surveillance, cannot be exhaustive because it is collected by healthcare staff as part of their routine duties. This necessarily introduces limitations and prohibits superficial interpretation of the results.

Spiegelhalter describes elegantly the limitations of such surveillance data, which are often poorly understood and which can allow hospitals to suffer at the hands of the mass media. Although there is undoubtedly some "overdispersion" within the data on MRSA bacteraemia, this infection is unlike many other transmissible infections and much of the overdispersion results from variation due to unmeasured risk factors, such as the specialty under whose care a patient is in hospital (as a proxy for the invasiveness of medical care received). Analysis of data from a voluntary surveillance scheme for bacteraemia [12] shows that there is no overdispersion after adjusting for specialty (Pearson $\chi^2 = 6119.5$, degrees of freedom = 6011). The inability to remove this additional variation due to risk factors from routine surveillance data also complicates the detection of "problem" hospitals, because the overdispersion factor also includes variation introduced by poor performance.

Despite these limitations, mandatory surveillance of MRSA infection rates has raised the profile of infection control. Infection control is now an essential element of the clinical governance process, with surveillance guiding quality improvement. The paper by Wyllie and colleagues emphasises the importance of certain hospital units as foci of MRSA.[1] In any hospital the data should be used to focus investigation to identify what allows MRSA to flourish in affected units. For example, lack of timely access to surgery to create arteriovenous fistulae for dialysis, resulting in prolonged use of intravenous lines, is a risk factor in renal units.[13]

Some of the limitations discussed here have already been removed through enhancements to the surveillance system in England. The mandatory dataset now includes information on where bacteraemia was acquired and gives dates of admission and infection. Continuing problems with information technology mean, however, that NHS trusts' infection control teams are hampered in collating and manipulating data pertinent to infection control. Improving such systems should be a priority for the national programme for IT (NPfIT), delivered by *Connecting for Health*.

In the meantime teams need interim solutions, possibly based on the linkage technology described by Wyllie and colleagues.[1] We also need robust multicentre studies to assess the efficacy of interventions. Lastly, it is time to turn the spotlight on bacteraemias caused by methicillin sensitive *Staphylococcus aureus*, whose prevalence is also rising.

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The need for outcome measures in medical education

Complex educational interventions demand complex and appropriate evaluations

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How can we ever be sure that educational approaches such as problem based learning are better than traditional ones? Change merely for the sake of change is futile. Changes in medical education should lead to better outcomes, but what is the best way to show cause and effect?

For simple research questions straightforward methods suffice, but more complex questions require more complicated study designs. A question such as "Is drug A more effective than a placebo?" is highly relevant, and the methods needed to answer it may be relatively straightforward. However, the question "Why does drug A lead to a better outcome than a placebo?" is more complicated, and "Does using drug A lead to better health for the population?" even more so. Answering more complicated questions often requires a programme of research rather than a single study.

Some authors would say that a randomised controlled trial is the best way to answer a question such as "Is problem based learning more likely than

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traditional education to produce good doctors?"[1]—and some would even say that anything less was unethical.[2] Others argue that randomised controlled trials of large scale educational interventions are doomed to failure and should not be tried.[3]

In this week's *BMJ* Tamblyn and colleagues report how they have taken up the gauntlet. They did not do a trial, however: they compared the quality—using a range of outcome measures—of the doctors who graduated before and after the introduction of a problem based learning curriculum.[4] They found interesting differences between the groups, thus providing important material for debate and further research. The design of the study also provides food for thought.

Deciding whether problem based learning produces better doctors requires, at least, clear consensus on what constitutes a better doctor. In trials of therapeutic interventions the outcome of each patient's management is a product of the interaction between multiple variables. These include the patient's personal characteristics such as age, sex, social status, type of disease, and concordance with treatment, as well as healthcare issues such as travelling distance to hospital and availability of diagnostic facilities and support staff. Furthermore, societal factors such as litigation and rationing may limit doctors' options. Comparing two cohorts while controlling for all these confounding variables is a tall order.

In addition, there are many factors in doctors' lives other than the formal educational system that may influence their performance. These encompass not only personal preferences but also the time lag between education and starting practice and the influence of further specialist training.

Lastly, the authors' selection of outcome measures may prove controversial. For example, a doctor's rate of carrying out breast cancer screening, even if it is an indicator of other preventive work, may not necessarily be a good indicator of overall medical competence and performance.

Does this mean that changes in competence and performance are not measurable and that evaluation is pointless? We think not. It is essential to collect such data, not only to seek evidence for the notion that some broad changes in education are for the better, but also to gain more insight into exactly which elements of education work best. A single large scale study is unlikely to achieve all of this.[5] Nor will research that looks only at one dimension using oversimplified outcome measures[6] or describing no more than convictions or beliefs. Evaluating a complex educational intervention such as a new curriculum demands a complete programme of research.[6 7] Studies such as that by Tamblyn and colleagues add pieces to the puzzle rather than provide definitive answers.

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Detecting fabricated or induced illness in children

May now necessitate controversial surveillance tools

Fabricated or induced illness, sometimes called Munchausen syndrome by proxy, occurs when a carer fabricates the impression of illness in a child, sometimes deliberately harming the child to produce signs.[1] The syndrome is uncommon but is associated with mortality of around 10%.[2] The increased risk of unexplained death in siblings of children identified as having fabricated illness[3] shows that the syndrome may be underdetected and current methods for identifying it are underdeveloped.[4] The validity of the concept of fabricated or induced illness is accepted by expert professionals but has been rejected by some medical correspondents, senior politicians, and members of the public.

The commonest methods for inducing illness seem to be poisoning, including the misuse of prescribed medication, and suffocation (which is also the cause of some cases of apparent sudden unexplained death in infancy—cot death).[3] Poisoning—although not the identity of the perpetrator—may be confirmed by toxicological testing of specimens from the child but with suffocation, should the child survive, observation of the abusive act seems to be the only method of confirmation.[5] Covert video surveillance of infants in paediatric units is one such form of observation. Although in principle an ethical investigation, it potentially infringes civil liberties and risks exposing a child to harm, and currently is rarely practised in the United Kingdom. Its use is governed by the Regulation of Investigatory Powers Act 2000 under the European Convention on Human Rights. The accompanying guidance identifies "public health," "public safety," and "preventing and detecting crime" among acceptable reasons for such surveillance outside the home,[6] so its use in hospital may be motivated by appropriate health or safety concerns. Unhelpfully, only crime is mentioned in the guidance for its use in fabricated or induced illness.[1]

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