

**The Winston Churchill Memorial Trust of Australia**

**Report by Katie Walker**

**2006 Churchill Fellow**

**To study the curriculum delivered from Clinical  
Simulation Centres to build course capacity in  
Queensland  
– USA, Denmark, Italy, Germany, UK**

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*Lavante Simulation Centre, Granada, Spain.  
A large purpose-built centre serving the healthcare  
professionals of the Andalusia region*

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## INTRODUCTION

*David Gaba and Steve Howard at Stanford University, two of the forefathers in Anaesthetic Crisis Resource Management (team training)*

Each year 10% of patients admitted to hospitals worldwide will experience a preventable adverse event. A large percentage of these adverse events is due to poor communication. Simulation in healthcare has been used in some form since the 1960's and recently has gained momentum as a potential panacea to the medical error caused by poor communication and deficient teamwork. Simulation is also used to practise complex or rare procedures, to review systems and work flow, and to train a broad range of healthcare professionals to meet workforce needs.

There are many issues to consider in this innovative approach to improving patient well-being. This Fellowship has given me the opportunity to research many different approaches to simulation and to discuss the issues with the experts in this field. I had the opportunity to visit over 30 different sites and witness how simulation is used in each environment.

I would like to acknowledge the Winston Churchill Memorial Trust and Queensland Health for this wonderful opportunity and know that I can use the knowledge that I have gained to have an impact on program development and delivery at Queensland Health Skills Development Centre. I would also like to acknowledge the generosity of the people at the sites that I visited. Staff at all of the centres showed a willingness to share their knowledge that had been gained over time. The desire of the simulation in healthcare community to increase the body of knowledge in simulation was palpable.

On a personal level, I was taken out for many meals, and provided with accommodation in a number of places. I would like to thank Dave Harvey and Patricia Rêgo at the Queensland Health Skills Development Centre for assistance with the production of this report.

The main focus of the proponents of the use of simulation in healthcare is patient safety. Their use of simulation techniques in every location is very creative, and the way that each course or program is delivered is very different. This is despite the fact that a feature common to all simulation users was that the same hardware and software are used as there is only a small pool of simulation manufacturers.



## EXECUTIVE SUMMARY

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*The Center for Medical Simulation, Harvard, Boston, the world leaders in de-briefing training in healthcare simulation*

### Project Description

#### ***The Study of Curriculum delivered by Clinical Simulation Centres to increase course capacity in Queensland***

I undertook the Fellowship travel between the 5<sup>th</sup> May 2007 and the 16<sup>th</sup> July 2007. The aim of my Fellowship was to visit Programs where clinical simulation had been practised for many years and where there had been opportunity for the programs to be developed, reviewed and used in a variety of healthcare settings. I met with program directors and clinicians in simulation centres, hospitals, military establishments, universities and learned colleges. I also visited several simulation industry developers and manufacturers. The experience was further enriched by the opportunity to attend two key clinical simulation conferences, the Society in Europe for Simulation Applied to Medicine (SESAM) in Copenhagen, and the Second International Clinical Skills Conference in Prato, Italy.

### Highlights

Examples of the diversity of simulation activity I encountered include:

- *In situ Simulations:* Paul Preston, Director of Patient Safety at Kaiser Permanente in San Francisco delivering a range of *in situ* simulations in clinical units.
- *Surgical Simulation:* Thomas Burger at the European Surgical Institute in Hamburg.
- *Non-technical Skills:* Rhona Flinn, Steven Yule and Rona Patey and the non-technical skills research team at University of Aberdeen.
- *Faculty Training:* Robert Simon, Dan Raemer & Jenny Rudolf at the Center for Medical Simulation, Harvard in Boston.
- *Research & Specialties:* David Gaba, Tom Krummel & Lou Halamek at the Center for Immersive & Simulation-based Learning (CISL) at Stanford University. This is the umbrella organisation for simulation activities associated with the School of Medicine.
- *High Volume Training:* Paul Phrampus at the WISER center in Pittsburgh.
- *Standardized Patients:* Holly Gervina at the North Eastern Ohio, College of Medicine, with the established high throughput, standardised patient program.
- *Hospital Re-development:* Christie Zuber at the Garfield Center, San Francisco.
- *Industry:* Limbs & Things, Laerdal and Mentice.
- *Meetings:* SESAM, Copenhagen & The 2nd International Clinical Skills Conference, Prato, Italy.
- *E-Learning:* Keith Ward, Penfield Virtual hospital, UK.



