

EVIDENCE SYNTHESIS BRIEFING NOTE

TOPIC: INCREMENTAL BENEFIT OF USING A HISTORY OF SUDDEN LOSS OF TASTE (AGEUSIA) AND/OR SMELL (ANOSMIA) IN SYMPTOM SCREENING FOR COVID-19

Information finalized as of May 14, 2020.^a Last updated on May 28, 2020.^b

Purpose: This note provides a summary of scientific evidence and jurisdictional experiences on the incremental benefit of using a history of sudden loss of taste (ageusia) and/or smell (anosmia) in symptom screening to help identify people who may have COVID-19 and need to take appropriate action.

Key Findings:

- Most of the identified evidence identifies loss of taste and/or smell as a strong predictor of COVID-19 and speaks to the value of including them, alongside other symptoms, in screening tools. No evidence was identified that directly addresses the incremental benefit of screening for sudden loss of taste and/or smell and how best to operationalize this symptom with other types of symptom screening (e.g., by self screening prompted by signage or using a questionnaire).
- Many Canadian provinces, Australia, New Zealand, Sweden, and UK have included ageusia/anosmia in COVID-19 screening symptoms.
- Using a list of COVID-19-related symptoms as a screening tool can be used:
 - For those at high risk for COVID-19 (e.g., travellers passing through air, land, and sea borders) and for the entire population (e.g., on entering schools, stores, and workplaces);
 - Alongside other potential screening tools (e.g., temperature taking); and
 - For operationalization 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 with an elevated temperature 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: Symptom screening to date in Ontario initially focused on six symptoms, namely fever, cough, shortness of breath and/or difficulty breathing, headache, runny nose, and sore throat. The Ontario government's self-assessment tool, like the one used by the Government of Canada, now includes a much longer list of symptoms.

^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.

^b This briefing note has been updated based on a new research published on May 27, 2020: Carignan, A., Valiquette, L., Grenier, C., Musonera, J. B., Nkengurutse, D., Marcil-Héguy, A., et al. (May 27, 2020). [Anosmia and dysgeusia associated with SARS-CoV-2 infection: an age-matched case-control study](#). *Canadian Medical Association Journal*. The briefing note was also updated on May 19, 2020 with new information from the UK: Department of Health and Social Care, Government of United Kingdom. (May 18, 2020). [Statement from the UK Chief Medical Officers on an update to coronavirus symptoms: 18 May 2020](#).

Supporting Evidence

[Table 1](#) below summarizes scientific evidence and international/Canadian jurisdictional experiences on the incremental benefit of using a history of sudden loss of taste (ageusia) and/or smell (anosmia) in symptom screening to help identify people who may have COVID-19 and need to take appropriate action. Additional details are provided in [Table 2](#) (for experiences from Canadian provinces and territories), [Table 3](#) (for experiences from other countries), and [Table 4](#) (for abstracts for highly relevant documents) in the Appendix.^c

Table 1: Lessons Learned from Evidence Documents and International/Canadian Experiences about Including Sudden Loss of Taste and/or Smell in Symptom Screening for COVID-19

<i>Scientific Evidence</i>	<ul style="list-style-type: none"> • Identified evidence consistently identifies loss of taste and/or smell as a strong predictor of COVID-19. <ul style="list-style-type: none"> ○ For example, one recent Canadian study found that patients who test positive for SARS-CoV-2 infection are much more likely to have impaired taste and smell than those who test negative for the infection.^d • None of the evidence documents directly address the incremental benefit of screening for sudden loss of taste and/or smell, but many speak to the value of including it alongside other symptoms. • None of the evidence documents directly address how best to operationalize this or other types of symptom screening (e.g., by self screening prompted by signage or using a questionnaire).
<i>International Scan</i>	<ul style="list-style-type: none"> • Loss of smell and taste is variably included in the self-assessments and other symptom lists across the countries that were examined: <ul style="list-style-type: none"> ○ China, a country that was hit earlier by the effects of COVID-19, has not included ageusia/anosmia as a screening symptom. ○ Countries that continue to develop their responses to the pandemic (i.e., Australia, New Zealand, and Sweden) have adapted screening tools to include this symptom. ○ On May 18, 2020, the UK issued an updated statement on COVID-19 symptoms, advising that all individuals should self-isolate if they develop a new continuous cough, or fever, or anosmia.^e ○ No information could be found about South Korea's inclusion loss of taste and smell in their list of screening symptoms.
<i>Canadian Scan</i>	<ul style="list-style-type: none"> • The Government of Canada's self-assessment tool does not include symptoms related to ageusia/anosmia. • In Canadian provinces and territories, there appears to be significant variation in the inclusion of ageusia/anosmia as a symptom in provincial symptom lists:

^c Six countries were examined: Australia, China, New Zealand, South Korea, Sweden, and the United Kingdom.

