

Part 2: The ‘inside-out’ quality surgical care model

To improve the quality of surgical care in Africa, and other low resource environments, ASOS and ASOS-2 have provided much learning. The anguish following the results of ASOS-2 trial led to hundreds of hours discussing the results and the implications for improving surgical care with Rupert Pearse, Pierre Barker, Rowan Duys and others. The process evaluation provided amazing insight into the mistakes we made in ASOS-2, and has given fantastic signals on what needs to be done to improve surgical care in Africa.

There are six generally accepted core challenges facing healthcare systems, originally described by Bate et al.¹ (2008) and then adapted by Vincent et al. (2010)² which we need to address if we want to improve the quality of surgery in low resource environments, and make surgery safer (Table 7). These challenges include structural, cultural, emotional, educational, physical and technological, and political challenges. To overcome these challenges, I propose that we need three complementary approaches to improve care. All three are needed if we are to make surgery safer in Africa.

Table 7. The challenges facing healthcare systems¹

Cultural challenges: problems related to giving quality a shared collective meaning, value and significance within an organization
Educational challenges: problems related to training and nurturing the learning process
Physical and technological challenges: problems related to designing physical systems and technological infrastructures that support improvement and the delivery of safe, high-quality care
Emotional challenges: problems related to motivation
Political challenges: problems related to engaging the relevant parties, negotiating conflict and relationships and broader socio-economic challenges
Structural challenges: problems related to structuring systems, planning for adequate resources (finance, infrastructure, equipment and workforce) and coordinating stakeholders

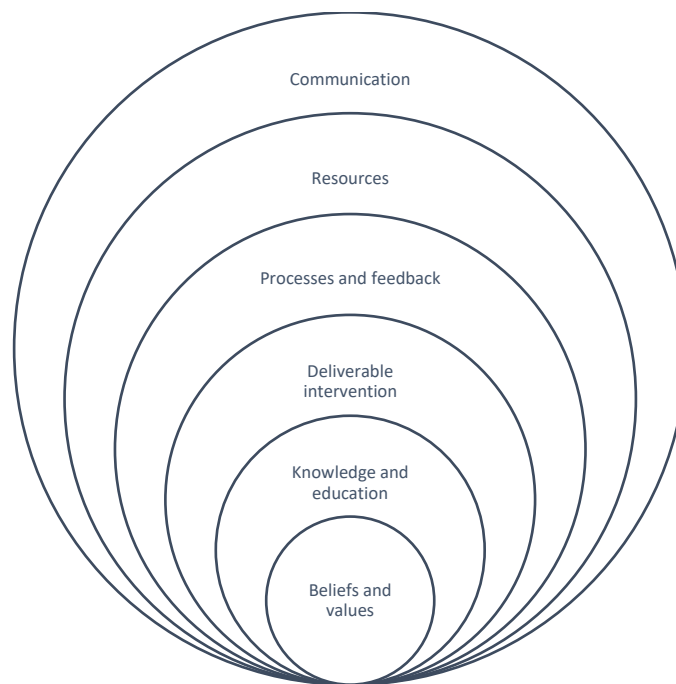
The first approach centres around optimising our delivery of care in the workspace (which includes addressing the emotional, cultural, and educational components associated with care). This is about providing the best care possible within the current work environment. This strategy centres around the people, relationships and processes within a hospital. The second approach deals with creating an enabling work environment by addressing the structural challenges (or rather the environment in which surgery is delivered). These structural challenges are around resources; both physical (infrastructural and technological) and human (in terms of numbers, skill sets and education). This about capacitating hospitals so that the surgical teams so that they can provide the necessary surgeries required in this environment. The third and final approach addresses the societal challenges (which includes politics, the community, and advocacy).

A model to improve surgical health in low resource environments

For the first approach I propose a healthcare provider model for ‘quality surgical care’ based on the work of Schein,³ Chandauka⁴ and the findings of ASOS-2⁵ This model focuses on individual excellence and system excellence. This is a stepwise model where each step is dependent on the delivery of the previous step (Figure 3). If we do not address the steps sequentially, the subsequent steps will be compromised, and the ability to provide quality

surgical care is likely to fail. It is therefore important to sequentially address the ‘values and beliefs’ of the team, then the ‘knowledge and education’, and then the team agrees upon a ‘deliverable intervention’, provides the support for this intervention through ‘processes and feedback’ and finally removes the ‘ceiling effect’ of limited ‘resources’ on delivery of quality care. This whole model is cradled by ‘communication’, as each step is dependent on effective and clear communication.

Figure 3. The ‘inside-out’ quality surgical care model



At the centre of the model are the ‘beliefs and values’ of the individuals and the ‘organisation’. The ‘organisation’ represents the surgical team. It can represent a small group, such as the surgical ward, or the bigger ‘organisation’ such as the hospital. The beliefs and values of the ‘organisation’ must be aligned with the vision of improving the quality of surgical care. If the individual’s beliefs and values are inconsistent with the ‘espoused’ values of the ‘organisation’,³ then there will be no chance of improving the quality of care.

Once the beliefs and values of the individuals and the ‘organisation’ have been discussed and determined to be sufficiently aligned to improving the quality of care, then it is essential to ensure that the team has the ‘knowledge and education’ to understand why these evidence-based interventions are needed to improve care. At times this ‘knowledge and education’ step may also support the understanding necessary to galvanise the values and beliefs of the team consistent with the broader vision. Only once these two steps have been navigated, will the team understand why we plan to do what we want to do, and how it could improve patient outcomes.

Then it is time to provide a ‘deliverable intervention’. A ‘deliverable intervention’ has three components. The first is it needs to be simple. Too many steps would decrease the ability to deliver the intervention with the fidelity necessary for successful implementation. We must resist an intervention which is dependent of many components for delivery. Many components decrease the fidelity of implementation and would set ourselves up for failure. Secondly, the health care providers need support in their practice, to implement the intervention. Ideally, this should include training and group problem solving. Finally, frontline workers and more junior

colleagues need some autonomy to ensure that implementation of care starts early, before more senior clinicians have made their way to treat the patient. Time saves lives. This is the ‘golden hour’ concept of early intervention to save lives.

The next stage is to develop the processes needed to support the proposed care interventions. Once, the team is comfortable with the knowledge and understanding of addressing the challenge of providing the quality care intervention, then the processes need to be co-developed within the surgical team on the ground. Individuals within the team need ownership to buy into the delivery of the intervention. They need a voice to explain why some interventions won’t work or need to be reworked to fit in the local clinical care pathway. This is an iterative process, of trial and error, with checking and feedback. To ensure compliance with the processes, auditing and feedback on process adherence is needed. Process adherence must be supported by regular feedback on both the processes and the outcome of interest. The knowledge and educational base of the quality surgical care intervention needs to be current, to ensure that the processes supporting implementation remain appropriate. Each team member needs to understand the impact of the processes on the implementation of the quality surgical care intervention. Only then will the team be able to continue to refine and improve the processes necessary to support the intervention.

Regular feedback sessions need to be part of the clinical culture, which track the quality outcomes, the adherence to processes and the implementation of the intervention. It is important to embed effective processes in the culture of the team and the ‘organisation’ by auditing of the processes. This can be supported by policies which embed the processes in clinical care.

However, there will be a ‘ceiling effect’ to the quality of care attainable which is determined by the resources available. This ‘ceiling’ is dependent on the organisational infrastructure and the healthcare providers available. To break through the ‘ceiling’, it is essential that improving resources are strategically addressed to continuously move towards (at the very least) the ‘minimum standards of care’ agreed upon internationally.

