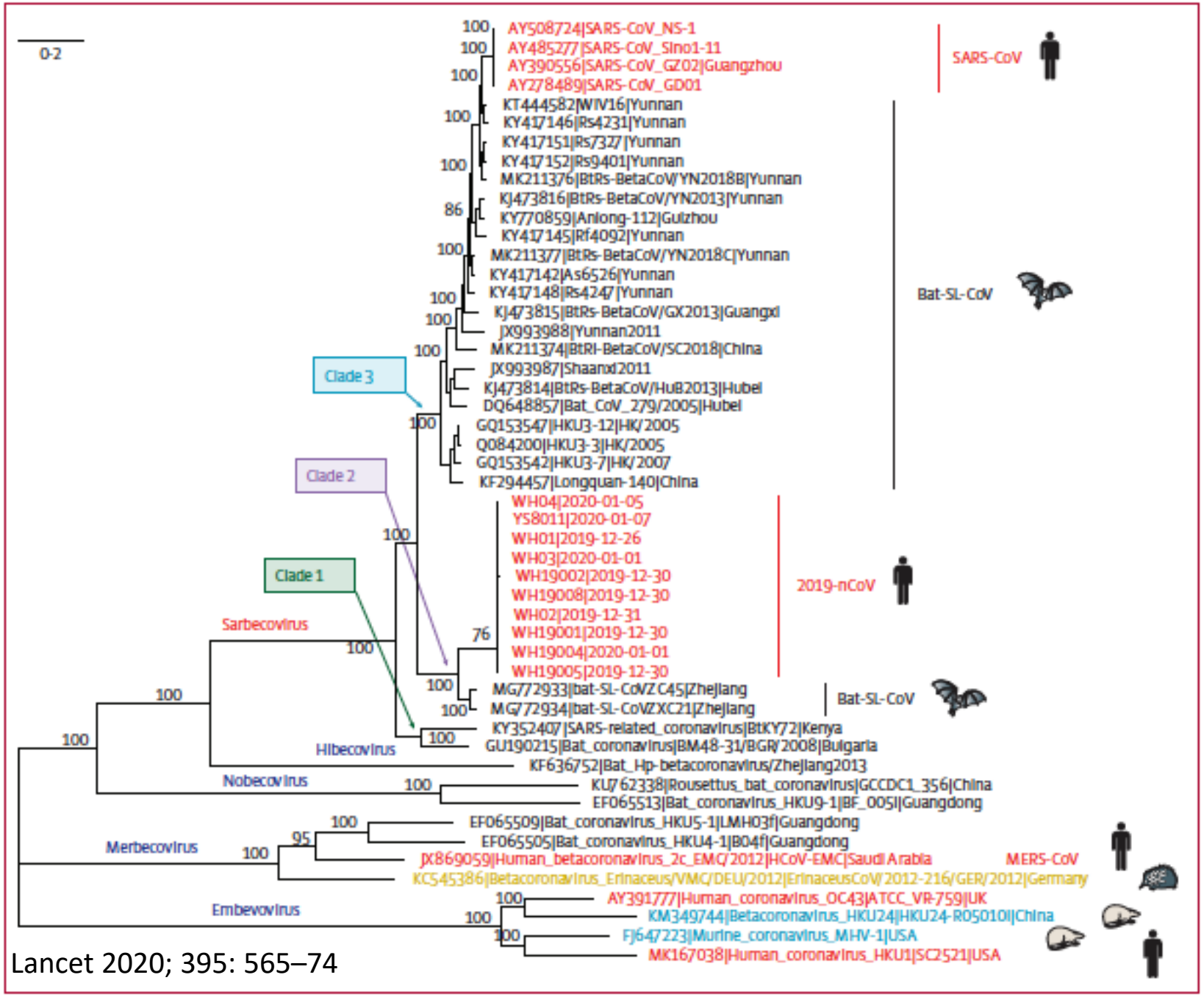


Figure 3. Visualization of 2019-nCoV with Transmission Electron Microscopy.

Negative-stained 2019-nCoV particles are shown in Panel A, and 2019-nCoV particles in the human airway epithelial cell ultrathin sections are shown in Panel B.



Lancet 2020; 395: 565–74

***Figure 3*: Phylogenetic analysis of full-length genomes of 2019-nCoV and representative viruses of the genus Betacoronavirus**

2019-nCoV=2019 novel coronavirus. MERS-CoV=Middle East respiratory syndrome coronavirus. SARS-CoV=severe acute respiratory syndrome coronavirus.

Timeline of COVID-19

- On February 11th, 2020, WHO officially named the new illness COVID-19
  - COVI stands for coronavirus, D stands for disease and 19 represents 2019
  - Virus itself is called SARS-CoV-2

- Public Health Emergency of International Concern declared on January 30, 2020

Coronavirus

- Coronaviruses are enveloped RNA viruses causing disease among humans, other mammals, and birds

- Six coronavirus species are known to cause human disease

- Four species (229E, OC43, NL63, and HKU1) are prevalent and typically cause common cold symptoms in immunocompetent individuals (10-30% of URIs/Common cold)

Coronavirus

- The two other strains — severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) — are zoonotic in origin

- SARS-CoV outbreaks occurred in 2002 and 2003 in Guangdong Province, spreading to other locations, including Toronto, Ontario

- MERS-CoV was the pathogen responsible for severe respiratory disease outbreaks in 2012 in the Middle East (Still ongoing)