^d Carignan, A., Valiquette, L., Grenier, C., Musonera, J. B., Nkengurutse, D., Marcil-Héguy, A., et al. (May 27, 2020). [Anosmia and dysgeusia associated with SARS-CoV-2 infection: an age-matched case-control study](#). *Canadian Medical Association Journal*.

^e Department of Health and Social Care, Government of United Kingdom. (May 18, 2020). [Statement from the UK Chief Medical Officers on an update to coronavirus symptoms: 18 May 2020](#).

	<ul style="list-style-type: none"> ○ Many jurisdictions (Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland and Labrador, Yukon, and Northwest Territories) have included ageusia/anosmia as a prioritized symptom as part of their-self assessment or symptom-screening questionnaires. ○ Other jurisdictions (e.g., British Columbia, Nova Scotia, Prince Edward Island, and Nunavut) have not included these symptoms.
<i>Ontario Scan</i>	<ul style="list-style-type: none"> ● The Ontario government's COVID-19 self-assessment tool includes loss of taste or smell.

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 member of the Network provided an evidence synthesis product that was used to develop this Evidence Synthesis Briefing Note:

- Waddell K, Wilson MG, Gauvin FP, Mansilla C, Moat KA, Wang Q, Lavis JN. [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, 14 May 2020.

APPENDIX

Table 2: Canadian Provinces’ and Territories’ Experiences with Including Sudden Loss of Taste and/or Smell in Symptom Screening for COVID-19

Province/ Territory	Key Features of Implemented Strategies
Pan-Canadian	<ul style="list-style-type: none"> The Government of Canada self-assessment tool does not include symptoms related to ageusia/anosmia
B.C.	<ul style="list-style-type: none"> The British Columbia Centre for Disease Control self-assessment tool does not include ageusia/anosmia as a potential symptom
Alberta	<ul style="list-style-type: none"> Alberta Health Services’ online self assessment includes loss of taste, loss of smell, and unexplained loss of appetite
Saskatchewan	<ul style="list-style-type: none"> Saskatchewan Health Authority’s online self-assessment tool was adapted from that of Alberta and prioritizes 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
Manitoba	<ul style="list-style-type: none"> The Manitoba government’s workplace guidance for business owners includes loss of taste or smell in their list of symptoms to use in screening employees, volunteers or clients
Ontario	<ul style="list-style-type: none"> The Ontario government’s self-assessment tool includes loss of taste or smell
Quebec	<ul style="list-style-type: none"> The Quebec government’s website lists the main symptoms of COVID-19, which it notes can be mild (similar to a cold) or more severe and include sudden loss of smell without a stuffy nose, with or without loss of taste
New Brunswick	<ul style="list-style-type: none"> The government’s online self-assessment survey includes loss of sense of smell or taste as a symptom to be used in determining who should be tested in the province
Nova Scotia	<ul style="list-style-type: none"> The province’s screening questions for symptoms does not currently include ageusia/anosmia as a prioritized symptom
Prince Edward Island	<ul style="list-style-type: none"> The province’s screening questions for symptoms does not currently include ageusia/anosmia as a prioritized symptom
Newfoundland and Labrador	<ul style="list-style-type: none"> The province’s online self-assessment survey includes a loss of sense of taste and or smells as a screening symptom
Yukon	<ul style="list-style-type: none"> The territorial government’s online self-assessment includes loss of taste and/or smell as a screening symptom
Northwest Territories	<ul style="list-style-type: none"> The territorial government’s online self-assessment includes loss of sense of taste and/or smell as well as loss of appetite
Nunavut	<ul style="list-style-type: none"> The territorial government has not included ageusia/anosmia in their self-assessment tools

Table 3: International Experiences with Including Sudden Loss of Taste and/or Smell in Symptom Screening for COVID-19

