Development and Evaluation of a Computerised System for the Provision and Documentation of Pharmacists' Cognitive Services.

Final Report

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Acknowledgements

Executive Summary

At present, the documentation of cognitive services and medication incidents in community pharmacy practice in Australia is virtually non-existent, yet quality care cannot be provided without complete documentation. Only by appropriately evaluating and documenting patient outcomes will pharmacists be able to receive payment for cognitive services. There can only be acceptance of the pharmacists' role if the profession has documented evidence of its activities and their outcomes. The future of our profession lies in our ability to document the benefit of pharmaceutical care for our patients.

With funding from the Third Community Pharmacy Agreement Research and Development Grant, Professor Greg Peterson, Kimbra Fitzmaurice and Duncan McKenzie (honours student) from the Tasmanian School of Pharmacy, in collaboration with John Elkerton (Pharmacy Electronic Information Manager, Royal Hobart Hospital) and Chung Liauw (Phoenix Computer Systems) recently developed and evaluated a convenient, computerised process for the recording of medication incidents and community pharmacists' cognitive services.

The system provides a structured record of intervention superior to those currently available in dispensing systems. The system was to address the following criteria:

(i)   be easy to use;

(ii)   place minimal impediment on time;

(iii)   interface with dispensing software;

(iv)   have a generic design, so that modifications could be made for its incorporation into as many software systems as possible;

(v)   enable de-identified information to be easily downloaded, summarised and evaluated.

This system was devised after an extensive literature evaluation and it underwent several pilot phases and intensive testing by consulting pharmacists with many iterative modifications being made prior to the trial period.

The system has been designed to be easy to use, with a minimum number of keystrokes, and to interface with dispensing software. It was initially developed for incorporation into the REX system (Phoenix Computer Systems).

Details of incidents recorded include the drug involved, problem identified and its potential severity, and the steps that were taken by the pharmacist to resolve the problem, including time taken and details of contact with the prescriber (and whether the recommendation was accepted). The record can have sufficient information for other pharmacists to understand the problem and outcome, with minimal data entry. De-identified data files are downloadable locally, and as an extension of this project a web-based central repository is being developed to potentially allow the down-loading of the data securely via the Internet. The details of the provision of cognitive services can be easily collated and summarised.

Such a facility is critical to the profession for several reasons;

- It provides a medico-legal record;

- It facilitates the provision of quality care;

- It enables continuity of care;

- It provides evidence of a practice, which is required before remuneration can be a possibility; and

- It will enable quality audits and peer review.

The system was evaluated by 19 Tasmanian community pharmacies over a 6-month period.

The number of interventions and rate of recording interventions was less than anticipated. This made some aspects of analysis difficult. One of the reasons for this was the required change in usual practice and routine. Community pharmacists have previously undertaken cognitive services as an extension of their dispensing role, and have not been required to document these activities, nor have they expected to be remunerated for them. Work on the system to date has made it clear that pharmacists need to have the skills and knowledge to make useful interventions and training is critical. Not necessarily training in the use of the software, but ensuring that pharmacists have the knowledge and skills to make useful and timely interventions, and understand the importance of documentation. As noted by Cipolle et al[23]., "The computer program is not your practice it is merely an aid to support practice; a means to an end."

Pharmacists who evaluated the system received a professional recording fee for documenting their cognitive services, in a model that could lead to the reimbursement of Australian community pharmacists for the provision of these services.

Feedback on the system from the pharmacists was generally very positive.

Introduction and literature review

Despite calls for improvements in the use of pharmaceutical drugs, and better liaison between doctors, pharmacists and patients,[1] problems associated with the use of pharmaceutical drugs in society continue to be a significant public health burden. It has been estimated that sub-optimal drug use in Australia results in at least 80,000 hospital admissions annually (accounting for approximately 12% of all admissions to medical wards), at a cost of around $400 million per year.[2-4] About one-half of these hospital admissions are considered to be avoidable. The profession of pharmacy has an enormous responsibility to address the problem of adverse drug outcomes in the community.

In hospital practice, the close working relationship between prescribers, pharmacists and their patients has lead to considerable improvements in the quality of drug use.[5,6] Studies in this country and overseas have repeatedly and overwhelmingly demonstrated the value of clinical pharmacy services, principally in the hospital environment, in terms of improving the quality of patient care and containing both medication expenditure and therapeutic drug monitoring costs.[5-13]

In contrast, there is a dearth of published material from Australia on the provision of pharmaceutical care by community pharmacists and the value of clinical pharmacy activities within the community setting.[14-16] One of the major differences between community and hospital pharmacy practice that explains this difference is that pharmacists in the hospital setting routinely document their clinical interventions in patients' medical records and/or in dedicated databases within the hospital pharmacy department.

The introduction of medication reviews at long-term care facilities, and now domiciliary medication management reviews,[17] by pharmacists has created an ideal opportunity for community pharmacy practice to become firmly established as part of the healthcare team.

The successful transition of community pharmacists into the healthcare team depends on acceptance by other health professionals, administrators, governments and patients.[18,19] There can only be acceptance of the pharmacists' role if the profession has documented evidence of its activities and their outcomes.

Pharmacy practice and education have undergone significant change over the past 30 years and continue to evolve.[20] The practice of pharmacy has shifted from a traditional stage, where pharmacists procured, prepared, evaluated and dispensed drug products, to a patient care focus, with an emphasis on the patient and his or her specific drug therapy problems. The importance of technical functions has been supplanted by the provision of cognitive services, which has been defined as the use of specialised knowledge by the pharmacist for the patient or for health care professionals for the purpose of promoting effective and safe drug therapy.[20] Other terms appearing throughout the pharmacy literature to mean conceptually the same thing as cognitive services include: professional services, value-added services, clinical pharmacy services, consulting services, and patient-oriented (or patient-focused) services. Many different pharmacist activities are encompassed in this broad definition, including patient counselling and education, medication profile monitoring, drug utilisation evaluation, medication compliance

monitoring, prescribing error detection and intervention, and monitoring of therapeutic outcomes, including point-of-care testing.

To ensure the future of the profession and adequately serve the public, the practice of pharmacy must add demonstrable value to the provision of pharmaceuticals.

> "Providing and obtaining educational experiences for the sole purpose of licensure is inadequate. If the patient is not able to benefit directly from the pharmacist's knowledge, then the educational experience is not sufficiently cost-effective and cannot be defended in today's health care environment."[21]

Currently, remuneration is focused towards volume dispensing rather than the extent or quality of pharmaceutical care to the patient [20,22] and this is not a sustainable remuneration model for the profession. The relative lack of solid evidence for the beneficial effects of pharmacy practice is perhaps the major weakness facing the profession, and this is principally tied to the lack of documentation of everyday practice activities. The routine use of documentation software in practice would serve many purposes, including the ability to clearly demonstrate the impact of pharmacists' interventions to politicians, doctors, the public and other stakeholders.

Computerised pharmacy dispensing systems have not advanced greatly since their introduction in Australia almost 20 years ago. Most dispensing systems function simply as label generators and systems for claiming reimbursement via the Pharmaceutical Benefits Scheme. The dispensing systems do not even keep track of non-prescription products. The systems have not kept pace with changes in pharmacy practice or facilitated change

in practice, in terms of assisting with the provision and documentation of cognitive services.

The documentation of a service, specifically a health care service, is very different from the documentation required to dispense a medication.[23] If one asks a physician, nurse, or other health care practitioner to describe documentation, it is commonly understood that reference is being made to the patient care records containing specific treatment recommendations and assorted clinical observations, all directed toward patient care. The pharmacist's response to this request will usually be to describe the record related to dispensing a prescription, commonly called the medication profile. Although this profile does have limited value in terms of providing a record of the prescription drug products dispensed at a particular pharmacy, it is constructed in such a static manner that its use is very limited in pharmaceutical care practice and the provision of cognitive services.[23]

The pharmacist's record of an individual patient's drug-related problems, together with the actions taken and subsequent outcomes, is very important for several reasons.[23-25]

1. It provides a medico-legal record. It is unfortunate but true that all activities performed for another need to be documented so that if, in the future, legal action is brought against the practitioner, appropriate documentation is available. It is clearly the case that the more comprehensive the documentation, the "safer" the practitioner.[23]

2. It enables the provision of quality care to the patient. Documenting patient care activities and patient care decisions is a vital responsibility of every practitioner providing pharmaceutical care. Documentation is essential because the

patient's condition, needs, and outcomes are constantly changing. No one is able to remember all the clinically relevant information about a patient. Records must report decisions made on a continuous basis. The documentation must form a chronological record that can be constantly updated and evaluated to improve patient care. Quality care cannot be provided without complete documentation.[23,25]

3. It supports continuity of care. It will seldom be the case that a pharmacist works entirely alone. Other pharmacists and support personnel may require access to the patient record. Therefore, it must be complete, consistent, easily retrievable, and up to date.[25]

4. It allows pharmacists to report on their actions. Documentation of pharmacists' cognitive services is so important that it is not an exaggeration to suggest that, without a documentation system, a practice does not exist. Documentation represents the evidence of a practice. Documentation is important to the profession in the long-term since it serves as the basis for reimbursement. Governments have understandably taken the position that "if it is not documented, it was not done." Reimbursement is not possible without this documentation.

5. It provides a basis for quality audits and peer review.[25-29] It is not possible for the pharmacist to learn about his or her practice without being able to "look" at the practice over time. It is difficult for a practitioner to "improve" if he or she is not able to critically examine the decisions and clinical judgments rendered and even review the mistakes made. This requires documentation of practice.

Additionally, if a pharmacist wishes to teach students or other pharmacists, documentation of cognitive services is necessary.[23,25]

It is unrealistic to think that quality care can be provided without complete documentation.[23] The data provided by documentation of care are critical to the transition of pharmacy from a product-based profession to a patient-care, service-based profession, especially during a period of great scrutiny of resource utilisation in the health care sector.[30,31] Only by appropriately evaluating and documenting patient outcomes will pharmacists be able to receive payment for cognitive services. The future of the profession lies in pharmacists' ability to document the benefit of pharmaceutical care for their patients.[32]

When developing a system for the recording of pharmacists' cognitive services, several requirements are paramount. Clearly, it must be a computerised system.[33] Above everything, the system must be easy to use and open when the dispensing software is open, so that pharmacists will utilise it. Time is a limited commodity, and a system for recording cognitive services in pharmacy must be as efficient as possible.[30] Not surprisingly, it has been demonstrated that documentation of cognitive services is more likely if the documentation procedure is not perceived as being burdensome.[34]

The most logical approach is to have a system that dovetails with the dispensing software. An interface between the documentation system and the prescription dispensing system enables a primary objective of minimising interruption of the dispensing workflow in the pharmacy and reduces the need for double entries for data such as patient name, address, medication history and Medicare or concession card information.

With the currently available dispensing systems, there exists the capability to record very brief notes in the patient's profile, but this system provides a structured record that is directly linked to the individual medication profile, and more specifically, to the prescription in question.

It is anticipated that a downloadable record of cognitive services could eventually be linked with the re-registration process for pharmacists. The National Competition Policy Review of Pharmacy (Wilkinson Review) has recognised that there needs to be a regular practice-based competence assessment. As part of this, community pharmacists could present their Board with a log of activities related to the quality use of medicines each year.

Objectives

The objective of this project was to develop and evaluate a computer-based system for the recording of community pharmacists' cognitive services.

The documentation system will:

- be easy to use;

- interface with dispensing software;

- have a generic design, so that it can be modified for use by as many dispensing software vendors as possible;

- enable information to be easily downloaded and summarised;

- set up a potential model for payment for cognitive services by pharmacists in the future.

Desired outcomes

- To design a fully-integrated intervention recording program that can be used by all community pharmacists.

- To design a system that is simple and easy to use, without being time-consuming.

- To show the benefits of documenting cognitive services for the future of the profession of pharmacy; and

- To demonstrate to government and other stakeholders the value of pharmaceutical services.

