

Report for the Victorian Travelling Fellowship Program 2005-06

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1. Project information

Project title: Improving medication safety in hospitals
Study area: Quality improvement and patient safety
Travel: United Kingdom and United States of America from 10 April 2006-06 May 2006
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2. Project summary

Places visited:

- Kings College Hospital, South London, UK
- National Patient Safety Agency, London UK
- Charing Cross Hospital, Hammersmith Trust London UK
- Craigavon Hospital Trust, Craigavon, Northern Ireland
- Brigham and Women's Hospital, Boston, USA
- Dana Farber Cancer Institute, Boston USA
- University of Massachusetts Medical Center, Worcester, MA, USA
- Massachusetts College of Pharmacy, Boston USA
- Northeastern University, Boston, USA
- American Health-System Pharmacists Association, Bethesda Maryland, USA
- Institute of Safe Medication Practices, Huntingdon Valley, PA, USA
- Abington Memorial Hospital, Philadelphia, USA
- St Josephs Medical Center, Reading PA, USA

Study area

I studied ways to improve medication safety and reduce risk of harm in hospitals in order to bring back to the Victorian healthcare services the latest ideas, techniques and initiatives.

I visited some of the leading international organisations in medication safety and quality improvement in the United Kingdom and the United States of America as well as a range of hospitals that have introduced some of these initiatives and gained a practical knowledge of the American medication use system in order to be able to understand which initiatives could be translated for use in Victoria.

Study lessons

Major learnings

- The UK prescribing, dispensing and administration of medications follows a similar model to that used in Australia, they are experiencing many of the same issues and at a similar stage in introducing systems to improve medication safety as we are in Australia.
- The UK has recently commenced a countrywide medication error reporting system, which has made it possible to analyse trends and develop strategies to address system problems across the country.
- Northern Ireland has introduced a territory wide, top down coordinated system for medication safety managed across all hospital trusts by Medicines Governance Pharmacists (similar to Medication Safety and Quality Use of Medicines pharmacists). This has enabled standardisation of medication error reporting systems, the implementation of new strategies and a standard approach to all medication safety activities across NI.
- The USA system has historically progressed from more discrete prescribing, dispensing and administration systems and has therefore developed differently. They are further advanced with respect to technology, for example Computer Prescriber Order Entry and pharmacy dispensing and medication supply systems, but less advanced with respect to clinical services and discharge prescription dispensing and patient counselling.
- Another fundamental difference between the USA and Australia is the funding mechanisms for hospitals and the medical insurance system which has one been one of the drivers for their unit dose medication system, (the patient can be charged electronically for each drug dose dispensed). In addition, confidentiality relating to error reporting is affected by the different funding of hospitals and insurance schemes, which makes them less willing to share data.
- The Joint Commission for Accreditation of Healthcare Organisations (JCAHO) patient safety goals has led a top-down safety approach that was visible in all hospitals I visited, and ensuing their organisation complies with the safety goals was the main driver of Medication and Patient Safety Officers.

Lessons for the Victorian health system

Improving the safety culture across the state:

- A safety culture promoted across all organisations led by DHS would progress safety in hospitals and give the public positive messages about safety in hospitals.
- Top down coordinated approach across all healthcare networks with a core group of medication safety pharmacists and patient safety officers working together - as in the Northern Ireland model - would enable standardisation and prevent errors, including extension to primary care through general practitioners and community pharmacist safety standards mandated by a government or affiliated organisation (eg JCAHO safety goals) is an effective way of giving organisations the capability to raise their standards and improve safety.

Lessons from the USA medication system:

- A thorough understanding of the USA medication management system is necessary to be able to determine whether system improvements, for example, barcoding, automated dispensing machines available in the USA can be translated for use in our system.
- It is not necessary to wait til all elements of technology are ready to commence an electronic prescribing system. The USA commenced with separate sections, such as CPOE first, then linked them together. If we wait for the whole system to be planned, we may never start. Australia should work towards implementing one section at a time.
- USA systems of unit dosing, and linkage to pharmacy dispensing systems could be a way to reduce medication administration system errors.

- Medication error reduction for administration needs to consider the capital outlay for electronic communication between prescribing, dispensing and administration. Capital outlay to do this will be major and needs to be built into future budget calculations.
- CPOE and barcoding also reduce errors but are very expensive to implement.
- Labelling and Packaging of medications needs a global approach, by working together with NPSA in the UK and ISMP in the USA this could be progressed.

Medication safety initiatives that could be implemented in Victorian hospitals in the near future:

- Pharmacist prescribing models for anticoagulant management and other chronic diseases. These could reduce LOS and reduce inpatient admissions for certain conditions.
- Chemotherapy safety could be improved with a coordinated top down approach to develop and implement guidelines and prescribing, dispensing and administration practice that are more robust than the present practice.
- Smart pump technology (Bayside Health is in process of reviewing infusion pumps and the value of 'smart pumps') would be valuable.
- Oral syringes for oral liquids could be introduced to prevent 'wrong route' errors.
- Executive safety walk rounds are a demonstrated way to involve staff, identify problems and improve systems.

Three major outcomes

- 1) A culture of safety led from the top down in organisations, which could be promoted by the Department Of Human Services. In USA the Joint Commission Accreditation of Health Care Organisations (JCAHO) patient safety goals are widely promoted and visible to staff, patients and visitors in all the hospitals. Medication safety could be promoted through the Department Of Human Services via Victorian Medicines Advisory Committee (VMAC) on a statewide basis on a model similar to that which I viewed in Northern Ireland that would facilitate a safer system and standardisation across Victorian healthcare networks. This includes a statewide medication safety program managed by pharmacists at each network, which could be facilitated by the Department Of Human Services.
- 2) New initiatives for the Victorian health system to improve medication safety in hospitals:
 - a) Specific initiatives that could be implemented in the short term. These include chemotherapy safety, pharmacist prescribing models, the introduction of oral dispensers to prevent 'wrong route' errors and executive safety walkarounds.
 - b) A practical knowledge of the American medication delivery system has enabled me to better understand which American initiatives could be used here. Initiatives that could be introduced, but would require a feasibility study and substantial funding, are computer prescription order entry (CPOE), patient and medication barcoding, linked dispensing and automated dispensing cabinets on wards and 'smart' technology infusion pumps
- 3) International collaboration to facilitate improved labelling and packaging on medications to prevent errors. Work with NPSA and ISMP who are leaders in this field, but with whom we have common goals.

Main activities undertaken

I visited the UK and USA and met with:

- medication safety pharmacists
- directors of pharmacy
- hospital patient safety officers and managers
- various clinical pharmacists and nurses who had specific project roles
- professors of pharmacy practice at USA colleges of pharmacy
- directors of national medication safety programs.

I visited:

- medication safety agencies
- hospital pharmacy departments
- hospital wards.

I viewed:

- the many variations of the entire medication delivery processes from prescribing to dispensing, medication preparation, supply and administration
- the latest technology - CPOE, barcoding, ' smart' pumps, dispensing robots, automatic dispensing machines.

I attended:

- multidisciplinary medication and patient safety committee meetings in several hospitals
- participated in an executive walk around at a leading USA hospital.