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*At Pennsylvania State University Simulation Center, curtains are used to change the simulation room to create different clinical settings. It is a clever technique to give flexibility to sim rooms*

### **Lessons learnt**

It was most valuable to observe the rapid expansion of simulation in healthcare across *most* specialities and domains. Participants in simulation range from student and novice healthcare professionals through to highly trained expert clinicians. The Queensland Health Skills Development Centre (SDC) is well positioned to continue to embrace the lessons learnt from all domains. Scaling (the ability to deliver the programs to large numbers) is a niche area for SDC.

I found the international simulation in healthcare community to be extremely collaborative which will allow rapid growth in curriculum development, evaluation, and technical and faculty training.

### **Dissemination and implementation in Australia**

The major vehicle for the dissemination and implementation of the knowledge I gained is through SimTecT, the Australasian Simulation in Healthcare Conference. In my role as the secretary for the Australian Society for Simulation in Healthcare (ASSH), there are many opportunities to share on a regular basis. I have already been invited to speak at the Australian Day Surgery Conference, the Mining Industry Conference in 2007, and the International Meeting on Simulation in Healthcare (IMSH), in January 2008.

I have also been invited to be a member of the International Committee of the Society for Simulation in Healthcare (SSH) on the Credentialing and Standards Sub-committee. I am planning to submit an article to the Simulation in Healthcare journal by November 2007.

The knowledge I gained will be implemented in the SDC strategic plan and I use information learnt on a daily basis to give advice to the Senior Director and SDC staff.



## FELLOWSHIP PROGRAM

*WISER Center, Pittsburgh, USA: Director, Paul Phrampus; Research Director, Joseph Samosky; Operations Director, Center for Medical Simulation, Boston, Dan Raemer; Operations Director, WISER, Thomas Dongilli*

### USA

#### **Monday 7<sup>th</sup> May**

1. Center for Advanced Paediatric and Perinatal Education (CAPE), Stanford University, California Dr Lou Halamek & Kim Yaeger

#### **Tuesday 8<sup>th</sup> May**

2. The Goodman Center, Stanford University, Dr Tom Krummel

3. The Garfield Center, Kaiser Permanente, San Francisco, Christie Zuber, Director, Innovation Consultancy & Dr Paul Preston

#### **Wednesday 9<sup>th</sup> May**

4. Samuel Merritt College, San Francisco, Celeste Villanueva, Coordinator of the Health Science Simulation Laboratory & Dr Paul Preston

#### **Thursday 10<sup>th</sup> May**

5. Santa Clara Hospital, Obstetrics and Neonatal simulation program, Dr Andrea Forgy & Dr Paul Preston

6. Center for Immersive Simulation & Learning, Stanford University, Dr David Gaba & Dr Steve Howard

#### **Monday 14 May –Saturday 19<sup>th</sup> May**

7. Center for Medical Simulation, Harvard, Boston. Comprehensive workshop in Medical Simulation, A/Prof Dan Raemer, Dr Robert Simon, Dr Jenny Rudolf

#### **Monday 21<sup>st</sup> May**

8. WISER center, Pittsburgh, Dr Paul Pamphras

#### **Tuesday 22<sup>nd</sup> May**

9. North Eastern Ohio, College of Medicine, Standardised Patient program, Holly Gervina

#### **Wednesday 23<sup>rd</sup> May**

10. National Capital Area, Medical Simulation Center, Gilbert Muniz, PhD

11. Uniformed Services University, Richard Kyle

#### **Thursday 24<sup>th</sup> May**

12. Maryland Advanced Simulation Training Research & Innovation center (MASTRI): Dr Colin McKenzie

13. Maryland School of Nursing Simulation Center

14. John Hopkins Hospital Simulation Center, Dr Betsy Hunt

15. Pennsylvania State University, Dr Lisa Sinz & Dr Bosseau Murray

CHURCHILL AWARD



## FELLOWSHIP PROGRAM

*Junior Doctors participating in the simulation program at Dundee Clinical Simulation Centre, Scotland.*