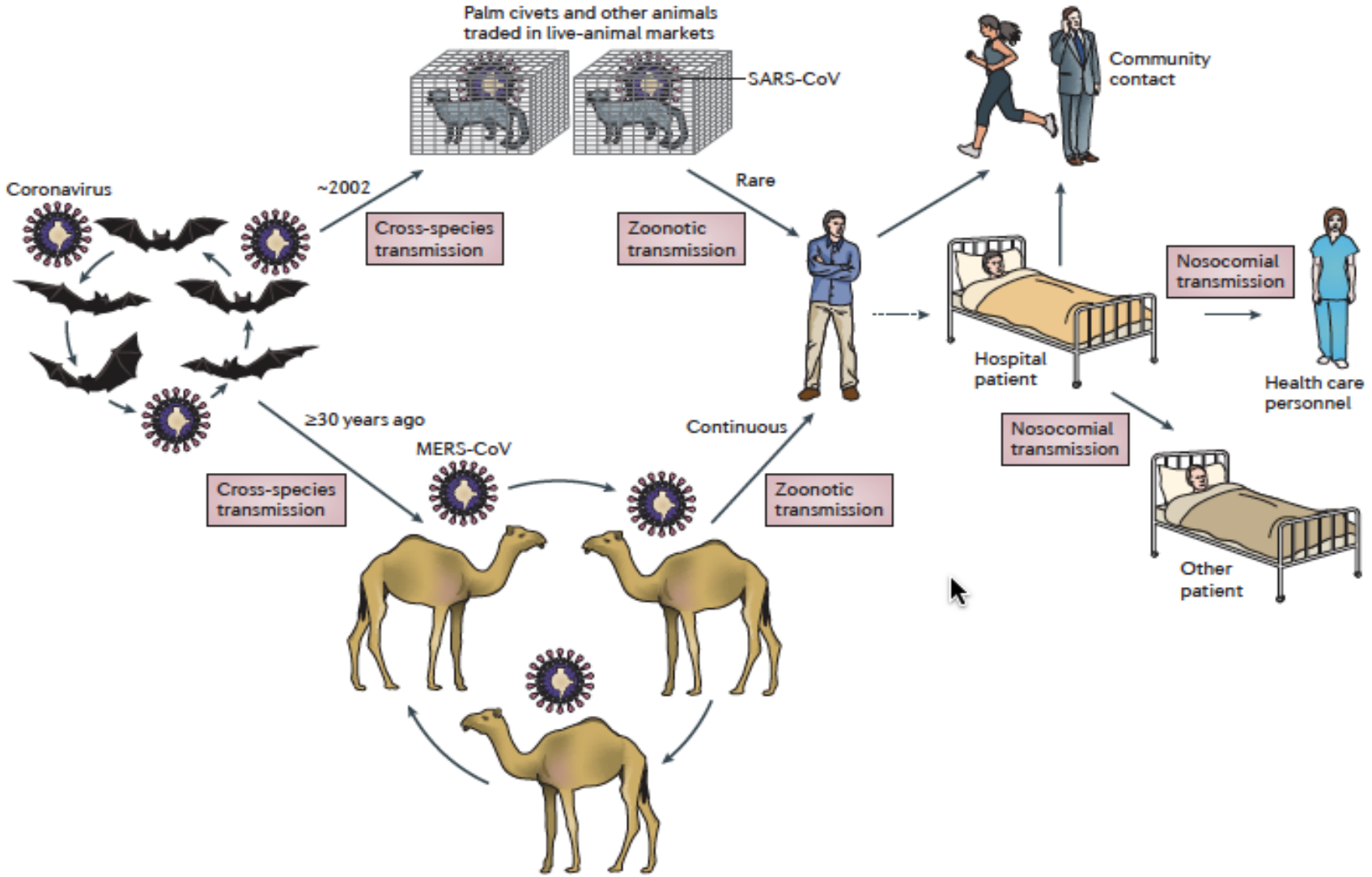


Figure 2 | **The emergence of SARS-CoV and MERS-CoV.** Bats harbour a wide range of coronaviruses, including severe acute respiratory syndrome coronavirus (SARS-CoV)-like and Middle East respiratory syndrome coronavirus (MERS-CoV)-like viruses. SARS-CoV crossed the species barrier into masked palm civets and other animals in live-animal markets in China; genetic analysis suggests that this occurred in late 2002. Several people in close proximity to palm civets became infected with SARS-CoV. A MERS-CoV ancestral virus crossed the species barrier into dromedary camels; serological evidence suggests that this happened more than 30 years ago. Abundant circulation of MERS-CoV in dromedary camels results in frequent zoonotic transmission of this virus. SARS-CoV and MERS-CoV spread between humans mainly through nosocomial transmission, which results in the infection of health care workers and patients at a higher frequency than infection of their relatives.

- Reservoir of COVID-19 uncertain at this time
- SARS-CoV-2 originated in bats, but unclear if there was an intermediate host
- Snakes and pangolins theorized

	2019-nCoV*	MERS-CoV	SARS-CoV
Demographic			
Date	December, 2019	June, 2012	November, 2002
Location	Wuhan, China	Jeddah, Saudi Arabia	Guangdong, China
Age, years (range)	49 (21–76)	56 (14–94)	39·9 (1–91)
Male:female sex ratio	2·7:1	3·3:1	1:1·25
Confirmed cases	835†	2494	8096
Mortality	25† (2·9%)	858 (37%)	744 (10%)
Health-care workers	16‡	9·8%	23·1%
Symptoms			
Fever	40 (98%)	98%	99–100%
Dry cough	31 (76%)	47%	29–75%
Dyspnoea	22 (55%)	72%	40–42%
Diarrhoea	1 (3%)	26%	20–25%
Sore throat	0	21%	13–25%
Ventilatory support	9·8%	80%	14–20%

Data are n, age (range), or n (%) unless otherwise stated. 2019-nCoV=2019 novel coronavirus. MERS-CoV=Middle East respiratory syndrome coronavirus. SARS-CoV=severe acute respiratory syndrome coronavirus. *Demographics and symptoms for 2019-nCoV infection are based on data from the first 41 patients reported by Chaolin Huang and colleagues (admitted before Jan 2, 2020).[8] Case numbers and mortalities are updated up to Jan 21, 2020) as disclosed by the Chinese Health Commission. †Data as of Jan 23, 2020. ‡Data as of Jan 21, 2020.[9]

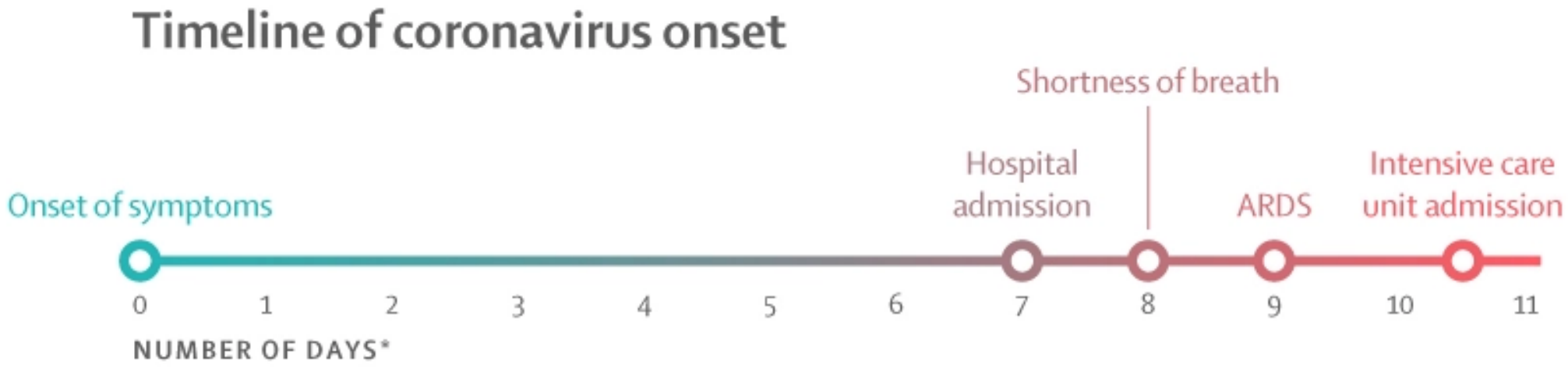
Table: Characteristics of patients who have been infected with 2019-nCoV, MERS-CoV, and SARS-CoV[7,8,10–12]

Seasonal Influenza
Mortality ~0.1%

1918 Spanish Flu
2% mortality
Killed 20 Million
Mostly young men
(Wide confidence intervals)

The Lancet: https://doi.org/10.1016/S0140-6736(20)30185-9

Clinical Progression



ARDS=Acute respiratory distress syndrome

*Median time from onset of symptoms, including fever (in 98% of patients), cough (75%), myalgia or fatigue (44%), and others.