3. Description of the study itinerary

Visit to Kings College Hospital, South London

I visited Kings College Hospital (KCH), South London, part of a 900 bed Trust where I knew there was a medication safety program, managed by a pharmacist. I spent time with Gillian Cavell, who is Deputy Director of Pharmacy and in charge of medication safety, and several pharmacists who have roles related to specific medication safety projects in which I had expressed interest. These were:

- Lucy Thompson - Ascetic Services Director
- Roz Perrot - Anticoagulant Clinic Pharmacist
- Helen Williams - Cardiac Service Senior Pharmacist, Supplementary Prescriber
- Rebecca Grundy - Haematology Oncology pharmacist
- Jackie Chappell - Haematology Oncology Team Leader, Supplementary Prescriber

Gillian's role is very similar to mine, and the UK prescribing, dispensing and administration processes are similar to ours in Australia, so there were many initiatives on which we could share views and issues.

KCH has initiated major improvements in the areas of:

- Chemotherapy safety; processes and procedures to ensure intrathecal medications are safely prescribed and administered. These follow the UK Guidelines for Safe Aseptic Prescribing and Dispensing, but also include extra safety precautions KCH have implemented.
- Pharmacists prescribing models for anticoagulant outpatient and heart failure clinics. These enable patients diagnosed with deep vein thrombosis (DVT) to be managed at outpatients instead of being admitted. This has been shown to be cost effective and reduces pressure on inpatient beds.

- Use of oral syringes for administration of oral liquids, instead of usual practice of using IV syringes, which increases the risk of an oral dose being administered intravenously.
- Medication dispensing by robots, which saves time and reduces 'wrong selection' errors. It has enabled the dispensing process to be more efficient, has reduced the pharmacy department's stock holding and has reduced dispensing errors.

I attended a multidisciplinary medication safety committee meeting which runs on a similar model to ours, and reviews reported medication errors and develops quality improvement strategies to reduce system errors.

Chemotherapy safety

The UK Guidelines were developed as a result of several deaths when an intravenous chemotherapy agent was administered intrathecally. This error has been reported over 20 times worldwide in recent years, one was reported in Sydney in 2003.

The contributing factors have included:

- products being available in look-alike syringes
- small font on the labels, making it difficult to differentiate between the words 'intravenous' and 'intrathecal'
- lack of knowledge by staff prescribing, preparing and administering these drugs
- that some regimes require both intravenous and intrathecal chemotherapy to be prescribed for the same patient.

The guidelines require intrathecal chemotherapy to be prescribed:

- by credentialed medical staff
- on a separate prescription
- reviewed and confirmed by a credentialed oncology pharmacist to ensure the protocol, drug, dose, route and patient are correct
- the intrathecal chemotherapy, once prepared, must be collected from the pharmacy by the prescriber. A credentialed chemotherapy nurse must also check the intrathecal dose before the doctor administers it
- pharmacy will only release this, once they have viewed the medication chart, which shows that the intravenous chemotherapy has been administered
- the intrathecal product must be clearly labelled as intrathecal
- it must be administered in a designated 'intrathecal' area
- if it is stored on the ward prior to administration, it must be locked in a designated intrathecal fridge.

KCH have implemented these guidelines and gave me copies of their policies and procedures.

In Australia, no national guidelines exist, though recently the Australian Commission, which replaced the Australian Council for Safety and Quality in Healthcare, issued a national alert regarding intrathecal chemotherapy. I think that safeguards similar to those used in the UK could be used as a guide for safety in Australia.

Pharmacist anticoagulation clinic

I was an observer during the anticoagulant clinic at KCH, managed by a pharmacist.

Patients discharged on warfarin, but who attend the Outpatient Clinic for ongoing management, have an appointment with the pharmacist and their INR result is reviewed by the pharmacist who adjusts

their warfarin dose. The pharmacist also ensures that the patient understands their dose and discusses any other issues, for example other medications which may interact, any planned surgery or long distance journeys. In addition, any patient diagnosed with uncomplicated atrial fibrillation is referred by the consultant and the pharmacist manages their warfarin dosing without the need to admit them as an inpatient.

To be qualified as a prescriber, a pharmacist must attend a supplementary prescribing course that is provided by universities. They then must have a clinical management plan (CMP) approved by the patients' consultant physician to commence prescribing. There is also the opportunity for pharmacists to become independent prescribers. In the UK, nurses have been supplementary prescribers for about ten years, but pharmacists have been part of this scheme for five years.

Other pharmacist prescribing models

I met with two other pharmacists who are qualified supplementary prescribers, one who will be part of oncology prescribing team and one who manages, in conjunction with a nurse prescriber, a heart failure clinic. Heart failure is a chronic condition that can often be managed as an outpatient by careful titration of medication. Experienced pharmacists are well placed to be able to titrate medication doses. The clinic at KCH was set up with the support of hospital consultants following a study that demonstrated improved patient outcomes when pharmacists were involved in the care team. KCH have demonstrated improved outcomes and have recently had an article accepted for publication to demonstrate this.

Oral syringes

KCH have introduced oral syringes for administration of all oral liquids instead of intravenous syringes that increase the risk of staff administering the liquids intravenously. The oral syringes are incompatible with IV tubing, but they are also incompatible with PEG and nasogastric tubing, which has been the stumbling block for use at our institution.

In the UK, however, adaptors from the oral syringes to fit PEG and nasogastric tubing are available and required at KCH. Following a trial, a policy has been developed and will now be part of the NPSA (see below) strategies.

Other initiatives

The medication safety pharmacist has a major role in educating junior medical staff and nurses on risk, incident reporting and safe prescribing. I attended a session for nurses.

The UK has a 'one stop' dispensing policy. If patients bring in their own medications these are used whilst inpatients, if more medications are required, and if the pharmacist is fairly confident the patient will be discharged on the same drugs, enough for use as an inpatient and discharge is dispensed at the one time. This saves time by reducing the necessity of separate discharge dispensing, but could not be introduced in Australia while we have state funding for inpatient medications and federal funding for discharge medications.

Robot dispensing

KCH pharmacy has introduced a robot to assist with dispensing. Pharmacists or technicians enter prescriptions into the computer and the robot picks the correct product, which is manually checked and the label attached. The robot has enabled a reduction in the drug stockholding and reduced drug selection errors.

Key lessons and suitability to my practice and the Victorian healthcare system

- Improved standardised safety precautions when prescribing, dispensing and administering intrathecal chemotherapy could be introduced to prevent serious errors.

- Pharmacists are trained to be experts in medication, I feel that pharmacist prescribing could be introduced in Australia, and an anticoagulant dosing service is one area that could be introduced in a short time frame.
- Another area where pharmacist prescribing could be introduced would be hospital discharge prescriptions. This would free up hospital medical officers time and improve the timeliness of patients' discharge. In the UK, medical staff has been happy to hand over this role to pharmacist as it has made it possible for them to concentrate on diagnosis and non medication related treatment.
- Oral syringes for oral liquids could be introduced to prevent 'wrong route' errors.
- Useful contacts for medication safety for the future.
- KCH is keen to set up an exchange program for pharmacists with Bayside Health, an exciting opportunity that our pharmacy department is keen to pursue.

Visit to National Patient Safety Agency (NPSA) Safe Medication Practice Unit

I met with Professor David Cousins, Head of the Safe Medications Practice Unit (SMPU) of the NPSA.

The NPSA was established in 2004 by the NHS in response to errors identified in the UK by 'Organisation with a Memory' and the USA 'To Err is Human'. The SMPU is staffed by two pharmacists and a pharmacy technician (a third pharmacist will be employed soon). David's background is as a Director of Pharmacy who has had an interest and track record in medication safety.

