

Partnership and rigor in improving patient care

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The Health Quality and Safety Commission (HQSC) was created in 2010 to promote improvement in health and disability services for all New Zealanders. One way to improve outcomes for patients is through implementing evidence-based guidelines to reduce inappropriate variation in practice. Unfortunately this is notoriously difficult to do.¹⁻³ In this edition of the Journal, Gray et al report the latest episode in a story about such an endeavour that has been a notable success—first overseas, then in Counties Manukau and now in New Zealand nationally.⁴

The story began just over fifteen years ago at Johns Hopkins Hospital in Baltimore, where Peter Pronovost (an intensivist) led the successful implementation of an infection control guideline to reduce central line associated bacteraemia (CLAB)—a problem previously held to be integral to the use of central venous lines (CVLs).⁵ Pronovost's team used a novel improvement model that drew from principles in the human factors literature and also addressed barriers to the uptake of guidelines identified by Cabana et al.¹ The model included four relatively generic interventions to improve the sterile insertion of a CVL.

1. Education: about the problem and the solution.
2. Facilitation of compliance: in this case, creating a catheter insertion cart to provide everything needed to follow the guidelines.
3. A checklist: to avoid missing key elements of the guidelines.
4. Insistence on compliance: empowerment of nurses to stop the procedure if the guidelines were not followed.

It is relevant that the elements of the guideline on CVL insertion itself (hand hygiene, chlorhexidine skin antisepsis, maximal barrier precautions, optimal catheter site selection) were supported by evidence.⁶ A further evidence-based element was implemented as a fifth, less generic, intervention:

5. Asking daily (in the ICU or on the ward) whether the inserted central venous catheters could be removed and prompt removal when no longer needed.

The median rate of CLAB per 1,000 catheter days decreased from 11.3 infections in the first quarter of 1998 to zero in the last quarter of 2002. It was estimated that 43 CLABs, eight deaths, and USD 1,945,922 had been saved. In the now famous Keystone Project, Pronovost and his team then implemented this “bundle” in 108 ICUs in the state of Michigan (103 reported data). The mean rate of CLAB per 1,000 catheter-days decreased from 7.7 infections at baseline to 1.4 a year and a half later.

Dr Mary Seddon, in her role as Clinical Director of the Quality Improvement Unit at Counties Manukau District Health Board, noticed this work and engaged senior ICU clinicians at Middlemore Hospital in discussions on its merits. She gained agreement to adopt four out of five of the elements of the bundle (subclavian placement being the exception). This group reduced the mean CLAB rate in their intensive care unit (ICU) per 1,000 line days from 6.6 in 2008 to 0.9 in 2010. They estimated cost savings at NZD 200,000 in 2009 and NZD 260,000 in 2010.⁶ They then extended this initiative to the rest of Middlemore Hospital, and decreased the hospital-wide rate of CLAB per 1,000 days from 7.04 to 1.37.⁷

It has been alleged that New Zealand's 20 DHBs often fail to learn from each other. Not so this time. These extraordinary gains in patient safety have now been extended to the whole country. The national average rate of CLAB per 1,000 line days has been reduced from 3.32 at baseline to 0.28 in March 2013. Between April 2012 and March 2013, an estimated 90 incidents of CLAB were prevented with a savings of NZD 1.8 million. More importantly, much suffering and some loss of life has been averted. Furthermore, the changes in practice that have brought about this substantial improvement in patient safety appear to have become embedded in New Zealand practice. Data from the HQSC show that the reduction in CLAB rate has been maintained, with fewer than 0.5 CLABs per 1,000 line days since March 2013. There were only 28 instances of CLAB in the entire country between April 2013 and December 2014, 160 fewer than would have been expected had the baseline rate continued. HQSC have calculated that by December 2014, the savings generated by avoided CLABs were in excess of NZD 5 million.

If this story can go from Hopkins, to Michigan, to Middlemore, to New Zealand... is the next step The World? Possibly not. There are many other places where the CLAB bundle has been successfully adopted and implemented (Gray et al provide examples), but the national success reported here would be difficult to replicate in some countries. It is worth reflecting on some of the factors that facilitated this success in New Zealand. In this respect, Gray et al outline several elements of the improvement method as applied by the "CLAB Zero" team more than a decade after the first work at Hopkins. We would like to expand on some of these points and add one or two others.

