EVIDENCE SYNTHESIS BRIEFING NOTE

TOPIC: SCREENING APPROACHES TO USE IN NON-HEALTHCARE SETTINGS TO IDENTIFY PEOPLE WHO MAY HAVE COVID-19 AND NEED TO TAKE APPROPRIATE ACTION

Information finalized as of May 15, 2020.[a]

Purpose: This note provides a summary of scientific evidence and Canadian/international experiences on what screening approaches can be used in non-healthcare settings (e.g., universities, stores, and office settings) to identify people who may have COVID-19 and need to take appropriate action.

Key Findings:

- Screening approaches that can be used in non-healthcare workplaces to identify people who may have COVID-19 include:
  - A list of COVID-19-related symptoms (with the symptoms signalling an increased chance of having COVID-19);
  - Temperature taking (with an elevated temperature signalling an increased chance of having COVID-19); and
  - A positive antibody test (with a recent positive test signaling a decreased chance of having COVID-19).
- Such screening approaches can be used for those at high risk for COVID-19 (such as travellers passing through air, land, and sea borders) and for the entire population (e.g., on entering university buildings, stores, and office buildings).
- Such screening approaches can be operationalized in different ways (e.g., by self screening prompted by signage, self-screening using a questionnaire, or screening using a questionnaire administered by another person; by randomly selecting individuals for symptom screening or screening everyone; and by varying the frequency of and settings for symptom screening).
- Appropriate follow-up actions for those who screen as being at elevated risk for COVID-19 can include self-isolating and seeking a diagnostic test, among others, however, such follow-up actions are not the focus of this briefing note.

Analysis for Ontario:

- Ontario is using different tools to screen for COVID-19 symptoms:
  - The provincial government has created a self-assessment tool which lists varying COVID-19 symptoms.
  - The Ministry of Labour, Training and Skills Development has developed sector specific guidance and signage, which recommends that employees use the provincial self-assessment tool and that any worker with symptoms related to cold, flu, or COVID-19 be sent home.
  - The Infrastructure Health and Safety Association has developed a COVID-19 screening checklist indicating that any workers or visitors accessing a work site should complete.

[a] This briefing note includes current available evidence as of the noted date. It is not intended to be an exhaustive analysis, and other relevant findings may have been reported since completion.

Supporting Evidence

Table 1 below summarizes scientific evidence and lessons learned from international[b] and Canadian experiences with screening for COVID-19 in non-healthcare settings. The findings are structured around two broad considerations:

- What screening approach to use:
  - Symptoms, such as fever, cough, shortness of breath / difficulty breathing, headache, runny nose, sore throat, and sudden loss of taste (ageusia) and/or smell (anosmia);
  - Signs, specifically temperature; and
  - Recent tests, specifically a positive antibody test.
- How to screen and support screening:
  - How to do the symptom screening, such as self screening prompted by (passive) signage, self screening using a questionnaire, and screening using a questionnaire administered by another person;
  - How to do temperature checking;
  - Digital approaches for screening or supporting screening (e.g., an app that prompts the user to complete a symptom check list, enter or provide consent to add their temperature, and provide consent to add a recent antibody text, and then an overall assessment about whether an individual should or should not take appropriate actions).

Additional details are provided in Table 2 (for experiences from Canadian provinces and territories), Table 3 (for experiences from other countries), and Table 4 (key findings from highly relevant evidence documents) in the Appendix.

Table 1: A Summary of the Scientific Evidence and Lessons Learned from International and Canadian Experiences with Screening for COVID-19 in Non-Healthcare Settings

Scientific Evidence	• Most of the findings from highly relevant evidence documents focus on symptom lists and temperature taking as screening approaches, as well as how to do symptom screening and take temperatures. Only one highly relevant primary study and one protocol for a systematic review focus on positive antibody tests. None of the highly relevant evidence documents focused on digital approaches for screening or supporting screening.
	• For symptoms, research points to a wide array of symptoms for COVID-19 that could be used in screening. Two of these documents provide particularly helpful insights:
	  ○ A recent study published in the journal Nature that analyzed potential symptoms reported on a smartphone app from 2.6 million people. It found that loss of smell (anosmia), skipped meals, and fatigue are the three best predictors of COVID-19 and that, while cough is important, it is also common in those who do not have COVID-19. Moreover, among these three top predictors, anosmia was most strongly associated with COVID-19.
	  ○ An up-to-date tracker that provides signs and symptoms for severe and non-severe COVID-19 provided by the Centre for Evidence-Based Medicine lists fever,

[b] Countries reviewed are: Australia, China, New Zealand, South Korea, Sweden, and the United Kingdom.