The SMPU has issued alerts for high-risk products and processes, for example IV potassium chloride, infusion devices and two similarly named immunisation products. David explained their philosophy and we discussed the current strategies. The alerts issued have evolved from primarily being alerts with recommendations for trusts, to alerts that describe the issues, suggested solutions to the problems and suggestions for evaluations. The major areas for 2006 are anticoagulants and IV medications. I received copies of the latest drafts of these.

The impetus for work in these two areas has been errors identified by the nationwide error reporting program, which commenced in 2005. David receives electronic reports from all trusts, including primary care, and can determine monthly breakdown of all medication related incidents. Analysis of these identified the two areas, which they have chosen to address. Draft reports are available on their new website; <http://www.saferhealthcare.org.uk/IHI/Topics/MedicationPractice>. This web site is for projects in progress and enables public consultation. The NPSA web site is for final reports.

We also discussed labelling and packaging (L&P) of medicines, look-alike sound-alike drug names and confusing packaging, which are a known source of medication error. In Australia, pharmaceutical companies state that we are only one per cent of the market, and therefore they cannot alter the L&P for us. David stated that he is told the UK is only three per cent of the market and similarly not a major influence. We agreed that L&P is an area where Australia and UK could work together to influence improvements. He gave me a copy of the UK recommendations for safe L&P, which concentrate on generic named products. We both felt that if the USA's main organisation, ISMP, who I also visited, was on board, we would have more ability to influence manufacturers to improve the safety of the L&P area. David is meeting with Mike Cohen, of ISMP, in Spain in September and suggested I put forward the Australian view when I see him next week.

Key lessons and suitability to my practice and the Victorian healthcare system

- Future NPSA alerts for medication safety will include evaluation and reporting to ensure recommendations have been implemented could be used as a model for improving Australian practice.
- 2006 NPSA priorities are anticoagulant and IV, very relevant for Australia.
- Collaboration between Australia and the UK, with regards to L&P, may be beneficial in convincing drug companies to improve safety.
- Useful contact for medication safety for the future.
- A new UK medication safety website that discusses projects in progress and has a users group facility that I have joined and notifies me of the latest information.

United States of America

I spent four days in Boston and four days in Philadelphia visiting hospitals and institutions looking at medication safety. One of my aims was to view the various medication systems from prescribing to dispensing and administration. There are several differences between the way these processes occur in Australia and the USA and observing and discussing the systems firsthand has enabled me to understand the differences and similarities for hospitals both with the latest technologies and without. Pharmacist dispensing and the medication supply, distribution and administration systems also vary from those in Australia. The terminology and abbreviations used in the USA are also different to ours, so explanation was required for me to understand and equate them to our Australian practice.

In Boston and surrounding areas, I visited Brigham and Women's Hospital (BWH) Dana Farber Cancer Institute (DFCI), University Of Massachusetts Medical Center (UMMC) Worcester, Massachusetts College of Pharmacy and North Eastern University Department of Pharmacy Practice.

USA medication processes

Each hospital I visited had a different combination of systems, from viewing each system and discussions with staff I think I have a reasonable overview of the way the USA system fits together and the differences from ours. The main elements are:

- Prescribing: prescribing has always occurred on a separate form to administration. The physician (all medical and surgical doctors are referred to as physician) only writes an order once, on a standard size single sheet (see figure 1). The order is valid for three months unless specifically ceased. This has led to physicians developing computer physician order entry (CPOE) separately from administration and dispensing.
- Medication administration record (MAR): the MAR has always been separate to the prescribing record. Physician's

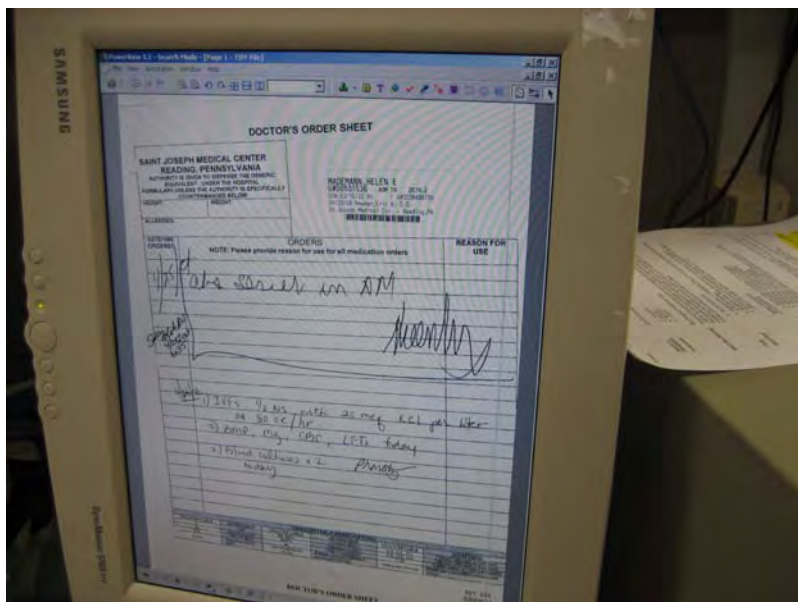


Figure 1

orders are transcribed (a task for the nurse manager or supervisor) from the prescribing record to the MAR, which is used for nurses to record administrations. Transcribing errors have been a major source of error, so the institutions that have introduced electronic MARs have been able to demonstrate a large reduction in errors post introduction. We need to recognise that in Australia we do not have separate MARs (and hence the transcribing errors) this reduction would not occur in Australia if electronic administration records were introduced.

- Dispensing: medications have been dispensed in unit doses in hospitals in USA for many years; this enables the patient to be charged for each dose dispensed as well as being considered the safest method. There are variations in the processes used:



Figure 2

- Some pharmacies package all oral doses in unit doses for a 24-hour period and 'fill a cart' every morning for these. Liquid and IV doses may be supplied in bottles and vials, or prepared in pharmacies in unit doses in pre-drawn syringes and cups (figure 2).
- The most advanced technology is the use of automated dispensing machines (ADM) on the floor (in wards) Pyxis® or Omnicell® (see figure 4) which are linked to the pharmacy dispensing system.
- Only small hospitals supply medications to the ward in the manufacturer's containers (the same as the ward imprest system used in Australia).
- When the pharmacist reviews a prescriber's order, either

electronically or manually, they then enter the order into the dispensing system for hospitals with a manual system, or approve its transfer to the pharmacy system electronically. If the hospital uses the 'cart fill' method, pharmacy technicians may manually prepare the doses, or the dispensing system may be linked to an automated machine (figure 3), which issues medications in unit doses, either with the patient name or not, depending on frequency that item is used. Each dose is checked by a pharmacist prior to a technician delivering the pre-filled cart to the ward and removing the previous day's cart, which is returned to pharmacy for a fill the next day.

- For those with ADMs, the pharmacist computer system is linked to a system for the automatic carts. The pharmacist approves the order, automatically, then allows a nurse to remove this drug for the patient from the cart at the time the medication has been ordered. As the drug is removed it is charged to the patient. If the drug ordered is not available in the cart, the pharmacy will dispense it, send it up to the ward, and place it in the cart. In theory, the nurse cannot access a drug that has not been approved by the pharmacist, but depending on the complexity and pre-programming and loading of the ADM, a nurse may be able to access another drug at this time.
- The USA system, whether the cart fill or ADM, allows much tighter control of administration of medications and ensures all orders are approved by the pharmacist prior to administration. However, in the USA, the majority of large hospitals (greater than 300 beds) are staffed by pharmacists working 24 hours a day, seven days a week, which is necessary for this system



Figure 3

staff on prescribing at the initial decision to prescribe, to interview patients on their medications, and dispense discharge medications and counsel patients.