Methodology

A generic approach was adopted in the design of the system, so that it could be modified for use by as many dispensing software vendors as possible. In the first instance, the system was designed to interface with the Rex Electronic Dispensing system (Phoenix Computers). Extensive evaluation of the existing Rex program was undertaken to enable us to assist with the integration of the intervention recording component into the existing program. It was desirable to make this addition as seamless as possible with the existing program, while still enabling adaptation for integration with other dispensing software.

The first project objective was the design of a computerised system for the recording of community pharmacists' cognitive services.

The system was accessible from the main dispense screen via a single keystroke. This enabled the user to record an intervention without leaving the main screen and had minimal impact on dispensing workflow.
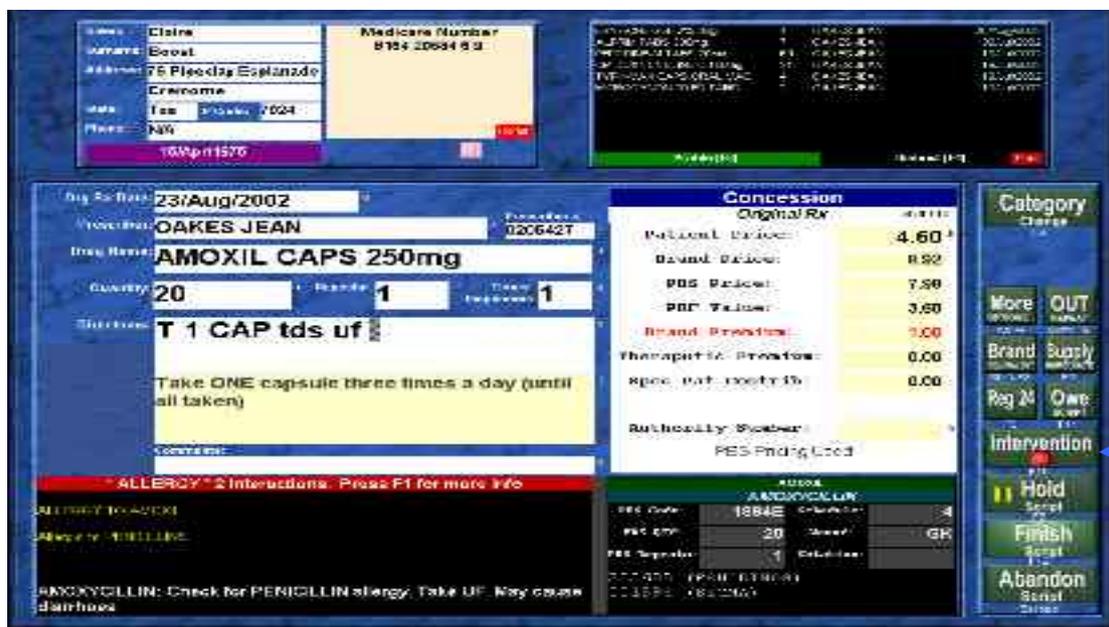
Figure 1. Intervention recording system accessible from dispense screen

The system was also accessible from the main menu to enable the recording of an intervention relating to a non-prescription product, or an intervention not performed at the time of dispensing. This menu also allowed for the editing of a previously recorded intervention.

Figure 2 The system was also accessible from the main menu for an intervention relating to an OTC product, or an intervention not performed at the time of dispensing

The system was integrated with the dispensary database so that much of the information required to be entered eg. patient details and prescribed medication was automatically transferred into the record, eliminating the need for double entry.

Once an intervention was recorded it was highlighted in the patient profile so that it could be reviewed. The script within which the intervention was performed was highlighted in purple (Fig. 3); the colour code used in Rex to represent interventions. Purple is also the colour of the intervention-recording screen. (Fig. 4)
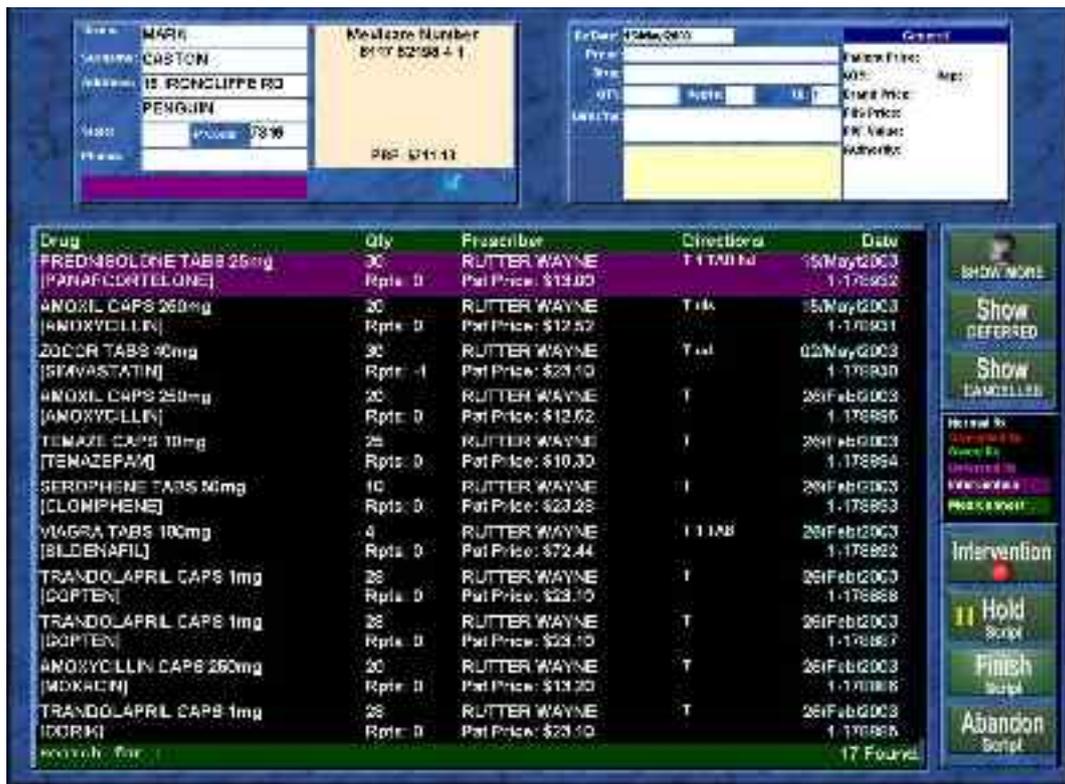

Figure 3. Patient profile showing a script highlighted in purple indicating that an intervention has been carried out on that script

The documentation process was split into six stages of data entry.

Script details: Any information relating to the script, including the date, prescriber, drug, and patients name.

Category: Interventions were classified into categories and sub-categories to reduce the need for free text entry and to aid the statistical evaluation of data. (Appendix 1)

Significance: Interventions were to be assigned a subjective rating, predicting the clinical severity of the actual or potential event if action was not taken.

Outcome: An outcome was recorded for each intervention based upon whether the recommendation was accepted by the patient/prescriber. If at the time of intervention the outcome was not known, the intervention was 'flagged' for future attention, and to enable the later addition of the outcome.

Notes: Free text entry point to describe or elaborate on action(s) performed and reasons why.

Time: Approximate time spent conducting the intervention.

A *Prescriber Contacted* button was added into the module towards the conclusion of the project upon request from the users. This reduced free text entry when contact with the prescriber was required.

A module was added during the project to record in the patient's profile when a CMI was printed out for a particular medication.

Emphasis was placed on minimising time restraints and reducing the number of keystrokes required to record interventions, thus reducing some of the major barriers pharmacists might have to recording. It was essential to provide pharmacists with a flowing on-screen process that was easy to follow and quick to use. This avoided the risk of interventions not being recorded due to program complexity. Many screen layouts and recording processes were designed and tested by the research team, programming staff at Phoenix and consulting community pharmacists until a final product was determined. It was decided that the system, in keeping with the consistency of the Rex dispensing system, would all be contained within one screen and take advantage of touch screen technology used in Rex. The screen displays patient details in the top left hand box and an intervention summary in the top right hand box. The stages of intervention entry are located at the right hand side of the screen (or the left hand side if the touch screen is configured for a left-handed individual). Most stages of data entry use a single keystroke or tap of the screen (if a touch screen is being used). Other stages require brief free text entry (eg. The *Notes* section).

Figure 4.Part of the intervention recording screen.

A major challenge was the creation of a set of categories suitable for use in community pharmacies. Extensive literature review was undertaken to evaluate existing intervention recording systems[21,22,37,38]. These were compared, contrasted and evaluated for their potential usefulness in this project. It was found that our project aimed for slightly different objectives to those carried out previously. Many models were hospital based and hence required revision for use in the community setting[21,37]. Also, we aimed to record "cognitive services" not just adverse drug events or medication errors as previous projects have done. It was hoped that averted mishaps would be recorded not just actual events. The model created by Hepler and Strand[21,38] was considered but required some revision to include services as well as error recording. The research team revised and evaluated the

category lists extensively and other community and academic pharmacists were consulted for feedback until a finalised list was created. The list created for the use of the project was still considered to be a dynamic one. Trial pharmacists were asked for recommendations throughout the process and changes/ additions were made during the trial.

The final list created (Appendix 1) provided a two-tiered approach to intervention categorisation in an attempt to avoid overwhelming quantities of information. It was hoped that this would be an exhaustive list (i.e. cover all the probable situations community pharmacies would face) whilst not being too overwhelming, and hence reduce or eliminate the need for free text entry during the recording process. It was envisaged that this would reduce the amount of time required to record the intervention, as well as enable statistics to be analysed.

Figure 5. An example of the category allocation screen

It was envisaged that appropriate tools would be included in, or added to, the chosen dispensary system to enable full access to first class decision support. It was believed that this would aid the pharmacist in making more informed decisions on interventions.

An agreement was reached with MIMS Australia to enable the use of their entire electronic MIMS product for the duration of the project. This was made available to all participants. The MIMS database is incorporated into the Rex dispensing system for the detection of drug interactions.

Therapeutic Guidelines was purchased for each pharmacy as a stand-alone decision support tool (i.e. not integrated with the dispensing system).

Discussions were held with the developer of the Docle medical coding system. This system enables the recording of diseases or conditions to build a medical history of a patient, and is the same system used by Medical Director, a prescribing program for Australian general practitioners. This component was purchased in cooperation with Medical Director but at the conclusion of the trial its incorporation into Rex had not taken place.

An agreement was reached with the developer of Pharmcare (a hospital based pharmacy system) to incorporate decision support aspects of this program into the Rex system. Although the program was not integrated with the dispensing program it was offered as a stand-alone tool.

The intervention program possessed the ability to print reports for the benefit of the pharmacy and for the use of the research team in correlating data. A report on single or multiple interventions could be printed or a full summary citing number of interventions recorded for that pharmacy within a stated date range and by whom they were recorded.

The research team were able to download a full copy of de-identified data files, related to the project, onto a floppy disk for the statistical purposes of the study.

Figure 6.   Pharmacists could print reports on interventions recorded.

In its infancy, the concept of a fully integrated system for the documentation of interventions was presented at a meeting of the Pharmaceutical Society of Australia (Tasmanian Branch) where feedback, ideas and constructive criticism were voiced. The project was also showcased at the Pharmacy Guild Fair held in Melbourne July 2002 and promoted via AusPharmList, an Australia wide chat group of pharmacy stakeholders. An abstract was submitted and work details were presented at the Pharmacy Australia Congress held in Hobart October 2002. Relevant pharmacy bodies such as Pharmacy Defence Limited and the Tasmanian branch of the Pharmacy Guild were also alerted to the existence of the project.

Nineteen Tasmanian pharmacies were recruited to participate in the project. The only prerequisite was that the pharmacies were currently using the Rex dispensing program

(Phoenix Computers). All Tasmanian pharmacies using the Rex dispensary system during the time of the trial were included. Hence there is some deviation from the proposed methodology outlining the evaluation would be carried out by 50 pharmacies.

Each pharmacy, with the Rex dispensary system, was sent a letter outlining the project, its methodology and importance. A training manual was also provided to guide the process involved in the recording of interventions (Appendix 2). The pharmacies were each visited by a member of the research team to answer questions, demonstrate and aid in the use of the program. A power point presentation containing example scenarios was created as another training option for participants.

