Evidence-Based Practice Group Answers to Clinical Questions

"Efficacy and/or Effectiveness of COVID-19 Temperature Screening of Workers"

A Rapid Systematic Review

By

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WORKING TO MAKE A DIFFERENCE

Clinical Services – Worker and Employer Services

About this report

Efficacy and/or Effectiveness of COVID-19 Screening of Workers

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About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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Objective

To gather and review (rapidly evolving) information regarding the efficacy and/or effectiveness for the use of temperature screening measures on (various) workers/at workplaces for COVID-19.

Methods

- A comprehensive literature search was conducted on March 24, 2020.
- Searches were conducted on commercial medical databases, including Embase® (1974 to 2020 March 23), Ovid MEDLINE® and Epub Ahead of Print®, Medline In-Process & Other Non-Indexed Citations®, Medline Daily Update® and Medline® (1946 to March 23, 2020).
- The searches were done by employing combinations of the following keywords:
    - ((SARS-CoV-2) OR (COVID-19) OR (wuhan ADJ virus) OR (2019-nCoV)) AND (screening OR screen OR surveillance) AND (temperature OR questionnaire OR (respiratory ADJ symptom*))
- A manual search was also conducted on the references of relevant studies identified via the database searches.
- Nine[1-9] articles were identified via all the above searches.

Results

- It should be noted that the majority of the relevant, currently available studies, including the nine[1-9] studies discussed here, focused on the screening of travelers and not workers or workplaces exclusively.
- Of these nine[1-9] studies that were retrieved in full, four[1,2,4,8] investigated the process and outcomes of using infra-red (IR) thermometers as part of various screening protocols of travelers.
- An expert opinion in the form of a letter to Editor is presented from Aw[1]. This opinion highlights the commonly known inconsistencies regarding the use of handheld IR thermometers, including issues concerning usage protocol (i.e. whether a reading is taken from the temple or the forehead, the distance between sensor and skin), operator training, and calibration/accuracy of the device. Another expert opinion

in the form of a letter to Editor is available from Bwire & Paulo[2], which additionally highlights the ineffectiveness of symptoms-based screening since individual COVID-19 carriers may be asymptomatic/early in their incubation period, or some of whom may be purposefully concealing fevers/high body temperatures with OTC medication.

- Quilty et al.[8] provided a report based on a simulation model of traveler (n=100 infected/carrier) screening for COVID-19 using IR thermal image scanners, based on currently known incubation periods and symptom manifestations for eventual severe cases, within a long duration of travel (12hrs, based on international flight times). This report concluded that even with both entry and exit body temperature screening, 47% of infected travelers will come and go undetected. It should be noted however, this does mean that around 53% of cases would be detected at some point over the course of this travel simulation.

- Finally, the ECRI issued an assessment of evidence on the use of IR temperature screening for potentially identifying infected staff or visitors presenting to healthcare facilities during infectious disease outbreaks[4]. This report reviewed data from studies and reports which focused on both airport and workplace settings, where IR-based thermal screening methods were used as an infection detection method (standalone or part of greater screening protocol). The ECRI concludes that a number of issues consistently render the use of temperature screening unfavourable as an infection screening method; issues include known factors such as the inability to detect COVID-19 positive but asymptomatic individuals, inconsistent screener/user technique or user error, differences in device calibration, and purposeful symptom suppression on the part of the infected individual.

- These four[1,2,4,8] reports/opinions also pointed out the potential shortcomings of using questionnaires as part of the screening process in conjunction with temperature screening, as it relies on each individual providing trustworthy and honest answers.

Summary

- Currently available information regarding the use of IR thermometer or similar IR temperature screening devices suggest only weak support for this practice, as part of a greater pandemic mitigation strategy in public places such as airports, care homes, and workplaces. A number of issues were raised, highlighting shortcomings inherent to the devices' usage, and also factors such as intentional symptom suppression on the part of the infected person, as well as the timing of each person's incubation period progression at the time of screening, or for those whose COVID-19

symptoms may not include fever and/or are asymptomatic.