Foremost to add is the leadership of Mary Seddon in this matter. To have followed the literature, understood its implications and then mobilised support for adopting its messages at Middlemore is impressive enough. In addition, the understanding of the importance of measuring the impact of the practice changes at Middlemore and publishing the results was masterful: the Middlemore data were critical to taking the CLAB Zero campaign nation wide. People seem more compelled by local data than by

data from overseas. In part this may reflect something emotive in one's response to information from various sources, but there is also a legitimate question of context. It is not a given that findings from different countries will apply in the particular healthcare setting that pertains in New Zealand. It was worth demonstrating that the problem was as real here as anywhere else and that the solution could be applied here with as much success as in the US. Following root causes (in this case of positive events), one step further back in the chain leads to Geraint Martin, CEO at Counties Manukau. This CEO established or fostered the infrastructure and environment at Counties Manukau that enabled these efforts to succeed—the Quality Improvement Unit directed by Dr Seddon, and the Centre for Health System Innovation (Ko Awatea) directed by Professor Gray. Engagement of senior hospital administrators in the quality of the services their organisations provide is essential for high standards of quality and safety to flourish, and is becoming increasingly apparent in New Zealand. Similarly, the Government, in establishing the HQSC, created a national agency with an explicit focus on improving quality, and therefore was ready, willing and able to partner with, support and fund the team from Ko Awatea in extending this initiative to the whole country. The overall culture of healthcare in New Zealand also deserves credit. The collaborative methodology used in this project will have found fertile ground in our workforce. Our health professionals are highly networked and are already in the habit of working together, inter-professionally, to solve problems. Gray et al mention the peer-led nature of the campaign (Dr Shawn Sturland was the clinical lead), and we agree with the importance of this, both in making the initial change and in ensuring that improvement is sustained and embedded by the time the program concludes. We note that a focus on clinical leads, respected by their colleagues, underpins all the work of the HQSC. Flexibility is also mentioned, and again we agree. Notably, insufficient flexibility to concede on the question of the optimal site of CVL insertion would probably have been a deal breaker.⁶ Also, the latter parts of the campaign were probably helped

considerably by the introduction and open publication of a relevant quality and safety marker by the HQSC—this was a novel element of the New Zealand campaign, not seen in previous initiatives or elsewhere, and not necessarily an approach that all who espouse quality improvement over quality assurance would find entirely comfortable. This is to some extent understandable: the potential perverse effects of ill-conceived accountability regimes are well known.⁸ However, well-conceived and clinically relevant measures can support quality improvement efforts. It is notable that compliance with the insertion bundle increased even further from 80 to 95% following the introduction of the Quality and Safety Marker.⁹ In our opinion, there are many ways to skin a cat, and the worn term “multifaceted approach” has currency.

One of the challenges in improving patient safety is obtaining convincing evidence of success. This raises an interesting question: in the context of healthcare, is there a fundamental difference between quality improvement and research? In the US, this very question was asked about the Keystone Project, and generated an interesting debate in the literature, summarised by Savel et al.¹⁰ One aspect to consider is the question of equipoise and risk to patients. Even in the first chapter of the story, at Hopkins, there was neither equipoise nor risk: the intervention amounted to asking clinical staff to do what everyone agreed they ought to be doing anyway, on the basis of a synthesis of the best available evidence. What was at stake was simply whether clinicians could be persuaded to adopt best practice. This is one distinction that does separate many quality improvement initiatives from more traditional research. However, there are many ways in which good ideas can go astray, and we do not think that this difference reduces the need for the public to be able to rely on the results claimed by those who seek to improve the quality and safety of our health services (Ko Awatea and the HQSC included). Many of the approaches advocated in what is often called “safety science”

are aimed at accelerating the process of improvement, for example through the use of iterative plan, do, study, act cycles as seen in this New Zealand project. This accelerated and flexible approach may at times raise questions of rigor when it comes to evaluating results. The Agency for Healthcare Research and Quality recently convened a panel to consider how to improve the conduct and reporting of interventions to improve patient safety.¹¹ It turns out that there is little difference between the underlying principles of any clinical research and those recommended for robust initiatives to show demonstrable improvement in patient safety. Perhaps after all there is only “science”. The starting point should always be a sound theoretical construct—a clear reason why the proposed intervention is likely to produce a particular improvement. The intervention should be described in sufficient detail to allow others to repeat it. Context is critical, and must be adequately described. The process of implementation must also be adequately described, including details of how the intervention changed over time (if it did). Outcomes need to be meaningful. Possible unexpected effects should be reported or discussed. And the health economic implications of the intervention should be considered. In our view, the paper by Gray et al is a good model for a quality improvement initiative that meets these expectations, and we have confidence that the improvements claimed are both real and worthwhile.

It is a great credit to all concerned, most particularly the doctors and nurses who care for patients who need CVLs, that the CLAB bundle is now so embedded in practice in New Zealand that the HQSC has been able to stop monitoring this problem and move its limited resources on to other important priorities for improving the health services of New Zealand. This, perhaps, is the hallmark of worthwhile quality improvement: improvement that has become sustained because a return to former, lower quality approaches has become unthinkable.

Competing interests:

Professor Merry is Chair of the Health Quality & Safety Commission New Zealand (HQSC).

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