The following information resources have been selected by the National Health Library and Knowledge Service Evidence Virtual Team in response to your question. The resources are listed in our estimated order of relevance to practicing healthcare professionals confronted with this scenario in an Irish context. In respect of the evolving global situation and rapidly changing evidence base, it is advised to use hyperlinked sources in this document to ensure that the information you are disseminating to the public or applying in clinical practice is the most current, valid and accurate. For further information on the methodology used in the compilation of this document — including a complete list of sources consulted — please see our National Health Library and Knowledge Service Summary of Evidence Protocol.

YOUR QUESTION

Is there any evidence to suggest that one form of temperature checking is more reliable than another — eg is infra-red thermography more accurate than oral or aural measurements for the purposes of screening?

IN A NUTSHELL

Mordiffi et al [1] point out that accurate measurement of body temperature is integral to the identification of many illnesses and the provision of safe and efficient patient care. Currently in practice, a diverse range of thermometers and a number of different routes are used by clinicians for the measurement of patients' body temperature. Each of these variables are known to be potentially influential upon the accuracy of body temperature estimation. The authors note that there is currently no gold standard thermometer type, manufacturer or route; that published and unpublished studies do not use a standard reference in comparison studies of the accuracy of thermometers; and that there is currently an absence of clarity around what constitutes a 'hospital grade' thermometer. How thermometers are compared and accuracy measured also appears to be inconsistently reported across studies, including previous systematic reviews [1]

With the spread of COVID-19 coronavirus, temperature measurement is being used widely to screen people for the illness and the accuracy of body temperature measurement is crucial 3. In the last decade, many advances have been made in the field of automatic temperature estimation, infrared thermography (IRT), and non-contact infrared thermometers (NCITs) [2] NCITs estimate temperature at a reference body site, usually oral, based on measurements of a single region of skin: eg forehead; on the other hand, IRTs provide a 2D temperature distribution, typically of the face, thus enabling a wider range of options for body temperature estimation [19.] Although NCITs currently represent the primary tool for fever screening during epidemics their accuracy has been called into question, particularly relative to IRTs. NCIT error may be due to a range of factors including the common use of forehead measurement locations, which are subject to fluctuations due to environmental factors such as ambient temperature and air flow [4, 22] In a pre-print clinical study which has not yet been peer-reviewed, Zhou et al [2] point out that IRTs have been used for fever screening during infectious disease epidemics, including SARS, EVD and COVID-19. Although IRTs have significant potential for human body temperature measurement, the literature indicates inconsistent diagnostic performance, possibly due to wide variations in implemented methodology. A standardized method for IRT fever screening was recently published, but there is a lack of clinical data demonstrating its impact on IRT performance [2] Zhou et al evaluated the use of IRTs under standardized conditions and collected a wide range of data on facial temperatures and their correlation to oral measurements. Temperatures from several facial areas — including the forehead, canthi, mouth and entire face — were compared to assess impact on fever screening. The authors claim that full face maximum temperatures provided the best performance followed closely by a wider inner canthi region. We await peer-review of the study [2]

The literature still has polarizing views, therefore, on a diverse range of thermometers and a number of different routes used for the measurement of patients' body temperature. Ryan-Wenger et al [21] report that tympanic, temporal, axillary chemical and axillary electronic thermometer devices should not be used; only oral and rectal electronic thermometers. Chen et al [7] suggest that wrist temperature is more stable than forehead and that to date there is still uncertainty with regard to the suitability of the tympanic membrane as a core body temperature site. Ng et al [8] also point out that it is important to understand that skin temperature does not solely depend on body-core temperature and may be affected by other physiological and environmental factors and that commercially available handheld infra-red thermometers require individual validation.

INTERNATIONAL LITERATURE

What does the international literature say?