- Medication reconciliation is further advanced in Victoria, pharmacists aim to be involved at prescribing, rather than preparation of unit dosing, and hospitals, such as Bayside Health, have clinical pharmacists attending medical rounds every weekday.
- The other aspect of the USA system, which is different to our own, is the funding system and the insurance availability. Hospitals may be private or public, for profit or not-for-profit, a single stand-alone institution or part of a group. For example, a large hospital in Philadelphia was a not-for-profit hospital that went bankrupt and was purchased by a profit group of 125 hospitals across the country.
- Patients are only eligible for medicare/medicaid if they are over 62, or are younger but unable to work due to health reasons. The remainder of the community needs to take out health insurance unless covered by their employer. Medications are charged to inpatients in hospitals, by individual dose, this is a necessary part of any dispensing system.
- Hospitals' safety agenda is driven by requirements of the Joint Commission for Accreditation of Health Care (JCAHO) organisations. They review hospitals and have specific standards, which must be met. Prior to five years ago, the criteria they used for measuring hospitals were not always considered relevant, but since then their focus has been safety and quality. Previously JCAHO has notified hospitals in advance when they will be visited to inspect their premises, but in the future they will be able to arrive unannounced.



Figure 4

to work. At present, no Australian hospital has a 24-hour service, so this system is not practical.

- Discharge dispensing: in the USA, hospitals are not licensed to dispense medication for the patient to take home, the physician writes a discharge prescription (not viewed by the hospital pharmacist) which they take to their community pharmacy for dispensing. This does not allow error in the discharge prescription to be detected at the hospital and community pharmacists are not able to view the hospital records to check the accuracy of the prescription. In addition, the hospital pharmacist has no role in patient counselling.
- The role of clinical pharmacists in Australia and the UK has concentrated on being available to advice medical

- By comparison, my impression of the Australian accreditation process (our hospital was accredited in 2005) by Australian Council of Healthcare Standards (ACHS) focuses less on safety. At Abington Memorial Hospital in Philadelphia, I attended a Patient Safety Committee meeting. They were very aware of the possible unannounced visit by JCAHO and it appeared that this was a major impetus to attempt to immediately address an area where they knew they were not meeting one of the expected standards. I got the impression that the JCAHO safety goals made it easier for hospitals to implement change, an external driver which makes these mandatory, means there is no resistance by the organisation. Discussion with medication and patient safety officers identified that some hospitals found this a little frustrating, as it meant they may not be able to work on other safety initiatives, which may be more relevant to them, as they were fully occupied with the JCAHO goals.

Meetings in Massachusetts

1. Dr Andrew Seger - Research Pharmacist for Brigham & Women's Hospital (BWH), Patient Safety Officer for Dana Farber Cancer Institute (DFCI)
2. Dr Jennifer Cina, Medication Safety pharmacist BWH
3. John Fonikos - Deputy Director Pharmacy BWH
4. Dr Jon Siverman, Pharmacist, Smart Pumps, BWH
5. Erin Graydon-Baker, Patient Safety Manager BWH
6. Anne Bane, Nurse specialist - electronic barcoding
7. Dr Jeff Rothchild, Physician Leader - smart infusion pumps
8. Dr Christian Hartman Manager, Medication Safety. University of Massachusetts Memorial Medical Center (UMMC)
9. Maichi Tran, pharmacist for anticoagulant inpatient clinic UMMC
10. Dr Tom Moniz, Pharmacy resident, UMMC
11. Denise Skrocki, Transfusion Safety Officer UMMC
12. Dr Eric Alper, Patient Safety Officer UMMC
13. Dr Caroline Zeind, Chair Department Pharmacy Practice, Massachusetts College of Pharmacy and Health Sciences, Boston
14. Dr John Reynolds, Chair Department Pharmacy Practice, School of Pharmacy, Northeastern University, Boston.

Medication safety research

Dr Andrew Seger, a Research Pharmacist employed by the Division of Medicine at BWH, lead by Dr David Bates, gave me an insight into some of this current medication safety research projects.

These include:

- Triggers in the electronic medical record that identify possible Adverse Drug Events (ADEs). Keyword triggers that may indicate an ADE, for example Syncope is linked to antihypertensives.
- Drug alerts linked to CPOE, for example poor renal function, alerting the physician to alter the dosing for specific drugs.
- Introducing medication reconciliation for all outpatients attending DFCI.
- Improving intrathecal chemotherapy by developing a consolidated case report of recent sentinel events.

CPOE, dispensing and automated dispensing machines

BWH and DFCI have an integrated CPOE, pharmacy and ADM system. The CPOE was developed first by physicians in 1992 and was followed by pharmacy developing an in-house dispensing system, which linked in, then the ADM was linked in and most recently a barcoding system to close the loop. This allows barcoding of the order, the medication, the patient, and the nurse administering it was added to complete the system.

Some of the learnings, with over 10 years experience, are listed below:

- Paper backups for CPOE were printed daily by pharmacy for years and never required, now no paper backups are printed. If the system breaks down, it is usually fixed within one hour.
- BWH uses Omnicell automatic dispensing machines in all areas. If the drugs are available in the Omnicell they do not need to be dispensed from pharmacy. When the pharmacist approves the order electronically, he can review the range of drugs in the Omnicell and, if it's stocked, approve its use for that particular patient. The nurse can remove that drug at the correct time, from the drawer after they have logged into the system on the ward.

Barcoding

I met with a senior clinical nurse responsible for overseeing barcoding and saw the pharmacy department's barcoding equipment.

BWH has implemented barcoding to ensure the right patient receives the right medications. This is considered the final step to close the loop to ensure safe medication use process. CPOE, electronic transfer of orders to pharmacy, electronic transfer of approval for each drug to be removed from an automatic dispensing machine on the ward, then barcoding to ensure this medication is administered to the correct patient.

The pharmacy department purchases as many medications as possible in unit doses with barcodes, and has on-site equipment to unit dose, pack and barcode all other medications, including vials and mixtures for all medications. All patients have barcodes on their identification wristbands, each nurse has a hand-held infrared scanner, a portable laptop computer, which they must take to the bedside every time they wish to administer a medication. They scan the medication (always a single dose), scan the patients ID band, log into the computer with their personal identification number, the computer then checks that the drug, the patient and the CPOE match. To date this system has been implemented in the majority of hospital units, it has not commenced for patients prescribed chemotherapy as there are still issues, chemotherapy is protocol driven and links have not been completed.

I was told that an estimate of the cost barcoding for BWH was ten million dollars.