	cough, fatigue, dyspnea, sputum production, shortness of breath, myalgia, chill, dizziness, and headache as the top 10 symptoms. ○ Moreover, a recent but low-quality systematic review highlighted that a combination of the most frequent symptoms (which it highlights as anosmia, fever, fatigue, persistent cough, diarrhoea, abdominal pain, and loss of appetite) have a reasonable specificity for COVID-19 diagnosis. However, the review notes that the symptoms can have rapid cessation or late onset and some people will also be asymptomatic. • For signs to use in screening, McMaster Health Forum's rapid evidence profile about temperature taking as a screening tool (at borders or in general) highlights that most guidelines and the included rapid reviews do not recommend temperature screening based on the available evidence. • Only one highly relevant primary study and a protocol for a systematic review focus on positive antibody tests, with the study indicating that antibody-based rapid tests should not be relied on for screening in community settings. • In addition to findings from identified guidelines, one guideline from the American College Health Association emphasizes that U.S. universities should screen health-service patients and staff regularly using symptom and temperature screening, and two guidelines for the food industry (one WHO technical guidance and one from WHO and Agriculture Organization of the United Nations) focus on the need for employees in the food sector to be aware of and recognize the symptoms of COVID-19. • Two single studies provide insight about additional approaches: • A walk-through screening centre using negative-pressure booths that has been used in South Korea for COVID-19 screening; and • Geospatial thermometer networks as possibly being useful for identifying anomalously elevated levels of influenza-like illness to help forecast COVID-19 spread and outbreaks in real time. • Given the emergent nature of these findings about the use of symptom lists and temperature tracking (and the lack of evidence about using a recent antibody test result), there's a clear need for a 'living review' on this topic.
International Scan	• The most common forms of symptom screening is through a self-administered questionnaire that is typically completed online through government websites or mobile apps as a self-assessment tool. No lessons could be gleaned from the jurisdictional scan about the relative effectiveness of the different types of screening. • Australia, New Zealand, and the U.K. have all established self-assessments, which are then followed up with directives to self-isolate or seek a diagnostic test. • China has widely implemented temperature screening using hand-held thermometers and calibrated non-contact thermometers in a range of transit hubs (e.g., buses and train terminals), workplaces, and institutions (e.g., childcare facilities, colleges and universities, social housing, among others). In addition, China has established a QR code system based on an online assessment that serves as a regional traffic permit as well as permission to enter public spaces or take public transportation. • Sweden is relying on self-screening by signage.
Canadian Scan	• Many Canadian provinces and territories, including British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick, Nova Scotia, Newfoundland and Labrador,

	Yukon, Northwest Territories, and Nunavut, have established online self-assessments for COVID-19, however, the symptoms included in the assessments vary. • Alberta, Saskatchewan, and the Northwest Territories have implemented temperature screening for particular high-risk groups. • Quebec has established checkpoints to limit travel into and out of select regions whereby access is prohibited for those with symptoms of COVID-19 (as determined through administered questions). • As provinces and territories begin to resume normal activities, many of their plans for 're-opening' rely on self-screening for symptoms through signage, questions administered by employers, and in select cases temperature screening (e.g., British Columbia universities and Saskatchewan personal care homes and personal services).
Ontario Scan	• Ontario is using different tools to screen for COVID-19 symptoms: o The provincial government has created a self-assessment tool which lists varying COVID-19 symptoms. o The Ministry of Labour, Training and Skills Development has developed sector specific guidance and signage, which recommends that employees use the COVID-19 screening checklist and that any worker with symptoms related to cold, flu, or COVID-19 be sent home. o The Infrastructure Health and Safety Association has developed a COVID-19 screening checklist indicating that any workers or visitors accessing a work site should complete.

Methods

The COVID-19 Evidence Synthesis Network is comprised of groups specializing in evidence synthesis and knowledge translation. The group has committed to provide their expertise to provide high-quality, relevant, and timely synthesized research evidence about COVID-19 to inform decision makers as the pandemic continues. The following members of the Network provided evidence synthesis products that were used to develop this Evidence Synthesis Briefing Note:

- Wilson MG, Waddell K, Gauvin FP, Mansilla, C, Moat KA, Wang Q, Lavis JN. 14 May 2020. COVID-19 rapid evidence profile #8: How effective is temperature taking at borders or in general as a screening tool to identify people who may have COVID-19 and need to take appropriate action? Hamilton: McMaster Health Forum.
- Waddell K, Wilson MG, Gauvin FP, Mansilla C, Moat KA, Wang Q, Lavis JN. 14 May 2020. COVID-19 rapid evidence profile #9: What is the incremental benefit of using a history of sudden loss of taste (ageusia) and/or smell (anosmia) in symptom screening to identify people who may have COVID-19 and need to take appropriate action? Hamilton: McMaster Health Forum.
- Wilson MG, Waddell K, Gauvin FP, Mansilla, C, Moat KA, Wang Q, Lavis JN. 15 May 2020. COVID-19 rapid evidence profile #10: What screening approaches can be used in non-healthcare settings (e.g., universities, stores and office settings) to identify people who may have COVID-19 and need to take appropriate action? Hamilton: McMaster Health Forum.

