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Judith Cornell Oration: Standing on the shoulders of giants

Dr Lois Hamlin

The following is a transcript of the 2008 ACORN National Conference Judith Cornell Oration by Dr Lois Hamlin.

Madam President and members of the ACORN Board, Mr Kevin Ryan, Managing Director, Device Technologies, other distinguished guests both local and international and, importantly, fellow perioperative nurses, welcome. I, too, acknowledge the traditional owners of this land, the Yugambeh people and the eight distinct family groups who comprise them [1], and pay tribute to their multidimensional, whole-of-life understanding of health which stresses the importance of living in harmony with the environment [2].

I thank you for choosing to attend this Oration; I'm touched to see you all here. Notwithstanding the fact it's trite to say that I'm deeply honoured to be given this opportunity to deliver the Judith Cornell Oration, it is true. Such occasions as these – oratory speeches – have a long history in terms of providing an opportunity to recognise and celebrate noteworthy achievements. In our case, the Judith Cornell oration is "intended to serve as an occasion of celebration for the achievements of Australian perioperative nurses and to allow future visions to be shared" [3]. While I salute all perioperative nurses, today it is my intention to celebrate the achievements of Australian perioperative nurse researchers as well as those Australian perioperative nursing colleagues who have taught me, both initially and over the years. In exploring some of their achievements, I intend to do so from an Australian perspective and from one that reflects my particular interests. I hope that sharing a future vision, albeit briefly, will prove diversionary.

Early on when preparing and researching for this oration, I took the time honoured route of firstly looking up the word oration in the dictionary – an interesting exercise if you're interested in words and their origins but otherwise a useful first step in the process. Oration comes from the Latin 'oratio' and, as with so many other words, there are several meanings including "... a formal public speech, especially one delivered on a special occasion" [4(p 1346)]. This was the one I chose to run with because an alternative meaning, "... a speech characterised by an elevated style, diction or delivery" [4(p 1346)], seemed like a bridge too far for me. Indeed, I wasn't certain what it might have meant, though I had an inkling and it was one to which I did not aspire. This research was a useful start for me but I was curious and further investigation revealed even more interesting observations about orations. One is the longevity of the notion going back to both Greek and Roman times – Shakespeare, unsurprisingly, refers to the concept in several plays and publications. The most salutary for me were the words of Benjamin Franklin (written in the mid 1800s) – "Here comes the orator! with his flood of words, and his drop of reason" [5(p 319)]. Notwithstanding the gendered nature of his statement, it behoves me to try to control the potential torrent of words, while at the same time ensuring the nature and quality of the content (hopefully). It won't be easy for one who rather likes words but who loves talking even more.

Celebrating the achievements of perioperative nurses is an important activity and one which we are disinclined to pursue. In attempting to do that today, I intend to look at the nature and essence of Australian perioperative nursing and perioperative nurses as it has been laid bare by those Australian perioperative nurses who have researched in this area. Their work has informed my thinking and writing; however, I must also beg your indulgence because, first, I intend to include a personal reflection about perioperative nursing and pay tribute to those perioperative nurses who have influenced me, especially during my formative years in the OR.

The ghost of perioperative nursing past

In exploring perioperative nurses and nursing, what springs to mind is nursing behind closed doors in geographically isolated environments; a uniquely clothed and cloistered elite, remote not only from the rest of the hospital but from the rest of the nursing fraternity, too. In this unique microcosm, perioperative nurses spoke their own language, never appeared in communal dining rooms and their obsession with managing the theatre environment and its artefacts was legendary. And that was what many nurses and other healthcare professionals, that is, insiders, thought. The literature depicts us as highly technically-oriented and task-focused nurses, who appear to work in a hierarchically structured, medical model [6]. Members of the population at large had (perhaps still have?) a more stereotypical view moulded by media images of a highly charged, frenetic setting (the operating theatre) where eyes gaze over the tops of masks in a meaningful way, orders are succinct and delivered tersely by supercilious male surgeons and super sister manages to be both assertively efficient and deceptively demure all at the same time! That is, if the public believe that nurses work in the OR at all [7]. How far from, or close to, 'truth' and 'reality' are these views?