Some practical points that are relevant include:

- Ensuring the system introduced has a built in ability to generate reports, this is needed to ensure compliance and, if necessary, identify any shortcomings.
- Nurses having 'spare' patient ID bands at their workstation, then they can scan the drug against the CPOE and ID band, without taking the computer to the bedside, which defeats the purpose of the barcoding to ensure the medication is administered to the correct patient. This has been overcome by making only one ID band active at a particular time (when a patient is admitted six identical ID bands are generated in case they get lost or cut off for procedures). If a nurse does use a spare ID band at the computer workstation, this inactivates the one the patient is wearing; so on the next occasion when a nurse attempts to scan the ID band the patient is wearing they are unable to.
- When the system was being planned, it was necessary to choose a specific barcode reader, which could decode all types of barcodes - infrared, matrix and 3D. This added extra expense but was considered necessary.
- To introduce barcoding in the Australian setting there must be some computer record of each prescription for the nurse to scan, each drug must have a barcode, the nurse and the patient must have a barcode. Hence in the current environment this would not be possible. However, the section from pharmacy dispensing to drug availability in ADMs could be considered.

'Smart' infusion pumps

BWH has also introduced smart pumps for all intravenous infusions. This helps prevent 'wrong rate' errors, as the pumps have software to guide the nurse in the correct rate to run a particular infusion.

I met with Jeff Rothchild, the lead author for a study published by BWH regarding the trial of use of these. The study did not find that these pumps reduced errors, but improvements to the technology and lessons learnt from this trial have changed this. Jeff's comment was that he did not consider it worthwhile for an organisation to discard their current pumps to purchase those with smart technology, as resources may be better spent on other technology aids, for example CPOE, automatic dispensing cabinets, but if it was necessary to purchase new pumps, then it would be sensible to purchase those with smart technology.

I also met with the pharmacist Jon Silverman who was the main contact for ongoing issues with the pumps. Jeff and Jon gave me the following practical points:

- smart pumps could reduce errors if used properly
- the pump drug library and its programming is crucial to their success
- pumps must be wireless connected – without this, they are too labour intensive and do not have the required forcing functions to prevent errors
- infusion concentrations must be programmed centrally, pharmacy is the appropriate discipline to lead and control this
- the first screen visible when the pumps are turned on must be the drug library. If they turn on to a generic screen, then the nurse may use this and program them themselves. This bypasses the safety feature of the pumps
- hard limits (such as those that prevent a manual override) should be used wherever possible. If soft limits, which allow override by a nurse, are employed, this reduces the safety feature
- particular drugs and the hard limits must be programmed by area and in the order that follows patient workflow. Thus if a patient is moved from ICU to a ward and the pump goes with them, when they move the wireless connection will allow for the drug concentration to be changed for that area
- drug concentrations required for each drug should be no more than two. These should be named clearly and using the terminology single/double strength, then the actual concentration stated, not the other way around
- for narcotics, the terminology morphine naive and morphine tolerant should be used and two different sets of hard limits programmed. This prevents a morphine naive patient receiving too high a dose, but also prevents frustration and the tendency to bypass the software for patients with chronic pain that require high morphine doses.

Robot dispensing for outpatients

I viewed the robot dispensing for outpatient prescriptions at BWH. This robot was quite different from the one I viewed in the UK. Bulk bottles of tablets were fed into a robot, a scanning process confirmed the correct tablets were loaded, then, when pharmacists or technicians dispensed that medication for a patient, the robot issued the correct number of tablets and attached the label.

Patient safety manager and executive walkaround

I met with the BWH Patient Safety Manager who has a staff of about five and discussed their current priorities. Their priority is complying with JCAHOs patient safety goals and sentinel alerts. In addition, they are currently introducing rapid response teams (our MET, already introduced in Victoria) and team training-crew resource management, developed by the airline industry. They are developing short-term goals and a five-year plan to ensure this is rolled out through the organisation. I discovered that the issues between staff of different disciplines within a work team are similar to ours.

I was then invited to join their weekly executive walkaround. This program was commenced in 2001. Each week the patient safety manager, the medication safety pharmacist and an executive, (this week the chief nursing officer (CNO)) visited a unit for an hour. They have a timetabled program, which they distribute in advance to staff, and visit one unit a week; it takes 18 months to visit all units. I would have expected (from the literature) that this visit would be unannounced, so staff could be observed doing their normal duties, however BWH believes that staff need notice to prepare any comments, complaints or suggestions that they may have, hence the advance notice. The safety office keeps a record of every issue brought up and feeds back to staff results from any investigations or changes implemented following the walkaround.

The Safety Manager commenced with questions:

'Do you have any safety problems or issues?' and 'Where do you think your next error will be?'. The issues discussed were very similar to some I am aware of in our organisation, but I was impressed by the CNOs quick assessment of the situations and her promise to address it.

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DFCI

I visited DFCI and saw how the medication reconciliation process works and met with some of the pharmacists.

DFCI is a leading cancer treatment centre, but it only treats outpatients and day patients, inpatients are treated at BWH or at the children's hospital nearby. This was an organisational decision following the Betsy Lehman error, it was decided that they should concentrate on one area in which they were expert.

Clinic assistants review patients and a registered nurse administers the chemotherapy.

Chemotherapy is regulated by protocols and pharmacists review all protocols prior to preparation in the pharmacy.

Key lessons and suitability to my practice and the Victorian healthcare system

- The opportunity to view the USA system firsthand has been very valuable and I can now confidently interpret literature for its applicability to the Australian setting.
- Some of the differences between medication processes are funders, insurance and reimbursement schemes, availability of pharmacists, hours a pharmacist works, prescribing, dispensing and administration systems.
- CPOE and barcoding are the way forward to improve medication safety, but because our system is very different to the USA's, we cannot take their systems and software and use or modify it for use in Australia.
- It is not necessary to wait until we have all elements of an electronic prescribing, dispensing and administration system in place before we commence with this technology. The USA systems have usually commenced with one section first (due to their system containing separate elements), we should work towards implementing one section at a time, or we may never start.
- 'Smart' pump technology could be used in Australia and we could pilot this at our hospital.
- Executive safety walk rounds are a demonstrated way to involve staff, identify problems and improve systems, this could be implemented easily and quickly in Australia.
- The profile of safety and quality are much higher in the hospitals I visited in comparison to Australia. This may partially be due a higher availability of beds. Access is not an issue so it is easier to concentrate on safety and quality. Positive publicity and an improvement in the hospital safety culture could result if a top down encouragement and emphasis on safety and quality was promoted across Victoria.
- Useful contacts for medication safety for the future.
- Some of our practices are further advanced, for example we dispense medications for discharge and routinely counsel patients on their medications.

Visit to University of Massachusetts Medical Center, Worcester, Massachusetts

The University of Massachusetts Medical Center (UMMC) is located 50 miles west of Boston and is associated with the University of Massachusetts.

I met with the Medication Safety Pharmacist, the anticoagulation clinic pharmacist, the blood transfusion nurse and their physician patient safety officer.

UMMC has a CPOE system, but not barcoding or automated dispensing carts.

UMMC had recently completed their accreditation by JCAHO. They had received good results, but this focus had resulted in other safety areas being neglected and standards had dropped. BWH and DFCI are well known hospitals at the forefront of medication safety technology. I visited UMMC because I wanted to be sure I had an overview of the range of practice related to medications across several hospitals. They are well advanced with medication reconciliation; they mentor hospitals in the 100,000 lives campaign. They have a pharmacist referral anticoagulant clinic, which has demonstrated improved patient outcomes.

The medication safety pharmacist's role is similar to mine, reviewing medication-related errors, chairing the UMMC Medication Safety Committee, and is involved in hospital wide implemented of initiatives. He has a joint appointment with medical school and lectures medical students on medication safety.