### Europe

#### **Tuesday 29<sup>th</sup> May**

16. Imperial College, London, Debra Nestel & Roger Kneebone

#### **Wednesday 30<sup>th</sup> May**

17. Royal College of Surgeons, England, Ruth Warne

#### **Thursday 31<sup>st</sup> May**

18. The Minimal Access Technical Training Unit (MATTU), Guildford, UK, Alison Snook

#### **Friday 1<sup>st</sup> June**

19. Bristol University Medical School, Anatomy Laboratory and Mobile Centre  
20. Limbs and Things factory, Bristol, Margo Cooper & Nic Riley

#### **Monday 4<sup>th</sup> June**

21. Bristol Medical Simulation Centre  
22. Penfield Virtual University, Huddersfield University, Keith Ward

#### **Wednesday 6<sup>th</sup> June**

23. Aberdeen University, Industrial Psychology Research Centre, Dr Rhona Flinn and Dr Steven Yule  
24. Aberdeen Clinical Simulation Centre, Dr Rona Patey

#### **Friday 8<sup>th</sup> June**

25. Cuschieri Surgical Skills Centre, Dundee University, Lorna Christie  
26. Scottish Clinical Skills Network, Prof Philip Cachia  
27. Dundee Clinical Skills Centre, Dundee University Medical School & Ninewells hospital, Dr Jean Kerr



## FELLOWSHIP PROGRAM

*Delegates at the Society in Europe for Simulation Applied to Medicine (SESAM), Copenhagen, June 2007.*

### Europe

#### **Monday 11<sup>th</sup> June – Tuesday 12<sup>th</sup> June**

28. European Surgical Institute, Hamburg, Germany, Thomas Burger

#### **Wednesday 13<sup>th</sup> June**

29. SAFER Centre, Stavanger, Norway, Trond-Harald Olsen

30. Laerdal factory, Stavanger, Norway, Tom Guthormsen

#### **Thursday 14<sup>th</sup> June**

31. Mentice factory and offices, Gothenburg, Sweden, Jonas Ohlsson

#### **Sunday 17<sup>th</sup> June – Wednesday 20<sup>th</sup> June**

32. Society in Europe for Simulation Applied to Medicine (SESAM), Copenhagen, Denmark

33. Herlev Simulation Centre, Denmark

#### **Friday 22<sup>nd</sup> June**

34. Iavante Medical Simulation Centre, Granada

#### **Sunday 1<sup>st</sup> July – Tuesday 3<sup>rd</sup> July**

35. 2<sup>nd</sup> International Clinical Skills Conference, Prato, Italy



## CENTRE DEVELOPMENT – A GROWING INDUSTRY

*John Hopkins, Baltimore, has plans for an extensive simulation center attached to the hospital*

On day four of my Churchill Fellowship program, I was fortunate to visit one of the centers where simulation in healthcare in its current construct began. The Veteran Affairs Palo Alto Simulation Center is one of the sites of the Center for Immersive Simulation-based Learning (CISL) at Stanford University. Dr David Gaba in 1986 developed one of the first human patient simulators. In the past 21 years simulation in healthcare has grown exponentially, and has spread to all specialities to replicate the reality and complexity of our current healthcare system.

Most sites I visited had plans for re-development or were recently-developed. Centres are becoming increasingly creative by using small spaces very flexibly to maximise training time. The Samuel Merritt School of Nursing in San Francisco, the Herlev Centre in Copenhagen, and the Safer Centre in Stavanger, Norway were great examples of innovative centre design. John Hopkins Hospital, Baltimore and Aberdeen University had extensive plans for new locations which were ready to start building. The plans consisted of integrated teaching auditoria, break-out rooms, and simulation rooms with embedded audio-visual systems. These designs allow for enormous flexibility for blended learning sessions and give the instructors the ability to take into account all learning styles.