Before looking at the research findings from the last decade or so, I'd like first to present both my tribute to and my idiosyncratic understandings about OR nurses. Before I go any further, it is important to point out that we are today celebrating Australian perioperative nurses. Although much of what is to follow will be understood by any perioperative nurse globally (for there are some things that are universal 'truths' for us), nonetheless, I am an Australian, a proud one, and one by choice not by birth. When I first came to this great, brown southern land of ours decades ago, I was captivated by many things, especially the casual distain many

Australians evinced for authority, pomposity, class and 'the old dart'. In other words, I loved what I understood to be the 'Aussie larrikin' and the inclination not to take ourselves too seriously, a characteristic which persists [9]. This elemental aspect of the Australian character will occasionally appear as a little 'tongue in cheek' commentary. However, in no way is this meant to diminish the character or worth of those perioperative nurses who were and who remain my heroines and heroes.

Standing on the shoulders of giants

There are those within the sphere of perioperative nursing who have made a serious and lasting impression on me; most were good, some were bad and a number were indifferent. All (knowingly or unknowingly) have shaped my professional persona. It's those who had a positive effect on me that I celebrate and thank today. They inculcated me with their understanding of what it was to be a perioperative nurse, an understanding I tried to make my own. We might know them these days as mentors, preceptors, champions or any one of several other titles; call them what you will, it matters not. To me they were (and remain) "the giants on whose shoulders I stand" [9].

Reflecting on these individuals across time, place and space, I have tried to distil, in a few, wholly inadequate words, the very essence of these perioperative nurses and what it was that made them the flag bearers of our world. In keeping with the theme and parlance of the conference, these perioperative nurses (all women, during my early years in the OR) were the lifeguards of our turbulent and oft storm-wracked world of OR practice. They determined where the flags of perioperative practice should be placed, because they first tested then trod the incoming tides of would-be surgeons, and with ease they surfed each new wave of surgical innovation. In this surging and receding swell of operative endeavour they ensured that I/we (young ones then!) learned/practised/swam safely, and endured within.

Without eulogising about the good, the bad and the aloof amongst my former colleagues, these are (or were) their attributes.

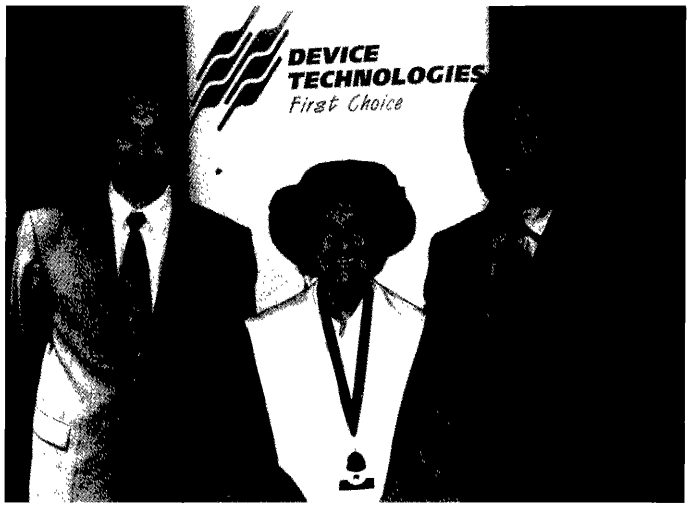
They were knowledgeable, highly skilled and very capable OR nurses who had great technical know-how. There seemed to be nothing they didn't know about instruments, equipment or any surgical paraphernalia, or how they should be cleaned, sterilised, handled and stored. And they were as all-knowing about the surgeons who wielded them and helpful to those surgeons, too – if they chose to be. Because, yes, his 'face had to fit', as did yours! And, no, 'lady surgeons' didn't usually fare as well.

They displayed a deep understanding of the arcane workings of the operating suite, in particular, the daily operating list. To hear them respond to the surgeon who wanted to slip a little case onto the end of the list was to stand in the presence of master tacticians. "It will only take five minutes, sis" the surgeon would say, "... a whiff of gas and we'll be done" or "Trust me, the anaesthetic will take longer than the surgery". My heroines would reply, "Well, we could do that, sure, we can handle it but... if you want your 'ditherotome' we'll have to wait for CSSD to clean and sterilise it, and for sure you'll need it – and please don't ask for the retrospectoscope, it's away for repairs". Or to an orthopaedic surgeon they'd say, "No problem, but we'll have to change theatres, we'll go to the overflow theatre and you'll have to follow an infected case because that's already scheduled".

