

3 Med eSupport Executive Summary

This 21 page section is a summary of the complete Med eSupport report. Throughout this document, references are made to the sections within the complete report that are relevant to the summarised information. These are indicated at the top of each section as follows: *Refer Section X*

3.1 Introduction

Refer Section 8

A major contributor to inadvertent polypharmacy and drug-related problems in the elderly appears to be hospitalisation and the consequent changes in medication during the transitions between the community and hospital settings. It has been noted previously that the management of prescribed medications among chronically ill patients recently discharged from acute hospital care is often sub-optimal. It has also been noted that assessment of medication management in the home following discharge provides an invaluable opportunity to detect and address problems likely to result in poorer health outcomes. More specifically, while being a very valuable drug, warfarin is also recognised as a major contributor to adverse drug events, particularly soon after initiation.

Med eSupport tackled this major issue of poor medication management at the community-hospital interface. Confusion about medications, poor compliance and adverse outcomes in recently hospitalised patients were a major focus of this project. The Project Team implemented and evaluated an innovative medication support program (Med eSupport) for high-risk patients. The program utilised information and communications technology solutions and included:

- (i) provision of a secure bidirectional electronic communication pathway for medication profiles between community and hospital pharmacies to facilitate medication reconciliation,
- (ii) supplying a comprehensive medication information sheet to the patient/carer, general practitioner and community pharmacist at the time of discharge from hospital,

- (iii) uploading of the discharge medication information to a secure website for viewing and printing by the patient/carer, general practitioner or community pharmacist,
- (iv) providing a model whereby suitable patients were automatically referred for a home medicines review after discharge from hospital, and
- (v) providing home follow-up education, medication review and monitoring of the International Normalised Ratio for patients initiated on warfarin during hospitalisation.

Specifically, the desired outcomes of the Med eSupport project were expected to include the following:

- Better correlation between the list of prescribed medications during hospitalisation with the actual medications being taken by the patient immediately prior to admission,
- Improvements in quality use of medicines (QUM) by patients,
- Improved provision of medication-related information and follow-up of patients after discharge from hospital,
- Improved communication of discharge medication-related information between the hospital and community-based health professionals, ensuring continuity of treatment to promote patient care at the time of discharge from hospital,
- Improved patient compliance/adherence,
- Improved patient knowledge of their medications,
- Less medication-related adverse events following hospital discharge,
- Demonstration of the benefits of home follow-up visits on patient outcomes, targeting newly initiated warfarin patients as a specific example, and
- Favourable acceptance of the program by patients, community pharmacists (CPs) and general practitioners (GPs).

3.2 Methodology

3.2.1 Med eSupport Trial

Refer Section 9.1

Med eSupport consisted of a primary randomised controlled trial of a range of services as a package, with a smaller study specifically focused on patients initiated on warfarin.

Med eSupport primary trial

The primary Med eSupport trial was implemented in five hospitals in Tasmania, Western Australia and Victoria over a period of 9 months from December 2004 to August 2005.

Patients were eligible for enrolment if:

- they were 50 years or older,
- had at least two chronic conditions, (one of which was cardiovascular disease, diabetes mellitus or chronic obstructive airways disease),
- were taking at least three chronic medications,
- could nominate a regular GP and CP,
- did not live in a aged or residential care facility, and
- were able to provide informed consent.

The primary study consisted of a control and intervention group. These two groups were further divided into two sub groups, dependant on the form of home medicines review (HMR) recommendation utilised. Patients were randomly allocated to one of the four sub groups using block allocation concealment.

These groups were:

- Control
 - No HMR recommendation
 - HMR recommendation
- Intervention
 - streamlined HMR recommendation
 - post-discharge medication review (PDMR) model

For each patient enrolled, their progress was followed from the point of admission to 30 days post discharge. The following is a summary of the processes at each point in time, and a flow chart is provided on page 22 (see Figure 1).

At admission

For all patients:

- Patients interviewed to obtain basic demographic data, medication history, baseline knowledge, compliance and quality of life (QoL) score and self-reported drug-related problems (DRPs).
- CP telephoned and a 6 month dispensing history was obtained.
- GP was contacted for a medication history where required.
- Current medical notes checked for information regarding admission medications.
- All obtained information compared and collated to form a reconciled list of the most likely medications the patient was taking when they entered hospital.

For intervention patients only:

- The reconciled list, along with highlighted discrepancies between it and the initial drug chart were discussed with the resident medical officer (RMO) within 24 hours of admission.

Progress of resolution of identified discrepancies was followed for all patients throughout their hospital stay, actively for intervention patients and silently for control patients.