### **ACTUAL FACILITIES Vs VIRTUAL FACILITIES**

The application of simulation in the 30 institutions I visited occurred in a range of different locations. These included:

- 1) Re-furbished wards or hospital units
- 2) Purpose-built simulation units
- 3) Simulation rooms integrated into educational and training units
- 4) *In situ* simulation training in working clinical units (virtual)
- 5) Large central centres with satellite centres
- 6) Specialist research laboratories
- 7) Online simulations accessible from notebooks or PC's

Each location had advantages and disadvantages associated with their design. How simulation programs are integrated into the available space is dependent on the vision of the simulation leaders, the educational philosophy of the trainers, the capital expenditure available and the ability of the simulation leaders to influence executives with funding delegation. This demonstrates that simulation has not yet penetrated the fabric in any institution in a way that it has been able to affect all aspects of learning and patient safety efforts.



## GOVERNANCE & FUNDING MODELS

*Maryland Advanced Simulation Training Research & Innovation center (MASTRI): clinicians and managers discussing the governance model at this newly-developed center*

The models of governance of the simulation effort in each institution were very different. This was primarily due to the differences in funding sources. Several of the models I observed include:

### **Patient Safety Program Leadership**

The *in situ* simulations program that I visited was part of the patient safety action plan of the health services district. This had a great impact on the district in its ability to continually review existing systems through simulation and debriefing.

### **Simulation Centre Board**

Some centres had a board of governance which oversee the strategic direction of the centres' programs. This model appeared to be particularly effective for non-government centres in ensuring the key directions were being achieved.

### **Organisational Development Unit Accountability**

The centres under the aegis of the organizational development unit or the education and training program had simulation curricula which rapidly became a part of the regular training program and were thus more readily accepted.

### **Professional College or University Leadership**

The *raison d'être* for some centres was to be the educational arm of a professional college or as an adjunct to a university research or training program. This usually afforded strong governance with the centre manager reporting to the college or university executive.

## **FUNDING MODELS**

Who pays for simulation training and how will it be sustained are key questions. Funding for simulation training comes from multiple sources. These include universities, government, professional colleges, existing institutional educational budgets, industry and sponsorship. Some centres are self-funded by revenue from courses. This only seems to work effectively if units are contracted for training days rather than individual registrations. Most centres function with a mix of central funding and course revenue.

Faculty in some centres are not reimbursed for their training time, whereas elsewhere the provision of training time by faculty is the *quid pro quo* for their staff's free participation on courses. For long-term retention of faculty in centres payment for services should be considered.

The vast array of governance and funding models may be attributed also to the "theory" mentioned in centre development, that the diffusion of simulation into the framework of institutions in all aspects of learning and patient safety has not yet occurred.



## FACULTY TRAINING & DEBRIEFING TRAINING

*The 5.5-day comprehensive workshop in medical simulation delivered from the Center for Medical Simulation, Harvard, Boston. In this workshop debriefing is the focus.*

What are the necessary knowledge, skills and attitudes required for the clinical educator working in a simulated environment? Do all faculty have to have participated in courses before they undertake training participants?

Training and retention of the instructor pool for all simulation efforts are a major issue. When I asked the question "how are your faculty trained?", there was a particularly varied response.

Historically, many of the courses/programs for the simulated environment, are developed by clinicians who have the vision and an understanding of the power of teaching in the simulated environment.

Some of the faculty that I met with have a high level of educational expertise and some have no formal training in clinical education. The apprenticeship model has been the traditional way of imparting knowledge to health care professionals.