APPENDIX

Table 2: Canadian Provinces' and Territories' Experiences with Screening Approaches for COVID-19 in Non-Healthcare Settings

Province/ Territory	Key Findings

Pan-Canadian	**How to do symptom screening**
	• The government of Canada has put in place enhanced border measures at Canadian airports, land and sea borders this includes completing an ArriveCAN application (which includes screening questions related to symptoms) as well as a self-isolate plan, which is subject to monitoring by either federal or provincial authorities
	  ○ ArriveCAN mobile App includes a self-assessment questionnaire which asks travellers about the following symptoms related to COVID-19: cough; difficulty breathing; and fever.
	  ○ In addition, it asks about where the individual plans to quarantine, whether a vulnerable person will be placed at risk, and whether food and other essential services will deliver to their location

British Columbia	**What to use in screening** • The British Columbia Centre for Disease Control has established a self-assessment app and online tool to help determine whether individuals should seek additional testing, the symptoms in the self-assessment include: severe difficulty breathing (e.g., struggling to breathe or speaking in single words); severe chest pain; inability to lie down because of breathing; having a hard time waking up; feeling confused; loosing consciousness; or have a chronic health condition that the individual is having trouble managing because of illness; and experiencing any cold or flu like symptoms ○ In addition, the self-assessment asks questions related to travel history and living or caring for someone who has a confirmed case of COVID-19 • For vulnerable patients, self-assessment of any of the following symptoms triggers further testing: new respiratory symptoms; gastrointestinal symptoms; headaches; fatigue; chills and muscle aches **How to do symptom screening** • If COVID-19 transmission rates remain low, the province will resume post-secondary institutions for some in-class learning and as a preventative measure will introduce daily screening for all staff and students
Alberta	**What to use in screening** • Alberta Health Services has launched an online self assessment that includes the following symptoms: fever, cough, headache, aches and pains, sore throat, chills, runny nose, loss of sense of taste or smell, and shortness of breath or difficulty breathing ○ In addition, the survey includes questions related to recent travel history outside of Canada and contact history with confirmed cases COVID-19 **How to do symptom screening** • As part of Alberta's relaunch phase one plan they will be putting in place stronger international border controls and airport screening for international travellers (additional details were not provided) • Following the outbreak of COVID-19 at the Cargill meat-packing plant in Alberta, the chief medical officer of health outlined additional safety measures requiring temperature and symptom checks before entering the workplace

Saskatchewan	**What to use in screening**
	• Saskatchewan online self-assessment tool was adapted from that of Alberta and asks about the following symptoms: fever; cough; headache; aches and pains; sore throat; chills; runny nose; loss of sense of taste or smell; and shortness of breath or difficulty breathing
	  ○ In addition, the self-assessment includes questions related to contact with residents in long-term or continuing-care homes; contact with confirmed cases of COVID-19; and travel history within the past 14 days
	How to do symptom screening
	• As part of the Re-Open Saskatchewan plan, visitors to long-term care homes, hospitals, personal care homes and group homes will be required to undergo additional health screening prior to entry (additional details of what this screening is were not available)
	  ○ In addition, as personal services such as hairstylist, registered massage therapist and acupuncturist re-open, clients will be screened as well as asked to wear gloves and face masks

	• Saskatchewan Health Authority has implemented temperature checks for healthcare workers and visitors upon entering the facility using either a no-touch digital thermometer or tympanic thermometer ○ If the temperature registers as over 39 degrees Celcius the individual is not permitted to work and is required to return to home and contact the established health line

Manitoba	**What to use in screening**
	• The provincial government release the Workplace Guidance for Business Owners as part of their broader strategy to re-open the province. The document focuses on using COVID-19 symptoms to screen employees, volunteers or clients and includes: cough; headache; fever/ chills; muscle aches; sore throat/ hoarse voice; shortness of breath/ breathing difficulties; loss of taste or smell; vomiting or diarrhea for more than 24 hours; poor feeding if an infant; runny nose; fatigue; nausea or loss of appetite; conjunctivitis (pink eye); and/or skin rash of unknown cause.
	How to screen/how to support the screening
	• The Workplace Guidance for Business Owners provides the following reccomendations on how to screen:
	  ○ encourage employees and volunteers to use screening information in the provincial self-screening tool before leaving their home to attend work, and emphasize that they must stay home if they are experiencing symptoms of COVID-19 (e.g., cough, fever, runny nose, sore throat, breathing difficulties);
	  ○ post guidance on entrance requirements including screening information, to the facility for all employees, volunteers and patrons;
	  ○ do not allow patrons who are exhibiting symptoms of COVID-19 to enter the premises;
	  ○ employees, volunteers or clients identified as symptomatic should be instructed to call Health Links; and
	  ○ in situations where appointments are required, clients should also be screened by telephone before an appo intment is booked, and again upon arrival.

Ontario	**What to use in screening**
	• The provincial government has created a self-assessment tool which lists the following COVID-19 symptoms: fever (feeling hot to the touch, a temperature of 37.8 degrees Celcius or higher); chills; cough that is new or worsening; barking cough; shortness of breath (out of breath, unable to breathe deeply); sore throat; difficulty swallowing; hoarse voice (more rough or harsh than normal); runny nose (not related to seasonal allergies or other known causes or conditions); lost sense of taste or smell; headache; digestive issues (nausea, vomiting, diarrhea, or stomach pain); extreme tiredness that is unusual (fatigue, lack of energy); falling down often; and or sluggishness or lack of appetite (for young children and infants)
	• The Ministry of Labour, Training and Skills Development has developed sector specific guidance and signage, which recommends that employees use the provincial self-assessment tool and that any worker with symptoms related to cold, flu, or COVID-19 be sent home.
	• The Infrastructure Health and Safety Association has developed a COVID-19 screening checklist indicating that any workers or visitors accessing a work site should complete.
	  ○ The checklist includes four questions:
	  ▪ Have you travelled outside of Canada in the last 14 days?
	  ▪ Are you experiencing any symptoms of COVID-19 (e.g., shortness of breath, cough, sore throat, or fever)?
	  ▪ Have you been in close contact with a person showing symptoms or tested positive for COVID-19?
	  ▪ Have you been in close contact with a person with acute respiratory illness who has been outside of Canada in the last 14 days?

