Testing 101 placemat reference document

Infographic Section	Content	Reference
Sample collection	A swab is taken from the inside of the nose or back of the throat	World Health Organization. Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases. March 19, 2020. https://www.who.int/publications/i/item/10665-331501
Processing	Molecular tests detect whether there is genetic material from the virus	World Health Organization. Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases. March 19, 2020. https://www.who.int/publications/i/item/10665-331501
True positive	You are currently infected.	BC Centre for Disease Control. Interpreting the results of Nucleic Acid Amplification testing (NAT; or PCR tests) for COVID-19 in the Respiratory Tract. April 30, 2020. http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID19_InterpretingTesting_Results_NAT_PCR.pdf
	Almost all positive results are true positives	Public Health Ontario. COVID-19 Laboratory Testing. https://www.publichealthontario.ca/-/media/documents/lab/covid-19-lab-testing-faq.pdf?la=en
False positive	You are not infected but test positive (very rare)	Centers for Disease Control and Prevention Fact Sheet for Patients - CDC - 2019-nCoV Real-Time RT-PCR Diagnostic Panel. June 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/downloads/Factsheet-for-Patients-2019-nCoV.pdf Public Health Ontario. COVID-19 Laboratory Testing. https://www.publichealthontario.ca/-/media/documents/lab/covid-19-lab-testing-faq.pdf?la=en
True Negative	You are not currently infected. There is no risk of infecting others.	Centers for Disease Control and Prevention Fact Sheet for Patients - CDC - 2019-nCoV Real-Time RT-PCR Diagnostic Panel. June 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/downloads/Factsheet-for-Patients-2019-nCoV.pdf
False negative	You are infected, but test negative. Can happen when the test is done too early to detect the disease or when sample collection is poor	Centers for Disease Control and Prevention Fact Sheet for Patients - CDC - 2019-nCoV Real-Time RT-PCR Diagnostic Panel. June 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/downloads/Factsheet-for-Patients-2019-nCoV.pdf Woloshin et al. False Negative Tests for SARS-CoV-2 Infection Challenges and Implications. NEJM. https://www.nejm.org/doi/pdf/10.1056/NEJMp2015897?articleTools=true BC Centre for Disease Control. Interpreting the results of Nucleic Acid Amplification testing (NAT; or PCR tests) for COVID-19 in the Respiratory

		Tract. April 30, 2020. http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID19_InterpretingTesting_Results_NAT_PCR.pdf
Positive Test result	Individual isolates	Government of Canada. Updated: Public health management of cases and contacts associated with coronavirus disease 2019 (COVID-19. April 10, 2020. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/interim-guidance-cases-contacts.html
False Negative Test Result	Unaware of their infection and could infect others	Centers for Disease Control and Prevention Fact Sheet for Patients - CDC - 2019-nCoV Real-Time RT-PCR Diagnostic Panel. June 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/downloads/Factsheet-for-Patients-2019-nCoV.pdf
Test accuracy	Worst: Days 0 -2 Best: Days 4 – 8	He *et al.* Temporal dynamics in viral shedding and transmissibility of COVID-19. Nature Medicine volume 26, pages672–675(2020). https://www.nature.com/articles/s41591-020-0869-5
	Based on a 5 day incubation period from exposure to symptoms	Lauer *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. May 5 2020. https://www.acpjournals.org/doi/10.7326/M20-0504
Initial exposure:	Days 0 – 2 Very low virus	He *et al.* Temporal dynamics in viral shedding and transmissibility of COVID-19. Nature Medicine volume 26, pages672–675(2020). https://www.nature.com/articles/s41591-020-0869-5
	~98% not detected	Lauer *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. May 5 2020. https://www.acpjournals.org/doi/10.7326/M20-0504 Estimated that fewer than 2.5% of infected persons will show symptoms within 2.2 days of exposure. Assuming a test sensitivity of 80% for symptomatic individuals we estimate that (80% of the 2.5% who test positive at 2.2 days will be true positives = 2% test as true positive = ~98% failure rate)
	Those tested too early will be unaware of infection and may infect others	Centers for Disease Control and Prevention Fact Sheet for Patients - CDC - 2019-nCoV Real-Time RT-PCR Diagnostic Panel. June 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/downloads/Factsheet-for-Patients-2019-nCoV.pdf Woloshin et al. False Negative Tests for SARS-CoV-2 Infection Challenges and Implications. NEJM. https://www.nejm.org/doi/pdf/10.1056/NEJMp2015897?articleTools=true BC Centre for Disease Control. Interpreting the results of Nucleic Acid Amplification testing (NAT; or PCR tests) for COVID-19 in the Respiratory Tract. April 30, 2020.
Incubating:	Days 0 -5 Virus multiplying	Lauer *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. May 5 2020. https://www.acpjournals.org/doi/10.7326/M20-0504