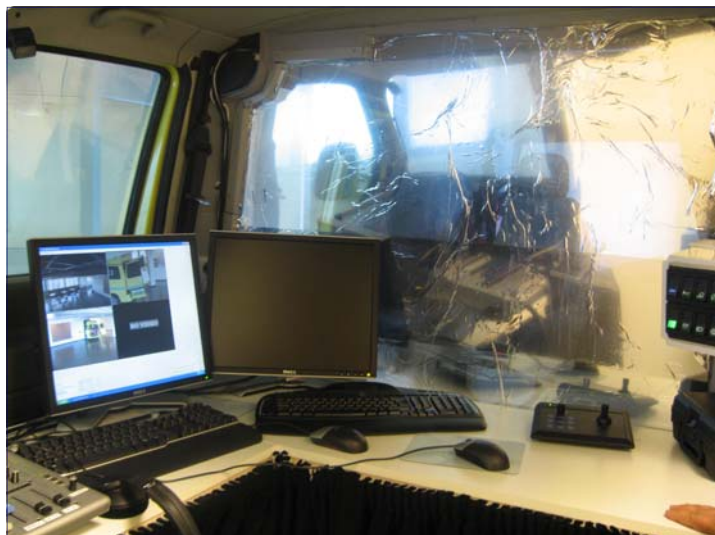
### **DEBRIEFING TRAINING**

*How should debriefing training be delivered in simulation centres?*

*Who does the instructing for debriefing? non-healthcare instructors?*

*Should debriefing training be mandated in all simulation programs?*

The Center for Medical Simulation in Boston has an extensive program for training in debriefing faculty, however few other centres appeared to have an active scenario-based debriefing program. Given that debriefing is a most crucial aspect of scenario-based learning, this was an important insight into what is required.



## TECHNICAL SUPPORT & TECHNICAL TRAINING

*A control room at the SAFER centre, Stavanger, Norway, which is situated inside the front of a decommissioned ambulance which is actually built into the simulation room.*

It was very interesting and useful to note that technicians from a variety of backgrounds can make an important contribution to simulation training.

Technical support is provided by dedicated technicians in some centres, faculty only in others and a mixture of both faculty and technicians in most centres. Some technicians receive technical training prior to commencing their role, and most do the majority of the training on-the-job. The technical role draws people from:

- the engineering sector
- nursing
- anaesthetics- technicians and assistants
- pharmacy personnel
- medical officers
- information technology sector
- laboratory technicians

Sometimes the technical staff are external contractors.

Some technicians perform maintenance on the computerised equipment and others write curriculum. Some play a major role in de-briefing and others work purely in a technical role. To achieve a high level of reality in scenario-based learning simulation coordinators/technicians play a major role.

*How much training and practise do technicians require to stay current?*

*What are the implications of this role for the long term? What career promotion will be available?*

These are important questions that remain unanswered.



## SIMULATION CURRICULUM

*The new surgical simulation center, the Goodman Center at Stanford University. The high-end endovascular virtual reality trainer (VIST) sits alongside SimMan for surgical team training*

The need to underpin the development of curricula using sound educational principles for all programs — regardless of the discipline — was reinforced during my trip.

Establishing how to create the best possible learning environments when using integrated simulation modes and hybrid simulation systems, is a major challenge to all who use simulation for training. Important questions which remain to be answered both in Australia and overseas include:

- who should decide which curricula to deliver?
- who should develop it?
- should simulation training be mandated for particular staff groups or students?
- should simulation be a mandated part of professional training programs?

The question of whether simulated training should be compulsory has implications for both curriculum development and delivery. The WISER Institute in Pittsburgh has mandated several courses for doctors. One includes the insertion of central lines.

At the Center for Medical Simulation in Boston simulation is essentially compulsory via the physician insurance discount.

However, there exists everywhere the circular problem of training programs not being mandatory and therefore attracting variable numbers of trainees, whilst the low number of trainees is likely to attract less funding for simulation programs.

The vast range of curricula I saw really confirmed that the most effective way to grow the industry is by sharing curricula, a project ASSH is leading with funding from the Department of Health and Aging in Australia. I was able to secure informal arrangements with many sites to share curricula that had been developed by particular centres.

The issue of how to evaluate courses was raised at many places that I visited. Most centres were open to multi-site evaluations, the results of which will underpin both qualitative and quantitative research in simulation.



## WHY CLINICAL SIMULATION BENEFITS THE COMMUNITY: *A PATIENT SAFETY STRATEGY*

*The historic Stanford Barn which currently houses the Center for Advanced Paediatric & Perinatal Education (CAPE) at Packard Children's Hospital at Stanford*

The use of simulation techniques in the education of healthcare professionals is increasingly becoming an important aspect of educational programs.