Quebec	**What to use in screening**
	• The provincial government has launched a website to inform the public during the COVID-19 pandemic, including details about the main symptoms which can be mild (similar to a cold) or more severe (such as those associated with pneumonia and respiratory or kidney failure):
	  ○ fever;
	  ▪ in children: 38°C (100.4°F) and above (rectal temperature),
	  ▪ in adults: 38°C (100.4°F) and above (oral temperature),
	  ▪ in older adults: 37.8°C (100°F) and above (oral temperature),
	  ▪ or 1.1°C above the person's usual value;
	  ○ new or worse cough;

	○ difficulty breathing; or ○ sudden loss of smell without a stuffy nose, with or without loss of taste • With the reopening of economic activities, along with preschool, elementary schools and childcare services, the Commission des normes, de l'équité, de la santé et de la sécurité du travail have released a workplace sanitary standards guide, along with additional tools for specific sectors (e.g., posters for manufacturing, retail, construction mining industry, childcare, schools, and public transportation sectors describing symptoms and key prevention measures). These tools remind employees to notify their employer if they feel symptoms compatible with COVID-19 (fever or cough, difficulty breathing or sudden loss of smell and taste, other symptoms that could be added on the provincial website listed above) before reporting to work. The same goes for parents and students who most notify their professors of any symptoms before reporting to school. **How to screen / how to support the screening** • In order to protect the most vulnerable populations (and regions that had low prevalence of COVID-19), checkpoints have been established to limit travel into and out of certain regions. Access is blocked for anyone with symptoms of COVID-19 as described by the provincial government website. Since 4 May 2020, many of these checkpoints have been lifted. • The Commission des normes, de l'équité, de la santé et de la sécurité du travail proposed several methods to screen for COVID-19 in its workplace sanitary standards guide: ○ self-screening of symptoms before reporting to work/school; ○ self-screening of symptoms prompted by (passive) signage in the workplace (posters are proposed); ○ self-screening of symptoms using a questionnaire before entering the workplace (although no such questionnaire is proposed); and ○ screening of symptoms using a questionnaire administered by employers before entering the workplace (although no such questionnaire is proposed).
New Brunswick	**What to use in screening** • To determine who should be tested in the province, individuals advised to seek help immediately if they are in respiratory distress (e.g., severe trouble breathing) with instructions to call an information line for any two of the following symptoms: fever, new cough or worsening cough, sore throat, runny nose, headache, new onset of fatigue, muscle pain, diarrhea, loss of sense of smell or taste, small and purple markings on fingers and toes in children. Special provisions for essential workers (including healthcare staff, long-haul truckers) who can be tested on demand if they want. • As part of reopening plan, additional screening recommendations include: ○ screening fellow passengers for symptoms when carpooling with co-workers or neighbours outside of their two-house bubble ○ screening drivers travelling through the province **How to screen/how to support the screening** • Online self-assessment survey, with telehealth support to triage individuals for testing, scheduled pre-surgical screening appointments (which include mandatory testing) for elective/non-urgent surgeries, and questionnaires administered by border patrol/peace officers to those entering the province through air or land
Nova Scotia	**What to use in screening** • Province instructs individuals to call an information line for any two of the following symptoms: fever, new cough or worsening cough, sore throat, runny nose, headache **How to screen/how to support the screening** • Self-assessment information provided online and telehealth support to triage individuals for testing
Prince Edward Island	**What to use in screening** • Province instructs the general public to call their family physician or nurse practitioner if any of the following symptoms develop: new onset fever, new or worsening cough, sort throat, runny nose, sneezing, congestion or unusual fatigue, or if in close contact with laboratory-confirmed case, and recommends testing for hospitalized individuals, healthcare workers, long-term and community care residents and staff if they have any of the systems, and testing for inter-facility transfer patients, temporary foreign workers and essential workers (e.g., long-haul truck drivers) regardless of symptoms **How to screen/how to support the screening** • Self-assessment information provided online, and telehealth support (including from primary-care providers) to triage individuals for testing