They taught all the time, formally and informally, and every interaction with another member of the OR team seemed to be a teaching and learning moment. They showed remarkable restraint when gently correcting the new student nurse whom they had found with a packaged but unsterile item in hand, on which the nurse was busy drawing – in fact, colouring alternate bands of the plain autoclave tape with a black magic marker! They were especially good at training surgical registrars, ensuring they performed exactly as their consultant did; they would supply them only with the instruments 'sir' used, no matter what they asked for, and there was no way they were going to be experimenting with (say) new sutures or any other damn thing – "Not in my theatre you're not" was their catch cry.

They wasted no actions. "Handle it once, handle it properly", was how one of them taught me to set up. In fact to watch them at work was to be enthralled, as Barbara Hepworth, a noted sculptor and photographer, once said, "... by the beauty in the coordinated human endeavour in the operating theatre" [10]. If only I was as efficient and effective as them. But you only got one chance to learn! "See one, do one, teach one", was their golden rule (unwritten).

They knew and used the peculiar jargon, nomenclature and language of the operating theatre; I suspect they invented some of it. Pieces of equipment resounded with names like the harbour bridge, J boards, Mickey Mouse ears, fake tan, Dolly, Lydia, or a newer one, the black sausage. Just recently my vocabulary was extended further, when in discussion with a doctoral student who is exploring communication in the OR, I learnt about 'Madonna's bra'. The orthopaedically-astute amongst you might have understood the fuller explanation given, but for me, it was lost in translation. However, they also used what I call 'ORspeak' to baffle those outside of their domain, and thus retain control of it. They had an irreverent and cheery disregard for all forms of authority and bureaucracy beyond the doors of their operating theatre but especially 'nursing administration' – the chook yard, they called it. They dealt adroitly with queries from assistant matrons or deputy directors of nursing (DDONs) about staffing or overtime by prattling on about the need for on call duties to manage vaguely defined and obscure cases out of hours, finishing up by inviting these



Gerry McDonnell (STERIS), Lois Hamlin & Kevin Ryan (Device Technology, sponsors of the Oration).

same nursing administrators to contact certain, very difficult surgeons directly, if they wished to clarify this further. Few, if any, did.

They were the unspoken leaders in the OR – queen bees as one old surgeon of my acquaintance used to call them. Not all had an inclusive attitude but those who did took me under their wing. Upon entering a new OR, they acknowledged my presence and thus put me instantly at ease. This privilege was not extended to all! Further, some of these doyens, with a few well chosen words or actions (or, on occasion, inaction) put any surgeon or nurse firmly in his or her place. I knew of one perioperative nurse who hid certain instruments in her locker, so that when the time came and the wily surgeon approached me to find it, I could not. No matter where I searched, it was to no avail. Those special instruments were only for surgeons she deemed special! This is a true story!

They were excellent communicators and from them I learnt the names of procedures and the many instruments used during them, what those instruments did and how they worked. Via these same colleagues I also came to understand the notion of 'surgeonspeak', that is, what surgeons called instruments and how they asked for them. You know how it goes – "Give me the big mommas" or "Anytime time now, I'm ready for the dongers!". While on the topic of being the instrument nurse, I really admired those surgeons who would happily use whatever you put in their hand, whether or not it was what they asked for, and whether or not it was what was actually required. They were obviously so versatile – and they made a pleasant contrast to those who, when you asked them to clarify an unusual or strange request, responded by saying "I'll know it when I see it". Collectively these were the ones who said, "Don't give me what I ask for, give me what I need"!

As well as understanding the surgeons' stunted grasp of the technical language of the OR, my colleagues were aware of another of their shortcomings, one that's probably unknown outside of the OR. Most surgeons have extreme myopia and, as a consequence, do not always 'see' the sterile field, grasp the concept of aseptic technique or notice the activities of those around them during surgery. At best, they have tunnel vision and as they moved around the sterile field to, say, dislocate a hip during joint surgery, the dexterity and speed with which the experienced scrub nurses moved their sterile table out of the way was a joy to behold. So much nicer than the alternative – the surgeon's butt fully resting on the table of instruments! Ah, the vision splendid. And you know, those same surgeons never had a clue how close they were to contaminating the whole setup, or the role my 'invisible' colleagues played, keeping everything sterile and safe. One could be forgiven for thinking that the operating room was a space shuttle, Captain Cutter was at the helm and the scrub and scout nurses at mission control.