There is a belief held by healthcare educators worldwide that simulation can be a vehicle to improve patient safety by:

- Allowing clinicians to practice technical and communication skills in a synthetic environment and gain expertise before treating a patient.
- Practicing infrequent or rare emergency conditions.
- Teaching clinicians how to work most effectively as part of a healthcare team.
- Assisting clinicians to understand the environment in which they work.
- Helping clinicians to know the value of calling for assistance early when it is required.
- Assisting clinicians to gain insight into how they approach a range of diverse clinical situations through videoing performance and review.
- Practising communication skills with a wide range of healthcare professionals.
- Reviewing workflows.
- Reviewing equipment functionality and packaging.
- Practising the interaction between healthcare teams.

These are just some of the benefits of simulation as a technique to improve the healthcare system. There has not been enough research performed on a large enough scale to state a direct relationship to patient safety at this stage. However, there is considerable anecdotal evidence that simulation training increases participants' confidence exponentially, and also some evidence from post program interviews with clinical supervisors that participants' competence in the areas covered by the training is increased.



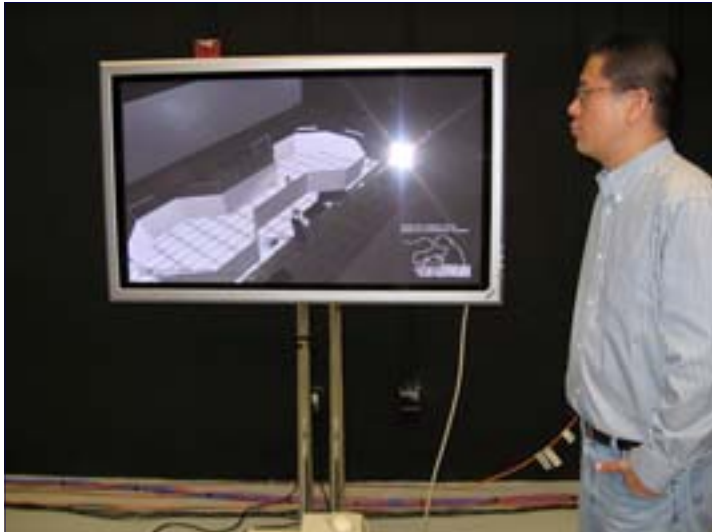
## CONCLUSIONS

*The Samuel Merritt School of Nursing Simulation Center, San Francisco. The storyboard depicts the Centre's origins.*

The Churchill Fellowship provided a unique opportunity to review the international state of healthcare simulations. The major learnings from my trip include the need for Australia to:

1. Invest in standardised simulation programs
2. Develop national and international collaborations for the sharing of curricula
3. Develop formal education programs to train instructors in the use of the immersive environment and de-briefing
4. Allocate funding to healthcare simulation research
5. Support efforts to integrate simulation and immersive learning techniques throughout the healthcare system continuum

These initiatives will only occur through the international and national collaborations of the simulation in healthcare community which will lead to a rapid development of valid curricula, evaluation and assessment in simulation training. Instructor training is the key to the development of successful simulation training programs; however, the training that was offered by most centres appeared to be quite *ad hoc*.



## RECOMMENDATIONS

*Dr Alan Lui at the National Capital Area Medical Simulation Center demonstrating the “wave” technology*

*(It should be noted that many of the recommendations relate directly to the Queensland Health Skills Development Centre in Queensland however being the Secretary of ASSH, collaborative relationships are already established throughout Australia. This will enable lessons to be shared.)*

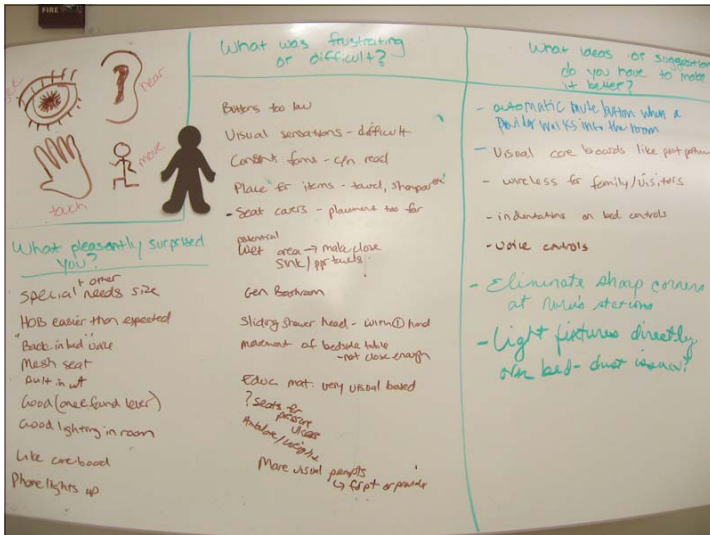
### **To further the growth of Clinical Simulation in Curriculum in Australia it is necessary to:**