Prior to discharge

For all patients:

- Discharge prescriptions were checked against current drug charts and medical notes and any new discrepancies found were highlighted.

For Intervention patients:

- Newly identified discrepancies were discussed with the RMO prior to discharge.
- Discharge medication counselling and a counselling sheet were provided.

All control patients received usual care in accordance with regular hospital practices.

At discharge

Control – No HMR recommendation

- Patients received usual care

Control – HMR recommendation

- Patients had a sticker, suggesting an HMR would be beneficial, placed on their discharge summary

Intervention streamlined HMR recommendation

- All medications and relevant medication information uploaded to the Med eSupport trial website in the form of a discharge medication summary, counselling sheet and weekly checklist.
- Summary was sent, via fax, to the patient's nominated GP(s) and CP(s) within 24 hours of discharge, along with access details for the website and information regarding the project and their patient's group allocation.
- Summary was in a HMR referral format, so all the GP had to do to refer the patients for an HMR was check the information, sign it and send it the CP.
- Nominated GP(s) and CP(s) were telephoned at this point and informed what they were going to receive and given the opportunity to ask questions and clarify any information.

Intervention – PDMR model

- All medications and relevant medication information uploaded to the Med eSupport trial website in the form of a discharge medication summary, counselling sheet and weekly checklist.

- Summary was sent, via fax, to their nominated GP(s) and CP(s) within 24 hours of discharge, along with access details for the website and information regarding the project and their patient's group allocation.
- Patients were given an automatic post-discharge medication review, funded by the trial, within 5-7 days post-discharge. The GP(s) and CP(s) were telephoned and informed what they were going to receive, how a PDMR worked, and given the opportunity to ask questions and clarify any information.
- Nominated CP(s) were encouraged to perform the PDMR themselves, but accredited pharmacists were available through the project team, if this was not possible.
- Trial Officers continued to keep in close contact with the nominated CP(s) and GP(s) to ensure the PDMR was performed in a timely manner.

30 days post-discharge

All patients:

- Telephoned and asked about their current medications and changes since discharge.
- Follow-up knowledge, compliance and QoL scores and self-reported DRPs collected.
- Asked if they had received a home visit from a pharmacist and when.

Intervention patients only:

- Asked about their use of the website.

After the 30 days post-discharge phone call

- CP(s) (and GP(s) where required) contacted to confirm current medication list and PDMR/HMR activity and reports collected where applicable.
- Satisfaction surveys sent to all patients.
- Satisfaction surveys sent to the CP(s) and GP(s) of intervention patients.