Importantly, across all these levels of care, communication is an overarching factor. Even if the values and beliefs, knowledge and education, processes, and resources are aligned, it is essential that communication is appropriate, informative, kind and compassionate. Poor communication can break down the best attempts at improving the quality of care, even in a system which appears to have a functional organisational model. This was seen in the ASOS-2 process evaluation results, where a steep hierarchical team structure resulted in little teamwork, and subsequently poor implementation of the surgical quality improvement intervention.⁵ Quality care is not built on ‘barking orders’ but rather collaborative care.

The Institute for Healthcare Improvement (IHI) has a white paper on ‘improving joy in work’.⁶ It begins with ‘what matters’ to individuals, and the identification and removal of the impediments to joy. This strategy is similar to the ‘beliefs and values’ approach in the model to improving the quality of health care. If individuals and teams find value in their work, then there will be hope for quality clinical care. Focussing on helping people find value in their work is an important early component of ensuring that a team will then have the commitment to ensuring an intervention will work.

This is the ‘inside-out’ surgical model of quality care. It starts at the inside with core of ‘value and belief’ systems, and then moves outwards with ‘knowledge and education’ of the clinical

problem to be addressed and then what can be done to improve it, followed by the provision of the processes needed to support the proposed quality intervention, while ensuring feedback on the outcome (which is the ‘quality of care’) and adherence to the processes necessary to support the quality care intervention. This ultimately moves out towards the available resources which may limit further delivery or expansion of the intervention.

Rowan Duys is a colleague in Cape Town, an anaesthesiologist and implementation scientist, who views the ‘values and beliefs’ core as a Trojan horse. He believes that if we can inculcate common ‘value and beliefs’ consistent with quality improvement within our workspace then ‘*a health system will ultimately heal itself.*’ I believe this is possible, especially in Africa, and possible other low resource environments as the ‘espoused values’ of the clinicians in these difficult settings are consistent with a caring, self-improving health care environment.^{7 8} This is evident by the positive response of the clinicians in Africa to the distressing findings of the ASOS study that patients were twice as likely to die following surgery in Africa, and women were 50 times as likely to die following caesarean deliveries. They rapidly established and executed the ASOS-2 trial which was a massive undertaking, especially considering that it was essentially unfunded and was conducted without any additional support. Instead of being overwhelmed by the enormity of delivering the clinical trial, the response across Africa was to get the trial done as fast as possible in the hope that the proposed intervention would ultimately save thousands of lives.⁹ However, for the clinicians across Africa, the failure of the ASOS-2 trial to show survival benefit,¹⁰ I believe has led to a pivot from a ‘challenge’ to decrease mortality following surgery to a ‘cause’ to enable a quality surgical health care system in Africa.

Beliefs and values

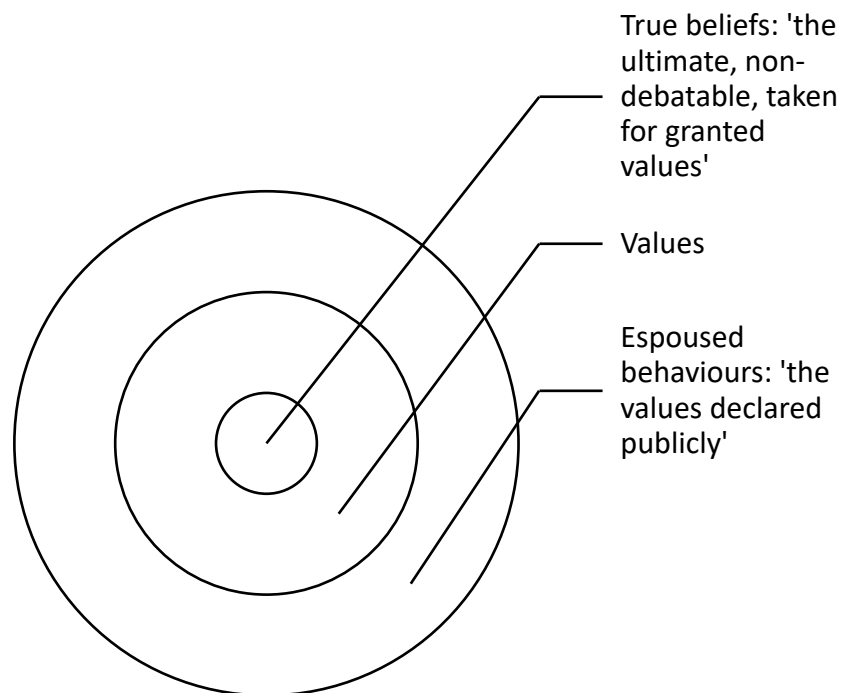
Beliefs and values in healthcare

I was at a meeting in Prato, Italy, which is a short distance from Florence. It was a clinical trialists meeting and as a nerd, it is a highlight of my year. I was presenting our plans for the proposed ASOS-2 trial, and how we could change surgical outcomes in Africa through the simple intervention of increasing postoperative surveillance of high-risk patients. We would ensure that any complications that occurred postoperatively would be identified early, and catastrophic outcomes averted. Shortly after my presentation, PJ Devereaux who has always been a fantastic mentor to me, walked up and simply said; ‘*Bruce, just make sure that the clinicians do the intervention.*’ I have been fortunate to work with PJ as a collaborator on some of his global projects. Like the giants of evidence-based medicine, Sackett, Guyatt and Yusuf who had mentored PJ, PJ was informally mentoring me on that balmy July afternoon in Prato. Research in the perioperative space is not easy, especially in low resource environments. To generate good evidence on whether an intervention works or not, one must ensure that the clinical trial itself is well conducted and delivers the proposed intervention in the trial. Failure to deliver the intervention makes it difficult to interpret the evidence and can result in a false negative trial. A false negative trial means the trial results showed no benefit, but in reality, the intervention if delivered to patients would be beneficial. A false negative trial is a disaster, as the patients are therefore denied the beneficial treatment based on the trial’s results. In hindsight, it was therefore unsurprising that PJ had walked up to me after my presentation and simply said; ‘*Just make sure that the clinicians do the intervention.*’ Never, had truer words been spoken. It took me thousands of hours to register the importance of this simple statement by PJ.

The vision of a simple intervention to change a surgical healthcare system never came to fruition as ASOS-2 failed to decrease mortality. Instead, ASOS-2 was a massive learning curve about the many factors that need to be addressed to improve surgical outcomes in low resource environments. To ensure implementation of an intervention at a local site, it begins with inspirational leaders who can articulate the belief in the intervention and inspire a team to follow. These inspirational leaders need to be locally present and respected.

When working within an 'organisation', one needs to determine whether the true 'beliefs and values' of the group are consistent with the proposed management to improve the quality of care. In Schein's original model of organisational culture³ he suggests that an organisation's culture consists of three core components. At the centre are the "ultimate, non-debatable, taken-for-granted values" of the group. These are the true beliefs. As outsiders, what we see are the 'espoused values'. The espoused values are those that are declared publicly. It is how the group would like to be seen from the outside. These 'espoused values' of the group are the rationalisation of their behaviour, and their subsequent visible behaviours and materials, which become the face of the values and assumptions of the group (Figure 4).³ Importantly, what you see, does not necessarily reflect what the true values are.

Figure 4. Schein's three core components of 'beliefs and values' (modified) ³



To start to effect change the primary objective is to ensure that the true 'beliefs and values' of the individuals within the group and the larger organisation are consistent with achieving the objective of the proposed intervention to improve care. People can say they will do something. But if they inherently do not want to do it, or have reservations about its value, or if it conflicts with another internal value, it will never be done. Most parents are used to this. You ask your child to do something, to which a simple affirmation is returned. This is the 'espoused value' that the child simply presents to the parent. Any of the three reasons (reservations, compromising oneself or conflict with another priority) will result in the child ultimately

dragging his or her feet, as it is not part of their ‘true belief’, and it will not be done. To start to improve the quality of clinical care of a health system, the first thing that is needed is to understand the basic, true core ‘belief and values’ of each member in the team.