THE LANCET

Incubation period?

- Mean 5.2 days (95th percentile of CI 12.5 days)

Li Q NEJM Jan 29 10.1056/NEJMoa2001316

When you hate people more than the virus

COVID-19 Transmission

- Coronaviruses in general transmitted through respiratory droplets, contact with infected secretions

- R_0= 2.2 (Jan 29th estimate) Li NEJM Jan 29th

- Seasonal Influenza 1.3. 1918 influenza 2.0

BMC Med. doi: 10.1186/1741-7015-7-30.

Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE

Total Confirmed
86,983

Confirmed Cases by City, Province/State
- 66,907 confirmed **Hubei** Mainland China
- 3,526 confirmed South Korea
- 1,349 confirmed **Guangdong** Mainland China
- 1,272 confirmed **Henan** Mainland China
- 1,205 confirmed **Zhejiang** Mainland China
- 1,128 confirmed Italy
- 1,018 confirmed **Hunan** Mainland China
- 990 confirmed **Anhui** Mainland China
- 935 confirmed **Jiangxi** Mainland China
- 756 confirmed **Shandong** Mainland China
- 705 confirmed **"Diamond Princess" cruise ship** Others

Country/Region | City, St/Prov

Last Updated at (M/D/YYYY)
2/29/2020 10:53:02 p.m.

Cumulative Confirmed Cases | Existing Cases

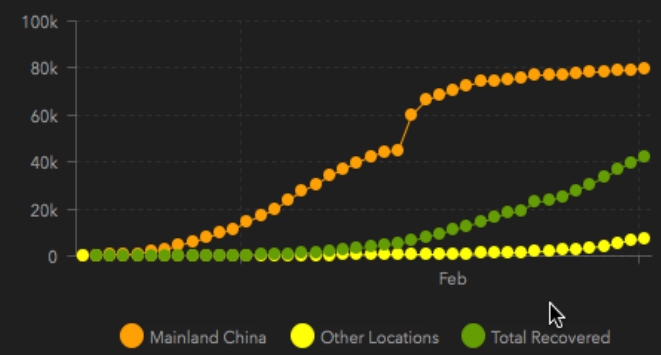
Lancet Article: Here. Mobile Version: Here. Visualization: JHU CSSE. Automation Support: Esri Living Atlas team and JHU APL.
Data sources: WHO, CDC, ECDC, NHC and DXY. Read more in this blog. Contact US.
Downloadable database: GitHub: Here. Feature layer: Here.
Point level: City level - US, Canada and Australia; Province level - China; Country level - other countries.
Existing cases = total confirmed - total recovered - total deaths

Total Deaths
2,978

- 2,761 deaths **Hubei** Mainland China
- 43 deaths Iran
- 29 deaths Italy
- 22 deaths **Henan** Mainland China
- 17 deaths South Korea
- 13 deaths **Heilongjiang** Mainland China
- 8 deaths **Beijing** Mainland China
- 7 deaths **Guangdong** Mainland China

Total Recovered
42,131

- 31,190 recovered **Hubei** Mainland China
- 1,185 recovered **Henan** Mainland China
- 1,027 recovered **Zhejiang** Mainland China
- 1,009 recovered **Guangdong** Mainland China
- 870 recovered **Anhui** Mainland China
- 853 recovered **Hunan** Mainland China
- 831 recovered **Jiangxi** Mainland China
- 531 recovered **Jiangsu** Mainland China



Actual | Logarithmic | Daily Cases

COVID-19 in Canada

- On January 25, the first presumptive case of COVID-19 was identified in Toronto
- On January 31, a confirmed case of COVID-19 was identified in London
- Numbers of case have increased, but no sustained transmission has been identified in Canada

Current Approach in Ontario

- COVID-19 was added to the list of diseases of public health significance, and is now reportable
- Specific guidance has been developed for returning travelers from impacted countries
- Definition of person under investigation was established, and continues to be updated as more countries are impacted
- Public health undertakes intensive case and contact management when a PUI is identified

Guidance for Returning Travellers

- Returning asymptomatic traveler from Hubei province, China AND Iran
  - Stay home and self-isolate for 14 days following travel
  - Contact local public health immediately

- Returning asymptomatic traveler from any other impacted region
  - Self-monitor for symptoms for 14 days following travel
  - If they develop a fever and/or new cough and/or have difficulty breathing, they should contact local public health

Isolation vs. Quarantine

- Isolation
  - Isolation separates sick people with a contagious disease from people who are not sick
- Quarantine
  - Quarantine separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick

https://www.cdc.gov/quarantine/index.html

Person under Investigation (PUI)

A. Person under Investigation

A person with fever and/or onset of cough or difficulty breathing **AND** any of the following within 14 days prior to onset of illness:

- Travel to an impacted area* **or**
- Close contact with a confirmed or probable case of COVID-19, **or**
- Close contact with a person with acute respiratory illness who has been to an impacted area*

Impacted or Affected Countries

- Regions are considered impacted after consideration of the following:
  - New cases have been recently reported from the area
  - Daily trend in case counts reported
  - Multiple instances of spread have occurred at the community level
  - Evidence of geographical spread
  - Whether cases can be linked to an exposure

https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/covid-19-affected-areas-list.html


COVID-19 IMPACTED AREAS as of FEBRUARY 26, 2020
ITALY (north)
IRAN
CHINA
SOUTH KOREA
JAPAN
HONG KONG
SINGAPORE
DENMARK
BELARUS
UKRAINE
ROMANIA
HUNGARY
BULGARIA
TURKEY
KAZAKHSTAN
MONGOLIA
UZBEKISTAN
TURKMENISTAN
KYRGYZSTAN
TAJIKISTAN
AFGHANISTAN
PAKISTAN
INDIA
NEPAL
BHUTAN
BANGLADESH
MYANMAR
LAOS
THAILAND
VIETNAM
CAMBODIA
PHILIPPINES
TAIWAN
SYRIA
IRAQ
JORDAN
KUWAIT
BAHRAIN
QATAR
SAUDI ARABIA
OMAN
YEMEN
TUNISIA
MALTA
LIBYA
EGYPT
NIGER
CHAD
SUDAN
ERITREA
DJIBOUTI
ETHIOPIA
SOMALIA
NIGERIA
CAMEROON
CENTRAL AFRICAN REPUBLIC
SOUTH SUDAN
EQ. GUINEA
GABON
CONGO
DR CONGO
UGANDA
KENYA
RWANDA
BURUNDI
TANZANIA
SRI LANKA
BRUNEI
MALAYSIA
SINGAPORE
INDONESIA
Created with mapchart.net ©