Participants were also invited to attend a training seminar held by the research team to reiterate the importance of the project, give a detailed demonstration of the process involved in recording and encourage staff to record all interventions performed over the trial period. Participants were encouraged to use their own initiative to determine the types of pharmacy activities that could be recorded and the predicted severity of the potential problems.

Training nights were staged in three central areas around the state to accommodate as many participants as possible.

The initial design of the system was incorporated into the July 2002 Rex program update (Build no. 466) sent out to each Tasmanian pharmacy using Rex as a dispensing system. This offered participating pharmacies time to familiarise themselves with the software before the trial began and give feedback to the research team on possible alterations to the system.

The system was extensively evaluated by the participating pharmacies for a 6-month period from 01/10/02- 31/03/03. This period was extended from that originally proposed (3 months) to accommodate for fewer pharmacies being involved than originally planned. Participating pharmacists were surveyed at the conclusion of the project by anonymous questionnaire (Appendix 4) to assess their opinion of the usefulness of the program. The evaluation also covered ease of use, time involved in using the system, barriers to recording and the advantages of computerised recording over paper based projects.

A remuneration system was devised for the pharmacists evaluating the system. Pharmacists received $2 for each intervention recorded as a professional recording fee.

Data was collected by mailing out a blank floppy disk with reply-paid envelope to each participating pharmacy. A simple procedure was followed that downloaded all the de-identified intervention data in the form of an excel spreadsheet file. The data was returned to the university where analysis took place.

The project was evaluated from two view-points; an evaluation of the system itself by the users, and an analysis of the interventions recorded by four experienced clinical pharmacists who were asked to clinically evaluate the significance of each intervention. The most frequent rating by the panel members was then compared to the significance value assigned by the documenting pharmacist to enable a correlation to be established.

A web-based system for the downloading of de-identified intervention data is also being developed in cooperation with Phoenix. It is envisaged that a secure central repository for documented interventions can be created and used in the future for research purposes and to improve the quality use of medicines.

The researchers envisage that the project will be extended later to modify the system to enable the documentation of clinical pharmacy services utilising automated bar code technology[35] and hand-held computers.[36]

Results

Pharmacies

A total of 19 pharmacies were invited to assist with the recording of cognitive services, all located in Tasmania. The only criteria for being involved was that the pharmacy had to be using the Rex dispensing system from Phoenix Corp.   Average daily script numbers ranged from 60 to 340.

A total of 463 interventions were recorded during the designated 6-month trial period. The number of interventions recorded per pharmacy ranged from 0-95. Four sites did not record any interventions.

Site	Location	Pharmacists	Prescriptions	Interventions	Rate of intervention (%)
1	Suburban	1	17885	41	0.23
2	Rural	1	18260	80	0.43
3	Rural	1	Not available	0	0
4	Suburban	1	30011	95	0.32
5	Suburban	2	40578	39	0.09
6	Rural	1	16299	88	0.54
7	Suburban	1	Not available	43	-
8	Suburban	1	15132	14	0.09
9	Suburban	1	Not available	6	-
10	Suburban	1	30900	5	0.02
11	Urban	1	Not available	0	0
12	Rural	1	10780	1	0.009
13	Urban	2	24427	10	0.04
14	Rural	1	23867	5	0.02
15	Suburban	2	61901	14	0.02
16	Suburban	1	Not available	4	-
17	Suburban	2	Not available	18	-
18	Remote	1	Not available	0	0
19	Rural	1	Not available	0	0

Table 1. Nature of pharmacies involved in recording interventions, and rate of intervention.
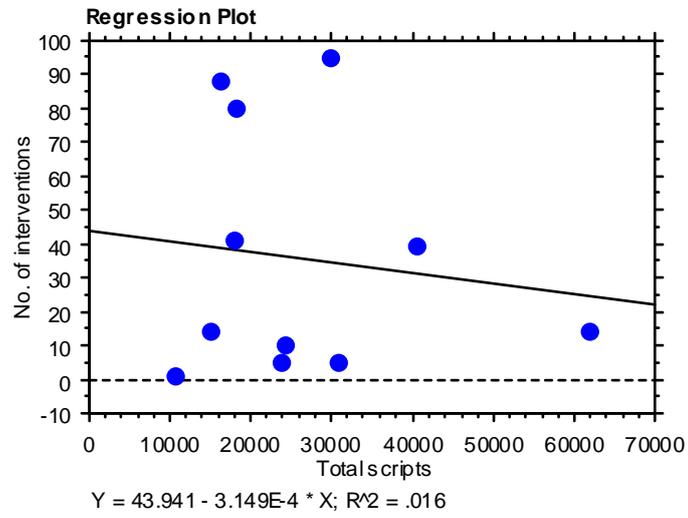
Plot 1. Number of interventions recorded compared to number of scripts completed during trial period.
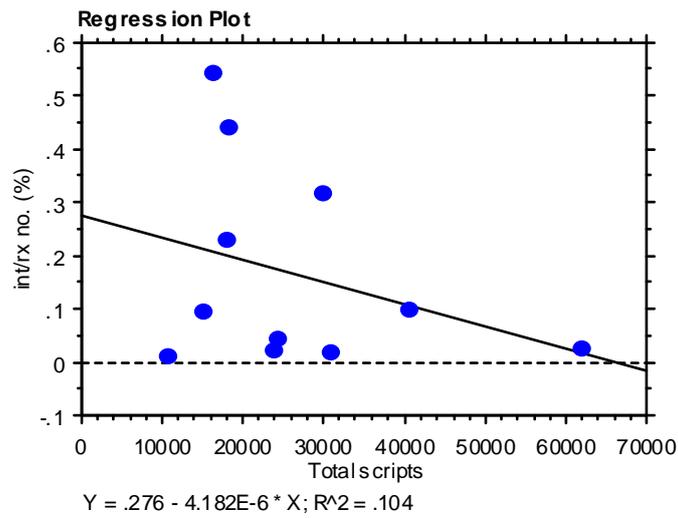
Plot 2. Rate of interventions compared to total number of scripts completed during trial period.

Interventions

Pharmacists were asked to assign a category from the designated list (Appendix 1) to each intervention they performed. Not all interventions were assigned a category, but those that were (394/463, 85%) are shown below (Fig 7). Problems with the dose of medications were clearly the most predominant cause of intervention, closely followed by problems with the drug itself and provision of counselling and advice.
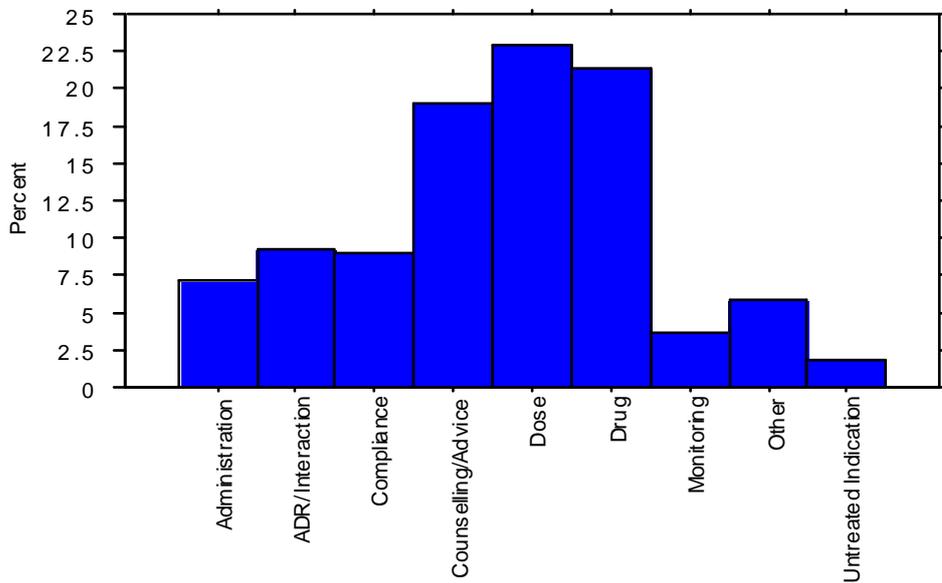

Figure 7. Categorisation of recorded interventions

Interventions were further categorised, to indicate more explicitly the nature of the intervention; the results of which are shown in figure 8.
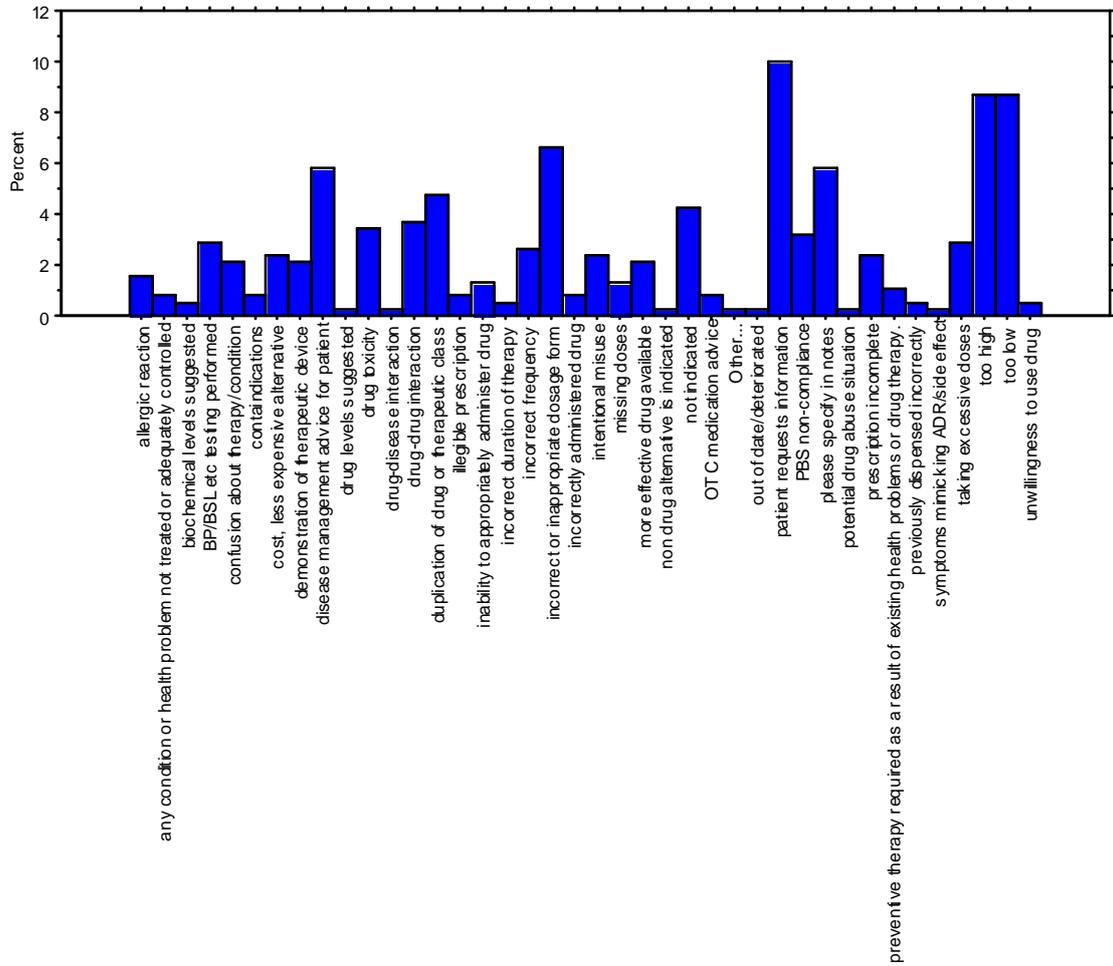

Figure 8. Categorisation of interventions

The validity of the categories assigned has not been analysed at this stage.