Mordiffi et al (2016) The use of non-invasive thermometers in healthcare facilities: a scoping review protocol[1]

Accurate measurement of body temperature is integral to the identification of many illnesses and the provision of safe and efficient patient care. Currently in practice, a diverse range of thermometers and a number of different routes are used by clinicians for the measurement of patients' body temperature. Each of these variables are known to be potentially influential upon the accuracy of body temperature estimation. Because there is currently no gold standard thermometer type, manufacturer or route, published and unpublished studies do not use a standard reference in comparison studies of the accuracy of thermometers. There is currently an absence of clarity around what constitutes a 'hospital grade' thermometer. How thermometers are compared and accuracy measured also appears to be inconsistently reported across studies — including previous systematic reviews.

Zhou et al (2020) [Preprint Not Yet Peer-Reviewed] Clinical Evaluation of Fever-Screening Thermography: Impact of Consensus Guidelines and Facial Measurement Location[2]

Infrared thermographs [IRTs] have been used for fever screening during infectious disease epidemics, including SARS, EVD and COVID-19. Although IRTs have significant potential for human body temperature measurement, the literature indicates inconsistent diagnostic performance, possibly due to wide variations in implemented methodology. A standardized method for IRT fever screening was recently published, but there is a lack of clinical data demonstrating its impact on IRT performance. We have performed a clinical study of 596 subjects to assess the diagnostic effectiveness of standardized IRT-based fever screening and evaluate the effect of facial measurement location. Temperatures from 17 facial locations were extracted from thermal images and compared with oral thermometry. Statistical analyses included calculation of receiver operating characteristic curves and area under the curve (AUC) values for detection of febrile subjects. Pearson correlation coefficients for IRT-based and reference temperatures were found to vary strongly with measurement location. Approaches based on maximum temperatures in either inner canthi or full-face regions indicated stronger discrimination ability than maximum forehead temperature (AUC values of 0.95-0.97 vs. 0.86-0.87, respectively) and other specific facial locations. These values are markedly better than the vast majority of results from in prior human studies of IRT-based fever screening. Our findings provide clinical confirmation of the utility of consensus approaches for fever screening, including the use of inner canthi temperatures, while also indicating that full-face maximum temperatures may provide an effective alternate approach.

Chen et al (2020) Investigation of the Impact of Infrared Sensors on Core Body Temperature Monitoring by Comparing Measurement Sites[3]

Many types of thermometers have been developed to measure body temperature. Infrared thermometers (IRT) are fast, convenient and easy to use. Two types of infrared thermometers are used to measure body temperature: tympanic and forehead. With the spread of COVID-19 coronavirus, forehead temperature measurement is used widely to screen people for the illness. The performance of this type of device and the criteria for screening are worth investigating. Our study evaluated the performance of two types of tympanic infrared thermometers and an industrial infrared thermometer. The results showed that these infrared thermometers provide good precision. A fixed offset between tympanic and forehead temperature was found. The measurement values for wrist temperature show significant offsets with tympanic temperature and cannot be used to screen for fevers. A standard operating procedure for the measurement of body temperature using an infrared thermometer was proposed. The suggested threshold for forehead temperature is 36°C for screening of fever. The body temperature is then measured using a tympanic infrared thermometer for the purpose of a double check.

Ng et al (2009) Remote-sensing infrared thermography[4]

The outbreak of the severe acute respiratory syndrome (SARS) in 2003 has ignited studies and research and even the general public interest in the field of infrared (IR) imaging systems for blind mass human fever screening to control the spread of the pandemic. The ideal device for blind mass fever screening should be speedy, non-invasive, and able to accurately detect people with fever. IR thermography has been used to detect inflammatory abnormalities and has the potential to serve as a tool for mass screening of fever. This article reviews the IR fever-screening systems and suggests the performance and environmental requirements for characterizing thermography for possible fever screening, during the onset of a pandemic, under indoor controlled-environmental conditions.