Country	Key Features of Implemented Strategies
Australia	<ul style="list-style-type: none"> • 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
China	<ul style="list-style-type: none"> • Symptoms related to ageusia/anosmia have not been included in screening questionnaires or in health declaration cards
New Zealand	<ul style="list-style-type: none"> • 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
South Korea	<ul style="list-style-type: none"> • No information could be located about what symptoms are being prioritized in screening
Sweden	<ul style="list-style-type: none"> • 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
UK	<ul style="list-style-type: none"> • On May 18, 2020, the UK Chief Medical Officers issued an updated statement on COVID-19 symptoms. The statement advised that all individuals should self-isolate if they develop a new continuous cough, or fever, or anosmia. The Chief Medical Officers indicated that after close monitoring of the emerging data and evidence on COVID-19 and, after thorough consideration, they are now confident enough to recommend this new measure. According to this statement, anosmia is the loss of or a change in normal sense of smell. It can also affect sense of taste as the two are closely linked.^f

^f Department of Health and Social Care, Government of United Kingdom. (May 18, 2020). [Statement from the UK Chief Medical Officers on an update to coronavirus symptoms: 18 May 2020](#).

Table 4: Abstracts for Highly Relevant Documents

Type of Document	Abstract and Link to Full Text
Full systematic reviews	<p>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</p> <p>Key messages</p> <ul style="list-style-type: none"> • Cough was observed in less than half of the mild cases in the largest included study and in two thirds of cases in a systematic review, suggesting it is unreliable as a key diagnostic symptom. • Fever (< 39.1 °C) was the most frequent symptom for mild and moderate cases of COVID-19, though a recent UK study suggests anosmia may be a stronger predictor of COVID-19 than self-reported fever amongst people in the community. • Overall, we found scarce and inconclusive evidence on symptoms that easily distinguish mild and moderate cases of COVID-19 from severe cases. • The majority of available evidence was from hospitalised patients. Mild and moderate cases were usually defined as those without pneumonia, acute respiratory distress syndrome (ARDS) or Intensive Care Unit (ICU) admission. Applicability to community cohorts is therefore uncertain. <p>Other reported symptoms include dyspnea, headache, diarrhoea, sore throat, fatigue and rhinorrhea.</p> <p>Anosmia is indicative of COVID-19 infection and should be carefully monitored among healthcare workers</p> <p>Abstract</p> <p>Background: Healthcare workers are at the forefront of the ongoing COVID-19 pandemic and are at high risk for both the contraction and subsequent spread of virus. Understanding the role of anosmia as an early symptom of infection may improve monitoring and management of SARS-CoV2 infection.</p> <p>Methodology: We conducted a systematic review of the literature of SARS-CoV2 infection/COVID-19 and anosmia to help inform management of anosmia in healthcare works. We report a case series of healthcare workers, who presented with a loss of sense of smell secondary to COVID-19 infection to demonstrate management principles. RT-PCR was used to confirm COVID-19 positivity and psychophysical testing of olfaction was performed using the British version of the University of Pennsylvania Smell Identification Test, UPSIT.</p> <p>Results: The systematic literature search returned 31 articles eligible for inclusion in the study and informed our recommendations for clinical assessment and management. All three healthcare professionals who presented with loss of sense of smell subsequently tested positive for SARS-CoV-2. Psychophysical testing of olfaction using the UPSIT confirmed mild and moderate microsmia in two, respectively, and normosmia at day 17 in one.</p> <p>Conclusions: Olfactory (± gustatory) dysfunction is indicative of COVID-19 infection and thus has important implications in the context of healthcare workers, or key workers in general, who work in close contact with others if not recognised as suffering from COVID. This leads to a potentially higher likelihood of spreading the virus. In conjunction with our literature review these findings have helped with creating recommendations on the assessment and management of olfactory dysfunction during the ongoing COVID-19 pandemic, both for healthcare workers and patients.</p>
Rapid reviews	<p>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</p> <p>Based on the information available at the time of writing, despite the uncertainty existing in this documentation and in the review process used, it appears that:</p> <ul style="list-style-type: none"> • Several sources of information report a significant number of clinical pictures of anosmia in suspected or confirmed COVID-19 patients around the world; In the case of an infection with the new coronavirus, the loss of smell would occur suddenly without nasal obstruction, and sometimes accompanied by a disappearance of the taste (ageusia) • The onset of this symptom would generally be seen in young patients with "mild" forms of COVID-19 disease

