MEDICATION DISCREPANCIES AFTER DISCHARGE FROM A RURAL DISTRICT HOSPITAL:

WHAT MEDICATIONS ARE OUR PATIENTS TAKING AT HOME?

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LIST OF ABBREVIATIONS

ADE	Adverse Drug event
ADR	Adverse Drug Reaction
CAM	Complementary and Alternative Medicines
COPD	Chronic Obstructive Pulmonary Disease
ED	Emergency Department
eMR	Electronic Medical Record
ICU	Intensive Care Unit
iPM	iSoft Patient Management data base
NPS	National Prescribing Service
PBS	Pharmaceutical Benefits Scheme
OTC	Over-The Counter medicine
PCEHR	Personally Controlled Electronic Health Record
USA	United States of America

GLOSSARY OF TERMS

For the purposes of this report, the following definitions of terms will be used:

ADVERSE DRUG EVENT (ADE):	Medication incidents that cause harm to the patient. An ADE encompasses both harm that results from the intrinsic nature of the medicine (**an Adverse Drug Reaction (ADR))** as well as harm that results from medication errors or system failures (1)
ADVERSE DRUG REACTION (ADR)	A response to a drug that is noxious and unintended, and which occurs at doses normally used in humans for the prophylaxis, diagnosis or therapy of disease, or for the modification of physiological function(1)
HIGH RISK MEDICATION:	High risk medications have been defined by the Clinical Excellence Commission (CEC) as medicines that have a high risk of causing injury or harm if they are misused or used in error. Error rates are not necessarily higher than with other medicines but when problems occur the consequences can be severe. CEC has represented these medicines using the acronym A PINCH – the medication groups being: Anti-infective agents, Potassium, Insulin, Narcotics and sedative agents, Chemotherapy and Heparin and other anticoagulants. (2)
MEDICATION DISCREPANCY	A difference between what medications are recorded as prescribed for a patient and what current medications are reported by a patient. **Intentional medication discrepancies**: a doctor makes a decision to change a patient's medication regimen, hence what was recorded as prescribed and what medications are being taken by a patient are different. **Unintentional medication discrepancies**: any unexplained differences between what was recorded as prescribed and what medications are being taken by a patient. (3)
MEDICATION ERROR	Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing; order communication; product labelling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use. (4)
MEDICATION RECONCILIATION	Medication reconciliation is the standardised process of obtaining a complete and accurate medication history and in the context of the plan for care comparing it to admission, transfer or discharge medication orders. Discrepancies are brought to the attention of the prescriber and if changes are made, they are documented (5)
MEDICATION SAFETY	Encompasses the 'freedom from unintentional injury during the course of medication use' and also describes 'activities to avoid prevent or correct adverse drug events that may result from medication use' (6)

ABSTRACT

AIM

To ascertain whether any discrepancies exist between medications documented on discharge from hospital and those reported as taken by the patient within one month, and to gain information as to the extent and nature of any discrepancies that may be arising.

METHOD

This study was a cross sectional survey of 66 medical patients discharged from a 162 bed general rural NSW hospital. Using a telephone questionnaire the study identified whether there were any discrepancies between medications documented in the hospital discharge summary and those reported as taken by the patient within one month of hospital discharge.

RESULTS

Only 5 of the 66 participants (8%) had no medication discrepancies and were taking the medications exactly as described in the discharge summary one month after discharge from hospital. 32% of the changes were intentional discrepancies initiated by their community based treating medical officer. However in 68% of cases medication changes were initiated by the participant - 57% continued a previous medication. This suggests either inadequate admission medication history-taking and reconciliation in hospital – if the discharge summary was incomplete; or inadequate communication of medication changes whilst in hospital, if the changes in the discharge summary were intentional. Eleven per cent of participants omitted a medication they thought unnecessary or didn't know they were to continue, again highlighting inadequate communication.

CONCLUSIONS

Within one month of discharge from a rural hospital 61 participants (92%) were not taking their medication as documented in their hospital discharge summary. Importantly 68% were unintentional discrepancies involving participants either recommencing a previous medication or discontinuing a medication prescribed in hospital because they thought it unnecessary or were unaware it was to continue. This has significant implications for continuity of care and ongoing medication management for the population.

