

# 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 Wong<sup>1</sup> 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,<sup>2-6</sup> 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 al<sup>2</sup> 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 al<sup>3</sup> 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 al<sup>4</sup> 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 study<sup>5</sup> 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 study<sup>6</sup> 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 Wong<sup>1</sup> 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.

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## References

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## Answers to CME Programme *Hong Kong Medical Journal* June 2006 issue

*Hong Kong Med J* 2006;12:174-9

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

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|---|----------|----------|----------|----------|----------|
| 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 |

*Hong Kong Med J* 2006;12:212-8

### II. Newborn hearing screening in Hong Kong

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