

The National Collaborating Centre for Infectious Diseases presents

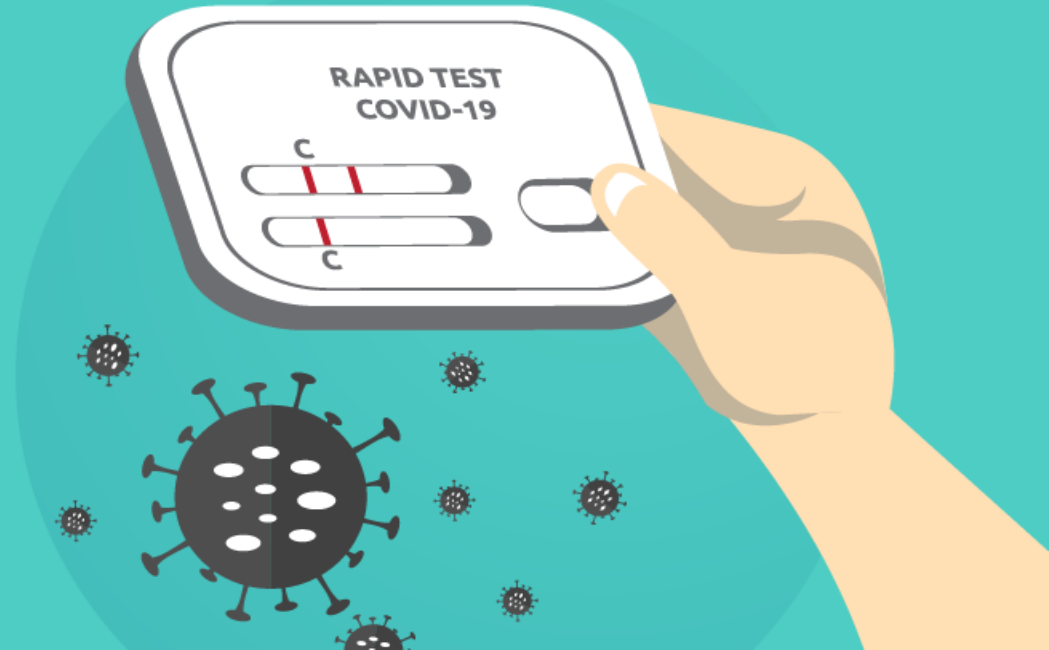
COVID-19 Testing Technologies

with the National Microbiology Laboratory (NML) and the Public Health Physicians of Canada (PHPC)

Friday, January 29th, 2021
2:00- 3:00pm EST

Speakers

Dr. Guillaume Poliquin
Dr. Jasmine Pawa



National Collaborating Centre
for Infectious Diseases
Centre de collaboration nationale
des maladies infectieuses