#### **Simulation Standards**

- Commence the development of standards for clinical simulation through the Australian Society for Simulation in Healthcare, in collaboration with the Society for Simulation in healthcare (the international society) and potentially the Scottish Clinical Skills Network.
- Continue the visiting Professor program at SDC, and approach potential candidates one year prior to proposed visits.
- Become a satellite centre to pilot the program for underperforming Doctors, in collaboration with the Dundee Clinical Skills Centre and the Queensland Health Safe Doctors program
- Use simulation when planning hospital development and re-development and maximise the learnings already available on system efficacy, the use of new technologies and patient flows.

#### **Instructor/Faculty Training**

- Develop a partnership with Harvard University, Center for Medical Simulation to deliver the comprehensive faculty workshop in Queensland annually, marketing to the Asia- Pacific region.
- Develop faculty training programs. SDC is in a good position to research this with the “scaling” initiative.
- Develop a faculty training plan for SDC, the affiliate centres and the mobile program
- Develop a Graduate Certificate/Diploma in Simulation in Healthcare



## RECOMMENDATIONS

*A storyboard created by staff as part of a program delivered by the Garfield Center, San Francisco. The key issue from a patient perspective was the need for a building that would allow for their sensory deficits. Simulation has a key role in hospital re-development*

### Curricula Sharing Internationally and Nationally

- Using the example of the North Eastern Ohio College of Medicine standardised patient program to build on the “simulated patient” program used for open disclosure training by the Queensland Health Patient Safety Centre and include volunteer “patients”, as well as a database of trained actors, for the more complex interpersonal interactions.
- Form stronger relationships with the anatomy laboratory at the University of Queensland and the animal laboratory, and commence the projection of live operating room cases into SDC to enhance the surgical training program
- Pilot surgical programs in collaboration with the Cuschieri Skills Centre, Dundee, Scotland.
- Pilot the anaesthetic non-technical skills program (ANTS) in the Anaesthetic Crisis Resource Management (ACRM) courses at SDC
- Pilot the nursing non-technical skills program in collaboration with Aberdeen University
- Integrate the reality virtual surgical trainers into surgical training programs in collaboration with the Royal Australian College of Surgeons (RACS), the Goodman Centre at Stanford University, and the Pennsylvania State University.
- Investigate with RACS the piloting of the non-technical skills assessment for surgeons program (NOTTS) from Aberdeen University

### Research

- Investigate the possibility of a training post in simulation for trainee surgeons in research and development to enhance the surgical simulation effort in Australia, in line with the model in the USA.
- Human Factors research to inform part-task and computerised mannequin development.



## RECOMMENDATIONS

*Dr Paul Preston, Director of Patient Safety, Kaiser Permanente hospitals, San Francisco with Dr Andrea Forgy, Obstetrician, facilitating an in situ simulations program at the Santa Clara hospital*

The design of Queensland Health Skills Development Centre (SDC) is well positioned to embrace the learnings from my Churchill Fellowship in all domains. The niche area in which Queensland Health Skills Development Centre is positioned to be a leader is in the area of scaling (growing simulation training to enable delivery to large numbers of clinicians). The initiative of “core courses” - centrally funded courses, plays a key role in this.

The collaborative nature of simulation in healthcare provides open channels for the sharing of knowledge particularly simulation curriculum. It appears that the centres that are growing most effectively in both quantity & quality, are those most open to learning from other institutions. My greatest learning was that it was invaluable to learn from others.