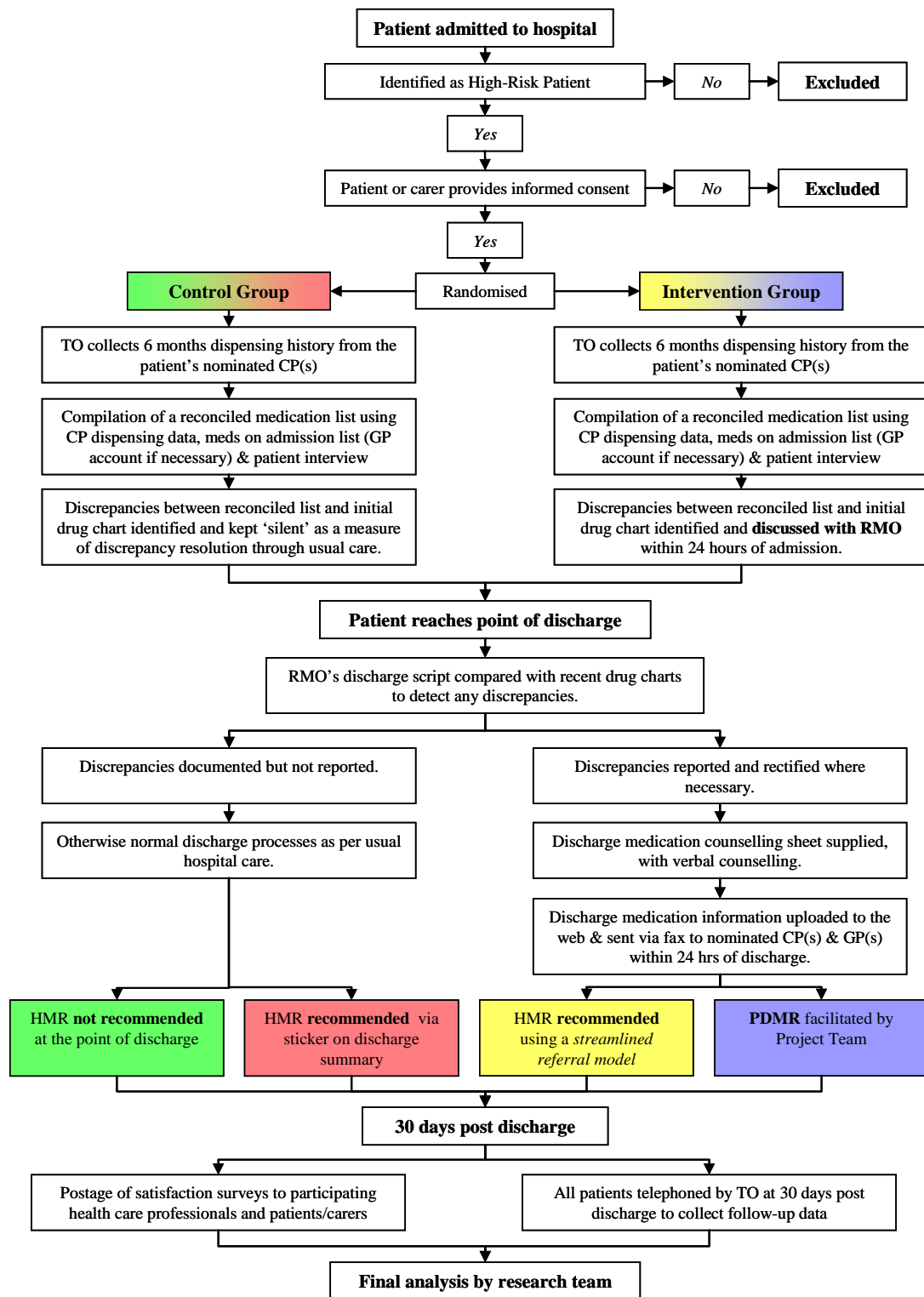


Figure 1 Summary of primary Med eSupport trial process

Post-Hoc Reclassification process

Refer Section 9.1.3

At the end of the trial it was found that, due to the nature of the trial design, which group a patient was allocated to and what services they received were not always uniform. The primary difference was whether they received a PDMR or HMR. This was variable due to the differing extents of uptake between the different models of recommendation.

On reflection, it was felt that these differences within the original groups could not be ignored, as it was the impact of the services received that was most important in terms of analysis of different aspects of the program.

Initial group allocation was still vital to measure uptake of the different methods of PDMR/HMR promotion and to assess for most aspects of patient satisfaction. However, for a more realistic analysis of the services offered by Med eSupport, the patients were reallocated to a new group, dependant upon the services received.

The new grouping system was comprised of three groups, as follows.

1. Minimal Intervention
 - Control Patients who did or did not receive discharge medication counselling
2. Partial Intervention
 - Discharge medication counseling received and discrepancies reported to the RMO
3. Full Intervention
 - Discharge medication counseling received, discrepancies reported to the RMO and PDMR/HMR performed

This new grouping, termed the ‘services received’ grouping, has been used to analyse those parameters that involve comparisons from baseline to 30 days and allow accurate comparison of the impact the services provided had on the outcomes. It is to be noted that all data was initially analysed using all three group allocations, control vs intervention, the four sub groups and the post-hoc ‘services received’ grouping.

3.2.2 The warfarin focused aspect of the Med eSupport trial; a specific 'high-risk' example.

Refer Section 12

For the warfarin focused section of the trial, a different trial process was undertaken. Patients initiated on warfarin at the Royal Hobart Hospital (RHH) were prospectively identified and randomised to a control (usual care; UC) or intervention (Post-discharge INR monitoring; PDINR) group. PDINR group patients received a home-visit by the project pharmacist on alternate days on 4 occasions, with an initial visit two days after discharge from hospital. The pharmacist, using Point-of-Care (POC) testing obtained international normalised ratio (INR) results and educated the patients regarding anticoagulant therapy. A review of the patients' medication was also undertaken during the visits (effectively a Home Medicines Review on the first visit, followed by short reviews on subsequent visits). The UC group was solely managed by the general practitioner (GP) and only received a visit from the project pharmacist eight days after discharge to determine anticoagulant control. A number of outcome variables were assessed, including the achievement of a therapeutic INR value on day eight after discharge. Bleeding, thromboembolic outcomes and warfarin knowledge were assessed 90 days after discharge. Patients and general practitioners were anonymously surveyed to assess satisfaction with the program.

See Figure 2 for a flowchart representation of this trial process.

