LETTERS TO THE EDITOR

Asthma: a follow up statement from an international paediatric asthma consensus group

SIR,—I was surprised to find in this very comprehensive and helpful consensus statement on asthma,¹ no mention about the short course of oral steroids that has in recent years become widely, yet so uncritically, used in the treatment of acute exacerbations of asthma: the use of oral steroids is referred to only in the context of managing severe asthma. Yet most children whom I see in hospital who have been treated with prednisone by the general practitioner at home or in hospital on admission by junior staff have been far from seriously ill. It is so easy for the occasional short course of prednisone to become for some children almost continuous therapy with its well known possible side effects. Can the Steering Committee advise on this?

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1 International Paediatric Asthma Consensus Group. Asthma: a follow up statement from an international paediatric asthma consensus group. *Arch Dis Child* 1992;67:240–8.

Professor Warner comments:

Professor Davies expresses a sentiment that I would personally very strongly support. The consensus statement is very clear that in the development of acute exacerbations of asthma, oral steroids are given after it has been established that an optimal dose of inhaled bronchodilators has not been effective or a relapse has occurred within four hours. This is stated in the acute asthma section. However, there is no further elaboration because there was some diversity of opinion about the exact time when oral steroids should be employed.

Professor Davies is correct in stating that uncritical use of oral steroids has resulted in excessive inappropriate use during mild exacerbations. It should, however, be appreciated that asthma deaths have been associated with failure to employ steroids in a severe attack and sometimes the course can be rapid in infancy or not appreciated in older patients.

In the final analysis, it is the interpretation of one or two words in publications on the use of short course oral steroids that dictates whether they are used appropriately or not. Storr *et al* completed a study of a single dose of prednisolone in 140 children 'if their symptoms were moderate or severe on initial assessment'.¹ Unfortunately there is no further elaboration on this point. However, the results very convincingly demonstrated the effects of the treatment in reducing the necessity for hospital admission and for further steroid treatment. I would suggest that moderate or severe asthma means an inadequate response to a nebulised dose of bronchodilator or a relapse of symptoms within four hours of the dose. Employing such criteria should reduce the frequency of steroid

usage while ensuring that it is given to those who need it.

1 Storr J, Barrell E, Barry W, Lenney W, Hatcher G. Effect of a single oral dose of prednisolone in acute childhood asthma. *Lancet* 1987;i:1879–81.

Axillary and rectal temperature measurements in infants

SIR,—Parents and family doctors commonly measure children's temperatures when they are ill and it is a routine assessment when in hospital. Yet there is uncertainty about where to measure the temperature and what instrument to use. Morley and colleagues from their recently reported observations concluded that a rectal temperature is a more 'precise measurement'.¹ Choosing a site for recording temperature depends not only on its potential precision but also the possibilities of errors and hazards. In 1949 Karlberg found that temperature recorded increased the further the thermometer was inserted into the rectum.² In newborn infants Chellappah showed the mean increase between 1 and 2 cm from the anal margin was 0.2°C, and 0.05–0.09°C for every 1 cm beyond this up to 5 cm.³ If the baby strained during the measurement the temperature increased 0.1°C, a change that persisted for up to 5 minutes with the passage of faeces. Morley and colleagues aimed to measure the temperature 3 cm from the anal margin. However, imprecise placement, which is bound to occur, could easily introduce a difference of 0.5°C.

Although they found no correlation between rectal or axillary temperature and time of day (8 am to 8 pm) other studies have shown an appreciable diurnal variation, where the rectal temperature in a normal healthy baby can vary between 36.0°C and 37.8°C.^{4 5} To use a specific temperature to define fever, whether rectal or axillary, is therefore somewhat arbitrary as it will depend on the time of day, the individual, and the activity.

With rectal temperature measurement cross infection hazards and the risk of rectal perforation, small but real,⁶ need to be considered. Furthermore as children get older, comfort and the acceptability of rectal thermometry become increasingly relevant. For these reasons we still favour measuring the temperature in the axilla.

The paper from Morley and colleagues serves to remind us of the problems of taking and interpreting body temperature and it would be unfortunate if the temperature, rectal or axillary, were to become the focus of attention rather than taking a history and examining the infant.

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- 1 Morley CJ, Hewson PH, Thornton AJ, Cole TJ. Axillary and rectal temperature measurements in infants. *Arch Dis Child* 1992;67:122–5.
- 2 Karlberg P. The significance of depth of insertion of the thermometer for the recording of rectal temperature. *Acta Paediatr Scand* 1949;38:359–66.
- 3 Chellappah G. Aspects of thermoregulation in term and preterm newborn babies. Nottingham: University of Nottingham, 1980. (PhD thesis.)
- 4 Anderson ES, Petersen SA, Wailoo MP. Factors influencing the body temperature of 3–4 month old infants at home during the day. *Arch Dis Child* 1990;65:1308–10.

- 5 Wailoo MP, Petersen SA, Whittaker H, Goodenough P. Sleeping body temperature in 3–4 month old infants. *Arch Dis Child* 1989;64:596–9.
- 6 Frank JD, Brown S. Thermometers and rectal perforations in the neonate. *Arch Dis Child* 1978;53:824–5.

Dr Morley and coauthors comment:

If we take an infant's temperature we should do it as accurately as possible, otherwise the measurement may be misleading, the infant interfered with unnecessarily, and precious time wasted.

We know that rectal temperature is dependent on how far the thermometer is inserted. However, we specifically used the temperatures taken by paediatric nurses. These may not always be accurate but they are the material we work with every day. Temperatures taken as a physiological study may be slightly more accurate but do not represent clinical practice. We found that rectal temperature was higher than axillary in 98% of the pairs of measurements and therefore deduced that it must be closer to the true body temperature.

Whatever the imprecision of rectal temperature measurement, axillary temperatures are more imprecise. Axillary temperatures cannot be used as a proxy for rectal temperature, even by adding a 'fudge' factor, because the difference between them is not constant. In 937 pairs of measurements we found wide differences between them, with axillary temperatures from 0 to 3°C lower. If only axillary temperature is measured there will be a few infants who have a normal axillary temperature even though their rectal temperature is high.

We know that body temperature falls at night after the first few weeks. The range of this has been well documented in infants by Wailoo and Petersen. However, we specifically stated that we recorded daytime temperatures and found no variation during this time. This was a cross sectional study, and individual babies' temperature will vary from hour to hour.

The hazard of perforation of the rectum has been exaggerated. The very few reported cases are all in neonates, some of whom may have had a spontaneous perforation. Considering the millions of times rectal temperatures are taken round the world, the risk must be almost infinitely small. There are no reports of rectal perforation in infants after the neonatal period. Both rectal and axillary thermometers may cause cross infection. This can be prevented by simple sterilisation.

We investigated infants, but those who have studied older children also highlighted the inaccuracy of axillary temperature measurement.¹ We entirely agree that temperature measurement plays only a small part in assessing the severity of an infant's illness, hence our papers on the importance of symptoms and signs of illness² and the development of the Baby Check system.³ If we are not going to abandon temperature measurement, we are duty bound to measure it as accurately as possible.

- 1 Kresch MJ. Axillary temperature as a screening test for fever in children. *J Pediatr* 1984;104:596–9.
- 2 Morley CJ, Thornton AJ, Cole TJ, *et al*. Symptoms and signs in infants younger than 6 months of age correlated with the severity of their illness. *Pediatrics* 1991;88:1119–24.
- 3 Morley CJ, Thornton AJ, Cole TJ, *et al*. Baby Check: a scoring system to grade the severity of acute systemic illness in babies under 6 months old. *Arch Dis Child* 1991;66:100–15.