will normally cover about ⅓ and ⅘ of the baby's surface area: if the tog values of the materials are 2 and 10 the contributions to total insulation will be about 0·7 and 8 tog respectively. If no such allowance was made their totals will be overestimates. Second, did they take into account babies' tendency to throw off bedding at night, which may considerably reduce their insulation?

As the authors suggest, comparison of a baby's insulation in bed at night (that is, clothing plus bedding) with insulation before he goes to bed (that is, clothing only) is not really meaningful because while awake and active his metabolic rate may be higher; a more valid comparison would be with insulation used for sleeping in the day.

Finally, it should be noted that the formula of Burton and Edholm that they quote relates to clothing in adults,[2] and its applicability to the bedding and clothing of babies is uncertain.

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Drs Wailoo and Petersen comment:

We are grateful to Dr Bacon for giving us an opportunity to clarify aspects of our paper that we have considered more fully since it was submitted last year.

We are also concerned about the consequences of babies being unevenly and incompletely covered by clothing and wrapping, but allowance cannot be made in the way Dr Bacon suggests. 'Tog value' refers to the insulating effect (standardised to 1 m^2) of fabrics, not garments. A total tog can only be calculated if all fabrics cover the same area, and this reflects total thermal insulation on a body only if it is completely covered, and allowance made for its actual area. It is not accurate to treat a fabric covering part of a body as though it were one of lower insulation covering the whole. Areas of low thermal resistance will shunt heat around those that are higher, and where parts are uncovered the heat flow through them may dominate the total. A fabric of 20 tog over 10% of the body will be very much less insulating than 2 tog fabric over the whole.

The accurate determination of heat flows from various parts of an unevenly insulated body of varying surface temperature is a complex problem, but we can simplify the situation for a baby in its cot by considering it as two parts, a well insulated body under wrappings, and poorly insulated exposed parts such as the head. The figure we quote in the paper is the 'tog value' of the insulation on the *covered parts,* assuming garments such as nappies and vests to be evenly spread under the blankets, which will introduce a small, but tolerable error.

This figure is very useful to examine parental behaviour, but, as we indicate in our discussion, assessing its impact on heat balance is another problem, which we are still considering. Our measurements of surface temperature indicate that 70–90% of the sleeping baby's body heat is lost by the head and other exposed parts. Changing insulation on the body, unless it becomes very low, does not much affect heat loss, but factors influencing heat loss from the head, such as ambient temperature, are critical.[3] In this context, although we did not observe babies throwing off their wrappings, they did often expose their hands, which will in fact have a much greater effect on heat balance.

The formula of Burton and Edholm, which we quote merely for comparison, was modified by Clulow for a baby's metabolic rate and body shape, but did assume a fixed 40% of heat loss from the head, which we now consider too simple. We are working on a more suitable model.

We are now able to report mean (SD) data on wrapping during daytime sleeps: babies are covered with 12·1 (0·9) tog in rooms at 19·5 (1·2)°C, though it is not clear to us whether comparisons between different conditions are useful for anything other than illustration.

We are continuing our studies, and will be able to report more fully on thermal balance in the cot very soon.

References

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2 Burton AC, Edholm OG. *Man in a cold environment.* New York: Edward Arnold, 1955.
3 Anderson E, Wailoo MP, Petersen SA. Keeping babies warm—have we got it right? *Health Visitor* (in press).