So where did we fail as far as ‘beliefs and values’ go, in the ASOS-2 trial? One big mistake was to assume that focusing more care on the high-risk patients, and less time on the care on the low-risk patients would not change the workload of the nursing staff. This assumption was flawed. The nurses believed that this strategy of increasing postoperative surveillance of high-risk patients would also increase their workload.⁵ This was important, as these nurses were already working in a very resource limited environment. In some situations, these nurses were working alone or with one or two others in large surgical wards. Clearly, the ‘true belief’ that increasing postoperative surveillance of high-risk patients increased workload, contributed to the failure of the trial. Until this fundamental personal value conflict is resolved, (immaterial if the individual believes that the intervention will improve care), it will be impossible to successfully implement the intervention of increased postoperative surveillance. So, the place to start when planning to implement a potential healthcare intervention is to openly discuss the true beliefs of the individuals within the team, and the values of the organisation, to ensure that they are consistent with delivering the proposed intervention. If one cannot reconcile divergent ‘true beliefs’ of individuals with the greater cause, then the quality care intervention will fail.

In the austere environment of surgical care in low-resource environments, you are probably wondering how it will ever be possible for healthcare providers to have personal beliefs and values consistent with providing better care, when there are so many other issues to consider, such as food, health, safety and education for oneself and the broader family. One would expect that Maslow’s pyramid of a hierarchy of needs would play out here, and the work of caring for others would be of a lower priority, than the more basic, personal needs of food and clothing, safety and job security, love, belonging and friendship, esteem, and self-actualization. Is it possible to provide more care for others when one’s own environment is so challenging?

I believe that there are many good reasons to believe that despite these challenging personal circumstances, that healthcare workers in these low resource environments do genuinely care and not only just say they care. That is their ‘true beliefs’ are consistent with their ‘espoused values’ of caring. *‘People in need, understand need’*. Here are some examples.

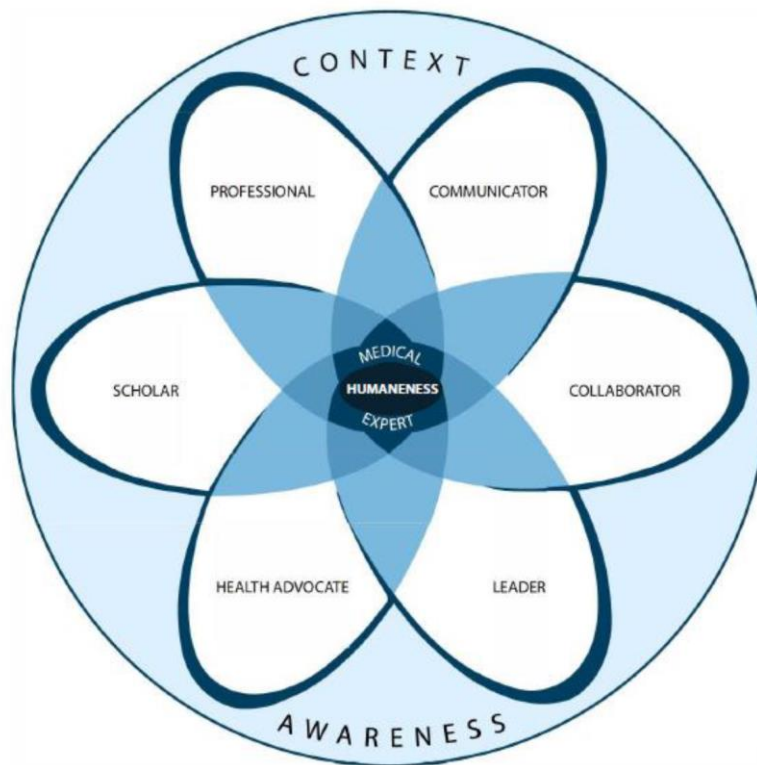
Following the publication of the African Surgical Outcomes Study (ASOS)¹¹ we surveyed the opinions of the participating clinician investigators from across Africa.⁷ The results from across 27 African countries strongly supported an ‘espoused value’ of continuing to do similar research across Africa, even if it was unfunded and added to the workload of the clinicians. More than 90% of the respondents considered the research valuable. But were the ‘true beliefs’ of the individuals consistent with these ‘espoused values?’ It is likely that they were indeed consistent, as this same group conducted the ASOS-2 trial with no funding, and the substantially increased workload of a clinical trial, while still providing their normal clinical work and care. This bodes well for improving healthcare in Africa, as the overriding ‘true beliefs’ of most clinicians is consistent with a desire to improve outcomes. This sends an important message about the values of these healthcare workers in a challenging resource-limited environment. Could this selfless contribution of healthcare workers providing surgical care extend to other resource-limited environments? I believe it can. On the 12 February 2021, a peer-reviewed surgical care paper was published with 15 025 clinician collaborators from 116 countries. Most of these collaborators were from low and middle-income countries, and these collaborators were also unfunded.⁸ The Guinness Book of Records recognised this

research paper as having the most authors on a single-peer reviewed paper. I would suggest that the true values of most healthcare providers in low-resource environments are consistent with improving surgical outcomes immaterial of the resources available. I know this is a generalisation but in most cases I believe it to be true.

One may be astounded by this overwhelming value base for ‘good’ considering the adversity in which so many of these clinicians work. The work by Nicky Kalafatis, a South African anaesthesiology colleague provides an insight into one of the dominant reasons, which is ‘humaneness’ or the quality of compassion or consideration for others.¹² ‘Humaneness’ is best illustrated by what happened the day before the publication of the ASOS Obstetrics outcomes paper which was to show the world that women in Africa are 50 times more likely to die following a caesarean delivery than in high-income countries.¹³ A news video of Dr Azza Mashumba, the head of the division of paediatrics at Parirenyatwa in Harare had just gone viral. She is standing in a patient reception area, clearly distressed, with tears streaming down her cheeks as she sums up the futility and despair of working in a dysfunctional, ill resourced environment; *“A mother presents, the baby is distressed, I can hear a fetal heart, we come here to main theatre, the fetal heart is dwindling, it's going. We get into theatre, I'm ready to receive the baby, and I am given a stillbirth. There is just no urgency. We trying so hard, we are making a plan, come up with contingency plans... I come to work, I do my very best, but my output are stillbirths, my output are disabled babies. Elective lists are not being done, we wait for it to become an emergency. When it becomes an emergency, I am given a baby with a hypoxic brain injury. This child now has permanent disability. This is not acceptable. ...”* It was essentially a prophetic summary of the findings of our study. She concludes with; *“I am here because I am desperate. I have tried, we have tried, but I feel that we are not getting heard. We need to move. I am so sorry, but this is really heart breaking for me... but we are struggling with the work we are doing... we are not helping patients.”*

Nicky in her doctoral thesis studied the characteristics of ‘fitness for purpose’ of the training medical of South African anaesthesiologists. She confirmed the appropriateness of the Canadian model of medical education known as the Canadian Medical Education Directives for Specialists (CanMEDS) in the South African environment. But she found two striking differences, the addition of ‘humaneness’ and context awareness. In the centre, or fundamentally the core of Nicky’s revised CanMEDS educational structure for South African anaesthesiologists was ‘humaneness’, and the whole model was encapsulated in a ‘context awareness’ (Figure 5).¹⁴

Figure 5. Nicky Kalafatis' CanMEDS model of South African anaesthesiologists¹⁴



When we conducted the survey on barriers and facilitators to collaborative surgical research across Africa,⁷ the same messages supporting ‘humaneness’ kept coming through in the free text with; “*Only Africans can tell the African story*”, with the “*opportunity to contribute to knowledge*” and “*brought new focus on optimising outcomes from surgery..., contributed to valuable information with regard to surgical work being performed on our continent, encouraged interdisciplinary team work...*” So, the ‘humaneness’ seen in Azza in Harare, is not isolated, but possibly a broader common characteristic seen across African medical environments. Based on Nicky’s work, it could be a characteristic which is hardwired into the education of healthcare providers in Africa. It appears that despite limited resources and overwhelming adversity which compromise the ability to provide care, there remains a genuine compassion and care by those involved in healthcare delivery in these environments.