RECOMMENDATIONS

There is an urgent need to examine processes to improve the accuracy of the medication record and to maintain its integrity through ongoing encounters with health care professionals, and thus:

- Medication reconciliation is essential at all points of the health care cycle and should be appropriately supported;
- Improved communication and documentation of medication changes during hospitalisation is required;

KEYWORDS

Medication error, medication discrepancy, adverse drug event, medication management, continuity of patient care, transfer of care, patient discharge, hospital discharge

EXECUTIVE SUMMARY

RATIONALE

The National Prescribing Service (NPS) (2009) highlighted in a systematic review of the literature that adverse drug events (ADEs) and medication errors in the community are common. In Australia, hospital admissions associated with ADEs ranged from 5.6% of admissions in the general population to 30.4% of admissions in the elderly. This review reported that one of the main factors associated with an increased risk of medication error or ADEs was being transferred between community and hospital care. Poor communication was the most common factor reported that contributed to medication errors; a problem that was exacerbated when patients were transferred between hospital and community settings. Other more recent studies have looked at medication errors and/or medication discrepancies arising at the point of transfer of care from hospital to home or a care facility and have shown that medication discrepancies and medication errors are still common occurrences. However few studies investigating medication discrepancies have been done in Australia – and even fewer from a rural hospital perspective. This study therefore aimed to investigate whether there were any discrepancies between medications documented on discharge from hospital and those reported as taken by the patient within one month of discharge.

THE STUDY

This study used a cross sectional survey design which involved telephone interviews with 66 patients discharged from the medical teams of a 162 bed general NSW based rural hospital. The verbal questionnaire was designed to ascertain whether there were any discrepancies between medications documented on discharge from hospital and those reported by the patient within a month of discharge. Discrepancies between the medication recorded on the discharge summary and the medications reported to be taken by the participants at the time of interview were documented, classified and counted. The reason for the discrepancy, as reported by the patient, was documented and categorised according to whether the change of therapy was instigated after consultation with their medical officer or whether it was patient led. Patient led variations were then categorised as to the reason for the change: specifically: reversion to previous regime; medication not considered significant- script not filled; medication too expensive, medication caused side effects or some other reason as specified by the patient.

RESULTS

This study shows unequivocally that within one month of discharge from a rural hospital the participants were not taking their medication as documented in their hospital discharge. Only five of the 66 participants (8%) had no medication discrepancies and were taking the medications exactly as described in their discharge summaries, meaning that 61 participants (92%) encountered medication discrepancies within the month following discharge from hospital. Thirty three (50%) had at least three medication discrepancies, 18 (27%) had at least five medication discrepancies, and four participants (6.1%) had eight or more discrepancies each.

32% of the changes were intentional discrepancies initiated by their community based treating medical officer. These intentional discrepancies highlight the rapidity of change in the medication record and the need to ensure such changes are documented and communicated appropriately. In 68% of cases medication changes were initiated by the participant with 57% continuing a previous medication. This suggests either inadequate admission medication history-taking and reconciliation in hospital – if the discharge summary was incomplete; or inadequate communication of medication changes whilst in hospital, if the changes in the discharge summary were intentional.

Thirty two per cent of the medication discrepancies in the present study involved OTC or CAM, an area historically not well documented in medical records, but possibly therapeutically important.

Twenty medications were omitted because the participant thought the medication unnecessary or did not realise the medications were ongoing. Importantly these omissions could have contributed to poor therapeutic outcomes because they included medications such as preventer inhalers initiated in hospital for relief of exacerbations of Chronic Obstructive Pulmonary Disease (COPD), as well as an antiplatelet agent recommended for the prevention of heart attack or stroke, which was discontinued by four participants. One participant completed the hospital discharge supply of this antiplatelet agent but did not continue as they reported being unaware that the medicine should be continued, indicating a lack of communication about this medication and the necessity for continued use. Again this emphasises the importance of communication of medication changes and their reasons to the patients whilst in hospital.

CONCLUSIONS

In conclusion, this study has demonstrated that within a month after discharge from an Australian rural hospital the participants are not taking their medication as documented in their hospital discharge summary. The discharge medication summary *should* be the most up to date and accurate medication list at that point. It is used by other health providers as a guide for future medication management. There is an urgent need to look at these discrepancies to improve the accuracy of this record and thereafter to maintain its integrity through ongoing encounters with health care professionals.

This study has demonstrated a problem with the continuity of care in terms of medication discrepancy for patients discharged from a rural hospital. Several mechanisms have been suggested in the literature to improve this continuity of care. At present the existing evidence supports the view that the process of medication reconciliation reduces medication discrepancies, potential adverse drug events and adverse drug events at hospital admissions, at transfer of care and at discharge. Many international studies also recommend medication reconciliation at all points of the health care cycle. In Australian hospitals this medication reconciliation process is also recommended, which has resulted in a Medication Management Plan form being introduced in NSW hospitals in 2011. Unfortunately to date the implementation is inconsistent. The process is labour intensive and recurrent and will require policy makers to support and fund its implementation to ensure effectiveness. Rigorous follow up studies will be required to determine best practice to implement medication reconciliation and to assess the effectiveness of this measure at reducing medication error.