Anticoagulation referral service

The anticoagulation referral service commenced in response to serious incidents related to Heparin induced thrombocytopenia (a potentially life threatening complication). This is managed by pharmacists who follow all inpatients on anticoagulants and dose the drug following a protocol developed in conjunction with haematologists. A pharmacist or physician is physically available for consultation and reviews every infusion, 24 hours a day, to ensure they are running at the correct rate.

Key lessons and suitability to my practice and the Victorian healthcare system

- an understanding of the range of systems in the USA
- useful contact for medication safety for the future
- an anticoagulation referral service for inpatients could be introduced here easily and quickly.

Visit to Boston College of Pharmacy and Health Services and Northeastern University Department of Pharmacy Practice

I was invited to speak at both these universities (on separate days) to give an overview of medication safety in Australian hospitals, my role and my opinion as how medication safety should be taught in universities.

I met with the Professors of Pharmacy Practice and some of their colleagues at both institutions and we exchanged ideas and gained an understanding of the education offered in our countries for pharmacists. Even though in the USA pharmacy is a six-year degree and graduates now receive the title doctor, I do not believe our program in Australia lags behind the USA.

These meetings gave me a valuable opportunity to consider collaboration and Bayside Health, in conjunction with Monash University, would be happy to set up an exchange program for students. Both universities were enthusiastic about this possibility and I will pursue this in the near future.

Key lessons and suitability to my practice and the Victorian healthcare system

- a understanding of the Doctor of Pharmacy qualification and comparison with the Victorian Pharmacy degree
- key contacts at two pharmacy departments
- an agreement that medication safety is an essential element of the undergraduate program
- the opportunity to commence negotiations for a student exchange program.

Visit to American Society of Health-System Pharmacists

I visited the American Society of Health System Pharmacists (ASHP) in Bethesda Maryland. They represent the pharmacists who work in hospitals and nursing homes and ambulatory care facilities directly serviced by these hospitals. There are 30,000 members and are very active in developing best practice standards, clinical standards and guidelines for safe use of medications. They have surveyed the members and have accurate statistics on percentage of hospitals with the various elements of medication systems.

I met with:

- Doug Scheckelhoff, Director Pharmacy Practice Sections
- Lesley Maloney, Director Public Health and Quality Practice Standards and Quality
- Cynthia LaCivita, Director Clinical Standards and Quality
- Dan Cobaugh, Director of Research

I was given an overview of some of their programs. They gave me copies of their standards and guidelines, which are very comprehensive, and they will be useful as a reference for our practice in Australia. They maintain a patient safety web site and communication group to assist pharmacists keep up with the latest initiatives.

Key lessons and suitability to my practice and the Victorian healthcare system

- Key contacts at the equivalent professional body to the Society of Hospital Pharmacists of Australia (SHPA) of which I am a member.
- An understanding of the scope of USA health system pharmacist practices.

Meetings in Philadelphia

1. Mike Cohen, President, ISMP
2. Allen Vaida, Executive President, ISMP
3. Kellie Taylor, ISMP Medication Safety Fellow
4. Mike Gaunt, Medication Safety Analyst
5. Matt Grisinger, Medication Safety Analyst, ISMP
6. Michelle Mandrack, Medication Safety Specialist, ISMP
7. Nancy Globus, MED-ERRs, Medication Safety Analyst
8. David Jaspán, Director Pharmacy Abington Memorial Hospital
9. Chris Walsh, Medication Safety Pharmacist, St Josephs Medical Center
10. Sheryl Nicol, Clinical pharmacist, St Josephs
11. Marion Rhoads, Director Pharmacy, St Josephs.

Visit to Institute of Safe Medication Practices (ISMP), Philadelphia

I visited the ISMP, which is a key American medication safety organisation. It is the first organisation I consult regarding issues and initiatives. Some of the resources are their newsletter, safety video, poster, alerts and website.

Their medication safety fellow was my main contact in the USA and organised all visits in Pennsylvania and recommended contacts in Boston and Washington DC.

I met with key staff and gained insight into:

- their voluntary error reporting system
- their consulting service. They visit hospitals as required to consult on improvements on systems (usually when there has been an error)
- the ISMP Medication Safety Self Assessment (MSSA) and Antithrombotic Tool (AT). This is completed by USA hospitals and grades their performance with elements of medication safety in their organisation. It can be used to identify areas where they have weaknesses and gives guidelines for the improvements that are required. The NSWTAG in conjunction with Victorian Medication Safety Committee (VMSC) – I have been a member of this group – has Australianised this ISMP MSSA. Bayside health has been field-testing this tool (lead by myself) and I was able to clarify some points with ISMP staff. In addition, a practical knowledge of the American medication use system has enabled me to review the questions in the MSSA and relate their relevance to Australian practice.

The ISMP MSSA tool project is being funded by the New South Wales (NSW) Centre for Clinical Excellence and will form part of the NSW key performance indicators.

We discussed L&P issues and their contribution to medication error. I suggested that as we are only a small player globally, for the majority of drugs it would be beneficial for us if we could be included in efforts to persuade manufacturers to improve L&P. Mike Cohen was very supportive of this and promised to help whenever he could.

ISMP has a for-profit subsidiary, Med-ERRS, and their process of reviewing manufacturers drug names was explained. Most products are reviewed for the USA market, but I volunteered to be a reviewer for Australian products.

I also discussed with Mike Cohen the possibility of collaboration to set up an ISMP in Australia. At present, as well as ISMP in USA, there is an ISMP Canada and ISMP Spain. Mike has visited Australia several times and has worked with NSW pharmacists but has not been able to set up an office in Australia. He explained the criteria for an Australian ISMP, which would include experienced staff, the backing of a major health service, and a university and government sponsorship. I explained that at Bayside Health we are setting up a Medication Safety Centre, in collaboration with Monash University, and we were in a position to consider such collaboration. Preliminary discussions have begun this.

Key lessons and suitability to my practice and the Victorian healthcare system

- Useful contacts for the future.
- The potential to collaborate with ISMP and NPSA on product labelling and packaging issues to persuade manufacturers to improve safety. At present each country works independently and the manufacturers are able to ignore Australia's requests, citing the fact that we are a small percentage of the market. In the future, if we can find common ground with USA and UK, we have the potential to influence manufactures more and also join in their successes. An example is the product Losec® which sound and looks very similar to Lasix®. In the USA they successfully lobbied to have the name Losec changed to Prilosec® but this has not happened in Australia.
- An ability to judge the relevance of the ISMP MSSA questions, I have met with NSWTAG, who manage this project, and have made suggestions for improving the tool.
- Possible collaboration with ISMP USA to set up an ISMP Australia.

Visit to Abington Memorial Hospital, Philadelphia

Abington is a 650 bed regional hospital in Philadelphia suburbs.

I met with the Abington Director of Pharmacy and attended a medical grand round, a Patient Safety Committee meeting, and was taken on a tour of the Pharmacy Department and satellites.

The organisation's safety culture was evident immediately, in the cafeteria, which is for staff and patient relatives, each table contained a flyer explaining the hospital's initiatives to improve medication safety. Posters and flyers promoting safety goals and culture were in evidence throughout the hospital.

