



Asymptomatic Transmission

Disclaimer:

This *Quick Response Report* was published on May 11, 2020. Given the rapidly changing nature of the coronavirus pandemic, some of the references included in this report may quickly become out-of-date. We further caution readers that researchers at the Newfoundland & Labrador Centre for Applied Health Research are not experts on infectious diseases and are relaying work produced by others. This report has been produced quickly and it is not exhaustive, nor have the included studies been critically appraised.

Highlighting below indicates added emphasis.

Original Inquiry

- What is the significance of asymptomatic/pre-symptomatic transmission of COVID-19?
- Is testing of asymptomatic individuals valuable for sentinel surveillance for COVID-19? If so, in what setting should testing occur? (e.g., hospital admissions, healthcare workers, random sampling.)

Key Definitions

Asymptomatic Transmission: An asymptomatic case is a person infected with SARS-CoV-2, confirmed by laboratory test, who does not develop COVID-19 symptoms. Asymptomatic transmission refers to transmission of the virus from such a person. Source: ([LINK](#)) (1)

Pre-symptomatic Transmission: The incubation period for COVID-19, i.e., time between infection and symptom onset, is 5-6 days on average and up to 14 days. This is the “pre-symptomatic period” during which some infected persons can be contagious and transmit the virus. Source: ([LINK](#)) (1)

Summary

We found a number of guidelines and expert statements. We did not find any systematic reviews at this time but we did find 10 other reviews. We found a large number of primary research articles including case studies and case series. We found a small number of news articles. Our findings are summarized below and organized into two sub-categories, Transmission and Testing.

Guidance

Transmission

Public Health England. **Transmission characteristics and principles of infection prevention and control.** Updated May 3, 2020. ([LINK](#)) (2)

- “There have been case reports that suggest possible infectivity prior to the onset of symptoms, with detection of SARS-CoV-2 RNA in some individuals before the onset of symptoms.”
- “Further study is required to determine the frequency, importance and impact of asymptomatic and pre-symptomatic infection, in terms of transmission risks.”
- Also available as a detailed PDF version: ([LINK](#)) (3)

PHAC. **Coronavirus disease (COVID-19): Symptoms and treatment.** April 24, 2020. ([LINK](#)) (4)

- “Recent evidence indicates that the virus can be transmitted to others from someone who is infected but not showing symptoms. This includes people who:
 - have not yet developed symptoms (pre-symptomatic)
 - never develop symptoms (asymptomatic)”
- “While experts know that these kinds of transmissions are happening among those in close contact or in close physical settings, it is not known to what extent. This means it is extremely important to follow the proven [preventative measures](#).”

WHO. **Q&A on coronaviruses (COVID-19).** April 17, 2020. ([LINK](#)) (5)

- “It is possible to catch COVID-19 from someone who has just a mild cough and does not feel ill. Some reports have indicated that people with no symptoms can transmit the virus. It is not yet known how often it happens.”

Transmission: Additional Sources

- CDC. **Clinical Questions about COVID-19: Questions and Answers.** Updated April 16, 2020 ([LINK](#)) (6)
- PHAC. **Coronavirus disease (COVID-19): Summary of assumptions.** April 13, 2020. ([LINK](#)) (7)
- WHO. **Coronavirus disease 2019 (COVID-19) Situation Report – 73.** April 2, 2020. ([LINK](#)) (1)

Testing

Ontario Ministry of Health. **COVID-19 Quick Reference Public Health Guidance on Testing and Clearance.** May 02, 2020. ([LINK](#)) (8)

- “Testing of asymptomatic individuals (i.e., have never had symptoms) is not generally recommended at this time and, beyond the priority list within the [COVID-19 Provincial Testing Guidance Update](#), prioritization should first be given to symptomatic over asymptomatic individuals.”
- “If an individual who has never had symptoms tests positive, this should be managed as a confirmed case of COVID-19.”

WHO. **Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases.**

March 2, 2020. ([LINK](#)) (9)

- “The decision to test should be based on clinical and epidemiological factors and linked to an assessment of the likelihood of infection. PCR testing of asymptomatic or mildly symptomatic contacts can be considered in the assessment of individuals who have had contact with a COVID-19 case. Screening protocols should be adapted to the local situation.”

Systematic Reviews

None found at this time.