Nguyen et al (2010) Comparison of 3 Infrared Thermal Detection Systems and Self-Report for Mass Fever Screening[5]

Despite limited evidence regarding their utility, infrared thermal detection systems (ITDS) are increasingly being used for mass fever detection. We compared temperature measurements for 3 ITDS (FLIR ThermoVision A20M [Boston, MA, USA], OptoTherm Thermoscreen [Sewickley, PA, USA], and Wahl Fever Alert Imager HSI2000S [Asheville, NC, USA]) with oral temperatures (>100°F = confirmed fever) and self-reported fever. Of 2,873 patients enrolled, 476 (16.6%) reported a fever, and 64

(2.2%) had a confirmed fever. Self-reported fever had a sensitivity of 75.0%, specificity 84.7%, and positive predictive value 10.1%. At optimal cutoff values for detecting fever, temperature measurements by OptoTherm and FLIR had greater sensitivity (91.0% and 90.0%, respectively) and specificity (86.0% and 80.0%, respectively) than did self-reports. Correlations between ITDS and oral temperatures were similar for OptoTherm ($\rho = 0.43$) and FLIR ($\rho = 0.42$) but significantly lower for Wahl ($\rho = 0.14$; $p<0.001$). When compared with oral temperatures, 2 systems (OptoTherm and FLIR) were reasonably accurate for detecting fever and predicted fever better than self-reports.

Aw et al (2020) [Letter] The non-contact handheld cutaneous infra-red thermometer for fever screening during the COVID-19 global emergency[6]

The recent article ‘Novel coronavirus is putting the whole world on alert’ highlighted the need for a large-scale programme to screen or detect individuals who may be infected by the novel coronavirus COVID-19. International media coverage of the COVID-19 global emergency has repeatedly depicted the popular but, to the author, disturbing use of the noncontact handheld infra-red thermometer to screen for fever at hospitals, primary care clinics and commercial buildings. Pulmonary artery catheterization is the reference standard to measure core body temperature, but is invasive, requires specialized skills and equipment, and is not suitable for screening of large cohorts.

Chen et al (2020) [Preprint Not Yet Peer-Reviewed] Validity of Wrist and Forehead Temperature in Temperature Screening in the General Population During the Outbreak of 2019 Novel Coronavirus: a prospective real-world study[7]

Temperature screening is important in the population during the outbreak of COVID-19. This study aimed to compare the accuracy and precision of wrist and forehead temperature with tympanic temperature under different circumstances. Methods: We performed a prospective observational study in a real-life population. We consecutively collected wrist and forehead temperatures in Celsius using a non-contact infrared thermometer (NCIT). We also measured the tympanic temperature using a tympanic thermometers (IRTT) and defined fever as a tympanic temperature ≥37.3C Conclusions: Wrist measurement is more stable than forehead measurement under different circumstances. Both measurements have great fever screening abilities for indoor patients. The cut-off value of both measurements was 36.2C.

Ng et al (2005) A brief report on the normal range of forehead temperature as determined by noncontact, handheld, infrared thermometer[8]

Background: Noncontact forehead temperature measurement by handheld infrared thermometer was used as a screening tool for fever. However, the accuracy data and normal range of forehead temperature determined by this method were not available. Methods: The temperature readings from 3 handheld infrared thermometers were validated against an electronic thermometer. Normal range of forehead temperature was determined by measuring the forehead temperature in 1000 apparently healthy subjects. Results: Significant differences were detected in readings obtained by the 3 different handheld infrared thermometers. The most accurate one was chosen and the normal range of forehead temperature in 1000 subjects detected by this method was 31.0C to 35.6C. Conclusions: Our study shows that commercially available, handheld infrared thermometers require individual validation. Forehead temperature in excess of 35.6°C is suggestive of fever. Further studies are required to confirm accuracy of this value in detecting fever.