In the process of imbuing me with all manner of surgical trickery in order to maintain aseptic technique, and teaching me 'ORspeak' and 'surgeon speak', my role models taught me the concept of surgical time. This differs from real time and it works like this. Upon the surgeon saying s/he is about to close, the senior nurse goes for morning tea, returns, checks the collection for the next case, relieves the circulating nurse for morning tea and the latter is still back in time to do the first closing count. Those perioperative nurses knew that the surgeon worked in 'surgical time' and I think the surgeon knew that those nurses knew this, too!

These colleagues were adaptable and could juggle cases, multiple lists, all of the operating rooms, nurses, surgeons, orderlies, CSSD staff, instruments, many other departments within the hospital, surgical supply companies and their representatives, and all other exigencies, internal or external – and they did so easily, without dropping their (sterile) bundle! That is, they were consummate, coordinators of care and very, very cool, too. Oh, how I longed to be just like them when I grew up!

Injecting a little seriousness back into proceedings, and in summarising this tongue in cheek acknowledgement of my gratitude to those wonderful people, I say this. They had practice wisdom and they were prepared to share it. Their approach to perioperative nursing, and their engagement with their colleagues and their patients epitomised and brought alive for me the idea of the true perioperative professional. Those whom I admired the most and only dreamt of becoming – Sally, Sue, Sharon, Janet, Judith, Jane and John... and I've changed all of your names – today, I thank you and I salute you.

Perioperative nursing present

So, how does the ghost of perioperative nursing past and the actions of those who shaped my understanding of it, compare to what the research reveals? Although a previously under-researched area of practice (perhaps because, of necessity, it is a closed and restricted environment) increasingly, perioperative nurse researchers (and other Australian researchers, e.g. linguists) are exploring many facets of our world. Over the last decade or so, their findings are exposing what happens on a day to day basis in the OR, who does what to whom and, importantly, what (if any) contribution perioperative nurses make to surgical patient care and outcomes. They are also highlighting the impact that working in the OR has on the nurses who deliver care there, and what can be done to ameliorate the negative consequences and improve retention. They have used a range of research methods and methodologies based on various world views or paradigms. I'm sanguine enough to believe we might be on our way towards a unified theory of perioperative nursing practice. Then again, perhaps not – perioperative nursing has not developed in a linear fashion over time, OR practice is idiosyncratic even across similar settings (like much of nursing [11]) and its evolution patchy, uneven and unpredictable.

While Australian perioperative researchers have advanced our understanding of OR practice, theirs was no idle theorising, important as that is. They have added to the broader body of knowledge of the phenomena, which in turn is assisting to improve practice, as they have used their insights to underpin specific recommendations that are practical and achievable related to the various aspects of practice explored. I hasten to add at this point that I have undertaken no systematic review of all that research. I simply want to share my understanding of what it is to be an Australian perioperative nurse today, and how it might be in the future, using some of their findings; to present a distillation of the intangible 'essence of Australian perioperative nursing' as a tangible entity drawn from their research outcomes. I do so because I am a pragmatist. I believe shared insights will help each of us to understand self and others better, and assist in visualising future perioperative practice with more clarity, and inform efforts to create our own future.

Contemporaneous perioperative nursing practice: the research findings

Currently, standard perioperative textbooks detail an idealised world of perioperative nursing practice which is based on a written organisational philosophy that incorporates professional values, standards and beliefs, and one that places the surgical patient centre stage. Knowledgeable perioperative nurses practise collaboratively with other, are competent members of the healthcare team and safeguard patients by acting as their advocate [12].

In exploring research about practice, and in such a small compass as this, I've used selected Australian research findings. This is not meant in any way to diminish the validity or value of other Australian research findings, or imply a hierarchy of significance. Rather, I've used those findings that speak to my chosen topic and interests. Further, I acknowledge the importance of all perioperative nursing research, wherever in the world it may have been conducted (and which is accessible), and its significance in informing our research endeavours here in Australia. Nonetheless, I believe we need to think globally but not globalise; consider our context and localise.

What, then, are the salient features of Australian perioperative nursing practice? The OR has a number of features that are commonplace and unremarkable, and that exist in all acute care settings.

- Teams of healthcare professionals from different disciplines work together for a common purpose.
- There is a hierarchically-defined social order.
- Specialist work is performed here.
- Technology is all pervading.

