

Non-contact infrared thermal imagers may still be useful for mass fever screening

To the Editor—We have some observations on the commentary by Wong and Wong¹ on non-contact infrared thermal image sensors (NCIRTIS) for mass fever screening. Based on their literature review, the authors suggested that authorities should not rely on the use of NCIRTIS in mass fever screening. However, the authors overlooked a few recent studies,²⁻⁶ which may cast doubt on their conclusion. They pointed out that thermal screening failed to pick up a single severe acute respiratory syndrome (SARS) case during the 2003 epidemic. However, Chiu et al² showed that infrared thermography as a mass fever screening measure successfully picked up 305 febrile patients from 72 327 outpatients and visitors of a hospital. Of these 305 febrile patients, three were confirmed to have SARS.

Chan et al³ suggested that infrared thermography from the side of ear yielded the most accurate estimation of conventionally determined body temperature. Ear infrared thermography gave a sensitivity and specificity of 83% and 88%, respectively for detecting tympanic fever in a group of out-patients, in-patients, and others. Liu et al⁴ suggested that auditory meatus temperature was the best site for infrared body temperature taking. However, they showed that infrared thermometry had limited ability in detecting fever in an outdoor environment.

We published two studies that evaluated the accuracy of handheld infrared thermometer (HIT) for forehead temperature, a similar technology to infrared thermography, to detect fever at a standard distance of 5 cm from the forehead. Our first experimental study⁵ was performed in a group of healthy adults and it suggested that commercially available HIT required individual validation and that 35.6°C was the statistical upper limit of the normal forehead temperature in adults. Our second study⁶ evaluated the accuracy of HIT in detecting fever in 567 paediatric in-patients. Our data suggested that HIT had reasonable accuracy in detecting fever in children and the sensitivity and specificity were 89.4% and 75.4% when any forehead temperature higher than 35.1°C was regarded as fever. In the two aforementioned studies, we strictly controlled the influence of ambient temperature by making sure that the subjects rest in an

air-conditioned environment for at least 7 minutes prior to determining their temperature.

We agree with Wong and Wong¹ that NCIRTIS is not capable of measuring core body temperature and NCIRTIS should not be relied on as the only screening tool for fever. However, recent studies on infrared thermography suggest a useful role in screening for fever in an apparently healthy population, especially if the distance between the sensor and the subject and the ambient temperature is controlled.

DK Ng, M Med Sc, FHKAM (Paediatrics)

(e-mail: dkng@ha.org.hk)

Department of Paediatrics

Kwong Wah Hospital

Hong Kong

CH Chan, BSc

Jockey Club Centre for Osteoporosis Care and Control

The Chinese University of Hong Kong

Hong Kong

References

1. Wong JJ, Wong CY. Non-contact infrared thermal imagers for mass fever screening—state of the art or myth? *Hong Kong Med J* 2006;12:242-4.
2. Chiu WT, Lin PW, Chiou HY, et al. Infrared thermography to mass-screen suspected SARS patients with fever. *Asia Pac J Public Health* 2005;17:26-8.
3. Chan LS, Cheung GT, Lauder IJ, Kumana CR, Lauder IJ. Screening for fever by remote-sensing infrared thermographic camera. *J Travel Med* 2004;11:273-9.
4. Liu CC, Chang RE, Chang WC. Limitations of forehead infrared body temperature detection for fever screening for severe acute respiratory syndrome. *Infect Control Hosp Epidemiol* 2004;25:1109-11.
5. Ng DK, Chan CH, Chan EY, et al. A brief report on the normal range of forehead temperature as determined by noncontact, handheld, infrared thermometer. *Am J Infect Control* 2005;33:227-9.
6. Ng DK, Chan CH, Lee RS, Leung LC. Non-contact infrared thermometry temperature measurement for screening fever in children. *Ann Trop Paediatr* 2005;25:267-75.

Answers to CME Programme

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I. Epidemiology of leprosy and response to treatment in Hong Kong

A	1. False	2. False	3. False	4. True	5. False
B	1. False	2. True	3. True	4. False	5. True
C	1. False	2. True	3. True	4. True	5. False

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II. Newborn hearing screening in Hong Kong

A	1. True	2. False	3. True	4. False	5. True
B	1. False	2. True	3. True	4. True	5. True