Not every intervention had a specific drug associated with it, but those that did 350/463 (75%) have been assessed according to the BNF drug categorisation system as shown below (figure 9).
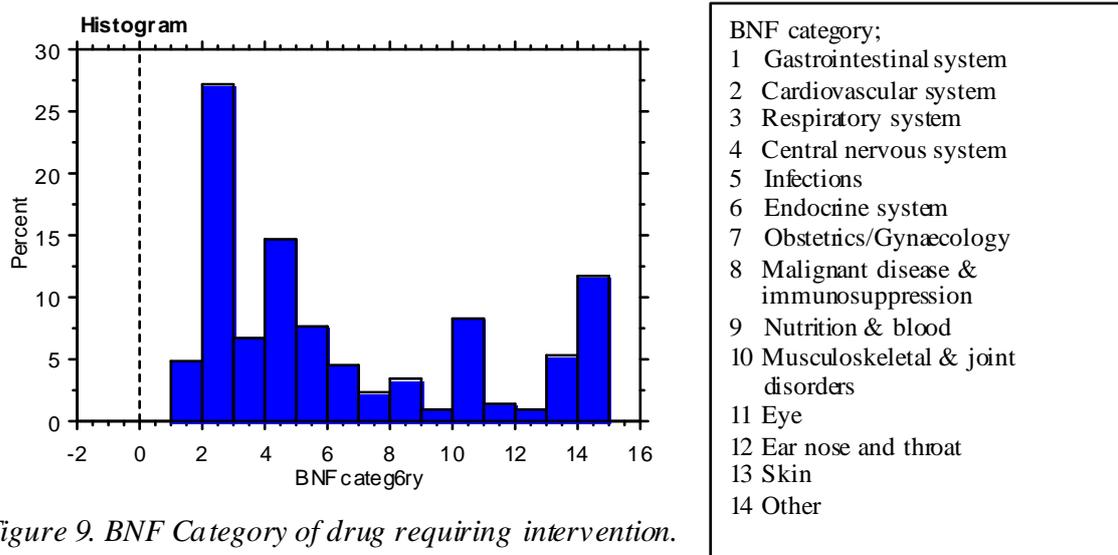
Histogram

BNF category;
1   Gastrointestinal system
2   Cardiovascular system
3   Respiratory system
4   Central nervous system
5   Infections
6   Endocrine system
7   Obstetrics/Gynaecology
8   Malignant disease & immunosuppression
9   Nutrition & blood
10 Musculoskeletal & joint disorders
11 Eye
12 Ear nose and throat
13 Skin
14 Other

Figure 9. BNF Category of drug requiring intervention.

Clearly cardiovascular drugs far outweighed all other categories in terms of rates of intervention required. Followed by CNS and 'other' which was primarily narcotic analgesics.

It was interesting to note that the community pharmacists rated almost 20% of their clinical interventions as being of high significance (i.e. potentially prevented a hospital admission) and that almost all of the pharmacists' therapeutic recommendations were accepted by the patient or doctor (figure 11). The majority of interventions recorded took less than 5 minutes to complete (figure 12).
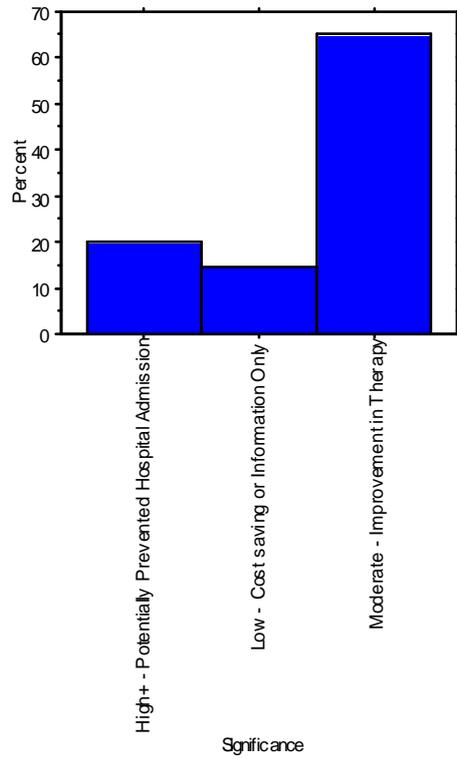
Figure 10. How pharmacists rated the clinical significance of their intervention.
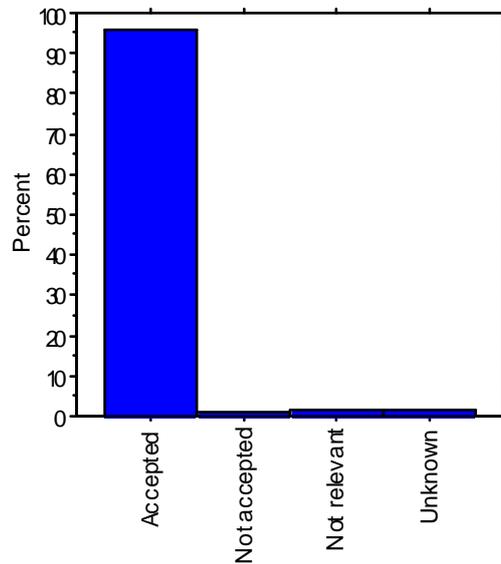

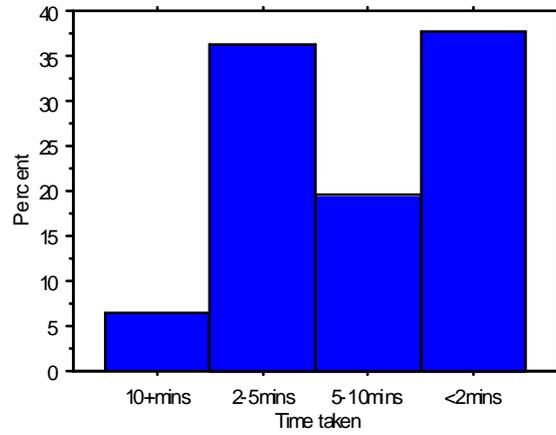*Figure 11. The stated outcomes of interventions recorded.*

Figure 12. Pharmacists were asked to record the amount of time taken to perform the intervention or cognitive service.

Clinical Panel Assessment

One hundred and ten randomly selected interventions were reviewed by a panel of four experienced clinical pharmacists. Each panel member assigned a level of significance to each intervention. The information was then pooled, and correlated with the significance level assigned by the documenting pharmacist.

There was moderate agreement between the ratings of the four assessors on the panel $(Kappa = 0.42, p < 0.0001)$.

Percents of Row Totals for significance - pharmacist, Mode of ratings

	H	L	M	Totals
H	35.714	21.429	42.857	100.000
L	0.000	100.000	0.000	100.000
M	4.167	22.917	72.917	100.000
Totals	10.606	27.273	62.121	100.000

Table 2 Breakdown of correlation between pharmacists' ratings and mode of ratings from clinical panel

Percents of Column Totals for significance - pharmacist, Mode of ratings

	H	L	M	Totals
H	71.429	16.667	14.634	21.212
L	0.000	22.222	0.000	6.061
M	28.571	61.111	85.366	72.727
Totals	100.000	100.000	100.000	100.000

Table 3 Breakdown of correlation between mode of rating by clinical panel and pharmacists

	Pharmacist	**Assessor 1**	**Assessor 2**	**Assessor 3**	**Assessor 4**	**Mode of assessor ratings**
Low	6	58	45	35	31	43
Medium	73	33	45	56	30	50
High	21	9	11	9	39	6

Table 4. Percentages of interventions in each significance category

Pharmacists

A pharmacist satisfaction questionnaire (Appendix 4) was sent out to each person who had recorded an intervention. Of the 32 questionnaires sent out, 21 were returned completed (66%).

This relatively small number makes meaningful statistics difficult to establish.

66% of pharmacists returning a questionnaire attended an education session. It was hoped that those pharmacists would have a higher rate of intervention recording, but numbers were not sufficient to establish whether this was the case or not.

It is interesting to note that only 14% of responders regularly recorded their interventions prior to this project, and 62% recorded their interventions sometimes. Five responders (24%) indicated that they did not record their interventions at all previously.

Pharmacists completing the satisfaction questionnaire were asked to indicate their opinion of what percentage of interventions performed, were documented. The results are shown in figure 13.
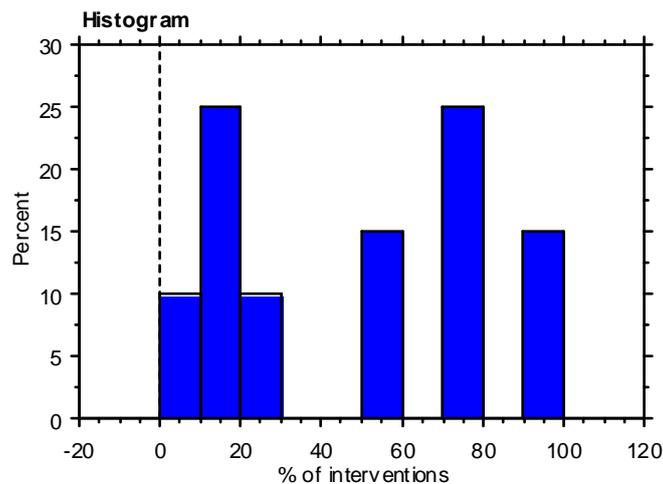

Figure 13. What percentage of interventions performed were documented?

Each responder was asked to indicate how many interventions they personally recorded during the trial period. The results are shown below (figure 14)
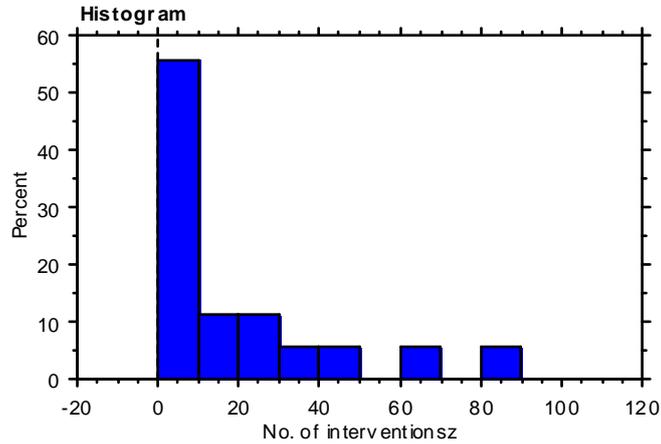

Figure 14. How many interventions did you personally record during the trial period?

Pharmacists were asked to indicate what barriers they perceived would make documenting of interventions difficult (table 5), and then what actual barriers they found to documenting interventions (table 6).

Perceived barriers	Number of responses	% of responses
Lack of motivation	1	3%
Lack of time	18	50%
Forgetfulness	16	44%
None	1	3%
Other	0	0%
Total responses	36*	100%

*Each respondent was allowed to indicate more than one perceived barrier to recording interventions.

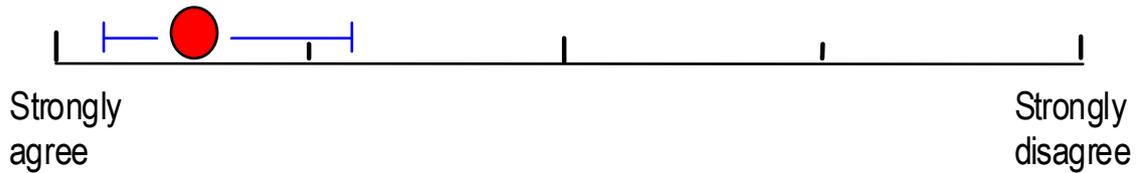*Table 5. Perceived barriers to documenting interventions.*

Actual barriers	Number of responses	% of responses
Lack of motivation	2	6%
Lack of time	13	41%
Forgetfulness	15	47%
None	1	3%
other	1	3%
Total responses	32*	100%

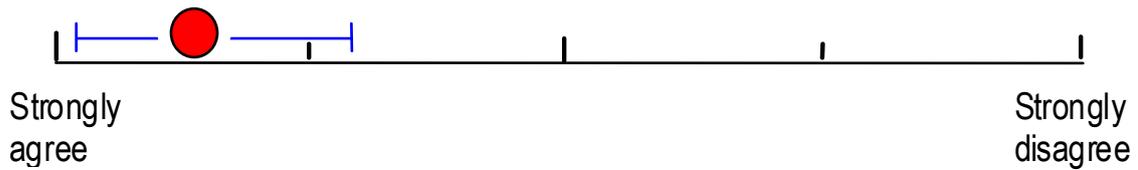*Each respondent was allowed to indicate more than one actual barrier to recording interventions.