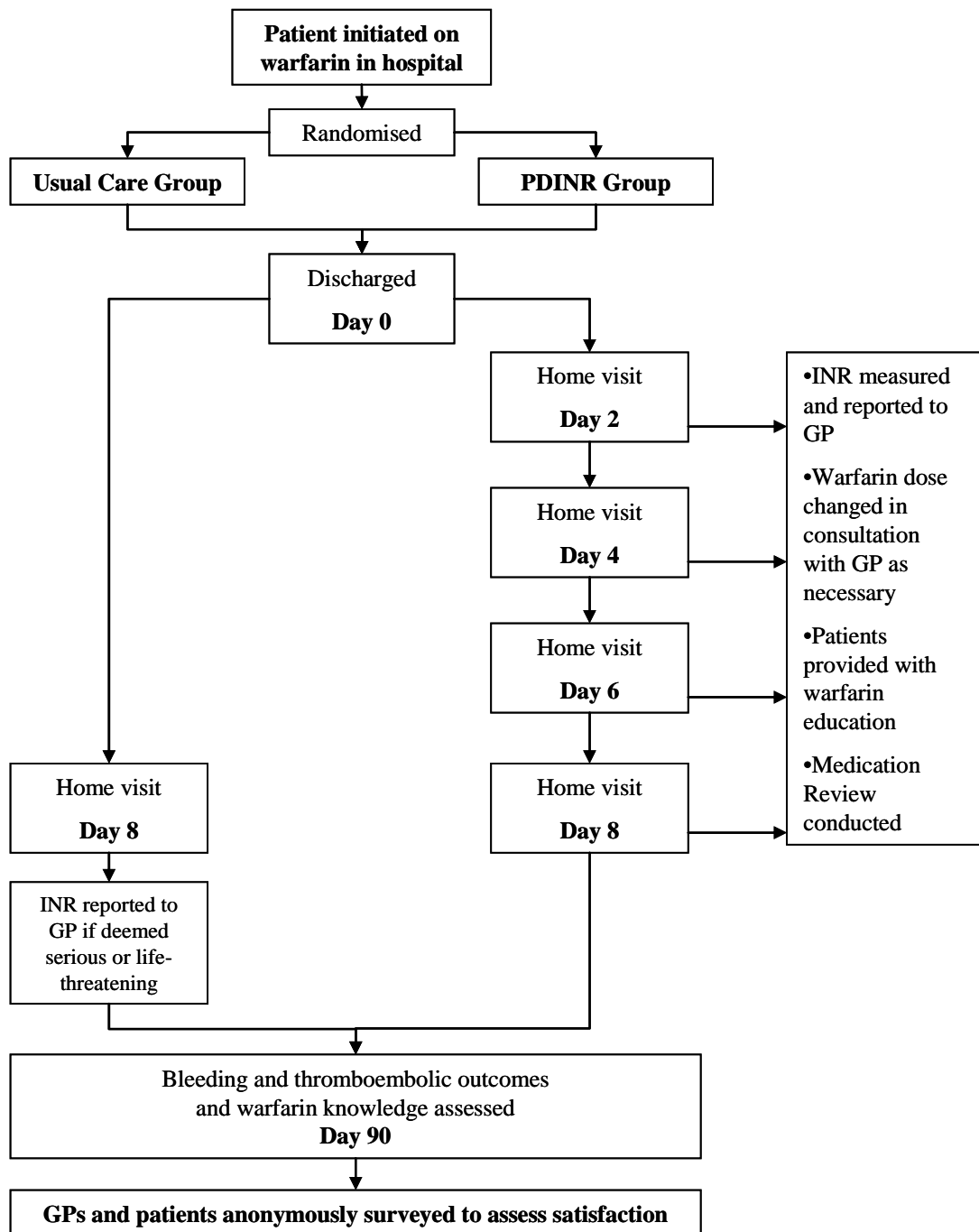


Figure 2 Flowchart showing methodology of warfarin focused aspect of Med eSupport

3.2.3 ICT systems evaluation

Refer Section 10.1

Med eSupport sought to improve sub optimal medication management at the community-hospital interface. One focus of the study was to investigate the use of ICT in securely transferring patient's information between key stakeholders.

The ICT model implemented provided an innovative bi-directional transfer of prescription information between community pharmacies and hospitals (Figure 18). It also allowed patients and their GP's access to discharge information, including discharge diagnosis, relevant medical conditions, and a current list of medications on discharge from hospital. The model also allowed for the secure, automatic uploading of patient's prescription details from the community pharmacy to the server based at the University of Tasmania.