Newfoundland and Labrador	**What to use in screening** • To determine who should be tested in the province, individuals advised to seek help immediately if they are in respiratory distress (e.g., severe trouble breathing, chest pain) or have other symptoms such as hard time waking up, confusion, lost consciousness, with instructions to call an information line for any two of the following symptoms: fever, cough, headache, sore throat, painful swallowing, runny nose, unexplained loss of appetite, diarrhea, loss of sense of smell or taste, or small red or purple markings on hands and/or feet. Exposure to someone who has been confirmed or who has travelled and travel outside of the province is also considered. **How to screen/how to support the screening** • Online self-assessment survey and telehealth support to triage individuals for testing
Yukon	**What to use in screening** • Government of the Yukon has established an online self-assessment for COVID-19 which includes questions related to the following symptoms: severe difficulty breathing; severe chest pain; having a hard time waking up; feeling confused; lost consciousness; shortness of breath at rest; inability to lie down because of difficulty breathing; chronic health conditions that are difficult to manage because of difficulty breathing; fever; chills; sore throat or hoarse voice; headache; runny nose or nasal congestion; gastrointestinal symptoms such as vomiting or diarrhea; fatigue or muscle aches; or loss of sense of taste and/or smell ○ In addition, the self-assessment asks about: contact history including providing care to someone who has been diagnosed with COVID-19; and recent travel history outside of the Yukon **How to do symptom screening** • When entering into the Yukon, individuals will be asked by a government official to confirm that they have not had any symptoms consistent with COVID-19 (see list above)
Northwest Territories	**What to use in screening** • Government of Northwest Territories has established an online self-assessment for COVID-19 which includes the following symptoms: difficulty breathing; chest pain; having a very hard time waking up; fainted or lost consciousness; difficulty managing your daily life because of breathing difficulties; fever; new or worsening cough; shortness of breath; tiredness; generally feeling unwell; sore throat; muscle aches; runny nose; headache; vomiting; diarrhea; loss of sense of smell/taste; and loss of appetite ○ In addition, the assessment asks about recent travel history both internationally and within Canada; contact history with someone who has or is being investigated for COVID-19; lab exposure to biological material; attended a mass gathering; living or working in a facility experiencing a COVID-19 outbreak **How to do symptom screening** • Oil and gas workers before returning to their workplace are required to complete a workplace risk assessment form as well as complete a health screening that includes a temperature check and COVID-19 symptom inquiry ○ In addition, a daily symptom inquiry is administered prior to the start of each shift
Nunavut	**What to use in screening** • Government of Nunavut has established an online self-assessment for COVID-19 which asks individuals whether they have experienced any of the following symptoms: severe difficulty breathing; severe chest pain; having a hard time waking up; feeling confused; and losing consciousness; mild to moderate shortness of breath at rest; inability to lie down because of difficulty breathing; chronic health conditions that are difficult to manage because of difficulty breathing; fever; new onset or worsening cough; sneezing; sore throat ○ In addition, the assessment asks: about recent travel history both internationally and within Canada; care providing for an individual who is being testing for COVID-19 or has been diagnosed; and contact with a person who has travelled outside Nunavut and has become sick

Table 3: International Experiences with Screening Approaches for COVID-19 in Non-Healthcare Settings

Country	Key Findings
Australia	**What to use in screening** • The Australian government has established a COVID-19 app to be able to inform individuals when they have been identified as someone who may have been in contact with a confirmed COVID-19 case. • The app lists a series of symptoms to look for, namely: headache; muscle pains; runny nose; nausea; vomiting or diarrhoea; loss of smell; altered sense of taste; and a loss of appetite **How to do the symptom screening** • In addition to establishing the app, the Australian government has also created an online screening test which uses a questionnaire listing similar symptoms to the app in addition to asking about information related to gender, age and location • Australia's borders are currently closed, but citizens, residents and immediate family members can travel to Australia and may undergo enhanced health screening on arrival which may include questions related to symptoms (same as listed above). • The Aged Care Quality and Safety Commission's Chief Clinical Advisor has mandated that routine screening questions related to COVID-19 symptoms and temperature checks are applied to staff and visitors for all residential aged care facilities
China	**What to use in screening** • Temperature-monitoring equipment (hand-held thermometers or calibrated non-contact temperature monitoring equipment) is setup in China to take the temperature of people entering the settings in the list below, and only those with normal temperature are allowed to enter. Railway and road passenger transport at urban rail transit stations also require temperature to be lower than 37.3℃ to enter. The settings with temperature-monitoring requirements include: ○ office buildings; ○ hotels (at the entrance of lobby); ○ shopping malls (at the mall entrance); ○ banks (at the bank entrance); ○ restaurants (at the restaurant entrance); ○ barber shops (at the shop entrance); ○ agri-product market (at the market entrance); ○ parks (at the park entrance); ○ medical institutions; ○ railway passenger transport (at the rail station entrance); ○ road passenger transport (at passenger bus stations); ○ waterway passenger transport (at ferry terminals); ○ civil Aviation (taking temperature of all passengers entering or leaving the airport; taking temperature on board based on different flight risk levels and the needs of epidemic prevention and control); ○ urban rail transits (at urban rail transit stations); ○ enterprises (for external personnel, at registry); ○ government departments and public institutions (for staff and external personnel, at the entrance of the unit); ○ childcare institutions (for staff, nursery governess, children and visitors, at the entrance); ○ primary and secondary schools (for teaching staff, students and external personnel, at the entrance); ○ colleges and universities (for teaching staff, students and external personnel, at the entrance); ○ pension facilities; ○ welfare house (for working staff, nursing staff and external personnel, at the entrance); ○ prison (closed-off management); ○ mental health medical institution (for staff and external personnel, at the entrance); ○ medical waste disposal centres; and ○ property management centres. • Temperature monitoring equipment (hand-held thermometer or calibrated non-contact temperature monitoring equipment) is required for some public transportation along with emergency areas setup to temporarily quarantine passengers with symptoms such as fever and cough. This is required for: ○ trains (hand-held thermometer); ○ regular buses above Class-III and chartered buses (hand-held thermometer);