Scratch the surface, however – as Australian researchers have done and continue to so do– and these features can be seen in detail and understood differently. These alternate understandings depend on the viewpoint of the observer, itself often dictated by disciplinary background, and the lens one uses to examine the phenomena of interest. Despite their discussion here as discrete, independent concepts, they are inextricably bound.

Teamwork

Teamwork is a fundamental aspect of care delivery in the OR and it is embedded within the culture of the perioperative environment. Teamwork is defined as a group of individuals who share common goals, work together interdependently to perform tasks, and who manage their relationships and clinical roles across professional boundaries [13]. However, this notion is contested for several reasons. Some could be forgiven for thinking that the surgical team was a fixed or stable corpus, when, in fact, it is a dynamic, fluid, non-constant entity, membership of which is often transitory. On occasions, the 'surgical team' seems nominal only, so nebulous is membership. That said, membership of 'the surgical team' is highly prized by OR nurses [14] and sometimes over-zealously guarded; and gaining entry into that team can be problematic for novice nurses [15].

The performance of the team is influenced by social relationships and communication patterns, and it is exploration of these that have produced some unhappy findings. The varying ways those members of the relevant disciplines (nurses, surgeons and so forth) are socialised into their communities of practice, their beliefs about their role and the roles of others in the OR, and their different communication styles and foci are now well documented. And they are the source of confusion and conflict [16-18]. Inadequate or inappropriate communication is commonplace amongst surgical team members and can have significant (even disastrous) consequences for patients – surgical delays and cancellations, wrong site surgery or surgical paraphernalia left in patients, to name but a few. It is during the course of surgical interventions that the highest incidences of surgical adverse events are recorded [17, 18]. Many of these have been associated with communication breakdown of one type or another [17, 18]. That communication is not standardised in the OR adds to the risk of things going wrong [19].

There is another aspect of interpersonal communication among OR team members, one that has a negative dimension for nurses – and it is that of verbal abuse, which is far more prevalent than most suppose. Nurses continue to experience it from colleagues, managers and medical staff [14, 20-22]. Associated with this is workplace bullying, harassment and horizontal (or lateral) violence. The manifestations of these facets of workplace violence [23] – such as overruling of decisions, undervaluing or belittling colleagues, withholding information and sabotaging (to name but a few examples of these behaviours) – are rife in the OR [14, 20-22, 24]. Such regressive behaviours limit the extent to which individuals can both practise and participate as team members [19, 25]. It is acknowledged that these behaviours are not confined to the OR; they are almost certainly systemic in health [25].

The role of the perioperative nurse in the team – indeed, the role of the nurse in the OR – continues to attract the attention of some [26, 27]. It would be flippant to brush aside these discussions about role which appear in the literature periodically, or label them as unnecessary, professional naval gazing. Role confusion and role conflict continue to be reported, and add undue stress to the practice of perioperative nursing. Some of the conflicts arise when managerial goals, often driven by a political imperative (for example, to complete more cases and reduce the waiting list), are at odds with beliefs about the need for OR practice to be based on professional standards [28, 29] or the technological imperative rules [30].

The social order and acclimatisation

Historically, the traditional hierarchical model, headed by the surgeon, has defined the social order in the OR [6] and this has had a significant impact on the socialisation of nurses into this environment [30]. Broadly speaking, professional socialisation involves developing the necessary behaviours, attitudes and capabilities that are expected and reinforced by the collective. The extent to which new staff members are accepted into the perioperative setting generally depends on their ability to acclimatise to the contextual subtleties therein – its idiosyncratic language, the 'taken for granted' rules and the oft-stated 'this is the way we do things around here' (an old saw). The level of education and support given to novice nurses, so they can acquire the requisite specialty knowledge and develop associated clinical skills, is also highly influential [15, 31, 32] and its absence critical [15, 21]. Survival in this environment (and I use the word advisedly) continues to depend on an individual's ability to acclimatise to it [15, 33].

The prevailing view about the hierarchical nature of the OR culture is being challenged, with more recent evidence emerging that leadership and authority is more situational [15]; this is useful information. However, that the 'pecking order' is alive still is evidenced by the bullying and harassment that continues to occur, and which maintains the status quo vis-à-vis the social order [14, 20, 22].