I would suggest that the challenge in low resourced environments of marrying ‘true beliefs and values’ and ‘espoused values’ may be easier than we think. Essentially, ‘what you see is what you get’.

Values-driven leadership

The consistency between ‘true beliefs’ and the ‘espoused values’ seen in action in Azza, the ASOS network (which is now known as the African Perioperative Research Group (APORG)), and Nicky’s doctoral work suggest that ‘values-driven leadership’ may be central to African perioperative and surgical care. *Ubuntu*, or ‘I am because we are’ speaks to the relational role that others within the community and society play in our individual existence. The work by Painter-Morland and others have contributed to our understanding of the central role that *Ubuntu* plays in ‘values-driven leadership’ through the principles of ‘interdependence’,

‘relational normativity’, and ‘communality’.¹⁵ ‘Interdependence’ is the core component of *Ubuntu* which frames my existence as a function of the existence and contributions of others. ‘Relational normativity’ refers to the harmonious nature of the interdependence between individuals and groups.¹⁵ ‘Communality’ speaks to the individual’s service and care, and that the organisation is a ‘potential agent of transformation’.¹⁵ This contributes to a pursuit for common good. Tinashe Chandauka’s doctoral studies were of the patient safety culture in South African obstetric theatres⁴ under the mentorship of Peter McCulloch, an Oxford surgeon passionate about global health. In comparison to Tinashe and Peter, I was once again so naïve at the beginning of our work. Soon after ASOS¹¹ was published Peter really pushed me hard on processes and safety, yet at that time I was fixated on evidence-based medicine alone and establishing evidence for simple therapeutic interventions. However, it was the learning of ASOS-2¹⁰ that provided the springboard of understanding this complex environment and the relationship between values, communication, education and resources in determining the ultimate outcomes of patients during and after care. In Tinashe’s work he observed that ‘*South African surgical teams... are transitioning from a culture where individual excellence is seen as the main bulwark against patient harm toward a systems approach to patient safety*’.⁴ This observation is consistent with *Ubuntu* and its effect on ‘values-driven leadership’ in Africa. Most of us were educated in the old medical system of surgical tyrants, who put the fear of God into you. This system of yesteryear is now dead. Surgical care is not about the skill of a single surgeon with a knife, but rather the dexterity of the team.

The ‘values-driven leadership’ has iteratively developed a ‘ME-WE-WORLD’ framework in its African work.¹⁵ As individuals (ME) are connected through a mesh of relationships (WE), and more broadly to the WORLD. We cannot disconnect one from the other. We all have shared values, context and perspectives, which has been demonstrated across the African perioperative surgical work discussed here. We are fortunate to have a dominant philosophy of ‘collectiveness’ in Africa, which results in ‘humaneness’ and compassion despite the challenging environment. The previous examples of *Ubuntu* with consistent ‘beliefs and values’ and ‘espoused values’ and the ‘humaneness’ of the carers would suggest that other factors may have contributed to the failure of ASOS-2. ASOS-2 showed that some of these challenges centred around communication and teamwork.⁵ When failing to escalate care for sick patients, barriers to communication are centred around hierarchy, the fear of criticism, and a desire to work independently. These are key lessons for leaders and team members if one is to realise the vision of *Ubuntu*.¹⁶ Certainly, some sites in ASOS-2 were hampered by hierarchical structures and poor leadership which compromised the WE in ‘values-driven leadership’. Discussing this with a colleague involved in nurse education related the following pearl. He told him; ‘When you use the word ‘*you*’, I know that we are not a team. I know we are a team when you say ‘*we*’.’ Words matter.

So where did we fail in ‘values-based leadership’ in ASOS-2? Probably in trying to get the trial done quickly, we cut important corners. Corners that possibly should never be cut. You need everyone in the group to openly discuss their true beliefs and values. What we need from the group are people to be comfortable discussing their true beliefs and values, who can be challenged on their beliefs and values without feeling uncomfortable, and team members who can facilitate these difficult but important discussions. They must understand that if the team is to respond to the needs of a quality care project, that there have to be the people within the group facilitating and owning this discussion. A hierarchical approach will not cut it, as the values and solutions must come from within. Ultimately the team must work to a point where their true core beliefs are consistent with the espoused values necessary to sustain the quality improvement intervention.

For each staff member, failure to implement interventions is often due to ongoing competing priorities. These competing priorities may dominate decisions and actions which compromise leadership and intervention delivery. Without sufficient personal priority for the intervention, it is impossible to create a vision or purpose for the group to improve care. Without a common purpose, the underlying challenge remains overcoming the conflicting priorities that team members may have, which hinder the implementation of quality care. This is clear in the ASOS-2 trial where the following comment was made; “Nurses are generally overburdened, too many patients etc... generally when I handed over [the ASOS-2 interventions] it was seen as extra work and the response often was... [that] they didn't appreciate the addition to their work”.⁵ Clearly, balancing personal priorities, such as work burden, finances, security, etcetera against team priorities is the key initial step to ensuring intervention implementation. Only once the true beliefs and values of each person in the team is consistent with that of the vision of the organisation, can an intervention be implemented. Anyone whose concern is ‘how am I going to get to work?’, or ‘do I have enough money for dinner tonight?’, or ‘are my children safe while I am at work?’, or ‘how am I going to complete my expected work duties?’, cannot be expected to prioritise a new intervention to improve care until these fundamental personal priorities are addressed. Until we address the basic needs of frontline staff, we will fail to improve the quality of care through intervention initiatives.

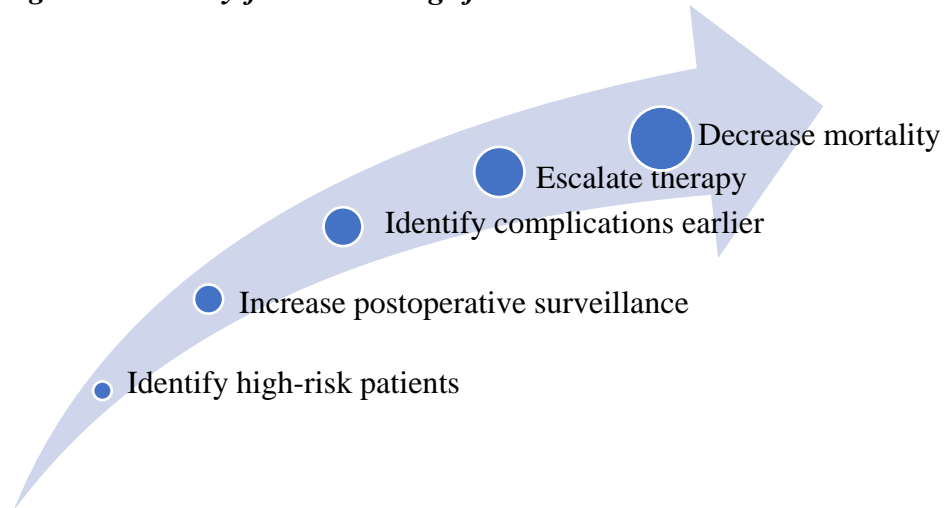
Success of the first step is dependent on the team working through their true beliefs and values, until such time as it allows each individual to support the implementation of the quality improvement intervention.