In addition to the medication reconciliation process to ensure an accurate medical record, improved communication with the patient to ensure medication changes are adequately communicated is also necessary. The patient, as shown in this study, is an active participant in their health care and needs to be informed about changes that have been instigated in hospital and the reason behind the change. Without this information patients are likely to revert to their previous medication regime following discharge from hospital, or omit important medication. .

RECOMMENDATIONS

- Medication reconciliation is essential at all points of the health care cycle and should be appropriately supported;
- Improved communication and documentation of medication changes during hospitalisation is required.

INTRODUCTION AND RATIONALE

'The pharmacist was working late at the hospital pharmacy when a call came in from an elderly lady who had taken her husband home from hospital that day. The caller had arrayed in front of her multiple medications that had been dispensed to her husband on his discharge – all in similar little orange bottles labeled with unpronounceable names….. aspirin, irbesartan, metoprolol, atorvastatin, metformin ….. Also laid out before her was her husband's previous medication, in different looking boxes, with different names… Cartia, Avapro, Minax, Lipitor, Diabex…. and more boxes and bottles of medication that her husband had been taking for many years and was adamant that he was to continue. She had a vague recollection that she had been told that one of his tablets should be stopped….'

This scenario, probably not unfamiliar to health professionals in the field, is a recipe for medication error and the possibility of harm to the patient – that is an adverse drug event. This study investigates medication discrepancies and medication errors which may be occurring in patients after discharge from hospital, concentrating particularly on the time after transfer of care from the hospital to the home, and importantly looking at documentation and communication between health care professionals and the patient.

BACKGROUND AND LITERATURE REVIEW

Multiple medication use is common in older adults. There is good evidence that, in many diseases, medication use can ameliorate symptoms, improve and extend quality of life, and occasionally cure disease. However it is also the case that multiple medication use can be a risk factor in medication errors, and adverse drug events.(7)

A systematic review of articles by the National Prescribing Service (NPS) in 2009 outlined the prevalence and outcome of adverse drug events and medication errors in the community; factors that could contribute to these events and errors; and interventions aimed at reducing adverse drug event and medication errors (1). Their review of the overseas literature found that adverse drug events (ADEs) in the community are common being associated with 3.1% of deaths, 17.5% of general hospital admissions, and 30.7% of hospital admissions of the elderly. It was also found that 38% of re-admissions to hospital, 33.2% of Emergency Department attendances and 0.4% of outpatient clinic visits were related to ADEs. In Australia the findings were similar with 5.6% of admissions in the general population, and 30.4% of admissions in the elderly, associated with ADEs.

The NPS report highlighted the following factors contributing to the increased risk of medication error:

- Those at highest risk of adverse events associated with medicines are older people, those with serious health conditions, those taking multiple medications, those using high risk medicines and **those being transferred between community and hospital care (p7).**
- **Poor communication was the most common factor reported that contributed to medication errors.** Problems with communications occurred between health professionals and patients, between GPs and pharmacists, and among health professionals. These problems were highlighted when patients were transferred between hospital and community settings (p6).

MEDICATION DISCREPANCIES AND MEDICATION ERRORS AT TRANSFER OF CARE

The NPS paper reported on seven studies of patients discharged from hospital and found that between 11.3% and 12.5% of patients experienced an Adverse Drug Event after hospital discharge. A further five studies investigated documentation related medication errors which occurred during transfer of care. Of particular interest was a study which surveyed 66 patients three days after discharge from hospital and found a discrepancy rate of 91% between the medications listed on the discharge medication sheet and number of medications reported by patients as being taken at home (8). In fact the researchers found that in most cases fewer medications were documented on the discharge medication sheet than were actually being taken at home, with an average of 4.31(SD = 2.96) medications listed in the hospital record, as compared with an average of 6.33 (SD =4.24)medications reported by the patient.