Table 6. Actual barriers to documenting interventions.

Pharmacist Satisfaction Questionnaire
(Medians, with range lines plotted at the 10th & 90th percentiles.)

1. Documenting of cognitive services helps to demonstrate the ability of pharmacists to improve medication therapy.

Strongly
agree

Strongly
disagree

2. Documenting of cognitive services helps to demonstrate the ability of pharmacists to reduce health care costs.

Strongly
agree

Strongly
disagree

3. Participating in this project made me more aware of/focussed upon identifying Drug Related Problems.

Strongly
agree

Strongly
disagree

4. The intervention-recording program was easy to use.

Strongly
agree
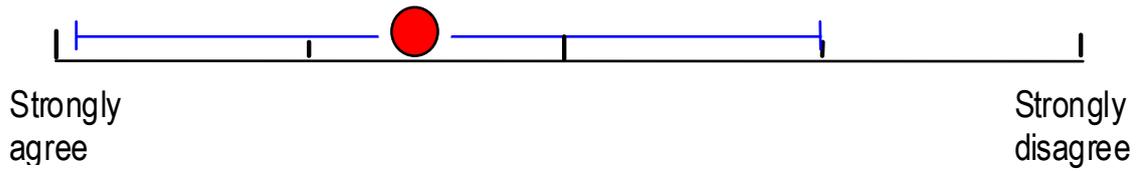
Strongly
disagree
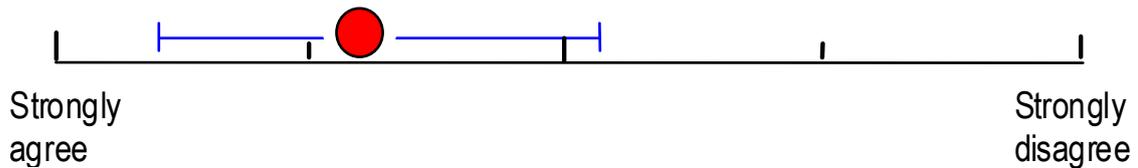
Pharmacist Satisfaction Questionnaire continued…

5. The sequence for documenting an intervention, including accessibility to the intervention screen, was logical and easy to follow.
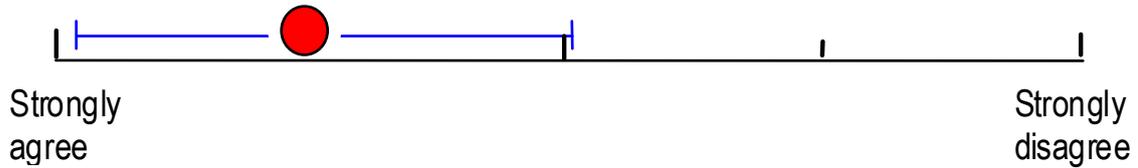
Strongly agree   Strongly disagree

6. The 'categories' and options were logical and relevant.

Strongly agree   Strongly disagree

7. A computerised documentation record has advantages over a paper-based recording system eg books

Strongly agree   Strongly disagree

8. Computerised documentation of cognitive services should be more widely available ie. to all pharmacists.

Strongly agree   Strongly disagree
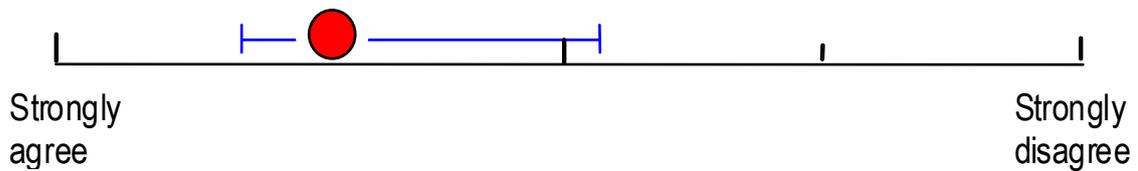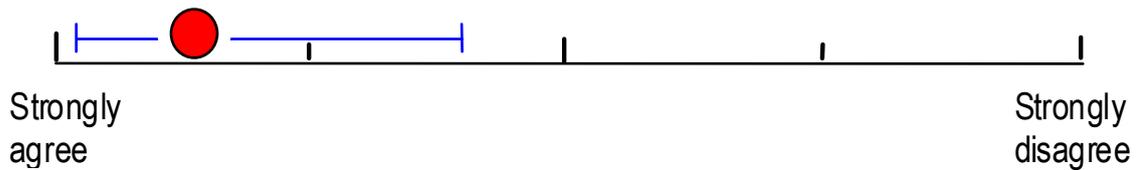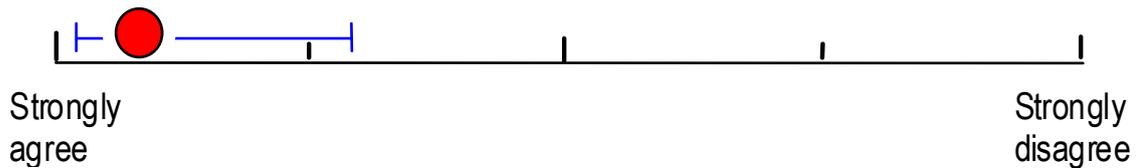
Discussion

A total of 463 interventions were recorded during the designated 6-month trial period. The number of interventions per pharmacy ranged from 0-95. As a percentage of total scripts dispensed the intervention rate ranged from 0.009% to 0.54% with a median value of 0.09%. An average of approximately 1 in 1000 scripts required intervention. This may seem to be a very small figure, particularly when compared to a study conducted in the US by Knapp et al[39] that found around 4% of scripts dispensed would require pharmacist intervention. It must be taken into consideration that the majority of prescriptions dispensed in Australian pharmacies are repeat prescriptions with less scope for intervention and the American model only includes original prescriptions in achieving this figure.

Not all interventions conducted were documented, only 3 out of 21 pharmacists responding to questionnaires claimed that they documented all (100%) of the interventions that they performed. The median value was 50%; this is likely due to time constraints and pharmacists not recording activities that they determine to be routine practice. A clinical study by Boardman et al[40] stated that upon questioning, clinical pharmacists only documented 31% of the interventions that they performed on ward rounds, a similar figure to what this study has shown.

Many pharmacists stated that one of the problems they encountered in tackling the study was defining what was considered to be an intervention. It was defined as the use of specialised knowledge by the pharmacist for the patient or for health care professionals for the purpose of promoting effective and safe drug therapy.[20] Activities such as blood pressure monitoring, additional patient counselling and prescriber contact were considered

by researchers to be recordable activities as they contribute to the quality use of medicines for patients. Many found it was difficult to get in the habit of recording activities that are done on a routine basis as part of regular daily activities.

Research to date has made it clear that pharmacists need to have the skills and knowledge to make useful interventions and training is critical. Not necessarily training in the use of the software, but ensuring that pharmacists have the knowledge and skills to make useful and timely interventions, and understand the importance of documentation. As noted by Cipolle et al[23]., "The computer program is not your practice it is merely an aid to support practice; a means to an end."

Interventions for which a specific drug was specified are summarised in Figure 9 under BNF (British National Formulary) categories, as used in the study by Hawksworth et al[22]. In terms of number of interventions required, cardiovascular drugs far outweighed all other categories followed by central nervous system drugs and 'other' which were primarily narcotic analgesics. Cardiovascular drugs are the most frequently dispensed medications so it would be expected that the majority of interventions be related to them.

Limitations of the BNF grading scale are that some medications do not fit distinctly into a single category. For example, prednisolone could be classified as: gastrointestinal, respiratory, endocrine, malignant disease & immunosuppression or musculoskeletal & joint disorders depending on the specific indication.

The patient and/or prescriber accepted approximately 95% of the interventions performed during the trial. Many of the interventions performed included provision of information

to the patient which was regarded as accepted. This is a very positive figure, showing that intervention and therapeutic recommendations from pharmacists are a valued, respected and important part of the quality use of medicines.

There was a strong correlation between the pharmacists' ratings and the mode value of the assessor ratings for each intervention (chi-square = 23.1, df = 4, p < 0.0001; Tables 2 and 3), however there was considerable variation between pharmacists' ratings and those of each individual within the clinical panel (see Table 4). When the pharmacist gave a rating of 'low' or 'moderate', this matched the mode value of the clinical panel of assessors in 100% and 73% of cases, respectively. However, when the pharmacist assigned the intervention a rating of 'high', this was matched in only 36% of cases by the mode value of the panel.

The documented interventions also showed that the majority (approximately 75%) took less than 5 minutes to complete. This should not be misconstrued to suggest that pharmacists spend only a small amount of their time on problems. On the contrary, the clinical panel suggested that it is the repeated, minor interventions that add up and become a significant contribution to the improved health of the general population.

Although pharmacy numbers were small (19) a good cross section of participants were found from all over Tasmania. Pharmacies varied greatly in size and location from seaside and mining towns to inner city and suburban shopping strips. They ranged from being one pharmacist, one assistant pharmacies to three pharmacist, ten assistant large pharmacies. Average script numbers ranged from 60 to 340 per day. It was hoped that

this diverse cross section would allow comparisons to be made between urban versus rural and small versus large pharmacies. The lack of data and reduced number of participants

limited the value of this type of data analysis. It can be seen in Plots 1 and 2, as the total number of scripts completed during the trial period increased, the number and rate of interventions decreased. This is only a general trend as a lot of scatter is present in the data. It was expected that there would be an approximately steady rate of intervention and therefore a greater number of interventions performed in pharmacies with higher 'script numbers. The reason for this variation is unknown.

The geographical distance between sites that trialled the program proved to be a hindrance to the study. Ideally pharmacies would have been situated in a smaller area giving participants greater personal contact with the research team and possibly a better attendance record at the information evenings. Of the pharmacists who returned a questionnaire only 66% attended an information evening. From the results, it is difficult to establish whether attendance had a bearing on the number of interventions recorded. Those who attended were better informed about the project, its relevance, and recording procedure and had more personal contact with the project coordinators.

The recording of interventions using pre-existing software is a relatively new concept to community pharmacy. Recording of DRPs and ADRs has occurred, primarily in the hospital setting where actual problems and events are recorded. The challenge of this study was to create both a model that was specifically designed for community practice and a set of categories that would encompass not only actual events but also pre-emptive measures taken by pharmacists to prevent potential DRPs and ADRs. It was here that the

focus of the study differed slightly to previous work and the creation of a unique set of categories and sub-categories was difficult and time consuming.

Categories have been used in many previous studies to classify interventions and it was thought that their inclusion into the system would minimise the amount of work required to record an intervention, reducing the need for free text entry. Using categories is also advantageous for statistical analysis as it allows patterns and problem areas in prescribing to be drawn from the data. From the data collected and comments from the participants and clinical panel it has been shown that:

- The sub-categories were not all encompassing as had been hoped. Eg Dose/ not stated,

- Some pharmacists categorised incorrectly and others didn't categorise at all,

- Many pharmacists preferred to enter details by free text entry, going against our initial feeling that free text entry would be too time consuming

The clinical panel found that interventions void of free text were more difficult to evaluate eg 500 mg Amoxil/ dose/ too high. No free text entered (For who and why?).

The program would probably be more valuable with only the broad categories (Appendix 1, column A) and more focus on free text entry to give a more full description of the intervention performed. It could be concluded that the sub-categories were too time consuming to become familiar with and, in most cases didn't give a full description of the intervention without the addition of free text.

When asked, via questionnaire whether the categories were relevant and logical, the majority of respondents marked around the neutral area of the visual analogue scale. This indicates some confusion regarding categorisation and backs up the statement above that a single set of categories would be a more practical and easy to use model.

