Medical care is too complex to be carried out from memory alone

One of the more striking findings of the Anaesthesia Sprint Audit of Practice (ASAP) [2, 3] is the continuing wide national variation in anaesthesia practice for hip fracture, variation which remains similar in extent to that found throughout the modern era of hip fracture treatment [4–6].

Some variation in practice is inevitable, as a natural consequence of pathophysiological differences between patients. However, the frequency distribution of age and comorbidity is too homogenously nationally to account for the variation entirely: hip fracture patients are as ‘similar’ in Brighton as they are in Nottingham, Peterborough or elsewhere. Similarly, relatively few hip fracture patients are ‘complex’: only 2.9% are admitted with a Nottingham Hip Fracture Score of 8/10 or more (and 11.2% ≥ 7/10). Non-patient ‘artificial’ factors, therefore, appear to account for the majority of the variation measured. Anaesthetists are undoubtedly providing what they believe to be the safest care, but organisational, educational and cultural factors are affecting the way in which anaesthesia care is delivered to hip fracture patients, and as a consequence, a spectrum of care occurs.

Some hospitals and some practitioners are delivering high-quality anaesthesia care, achieving high rates of nerve block administration (92% in Ulster Hospital) and low rates of intra-operative hypotension (37% in South Tyneside District Hospital), for example [2]. Other hospitals and individual practitioners are delivering what would be considered unusual or poor care by any measure, particularly in relation to the quasi-legal professional standards described by the AAGBI management of proximal femoral fracture guidelines [7] – 3.5 ml 0.5% hyperbaric bupivacaine or more were administered intra-thecally to 47 patients during the three-month ASAP data collection period (and ≥ 3 ml to 925 patients), for example.

Variation in practice
In part, artificial variation in anaesthetic practice for hip fracture surgery results from a lack of evidence on which to base care. A ‘cycle of uncertainty’ exists – if all practitioners administer different anaesthetics, then observational studies cannot easily identify best practice (particularly if data collection is sporadic and inaccurate), which, combined with a historic lack of research, makes it difficult to publish useful meta-analyses, reviews and practice guidelines, which means that practitioners continue to administer different anaesthetics. Focused research would help to answer some of the more urgent questions about how best to anaesthetise patients with hip fracture, but can be difficult and expensive [8, 9].

Such uncertainty is compounded by a lack of formal professional education. Very few anaesthetists have received practical training in how to anaesthetise hip fracture patients to a very high quality (we certainly didn’t) and commonly admit to transferring knowledge from extensive formal training in obstetric anaesthesia, where patients are younger, fitter and at very low risk of anaesthesia-related complications. In addition, the prevailing cultural norm of discussing medical knowledge periodically in groups but applying it as individual practitioners is perfectly designed to delay the implementation of new knowledge and is at odds with technological advances in communication [10].

Standardisation of practice
Encouraged by the overwhelming enthusiasm of the anaesthetists who collected data for the ASAP project, and by advances in accurate, real-time electronic data collection, we...
believe a second method of radically improving evidence-based anaesthesia care for hip fracture is now possible: if anaesthesia care for hip fracture is standardised nationally, based on current best practice evidence, then continuous audit should be able to determine whether adherence to the standards improves outcome compared with non-adherence, with subsequent modification of the standards according to this (and other research) evidence [11]. This is a continuous, dynamic process of evidence-based practice change.

In fact, this idea is not as revolutionary as it sounds, even within the field of hip fracture care. As the national Trauma Czar Professor Chris Moran pointed out at the professional launch of the ASAP report at the AAGBI in July 2014, national improvements in the mortality and process outcomes of hip fracture patients in England, Wales and Northern Ireland have been achieved almost entirely by standardising orthopaedic, orthogeriatric and organisational care according to the British Orthopaedic Association Standards for Trauma [12], incentivising hospitals financially to comply with these standards as measured by the National Hip Fracture Database [13] and altering the standards to incorporate new evidence [14]. He stated – embarrassingly – that the only professionals within the multidisciplinary care team not to have so far standardised their practice were anaesthetists, and that standardisation would be likely to deliver greater patient benefit than any specific concern about what anaesthetic drugs are used or who administers them.