Rajee (2006) NexTemp Thermometer Can Be Used Interchangeably With Tympanic or Mercury Thermometers for Emergency Department Use[9]

Objectives: To determine the agreement between the chemical dot NexTemp thermometer with mercury and tympanic thermometers and the repeatability of measurements using these devices.
Methods: A prospective study involving a convenience sample of 194 consenting adult patients presenting to the ED, Freemasons Hospital, East Melbourne, Victoria, Australia. A survey of emergency medical staff was conducted to determine what they considered an acceptable level of agreement and repeatability for a putative new thermometer. The NexTemp thermometer's performance was judged against this. For each thermometer, a set of two temperature measurements was made in every patient. The sequence of the set of readings and hence the device was random between patients, and the staff member performing one set was blinded to the results of the other two sets of readings in each patient. The method of Bland and Altman was used for assessing agreement and repeatability.
Results: Clinicians considered that a new thermometer should exhibit repeatability of +/- 0.3 degrees C and agree with existing devices within +/- 0.5 degrees C. The tympanic thermometer had 95% limits of repeatability of -0.8-0.5 degrees C compared with the NexTemp (-0.3-0.4 degrees C) and mercury thermometers (-0.3-0.4 degrees C). The NexTemp thermometer agreed with mercury thermometer within -0.6-0.5 degrees C. The tympanic thermometer agreed with the mercury thermometer within -1.0-1.1 degrees C.
Conclusion: Based on temperature measurement only, the NexTemp thermometer can be used interchangeably with current mercury and tympanic thermometers.

Mogensen et al (2018) Ear Measurement of Temperature Is Only Useful for Screening for Fever in an Adult Emergency Department[10]

A new generation of ear thermometers with preheated tips and several measurements points should allow a more precise temperature measurement. The aim of the study was to evaluate if the ear temperature measured by this ear thermometer can be used to screen for fever and whether the thermometer is in agreement with the rectal temperature; and if age, use of hearing devices or time after admission influences the temperature measurements.

Huang et al (2019) Ingestible sensors correlate closely with peripheral temperature measurements in febrile patients[11]

Background: Reliable non-invasive methods for measuring body temperature are essential for the diagnosis and monitoring of infectious disease. Methods: This study used Intraclass Correlation Coefficients (ICC) and the Bland- Altman plot to analyse the agreement between temperature measurements using an ingestible capsule sensor, a skin sensor and two non-invasive peripheral temperature measurements ¾ axillary and infrared non-contact ¾ collected from a population of febrile patients admitted for infectious disease. Results: Of the 77 febrile patients screened, 26 patients were enrolled. The ICC between axillary temperature measurements (Taxi) vs. non-contact measurements (Tno-c) were 0.34 [−0.18; 0.63], 0.87 [0.55; 0.94] between Taxi vs. ingestible capsule measurements (Tcap) and 0.12 [−0.09; 0.37] between Taxi vs. Tetac. The mean difference between Taxi vs Tno-c was −1.18 °C with limits of agreement (LoA) from −2.96 to 0.58 °C. The mean difference between Taxi vs Tcap was 0.48 °C, with LoA from −0.60 to 1.56 °C. The mean difference between Taxi vs Tetac was −4.23 °C with LoA from −7.22 to −1.23 °C. Conclusions: Ingestible capsule measurements are reliable enough to adequately estimate the core body temperature in clinical practice. Its non-invasiveness and real-time remote control offer new opportunities for future research into fever during infectious diseases.

Wui Keat Yeoh et al (2017) Re-visiting the tympanic membrane vicinity as core body temperature measurement site[12]

Core body temperature (CBT) is an important and commonly used indicator of human health and endurance performance. A rise in baseline CBT can be attributed to an onset of flu, infection or even thermoregulatory failure when it becomes excessive. Sites which have been used for measurement of CBT include the pulmonary artery, the oesophagus, the rectum and the tympanic membrane. Among them, the tympanic membrane is an attractive measurement site for CBT due to its unobtrusive nature and ease of measurement, especially when continuous CBT measurements are needed for monitoring such as during military, occupational and sporting settings. However, to-date, there are still polarizing views on the suitability of tympanic membrane as a CBT site. This paper will revisit a number of key unresolved issues in the literature and also presents a benchmark of the middle ear temperature against temperature measurements from other sites. Results from experiments carried out on human and primate subjects will be presented to draw a fresh set of insights against the backdrop of hypotheses and controversies.