It was hoped that by using a computer-based model, fully integrated with the dispensary system, that the major preconceived barriers to recording interventions would be overcome and superiority over previous paper-based studies would be evident. The post trial questionnaire found that pharmacists perceived the greatest barriers to recording interventions would be lack of time (50%) and forgetfulness (44%). The computerised system theoretically reduced time constraints by eliminating the need for double entry of script details and patient demographics, but 41% of participants found time constraint as an actual barrier to intervention recording during the trial period. It was hoped that the ability to perform an intervention without having to leave the main dispensary screen would reduce the preconceived barrier of forgetfulness. This was a major problem encountered in previous paper based trials where details of intervention were filled out on paper after the script had been processed, this often occurred hours or days after the fact. Forgetfulness was stated by 47% of participants as an actual barrier to recording during the trial period; this is a higher figure than that preconceived. It has also been indicated by data collected from this study that less recording of interventions occurred in this study than other previous studies. This may suggest that paper-based documentation is superior

to computer -based recording at this time, but pharmacists need to embrace the computer age and use resources to their fullest capacity. The use of computer-based documentation

has many clear advantages over paper-based trials especially in the long term. Pharmacists responded that they strongly agreed to computer-based systems having advantages over paper based recording systems, eg books. Computerised intervention systems give a permanent record of action and are stored in a patient's profile, they do not require double entry of script details or patient demographics and they allow for quick downloads of information for study purposes or in the future for the purposes of re-registration of pharmacists.

It is feasible that paper-based trials have an advantage because they do not require the programming, training and dramatic change in practice that the computerised system carries for the relatively short period of time that most trials run. For the recording on a long term or permanent basis there can be no argument that computer based documentation is superior.

Most pharmacists who responded to the questionnaire indicated that the documentation of interventions was very important and should become a mandatory part of pharmacy practice. Almost all pharmacists agreed strongly that the documenting of cognitive services helps to demonstrate the ability of the pharmacist to improve medication therapy and to reduce health care costs.

There was a varied response to the statement that 'participation in the project made the pharmacist more aware of/ focussed upon identifying DRPs' from strongly agree to some disagreeing. The variation can probably be put down to the level of participation that

individual pharmacists chose to give to the project and whether or not the participant recorded interventions prior to the trial. Only 3 out of the 21 responders to questionnaires

noted that they regularly recorded interventions prior to the study, 13 recorded sometimes and 5 responders claimed that they did not previously record interventions at all. Thus there was scope for most participants to become more aware of and focused upon identifying and recording DRPs.

It was stated generally that a change in preconceived ideas and work habits are required to make the change in practice to regularly document interventions and hence ongoing incentive in the form of payment should be offered as reimbursement. The vast majority strongly agreed that the computerised documentation of cognitive services should be made available more widely to pharmacists. With the generic approach taken in its design, the system is capable of incorporation into most other dispensary software. The program will also be available for use on hand-held computers.

Conclusions and Recommendations

The practice of community pharmacy needs to move away from volume dispensing as its primary means of remuneration and look towards a more patient-care-oriented future. Documentation of interventions and cognitive services as a routine part of practice is a positive step towards this goal and one that must be instigated.

The response from the trial pharmacists was very positive regarding documentation and its necessity to the profession. The full benefit of intervention documentation will not be realised until it becomes a part of everyday practice for community pharmacists. In order for this to occur, adequate remuneration and incentive for documentation must be offered, as well as adequate skills and knowledge possessed by pharmacists. It is suggested that along with remuneration these activities could be linked with re-registration activities as a measure of pharmacists' performance. Pharmacists should be encouraged to record their interventions electronically. The profession needs to be encouraged to use computer programs available to full potential, not just as label and claim producing machines. Computer documentation has the advantages of directly linking with the patients' profile, and providing a permanent legal record of practice. It should be encouraged that this system or similar, be incorporated into all dispensing software Australia-wide so that all community pharmacists can benefit.

In order for interventions to be recorded quickly and with sufficient detail a single tier of categorisation should be used along with the entry of brief free text to further describe the action taken and why.

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Appendices

Appendix 1 Categories

Appendix 2 Manual

Appendix 3 Screen shot examples

Appendix 4 Questionnaire

Appendix 5 Pharmacists' comments

Appendix 1 – Categories

Column A   Column B

| Column A	Column B
Untreated indications	any condition or health problem not adequately treated or controlled preventive therapy required as a result of existing health problems or drug therapy
Drug	not indicated non-drug alternative is indicated more effective drug available cost, less expensive alternative contraindications duplication of drug or therapeutic class out of date/deteriorated incorrect or inappropriate dosage form existing allergy
Dose	too high too low incorrect frequency incorrect duration of therapy intentional misuse
ADR/interaction	undesirable or intolerable side effects allergic reaction drug toxicity drug-drug interaction drug-food interaction drug-disease interaction symptoms mimicking ADR/side-effects
Compliance	missing doses taking excessive doses incorrectly administered drug inability to appropriately administer drug unwillingness to use drug confusion about therapy/condition
Counselling/Advice	patient requests information health care worker requests information disease management advice for patient OTC medication advice demonstration of therapeutic device potential drug abuse situation
Administration	prescription incomplete not authorised to prescribe PBS non-compliance forgery previously dispensed incorrectly illegible prescription
Monitoring	drug levels suggested biochemical levels suggested BP/BSL etc performed
Other	Please explain in 'notes' section

Appendix 2 – Manual

Tasmanian School of Pharmacy

Development And Evaluation of a Computerised System
For the Provision and Documentation of
Pharmacists' Cognitive Services

Development and evaluation of a computerised system for the provision and documentation of pharmacists' cognitive services

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Development and evaluation of a computerised system for the provision and documentation of pharmacists' cognitive services
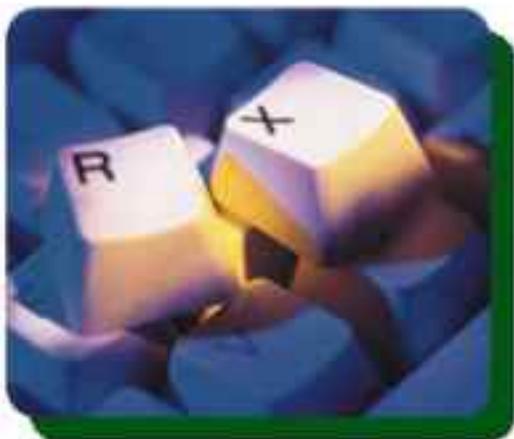
Development and Evaluation of a Computerised System for the Provision and Documentation of Pharmacists' Cognitive Services

WHAT IS THIS PROJECT ABOUT?

With funding from a Third Community Pharmacy Agreement Research and Development Grant, Professor Greg Peterson, Kimbra Fitzmaurice (Research Assistant) and Duncan McKenzie (Honours student) from the Tasmanian School of Pharmacy, in collaboration with John Elkerton (Pharmacy Electronic Information Manager, Royal Hobart Hospital) and Chung Liauw (Phoenix Computer Systems) are developing and evaluating a convenient mechanism for the recording of community pharmacists' cognitive services.

At present, the documentation of cognitive services in community pharmacy practice in Australia is virtually non-existent, yet quality care cannot be provided without complete documentation. Only by appropriately evaluating and documenting patient outcomes will pharmacists be able to receive payment for cognitive services.

The system will be easy to use and interface with dispensing software. The team envisage that the system will become an Australia-wide standard. It has initially being developed for incorporation into the REX system (Phoenix Computer Systems). A generic approach has been adopted in the design of the system, so that it can be later modified for use by as many dispensing software vendors as possible.

The documentation system is problem-oriented. The recorded list of drug therapy problems includes the drug involved, problem identified, and the steps that were taken to resolve the problem, including details of contact with the prescriber (and whether the recommendation was accepted). The record should have sufficient information for other pharmacists to understand the problem and outcome. Data files without patient-specific information can be easily downloaded and the details of the provision of cognitive services can be easily collated and summarised.

As part of the trial phase, we ask you to record the professional services and interventions you perform during your daily duties. We are not asking you to perform any extra duties, but just to record those

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Development and evaluation of a computerised system for the provision and documentation of pharmacists' cognitive services

activities that you normally do. This does not mean documenting every brand substitution you do, or every time you reinforce the dosage details of an antibiotic to a patient. Examples are given later in this document.

WHY IS IT IMPORTANT?

1 QCPP Continuous Quality Improvement points

Participation in research projects, such as this one, has been identified as an appropriate activity to gain CQI points. For each 10 hours of participation, you will earn one CQI credit point, and that is one less self assessment you will need to complete!

2 Improving the Remuneration Model

Currently, remuneration in pharmacy practice is focused towards volume dispensing, rather than the extent or quality of pharmaceutical care provided to the patient. This is not a sustainable remuneration model for the profession.

The development of this program is the first step towards gaining payment for cognitive services.

3 Adverse Drug Reactions

Data show that between two and three percent of hospital admissions are related to problems with medicines (approximately 140,000 per year). This is more than the combined number of admissions for asthma and heart failure.[1] As the recognised medication experts, pharmacists have a moral, ethical and humanitarian obligation to address these issues and implement strategies to better detect, manage and prevent these problems.

How many hospital admissions are avoided by pharmacist interventions?
We don't know at this stage, but by documenting clinical interventions and cognitive services performed by the pharmacist, we are on the road to finding out.

4 Documentation

The relative lack of solid evidence for the beneficial effects of pharmacy practice is perhaps the major weakness facing the profession. Worldwide, the profession faces the issue of convincing itself and outside stakeholders that our role is more than merely a supply function.

The positive arguments for documenting clinical activities are overwhelming:
- it allows continuity of care
- it creates a legal record of events
- it provides evidence that an activity took place

Development and evaluation of a computerised system for the provision and documentation of pharmacists' cognitive services

5   We will pay you!

We are proposing to pay pharmacists $2 for each cognitive service that they provide and record during the trial period. This is similar to the DD recording fee that is currently paid, and will partially compensate for the time involved in documenting the cognitive service.

[1]   Australian Council for Safety and Quality in Health Care. Second National
Report on Patient Safety. Improving Medication Safety. July 2002

WHAT IS A COGNITIVE SERVICE?

A pharmacist's responsibilities include identifying, resolving and preventing health problems, in particular drug related problems. In different studies and research projects, various definitions of adverse drug reactions, drug related problems and interventions have been used. For example;

"A drug therapy problem is any undesirable event experienced by the patient that involves or is suspected to involve drug therapy and that actually or potentially interferes with a desired patient outcome." [2]

We would like to push the boundaries of recordable events beyond just 'drug related problems'. In the past, similar studies have restricted recordable events to drug related problems, or actual adverse events. These boundaries do not allow for the recording of potential events or near misses. Nor does it allow for the recording of such things as blood pressure or blood sugar monitoring, which are becoming more commonplace in community pharmacy. These professional services are time consuming, and may involve financial outlay. They have also been shown to be valuable services in the community pharmacy setting.

A cognitive service encompasses many aspects of a pharmacist's activities.
- Identifying DRP's and ADR's
- Health management advice
- Working in conjunction with the entire health care team to provide the best possible outcome for patients.
- Monitoring response to therapy

Development and evaluation of a computerised system for the provision and documentation of pharmacists' cognitive services

So an overall definition of the types of activities that are recordable for this research project is;

Any professional activity directed towards improving health outcomes or the quality use of medicines, or the provision of health related information.

An examination of the table (see Appendix 1) will give an indication of the types of activities, services and interventions that we suggest are worthy of being recorded. Please don't consider this a definitive list, but let us know if you think it needs to be altered.

[2] Pharmaceutical Care Practice. Cipolle Strand and Morley

HOW DO I RECORD AN INTERVENTION OR ACTIVITY?

This process is fully integrated with your dispensing program, so much of the information that needs to be recorded is automatically transferred to the intervention record, thereby minimising the amount of data that you need to input, and also the amount of time taken.

The recording procedure has 6 stages or components of data entry, four of which only require a single mouse click or touch of the screen.