- The use of questionnaires in conjunction with temperature screening provides no greater efficacy and/or effectiveness in infection detection, as the level of subjectivity in answers are hard to control for.
- At present, official Health Canada guidelines regarding public pandemic mitigation practices should remain at the forefront in all social/public settings, including the practice of social distancing, self-isolation in the presence of COVID-19 symptoms and/or after high-risk exposure, and personal hygience vigilance such as proper handwashing and cough/sneeze etiquette.

References

1. Aw D.J. The non-contact handheld cutaneous infra-red thermometer for fever screening during the COVID-19 global emergency. The. Journal of hospital infection. (no pagination), 2020. Date of Publication: 21 Feb 2020.

2. Bwire G.M. and Paulo L.S. Coronavirus disease-2019: Is fever an adequate screening for the returning travelers?. Tropical. Medicine and Health. 48 (1) (no pagination), 2020. Article Number: 201. Date of Publication: 09 Mar 2020.

3. Cao, L.; Wang T.Y.; Chen H.Z.; Qian, Y.; Chen B.W.; Fang, P.; Sun Y.X.; Zhu R.N.; Deng, J.; Zhao L.Q.; Mi, J., and Zhang, T. A preliminary investigation on the serological and epidemiological characteristics of severe acute respiratory syndrome in children. [Chinese]. Zhonghua. er ke za zhi. Chinese journal of pediatrics. 42 (11) (pp 840-844), 2004. Date of Publication: Nov 2004.

4. ECRI Clinical Evidence Assessment. Infrared temperature screening to identify potentially infected staff or visitors presenting to healthcare facilities during infectious disease outbreaks. 2020 March. Retrieved from: https://assets.ecri.org/PDF/COVID-19-Resource-Center/COVID-19-Clinical-Care/COVID-ECRI-Temperature-Screening.pdf

5. Guillen, E.; Pineiro, G. J.; Revuelta, I.; Rodriguez, D.; Bodro, M.; Moreno, A.; Campistol, J. M.; Diekmann, F., and Ventura-Aguiar, P. Case report of COVID-19 in a kidney transplant recipient: Does immunosuppression alter the clinical presentation?. American. Journal of Transplantation. 2020 Mar 20. 1.

6. Liu, H.; Liu, F.; Li, J.; Zhang, T.; Wang, D., and Lan, W. Clinical and CT Imaging Features of the COVID-19 Pneumonia: Focus on Pregnant Women and Children. Journal. of Infection. 2020 Mar 11. 1.

7. Lu, S.; Lin, J.; Zhang, Z.; Xiao, L.; Jiang, Z.; Chen, J.; Hu, C., and Luo, S. Alert for non-respiratory symptoms of Coronavirus Disease 2019 (COVID-19) patients in epidemic period: A case report of familial cluster with three asymptomatic COVID-19 patients. Journal. of Medical Virology. 2020 Mar 19. 1.

8. Quilty, B. J.; Clifford, S.; Flasche, S.; Eggo, R. M., and CMMID nCoV working group. Effectiveness of airport screening at detecting travellers infected with novel coronavirus (2019-nCoV). Euro. Surveillance: Bulletin Europeen sur les Maladies Transmissibles = European Communicable Disease Bulletin. 25(5), 2020 02. 1.

9. Zhu W.J.; Wang, J.; He X.H.; Qin, Y.; Yang, S.; Hu X.S.; Wang H.Y.; Huang, J.; Zhou A.P.; Ma, F.; Shi Y.K., and Zhou S.Y. The differential diagnosis of pulmonary infiltrates in cancer patients during the outbreak of the 2019 novel coronavirus disease. [Chinese]. Zhonghua. zhong liu za zhi [Chinese journal of oncology]. 42 (pp E008), 2020. Date of Publication: 05 Mar 2020.

Appendix 1

WorkSafeBC - Evidence-Based Practice Group Levels of Evidence

(adapted from 1,2,3,4)

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

References

1. Canadian Task Force on the Periodic Health Examination: The periodic health examination. CMAJ. 1979;121:1193-1254.

2. Houston TP, Elster AB, Davis RM et al. The US Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition. AMA Council on Scientific Affairs. American Journal of Preventive Medicine. May 1998;14(4):374-376.

3. Scottish Intercollegiate Guidelines Network (2001). SIGN 50: a guideline developers' handbook. SIGN. Edinburgh.

4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003;169(3):207-208.