January 29, 2021—Part 2

Dr. Jasmine Pawa

Public Health Physicians of Canada

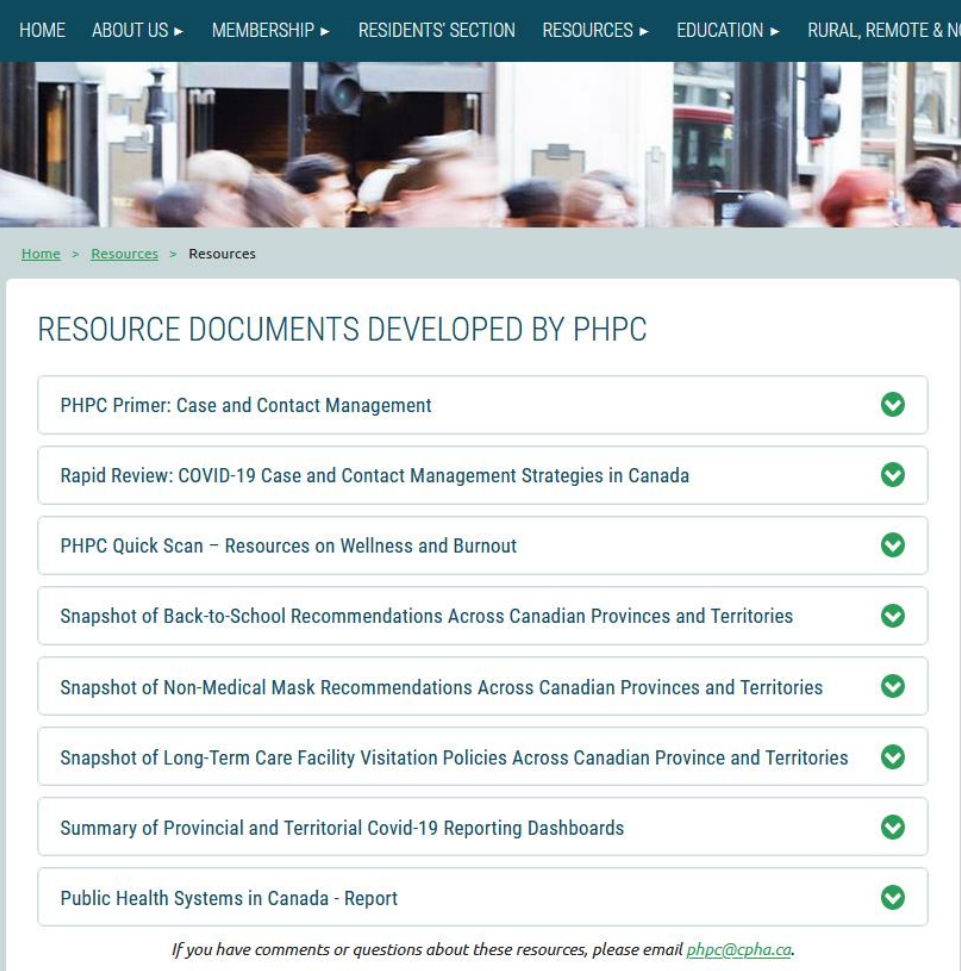
DISCLOSURES

ACKNOWLEDGEMENTS

PUBLIC HEALTH PHYSICIANS OF CANADA

The Public Health Physicians of Canada (PHPC) is the national specialty society for Public Health and Preventive Medicine specialist physicians and other physicians working in public health.

Many PHPC members are Medical Officers of Health (MOH) with responsibilities for overseeing the public health response to the pandemic within health authorities and health units across Canada, alongside their broader scope of public health practice.



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RESOURCE DOCUMENTS DEVELOPED BY PHPC

- PHPC Primer: Case and Contact Management ✓
- Rapid Review: COVID-19 Case and Contact Management Strategies in Canada ✓
- PHPC Quick Scan – Resources on Wellness and Burnout ✓
- Snapshot of Back-to-School Recommendations Across Canadian Provinces and Territories ✓
- Snapshot of Non-Medical Mask Recommendations Across Canadian Provinces and Territories ✓
- Snapshot of Long-Term Care Facility Visitation Policies Across Canadian Province and Territories ✓
- Summary of Provincial and Territorial Covid-19 Reporting Dashboards ✓
- Public Health Systems in Canada - Report ✓

If you have comments or questions about these resources, please email phpc@cpha.ca.

OUTLINE



FRAMEWORKS
AND TOOLS



EXAMPLES



QUESTIONS &
DISCUSSIONS

AS WE SORT OUT...

- Which of the testing technologies described most appropriate given the context?
- Who to offer testing to or implement these programs with and for?
- When to do the testing? Repeat the testing?
- How to get this in place given staffing, tracking, and other considerations?
- What settings are important to consider or prioritize?

Will discuss some tools today....