Key	Category	Explanation	Options
F1	* SCRIPTDETAILS	Name of patient, prescriber, date, drug name	
F2	* CATEGORY	Categorise the intervention via the root cause of the need to perform the intervention.	See table, Appendix 1
F3	* SIGNIFICANCE	If you had not intervened, what was the possible/potential outcome if therapy had continued.	* Low * Medium * High
F4	* OUTCOME	Did your intervention actually result in a change of therapy, or was the suggestion deemed not relevant in this case?	* Unknown * Accepted * Not accepted
F5	* NOTES	This section is for you to add free text notes, to more thoroughly explain your action(s) or the reason(s) for them.	
F6	* TIME	How long did it take you to perform the intervention? This will give us (and you) an idea of how much time is spent each day on activities that you aren't compensated for.	* < 2mins * 2-5 mins * 5-10 mins * > 10 mins

It has been set up in this way to enable the collection of the most complete data possible, with the minimum amount of data entry.

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TO RECORD AN INTERVENTION PART WAY THROUGH DOING A PRESCRIPTION:

- enter as much information as possible on the dispensing screen, as this is then transferred to the intervention record script details.

- hit the [intervention] button

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This is the Script Details screen

- enter [script details] if they haven't already been transferred form the dispense screen
- enter [category], then [sub-category]
- enter [notes] if necessary
- enter [significance]
- enter [outcome] (if known**)
- enter [time taken]
- hit the [RECORD/SAVE] button
- enter your initials to confirm

** There may be occasions when you don't know at the time of recording the intervention what the outcome is. There are even circumstances whereby you may never know the outcome. If an outcome is not recorded, the entry will be "flagged" for review and/or follow-up at a later time.

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TO RECORD AN INTERVENTION, NOT ASSOCIATED WITH THE CURRENT (OR ANY) PRESCRIPTION, EG AN OTC ITEM;

- Main menu

- [F1]   =   dispense
- [c]   =   intervention
- [1]   =   new intervention

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Press the [Back] button if you do not wish to link the intervention with a script.

You might enter this as;

Script #: blank

Patient Name: unknown or fill in name if known

Org Rx Date: today's date
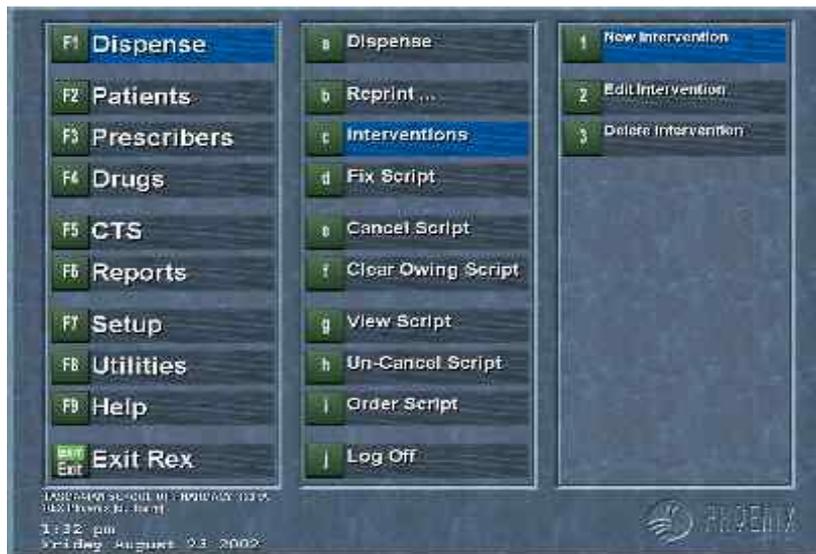
Prescriber : blank

Drug Name:

And then continue with the usual 5 step entry procedure:

- enter [category], then [sub-category]
- enter [notes] if necessary
- enter [significance]
- enter [outcome] (if known**)
- enter [time taken]
- hit the [RECORD/SAVE] button
- enter your initials to confirm

HOW DO I EDIT AN INTERVENTION? 69

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HOW DO I EDIT AN INTERVENTION?

- Main Menu

- [F1] Dispense
- [c] interventions
- [2] edit intervention

An 'Intervention Search' screen will be shown.

- Select (highlight) the intervention that you wish to edit.
- Hit [OK]
- Make the necessary changes.
- [Record/Save]
- enter intitials to confirm

HOW DO I DELETE AN INTERVENTION? 70

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HOW DO I DELETE A NINTERVENTION?

- Main Menu

- [F1] Dispense
- [c]   interventions
- [3]   delete intervention

An 'Intervention Search' screen will be shown.

- Select the intervention that you wish to delete.
- Hit [OK]
- You will be asked to confirm that you definitely want to delete the intervention
- Hit [yes] or [no]

HOW DO I PRINT A REPORT? 71

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HOW DO I PRINT A REPORT?

- Main menu

- [F6]   reports
- [f]   intervention

1   Intervention details; this function will list details of all interventions recorded in the chosen category, time frame and date range.

2   Intervention summary; this function will summarise the types of interventions that have been recorded, with out any specific details.

3   Individual intervention; still under construction

You can make the report as detailed or as broad as you like. This is achieved by selecting the report parameters that you wish to appear, or by selecting ALL.

Select the date range that you want the report to cover.

[Preview]

[Print]

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SOME IMPORTANT POINTS TO REMEMBER:

1   You can't get it wrong! There isn't really a right or wrong way to record an intervention. We just ask that you use your professional judgment and common sense when recording an intervention.

2   If you have any suggestions for alterations or improvements, please let us know.

3   Each intervention record will be held in a dedicated database, as well as appearing in the relevant patients profile. This enables you to produce reports of all interventions, or interventions of a particular type, as well as reminding you of a previous intervention next time you are dispensing for a particular patient.

4   An extensive interaction database has been incorporated to assist you in the detection of drug related problems. You can now enter the diseases or conditions that a person suffers from. These tools will assist you in providing quality pharmaceutical care to your patients.

For technical information regarding your dispensary software or hardware, please contact Phoenix Corp.

If you have questions specifically about the recording of interventions or this research project, please call:

Kimbra Fitzmaurice

Phone: (03) 6226 7526
Mobile: 0417 395 496

Email: K.Fitzmaurice@utas.edu.au

APPENDIX 1

Column A	Column B
Untreated indications	any condition or health problem not adequately treated or controlled
	preventive therapy required as a result of existing health problems or drug therapy
Drug	not indicated
	non-drug alternative is indicated
	more effective drug available
	cost, less expensive alternative
	contraindications
	duplication of drug or therapeutic class
	out of date/deteriorated
	incorrect or inappropriate dosage form
	existing allergy
Dose	too high
	too low
	incorrect frequency
	incorrect duration of therapy
	intentional misuse
ADR/interaction	undesirable or intolerable side effects
	allergic reaction
	drug toxicity
	drug-drug interaction
	drug-food interaction
	drug-disease interaction
	symptoms mimicking ADR/side-effects
Compliance	missing doses
	taking excessive doses
	incorrectly administered drug
	inability to appropriately administer drug
	unwillingness to use drug
	confusion about therapy/condition
Counselling/Advice	patient requests information
	health care worker requests information
	disease management advice for patient
	OTC medication advice
	demonstration of therapeutic device
	potential drug abuse situation
Administration	prescription incomplete
	not authorised to prescribe
	PBS non-compliance
	forgery
	previously dispensed incorrectly
	illegible prescription
Monitoring	drug levels suggested
	biochemical levels suggested
	BP/BSL etc performed
Other	

Appendix 3 – Screen shots

Image 1 The Main Menu of the Rex Dispensary System

Image 2 The Main Menu of the Rex Dispensary System showing the 'Intervention' section

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Image 3 The Intervention recording screen, showing the 'script search function
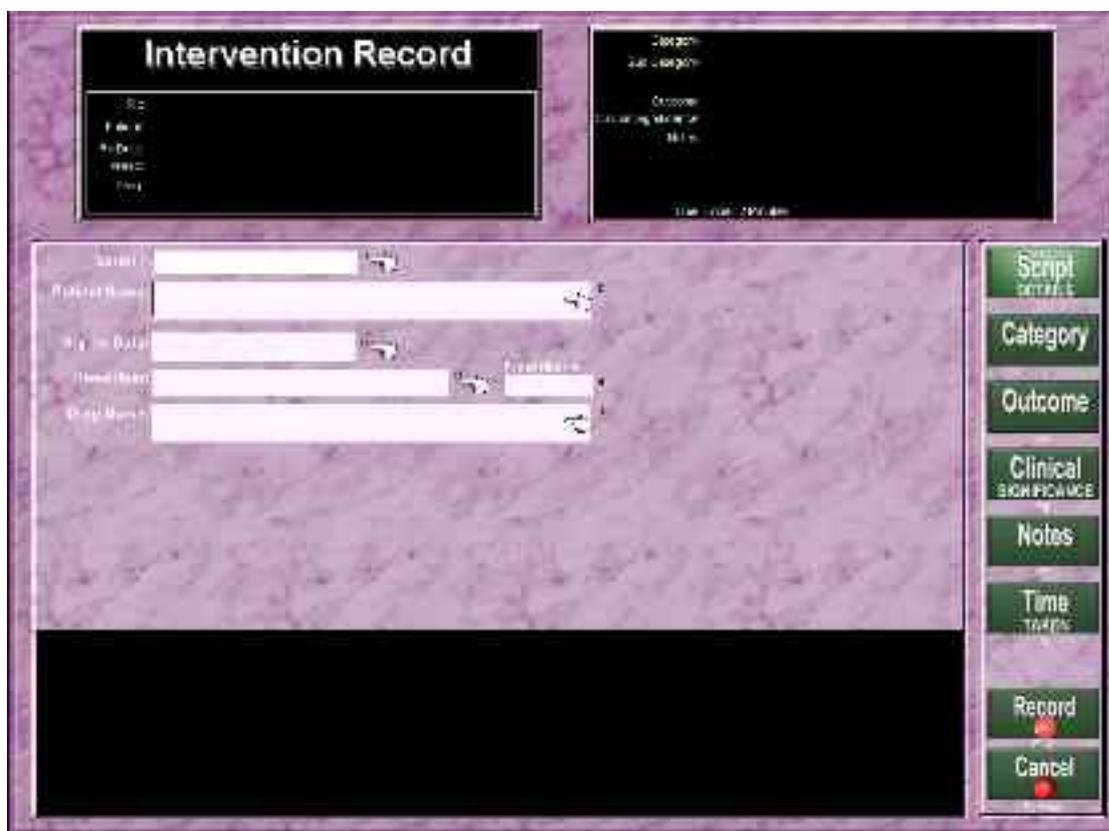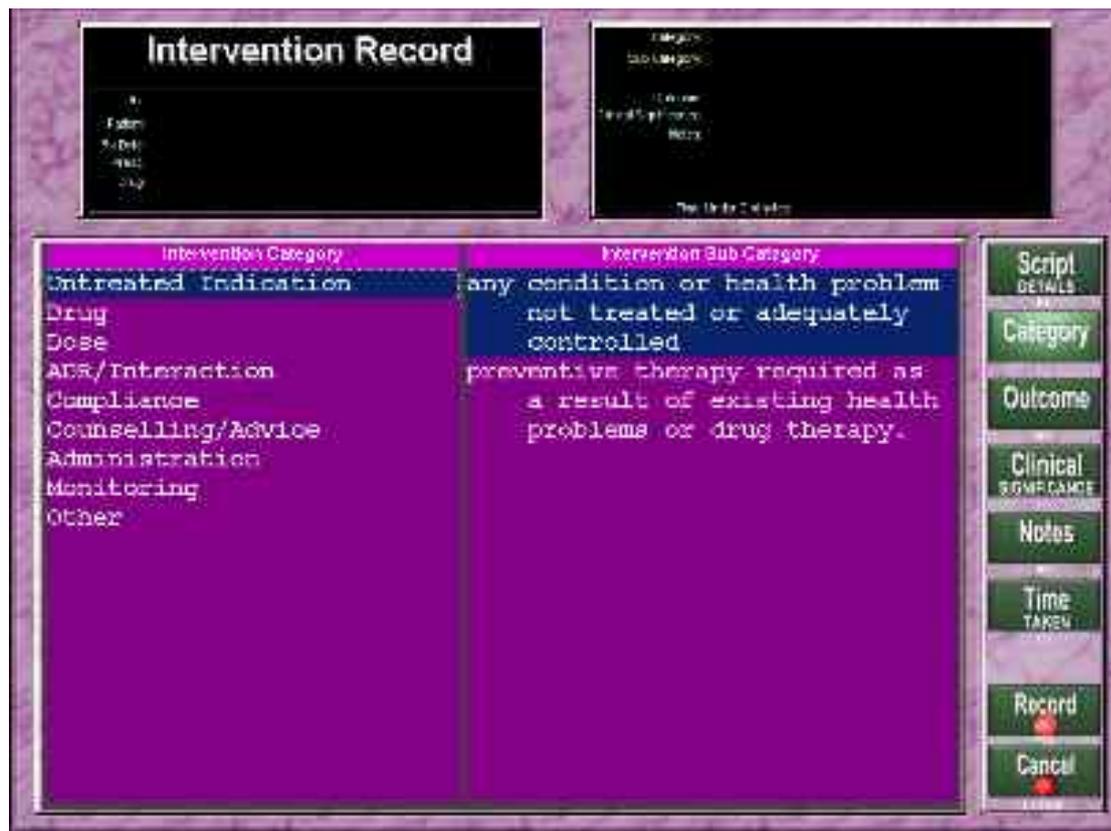

Image 4 The Intervention Recording screen

Image 5 The Intervention Recording screen showing 'categories'

Image 6 The Intervention Recording screen showing the 'significance', 'outcome' and 'time taken' selection process.