Specialty knowledge and perioperative competence

The work undertaken by nurses in the operating room is unique and has no parallels. Consequently, the primacy of specialist knowledge, including the skills underpinned by this knowledge, management of the related technology and understanding of the nomenclature, are identified and reinforced in the literature [6, 15, 20, 31-33]. The Australian College of Operating Room Nurses (ACORN) has developed and refined professional standards for perioperative nursing practice (the Standards) over many years; indeed, the need to standardise practice was a key driver of the College's formation [20]. These Standards represent much of what constitutes 'specialty knowledge' and they remain ACORN's most significant achievement. However, they rely heavily on 'expert opinion' rather than more rigorous forms of evidence [20]. Nonetheless, they are significant [6] as they map all aspects of the perioperative terrain and care delivery therein. More recently, ACORN over sighted the development of specialty competencies for perioperative nurses [34, 35] and a subsequent review [36]. These are another invaluable resource and tool for practice, although knowledge of them is not as widespread as the Standards, nor are they promoted or used as much [20].

It transpires that developing competence to practise as a perioperative nurse is arduous; worse, there are barriers to the way the specialised knowledge is developed and transmitted by individuals [15, 33]. The requirement to understand and apply (say) the principles of infection control, to manipulate the complex technologies encountered with speed and dexterity [6], to withstand the sheer physicality of the work (long scrubs and excessive on-call hours [37]), and develop anticipatory skills, are a significant challenge.

Overarching much of the development of these capabilities is the need to first understand the lingua franca. Interpreting the novel language and communication patterns of the OR is necessary if one is to develop competence there [15, 31]. This includes both verbal and non-verbal interactions, where, much of the time during surgery, a 'message' is being sent every second [38]! Put simply, access to the language patterns of the professions symbolises access to its power [16]. Without these linguistic capabilities and competencies, novice nurses do not acquire full membership of the surgical team [14, 15]. Yet, all too often, the support and education needed to grasp all the nuances of specialist practice, and develop clinical skills, are inadequate [15, 21].

What is also emerging is that as all aspects of surgery become increasingly complex, so too does the role of the instrument nurse. Frequently, it is now more narrowly defined, technologically-focused and highly complementary to that of the surgeon, and the level of interdependence between the two is greater than it has ever been before [39, 40] – a fact that supports the need for the nurse in the OR!

Technology

Technology may be defined as artefacts and resources, and their complex interrelationship with knowledge, skill, science, people, organisations, systems, culture, values and politics [41]. Notwithstanding this sweeping explanation, only two aspects of 'technology' are explored, namely surgical technologies and some aspects of information technology (IT). I contend that no other acute or critical care setting is more imbued with or more burdened by 'technology' than the operating room and note that the relentless onslaught of surgical technologies is now recognised as a source of stress for perioperative nurses [22, 28, 39, 40]. Much of what we understand as surgical technologies – and here I'm using Johnstone's definition of "instruments and equipment used during the surgical process, along with the technologies employed in instrument reprocessing" [28(p 19)] by way of example – is neither labour saving nor time saving; in fact, the opposite is true. Over the last decade and a half of new surgical artefact adoption, there have been largely unforeseen organisational and practitioner consequences [39, 40], namely:

- Changes in the division of labour.
- Greater awareness of team work and role complementarity arising from increased task interdependence.
- Increasing specialisation, particularly amongst circulating and scrub nurses, as well as surgeons, which results in limiting their practice.

Paradoxically, the introduction of these surgical technologies has not resulted in the automation of production tasks (with their underlying assumptions of job simplification and economic benefit) that senior managers and hospital CEOs expected; instead, the opposite is evident [40]. The introduction of these technologies creates stress in several ways – they are not always accompanied by the necessary training and/or support [14, 15, 20, 28], they create unrealistic expectations, and they cause role conflict. The latter occurs because of the requirements to use increasingly complex equipment, with insufficient associated resources to do so, in parallel with a managerial desire for greater throughput of cases, which is often an assumed 'given' that will occur because of the new equipment [28, 29]. The technology also competes with and distracts perioperative nurses from other tasks [30].

The increasing use of IT to enhance or improve many OR processes continues, but not necessarily in a coordinated fashion. The electronic health record (EHR), for example, has great potential to provide perioperative nurses with a medium to make visible the care they deliver and its effectiveness, in a transparent format that can be understood by those outside nursing [42, 43]. For example, it will capture the key patient safety activities that nurses alone appear to be the drivers of, such as 'time out', the count and so on. It is reassuring that key perioperative nurses are closely involved in the development of those parts of the EHR related to capturing all surgical data [44], but they must ensure that the final product meets our needs in Australia, and not those of the (overseas) companies who create the software and hardware.