For case definitions please refer to the **Ministry of Health COVID-19 Guidance.**

PUIs in Ontario

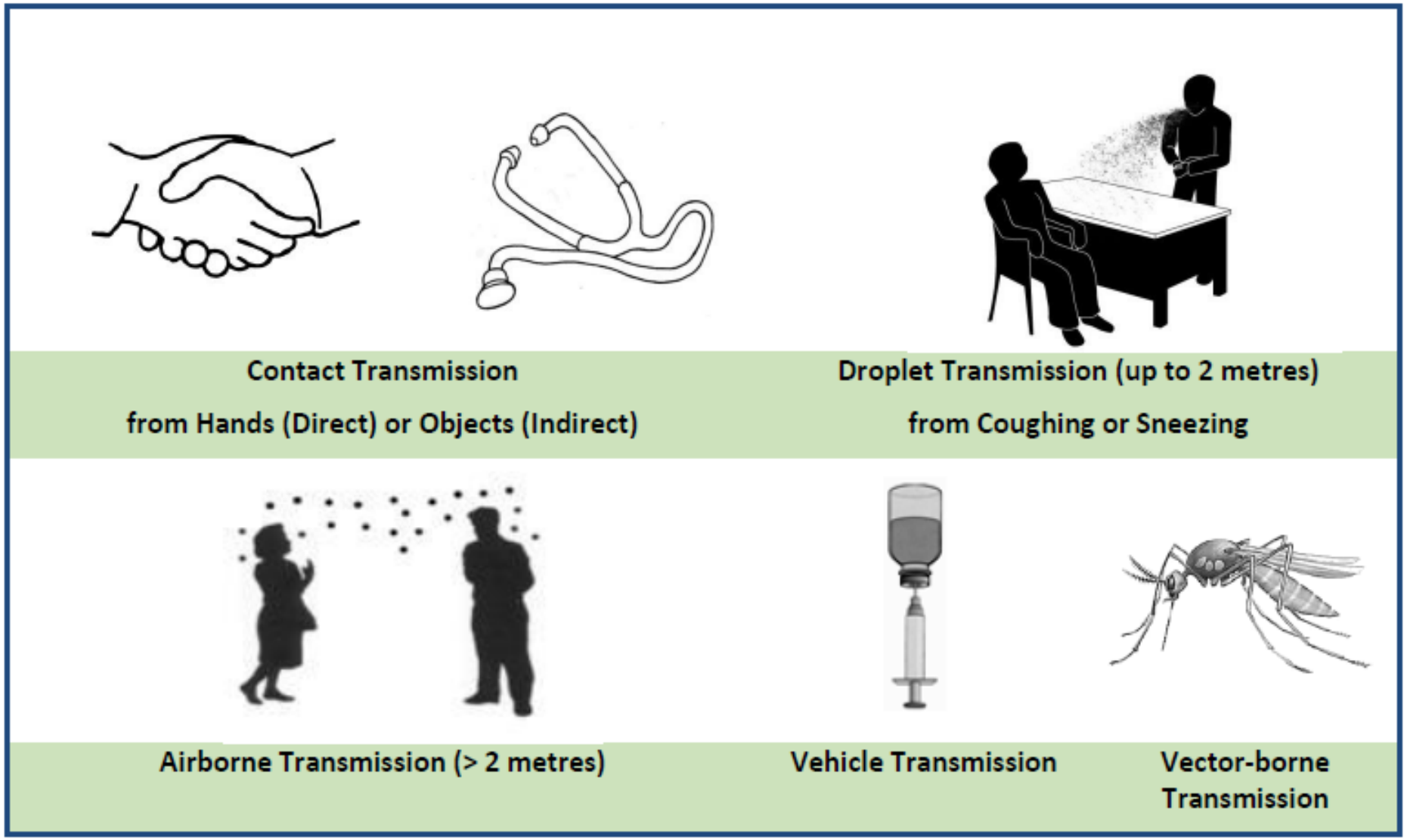
Confirmed negative[1]	739
Currently under investigation[2]	22
Presumptive positive[3]	1
Confirmed positive[4]	3
Resolved[5]	3
Total number of patients approved for COVID-19 testing to date	**768**

[1]Patient negative based on testing performed at Public Health Ontario (PHO) Laboratory (Note: Testing at National Microbiology Lab (NML) no longer required due to enhanced national testing protocols.)
[2]Test results are pending
[3]Patient tested positive at PHO Laboratory but not yet confirmed by sequencing
[4]Patient still testing positive and has not had two consecutive negative results greater than 24 hours apart
[5]Patient is no longer infectious based on two consecutive negative tests performed at PHO Laboratory at least 24 hours apart

Last updated: February 28, 2020 at 11:00 a.m. ET

COVID-19 and IPAC

Modes of transmission



Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Infection Prevention and Control for Clinical Office Practice. 1st Revision. Toronto, ON: Queen's Printer for Ontario; April 2015.

COVID-19 Transmission

- COVID-19 transmitted via droplets and fomites during close contact
- Airborne spread has not been reported for COVID-19
  - Certain aerosol-generating procedures may be a risk
- Fecal shedding has been demonstrated from some patients, but does not appear to be a driver of COVID-19 transmission

Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)

IPAC Refresher

- Routine Practices
  - Hand hygiene, risk assessment, environmental control, administrative controls, and PPE
- Additional Precautions
  - Used in addition to routine precautions, depending the on the mode of transmission

Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Infection Prevention and Control for Clinical Office Practice. 1st Revision. Toronto, ON: Queen's Printer for Ontario; April 2015.