Country	Key Findings
	○ ships (hand-held thermometer); and ○ terminal buildings (calibrated non-contact temperature monitoring equipment). • Before resuming work in the following industries, non-contact thermometers and other anti-epidemic supplies (e.g. masks, liquid hand soap, disinfectants) need to be reserved, and emergency areas to be set up to temporarily quarantine those with suspicious symptoms: ○ enterprises (in low-, medium- and high-risk areas); ○ construction industry (in low-, medium- and high-risk areas); ○ postal and express delivery industry (in low-, medium- and high-risk areas); ○ government departments and public institutions (in low-, medium- and high-risk areas); ○ childcare institutions; ○ primary and secondary schools; ○ pension facilities (in medium- and high-risk areas); ○ welfare houses (in low-, medium- and high-risk areas); ○ prisons (in low-, medium- and high-risk areas, and if there is a confirmed case of COVID-19 in a prison, symptom screening is conducted for all prisoners and police officers as soon as possible); and ○ property management centres (in low-, medium- and high-risk areas). • The following settings are required to establish an employee health monitoring system, record the employees' health status every day, and those who feel unwell should seek medical treatment in time: ○ office building; ○ hotels; ○ shopping malls; ○ banks; ○ restaurants; ○ barber shops; ○ agri-product markets; ○ parks; ○ railway passenger transport; ○ road passenger transport; ○ waterway passenger transport; ○ civil aviation; ○ urban buses and trams; ○ urban rail transits; ○ community staff; ○ enterprises (in low-, medium- and high-risk areas); ○ construction industry (in low-, medium- and high-risk areas); ○ postal and express delivery industry (including postman, courier, transport vehicle drivers and stevedores; in low-, medium- and high-risk areas); ○ government departments and public institutions (in low-, medium- and high-risk areas); ○ childcare institutions (including staff, nursery governess and children and with the requirement to examine children's health status in the morning and at noon, and implement "daily report" and "zero report" systems); ○ primary and secondary schools (including teaching staff and students and with the requirement to examine health status in the morning and at noon, and implement "daily report" and "zero report" systems); ○ colleges and universities (including teaching staff and students); ○ pension facilities (including the elderly and staff); ○ welfare houses (in medium- and high-risk areas); ○ prisons (including prison police officers, working staff and prisoners in medium- and high-risk areas); ○ mental health medical institution; ○ medical waste disposal center (in low-, medium- and high-risk areas); and ○ property management center (in low-, medium- and high-risk areas); • Preventing imported cases has become the focus of epidemic control and prevention in China. ○ The focus of epidemic control and prevention was constantly adjusted to preventing imported cases and domestic re-infections in China. A joint-work mechanism comprising different departments such as civil aviation, customs, public security, health, foreign affairs, border inspection and airports was established to prevent transmission of the virus at the point of first entry. With an increasing number of asymptomatic cases, it was decided to place all such

Country	Key Findings
	cases under medical observation for 14 days at designated sites, and allow them to be discharged only after the two consecutive negative nucleic acid tests. **How to screen / how to support the screening** • Health QR codes have been developed and are being used to help local authorities and enterprises monitor an epidemic situation in real time and serve as permits for residents travelling or accessing public venues. ○ The code serves as a regional "traffic permit" to ensure orderly population flow during the COVID-19 outbreak. People need to report their travel history and health conditions online in advance, and they will are assigned green, yellow or red codes based on the information they provide. ○ The green code is for people with little chance of having been infected, while residents assigned a yellow and red code are required to be quarantined for a few days and report their health information daily before they are cleared for travel again. ○ People who want to enter public spaces or take public transport vehicles are required to show their green health codes (e.g., at the entrances to residential communities, companies and other public places in some cities). Those who do not have smartphones, especially the elderly and children, can pass with valid paper documents. ○ All inbound passengers must report their health condition before entering China and may use a built-in WeChat program or a mobile phone application developed by China Customs to complete the health condition report, resulting in a two-dimensional code for presenting to pass through customs. ○ Big data is also being used to implement the health code and promptly share information such as nucleic acid and blood antibody test results
New Zealand	**What to use in screening** • The list of symptoms provided by the government for self-screening to contact an established hotline or an individual's doctor, and these include: a cough, a high temperature of at least 38 degrees Celsius, shortness of breath, sore throat, sneezing and runny nose, and temporary loss of smell **How to do the symptom screening** • Every traveller entering New Zealand is screened for COVID-19 on arrival where they will be met by government officials at the gate where: 1) if they are symptomatic will be tested and placed in a quarantine facility for 14 days; and 2) if not symptomatic they will be placed in an approved managed isolation facility for 14 days ○ At the end of the 14 days, a final health check is carried out which includes examining temperature to ensure it is below 38 degrees Celsius, and confirming a non-positive test for COVID-19, no symptoms of COVID-19 are present, and that a suitable travel plan is in place.
South Korea	**What to use in screening** • All inbound passengers to South Korea are required to pass through infrared cameras and then have their temperatures taken using electronic thermometers, if they show symptoms of a fever they are required to be tested for COVID-19 **How do to symptom screening** • All health workers in senior care facilities are excused from work for 14 days if they self screen and determine they have a fever, cough or other respiratory symptoms. • Drive-through screening clinics have been established which allow for individuals to open a window, while remaining in their car and undergo an examination for travel history and symptoms including a temperature check, which is then used by medical professionals to decide whether to collect samples for testing.
Sweden	**What to use in screening** • Symptoms listed by the Public Health Agency of Sweden that may be associated with COVID-19, include: cough, fever, difficulty breathing, runny nose, blocked nose, sore throat, headache, nausea, muscle and joint pain, loss of smell, loss of taste, and diarrhea **How to do symptom screening** • Temperature checks have not been implemented at borders in Sweden
U.K.	**What to use in screening** • Symptoms listed by the NHS as part of their mobile app and online website that may be associated with COVID-19 include having a high temperature (assessed by the individual as feeling hot to touch on the chest or back) or a new, continuous cough (meaning coughing for more than an hour or three or more coughing episodes in 24 hours) **How to do symptom screening** • The NHS has been screening symptomatic healthcare workers using an initial symptom screen that asks about a continuous cough or fever, at which point if the answer to either is yes, they are taken to a designated screening pod which is staffed by a trained nurse to get nose and throat swabs to test for COVID-19 • U.K. borders remain closed and as a result temperature checks have not been implemented