Knowledge and education

The hypothesis and the programme theory

Once you are certain that the true beliefs and values of the team members are aligned with the quality improvement project, it is important that the hypothesis behind the project and the ‘programme theory’ are clearly understood. This is the example of the programme theory for decreasing ‘failure to rescue’ in ASOS-2 (Figure 6).⁵

Figure 6. The programme theory for decreasing ‘failure to rescue’ in ASOS-2⁵



The hypothesis is that due to insufficient staff numbers, patients who develop postoperative complications are more likely to have complications that will progress and result in death. To decrease this excess mortality, we need to identify the patients at risk, then increase their postoperative surveillance on the ward, so that any complications can be identified earlier. We then escalate appropriate therapy for the complication, and hope that the complication responds to the therapy, and early mortality is averted. There are a number of ‘ifs’ in this process which can derail the whole intervention.

Education about the hypothesis and the programme theory are important. To implement the intervention successfully, it is important to co-design the intervention supporting the programme theory, to ensure that it addresses each step of the intervention. The intervention must be feasible to deliver. ‘Collective competency’ is necessary for the delivery of the intervention. That is, each person has a role to play in increasing the quality of care delivered. Therefore, an accepted degree of autonomy is necessary to ensure early implementation of the intervention by removing barriers to early care dependent on ‘sign offs’ by clinical superiors, characteristic of hierarchical structures.

Feasible interventions

Elliott Taylor studied interventions which were both efficacious *and* feasible to decrease death from maternal haemorrhage following caesarean section in Africa. The premise of the study was that to prevent death from haemorrhage in mothers in Africa, we need treatments that are available, deemed effective in the environment, and feasible to deliver. A consensus study of obstetric and anaesthesia leaders from across Africa was conducted of essential interventions to prevent or manage maternal haemorrhage. Unsurprisingly, not all of the efficacious interventions were actually feasible in the African context. The following ‘essential interventions’ were not considered feasible for treating maternal haemorrhage in Africa: the availability of a specialist obstetrician and anaesthetist, early and comprehensive antenatal consultation with regular follow up, providing mentorship and support networks to non-physician surgical and anaesthesia providers, creation of a multidisciplinary peri-partum haemorrhage response team with a rapid alert and call network, ensuring repeat caesarean sections are only performed by experienced providers, and accurate and quantitative measurement of peripartum blood loss.¹⁷

The inability to provide these efficacious interventions are instructive. Five of these six interventions are due to the restrictions associated with a limited healthcare workforce. If we want to improve the quality of surgical care, and decrease mothers dying from bleeding, we need to co-design care strategies which are ultimately deliverable by the team available at the coal face. While guidelines exist on how to manage maternal haemorrhage for example, these guidelines have little consideration of the austere environment in which healthcare workers are toiling in Africa. To decrease maternal haemorrhage, Elliott's work suggests that we will have to upskill the healthcare providers, and create educational, training and treatment guideline 'stepping-stones' relevant to the working environment. This strategy would provide for safer care to bleeding mothers in Africa. The alternative is for clinicians to try and follow guidelines drawn up in high-income countries which list interventions requiring resources which are unavailable. This essentially sets the carers up for failure, as the interventions cannot be delivered. The result of guidelines that cannot be followed could be dead mothers.

'Collective competency' and autonomy

Until such time as we have all the resources needed to deliver quality care, we will need strategies to navigate the resource constraints. I would call this interim strategy '*stepping-stones*' where a response is tailored according to the resources of the local environment. To increase the capacity to deliver the intervention, and ensure it is implemented early, part of this response needs to include consideration of '*task-shifting*' or '*task-sharing*' of aspects of the work, so that the initiation of early interventions is not delayed due to limited access to clinicians. '*Task-shifting*' and '*task-sharing*' is about the autonomy needed to deliver specific tasks to ensure the 'collective competency' necessary for early and appropriate quality care.

Although, the days of the surgeon barking orders are gone, but instead what remains is the need to speak up. Good communication is not about barking from the top of the heap, but rather the ability to speak up from the bottom of the pile. ASOS-2 suggested that to implement interventions to decrease 'failure to rescue',⁵ required teamwork, and leadership within an environment of a flat hierarchy which is responsive to the needs of everyone within the team. However, it appears that to make a difference in health, you should be able to speak up and be heard. Just as Malcolm Gladwell points out in *Outliers*¹⁸ that a steep hierarchy is associated with aviation disaster, and the very visceral example of the Korean co-pilot who would not speak up, despite an awareness that the plane was on a collision course, which ultimately killed them. So too if nurses cannot flag the patients that they are concerned about for fear of admonishment or scorn, then the sick patient has no chance of salvation, and similarly may ultimately die as a result. Essentially, the health care system needs to support the nursing staff in being able to identify, communicate and respond to the deteriorating patient. If there is fear to flag deteriorating patients because of a fear of the hierarchy, or an 'authority gradient', or if there is a delay in the time it takes for a doctor to respond because they have little respect for the nurse on the ward, then the patients are going to do badly. Essentially, the team needs to trust its team members, and this should be reflected in the autonomy of its members. Every team member needs 'agency'. A nurse who feels empowered to make a call on the deteriorating patient and has the autonomy to start therapeutic interventions while he or she awaits the arrival of others has the power to save lives. This is 'agency'.

How does one do this? This is done by co-development of the quality-of-care interventions, and then agreement on 'outsourcing' some interventions to staff at the coalface. A delay in time to intervention implementation kills patients. The classic example is the 'golden hour' in trauma resuscitation. The same exists in surgery and critical care. Some complications kill

patients quickly in the postoperative period. Bleeding kills mothers. A key principle must be to enable some autonomy to healthcare providers at the bedside. Calling for a doctor, and then having to wait for the arrival of the doctor without starting an intervention, as opposed to starting an intervention while waiting for the doctor to arrive can be the difference between life and death, especially in a resourced constrained environment. What is needed is a call for a doctor, which is followed by the initiation of agreed upon evidence-based interventions while waiting for the doctor to arrive.

Indeed, an analysis of nearly 130 000 patients from critical care in Brazil has shown that when controlling for other human resource factors, increasing nurse autonomy was associated with increased critical care and hospital survival.¹⁹ Nurses save lives. Let them do that by empowering them with co-designed protocols and clear instructions of agreed upon early interventions that they can implement, while awaiting more senior care to help deliver the remaining quality clinical care intervention.

Deliverable interventions

The success of the surgical safety checklist, and failure of other interventions

The surgical safety checklist has become a standard in surgical care. It ensures that common avoidable errors are prevented through systematic checking of the patient, operation, and resource usage from before to after the operation. It ensures that antibiotics are given timeously to prevent surgical infections, and sutures and swabs are documented to ensure that none are left behind in the wound. It is considered similar to a pre-flight checklist. The history of the surgical safety checklist is documented in Atul Gawande's book.²⁰ In the first study of the checklist conducted between 2007 and 2008, the outcomes of nearly 4000 patients from eight hospitals across five continents were compared to the subsequent 4000 patients operated on with the introduction of the surgical checklist. The introduction of the checklist was an astounding success; where postoperative mortality fell by nearly 50% from 1.5% to 0.8%, and surgical complications from 11.0% to 7.0%.²¹ Introducing these simple checks of processes had a huge impact on outcomes. Certainly the 'true beliefs and values' of the participating organisations were consistent with the expected benefit of the checklist intervention. The result was that the surgical checklist was adopted by the World Health Organisation (WHO).