Additional Precautions

CONTACT PRECAUTIONS

For patients with:

- Antibiotic-resistant organisms (e.g., MRSA infection)
- Acute vomiting and/or diarrhea
- Uncontained drainage
- Conjunctivitis

DROPLET PRECAUTIONS

For patients with:

- Pertussis
- Mumps
- Rubella
- Meningitis, etiology unknown and meningococcal

Droplet + Contact Precautions for patients with:

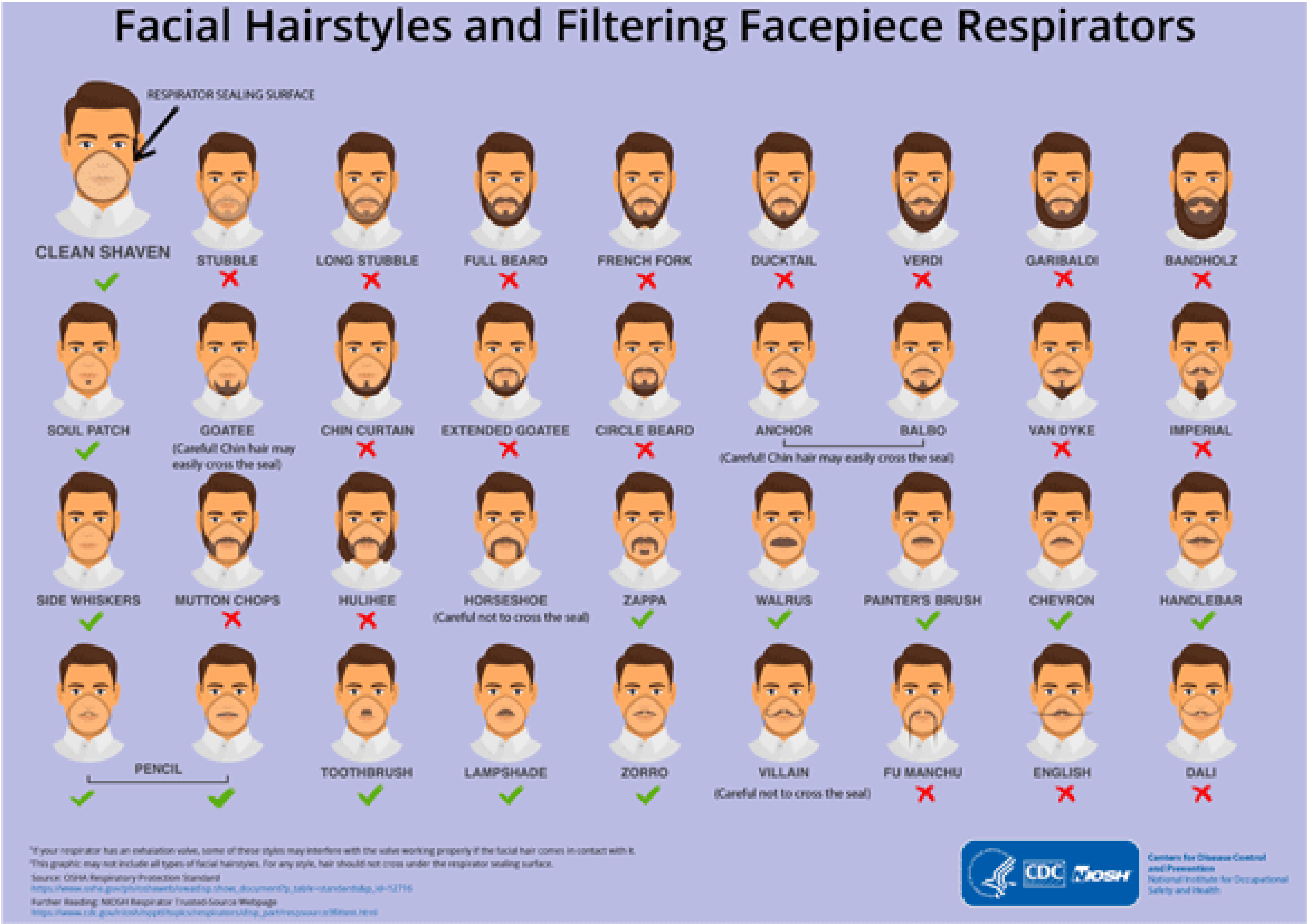
- Acute Respiratory Infection (e.g., croup, RSV, common cold, influenza, bronchiolitis, pneumonia, acute exacerbation of asthma)

AIRBORNE PRECAUTIONS

For patients with:

- Pulmonary tuberculosis
- Measles
- Chickenpox

Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Infection Prevention and Control for Clinical Office Practice. 1st Revision. Toronto, ON: Queen's Printer for Ontario; April 2015.



Facial Hairstyles and Filtering Facepiece Respirators
RESPIRATOR SEALING SURFACE
CLEAN SHAVEN
STUBBLE
LONG STUBBLE
FULL BEARD
FRENCH FORK
DUCKTAIL
VERDI
GARIBALDI
BANDHOLZ
SOUL PATCH
GOATEE
(Careful! Chin hair may easily cross the seal)
CHIN CURTAIN
EXTENDED GOATEE
CIRCLE BEARD
ANCHOR
BALBO
(Careful! Chin hair may easily cross the seal)
VAN DYKE
IMPERIAL
SIDE WHISKERS
MUTTON CHOPS
HULIHEE
HORSESHOE
(Careful not to cross the seal)
ZAPPA
WALRUS
PAINTER'S BRUSH
CHEVRON
HANDLEBAR
PENCIL
TOOTHBRUSH
LAMPSHADE
ZORRO
VILLAIN
(Careful not to cross the seal)
FU MANCHU
ENGLISH
DALI
If your respirator has an exhalation valve, some of these styles may interfere with the valve working properly if the facial hair comes in contact with it.
This graphic may not include all types of facial hairstyles. For any style, hair should not cross under the respirator sealing surface.
Source: OSHA Respiratory Protection Standard
Further Reading: NIOSH Respirator Trusted-Source Webpage
CDC
NIOSH
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Infection Control

- A key component of protecting staff is the prompt recognition and isolation of patients who present with:
  - Symptoms of acute respiratory symptoms
  - Travel to an at-risk area

Infectious Disease Threat

LHSC is committed to maintaining readiness in response to an Infectious Disease Threat in order to protect the safety of our staff, patients and community.

An Infectious Disease Threat may include:

- Novel Respiratory Virus, Viral Hemorrhagic Disease (Ebola/EVD), Emerging Infectious Disease.
- A sentinel event, defined as a unanticipated event of infectious origin with the potential for a high risk impact to patient/staff safety.
- An external/community based infection risk as determined by the Local Medical Officer of Health or MOHLTC

Resources

- LHSC Organizational Readiness Plan for an Infectious Disease Threat
  - Resources for Emergency Departments, Critical Care, Obstetrical Triage
- LHSC Escalation Plan for an Infectious Disease Threat
- LHSC Tools and Resources for an Infectious Disease Threat
  - CC Raid Team Patient Management Resources

Contact

CLINICAL CONSULTATIONS
Monday to Friday 0800-1600
University Hospital pager 15836
Victoria Hospital Pager 15591

Off site after hours for urgent matters
pager: 14335
(Weekdays: 1600-2100)
(Weekends: 0800-2100)

GENERAL INQUIRIES
Phone ext. 56031
Email infectioncontrollhsc@lhsc.on.ca

ONLINE CONSULT REQUEST FORM

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Quick links

Hand Hygiene Auditing Tool

Semmelweis Scanner

Current Infection Control Alerts

Ebola

Ebola virus disease (EVD): August 1, 2019

Countries:
- Democratic Republic of the Congo

1. Do you have a fever?
2. Have you traveled to or resided in a country associated with a travel risk in the 21 days prior to onset of illness?
3. Have you been in close contact of a person with illness who has traveled to or resided in a country associated with a travel risk in the 21 days prior to onset of illness?