In another particularly relevant study in the United States 493 Department of Veteran Affairs patients were interviewed about their medication at a return visit to a primary care outpatient clinic(9). The researchers found that only 5.3% of the patient participants were taking their medication exactly as documented on their computerised record – a discrepancy rate of 94.7%. There were 3.1 drug omissions in documentation per patient, and 25% of the total number of medications taken by patients had been omitted from the electronic medical record. Furthermore the researchers found that there were 1.3 additional medications documented per patient, and that the patients were not taking 12.6% of all active medications as suggested on the computer profile. This led the researchers to conclude that very few computerised medication histories were accurate. The study did not document the time lapse between documentation of the medication on the computerised record and return to the outpatient clinic, but compared the computerised record at that point with what the patient recorded they were actually taking. There was also no attempt to ascertain what the patient should be taking. The researchers concluded that this inaccurate medication information could compromise ongoing patient care.

In order to capture more recent research articles the Ovid Medline data base was searched using the search strategy as described by NPS investigators (1) but using search dates 2008-present. This literature review showed further more recent studies have looked at medication discrepancies and/or medication errors arising at the point of transfer of care from hospital to home or a care facility and have shown that medication discrepancies and medication errors are still common occurrences. Swedish studies conducted between 2008 and 2012 have found a slightly lower discrepancy rate: finding between 36.5% and 66% of patients have at least one medication discrepancy at discharge, 17.5% have at least 3 discrepancies and 7.9% have at least 5 discrepancies (10, 11). The potential for these medication errors and/or medication discrepancies to cause harm to the patient was also reviewed in several of the Swedish studies (12, 13). One such study reviewed 123 patients at discharge and determined that 58 (47%) patients had a medication error associated with their discharge. The risk of clinical harm from the medication error was rated as low for 34 (58.6%) patients, moderate for 22 (37.9%) and high for 2 (3.4%) patients (13).

These results were further supported by a randomised control study in the USA in 2013, which found that clinically important medication errors were very common, affecting 50.8% of patients during the first 30 days after hospital discharge (14). This ongoing threat to patient welfare based on medication discrepancies and medication errors at transfer of care is further reinforced by a large Canadian study, which looked at administrative records of just under 400,000 patients before and after a hospital admission using the Ontario Drug benefits database (15). This study identified potentially unintended discontinuation of a critical medication using the measure of failure to renew a prescription for a critical medication within 90 days of hospital discharge. The researchers concluded that patients prescribed medications for chronic diseases were at a higher risk of unintentional discontinuation of critical medication after hospital admission. Notably, admission to the hospital ICU was generally associated with an even higher risk of critical medication discontinuation. Even though it is important to acknowledge that this study had limitations because the data

was derived from administrative records only, it does highlight the increased potential for medication discrepancies involving critical medication, following admission to hospital, and especially the ICU.

In addition to medication errors being problematic at point of transfer of care from hospital to home, they can also be problematic when patients are transferred from hospital to another care facility, with up to 71.4% of patients admitted to an aged care facility after hospital discharge experiencing at least one medication discrepancy (16). This is confirmed in a recent Australian study which showed that 37 of 202 patients (18.3%) had missed or significantly delayed medication doses in the 24 hours after discharge, meaning approximately one in five patients had a medication error within 24 hours of discharge from hospital (17). That particular study found 79.7% of hospital discharge medication lists contained one or more medication or dose discrepancies compared with the patients' discharge prescriptions (median 2 discrepancies per patient; range 0-16) and concluded that there were significant gaps in the continuity of medication management at the hospital residential care interface (17).

Unlike the availability of the international data there are limited Australian studies documenting medication errors and/or medication discrepancies at transfer of care. One retrospective study of 76 patients who had been discharged from a specialist cardiology unit of a large Australian teaching hospital between 2004 and 2007 found marked differences in the number of drugs taken between hospital discharge and a pharmacist lead Home Medication Review, as well as many other medication related problems (18). It is particularly relevant as it examined the medications that patients were actually taking following their discharge.

Use of Over-The-Counter (OTC) and Complementary and Alternative Medicines (CAM) is also under reported. A study of inpatients of Royal North Shore Hospital, Sydney NSW, reported that 58% of patients used 129 CAM in the month prior to admission but only 36 (28%) of the CAM were documented in the medical record. After education this recording rate improved – but still only reached a documentation rate of 44% of CAM (19).