A laparotomy, an operation which enters the abdomen, has one of the highest complication and mortality rates in the United Kingdom. Yet, it is essential operation in the treatment and management of many abdominal cancers in the elderly, making it a necessary and common operation in the United Kingdom. To improve the outcomes for these operations, a quality improvement project was adopted to ensure that all the best care processes necessary in the care pathway for emergency laparotomy would be adopted across the NHS in the United Kingdom. These included best care practices in the preparation and investigation of the patient prior to surgery, intraoperative, and postoperative care. This study was known as the Enhanced Peri-Operative Care for High-risk patients (or EPOCH) study. Ninety-three hospitals across the NHS participated, with over 15 000 patients recruited into the study during 2014 and 2015. The primary outcome was death at 90 days postoperatively, and once the study was complete, there was no difference between the standard care group, and best perioperative care group for emergency laparotomy. Both groups had a 90-day mortality of 16%.²² This is despite the best

care processes being set in place, the preparation of sites to provide the care, and local feedback on how the site were doing.

This was similar to our own experience in Africa in ASOS-2 where our simple package to ensure increased postoperative surveillance failed to decrease in-hospital mortality or severe complications between the intervention and standard care groups.¹⁰

How processes contribute to implementation of interventions

While the EPOCH and ASOS-2 studies were running, subsequent studies of the surgical safety checklist continued to document survival and complications benefit associated with the surgical safety checklist.^{23 24} In contrast why did EPOCH and ASOS-2 fail? How was it possible for the surgical safety checklist to work, but for the surgical care pathways which included best practice to fail to change outcomes? Clearly, merely trying to implement processes of care known or expected to be associated with benefit, does not necessarily translate into benefit.

To understand why EPOCH and ASOS-2 failed, we need to understand what was happening on the ground. What were the barriers to providing optimal care? These reflect the conflict between the processes that are needed to deliver a desired outcome, and the way in which the actual healthcare system is negatively impacting on these processes. These processes may include numerous aspects of care including identification of risk, communication of the clinical status of the sick patient, and implementation of the quality-of-care interventions. It is incorrect to assume that an intervention expected to be associated with benefit, will be implemented successfully. Similarly, if the intervention does not work, we shouldn't throw the baby out with the bath water. Rather, we need to understand why the intervention did not work. And this comes down to intervention implementation or 'implementation fidelity'. This is exactly what PJ Devereaux had been alluding to in Prato a couple of years before: implementation fidelity. Rule number one.

When the leaders and teams were asked about what they would do differently in EPOCH the following responses were volunteered. '*We would engage our colleagues better*', '*we will use the data-collection and analysis to support the change in how we provide care in the pathway*', and '*we will spend more time training our team in the proposed care pathway*'.²⁵ In ASOS-2 the findings were similar, despite EPOCH coming from a high-resource environment, and ASOS-2 from a low-resource African environment.⁵ These challenges to successfully deliver interventions to improve surgical care are universal.

To support care pathway improvement, many actions are needed to promote intervention implementation fidelity. A typical response in ASOS-2 was "*We needed to have better engagement with the surgeons and the nurses and better education about the trial...this was our main barrier... I think people lacked understanding of what we were trying to do*". It is important to lead and build teams who are enthusiastic about the intervention. Leaders need to engage well across disciplines to form a multi-disciplinary team. And the team needs to understand the hypothesis and the programme theory supporting the intervention through education. This should have been a key leadership component to implement the intervention in ASOS-2.⁵

Training is necessary to ensure that there is an understanding within the team of the hypothesis, objectives, and reasons for the interventions. A contrary belief to the hypothesis of the intervention or the components needed to deliver the intervention within the team will result in

resistance to constructive participation in the project. This is captured appropriately in the comment; “[the] staff aren’t always enthusiastic about the intervention when a ‘high-risk’ patient by ASOS standards does not match high-risk in their mind. In that sense, buy-in from nursing staff is less than desired.”⁵ Training, and then co-design would have allowed the team to include other patients they considered high-risk independent of the standard criteria. This might have improved implementation of the intervention.

Even when the programme theory and interventions are agreed upon by the team, feedback on intervention fidelity performance is necessary. Presentation of what and how the processes are being delivered, and the resultant patient outcomes are important to ensure compliance and any modifications needed to ensure intervention fidelity within the local environment. For example, understanding the delivery of the intervention would have helped this site, either galvanise their commitment to deliver the intervention, or modify their intervention strategy towards a more manageable solution; “it was mostly the postoperative logistics that were a challenge...getting the patients to the right bed, the Bedside Guide, communicating with the nurses that the 2 hour[ly] observations needed to be done.”⁵ To ensure that the team understands the outcomes of the patients within their care pathway, and the care they received, it is important to provide regular, audited feedback.

ASOS-2 did not provide feedback, while EPOCH did provide feedback, but still failed to implement effectively. In EPOCH, only eleven of the 37 processes included in the optimal care pathway for emergency laparotomies, had more than 50% of the sites trying to improve them.²⁵ In ASOS-2, only between 38 and 57% of sites achieved intervention fidelity (depending on the definition of fidelity used).⁵ A spectacular implementation failure by any stretch of the imagination. It could be argued that both projects have potential clinical efficacy, as the hypothesis and programme theories are good, but the real learning is about how do we ensure implementation fidelity.

Intervention fidelity of a quality improvement process is key. In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) launched the 95-95-95 targets. The aim was to diagnose 95% of all HIV-positive individuals, provide antiretroviral therapy (ART) for 95% of those diagnosed and achieve viral suppression for 95% of those treated by 2030.²⁶ This programme was originally supposed to be the 90-90-90 programme, but the mathematical success is substantially different between the two programme targets. Successful implementation in a 90-90-90 programme is 72% (90% x 90% x 90%), compared to the 95-95-95 programme at 86% (95% x 95% x 95%). The problem is that as the number of processes contributing to an intervention increase, the overall ability to effectively implement the intervention decreases. Let’s assume that you have 95% fidelity for every process, and you need four processes to deliver quality care, then your implementation fidelity will only be 81.5% (95% x 95% x 95% x 95%), even if you have a team, delivering 95% fidelity on every single task. Look at the overall fidelity below for a highly functioning team, based on the number of interventions needed to deliver a care package. If a care pathway requires 10 steps, even a great team will only be able to achieve 60% implementation fidelity (Table 8). This is the challenge when determining the number of processes to support a deliverable intervention.

Table 8. The effect of the number of processes on intervention fidelity

Number of processes	Fidelity of each process	Fidelity of entire pathway
1	95%	95%
2	95%	90%
4	95%	82%

6	95%	74%
8	95%	66%
10	95%	60%

The Surgical Safety Checklist (SSC) had three processes (pre, intra and postoperative checklist), ASOS-2 had five processes and EPOCH had 37, although the clinician behaviour in EPOCH would suggest that eleven were consistent with the ‘true beliefs’ of the clinicians and feasible at the sites. The increasing number of processes are a major impediment to implementation fidelity. One is up against an increasing likelihood that some of the components of the intervention will conflict with the true belief and values of some team members, which may prevent implementation of these components. Where an intervention package depends on the delivery of each intervention step, this could decrease the fidelity of the entire pathway, as shown in Table 8.