Viral Respiratory Disease

1. Influenza (Avian Influenza A Virus): Feburary 2014
2. Undiagnosed Viral Pneumonia: January 2020

Countries:
- China

1. Do you have respiratory illness with a fever?
2. Have you traveled to or resided in a country associated with a travel risk in the 21 days prior to onset of illness?
3. Have you been in close contact of a person with ARI who has traveled to or resided in a country associated with a travel risk in the 21 days prior to onset of illness?

MERS-CoV

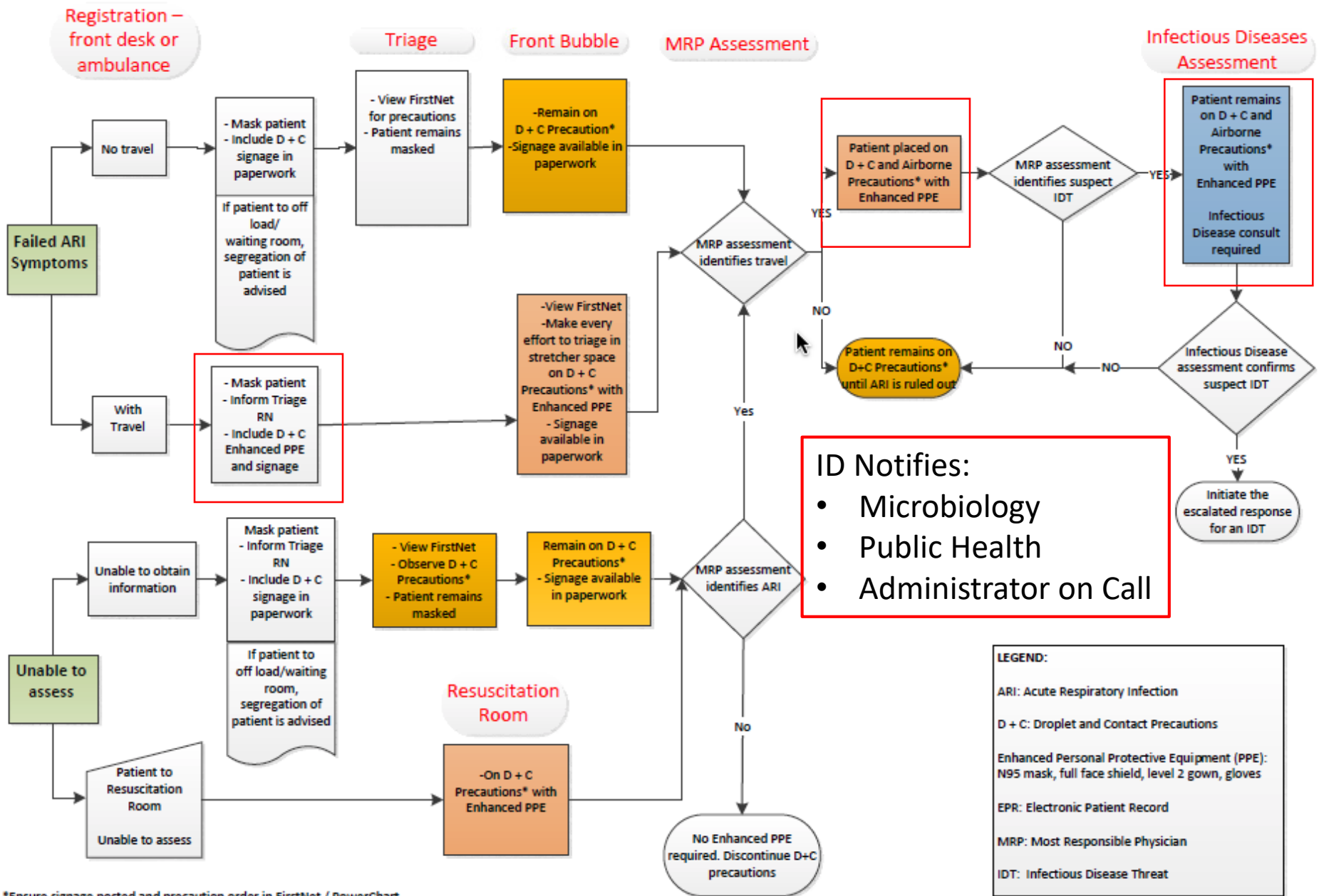
Middle East Respiratory Syndrome - Corona Virus: February 2016

Countries:
- Jordan, Oman, Qatar, Saudi Arabia, the United Arab Emirates and Yemen

London Health Sciences Centre

February 2018

Adult Emergency Department Flow Map for Travel/Symptom Screening



*Ensure signage posted and precaution order in FirstNet / PowerChart

ACUTE CARE

STOP

No Visitors: Speak to a charge nurse

Staff: Enhanced PPE Required

DROPLET + CONTACT PRECAUTIONS

N95 mask and full face shield


Gloves required for all patient /patient environment contact. Level 2 gown required

Patient room door closed

Consult IPC if patient transport required

Use dedicated equipment

ACUTE, AMBULATORYCARE

STOP

Visitors: Speak to a nurse before entering this room.

AIRBORNE PRECAUTIONS

Negative pressure room with door and windows closed*

N95, fit-tested and seal-checked respirator required for room entry** and transport

Patient to wear a procedure/surgical mask for transport

* If negative pressure is not available in a treatment room/operating room the doors must remain closed

** For chickenpox, disseminated zoster or measles, known non-immune staff should enter only if absolutely necessary

OVER

5. Infection Prevention and Control/ Occupational Health and Safety:

At this time, consistent with the guidance in place for MERS-CoV, the ministry is recommending the following for acute care settings. Please note that the ministry is reviewing guidance for other settings and will provide further updates in the coming days:

Routine Practices and Additional Precautions (Contact, Droplet, Airborne) by health care workers at risk of exposure to a confirmed case, presumptive confirmed case, probable case or person under investigation (or PUI) and/or the patient's environment. These precautions include:

- hand hygiene
- use of airborne infection isolation rooms when possible
- masking the patient with a surgical mask when outside of an airborne infection isolation room
- use of gloves, gowns, fit-tested, seal-checked N95 respirators and eye protection by health care workers when entering the same room as the patient or when transporting or caring for the patient

For more information on Routine Practices and Additional Precautions, health care workers should refer to (PIDAC's) Routine Practices and Additional Precautions in All Health Care Settings and Annex B: Prevention of Transmission of Acute Respiratory Infection in all Health Care Settings.

Note: The use of Airborne Precautions is a higher level of precaution than is being recommended by the Public Health Agency of Canada or the World Health Organization (WHO), or that is normally recommended for coronaviruses. The ministry is recommending at this time that health care workers apply Airborne Precautions based on the application of the precautionary principle to this novel virus for which little information about transmission and clinical severity is available.