The Anaesthesia Sprint Audit of Practice confirmed that the conduct of anaesthesia appears to affect outcome after hip fracture surgery [2, 3]. It reported a significant association between a lowest recorded mean arterial pressure of less than 60 mmHg and significantly higher 30-day mortality ($p = 0.0039$), echoing recent findings from the USA [15, 16]. Further research is needed to establish a causal link, but it is plausible to consider that intra-operative hypotension might lead to organ hypoperfusion, manifest as confusion, dysrhythmia and acute kidney injury, and so to increased postoperative mortality and morbidity, and poorer rehabilitation. Intra-operative blood pressure control is exclusively an anaesthetic concern, and yet the prevalence of hypotension varies markedly between and within hospitals (37–96% if defined as lowest intra-operative systolic blood pressure < 100 mmHg).

If we accept that how anaesthesia is administered makes a difference to outcome, then we have to accept that ‘artificial’ variation created by the way anaesthetic practice is set up and managed will differentially affect outcome, resulting in avoidably inconsistent care across the country [17]. Some patients will receive less safe care or have a poorer experience of care than they might receive at another hospital, or from another anaesthetist in the same hospital. This is an anathema to our profession, which is built on the foundations of patient safety and delivering a positive patient experience.

Standardisation reduces artificial variation in care and achieves high levels of safety and performance through consistency and reliability, in the face of considerable hazards and operational complexity [18]. In healthcare, standardisation is particularly beneficial when implementing evidence-based care for large numbers of patients with a similar disease process, for whom current treatment is costly, has poor outcomes and is recognised professionally as being of sub-optimal quality – all of which apply in hip fracture [17].

**Standardisation vs. professional autonomy**

There is dynamic tension within healthcare concerning the balance between standardisation and intuitive flexible management of complex situations [19]. Although we may not like to admit it, the vast majority of the healthcare we deliver exists at the ‘routine’ or ‘limited variety’ end of the spectrum.

More than any other specialty, anaesthesia has accepted that the professional autonomy of the clinician to decide how treatment should be given is sometimes less important than that the treatment should be delivered safely. We deliver standardised anaesthesia daily, having checked our machines and labelled our syringes. We resuscitate patients according to Advanced Life Support (ALS) protocols. We participate in the WHO checklist, as an aide-memoire for providing consistency within the complexity of modern healthcare [20]. Professional involvement in standardised orthopaedic enhanced recovery
programmes has delivered improved patient outcome [21] and experience [22]. Every mother in the obstetric unit is unique and individual but, by and large, the obstetric anaesthesia community has developed, and enforced, highly protocolised care. We would argue that hip fracture patients are similarly unique and individual, but that does not preclude us from having clearly defined strategies and aims for their care.

Standardised care should be seen as a valuable resource rather than a threat to professional autonomy by replacing physician-individualised care [10, 23]. As professionals, we are accountable not only for continuous and sustained quality improvement [24, 25], but also for maintaining standards, assessing risk and avoiding failure. If we know standardised care improves outcome, we should deliver standardised care, unless we judge that deviation from standardised care is more beneficial for patients. By reducing artificial variation, standardisation allows anaesthetists to concentrate on improving specific aspects of care for the individual patient, with the knowledge that fundamental care is being reliably and consistently provided.

Similarly, it is hard to justify care provision on the grounds of experience alone: whereas there is some published evidence that standardised care improves patient outcome compared with non-standardised care, there is no published evidence that favours physician-individualised care over standardised care [26]. Of course there may be problems as anaesthetists learn or relearn new skills or techniques in order to deliver new standards, but delivering standardised care benefits patients in the longer term. Anaesthesia should not be delivered in a way that is for the anaesthetist’s benefit ahead of their patients.

None of the above commentary in any way diminishes the need for highly trained anaesthetists with the knowledge, technical skills and non-technical skills to manage time-critical, information-poor or target-conflicted situations, but standardisation is part of our armamentarium to reduce the need for these high-risk decisions. If we needed surgery, most of us would prefer a surgeon who operated calmly with the reassurance of having done the same thing the same way a thousand times before, but also with the ability to manage a rare complication. To quote Martin Bromiley, airline pilot and chair of the Clinical Human Factors Group in the UK – ‘standardise until you absolutely have to improvise’.