Two community pharmacy dispensing software vendors were contracted to enable their software to communicate patient's medication information to the central database. For incompatible dispensing systems, medication lists were faxed from the pharmacy and manually entered into the database by trial officers using the website. All transfers of patient information occurred using recommended security technologies, including 128-bit encrypted HL7 messages with PKI keys.

Retrieving information from the central database was achieved using the secure interactive website. Different access privileges were given to patients, health care providers and trial officers. Patients were encouraged to use the website to obtain a current discharge summary. Health care providers had the ability to print medication lists and update medication lists for patients in their care.

Transactions to the website were logged to the database. These data were used to determine the uptake and usage by health care providers and patients, along with the number of automated uploads that occurred. Intervention patients and their GPs and CPs were surveyed to establish uptake and barriers of the ICT solution.

As can be expected with a trial of this nature, there were many technical obstacles to overcome. Examples include: full logging requested was not available until the trial had ended and one dispensing software vendor delivered automatic uploading towards the end of the data collection period.

3.3 Results

Refer Section 9.2

Four hundred and eighty seven patients remained enrolled across all sites and available for initial data analysis; four hundred and twenty seven for analysis at the point of discharge, and 378 for the 30-day phone call. Significant losses occurred due to concerns with data integrity and alternative interpretations of the trial protocol at two of the trial sites.

Further discussion surrounding withdrawals of patients from the primary Med eSupport trial can be found in section 9.2.1.1 of the full report. Figure 3 shows the flow of patients through the study. Similar flowcharts for each individual site can be found starting from page 88 of the full report.