Another area where perioperative nurses have embraced IT is computerised incident reporting and the opportunities this presents to improve patient safety [45]. Training is crucial though, as the effective use of IT continues to be a recognised deficit, particularly by medical staff, and in public health settings [46].

Summarising this part of oration, it is probably not a definition of 'technology' that is needed, rather an understanding of its characteristics, its impact and consequences, its pervasiveness (though but a fraction only has been presented here) and how all of these can be made known, and that knowledge subsequently used to further our cause.

So how is perioperative nursing different now?

Reflecting on my experiences and beliefs about perioperative nursing compared to the way it is perceived now through the eyes of those who have undertaken a systematic and rigorous examination of our world of practice, I see similarities but also some differences.

- It is faster paced and much more complex.
- It is much more imbued with the technological imperative.
- Team work and communication are even more critical.
- All roles are changing, as is...
- ... the culture of the OR, but the latter much more slowly.

If we are to survive as a discrete nursing specialty, then consideration needs to be given the following points.

In light of the current acute shortages of nurses in the OR and an ageing workforce there [47, 48], we need to address the barriers to entry into the surgical team. More than ever, the need to provide education – formal and informal, at the introductory level and beyond, and in the shape of continuing professional development – is paramount. 'Technology' – in the form of low, medium and high fidelity simulation, online learning, and so forth – can and should be harnessed in these endeavours.

Along with the urgent need to address the provision of all forms of education, equally important is the requirement to support and mentor all who choose to pursue perioperative nursing. If we don't take care and support our own, we will be diminished, and risk being sidelined. The provision of professional support and education (clinical and academic) are within the profession's remit and we overlook this responsibility at our peril.

OR language needs standardising and this is something that ACORN should heed, and address as a matter of priority.

The need to improve patterns of communication is critical. Team training and interprofessional education [49] are a part of addressing this and there is some evidence of this happening overseas and, perhaps, in small pockets here. It is here that perioperative researchers can take a leading role – by actively seeking out and working with surgeons, anaesthetists, allied health professionals and linguists (to name but a few) – to further our understanding of team functioning in closed and capricious environments, and to test educational interventions to improve that functioning.

Addressing the systemic bullying and harassment apparent within health may be a bridge too far but, as individuals, we can choose how we interact and support the novice nurses in our team – and today, I exhort each of us to commit to caring for a new colleague.

Notwithstanding the prevailing view, I don't subscribe to the technical versus the caring role dichotomy; rather, I believe they are different sides of the same coin. That is, the two are essential and complementary facets of OR nursing. It is the fascination with and challenges of the technological facets of the OR that attract many nurses to our world. If we embrace and make visible our understanding of surgical technologies and devise ways to use IT to serve our ends – that is safe, surgical patient outcomes – then we can leverage our beliefs about the importance of caring and 'being there' [50] for the patient, and of delivering care in the ways we wish to and that our professional standards dictate.

ACORN Standards are a significant document but there is an urgent need to ensure they are evidence-based. Other activities that ACORN needs to consider are addressed elsewhere during this conference. However, the need for a new kind of leadership, one based on the tenets of transformational leadership, is proposed [20, 51].

We are slowly making visible the contribution we make to safe patient outcomes, for example, we have instituted practices such as time out, and we've embraced opportunities to monitor and record adverse incidences, and used the information to improve practice. This is another area where ACORN could take the lead, initiating research into various, critical aspects of practice and using the insights gained to inform the Standards.

We have demonstrated increasingly specialised and highly technologised knowledge and skills (and an associated interdependence with surgeons) and now know that these attributes are highly valued and rewarded. In the process we have highlighted the uniqueness of our practice and, more, we've started to generate theories of perioperative practice. In a nutshell, we've demonstrated the need for a qualified nurse in the operating room! That we can practise as competent perioperative nurses means we have the power to subtly change the culture of our work places, alter team dynamics and break down restrictive hierarchical 'ways of being'. This is no idle boast – we have the data to justify it and we must seize the moment!

Into the future – surgery in 2020 or 2050

"Prediction is hard, especially when it's about the future"; thus said Yogi Berra.