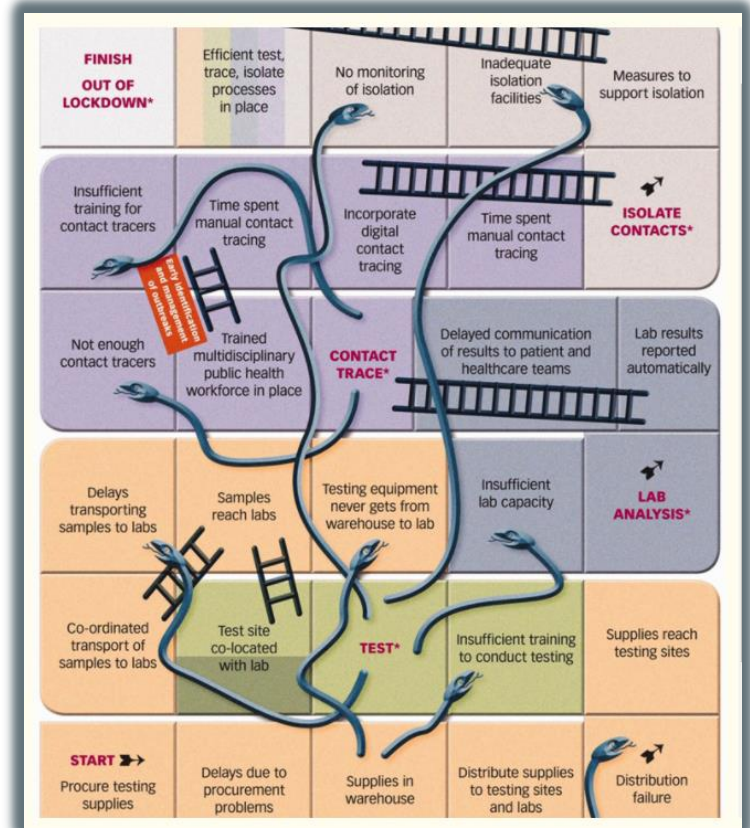
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A NOTE ON PUBLIC HEALTH & GOALS

- Population health goals are typically two-fold:
 - Improve health outcomes
 - Decrease health inequities
- Canada's goal for COVID-19 response:
 - to minimize serious illness and overall deaths while
 - minimizing societal disruption as a result of the COVID-19 pandemic.

IN CONTEXT

- Recognize that testing fits into the chain of find-test-trace-isolate-support
- Remembering that preventing exposures in the first place is even more upstream
- Public health is about much more than communicable disease and is very different to 1-1 health care services



Rajan et al, 2020

MANY PURPOSES TO TESTING

Consider:

Individual-level

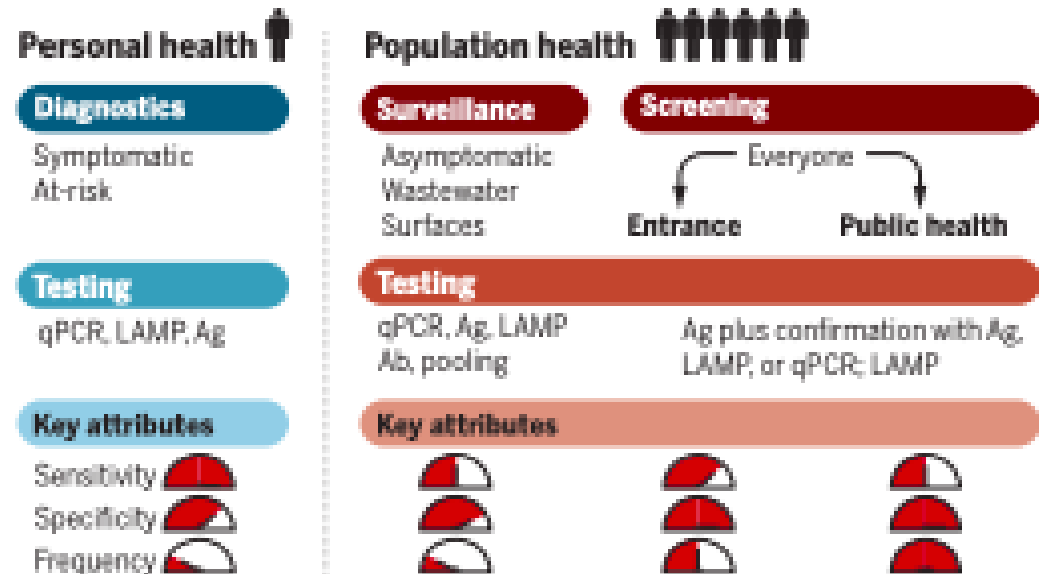
- Diagnostics

Population-level

- Surveillance
- Screening

COVID-19 testing strategies

Testing for SARS-CoV-2 can be for personal or population health. Collection can be from symptomatic or asymptomatic individuals, as well as from wastewater and swabs of surfaces. The tests may be performed in central laboratories, at the POC, or using rapid tests. Attributes of tests differ according to application.



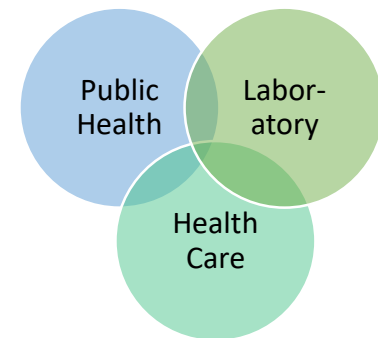
Ab, antibody; Ag, antigen; LAMP, loop-mediated isothermal amplification; POC, point of care; qPCR, quantitative polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2

Mina, M. J., & Andersen, K. G. (2021). COVID-19 testing: One size does not fit all. *Science*, 371(6525), 126–127.

REASON FOR TESTING

- Testing for COVID serves different purposes, which in turn influences which types of tests used in different parts of the health system
- 5 objectives (as proposed by ECDC)
 - To control transmission
 - To monitor transmission rates & severity
 - To mitigate impact in health care and social care settings
 - To detect clusters or outbreaks in specific settings
 - To maintain COVID-19 elimination status when achieved

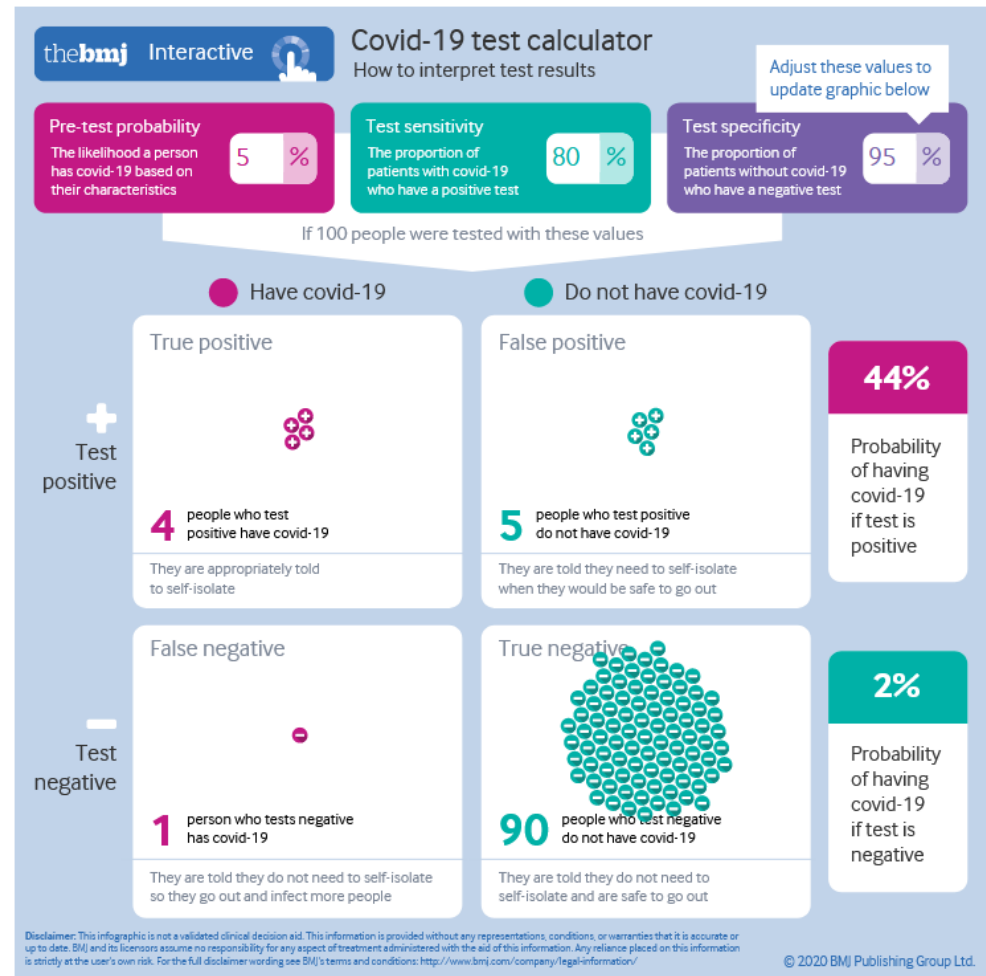
“Testing strategies should remain flexible and able to adapt rapidly to change depending on the local epidemiological situation, ... population dynamics, and available resources.” -- ECDC, link below.