Diagnostic Testing

- Virus has been cultured, but this is not a sensitive method
  - Few clinical laboratories still have virus culturing capability
- Serology could be useful in the future, but at this time there is no test available
- Molecular testing, polymerase chain reaction (PCR) is the current standard

LHS

Date October 23, 2019

To LHSC and St. Joseph's Hospital Physicians, Residents, Nursing

From Dr. Johan Delport
Division Head, Microbiology

Subject Fall/Winter Respiratory Virus Testing Algorithm

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What is happening?

Beginning November 4, 2019 the Microbiology laboratory will return to the winter algorithm for respiratory virus testing.

1. All specimens submitted for respiratory virus will be routinely tested for Influenza A/B and Respiratory Syncytial Virus (RSV). This includes specimens from the Emergency Department, outpatients and adult inpatients.
2. ICU, oncology and paediatric inpatients negative for Influenza A/B and RSV will have additional testing performed for Parainfluenza 1/2/3/4, Adenovirus, Human Metapneumovirus, and Enterovirus (includes D68).
3. Testing for Bocavirus, Rhinovirus and Coronavirus will be routinely performed for all paediatric patients younger than 60 days. Any other patient request requires approval by the Microbiologist On-Call (Pager 19000).
4. Testing will occur 7 days a week. Specimens received before 8:00 AM will be reported by 1:30 PM.
5. As part of our Choosing Wisely and Pathology and Laboratory Medicine (PaLM) Utilization strategy, a test utilization pop-up will appear on your computer screen when ordering respiratory virus testing; routine re-testing will not be performed within 7 days. If indicated, a retest can be discussed with the Microbiologist On-Call.

Specimen Collection

A. Person under Investigation

A person with fever and/or onset of cough or difficulty breathing **AND** any of the following within 14 days prior to onset of illness:

- Travel to an impacted area* **or**
- Close contact with a confirmed or probable case of COVID-19, **or**
- Close contact with a person with acute respiratory illness who has been to an impacted area*

*this includes: China, Hong Kong, Iran, Italy, Japan, Singapore, and South Korea

- **Testing will only be performed on patients who meet the MOHLTC case definitions**

Specimen Collection

Upper respiratory tract specimens:

- Nasopharyngeal swab (NPS) in viral transport media

+/-

- Viral throat swab in viral transport media
  - Throat swab is only indicated if **admitted** to acute care facility

If possible, a lower respiratory tract specimen should be collected:

- Sputum, collect if patient has a productive cough. Do not induce
- Lower respiratory tract specimen (pleural fluid, lung tissue; bronchoalveolar lavage (BAL), endotracheal secretions), if performed
  - Only submit if patient is intubated, to avoid unnecessary aerosol generating medical procedures

PHL Testing Algorithm

A. Testing for other respiratory viruses:

- At least one respiratory specimen will be tested for influenza by molecular methods (PCR) and evaluated for possible **avian influenza** if influenza A is positive
- Specimens will also be tested for other **respiratory viruses** by a multiplex respiratory virus PCR (MRVP), which detects 11 respiratory virus targets. These include influenza A, influenza A H3 subtype, influenza A H1 (pdm09) subtype, influenza B, respiratory syncytial virus, parainfluenza, adenovirus, enterovirus, seasonal human coronaviruses*, rhinovirus and human metapneumovirus.

*Cross-reaction with 2019-nCoV is not expected based on available sequence data.

- Currently routine respiratory virus testing will not be performed for PUI at LHSC, will be done at PHL
    - A positive result for another virus does not exclude COVID-19

Test Methods

Testing for COVID-19 is done by real-time RT-PCR using protocols validated by PHO Laboratory and the NML. Targets include the RdRp (RNA-dependent RNA polymerase) gene and E (envelope) gene.

Specimens with any real-time PCR target(s) detected or indeterminate will be tested by PCR and Sanger sequencing for the RdRp gene. The RdRp gene PCR and sequencing assay in use at PHO Laboratory is a common coronavirus target designed to provide broad detection of Betacoronavirus clade C viruses, including COVID-19.

- Turn-around time is expected to be 24 to 48 hours, but this could change based on specimen volumes
- If a person under investigation is worsening or not improving, testing should be repeated
- Positives/indeterminates sent to the National Microbiology Laboratory (NML) for confirmation

Role of primary care in COVID-19 response

Ministry of Health

Novel Coronavirus (COVID-19) Guidance for Primary Care Providers in a Community Setting

Version 2.1 – February 11, 2020

Role of primary care in COVID-19 response

- Follow routine precautions plus droplet + contact precautions
- Undertake active and passive screening of patients for COVID-19
- Develop plans for referral if unable to conduct testing within the clinic
- Assess capacity to safely conduct a clinical examination and collect specimens for a patient at risk of having COVID-19
- Report to your local public health unit all patients suspected of having COVID-19

Passive Screening (signage)

- Post signs on entry to the office and at reception areas for patients with symptoms to self-identify, perform hand hygiene, wear a procedure mask, and have access to tissue and a waste receptacle.
- All patients should be instructed to cover their nose and mouth with a tissue when coughing and sneezing.

Active screening (asking questions)

- Screen patients over phone before scheduling appointments
- Where patients present without phone screening, trained staff should screen patients upon entry using the screening tool
- Staff conducting screening should ideally be behind a barrier to protect from droplet/contact spread

Screening Tool - PUI Criteria

Is the patient presenting with fever and/or onset of cough or difficulty breathing **AND** any of the following within 14 days prior to onset of illness:

- Travel to an impacted area, **or**
- Close contact with a confirmed or probable case of COVID-19, **or**
- Close contact with a person with acute respiratory illness who has been to an impacted area

What to do if a patient screens positive?

N95 respirators are available

- Offer clinical assessment, examination, and testing (as indicated)
- Provide patient with procedure mask and place in room with door closed to avoid contact with other patients in common areas
- Using droplet/contact precautions and N95 respirator, take detailed history and conduct a clinical assessment to determine if patient meets the case definition of a PUI
- Contact local public health unit to report and discuss the most appropriate setting for testing

N95 respirators are NOT available

- If by phone, take clinical history and travel/exposure assessment by phone to determine if the patient is a PUI
- Contact the local public health unit to report the individual as a PUI, determine whether testing is appropriate, and develop management plan for safe clinical examination and testing of the patient

N95 respirators are NOT available

- If in the office, provider should use a procedure mask and isolate the patient including providing a procedure mask for the patient to wear
- Conduct a clinical history and visual assessment while under contact/droplet precautions and maintaining a 2 metre distance
- Contact the local public health unit to report the individual as a PUI, determine whether testing is appropriate, and develop management plan for safe clinical examination and testing of the patient

Testing

- Primary care practices who can safely use N95 respirators may test patients who they determine are a PUI

- Single upper respiratory tract specimen will be accepted for COVID-19 testing
- Upper respiratory tract specimens include a nasopharyngeal swab (NPS) **OR** viral throat swab collected in universal transport medium
- NPS is preferred over a viral throat swab due to evidence of higher sensitivity for COVID-19 detection

https://www.publichealthontario.ca/en/laboratory-services/test-information-index/wuhan-novel-coronavirus

If you test in clinic…

- Call MLHU to report PUI
- MLHU can help to guide you through the testing process

- Specialized COVID-19 lab req is available through the Public Health Ontario Laboratory Lab
  - Need to complete the requested epidemiology and clinical symptoms fields
- If you are able to send a sample directly to the public health lab, do so! If not, MLHU will arrange for a courier

Contacting MLHU

- Call **519-663-5317**

- Monday to Friday, 8:30-4:30
  - Ask for the Infectious Disease Control team

- After-hours and weekends
  - Select option 2 to reach the on-call service

What’s on the horizon?