Other Reviews

Transmission

Furukawa, Brooks, Sobel. **Early Release: Evidence Supporting Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 While Pre-symptomatic or Asymptomatic.** May 4, 2020. ([LINK](#)) (10)

- **Disclaimer: Early release articles are not considered as final versions. Any changes will be reflected in the online version in the month the article is officially released.**
- Abstract: “Recent epidemiologic, virologic, and modeling reports support the possibility of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission from persons who are pre-symptomatic (SARS-CoV-2 detected before symptom onset) or asymptomatic (SARS-CoV-2 detected but symptoms never develop). SARS-CoV-2 transmission in the absence of symptoms reinforces the value of measures that prevent the spread of SARS-CoV-2 by infected persons who may not exhibit illness despite being infectious.”

Johns Hopkins Medicine. **Coronavirus COVID-19 (SARS-CoV-2).** April 27, 2020. ([LINK](#)) (11)

- “Viral shedding by asymptomatic people may represent 25–50% of total infections.”
- “Why widespread and rapid transmission occurs is not completely certain, and is provoking changes in public health recommendations as well as anxieties. Asymptomatically infected people who shed and spread is a likely explanation.”
- “The contribution of asymptomatic persons with SARS-CoV-2 to the transmission is not well characterized but will be much better understood when validated antibody testing available.”

Transmission: Additional Sources

- National Collaborating Centre for Environmental Health (NCCEH). **An introduction to SARS-CoV-2.** April 24, 2020. ([LINK](#)) (12)
- Public Health Scotland. **Rapid Review of the literature: Assessing the infection prevention and control measures for the prevention and management of COVID-19 in health and care settings.** Version 1.2 Published April 20, 2020. ([LINK](#)) (13)

- Alberta Health Services. **Key Research Question: What is the evidence supporting the possibility of asymptomatic transmission of SARS-CoV-2?** Updated April 13, 2020. ([LINK](#)) (14)
- Han and Yang. **The transmission and diagnosis of 2019 novel coronavirus infection disease (COVID-19): A Chinese perspective.** March 6, 2020. ([LINK](#)) (15)
- Wang et al. **Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures.** March 5, 2020. ([LINK](#)) (16)

Testing

Alberta Health Services. **Key Research Question: Are there populations of asymptomatic individuals that should be considered priority for screening for COVID 19 infection, with the goal of surveillance and preventing spread within these populations?** April 29, 2020

([LINK](#)) (17)

- “Early evidence around initiatives testing asymptomatic people (e.g., Iceland, Italy) have reported identification of asymptomatic cases in which the authors conclude that identifying these cases was vital to outbreak control.”
- “In light of early evidence, different jurisdictions and specialties have suggested revised guidelines to include testing asymptomatic people within a given population, particularly in congregate living and risky work/living conditions when there is an outbreak.”
- “It will be important to examine the impact of testing asymptomatic people as evidence becomes available, especially given it is unknown how infectious SARS-CoV-2 is in asymptomatic cases.”

Testing: Additional Sources

- Heneghan et al. **COVID-19: What proportion are asymptomatic?** April 6, 2020. ([LINK](#)) (18)
- Lai et al. **Asymptomatic carrier state, acute respiratory disease, and pneumonia due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): Facts and myths.** March 4, 2020. ([LINK](#)) (19)

Primary Research

Transmission

He et al. **The relative transmissibility of asymptomatic COVID-19 infections among close contacts.** April 18, 2020. ([LINK](#)) (20)

- Abstract: “In summary, we conclude that the relative transmissibility of asymptomatic case could be significantly smaller than that of the symptomatic cases. The main contribution of Chen et al. (2020) is that they raise the alarm of the existence of the transmissibility of the asymptomatic cases. We remark that how efficient of the

transmissibility of asymptomatic cases comparing to symptomatic cases warrants more study.”

Huang et al. **Rapid asymptomatic transmission of COVID-19 during the incubation period demonstrating strong infectivity in a cluster of youngsters aged 16-23 years outside Wuhan and characteristics of young patients with COVID-19: A prospective contact-tracing study.**

April 10, 2020. ([LINK](#)) (21)

- Conclusions: “SARS-CoV-2-infection presented strong infectivity during the incubation-period with rapid transmission in this cluster of youngsters outside Wuhan. COVID-19 developed in these youngsters had fast onset and various nonspecific atypical manifestations, and were much milder than in older patients as previously reported.”