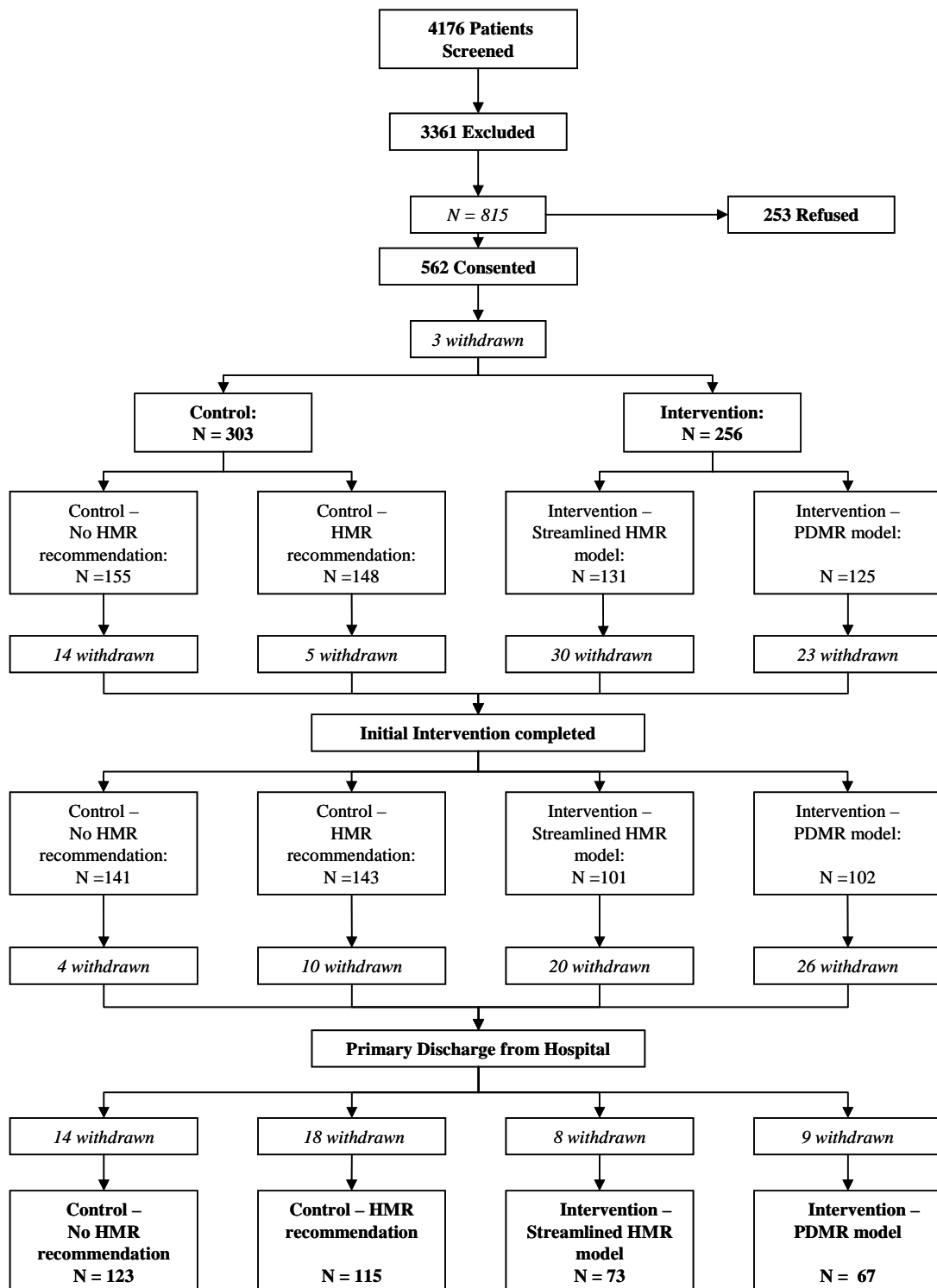


Figure 3 Med eSupport trial patient enrolment flowchart

3.3.1 Key Findings

Refer Section 9.2.1

3.3.1.1 Key findings of the Med eSupport trial

Section	Finding
9.2.1.5.2.1	A significantly greater number of discrepancies per patient were resolved within the first 48 hours of admission for the intervention group than for the control.
9.2.1.5.3.1	Significantly more discrepancies were resolved prior to discharge for intervention patients than for control patients.
9.2.1.5.4	LOS increased with number of discrepancies not resolved at 48 hours.
9.2.1.6	Generally, all patients were found to improve their knowledge over time. However, at 30 days after discharge patients who received the full intervention had significantly higher drug knowledge than minimal and partial intervention patients.
9.2.1.7	The full intervention group displayed a significant improvement in their compliance over the 30 day post-discharge period.
9.2.1.8.2.1	During the peri-discharge period (discharge to 30 days post-discharge), the full intervention group and the partial intervention group experienced a significant decrease in the total number of significant and moderate DRPs per patient.
9.2.1.8.3.1	Over the full study period (admission to 30 days post-discharge) the full intervention patients did not have an increase in the total number of drug interactions identified. In comparison, over the same period the minimal intervention and partial intervention patients did have a significant increase in drug interactions identified by <i>Drug Interaction Facts</i> software.
9.2.1.8.4.1	Patient identified drug-related problems reported by the full intervention group were significantly fewer than the other groups over the period from admission to 30 days post-discharge.
9.2.1.8.5.1.1	Generally, all patients experienced an increase in drug selection DRPs over the period from admission to 30 days post-discharge. However, in the full intervention group of patients this increase was not significant, where it was in the other groups.
9.2.1.8.5.2.1	Overall, from admission to 30 days post-discharge, the full intervention group displayed a significant decrease in total number of recorded compliance DRPs.

9.2.1.8.5.3.1	Generally, all patients experienced an increase in untreated indications DRPs over the period from admission to 30 days post-discharge. However, in the full intervention group of patients this increase was not significant, where it was in the other groups.
9.2.1.9.1	The current method of HMR referral or a passive indicator on the discharge summary does not induce a medication review after discharge.
9.2.1.9.1	The automatic post-discharge medication review is currently the best referral process to ensure a review occurs in a timely manner after discharge.
11.3.1	Quality of Life improved significantly for all patients from admission to 30 days post-discharge.
11.3.3	The average number of medical consultations and their associated costs were slightly higher in the full intervention group. This was not surprising as the conduct of the medication review would generally have necessitated at least one GP visit.
11.3.2	There was no statistically significant difference in readmissions across the groups. Most (82%) of the readmissions were seemingly unplanned.
11.3.2.1	It was interesting to note that of the 9 patients who reported they were readmitted within 5 days of initial discharge (“rebound readmission”), 8 were control patients and only 1 was an intervention patient. Unfortunately, due to the small numbers, this was not found to be statistically significant, but a trend was seen.

3.3.1.2 Patient survey responses

Refer Section 9.2

Section	Finding
9.2.2.2.1	Patients who had a PDMR were more likely to want a home visit by a pharmacist to be available in the future. It is likely that exposure to a service increases future uptake.
9.2.2.2.1	When asked how much money they felt they would pay for a home visit by an accredited pharmacist most replied they would pay less than \$20. A common reason for not wanting to pay was the perception they could get the same information from their GP or Community Pharmacist.
9.2.2.2.1	Patients in the PDMR group were more likely to feel confident about their medications after discharge.