Table 4: Overview of Key Findings from Highly Relevant Evidence Documents about Screening Approaches for COVID-19 in Healthcare Settings

Screening Options		Key Findings From Highly Relevant Evidence Documents
What to use in screening	Symptoms (such as fever, cough, shortness of breath / difficulty breathing, headache, runny nose, sore throat, sudden loss of taste and/or smell)	**Guidelines developed using a robust process (e.g., GRADE)** • The most common presenting symptoms of COVID-19 were cough (86%), fever or chills (85%), and shortness of breath (80%), diarrhea (27%), and nausea (24%), but other reported symptoms have included anosmia. (National Institutes of Health; last updated 12 May 2020) • Institutions of Higher Education recommend that student health services should update screening forms with a more detailed list of symptoms (e.g., chills, repeated shaking with chills, muscle pain, headache, sore throat, anosmia, dysgeusia, and any other COVID-19 symptoms), screen all patients and staff for respiratory symptoms and check temperature (ideally with infrared or laser devices) before entering the clinic, and consider implementing pre-participation screening and evaluation of student athletes (American College Health Association; last updated 7 May) • The symptoms of COVID-19 vary, but may include ageusia and anosmia (American College of Occupational and Environmental Medicine; last updated 24 April 2020) • Employees conducting inspections in food businesses need to be aware of and recognize the symptoms of COVID-19, so that they can self-report and exclude themselves from work (WHO technical guidance; last updated 22 April 2020) • Employees working in the food sector need to be aware of the symptoms of COVID-19 and refer to written guidance by their employers on reporting such symptoms and on exclusion from work policies (World Health Organization and Food and Agriculture Organization of the United Nations; last updated 7 April 2020) • The typical symptoms for patients with COVID-19 are cough, fever and fatigue, but they may also have breathlessness, muscle aches, sore throat, headache and loss of sense of smell (anosmia). (National Institute for Health and Care Excellence; last updated 3 April 2020) • Ill travellers may be screened through self-reporting, visual observation, or temperature measurement (WHO technical guidance; last updated 19 March 2020) • Upon admission to prisons and other places of detention, all individuals should be screened for fever and lower respiratory tract symptoms, and any other symptoms compatible with COVID-19 using self-reporting questionnaires (WHO Regional Office for Europe; last updated 15 March 2020) **Full systematic reviews** • Presenting symptoms varied widely but, in combination, anosmia, fever, fatigue, persistent cough, diarrhoea, abdominal pain and loss of appetite have a reasonable specificity for COVID-19 diagnosis, but the symptoms can have rapid cessation or late onset and some people will also be asymptomatic (AMSTAR rating 1/9; last updated 1 April 2020) **Rapid reviews** • In mild and moderate cases, cough was present in less than half of cases, fever was the most frequent reported symptom, and other reported symptoms included dyspnea, headache, diarrhoea, sore throat, fatigue and rhinorrhea (AMSTAR rating 5/9; last updated 1 April 2020) • Limited evidence suggests changes in olfactory sensation is a feature of COVID-19 and clinicians are encouraged to incorporate questions around loss of olfactory sensation into their clinical practice when assessing patients with suspected COVID-19 (AMSTAR rating 3/9; last updated 23 March 2020)