Devrim et al (2007) Measurement Accuracy of Fever by Tympanic and Axillary Thermometry[13]

As the basic sciences develop, temperature measurement methods and devices have been improved. For hundreds of years both in clinics and home, mercury-in-glass thermometer was the standard of human temperature measurements. In this study, we aimed to compare tympanic infrared thermometers with the conventional temperature option, mercury-in-glass thermometer, which is historical standard in the clinical conditions.

Khorshid et al (2005) Comparing Mercury-In-Glass, Tympanic and Disposable Thermometers in Measuring Body Temperature in Healthy Young People[14]

The aim of this study was to determine whether a disposable thermometer was at least as accurate as a tympanic thermometer when compared with a mercury-in-glass thermometer and to investigate the waiting periods of mercury-in-glass thermometers. It was found that body temperature readings measured by tympanic thermometer were higher than axillary mercury-in-glass thermometers by 0.12 degrees C; body temperature readings measured by tympanic thermometer were higher than axillary disposable thermometer readings by 0.65 degrees C; and body temperature readings measured by axillary mercury-in-glass thermometer were higher by 0.53 degrees C than readings measured by axillary disposable thermometer. It was found that readings measured by mercury-in-glass thermometer stabilized in the eighth minute.
Relevance to Clinical Practice: When assessing body temperature, it is important to take the type of thermometer into consideration. In addition, axillary mercury-in-glass thermometers must be kept in place a minimum of eight minutes.

Chue et al (2012) Comparability of Tympanic and Oral Mercury Thermometers at High Ambient Temperatures[15]

Body temperature can be measured in seconds with tympanic thermometers as opposed to minutes with mercury ones. The aim of this study was to compare tympanic and oral mercury thermometer measurements under high ambient field temperatures.
Results: Tympanic temperature measured 3 times by 3 operators was compared to oral temperature measured once with a mercury-in-glass thermometer in 201 patients (aged ≥5 years) on the Thai-Myanmar border. Ambient temperature was measured with an electronic thermo-hygrometer. Participants had a mean [min-max] age of 27 [5-60] years and 42% (84) were febrile by oral thermometer. The mean difference in the mercury and tympanic temperature measurement for all observers/devices was 0.09 (95%CI 0.07-0.12)°C and intra-class correlation for repeat tympanic measurements was high (≥0.97) for each observer. Deviations in tympanic temperatures were not related to ambient temperature.
Conclusion: Clinically significant differences were not observed between oral and tympanic temperature measurements at high ambient temperatures in a rural tropical setting.

Ring et al (2010) New Standards for Devices Used for the Measurement of Human Body Temperature[16]

Significant changes in recording of human body temperature have been taking place worldwide in recent years. The clinical thermometer introduced in the mid-19th century by Wunderlich has been replaced by digital thermometers or radiometer devices for recording tympanic membrane temperature. More recently the use of infrared thermal imaging for fever screening has become more widespread following the SARS infection, and particularly during the pandemic H1N1 outbreak. Important new standards that have now reached international acceptance will affect clinical and fever screening applications. This paper draws attention to these new standard documents. They are designed to improve the standardization of both performance and practical use of these key techniques in clinical medicine, especially necessary in a pandemic influenza situation.

Hsiao et al (2020) Body Temperature Measurement to Prevent Pandemic COVID-19 in Hospitals in Taiwan: Repeated Measurement is Necessary[17]

Along with the TOCC history and presence of respiratory symptoms fever is a key warning sign of COVID-19. Therefore, almost all Taiwanese hospitals have established temperature monitoring at outdoor quarantine stations using techniques such as infrared temperature detectors and forehead thermometers. Febrile patients are prohibited from entry and are sent to Emergency Department for assessment. However, these thermometers can normal values, or even hypothermia, in visitors who are actually febrile under the influence of environment factors such as outdoor temperature, wind and rainfall. Erenberk et al reported that accurate determination of fever in cold environmental conditions requires at least 10 minutes for children to become acclimatized after coming in from the cold. Another problem is that some patients may take antipyretics to avoid being blocked at outdoor quarantine stations.