	<ul style="list-style-type: none"> • Loss of smell could occur in isolation without inflammation and without being associated with commonly recognized symptoms of fever and cough; • Although this evidence is not yet supported by scientific studies, some French, British and American associations call on the authorities to advise anyone with a loss of smell or taste to isolate themselves and confine themselves as a precaution. Some even recommend adding this symptom to the list of recognized criteria for screening for possible COVID-19 infection • Contrary to what is done in the case of a classic anosmia, French companies recommend not to administer corticosteroid therapy and to refrain from performing nasal washes. <p>[McMaster Health Forum translation]</p> <p>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</p> <p>Key messages The current evidence base to suggest changes in olfactory sensation is a feature of COVID-19 is limited and inconclusive. More evidence is required to establish whether there is a link between changes in olfaction and COVID-19; we therefore encourage clinicians to incorporate questions around loss of olfactory sensation into their clinical practice when assessing patients with suspected COVID-19.</p>
Primary studies	<p>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</p> <p>Abstract A total of 2,618,862 participants reported their potential symptoms of COVID-19 on a smartphone-based app. Among the 18,401 who had undergone a SARS-CoV-2 test, the proportion of participants who reported loss of smell and taste was higher in those with a positive test result (4,668 of 7,178 individuals; 65.03%) than in those with a negative test result (2,436 of 11,223 participants; 21.71%) (odds ratio = 6.74; 95% confidence interval = 6.31–7.21). A model combining symptoms to predict probable infection was applied to the data from all app users who reported symptoms (805,753) and predicted that 140,312 (17.42%) participants are likely to have COVID-19.</p> <p>Self-reported olfactory or taste disorders were found to have high specificity as a screening criterion for COVID-19 in an Asian cohort where patients with COVID-19 appeared to have higher odds of olfactory or taste disorders compared to those positive for other respiratory viruses and, as a result, routine screening in patients with new-onset olfactory or taste disorders can improve case detection</p> <p>No abstract provided Anosmia, muscle ache, ocular pain, general malaise, headache, extreme tiredness and fever are strongly associated with COVID-19 positive tests, and can contribute to targeted screening strategies for healthcare workers</p> <p>Abstract Healthcare workers (n = 803) with mild symptoms were tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (n = 90 positive) and asked to complete a symptom questionnaire. Anosmia, muscle ache, ocular pain, general malaise, headache, extreme tiredness and fever were associated with positivity. A predictive model based on these symptoms showed moderate discriminative value (sensitivity: 91.2%; specificity: 55.6%). While our models would not justify presumptive SARS-CoV-2 diagnosis without molecular confirmation, it can contribute to targeted screening strategies.</p> <p>New onset smell/taste disorder disorders were found to occur significantly more frequently among COVID-19 patient than influenza patients and were typically characterized by acute onset and were an initial manifestation and this symptom is therefore likely helpful to identify COVID-19 and aid in individuals' decision making about self-isolation</p> <p>Abstract Background: Specific respiratory tract infections, including Covid-19, may cause smell and/or taste disorders (STD) with increased frequency. We aim to determine whether new-onset STD are more frequent among Covid-19 patients than influenza patients.</p>

