Secondly, dietary intakes were recorded between 9 and 20 weeks' gestation (mean 16.3 weeks). Our studies of nutritional intakes in east London have consistently shown that maternal nutrition before the end of the first trimester of pregnancy is related to birth weight. In a randomised controlled trial, although intakes of protein, six B vitamins, and four minerals recorded by 513 women during the first trimester, were highly correlated with birth weight, supplementation with a broad based nutritional supplement starting in the second trimester failed to show a reduction in the incidence of low birth weight.[4] Programmes of nutritional intervention both preconception and during the first trimester with low income women in the United States have shown a reduction in the incidence of low birth weight.[5]

To generalise the failure to find a relationship between low birth weight and maternal nutrition from this limited study is stretching the conclusion far beyond the evidence.

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**Authors' reply**

EDITOR—Doyle et al argue that our failure to detect relations between birth weight and maternal diet was because our cohort was too high in social class and contained too few infants of low birth weight. However, the social class distribution of our subjects[1] was similar to that of a nationally representative sample and to the cohort studied by Barker and colleagues.[2] We based social class on the woman's occupation, or that of her partner if this gave a higher grouping. Using the partner's occupation alone would classify 62% of our cohort as manual/unemployed, compared with 66% of Doyle et al's cohort.[3]

Doyle et al were more interested in low birth weights than in the whole range. We specifically included only term infants—excluding many babies of low birth weight—to permit comparisons with Barker's study. Nevertheless, at the time of recruitment our cohort was drawn from a population with an incidence of low birth weight (6.4%) similar to that of England and Wales (6.9%).[4] Separate analyses using our entire cohort have found no associations between intake of any nutrient and poor outcomes of pregnancy, including preterm delivery and low weight for gestational age.[5] Dietary data were available in our study for 51 mothers who delivered infants of low birth weight (≤2500 g), compared with 28 in Doyle et al's work.

The suggestion that pregnancy outcome is influenced by maternal diet in the first but not in the second trimester contrasts with Barker and colleagues' work. Most women in Doyle et al's project were probably 9-12 weeks pregnant. In our study all women were between 9 and 20 weeks' gestation (mean 16 weeks). Even accounting for morning sickness, it seems improbable that the diets of our mothers would have been sufficiently different a few weeks earlier to have produced completely contrasting results.

Finally, Doyle et al argue that the mothers in our study had diets insufficiently poor to permit us to see a relationship with birth weight. Unfortunately, the distribution of intakes in Doyle et al's study has not been published, so we cannot compare our study with theirs. More than 20% of our cohort had intakes below the reference nutrient intake for all nutrients examined except thiamin and vitamin B-12. We are now analysing the relations between pregnancy outcome and biochemical indices of nutritional status, paying particular attention to factors such as smoking and height, which complicate the interpretation of studies such as those presented by Doyle et al.

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## Assessing palliative care is difficult

EDITOR—Keeley rehearses the problems of recruitment, attrition, data collection, and ethical concerns which make research on palliative care so difficult.[1] We recently conducted a comprehensive systematic review of the evidence for the effectiveness of different models of palliative care, commissioned by the NHS Executive.[2–4]

Our team reviewed more than 800 papers, but despite this volume of literature it was difficult to reach clear conclusions about any of the questions we considered. In addition to those listed by Keeley there are problems in the use of inappropriate outcome measures, the unreliability of using carers as proxies to provide assessments, the heterogeneity of patients receiving palliative care, rapid fluctuations in patients' conditions, and the difficulty of generalising from local evaluations when other local support services vary so widely. These problems should now be familiar to, and anticipated by, researchers and funding bodies. Small scale, underfunded, and underpowered randomised controlled trials can no longer be supported. Well conducted observational studies, qualitative research, and a careful description of the process of care and the context may provide more useful information for evaluating local services.

At the national level, however, it would be possible to conduct a large scale trial of palliative home care teams. This would need to include several sites, with patients randomised by practice or by district.[5] Although such a study would be expensive to mount, it would be a better investment than many small, inconclusive studies. It would also be fully justified in the light of the considerable national investment in different models of palliative care services, when evidence of effectiveness is lacking.

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## Hospitals must become "focused factories"

EDITOR—I agree with Wilson that we will see many more specialised, niche-type healthcare facilities in the future rather than the all purpose giant mammoths that dominate the hospital landscape currently.[1] I believe, however, that this paradigm change will be brought about for reasons of operational efficiency as much as through technological advances.

There is a steep learning curve for most medical interventions. Centres that have a higher volume of cases generally report better clinical outcomes at a lower cost than do centres with a lower volume of cases.[2 3] This phenomenon seems to hold true for most interventions irrespective of the technological sophistication involved.[2 3] The experience of Shouldice Hospital in Ontario, Canada, is typical. The hospital performs only

abdominal hernia repair, a relatively low tech procedure. Yet its excellent outcomes, low relapse rates, and relatively low costs have prompted former patients to celebrate anniversaries of their operations with a gala banquet every year. What is so special about the hospital? It is a "focused factory."