What strategies can we adopt to support the healthcare workers in delivering the intervention? Data from low- and middle-income countries suggest that there are many strategies to support the practices of healthcare workers, including supervision, training, and group problem solving, amongst others. However, single, isolated support strategies do not appear to work. The strategies associated with the poorest support of performance are printed job aids or information sheets, running at a median increase in performance of only 1%. This was part of the ASOS-2 intervention: a bedside guide. Training, and supervision appear to be better at a solitary level with a 10 to 20% increase in performance, and group problem solving exceeds 20%. Group problem solving, together with training may improve performance by over 40%.²⁷ This is important. Pierre Barker, a paediatrician by training, but who now passionately heads up the Institute for Healthcare Improvement (IHI) points out that their quality improvement method is essentially built around structured group problem solving (which are known as collaborative learning communities) and adaptive learning (which is a structured approach to systems analysis, data feedback and rapid learning) (personal communication). Their successful programmes are built around marrying problem solving with training.

So where did we get the ‘deliverable intervention’ wrong with ASOS-2? Firstly, the design of the intervention was wrong. We could not determine whether the intervention arm received increased postoperative surveillance, whether complications were identified earlier, and whether there was appropriate escalation of care for complications.⁵ Essentially, the intervention could have failed at any one of these points of the programme theory. Process monitoring of these steps of the intervention should have been included in the intervention. Secondly, our educational preparation for the intervention was inadequate, through the general lack of on the ground team meetings and group problem solving for the understanding of the hypothesis and implementation of the intervention. Instead, we had offered a simple online test of the understanding of the intervention, with incorrect responses prompting a short educational text. We did not assess agreement with hypothesis, nor did we determine if the intervention was ‘context-sensitive’ for the sites where it was being rolled out.

In our attempt to rapidly roll out a project over the continent with the hope of identifying a generalisable intervention to decrease mortality from ‘failure to rescue’, our intervention was fatally flawed in design, co-development of context-appropriate interventions, auditing of the processes to document intervention fidelity, and local team feedback on implementation and outcomes.

Processes and feedback

The role of processes in the success of quality surgical care

The intervention needs to ensure that each step of the programme theory, has at least one process metric measuring the fidelity of each step of implementation. This is important in ensuring that we work towards fidelity of each step of the entire intervention. It is key that the performance of these process steps is fed back to the team to understand where and why performance may be sub-optimal, so that strategies can be developed to improve implementation fidelity.

To maximise the ability to realise success, it is important that the number of steps is limited, and that each intervention step is supported by evidence for efficacy. It is critically important not to include steps which are unlikely to improve outcome. All that unnecessary, additional steps will do, is decrease intervention fidelity, and set the entire intervention up for failure.

The classic example of successful implementation of processes to improve outcomes in surgery is the enhanced recovery after surgery (ERAS) programme. Henrik Kehlet, a surgeon from Copenhagen is a legend. A formidable personality (in his chocolate brown corduroy jeans) is an inspiration to a multitude of surgeons globally. More impressively, he has managed to cross the blood-brain barrier dividing surgeons and anaesthesiologists, and anaesthesiologists also consider him a true hero. He was convinced that patients spent too long in hospital, putting them at risk of complications. He knew we could get patients up and about and home earlier to prevent these unnecessary complications. He felt that if we could make outcomes better if we cut out all the barriers that prevented patients from getting up and walking, and then allow them to continue walking right out of the hospital after major surgery. He was correct. Get rid of all the bandages, tubes and lines and the patients would get up. Removing catheters, nasogastric tubes and the like, and the patients got up and went home. This led to the global movement of ERAS.

It has been a phenomenal success at improving the quality of surgical outcomes. The package has come a long way. Patients are now not unnecessarily starved before surgery, they are optimised physically and nutritionally preoperatively, they are not overly sedated so that they wake up clear headed, they receive anaesthesia and surgery with minimal impact to allow early mobilisation after surgery, and then are vigorously encouraged to start moving and leave. Health economics has shown that the cost per surgical procedure has decreased for almost every procedure where ERAS has been implemented.²⁸

However, the efficacy of ERAS has not been consistently demonstrated. Some studies have shown an incredible decrease in the postoperative length of stay, while others have not. What is the reason that patients in Canadian and Dutch studies have got home quickly, and in other studies from Spain, the patients having hung around in the hospital for a long time? All the patients receive a standardised educational package to ensure that ERAS is implemented. Ollie Ljungqvist is convinced that the difference between these studies lies in auditing and feedback.²⁸ We know that education is important for implementation, but performance is way better when it includes group problem solving.²⁷ Monitoring and auditing, and feedback allows a team to reflect on performance, and put mechanisms in place to improve performance. The ERAS group provide good data on the fidelity of processes in improving outcomes through spider diagram reports. Increasing adherence to more than 70% of the ERAS intervention recommendations results in a dose-response for decreasing surgical complications, earlier

discharge, and 30-day morbidity, when compared to 50% compliance.²⁹ Tracking the processes to support the ERAS interventions ensures that we can provide better outcomes, in a dose-response manner.

There are also great examples in obstetrics and in surgery from low- and middle-income countries. A safe surgery multicomponent intervention study to decrease maternal sepsis and postoperative sepsis and surgical site infection known as Safe Surgery 2020, was introduced at 10 intervention hospitals in the lake zone of Tanzania.³⁰ The multicomponent intervention planned to improve five areas of surgical quality: leadership and teamwork, evidence-based safe surgical and anaesthesia practices, sterilisation, compliance with sepsis outcome data reporting and provision of infrastructure support necessary for the project through a \$10 000 grant.³¹ The implementation study included a 3-month pre-intervention period in 2018 and 3-month post intervention period in 2019.

Processes were instituted to monitor adherence to implementation in the study. The patient safety process adherence rate had six indicators, teamwork and communication had eight items, and patient medical record completion rate was also monitored.³¹ The outcomes were recorded to ensure complete data for feedback to the teams.³¹ The study resulted in an improvement in communication and teamwork by 25%, evidence-based practices by 33%, with a significant fall in surgical infections.³⁰ The caesarean section substudy also showed a decrease in caesarean section infection rates across institutions in Tanzania.³²

Almost simultaneously, a similar implementation programme ran in Ethiopia to decrease surgical site infections known as Clean Cut.³³ Clean Cut attempted to improve the quality of care through processes without investing in resources or infrastructure (which is a common scenario in low resource environments, where you are expected to do better without all the 'tools'). Clean Cut used three sequential steps to improve quality. Note that the sequential structure of the processes are identical in sequence to the model proposed for improving quality of care: team building, process monitoring, and then feedback on process and outcomes. The first phase included team building and modification of the surgical safety checklist led by local staff. The second step included assessment of compliance with quality processes, and the data collection of patient outcomes. The third step included process improvement through process-mapping and feedback cycles, which included compliance and patient outcomes. Six processes were targeted, and process adherence was reported together with patient outcomes to the team. This approach resulted in an approximately 50% improvement in process compliance, and a 35% reduction in surgical site infection.³³

To shift systems as Safe Surgery 2020 and Clean Cut managed to do, we need to focus on implementation fidelity for quality intervention processes. These quality metrics need to be informed by local patient outcomes. Therefore, in both Safe Surgery 2020 and Clean Cut, process adherence was closely married to patient outcomes in the feedback sessions.

These multimodal implementation interventions importantly also appear to result in sustainable change. An implementation study to decrease surgical site infections in four hospitals in Africa had a 'technical component', which were interventions targeting activities known to decrease surgical site infections, and an 'adaptive component', which were interventions to create a safety and audit culture. The adaptive component included safety webinars, and importantly, regular feedback on outcomes and process adherence with the 'technical components'.³⁴ The effect was sustained for 4 to 6 months. For longer term sustainability, one really must build a

culture of regular feedback, which includes tracking local outcomes and compliance with the ‘technical component’ interventions necessary to improve the outcome.

So where did we fail with process support of the intervention in ASOS-2? We made two fundamental mistakes. Firstly, in the mindset of a rapid continental trial, we did not provide feedback on processes, and hence the intervention hospital teams had no idea of their performance, nor could they initiate strategies to improve the fidelity of the proposed intervention.