What's a pandemic?

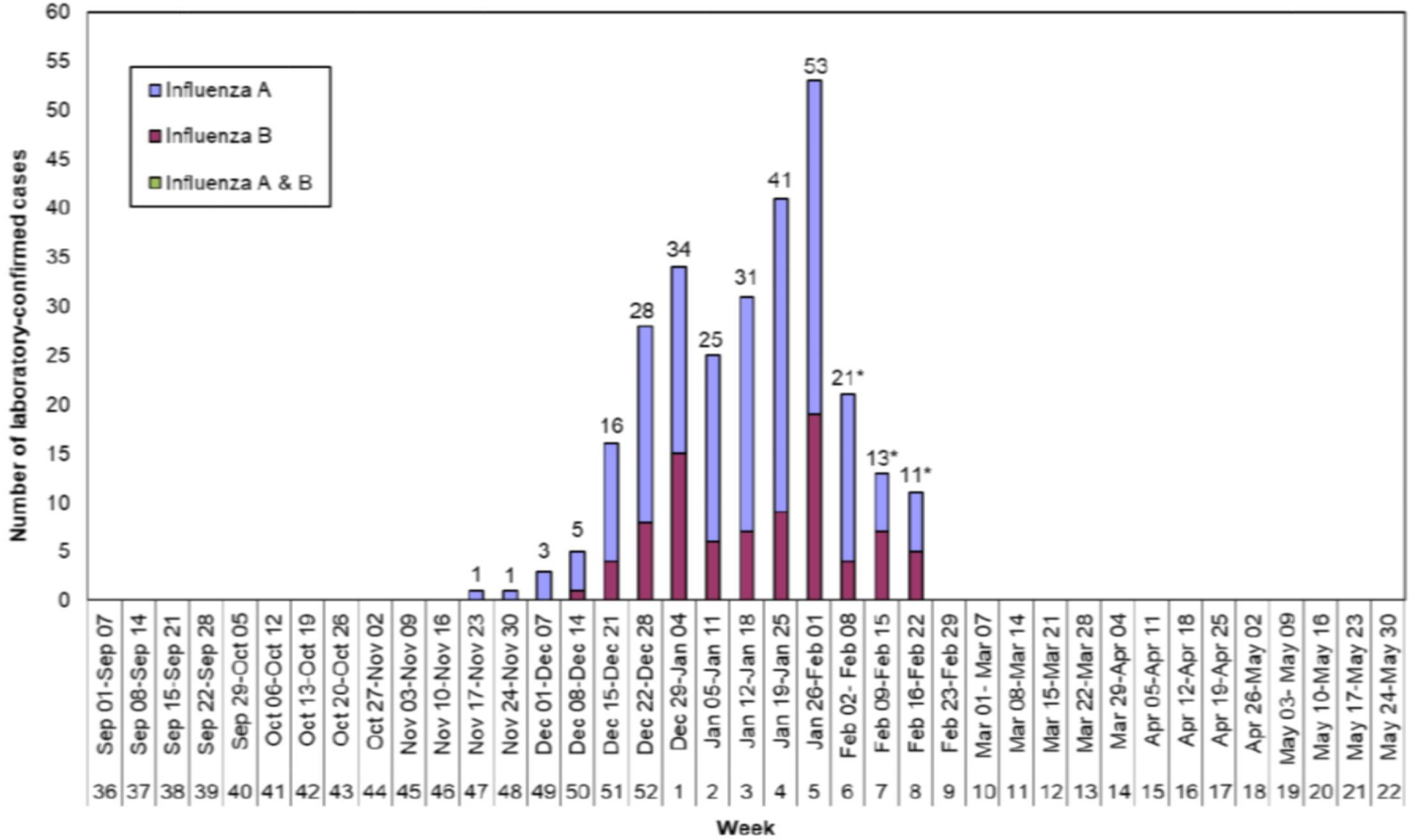
- Epidemic is an increase, often sudden, in the number of cases of a disease above what is normally expected in a population
  - Population may be defined as a geographic area or a certain demographic

- Pandemic is an epidemic that has:
  - Spread over several countries or continents
  - Usually affecting a large number of people

Preparing for a local outbreak

- Cases of COVID-19 are increasing globally and in Canada
- Public health measures will adjust change as the prevalence of COVID-19 increases, however the basics still apply:
  - Test those who need testing
  - Case and contact follow-up
  - Protect health care workers
  - Increase public knowledge and willingness to protect themselves

Laboratory-confirmed influenza cases, by influenza date†
Middlesex-London 2019-2020 influenza season (N=283)



Routine precautions work!

Stay home if you are ill, wash your hands regularly, don’t touch your face, cover your cough.

Treatment

- Supportive only, do **NOT** use steroids

- Remdesivir is a novel nucleotide analogue that has activity against SARS-CoV-2 in vitro and related coronaviruses (including SARS and MERS-CoV) both in vitro and in animal studies

- Lopinavir-ritonavir, which is used for the treatment of HIV infection, has in vitro activity against the SARS-CoV and MERS-CoV
  - It is being evaluated in larger randomized trials

Vaccines

- Vaccines, which have adapted approaches used for SARS-CoV or MERS-CoV, are being pursued

- Vaccine development is being accelerated, with a goal of 3 months to the phase 1 clinical trials

- It is important to remember we have a vaccine for seasonal influenza, which was responsible for 3500 deaths in Canada last year, but has suffered from poor uptake…..

Keeping up to date on COVID-19

- Sign up for MLHU's Healthcare Provider newsletter at https://www.healthunit.com/healthcare-providers

- Comprehensive information is available at the following websites:
  - MLHU
    - https://www.healthunit.com/news/novel-coronavirus
  - Public Health Ontario
    - https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/respiratory-diseases/novel-coronavirus
  - Ontario's Ministry of Health – Guidance for Health Sector
    - http://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/2019_guidance.aspx