Changing practice
How might standardised anaesthesia be introduced? If we accept that standardisation is potentially beneficial, then we have to decide a starting point, based on the best evidence available to us currently. The evidence is far from perfect; scepticism about the evidence base on which new standards are based is healthy – essential even – to the scientific method of knowledge accumulation, but does not provide any justification for persisting with a technique that is not evidence-based, particularly if the sceptic does not participate in collecting evidence to support or refute the evidence base.

What we are proposing in the first instance is to produce a pragmatic first draft of standards that are based on best current evidence where available and consensus opinion where not, and which are specific, measurable and achievable. These will be published online and publicised via the Hip fracture Perioperative Network (HiPPeN) for comment, and revised accordingly. Anaesthetists will also be asked to indicate their enthusiasm for adopting these standards individually and as a clinical department. A revised draft of the standards will be trialled in a number of pilot hospitals, revised again according to the feedback received and then made available nationally, as part of a comprehensive ‘Anaesthesia for hip fracture repair’ hospital information pack. We are proposing that data collection about compliance with these standards should occur for one week every three months initially, involving the National Hip Fracture Database to enable data protection.

Several further factors will need to be taken into account when introducing these standards. Firstly, there needs to be evidence-based discussion about what anesthesia-specific outcomes will need to be recorded in order to monitor whether compliance with standards correlates with improvements in care. Clinically, it is likely that additional information will need to be collected about, for example, intraoperative hypotension, early postoperative delirium (perhaps using the
4AT score [27]), analgesia and time to mobilisation. Equally importantly, we intend to collect patient-reported outcome measures.

Secondly, we would like to find out why anaesthetists deviate from the standards. In many cases, there will be patient-specific indications for deviation that will provide valuable feedback when modifying compliance targets and developing the standards in future. However, by seeking comments from anaesthetists on a per patient basis, we hope to be able to identify where there is evidential uncertainty (and so guide future research) and where there are training needs (and so guide departmental and national training days). We hope that the availability of regularly reviewed supplemental information about the standards will help decision making, and guide clinical practice specifically for anaesthetists who are in training or who care for hip fracture patients only occasionally.

Finally, it needs to be re-emphasised that the introduction of national standards should be a continuous quality improvement process [11]. The process itself will generate information about directions for future research, the results of which, together with other published research, will need to be systematically fed back into the evidence base, with the standards modified accordingly. To this end, we will coordinate an open access online database library of research questions and priorities, current evidence and proposed trial designs (www.hipfractureanaesthesia.com).

Progress in hip fracture anaesthesia has remained static for the past 30 years, resulting in avoidable inter-individual and institutional variations of care above and beyond those determined by clinical differences between patients. The current management of hip fracture patients is an anomaly in clinical anaesthesia, which has otherwise developed as a profession that delivers safe standardised care of the very highest quality. Standardisation has been shown to reduce care variability and improve patient outcome, including the management of hip fracture patients. The introduction of national standards of anaesthesia for hip fracture can coherently be expected to have similar benefits, and add to the ongoing national improvement in care for this most vulnerable of patient groups.

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Climate change in cardiothoracic intensive care

A recent article in this journal investigated the link between individual cardiac anaesthetists and mortality as an outcome and concluded that publication of individual anaesthetist mortality was unwarranted [1]. The accompanying editorial described this as a fundamental question and called for further outcome research into cardiac surgery outcomes [2]. Cardiac surgeons in the UK and the US have of course become familiar with this kind of disclosure of individual and unit mortality [3–5]. The choice of mortality as an outcome is widely questioned and is considered by many as too blunt an instrument to measure the quality of a service. What is indisputable is that it is easy to measure and definitive. Needless to say, it is also an outcome that is very important to the patients and their families.

Whose outcome is it anyway?

Critical care is a crucial, although not necessarily essential, part of the pathway for cardiac surgical patients and management therein is a major contributor to outcome. Cardiac surgeons have, correctly in my opinion, identified the current

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