	~50% not detected	*Expert opinion “Assuming an incubation period distribution of mean 5.2 days from a separate study of early COVID-19 cases, we inferred that infectiousness started from 2.3 days (95% CI, 0.8–3.0 days) before symptom onset and peaked at 0.7 days (95% CI, −0.2–2.0 days) before symptom onset (Fig. 1c). The estimated proportion of presymptomatic transmission (area under the curve) was **44% (95% CI, 25–69%).**” He *et al.* Temporal dynamics in viral shedding and transmissibility of COVID-19. Nature Medicine volume 26, pages672–675(2020). https://www.nature.com/articles/s41591-020-0869-5
Symptoms	Day 5+ Virus plentiful	Lauer *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. May 5 2020. https://www.acpjournals.org/doi/10.7326/M20-0504
	~10% not detected	Based on a sensitivity of 70-90% amongst symptomatic individuals Infectious Diseases Society of America. Guidelines on the Diagnosis of COVID-19. May 6, 2020. https://www.idsociety.org/practice-guideline/covid-19-guideline-diagnostics/ “Several studies with small sample sizes have been published, and have estimated that the first test done has a sensitivity of 70% to 90% for detecting SARS-CoV-2.” Public Health Ontario. COVID-19 Laboratory Testing. https://www.publichealthontario.ca/-/media/documents/lab/covid-19-lab-testing-faq.pdf?la=en “A statistic commonly quoted is that there is a 30% chance of a false negative result for a NAT test in a patient with COVID-19 infection (i.e., a 70% sensitivity)” BC Centre for Disease Control. Interpreting the results of Nucleic Acid Amplification testing (NAT; or PCR tests) for COVID-19 in the Respiratory Tract. April 30, 2020. http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID19_InterpretingTesting_Results_NAT_PCR.pdf
Footnote	* Based on preliminary data and expert opinion. Some do not develop symptoms, test accuracy for asymptomatic cases is unclear as it is	“SARS-CoV-2 has been detected in cases with a range of disease severity, including prior to symptom onset and in asymptomatic cases. At present, there is only a single study regarding the viability of the virus in presymptomatic and asymptomatic cases” Public Health Ontario. COVID-19 – What We Know So Far About Viral Detection. May 7, 2020. https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2020/05/what-we-know-viral-detection.pdf?la=en “It is presumed that the large majority of patients included in this analysis were symptomatic. The sensitivity in patients with milder forms of illness, including asymptomatic patients, is likely very different, and has not been well elucidated. Available data suggests that patients with more severe illness

	not known where they are in their disease progression.	have higher viral loads than those with milder illness. When testing asymptomatic patients, a negative test does not rule out infection, as it could be early in the incubation period before the virus is actively replicating at a level that can be detected by PCR assays. At this time, there is not enough data to know the sensitivity, specificity, and predictive values of testing in asymptomatic persons. This would require testing a large cohort of patients, and adjusting these values for the day within the incubation period that the person is tested at. This would also require a large cohort of patients tested in a controlled fashion, with clinical follow up and repeat retesting at intervals" Public Health Ontario. COVID-19 Laboratory Testing. https://www.publichealthontario.ca/-/media/documents/lab/covid-19-lab-testing-faq.pdf?la=en
Recovering	Day 15+ Virus decreasing	Lauer *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. May 5 2020. https://www.acpjournals.org/doi/10.7326/M20-0504
	May not be infectious to others	Government of Canada. Coronavirus disease (COVID-19): Summary of assumptions. April 13, 2020. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/assumptions.html
	May take longer to recover from severe disease	Government of Canada. Coronavirus disease (COVID-19): Summary of assumptions. April 13, 2020. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/assumptions.html
Serological (blood) test	Blood tests detects antibodies to the virus that usually start to appear when a person is recovering	COVID-19 Immunity Task Force. FAQs – What is a serological test? https://www.covid19immunitytaskforce.ca/faqs/
	The blood test is not used to diagnosed active COVID-19	World Health Organization. Advice on the use of point-of-care immunodiagnostic tests for COVID-19. Scientific Brief. April 8, 2020. https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19 Alberta Health Services. COVID-19 Scientific Advisory Group Rapid Evidence Report - Topic: Can people with previous COVID-19 infection become re-infected by the SARS-CoV-2virus? [updated May 12, 2020]. https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-reinfection-rapid-review.pdf
	Research is underway to	World Health Organization. "Immunity passports" in the context of COVID-19 - Scientific Brief. April 24, 2020. https://www.who.int/news-

	find out whether antibodies protect you from future infections.	room/commentaries/detail/immunity-passports-in-the-context-of-covid-19 Government of Canada. Testing devices for COVID-19: Overview. https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/medical-devices/testing.html CADTH. Serological Tests for COVID-19. May 28, 2020. https://cadth.ca/sites/default/files/covid-19/eh0085-serology-for-covid-tests-final.pdf Canada Communicable Disease Report. Canadian Public Health Laboratory Network Best Practices for COVID-19. Volume 46–5, May 7, 2020: Nosocomial infection surveillance. https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2020-46/issue-5-may-7-2020/covid-19-health-professional-cphln.html