Abington have a CPOE system which is linked to laboratory results and a pharmacy dispensing system which is linked to an automatic dispensing machine (figure 3) and some automated dispensing carts, mainly for drugs of addiction, in wards. All orders appear on the pharmacy dispensing system screen and must be approved electronically by a pharmacist. They are notified electronically if a designed electrolyte or lab result for the patient they are reviewing, for example if KCl is greater than 5.5. They also have an anticoagulant dosing service and are notified of patients INRs automatically.

Once the order is approved, a label is generated, which is linked to the automatic dispensing machine. The medication administration system uses the 'cart fill' technique. For this, the pharmacy prepares 24 hours supply of medications (including oral, liquid and IV doses, in unit dose packaging oral, IV drugs, see figure 5) seven days a week. Once prepared by technicians, and checked by pharmacists, the technician delivers a cart to each ward and returns an empty one to pharmacy in preparation for the next days fill. With this system, there is very little opportunity for nurses to administer the wrong drug or dose, as, except for emergency stock, which is stored on the ward, only one day's doses are available on the ward. The main risk is if an order is changed or ceased, it may be administered if it's not removed in time.

Abington will soon introduce the ADMs, which will free up pharmacists time and they hope to be able to send them on rounds with medical staff.



Figure 5

I attended an Abington Patient Safety Committee Meeting, this is the normal monthly meeting chaired by a senior medical consultant, the hospital CEO was present and about 40 other staff, including 20 medical staff members. I was very impressed because it was clear from the topics discussed and the staffs' input that safety is a high priority at this hospital.

Key lessons and suitability to my practice and the Victorian healthcare system

- Useful contacts for the future. The director of pharmacy was exceptionally open and willing to explain everything and was interested in some of our initiatives.
- How to promote a safety culture in the hospital – flyers, posters on wards, and all areas visited by relatives.
- I was very impressed by the strong safety culture, which was visible to anyone who worked or visited to Abington. I can see that if promoted from the top down, it is easier to make changes. On reflection, in our hospital and Victoria generally, the only issues visible relate to access. I think if safety was more openly discussed at hospital and state level, this would filter down to the staff and the publicity from the Department of Human Services would give the public a positive focus.
- Specific safety initiatives – a safe insulin storage system.
- Systems to prevent medication and administration errors could be introduced, if led by pharmacists reviewing orders and computer systems linking dispensing to electronic control of drugs in wards.

Visit to St Joseph's Medical Center, Reading, Pennsylvania

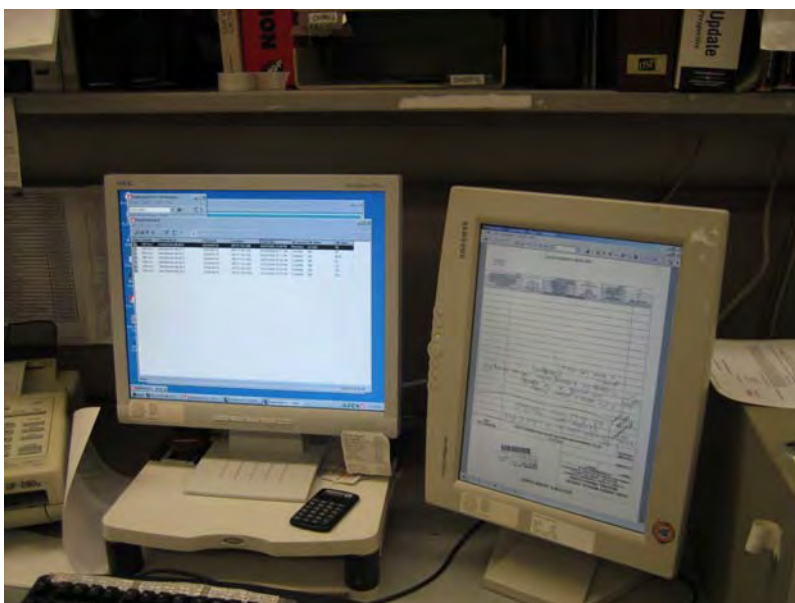


Figure 6

I visited St Joseph's and was shown around by the medication safety pharmacist and the director of pharmacy.

St Joseph's is a 270 bed regional hospital, without CPOE, barcoding or smart pumps, but with a 24-hour pharmacy service and automated dispensing cabinets on the wards, which are connected to the pharmacy dispensing system. I was told this was typical of a USA medication system.

Medical staff hand-write prescriptions and leave them in folders outside patient's room, the nurses scan the prescriptions, which are then transmitted electronically to the pharmacy (Figure 6). A list of waiting

prescriptions is available on the system, and pharmacists view the scanned order, and they can enlarge it if they have difficulty reading it. They then enter it into the patient's profile, and can check the patient's previous conditions. If a drug, which requires monitoring is entered, for example warfarin or potassium, and lab results appear on the screen, the appropriateness of the order can then be reviewed. Within minutes of the pharmacist approving an order, it is transmitted to the pyxis machine on the ward; this allows the nurse to remove that drug for the patient. All drugs, which are expected to be orders, have been preloaded into these machines in unit doses. They use the 'cubie' drawers (Figure 7).

The medication safety pharmacist's role is similar to mine; the position was created 2 years ago. He has worked on improving the culture for reporting errors, has similar issues with high-risk drugs and is currently addressing some communication and intimidation issues amongst hospital staff.

Key lessons and suitability to my practice and the Victorian healthcare system

- Useful contacts for the future.
- Completed my understanding of the range of medication use processes – a manual prescribing system but an electronic and automated dispensing machine system in the wards for administration of drugs.



Figure 7

United Kingdom

When in the UK initially, I asked David Cousins and Gillian Cavell's advice, as to other hospital with medication safety programs or initiatives which would be relevant for me to see. They both recommended the Northern Ireland (N.I) Medicines Governance project and Professor Bryony Dean, Principal pharmacist at Hammersmith trust who has published research into medications safety, including error analysis and CPOE. I visited these sites on my return the UK.

Visit to Craigavon Hospital Trust, Craigavon, Northern Ireland

Gillain Redpath is the Medicines Governance Pharmacist at Craigavon. She was one of six pharmacists recruited for this post across the six main hospital trusts in Northern Ireland (NI) in 2002.

The NI chief pharmacist was successful in a grant for a two-year project to improve medication safety by running a coordinated program. Each pharmacist is employed by a trust and links to smaller trusts in their area. They work together to develop initiatives, which can be implemented across NI. They also work on local projects that are priorities in their own trust.

The program has been so successful that after its evaluation in 2004 the program and all pharmacist positions were made permanent. (<http://www.pjonline.com/pdf/hp/200603/hp-200603-safety.pdf>).

The program has many similarities to my role at Bayside Health. They have worked on:

- improving the culture to promote medication incident reporting
- introducing a standardised classification for reporting incidents
- standardising warfarin strengths available across NI - all hospitals and primary care trusts
- developing a template for a standard safer medication chart
- producing a quarterly medication safety newsletter.

I was impressed by this program, the issues they face and the stage is comparable to ours in Victoria, but having a program coordinated by the region (all NI) has enabled all trusts to work together to standardise practices. This gives better results than having each network work separately, then trying to spread initiatives, as has been the Victorian method with VicTAG and VMSC. I would envisage that the new VMAC could facilitate this approach, if a program was led by the Department of Human Services.