Liu et al (2005) Limitations of Forehead Infrared Body Temperature Detection for Fever Screening for Severe Acute Respiratory Syndrome[18]

Although some studies have questioned the accuracy of tympanic temperature measurements, others have reported their accuracy. Sloan pointed out that if the effect of ambient temperature could be eliminated, tympanic temperature would provide a good measurement for body temperature. This study accounted for shifting environmental temperatures. When outdoor temperature and the screening station temperature differed by more than 5°C, the subject was required to rest for 5 minutes in the station before any measurement was taken. Given some doubt about the accuracy of tympanic temperatures as a gold standard method, future studies could use other gold standard methods. A small percentage of SARS cases did not exhibit fever; therefore, the screening process for SARS should perhaps screen for other symptoms such as cough, dyspnea, or diarrhoea. Particular attention should be paid to individuals who have had close, sustained contact with SARS cases or have been in outbreak settings.

Ghassemi et al (2019) Best practices for standardized performance testing of infrared thermographs intended for fever screening[19]

Infrared (IR) modalities represent the only currently viable mass fever screening approaches for outbreaks of infectious disease pandemics such as Ebola virus disease and severe acute respiratory syndrome. Non-contact IR thermometers (NCITs) and IR thermographs (IRTs) have been used for fever screening in public areas such as airports. While NCITs remain a more popular choice than IRTs, there has been increasing evidences in the literature that IRTs can provide great accuracy in estimating body temperature if qualified systems are used and appropriate procedures are consistently applied.

Hewlett et al (2011) Evaluation of an Infrared Thermal Detection System for Fever Recognition during the H1N1 Influenza Pandemic[20]
Infrared thermal detection systems (ITDSs) have been utilized in several countries to screen for fever in travellers. Since fever screening with an ITDS is rapid and non-invasive, this technology may be useful as an infection control measure in clinical settings during a pandemic.

Ryan-Wenger et al (2020) Selection of the Most Accurate Thermometer Devices for Clinical Practice: Part 1: Meta-Analysis of the Accuracy of Non-Core Thermometer Devices Compared to Core Body Temperature[21]
The literature is inconclusive on the accuracy of various thermometer devices used in clinical practice. We conducted a meta-analysis on the accuracy of temperatures from six peripheral (non-core) thermometer devices compared to core body temperature. 34 research articles met criteria for inclusion in the meta-analysis: core and non-core temperatures measured concurrently or sequentially, appropriate statistics, and sample size of 10 or more. We applied Cochrane GRADE criteria for diagnostic tests and strategies. Assessments of bias, indirectness of evidence, overall confidence in effect sizes, consistency, precision, and publication bias indicated low risk. The extent of heterogeneity was Q=0% for each type of thermometer device; impact of heterogeneity was 0% due to true differences, and I 2 =100% due to random sampling error. Forest plots illustrated bias (mean differences), 95% confidence limits, and confidence intervals (CI). A forest plot of the overall accuracy of non-core devices indicated that oral and rectal electronic thermometers had the least bias (-0.05˚C and -0.04˚C) and narrowest CI: oral=0.58˚C, rectal=1.18˚C, compared to temporal (1.88˚C), axillary chemical (2.25˚C), axillary electronic (2.36˚C), and tympanic (2.62˚C). Our findings indicate that only oral and rectal electronic thermometer devices should be used to measure temperature of individuals for screening, monitoring, diagnostic, and treatment decisions. Tympanic, temporal, axillary chemical and axillary electronic thermometer devices should not be used in clinical practice.