3.3.1.3 General Practitioner survey responses

Refer Section 9.2

Section	Finding
9.2.2.2.2	Most GP respondents thought that the medication summary was provided within an adequate timeframe and they strongly agreed that receiving discharge medication information in the future would be valuable. There were no statistical differences across groups for the timeframe that General Practitioners received information.
9.2.2.2.2	General Practitioners who had patients in the PDMR trial were more likely to think that Med eSupport gave them a clearer picture of their patient's medication on discharge.
9.2.2.2.2	The General Practitioners who had patients in the PDMR trial arm were more likely to use the website. However, there was a trend for the group of General Practitioners who had patients in the PDMR trial arm to state the website was more difficult to use.
9.2.2.2.2	There was a very positive response when General Practitioners were asked if the PDMR/HMR assisted them in the medication management of their patient.
9.2.2.2.2	When General Practitioners were asked if they would like to see an automatic PDMR for their patients in the future 74% responded that they wanted the service. There were no significant differences between the study groups.
9.2.2.2.2	There was a positive response from GPs when asked if they thought that the study benefited them in optimising the patient's medication management through improved communication of medication related information.

3.3.1.4 Community Pharmacists survey responses

Refer Section 9.2

Section	Finding
9.2.2.2.3	Community Pharmacists whose patients received a PDMR were more likely to use the website.
9.2.2.2.3	Having a PDMR did not influence the Community Pharmacist's decision on whether the service ought to be automatic.
9.2.2.2.3	Comparing across provider groups, Community Pharmacists found that receiving a discharge summary gave them a clearer understanding of the patient's medication history than General Practitioners.

3.3.1.5 Results of note for the Warfarin focused section of Med eSupport

Refer Section 12.3

Section	Finding
12.3.1	The two study groups were found to be well matched in baseline demographics. A total of 161 patients were enrolled in the study (75 PDINR and 86 UC).
12.3.1	Thirty-nine and 48 percent of the PDINR and UC groups respectively had therapeutic INRs at discharge.
12.3.1	The PDINR group had 67% of patients with a therapeutic INR at day 8, compared with 38% of UC patients
12.3.1	Also, 27% of the UC patients had a high INR, compared with only 8% of the PDINR patients
12.3.1	There was a significantly lower incidence of all bleeding complications within 90 days in the PDINR group. Total bleeding was 14% in the PDINR group, compared with 34% in the UC group (P<0.004).
12.3.1	The incidence of major bleeding was 1% in the PDINR group compared with 11% in the UC group (P=0.02). The incidence of minor bleeding was also reduced in the PDINR group compared to the UC group, 12% to 30% respectively (P=0.01).

3.3.1.6 ICT systems-related results

Refer Section 10.2

Section	Finding
10.2.1	The trial protocol dictated that only intervention patients and their health-care professionals received access to the website. Twenty-eight patients (12%), 36 GPs (19%) and 63 Pharmacists (45%) used the website.
10.2.2	Of the 159 intervention patients telephoned, 12 reported they had used the website and eight reported they did so alone. Three patients reported they printed a counselling sheet from the website and one patient reported they printed a weekly checklist from the website
10.2.2	Of the people who did not use the web site when telephoned, a great majority reported they either did not have a computer (68%), or had no interest in using a computer (15%).
10.2.3	Of the anonymous questionnaire respondents, eleven intervention patients (10%) reported that they used the web site. Of these eleven respondents, nine thought that the website was 'OK' or 'Easy' to use, whereas two thought it was difficult to use.

10.2.3	Most people thought that the current medication summary was the most useful feature of the web site.
10.2.4	Of the providers who did not use the web site, 46% of community pharmacists and 35% of GPs responded they did not need to look at the website,
10.2.4	A majority of providers would prefer to receive patient discharge information by fax.
10.2.4	Of the respondents who did use the website, access to dispensed medication history, a current medication list, discharge medication information and the ability to maintain an up to date medication list were the most useful aspects.
10.2.4	In general, health care providers agreed that the information presented on the website was accurate.
10.2.3	People using the website tended to be younger, with approximately 30% of users aged between 50-59 age group used the website in comparison to 10% of users in the 70-79 year age group.