TEST PERFORMANCE

- As discussed earlier:
 - Lab-based PCR
 - “Rapid” tests authorized for use in Canada:
 - Nucleic acid tests (e.g. Cepheid Xpert, Abbott ID Now, ...)
 - Antigen tests (Abbott Panbio, BD Veritor Plus, Quidel Sofia , ...)

We lack good information on test performance (and need to consider this alongside the clinical & public health utility, ethics, feasibility, and acceptability).

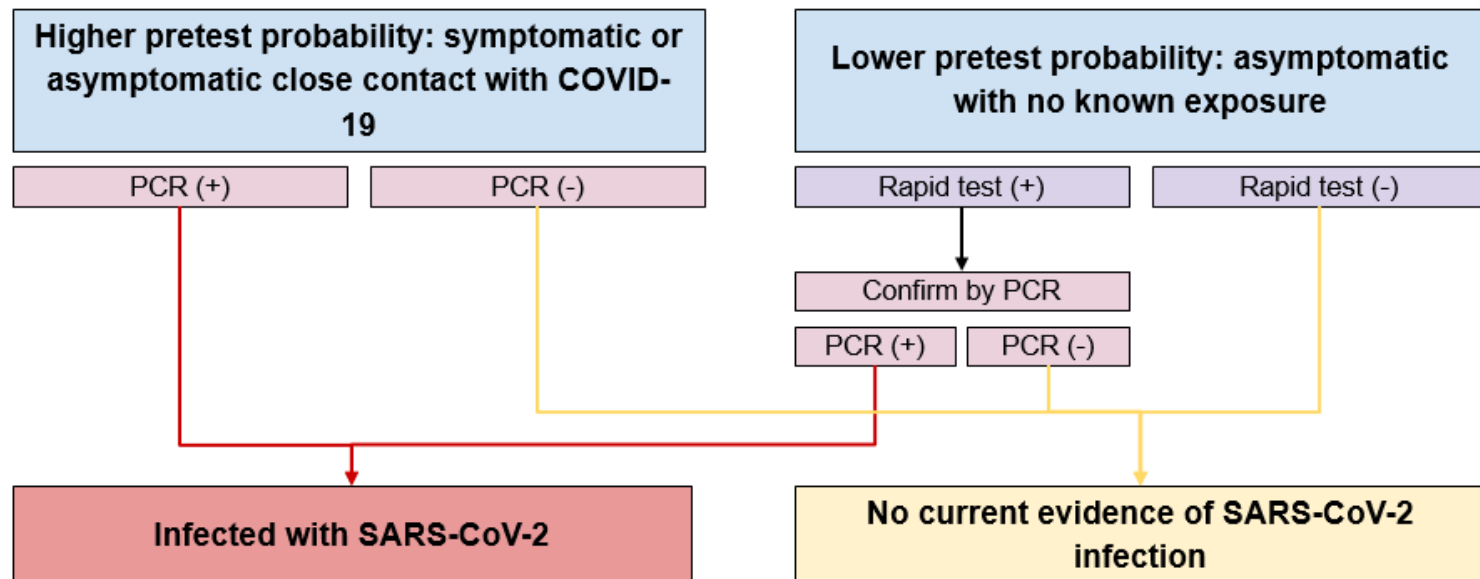


TEST PERFORMANCE – KEEPING IN MIND:

- How to consider:
 - Sensitivity, specificity
 - Positive predictive value, negative predictive value
(and estimates from academic literature, manufacturer, deployment evaluations)
- False positives, false negatives
 - How likely to occur?
 - Ways to mitigate adverse impacts?
- How above varies depending on:
 - Collection method
 - Asymptomatic or at different times following symptom onset
 - In different settings
 - With different community prevalence
- Remembering the relevance and importance of pre-test probabilities

EXAMPLE

Figure 1: Example of a testing approach that emphasizes the use of rapid tests in individuals with low pretest probability



Note:

- Importance of expert public health judgement in the best way to consider use of rapid tests in outbreaks
- Importance of linking in with existing public health case and contact management systems and planning on managing positives, indeterminates, and negatives clear in advance

IN ADDITION TO TEST SUPPLIES & CHARACTERISTICS, IMPORTANT FACTORS INCLUDE:

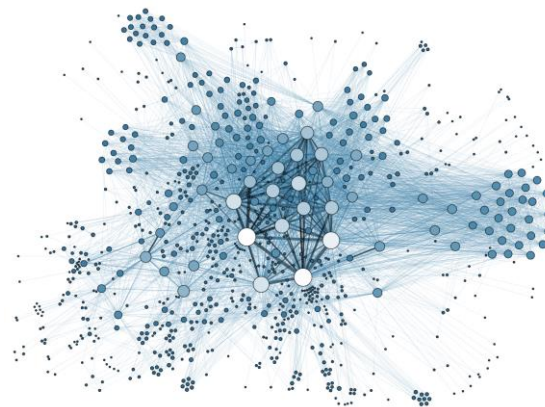
- Health human resources
- Certification and training preparation
- Specimen collection methods
- Biosafety
- Resourcing of Lab & Public Health systems
- Reporting results, tracking, & information systems
- Linking with existing case and contact management, including contact tracing and exposure assessment
- Storage facilities and space
- Equity in distribution
- Stigma, impacts relating to social determinants of health
- Communications
 - Realistic expectations of testing (such as sensitivity and specificity) “so that false positives and false negatives do not erode public trust.”

Information Systems....

“Realizing that beyond testing, you need an excellent [Public Health] information system for testing results to be swiftly sent to [Public Health] and then for case investigations to happen...unfortunately, this has been a major and less visible hurdle (fax and other IT challenges alluded to in the PHPC/NAO report this fall). An efficient IT system is one of vital and unsung 'heroes' of the whole test-trace-isolate enterprise.”

— quote from a colleague

Also considering privacy and personal health information implications...



EXAMPLES OF RAPID TESTING DEPLOYMENT

NEWS RELEASE

Ontario Deploys Rapid Testing to Support COVID-19 Response

New Technology is a Gamechanger in Significantly Improving Screening for the Virus

November 24, 2020

[Office of the Premier](#)

North

N.W.T. deploys COVID-19 rapid testing devices across territory



6 communities have them now, more to be delivered to other places in coming weeks

CBC News - Posted: Dec 09, 2020 6:02 PM CT | Last Updated: December 9, 2020



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Asymptomatic Testing Continues

[Health and Wellness / COVID - 19](#)

December 18, 2020 - 1:32 PM

Pop-up testing sites will also continue into the new year for general asymptomatic testing. Because they use rapid tests, the age limit is 16 and over at these sites. Appointments are not required for pop-up testing sites.