The second deal breaker was that we backed the wrong methods for healthcare worker practice support in our intervention. We had included printed aids and information sheets to be put above the beds of the high-risk patients, which flagged the patient as high-risk, and provided early care advice for these patients should they complicate. The reality is that this really provides little improvement in practice performance, running at a median increase in performance of 1%. Really, we should have been on the ground training the team, which would have increased their performance by about 10 and 20%, and then encouraged group problem solving to address how to maximise the fidelity of the delivery of the intervention during the feedback sessions. Then we would have increased performance in the region of over 40%.²⁷ The logistics to do this are demanding, and this re-iterates the importance of strong, local leadership who can build and support this training culture from within.

Resources

The 'ceiling effect' of resources

Even if we can get buy in for an intervention, ensure people understand the hypothesis and the supporting programme theory, and co-design a deliverable intervention, and ultimately ensure its implementation through feedback analysis of intervention processes and patient outcomes, ultimately, the peak performance of the intervention will be limited by the available resources. This is the 'ceiling effect' of a limited resource environment. What we must be on the lookout for are local performance indicators used by management which may allude to resource constraints. Performance indicators will go some way to identifying potential resource constraints on a quality care initiative.

When I moved to Cape Town seven years ago, I moved because the health system in KwaZulu-Natal, South Africa was falling apart. The budget was too tight to maintain an oncology service in the province and a radiology service in my own tertiary hospital. South Africa was battling to provide healthcare across the provinces, and budget cuts were taking their toll. I was committed to the public service, but this was fast becoming an environment which would be too difficult to work in if it continued the same trajectory. The Western Cape in contrast had somehow managed to survive. It had managed to continue to provide good care despite these limited resources despite the difficult economic times. It really stood out as something special in South African healthcare.

I moved to Groote Schuur Hospital in 2016. Essentially back to my roots. This is where I had trained in the late 80s and early 90s, when the new Groote Schuur Hospital had just opened. It was a hospital with a proud history. Known globally for its innovation and ground-breaking work. Most famously for the first human heart transplant, although it was much more than that. I returned to the same hospital which now looked like it had not had a lick of paint since I left in 1993. The same colour coded wards of brown, blue, orange and green existed. However, the chipped paint and stairs in the stairwells suggested that the money was better spent elsewhere. When I arrived there were two things which were evident, and probably what had contributed to the ongoing performance and stature of this great hospital. The first was that the management and staff were proud to deliver a fantastic service. The hospital management valued the opinion of the clinicians, and they were willing to take a chance on innovative ideas which may result in better care with limited resources. The second observation was that efficiency had become a cornerstone of healthcare delivery in the hospital. The performance indicators were centred around efficiency. Efficiency was important. As the budget had got tighter and tighter, the value and role of efficiency became more and more important in ensuring that the best outcomes could still be achieved with less spend. For a public sector hospital in Africa, it was very efficient. In the operating rooms, we targeted surgical starting times relentlessly to ensure that theatre time was not wasted, and that we understood the factors which may be barriers to delivering as much surgery to our patients with theatre time that we had available. The reason for late starts, and patient cancellations were studied with a fine-tooth comb to ensure that as many patients got surgery as possible, and theatre down time was avoided at all costs. I was proud to be part of this famous and efficient hospital delivering quality care against the odds.

But the last seven years have been instructive. The national health budget has not increased for the last few years, and as the health systems of the other provinces have deteriorated, more and more people have migrated into the Western Cape for care, while the population of the province itself has continued to grow. And this was compounded by the COVID-19 pandemic. We were

used to tracking surgical start times as a performance indicator. Originally, we were targeting performance in the 90 to 95% range, but over 2022 the performance has been consistently dropping, to levels as low as 50%. As the performance has dropped the scrutiny of efficiency increased, almost to the point of obsession. One may wonder if it was a lack of commitment of the doctors and nurses that has led to this poorer performance, or was it something else?

The reality was that the deteriorating performance indicator was a symptom of a bigger problem. It was fundamentally tied up in two factors. As the clinical service demand has increased on the system, the need to chase efficiency has increased, although in a relatively highly efficient system, small gains require tremendous effort. The reality is that the real reason behind the fall in efficiency had not been addressed. Chasing efficiency indicators will always ultimately reach a ceiling which is determined by the availability of resources. No matter how hard you drive efficiency, and immaterial of how committed your team is, optimal delivery will ultimately be determined by the available resources. And this is what we were experiencing at Groote Schuur Hospital. The falling efficiency was essentially the result of resource constraints becoming even more dire with the ongoing budget restrictions together with the increasing patient burden. Resource constraints were impacting on the efficiency of the operating theatres: no syringes, no drugs, and the like.

Tinashe Chandauka (who you met at the beginning of the book) is in awe of Sue Fawcus (who we are all in awe of). When he discusses leadership and people who make a difference to care he speaks of the time that Sue Fawcus was head of obstetrics at Mowbray Maternity Hospital (MMH). When the performance indicator of the wound sepsis rate went up, Sue would look for the cause. She would be up in the ventilator shafts ensuring that they were cleaned, speaking to the porters about other factors which may be contributing to sepsis, and changing the mops used to clean the floors in theatre. Sue used sepsis as a performance indicator at MMH. Indeed, when management identify that performance indicators are starting to fall short, they should consider that the real reason may be related to resources. At Groote Schuur, decreased efficiency could mean decreased morale or work ethic, or importantly, inadequate resources to deliver surgery. At MMH, increased sepsis could mean increased antibiotic resistance, or poor infection control procedures. For management, performance indicators are an eye into the system, and at times it may be necessary to consider the 'resources' available.

Ant Reed, a lead anaesthesiologist in the Western Cape Province who is an expert in theatre management and surgical health systems confirms that there are performance indicators which tell you about the state of the system. People like Randy Heisner of Sullivan Healthcare Consulting and Jeff Peters of Surgical Directions have made a living identifying health systems failures to improve the quality of care. While Ant and I are talking in theatre, the orthopaedic surgeon stops operating. He is waiting for an instrument, which is being 'flash sterilised' during the same operation. 'Flash sterilisation' should be a non-starter for a surgical operating complex. It is a symptom of a system short on resources. The impact is that the surgical procedure is delayed mid operation, and time is added to the operation. Fewer patients ultimately will get surgery, if some operating room time is lost due to the need to 'flash sterilise' equipment during the operation because there are not enough instruments to go around. Performance indicators which are stubbornly resistant to improvement, should make us consider the possibility of the 'ceiling effect' of limited resources. Resource limitations may include a lack of equipment, limited patient bed capacity, limited operating theatre time, or limited theatre staff.³⁵ These are all occurrences in low-resource environments. It is this 'ceiling effect' which will cap the performance of a quality care intervention.

Communication

Poor communication can break down the best attempts at improving the quality of care, even in a system which appears to have a functional organisational model. The process evaluations from both EPOCH and ASOS-2 suggested that leadership, with senior support and a collaborative, team-based approach were important for implementation fidelity.^{5,22} Conversely, what we saw in the ASOS-2 process evaluation, was that a steep hierarchical team structure, resulted in little teamwork, with poor implementation of the quality improvement intervention.⁵ A recent systematic review of systems approach to health care delivery sums it up nicely as follows; *“Most of the factors reported as contributing to success were related to people; engaging stakeholders, taking a team-based approach, enhancing communication, adopting a collaborative approach, and patient-centredness and physician-centredness.”*³⁶ There is a need for ‘soft skills’ communication education in order to provide quality surgical care. The days of the ‘barking’ leader are gone.

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