3.3.2 Economics and Financial Analysis of Med eSupport

Refer Section 11.3

An economic analysis of the Med eSupport project was performed to assist in the evaluation of the future sustainability of the program. The analysis was applied to isolate the outcomes of the two key components of the intervention program (the services that would be critical in a national roll-out): the medication list reconciliation process undertaken at the time of hospital admission and discharge, and performance of post-discharge medication reviews. The analysis included the determination of direct health service costs utilising time trials to estimate staff time required to perform the critical activities and an evaluation by an independent 5-member clinical panel of a random selection of medication reconciliation cases and post-discharge medication reviews from the trial. The economic analysis was intentionally conservative in that only one drug-related problem was considered per medication reconciliation case and post-discharge medication review. The clinical panel members were asked to consider the probability of a consequence occurring (with the Med eSupport program's intervention and without the intervention) and also the "attributability" of the intervention to the program. Savings to the health care system were based on hospital admission, general practitioner and medical specialist consultation, and investigation and pathology costs avoided.

All estimates were subsequently adjusted (diluted) to take into account that not all medication reconciliation cases and post-discharge medication reviews identify drug-related problems and have associated clinical recommendations, and the likely uptake rate of the recommendations from medication reconciliation cases and post-discharge medication reviews. Discrepancy review recommendations, which occurred in the hospital, were implemented 78% of the time. However, post-discharge medication review recommendations were implemented only 29% of the time. The costs of implementation at site and national levels were identified. The number of sites at which the program could be implemented in an initial roll-out was estimated to be 50, with each site essentially representing a combination of a Division of General Practice and one or two mid-size (approximately 400-bed) general public hospitals.

The analysis determined that an average medication reconciliation review would prevent 41 days of health loss and save \$205 in financial savings to the health sector. Similarly, just one randomly selected post-discharge medication review recommendation would prevent 46 days of health loss and \$206 in financial savings to the health sector. When adjusted, particularly for the likely uptake rate of clinical recommendations, it was estimated that, on average, a medication discrepancy review produces \$103 financial savings to the health sector and a post-discharge medication review produces \$51 financial savings to the health sector.

Our analyses indicated a saving to the health care system of approximately \$0.5M per annum for each roll-out site for the extra post-discharge medication reviews and medication discrepancy checks performed, taking into account the partial uptake of recommendations. Overall, the economic effect of the Med eSupport program is relatively modest (i.e. around \$111 savings per patient) and it is not surprising that this effect was not observed in clinical outcomes when dispersed across the relatively small number of patients in our trial. However, when applied to a hospital over one year, these savings are substantial and important. Although based on conservative assumptions, Med eSupport can save the health sector between \$54M (additional) and \$69M (total) in financial savings annually on a national level (50 sites initially), assuming full implementation of the key post-discharge medication review recommendations. With the current rate of pharmacists' recommendation uptake being only partial, the sector can save \$25M (additional) and \$34M (total) annually at a national level. Even

assuming partial compliance and excluding the expected financial savings, the program represents value for money at an additional \$10.84 per day of health loss prevented.

3.4 Med eSupport Recommendations

Refer Section 14

Based on the conduct and results of Med eSupport, the Project Team makes the following recommendations.

1. A strategy for the national roll-out of a medication information sharing process between hospitals and community pharmacies should be developed and consequently implemented. Ideally, this would incorporate an automated ICT system to transfer medication information efficiently. With some modifications, the approach utilised in Med eSupport and successfully trialled with the principal Australian pharmacy software vendor, could be expanded. Transfer of information to GPs and community pharmacists regarding initiation of warfarin in hospitals is one priority.
2. A strategy for the national implementation of automatic post-discharge home medication reviews in high-risk patients, identified during hospitalisation, should be developed and implemented. There was very strong support for this amongst patients and other stakeholders exposed to the Med eSupport program. This would include patients commenced on warfarin in hospitals as a priority group.
3. In the event of national implementation of automatic post-discharge medication reviews, existing MMR Facilitators should be trained to act as liaison officers, working to co-ordinate accredited pharmacists for the post-discharge medication reviews.
4. There should be further examination of factors influencing the uptake of recommendations from home medication reviews. One strategy could be development and implementation of educative and monitoring procedures to continually improve the quality and presentation of home medication reviews by accredited pharmacists.

5. When considering the implementation of new services, (such as transferring of community pharmacy dispensing histories to hospitals, creation of a community liaison role, or PDMR), whether within a trial framework, or on a larger national scale, all sites should be considered individually to ensure the roll out is successful, and ongoing quality assurance measures must be put in place to ensure the ongoing integrity of the new service.
6. Training and accreditation programs should be developed for accredited pharmacists to undertake, for the purposes of developing a system for pharmacists to monitor the INR of patients after discharge from hospital.
7. All patients who are initiated on warfarin in the hospital setting should receive a PDINR after discharge, as outlined in this study. This service should be funded similarly to the existing HMR program, although funding would need to be significantly increased. The PDINR program should comprise point of care INR monitoring, patient-focussed anticoagulant education and medication review.