People who get a general asymptomatic test are not required to self-isolate while waiting for their test or results. People getting tested for other reasons can find their self-isolation

POSITIVE REFLECTION



RAPID TESTING

- May have a role in:
 - Outbreak control
 - Proactive monitoring in populations with high community prevalence
 - Monitoring high-risk congregative living settings
 - Communities where standard testing not / less available
- Note example of pop-up testing and “testing as engagement” discussed earlier

SETTINGS AND CIRCUMSTANCES TO CONSIDER

- High-risk or large settings such as:
 - Rotational workers
 - Migrant workers
 - Food processing facilities?
 - Warehouses with large number of onsite employees?
- Congregate living facilities:
 - Long-term care and continuing care homes
 - Shelters
 - Corrections
- Travel-related

- *Consider both residents and staff*
- *Keep in mind factors in above slides, won't be appropriate in all settings or contexts...*

- *Would need to be periodic, repeated testing*
- *Keep in mind testing fatigue*
- *Consider less invasive options (e.g. nasal swab) where feasible/appropriate*

- *With testing for entry screening, negative test alone is insufficient to enter, need other requirements such as distancing/symptom screening*

SCREENING

As noted by Wilson and Jungner in 1968, “*in theory, screening is an admirable method of combating disease ... [but] in practice, there are snags*”. They outlined that:

*“The central idea of early disease detection and treatment is essentially simple. However, **the path to its successful achievement** (on the one hand, bringing to treatment those with previously undetected disease, and, on the other, avoiding harm to those persons not in need of treatment) is far from simple though sometimes it may appear deceptively easy.”*

Box 2. Synthesis of emerging screening criteria proposed over the past 40 years

- The screening programme should respond to a recognized need.
- The objectives of screening should be defined at the outset.
- There should be a defined target population.
- There should be scientific evidence of screening programme effectiveness.
- The programme should integrate education, testing, clinical services and programme management.
- There should be quality assurance, with mechanisms to minimize potential risks of screening.
- The programme should ensure informed choice, confidentiality and respect for autonomy.
- The programme should promote equity and access to screening for the entire target population.
- Programme evaluation should be planned from the outset.
- The overall benefits of screening should outweigh the harm.

*Accessed from Andermann, A., Blancquaert, I., Beauchamp, S., & Déry, V. (2008). Revisiting Wilson and Jungner in the genomic age: A review of screening criteria over the past 40 years. *Bulletin of the World Health Organization*, 86(4), 317–319.

EVALUATION

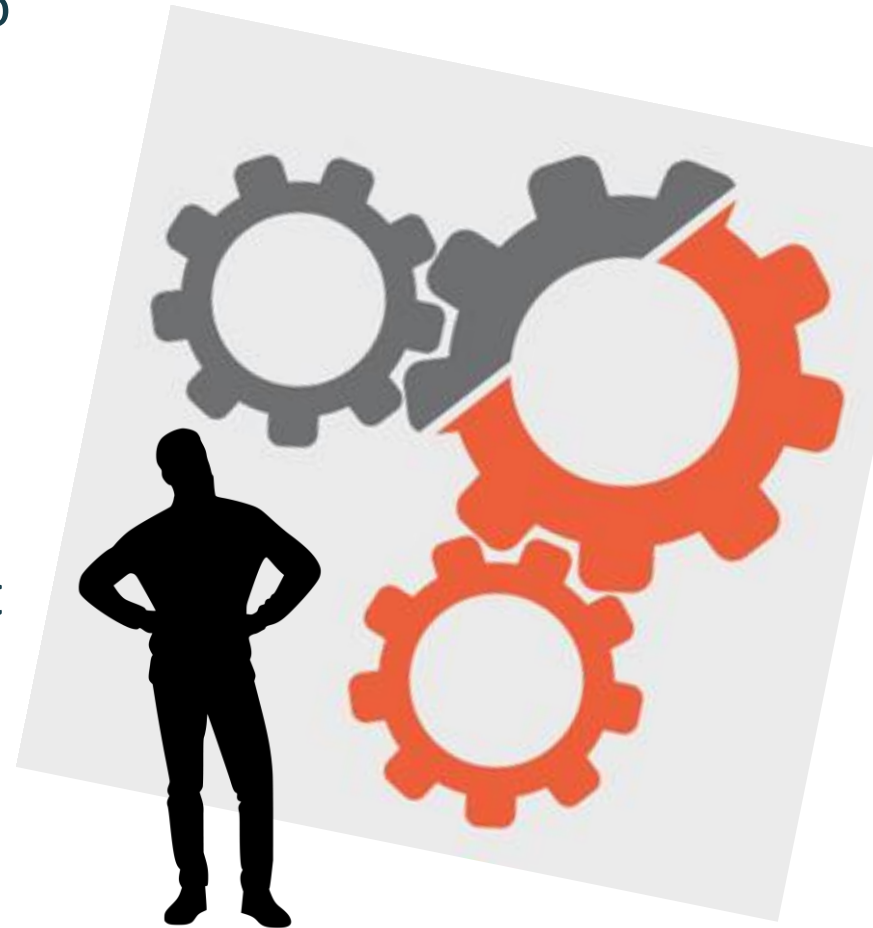
- Consider:
 - Client impact
 - Provider impact
 - Outcomes achieved
 - Costs
- Examples of information to consider including:
 - Proportion that accept / decline testing
 - Test positive rate
 - Qualitative information & feedback
- Ethical and equity implications (throughout assessment, planning, implementation, and evaluation)