Transmission: Additional Sources

- Wei et al. **Pre-symptomatic Transmission of SARS-CoV-2 - Singapore, January 23-March 16, 2020.** April 10, 2020. ([LINK](#)) (22)
- Tian et al. **Characteristics of COVID-19 infection in Beijing.** April 1, 2020. ([LINK](#)) (23)
 - “We reported the characteristics of 262 cases infected with COVID-19 from 57 hospitals across Beijing and provided the proportion of the COVID-19 infection on the severe cases to mild, asymptomatic and non-pneumonia cases.”
- Aguilar et al. **Investigating the Impact of Asymptomatic Carriers on COVID-19 Transmission.** March 31, 2020. ([LINK](#)) (24)
- Wang et al. **Clinical Outcomes in 55 Patients With Severe Acute Respiratory Syndrome Coronavirus 2 Who Were Asymptomatic at Hospital Admission in Shenzhen, China.** March 17, 2020. ([LINK](#)) (25)
- Mizumoto et al. **Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020.** Published March 12, 2020. ([LINK](#)) (26)
- Hu et al. **Clinical characteristics of 24 asymptomatic infections with COVID-19 screened among close contacts in Nanjing, China.** March 4, 2020. ([LINK](#)) (27)
- Nishiura et al. **Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19).** February 13, 2020. ([LINK](#)) (28)

Testing

Arons et al. **Pre-symptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility.** April 24, 2020. ([LINK](#)) (29)

- “Conclusion: Rapid and widespread transmission of SARS-CoV-2 was demonstrated in this skilled nursing facility. More than half of residents with positive test results were asymptomatic at the time of testing and most likely contributed to transmission. Infection-control strategies focused solely on symptomatic residents were not sufficient to prevent transmission after SARS-CoV-2 introduction into this facility.”

Case Studies

- Jiang et al. **Transmission potential of asymptomatic and paucisymptomatic SARS-CoV-2 infections: a three-family cluster study in China.** April 22, 2020. ([LINK](#)) (30)
- Danis et al. **Cluster of coronavirus disease 2019 (Covid-19) in the French Alps, 2020.** April 11, 2020. ([LINK](#)) (31)

News Articles

BMJ. **Covid-19: four fifths of cases are asymptomatic, China figures indicate.** April 2, 2020. ([LINK](#)) (32)

- “New evidence has emerged from China indicating that the large majority of coronavirus infections do not result in symptoms. Chinese authorities began publishing daily figures on 1 April on the number of new coronavirus cases that are asymptomatic, with the first day’s figures suggesting that around four in five coronavirus infections caused no illness. Many experts believe that unnoticed, asymptomatic cases of coronavirus infection could be an important source of contagion.”

New York Times. **Infected but Feeling Fine: The Unwitting Coronavirus Spreaders.** March 31, 2020. ([LINK](#)) (33)

- “Experts agreed that infections were being passed along by people who do not report symptoms — what they call asymptomatic transmissions...”
- “Rapid tests for infection might help detect people, especially health care workers, who are infected yet feel normal.”

Nature. **Covert coronavirus infections could be seeding new outbreaks.** March 20, 2020. ([LINK](#)) (34)

- “Chowell’s modelling study³, published on 12 March in Eurosurveillance, shows that about 18% of some 700 infected individuals on Diamond Princess never showed symptoms.”
- “...he suspects the rate of asymptomatic infections in a general population might be closer to the 31% that the Japanese team reported.”
- “Taking the results from several studies into account, Chowell thinks that asymptomatic or mild cases combined represent about 40–50% of all infections.”

Methodology

Newfoundland and Labrador Centre for Applied Health Research (NLCAHR) COVID-19 Quick Response reports are initiated by, and shared with, our partners in the provincial health system, including the four Regional Health Authorities, the Departments of Health and Community Services and Children, Seniors and Social Development, and public health officials.

NLCAHR staff work with topic submitters to clarify the research question. We then search for related systematic reviews, meta-analyses, other reviews, interim and other guidance statements, primary research, expert opinion and health and science reporting.

We use several search strategies, with a focus on the following databases:

- [Alberta Health Services](#)
- [CADTH](#)
- [Canadian Pharmacists Association](#)
- [Campbell Collaboration](#)
- [Cochrane Collaboration](#)
- [Centre for Disease Control](#) (CDC)
- [Centre for Evidence Based Medicine](#) (CEBM)
- [Evidence for Policy and Practice Information and Co-ordinating Centre](#)
- [European Centre for Disease Prevention and Control](#)
- [Health Canada](#)
- [Joanna Briggs Institute](#)
- [Johns Hopkins](#)
- [MedRxiv](#)
- [National Institutes of Health](#) (NIH)
- [National Institute of Allergy and Infectious Diseases](#) (NIAID)
- [National Library of Medicine](#)
- [Public Health Agency of Canada](#)
- [Trip Database](#)
- [World Health Organization](#)

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