Image 7 The Rex Dispensary System Main Menu, showing the location of the reporting function
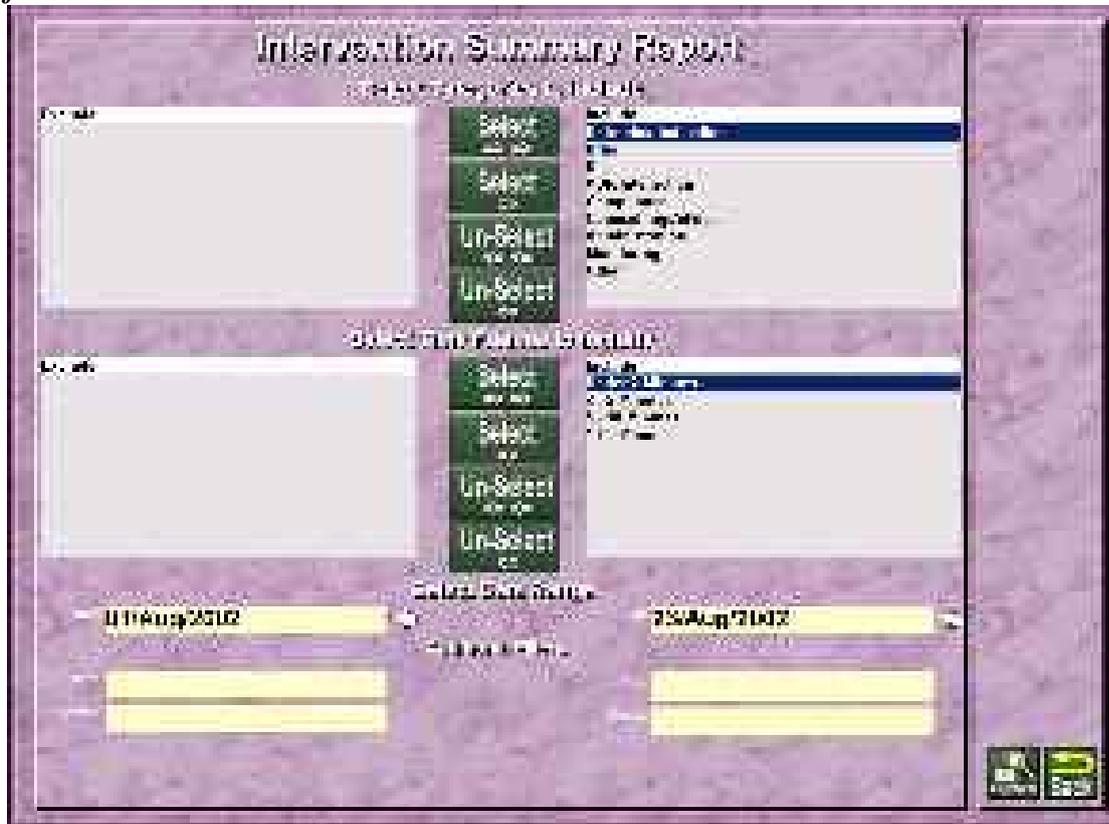

Image 8 The report selection process enables you to download a narrow or broad report according to the selected criteria and time frame.
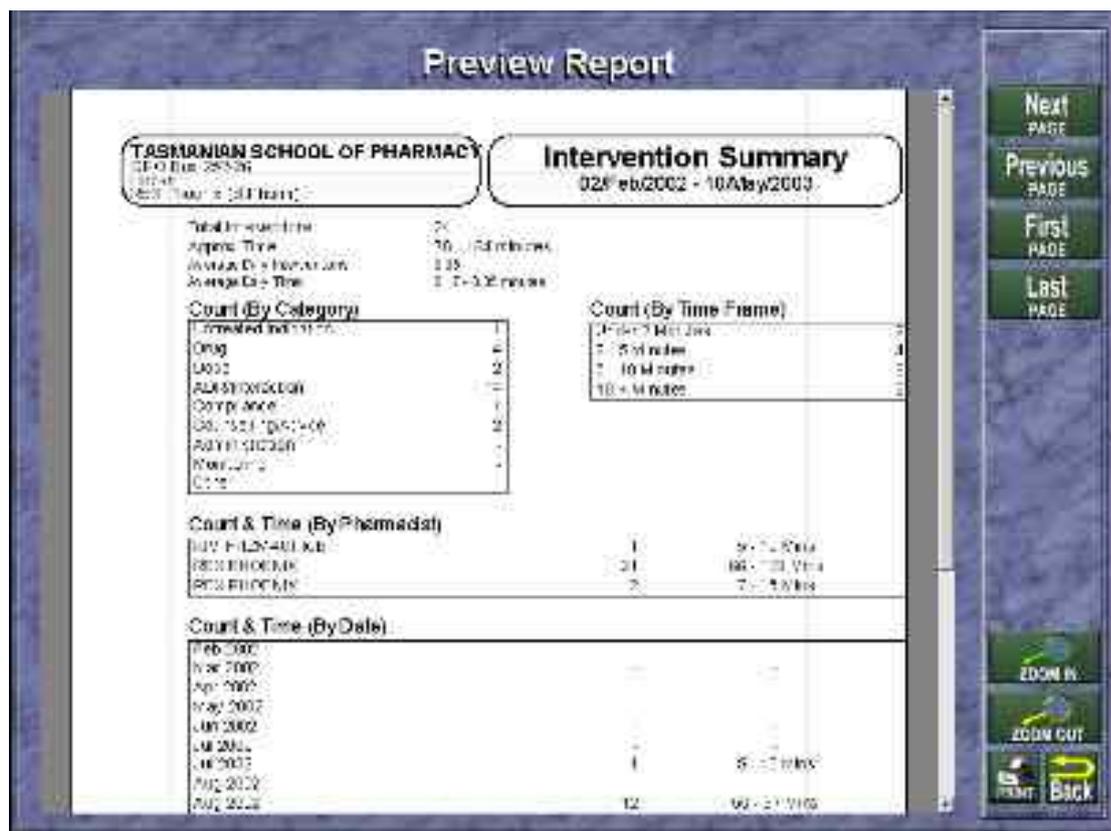
Image 9 A 'print preview' of an intervention summary report

Image 10 A specific recorded intervention can be found using the 'intervention search' function

Appendix 4 - Pharmacist Questionnaire

Please place a cross in the box to indicate your answers

Section 1 – Demographics

1. Sex   M ❑   F ❑

2. Age: ___

3. Employment status

  Pharmacist ❑   Dispensary technician ❑ Trainee ❑

  Owner ❑ Full-time ❑ Part-time ❑ Locum ❑

4. How many scripts are done on average per day?

_____

5. How many pharmacists are usually on duty between the hours of 9am and 5pm? _____

6. Are dispensary technicians/assistants used on a regular basis?

  Yes ❑ No ❑

Section 2-The Project

1. Did you attend an education session relating to this project, hosted by the University of Tasmania?

   Yes ❑   No ❑

2. Did you document your professional services or interventions prior to this project?

   Yes ❑   No ❑   Sometimes ❑

   If Yes, where did you document these activities?

   Scraps of paper ❑   Dedicated Book ❑   Patient file ❑

3. When you first heard about this project, what barriers did you perceive would prevent you from recording your cognitive services and/or interventions?   *You may select more than one*

   Lack of motivation ❑   Lack of clinical knowledge ❑   Lack of time ❑

   Forgetfulness ❑   None ❑   Other ❑

4. How many interventions/cognitive services did you personally record in the Rex Intervention Program during the period 01/10/02 – 31/03/03?

   ————

5. Approximately what percentage of cognitive services performed, did you actually document in the Rex Intervention Program?

   100% ❑   75% ❑   50% ❑   25% ❑   10% ❑   0% ❑

6. What barriers did you actually find in recording your cognitive services?

You may select more than one

Lack of motivation ❑   Lack of clinical knowledge ❑   Lack of time ❑

Forgetfulness ❑   None ❑   Other ❑

Section 3

Place a cross *anywhere* on the line or tick the box to indicate your opinion on the following statements;

1. Documenting of cognitive services helps to demonstrate the ability of pharmacists to improve medication therapy.

☐ Unsure

Strongly agree   Strongly disagree

2. Documenting of cognitive services helps to demonstrate the ability of pharmacists to reduce health care costs.

☐ Unsure

Strongly agree   Strongly disagree

3. Participating in this project made me more aware of / focussed upon identifying Drug Related Problems.

☐ Unsure

Strongly agree   Strongly disagree

4. The intervention recording Program was easy to use.

☐ Unsure

Strongly agree   Strongly disagree

5. The sequence for documenting an intervention, including accessibility to the interventions screen, was logical and easy to follow.

☐ Unsure

Strongly agree   Strongly disagree

6. The 'Categories' and options were logical and relevant.

☐ Unsure

Strongly agree   Strongly disagree

7. A computerised documentation record has advantages over a paper-based recording system eg books.

☐ Unsure

Strongly agree   Strongly disagree

8. Computerised documentation of cognitive services should be more widely available i.e to all pharmacists.

☐ Unsure

Strongly agree   Strongly disagree

Appendix 5 - Pharmacists' Comments

"Great idea……you missed the best intervention…..it was definitely a hospital prevention!"

"Great program and well structured. Good to have the incentive to use it. If the government can provide an ongoing incentive to record interventions then people have no excuse not to use the program. It would be an easy way to make a few spare dollars and at the same time creating invaluable documentation for future reference. Once you start recording these, you become very aware of how much work we do to prevent errors etc and increase compliance, and how many phone calls we make to doctors."

"The time and remembering factors were the most important reasons why more interventions were not recorded. What constitutes an 'intervention' was another problem."

"Documenting any service that the pharmacist adds should be mandatory. We are the experts on drug therapy/interactions so this step is a natural progression. Payment for this service should also be mandatory."

"I am very sorry but I do not have time to give to this project, and I have had no cause to intervene in any prescription."

"Have been very lazy with this project (sorry). The idea is great. ..It is good to see things have changed so much and that the pharmacist is a worthwhile member of the health care team – it would be exciting to start all over again."

"The intervention categories still had some descriptions missing – eg dose – not stated. The process of documenting interventions has been very useful and has entailed a change in 'practice' – ie pharmacists perform interventions frequently, but do not document."

"It will take some time to include recording interventions as it is not a part of previous practice. Interventions happen on a regular basis throughout the day – one just gets on with the next patient, while recording takes second place. I agree it should be done."