Another advantage in NI is that the primary care trusts are managed by the same government department, so when warfarin strengths were standardised (it was agreed to keep only 1mg and 3mg in hospitals, the DOPH, also mandated this for community pharmacies. Similarly when it was decided to only stock methotrexate 2.5mg (and not 10mg) in the trusts, as we have done at Bayside Health, the DOH also made that decision for community pharmacies. This means, medication safety for patients when discharged home is assured, patients cannot get confused by receiving a different strength when they get their prescription dispensed in the community.

The standard template for the medication chart has not yet been adopted by all trusts, but work is progressing. Similarly, if Victoria had a coordinated approach to medication safety, issues as have developed with attempting to introduce the national inpatient medication chart (NIMC), could be prevented for future projects.

Key lessons and suitability to my practice and the Victorian healthcare system

- Some of Craigavon projects could be considered at Bayside Health.
- A useful medication safety contact for the future.
- A coordinated medication safety program could be run from the Department of Human Services across Victoria, using a combination of existing medication safety pharmacists, nurses and quality managers. If a representative from each hospital met and agreed to work on initiatives across Victoria, this would result in more consistency and would prevent some of the issues highlighted by the NIMC.

Visit to Charing Cross Hospital Hammersmith, London

Professor Bryony Dean is Principal Pharmacist at the Trust and Director of the Academic Pharmacy Unit, University of London. She gave me an overview of her research projects and an insight into some of the results. She has visited USA several times and has an overview of their system, however her knowledge reflected practice a couple of years ago, she had not visited Boston, so was not aware of latest BWH practice.

In general, the practices at her Trust are very similar to those here in Australia, so her research is very relevant to us. To date, there is no coordinated solution to CPOE, and she is about to evaluate 'smart pumps' and does not believe there is evidence to say they reduce errors. She has a joint position with the trust and the university, so this model closely resembles our plans at Bayside Health.

Key lessons and suitability to my practice and the Victorian healthcare system

- A useful contact for the future.
- An understanding of research findings relating to prescribing errors, CPOE and barcoding on the UK medication process system, which is very similar to Australia's.
- An idea of how we could conduct an evaluation of 'smart pump' technology at Bayside Health

4. Improving the Victorian healthcare system

Some of the major learnings for Victoria are:

Improving the safety culture across the state

- A safety culture, promoted across all organisations and led by Department of Human Services would progress safety in hospitals and give the public positive messages about safety in hospitals. At present access issues are the main messages the public and health professionals receive.
- Top down coordinated approach across all healthcare networks with a core group of medication safety pharmacists and patient safety officers working together - as in the Northern Ireland model - would enable standardisation and prevent errors. Future initiatives, such as NIMC, would be able to be implemented in a more structured and coordinated manner. If this approach and some of the safety initiatives are promoted and extended to community pharmacies and general practitioners, this will further standardise systems and improve safety.
- Safety standards mandated by a government or affiliated organisation (for example the JCAHO safety goals) is an effective way of giving organisations the capability to raise their standards and improve safety.

Lessons from the USA medication system

- A thorough understanding of the USA medication management system is necessary to be able to determine whether system improvements, for example barcoding, automated dispensing machines available in the USA, can be translated for use in our system.
- It is not necessary to wait till all elements of technology are ready to commence an electronic prescribing system. The USA commenced with separate sections, such as CPOE first, then linked them together. If we wait for the whole system to be planned, we may never start. Australia should work towards implementing one section at a time.
- CPOE and barcoding reduce errors but are very expensive to implement.
- USA systems of unit dosing, and linkage to pharmacy dispensing systems could be a way to reduce medication administration systems.
- Medication error reduction for administration needs to consider the capital outlay for electronic communication between prescribing, dispensing and administration. Capital outlay to do this will be major and needs to be built into future budget calculations.
- Evaluation of smart pump technology (Bayside Health is in the process of reviewing infusion pumps which need replacing) would be valuable.

- L&P needs a global approach, by working together with NPSA in the UK and the ISMP in the USA, this could be progressed.

Medication safety initiatives that could be implemented in Victorian hospitals in the near future

- Pharmacist prescribing models, for anticoagulant management and other chronic diseases. These could reduce LOS and reduce inpatient admissions for certain conditions.
- Chemotherapy safety could be improved with a coordinated top down approach to develop and implement guidelines and prescribing, dispensing and administration practice, which are more robust than the present practice.

Current barriers to improvement in medication safety in Victoria

At present a major challenge in Victoria is the uncoordinated approach to medication safety. It is the responsibility of each network to decide how to allocate resources and priorities. It appears that access is the main focus and interest of the government and is promoted in the public domain. Hospital staff do not feel that safety is of as high priority as access and this affects the uptake of improvements.

If safety was promoted from the Department of Human Services this would be something positive for the media, instead of 'ambulance bypass, times on trolleys in emergency departments and cancellation of elective surgery'. It would also send a strong message to hospitals that safety was also a priority; at present it appears to be an afterthought or a lower priority than access.

Many inconsistent practices exist across Victorian hospitals, there is no promotion of standardisation and as we are experiencing with attempting to introduce the NIMC, a coordinated approach would prevent some future problems.

The recently formed Victorian Medicines Advisory Committee (VMAC) could be used as the group to lead a standardised, coordinated approach. If this body had the authority to lead projects centrally and mandate all networks participated and collaborated (as the NI model does), improvements with chemotherapy safety, IV potassium, oral syringes could be introduced together. A standard error reporting system, as with the NPSA, would be able to identify errors and develop required improvements more efficiently.

Safety practices in Australia

An important learning was that our practices in Australia are further advanced than USA in some aspects of medication safety. Some of the areas are:

- clinical service provided by pharmacists on wards, attending multidisciplinary rounds
- discharge dispensing
- medication reconciliation at admission and discharge
- patient counselling
- clinical pharmacy technicians.

5. Sharing and promoting the project

There has been a great deal of interest at my organisation regarding CPOE, barcoding and smart pump technology and I have already given a brief overview of my findings.

NSWTAG has requested a meeting to discuss the relevance of some of the IMSP MSSA tool questions. I have already advised them of possible changes to their program plan. Pharmacists are particularly interested in the comparison of practices between Australia and USA, many read the literature but few have visited or worked in the USA system. I plan to write an article for the Journal of Pharmacy Practice and Research on practice difference and suggestions for future directions in Victoria. In addition I will offer to give feedback through SHPA to the Medication Safety Committee of Specialty Practice.

I am presenting at National Medicine Symposium on our program to review safety of drugs prior to inclusion on the formulary and intend to highlight my ideas for promoting a global approach. I am a member of the TGA Working Group on Best Practice Prescription Labelling and will circulate my UK findings and their standards.

I am also available to discuss my findings with VMAC and hope some of the strategies can be promoted through this vehicle.

I hope that my recommendations will be considered seriously and I will be consulted if there is any doubt or clarification required. I would be delighted if I could be involved in assisting in the development or implementation of any of the recommendations I have made.

Feedback - key lessons learned

I thought the Travelling Fellowship program was excellent, I felt privileged to have had the opportunity to travel overseas and view current practice. I have met many helpful colleagues, who have been generous with their time and knowledge and do not believe this would have been achievable without either the funding or the name as a Travelling Fellow.

My only recommendation for future Fellows is that I did not realise how much time it would take to organise the trip, I found it very difficult to keep up normal daily work before I went and am now struggling to catch up, write the report and continue my daily work.

I would highly recommend this program, it has been very valuable for me, my career, my employer and I believe the Department of Human Services.

I would be delighted to present my learning at any interested forum.