Ng et al (2004) Analysis of IR Thermal Imager for Mass Blind Fever Screening[22]
Obtaining meaningful temperature for the human body requires identifying a body site that will provide reliable data across a large population. It is important to understand that skin temperature does not solely depend on body-core temperature and may be affected by other physiological and environmental factors. Currently, there is lack of

empirical data in correlating facial surface temperature with body core temperature. Present IR systems in use at airports/immigration checkpoints have not been scientifically validated particularly in regards to the false-negative rate. As a result, they may create a false sense of security by underestimating the number of febrile (and possibly infected) individuals. This article evaluates the effectiveness of thermal scanner when it is being used for mass blind screening of potential fever subjects such as SARS or bird flu patients.

OTHER

D'Alessandro (2020) [Webpage] How Good Is Infrared Thermography for MassScreening for Fever?[23]

Infrared thermal imaging (ITI) uses infrared data collection taken from an appropriate body location that then uses a mathematical formula to convert the data into a temperature reading. There is no specific data correlating core body temperature to ITI temperature.

There are not too many ways to screen people for fever that don't take a lot of time or that are not invasive. ITI has been used for remote sensing for human body temperature and fever screening since 2006 in international airports and is used in other locations such as hospital entrances and public places for crowd surveillance. While ITI can be accessible and affordable and efficient, it may not be used properly. ITI can be the first step in detection and therefore evaluation and management of individuals.

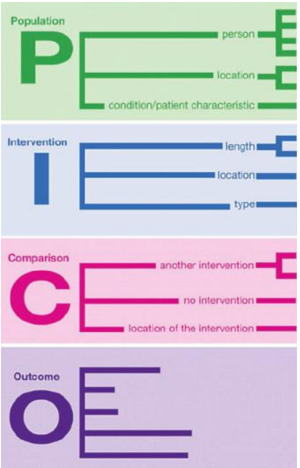
Irish Times (2020) [News Article] COVID-19 early warning system for medical staff developed in Cork[24]

An early warning system for detection of coronavirus symptoms among frontline medical staff at Cork University Hospital (CUH) has reportedly delivered promising results within days of being rolled out.

The COVID-19 remote early warning system (CREW) remotely identifies healthcare staff who may be developing a temperature, which is symptomatic of the illness. A quarter of all diagnosed cases of coronavirus in Ireland are among healthcare workers. Five volunteers have been wearing underarm thermometers connected to smartphones, with temperature readings being sent to the monitoring platform on an hourly basis. Where a staff member's temperature shows signs of being elevated, they are alerted to take appropriate action and self-isolate.

Produced by the members of the National Health Library and Knowledge Service Evidence Team[†]. Current as at 26 May 2020. This evidence summary collates the best available evidence at the time of writing and **does not replace clinical judgement or guidance**. Emerging literature or subsequent developments in respect of COVID-19 may require amendment to the information or sources listed in the document. Although all reasonable care has been taken in the compilation of content, the National Health Library and Knowledge Service Evidence Team makes no representations or warranties expressed or implied as to the accuracy or suitability of the information or sources listed in the document. This evidence summary is the property of the National Health Library and Knowledge Service and subsequent re-use or distribution in whole or in part should include acknowledgement of the service.

The following PICO(T) was used as a basis for the evidence summary:



P	TEMPERATURE SCREENING IN SUSPECTED COVID -19 INFECTION
I	INFRARED THERMOMETER
C	ANY OTHER MEASURING DEVICE
O	

The following search strategy was used:

Body Temperature Determination or body temperature or body temperature measurement or (MH "Tympanic Body Temperature") OR (MH "Oral Body Temperature") OR (MH "Axillary Body Temperature") OR (MH "Core Body Temperature") and (thermometer) or temperature measuring device and COVID-19 OR coronavirus OR "corona virus" OR (Wuhan N2 virus) OR(("2019-nCoV" or "2019 ncov")) OR "severe acute respiratory syndrome coronavirus 2" OR (("2019" and (new or novel) and coronavirus) or (SARS-Cov-2))

† Pauline Ryan, Librarian, University Hospital Waterford [Author]; Brendan Leen, Area Library Manager, HSE South [Editor]. Dr. Natalie Cole, Senior R&D Manager, HSE R&D [Editor]

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