IN ADDITION TO TEST SUPPLIES & CHARACTERISTICS, IMPORTANT FACTORS INCLUDE:

- Health human resources
- Certification and training preparation
- Specimen collection methods
- Biosafety
- Resourcing of Lab & Public Health systems
- Reporting results, tracking, & information systems
- Linking with existing case and contact management, including contact tracing and exposure assessment
- Storage facilities and space
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 - Realistic expectations of testing (such as sensitivity and specificity) “so that false positives and false negatives do not erode public trust.”

CONCLUSIONS

- Agree with the framing of how to implement
 - One thing...
- There are tools that can help with making decisions
- Consider difference between 1-1 health care and public health / population approaches
- Remember work beyond the test itself
 - Training / certification
 - Tracking
 - ...



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QUESTIONS

Contact info:

Dr. Jasmine Pawa MD CCFP MSc FRCPC

Public Health Physician

Jasmine.pawa@mail.utoronto.ca

THANK YOU

ADDITIONAL SLIDES

POTENTIAL CONSEQUENCES OF FALSE-POSITIVE SWAB TEST RESULTS (ITALICS VERBATIM FROM BELOW SOURCE)

“Individual perspective

Health-related

- *For swab tests taken for screening purposes before elective procedures or surgeries: unnecessary treatment cancellation or postponement*
- *For swab tests taken for screening purposes during urgent hospital admissions: potential exposure to infection following a wrong pathway in hospital settings as an in-patient*

Financial

- *Financial losses related to self-isolation, income losses, and cancelled travel, among other factors*

Psychological

- *Psychological damage due to misdiagnosis or fear of infecting others, isolation, or stigmatisation*

Also global:

- *Impacts on case and contact management systems and ability to prioritize follow-up to contain outbreaks*
- *Impacts on trust and credibility*

Global perspective

Financial

- *Misspent funding (often originating from taxpayers) and human resources for test and trace*
- *Unnecessary testing”*
- *Funding replacements in the workplace*
- *Various business losses*

Epidemiological and diagnostic performance

- *Overestimating COVID-19 incidence and the extent of asymptomatic infection*
- *Misleading diagnostic performance, potentially leading to mistaken purchasing or investment decisions if a new test shows high performance by identification of negative reference samples as positive (ie, is it a false positive or does the test show higher sensitivity than the other comparator tests used to establish the negativity of the test sample?)*

Societal

- *Misdirection of policies regarding lockdowns and school closures*
- *Increased depression and domestic violence (eg, due to lockdown, isolation, and loss of earnings after a positive test).”*



Political
Economic
Social
Technological

Legal
Ethical
Environmental

PESTLEE...