Changing societal norms in this, the information age, along with an ageing population, a culture of expectation that all health needs will be met and current techno-surgical advances, have resulted in an ever increasing number of surgical interventions occurring [52]. That the seemingly boundless advances in science and technology, which have shaped our understanding of the atom, the computer and the gene today, and will continue, is undeniable [53]. A small taste of what is, or might, impact on practice in the OR of 2020 or 2050 includes the following.

Enhanced visualisation as surgery and radiology merges, with the result that surgical sites can be seen through tissue, including behind and around organs in three dimensions (3D) without invasion. Imaging and high intensity ultrasound will eradicate tumours without the need for surgery as we know it now. In association with digitalisation – that is, the transfer of information in a digital format – means virtual reality e.g. virtual colonoscopies [54-56]. Virtual reality is a collection of technologies that allow people to interact efficiently with 3D computerised databases in real time using their natural senses and skills. The key strength of virtual reality is that

it supports and enhances real time interaction on the part of the user. When harnessed to robots it means we have robotic surgery. Robots are remote, computer-assisted telemanipulators, developed for use in surgery to overcome some of the limitations associated with laparoscopic equipment. And the surgeon doesn't even have to be in the same country never mind the same OR as the patient! Telesurgery and telepresence are already a reality [53, 57-60]. Old hat, you may think, so what's really new?

- Biogenomics and tissue engineering means that a new blood vessel for bypass grafting can be made using the patient's own fibroblast cells [54]. Genomic analysis will identify patients with postoperative infections by determining the abundance of messenger RNA in blood samples [54].
- Radio frequency identification (RFID) in patients' name bands (even RFID chips implanted under patients' skin) means that the end to wrong patient/site surgery and, via the same technology, patients' physiological status will be monitored continuously. Additionally, RFIDs can be used to track instruments, sponges, in fact all OR supplies [20, 56].
- Smart fabrics which incorporate computers within strands of material along with wireless transmitters in pockets and patches will be able to detect and respond to temperature changes and can be used ensure patient normothermia [56]. The same technology can be 'built into' scrub suits, and the perioperative nurse can, via a 'keypad', transmit information about patients' status, availability of supplies and so on.
- Nanotechnology, that is the engineering of functioning systems at the molecular level, enables the concept of nanosurgery. The use of nanobots that can travel through the body repairing damage (think, DNA screwdriver) will precipitate the next generation of surgery. Nanobots will be followed by cytobots and karyobots that will perform intracellular and intranuclear surgery [53, 54, 56].
- Virtual reality training in a simulated environment that will make use of holographic, 3D technology, special glasses (or even helmets which incorporate both) and haptic gloves to enable real-time practice and testing [56].

The list goes on and on, and other, more futuristic concepts such as the quantum computer (a computer on several atoms) [53], have not even been considered. Surgery in 2020 or 2050 may not even take place in the OR at all.

What does this mean for us? Perioperative nurses are crucial because they will be at the interface between the patient and the technology. Our deep understanding of the caring aspects of surgery, along with our propensity for technology, means that we will be key healthcare professionals during 'surgery'. There will be opportunities for a range of advanced roles, both highly technical (e.g. robotics nurse specialist who assists directly with the surgery) and as coordinators of surgical patient care. We will also perform minor surgery, both diagnostic and therapeutic, including endoscopic and other, non-invasive interventions. We will, however, need different knowledge and skills, including an understanding of informatics, software management, physics, and radiology and technology management [56]. We will learn in a simulated environment and need special training to learn to control machines through eye and hand movement and, eventually, through thought. Our scrubs will be made of smart fabric and will transmit information to computer, colleagues, even patients. Time does not permit me to add any more to this vision of surgery and the OR nurse of the future; perhaps that is just as well!

A final word

I've looked at OR nursing as it once was, presented a picture of how it is now – as informed by those who've chosen to research our world – and undertaken a 'best guess' peek at surgery 2020-2050 and what this may mean for us. In closing, let me reiterate my opening comments. You (like some of my professional forebears) are the giants on whose shoulders I (and others) stand. If we can see further than you, or things at a greater distance, it is not by virtue of any sharpness of sight on our part, but because we stand on your shoulders [9].

While I have paid a special tribute to Australian perioperative nurse researchers, I wish to salute all of you today. You are and remain the 'best of the best' nurses and the 'crème de la crème' of the operating room. I ask that you continue to bear the burden of us, because our patients and the profession rely on all of you now more than ever. Thank you.

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