Screening Options		Key Findings From Highly Relevant Evidence Documents
		• Anosmia has been reported in suspected or confirmed COVID-19 patients around the world, and (despite the limited research evidence) some public-health authorities recommend adding it to the list of COVID-19 symptoms (AMSTAR rating 3/9; last updated 31 March 2020) **Guidelines developed using some type of evidence synthesis and/or expert opinion** • An up-to-date tracker provides signs and symptoms for severe and non-severe COVID-19 signs and symptoms (Centre for Evidence-Based Medicine; last update 29 March 2020) **Primary studies with additional important insights** • The three best predictors of COVID-19 infection are loss of smell, skipped meals and fatigue, with cough being common but often present in people who do not have COVID-19 (published 11 May 2020)
	Signs (temperature)	**Guidelines developed using a robust process (e.g., GRADE)** • Ill travellers may be screened through self-reporting, visual observation, or temperature measurement (WHO technical guidance; last updated 19 March 2020) **Rapid reviews** • Temperature screening programs using infrared temperature screening devices with or without questionnaires for mass screening of those entering health facilities is ineffective for detecting infected persons due to environmental temperatures, false answers, and the use of fever reducing drug (AMSTAR rating 3/10; last updated 20 April 2020) • While asymptomatic subjects have similar viral loads than symptomatic patients, thermal infrared screening seems to lack sensitivity to detect COVID-19 cases when used in community settings (AMSTAR rating 2/10; last updated 9 April)
	Tests (positive anti-body test)	**Primary studies with additional important insights** • Antibody-based rapid tests should not be relied upon for SARS-CoV-2 screening in community settings (published 18 April 2020)
How to screen / how to support the screening	How to do the symptom screening (such as self screening prompted by (passive) signage, self screening using a questionnaire and screening using a questionnaire administered by another person)	**Guidelines developed using a robust process (e.g., GRADE)** • Institutions of Higher Education recommend that student health services should update screening forms with a more detailed list of symptoms (e.g., chills, repeated shaking with chills, muscle pain, headache, sore throat, anosmia, dysgeusia, and any other COVID-19 symptoms), screen all patients and staff for respiratory symptoms and check temperature (ideally with infrared or laser devices) before entering the clinic, and consider implementing pre-participation screening and evaluation of student athletes (American College Health Association; last updated 7 May) • Employees conducting inspections in food businesses need to be aware of and recognize the symptoms of COVID-19, so that they can self-report and exclude themselves from work (WHO technical guidance; last updated 22 April 2020) • Ill travellers may be screened through self-reporting, visual observation, or temperature measurement (WHO technical guidance; last updated 19 March 2020) • Upon admission to prisons and other places of detention, all individuals should be screened for fever and lower respiratory tract symptoms, and any other symptoms compatible with COVID-19 using self-reporting questionnaires (WHO Regional Office for Europe; last updated 15 March 2020) • Parents should recognize the symptoms of COVID-19 (e.g., coughing, fever, shortness of breath) in their child and keep them home from school and notify the school of their absence and symptoms (UNICEF, WHO and IFRC; last updated March 2020)

Screening Options		Key Findings From Highly Relevant Evidence Documents
		• Temperature screening programs using infrared temperature screening devices with or without questionnaires for mass screening of those entering health facilities is ineffective for detecting infected persons due to environmental temperatures, false answers, and the use of fever reducing drug (AMSTAR rating 3/10; last updated 20 April 2020) **Primary studies with additional important insights** • A walk-through (WT) screening center using negative pressure booths has been designed and implemented in South Korea for COVID-19 screening and has been found to increase patient access to the screening clinics, adequately protect healthcare personnel, reduce consumption of personal protective equipment, increase the number of people tested by 9–10 fold, but increase risk of cross-infection at each stage of screening which can be overcome using mobile technology and increasing the number of booths to reduce congestion inside the center, reducing booth volume for sufficient and rapid ventilation, and using an effective, harmless, and certified environmental disinfectant (published 9 April 2020)
	How to do temperature checking	**Guidelines developed using a robust process (e.g., GRADE)** • Institutions of Higher Education recommend that student health services should update screening forms with a more detailed list of symptoms (e.g., chills, repeated shaking with chills, muscle pain, headache, sore throat, anosmia, dysgeusia, and any other COVID-19 symptoms), screen all patients and staff for respiratory symptoms and check temperature (ideally with infrared or laser devices) before entering the clinic, and consider implementing pre-participation screening and evaluation of student athletes (American College Health Association; last updated 7 May) • Ill travellers may be screened through self-reporting, visual observation, or temperature measurement (WHO technical guidance; last updated 19 March 2020) **Rapid reviews** • Temperature screening programs using infrared temperature screening devices with or without questionnaires for mass screening of those entering health facilities is ineffective for detecting infected persons due to environmental temperatures, false answers, and the use of fever reducing drug (AMSTAR rating 3/10; last updated 20 April 2020) • While asymptomatic subjects have similar viral loads than symptomatic patients, thermal infrared screening seems to lack sensitivity to detect COVID-19 cases when used in community settings (AMSTAR rating 2/10; last updated 9 April 2020) **Guidelines developed using some type of evidence synthesis and/or expert opinion** • Evidence shows that non-contact infrared temperature screening is ineffective to detect COVID-19 for travellers (CADTH; published on 6 May 2020) **Primary studies with additional important insights** • Geospatial thermometer networks may be useful for identifying anomalously elevated levels of influenza-like illness to help forecast COVID-19 spread and outbreaks in real time (posted 10 April 2020 (pre-print))
	Digital approaches for screening or supporting screening	No highly relevant documents identified