The term focused factory was first coined by Skinner, a Harvard Business School professor, when he argued that complex and overly ambitious factories were at the heart of the American productivity crisis in the late 1960s and early '70s. He concluded that "simplicity and repetition breed competence."[4] The parallel with the current healthcare industry is striking. Costs are soaring while most health indicators have remained static. In short, there is an efficiency and productivity crisis in healthcare provision.

Previous attempts to rectify this problem have met with little success: managed care has so far failed to satisfy Americans, and reforms of the NHS have yet to deliver its promise. It is high time for hospitals to learn how to focus on a limited and manageable set of services. Hospital chiefs must learn to structure policies and supporting services so that they focus on a few explicit objectives instead of many conflicting and inconsistent goals from different clinical departments.[5] Only then can they realise the enormous clinical and financial economies of scale that have made Shouldice Hospital the envy of general surgical units everywhere.

Procedure (or organ system) based focused factories are already proliferating in the form of centres of excellence in some parts of the world.[1] I believe that we should continue to move towards the focused factory model in delivering hospital services. Therein lies one solution to our current efficiency and productivity crisis.

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## Hyponatraemia can be caused by standard fluid regimens

Editor—The article by Bhalla et al highlighted the dangers from giving excessive hypotonic fluids to children at home.[1] The striking omission from their article is that most perpetrators of this are members of the medical community. Hypotonic intravenous fluid continues to be given to hospitalised children on the basis of dogma laid down some 40 years ago, but which survives unchallenged today, even in the light of current understanding of the mechanisms of antidiuretic hormone secretion in acute illness.[2]

During acute illness, a number of physiological stimuli such as fever, pain, nausea, and stress are associated with the non-osmotic release of antidiuretic hormone, thereby limiting the renal excretion of water free of electrolytes.[3,4] The source of electrolyte free water in these circumstances is often not recognised because standard maintenance fluids (4% dextrose with 0.18% saline) are calculated to provide the correct water and salt requirements for healthy children, rather than the correct tonicity for sick children. Under these conditions, treatment with even "normal quantities" of hypotonic fluid will result in the net accumulation of electrolyte free water when antidiuretic hormone acts, and hence hyponatraemia will occur.

When a simple calculation based on a tonicity balance is used, as advocated by Halperin and Goldstein, a "standard" fluid maintenance regimen of 100 ml/kg/day of 4% dextrose and 0.18% saline would result in the accumulation of about 50 ml/kg/day of electrolyte free water (generously assuming that half the water intake is excreted renally or as insensible losses in an acutely ill child when antidiuretic hormone acts). This represents a gain of about 8% in electrolyte free water relative to the total body water (600 ml/kg total body water + 50 ml/kg electrolyte free water) which would proportionally drop the serum sodium concentration from 140 mmol/l to 129 mmol/l (8% of 140) after 24 hours.

The key to avoiding hyponatraemia in this scenario lies in maintaining the tonicity balance—that is, matching what the patient is putting out in terms of both volume and electrolyte content. We hope that the adoption of this simple principle by clinicians will reduce the incidence of hyponatraemia acquired in hospital and its associated complications.

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## Time could be the active ingredient in post-trauma debriefing

Editor—Evidence exists that debriefing after trauma is ineffective.[1] I was one of three psychologists who ran post-trauma debriefing sessions after a fatal accident in a factory. Each psychologist dealt with a group of 10-15 workers and later we compared outcomes.

One psychologist said that staff were angry with management for allowing the accident to happen, but that she had successfully settled them down. The other said that just a little anger had been expressed. No anger had been expressed in my group at all, so I asked the other psychologists what they had said to their groups.

The first had done classic debriefing, warning workers that they might feel anger and other symptoms. The second had talked about how to handle any feelings that might arise, with less emphasis on listing the possible outcomes. I was already suspicious of "debriefing," so I had taken what I called "the Country Women's Association approach." Country women have dealt with disasters for centuries and probably understand trauma better than psychologists do. They put up a tent near the site of the accident, keeping people comfortable, supported, and fed until they feel able to go home. This sounds just like the well tested behavioural treatment called exposure.

So I kept the tea and coffee flowing and protected the group against emotionally disturbing influences until everyone settled down. I explained what we were doing (waiting comfortably for reactions to settle, to prevent fear being learnt). They could relate to that and gave their own examples. I did not pressure anyone to volunteer symptoms. Mostly people just chatted to each other. I prompted people to speak about their best memories of the man who had died. I said that some people might find thoughts coming back and I told them how to deal with that. Anyone who was troubled could see me or ring me. Two people did, both of whom said that they had pre-existing problems and that the accident had brought those problems back to the surface.

So when dealing with people after an accident we need to remember that emotionally aroused people are suggestible. If we suggest that they might feel angry it is likely to come true. And if the secret of treatment is simply to keep people there for 90 minutes or so, feeling safe in the presence of the fearful thing, then we might need to consider eliminating the more confronting parts of the standard debriefing session.

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