	<p>Methods: Case-control study including hospitalized patients of two tertiary care centers. Consecutive patients positive for Covid-19 PCR (cases) and patients positive for influenza PCR (historical control sample) were assessed during specific periods, employing a self-reported STD questionnaire.</p> <p>Results: Seventy-nine cases and 40 controls were included. No significant differences were found in basal features between both groups. New-onset STD were significantly more frequent among cases (31, 39.2%) than in the control group (5, 12.5 %), adjusted OR 21.4 (2.77-165.4, p=0.003). Covid-19 patients with new-onset STD were significantly younger than Covid-19 patients without STD (52.6 ± 17.2 vs. 67.4 ± 15.1, $p < 0.001$). Among Covid-19 patients who presented STD, 22 (70.9%) recalled an acute onset and was an initial manifestation in 11 (35.5%). Twenty-five (80.6%) presented smell disorders (mostly anosmia, 14, 45.2%), and 28 (90.3%) taste disorders (mostly ageusia, 14, 45.2%). Only four (12.9 %) reported concomitant nasal obstruction. Mean duration of STD was 7.5 ± 3.2 days and 12 patients (40%) manifested complete recovery after 7.4 ± 2.3 days of onset.</p> <p>Conclusion: New-onset STD were significantly more frequent among Covid-19 patients than influenza patients, they usually had an acute onset and were commonly an initial manifestation. We suggest the use of STD assessment in anamnesis as a hint for Covid-19 and to support individuals' self-isolation in the current epidemic context.</p>
	<p>A relationship between COVID-19 and anosmia should be considered during the pandemic</p> <p>Abstract</p> <p>Patients with acute olfactory disorders typically present to the otolaryngologist with both acute hyposmia and less often with anosmia. With the onset of COVID-19 we have noticed an increase in the number of patients who have presented with new onset of complete smell loss to the senior author's practice in Tehran, Iran. This anosmia and the frequency with which patients present is highly unusual. Coronaviruses have been known to cause common cold symptoms. COVID-19 infections have been described as causing more severe respiratory infections and the symptoms reported by authors from Wuhan, China have not specifically included anosmia. We describe patients who have presented during a two-week period of the COVID-19 pandemic with complete loss of sense of smell. Most had either no symptoms or mild respiratory symptoms. Many had a normal otolaryngologic exam. A relationship between COVID-19 and anosmia should be considered during the pandemic. We hypothesize that the mechanism of injury is similar to that of other coronavirus infections that cause central and peripheral neurologic deficits.</p>
	<p>Anosmia was present in half of 114 European COVID-19 patients and was often associated with dysgeusia</p> <p>Highlights</p> <ul style="list-style-type: none"> • Fifty-four of 114 patients (47%) with confirmed COVID-19 reported anosmia. • There is no inpatient cohort about COVID-19-related anosmia in the medical literature. In our study, 37% of our patients were hospitalised. To our knowledge, our study is the main monocentric cohort of confirmed COVID-19 patients with anosmia in France and in the medical literature. • Our data is strong due to a standardised follow-up for non-hospitalised and discharged patients. Patients were called seven days (± 7 days) after the first symptoms and every week until recovery (national guidelines recommended a home follow-up for patients with COVID-19). <p>Our results are similar to the recent multicentric European study conducted by Lechien et al.</p>
	<p>Quantitative smell testing demonstrates that decreased smell function, but not always anosmia, is a major marker for COVID-19 and suggests the possibility that smell testing may help, in some cases, to identify COVID-19 patients in need of early treatment or quarantine</p> <p>Abstract</p> <p>Background: SARS-CoV-2, the virus that causes COVID-19 disease, is responsible for the largest pandemic since the 1918 H1N1 influenza outbreak. The symptoms presently recognized by the World Health Organization are cough, fever, tiredness, and difficulty breathing. Patient-reported smell and taste loss has been associated with COVID-19 infection, yet no empirical olfactory testing on a cohort of COVID-19 patients has been performed.</p> <p>Methods: The University of Pennsylvania Smell Identification Test (UPSIT), a well-validated 40-odorant test, was administered to 60 confirmed COVID-19 inpatients and 60 age- and sex-matched controls to assess the magnitude</p>

	<p>and frequency of their olfactory dysfunction. A mixed effects analysis of variance determined whether meaningful differences in test scores existed between the two groups and if the test scores were differentially influenced by sex.</p> <p>Results: Fifty-nine (98%) of the 60 patients exhibited some smell dysfunction [mean (95% CI) UPSIT score: 20.98 (19.47,22.48); controls: 34.10 (33.31,34.88); p<0.0001]. Thirty-five of the 60 patients (58%) were either anosmic (15/60; 25%) or severely microsmic (20/60; 33%); 16 exhibited moderate microsmia (16/60; 27%), 8 mild microsmia (8/60; 13%), and one normosmia (1/60; 2%). Deficits were evident for all 40 UPSIT odorants. No meaningful relationships between the test scores and sex, disease severity, or comorbidities were found.</p> <p>Conclusions: Quantitative smell testing demonstrates that decreased smell function, but not always anosmia, is a major marker for SARS-CoV-2 infection and suggests the possibility that smell testing may help, in some cases, to identify COVID-19 patients in need of early treatment or quarantine.</p> <p>In a non-negligible number of patients, especially if paucisymptomatic, ageusia and anosmia can represent the first or the only symptomatology manifestation</p> <p>Abstract</p> <p>In a not negligible number of patients affected by COVID-19 (coronavirus disease 2019), especially if paucisymptomatic, anosmia and ageusia can represent the first or only symptomatology present.</p> <p>In the absence of other respiratory conditions, anosmia and dysgeusia should be carefully evaluated, and special attention should be given to patients with non-classic COVID-19 symptoms in order to reduce transmission and protect health providers (based on case evaluation of elderly patients)</p> <p>Abstract</p> <p>We describe two elderly patients evaluated at emergency departments for anosmia/dysgeusia in the absence of any other respiratory symptoms prior to or upon admission. In the current epidemiological context, clinical and biological work-up led to a diagnosis of COVID-19 infection. Unfortunately, one of the patients died during hospitalization, but the other recovered and was discharged.</p> <p>Recently, a probability of association between COVID-19 and altered olfactory function has been reported in South Korea, Iran, Italy, France, UK and the United States, but a definitive association between COVID-19 and anosmia has not been established</p> <p>No abstract provided</p>
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