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Conflicts of interest

There are no conflicts of interests in this study. The Ethics Committee of the Medical Faculty of Umeå University approved the study (dnr 99–326).

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The use of the Tempa.Dot thermometer in routine clinical practice

SIR—The Tempa.Dot single-use thermometer has been in use in the UK for over 10 years and in the USA for nearly 30 years. Over the last 7 years it has been marketed by 3M Health Care Limited [1]. Its use in the NHS followed the European Union Directive to reduce the medical use of mercury. It also has the advantages of lack of cross-infection risk and more rapid recordings. A sensor matrix at the tip of the thermometer consists of 50 temperature-indicating dots, each with a melting point separation of 0.1°C. At any given temperature within the range 35.5–40.4°C, all dots with a
gave a correct interpretation versus only 12% of fully qualified staff ($\chi^2$ test $P < 0.06$). On both occasions the median result was 37.5°C with an interquartile range of 37.2–37.6°C. The temperatures recorded spanned a range of 0.7°C in 1998 and 1.3°C in 2001.

Comment

This is the first report of the accuracy of the interpretation of temperature recordings by staff using the Tempa.Dot thermometer and worrying failures were identified. Two previous studies have shown slightly higher axillary temperatures with the Tempa.Dot thermometer than the glass mercury thermometer [2, 3] but no difference in oral temperatures. The first of these studies used specific study nurses rather than ward staff so it is unlikely that there will have been inaccuracy in interpretation. In the second study, wide variability in readings was seen at each temperature, although mean axillary values differed by 0.25°C (Tempa.Dot higher than mercury glass). It is interesting that our data suggest a trend towards improved accuracy of interpretation in HCAs. It is not possible to fully explain this phenomenon, but taking routine patient observations is a task often delegated to HCAs and their increased experience may be reflected in their improved accuracy.

Although it seemed understandable that a radical change in temperature recording procedure should result in problems, it is worrying that 3 years later the problem persisted. There is no suggestion that there is any inaccuracy in the temperature recording, merely in the interpretations by staff.

The staff surveyed represented those that undertake temperature observations in practice. Our experience is that medical staff produce similarly unreliable recordings—indeed this originally prompted the study. We did not test this as medical staff are not responsible for routine temperature measurements.

Whilst staff training should correct the problem, our data suggest that the Tempa.Dot design is not impervious to human error. Interestingly, the two most common erroneous readings were 37.2°C and 37.7°C. It is easy to see why from Figure 1. Unfortunately we have no details of the training the nurses received in the use of the Tempa.Dot thermometer.

We brought our data to the attention of The Medicines and Healthcare products Regulatory Agency (MHRA) and the manufacturers. The manufacturers confirm that despite another reported problem with the interpretation of the Tempa.Dot thermometer they are confident that it is accurate and readable given suitably trained staff. The MHRA is taking no further specific action currently but will be evaluating non-mercury thermometers in the near future. Kings College Hospital no longer uses the Tempa.Dot thermometer.

Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Percentage correct</th>
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<th>Percentage correct</th>
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<tbody>
<tr>
<td>1998</td>
<td></td>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>Qualified ($n = 18$)</td>
<td>22%</td>
<td>Qualified ($n = 24$)</td>
<td>12%</td>
</tr>
<tr>
<td>HCA ($n = 12$)</td>
<td>25%</td>
<td>HCA ($n = 24$)</td>
<td>33%</td>
</tr>
<tr>
<td>Overall ($n = 30$)</td>
<td>23%</td>
<td>Overall ($n = 48$)</td>
<td>23%</td>
</tr>
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</table>

A total of 78 nurses were assessed, overall percentage correct = 23%.

Key points

- The large majority of nurses who perform temperature measurements with the Tempa.Dot thermometer in
routine clinical practice are unable to interpret a standardised image depicting a temperature reading of 37.6°C.  
- These results were reproducible 3 years after the thermometers had been in regular use.  
- The nurses’ interpretations of the image depicting 37.6°C spanned a range of 0.7°C in 1998 and 1.3°C in 2001.  
- The errors in interpretation of thermometer readings may lead to inappropriate medical management, potentially to the patient’s detriment.

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References

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A study of the management of COPD according to established guidelines and the implications for older patients

SIR—COPD is common in older populations and a major cause of mortality and morbidity. It accounts for over 1,000 consultations per 10,000 patients in the 75-and-over age group, compared with 400 in those under 65 years of age [1]. It is a major cause of hospital admission in the elderly with almost 20,000 admissions per million population in the year 1999/2000 in the 75-and-over age group [2].

Previous studies have shown that doctors are less likely to give smoking cessation advice to older subjects [3], and that pulmonary rehabilitation programmes mainly include younger subjects [4]. We hypothesized that older patients would have less access to interventions known to improve the morbidity and mortality in chronic obstructive pulmonary disease (COPD).

Methods
We surveyed the management of COPD in two large hospitals in the Trent region, over two 6 month periods between 2001 and 2003. The first hospital was a large teaching hospital in South Trent. The second a district general hospital in Mid-Trent.

For the first survey, 200 randomly selected case notes with a primary coding diagnosis of COPD over a 6 month period were requested. A total of 172 notes (86%) were obtained and of these 116 (67%) were felt, on review by a physician, to be correctly coded and thus suitable for inclusion in the study. In the second survey, 150 randomly selected case notes were similarly requested; 116 notes (77%) were obtained, of which 79 (68%) were felt to be correctly coded.

A standard form was used to record clinical details of the hospital admission in both centres. The management of patients was analysed by age as a binary variable (74 years and under and 75 years and above, based on a median age of 74 years) using contingency tables. Mantzel Heinz odds ratios were calculated where appropriate. Further logistic regression analysis was used to adjust for any potential differences in disease severity or differences between the two centres.

Results
One hundred and ninety-five case notes were included in the study. A total of 116 notes were included from the South Trent population and 79 notes from the Mid-Trent population. The subjects had a mean age of 72.4 years (range 35–92), 59% were male. By British Thoracic Society Criteria, 45.6% were felt to have severe disease and 33.8% mild or moderate disease; 20.5% could not be classified due to scarcity of information in the clinical notes.

Severity of disease was also assessed based on the number of hospital admissions over a 3 year period. Twenty-four per cent of subjects had had no admissions in the preceding 3 years, 15% had one prior admission, 16% had two prior admissions and 27% had three or more prior admissions. In 17% the number of previous admissions could not be accurately determined (incomplete notes). The two populations did not differ significantly in age, sex or severity of disease.

Smoking status was recorded in 93% of individuals: 33.8% were current smokers, 55.9% ex-smokers and 3.1% never smokers. Only 20% of subjects had evidence of spirometry being performed either in the preceding 3 years or 6 months after hospital admission, despite all having a clinical diagnosis of COPD and being on regular medication. Age did not appear to influence whether spirometry was performed (P=0.826).

Similarly, only 16.4% of subjects regularly using inhalers had their inhaler technique checked during the course of their hospital admission or on follow-up. Older patients were not more likely to have their inhaler technique checked than younger subjects (P=0.518).

Of those subjects still smoking, only 16% were given smoking cessation advice at any point during their hospital admission. Furthermore, older patients were significantly less likely to be given smoking cessation advice, 3% versus 27% (odds ratio =12.1 (95% CI 1.3–113.8), chi-squared=7.79, P=0.005). These differences in smoking cessation advice persisted after regression analysis with adjustment for disease severity, number of admissions and centre (P=0.002).