Rural patients are often at particular risk of experiencing these medication errors after discharge from hospital because of the multiple health care providers often involved in their care. Not only do they have their local primary health providers and local hospital specialists but they are often under the intermittent care of a specialist from a metropolitan tertiary health centre, all of whom add to the mix of potential sources of medication error. All health professionals in the rural area rely on speedy and accurate transfer of therapeutic information to ensure continuity of care, which unfortunately is often not the case. To date there have been limited studies looking at patients in rural Australia and the transfer of medication and other information from the hospital system to primary health providers. One small qualitative study conducted interviews with 49 local Australian health professionals in four regional Queensland towns to ascertain issues arising when patients are transferred between hospitals (rural and metropolitan) and rural community settings (20). The study identified discrepancies in medication records, a lack of a coordinated system to communicate between health professionals about medication or prescription information, and inadequate communication between secondary/tertiary facilities and rural primary care providers as major issues contributing to sub- optimum medication management for rural patients. In 2012 NSW Orange Health Service Mental Health Services (Bloomfield Hospital) identified discrepancies between the commonly used electronically generated discharge summaries and medications as prescribed on the discharge prescription. The initial audit identified that 16 of the 60 electronically generated discharge summaries contained at least one medication discrepancy in comparison with the discharge prescription. (21)

FACTORS WHICH CONTRIBUTE TO MEDICATION ERROR AT TRANSFER OF CARE

The factors that contribute to general medication error include: older age, people with serious and multiple health conditions, those taking multiple medications, those using high risk medicines(1). The cost of medications has been implicated in some Australian studies (22).

Although transfer of care between hospital and community settings is also known to be associated with consistently high error rates, factors which contribute to these rates are less well documented. In the NPS review communication factors were identified by all studies as an issue in the occurrence of medication errors (1). In the Australian setting lack of appropriate communication between hospital and community care has also been cited as a key factor which contributed to lack of continuity of care and possible medication error (20).

Documentation errors have been studied in an Australian metropolitan hospital in 2010 where the researcher looked retrospectively at 966 handwritten and 842 electronically generated discharge summaries (23). The discharge summaries were compared with the inpatient medication chart valid at time of discharge and discrepancies between the two were noted. The study concluded that 12.1% of handwritten and 13.3% of electronic summaries contained medication errors. The highest number of errors occurred with cardiovascular drugs and medication omission was the most common error.

A prospective cohort study of 400 patients discharged from hospital found that increased risk of a medication error was associated with increasing numbers of medication prescribed at discharge; prescription of high risk medication, such as corticosteroids, anticoagulants, antibiotics, analgesics, and cardiovascular medication; and failure to monitor medication appropriately after discharge (24). The study also found that education with respect to medication side effects decreased the likelihood of an adverse drug event after discharge from hospital.

FACTORS WHICH REDUCE MEDICATION ERROR AT TRANSFER OF CARE

The NPS review identified four main categories of interventions aimed at decreasing the incidence of medication error which included medication reviews; medication reconciliation; patient education; and eHealth interventions (1). Of these medication reconciliation was the most commonly described intervention to decrease error at points of transfer of care. The NPS report reviewed five studies involving medication reconciliation but found limited evidence that it had an effect on the incidence of adverse drug events. Since the publication of this review then there have been numerous studies of medication reconciliation, 26 of which were systematically reviewed in 2012 (25). According to this systematic review only six of 26 studies were rated good quality. However they found that the existing evidence supported the view that medication reconciliation reduced medication discrepancies, potential adverse drug events and adverse drug events but led to an inconsistent reduction in medical care related to medication error. Their final conclusion was that more, higher quality studies were needed to determine the most effective practices to implement medication reconciliation. Similarly a 2012 review of the evidence relating to the effectiveness of medication reconciliation to identify discrepancies and suboptimal medication management found that medication reconciliation has the potential to identify a high proportion of medication discrepancies and reduce 'potential' harm, but the actual health outcomes resulting from this process are less clear (3). This paper also highlighted the labour requirements for medication reconciliation, estimating that between 11.4 and 29.3 minutes per person was required for medication reconciliation at hospital admission alone.

The Australian Government in recognition of the importance of reliable health records introduced an eHealth program in July 2012. eHealth aims to introduce Personally Controlled Electronic Health Records (PCEHR) for all Australians to improve upon current paper-based systems The PCEHR will allow patients and their doctors, hospitals and other healthcare providers to view and share health information. In the future consumers will be able to personally access their health records and validate their current medication list online. The PCEHR is

designed to improve individuals' continuity of care as they move between a range of health settings and providers. However it remains to be seen what the outcome of this program will be on medication management.

At each point in the health system patient care decisions must be made, often after reflection on the patient's documented medication history. In hospitals it is essential to ensure that the patient's medication list at admission reflects their actual medication usage; that this information is transferred to a hospital medication chart; and that medication changes initiated in hospital are documented accurately and communicated to the patient, their primary health provider and other health providers on discharge. Much literature points to increased risk of medication errors at the point of discharge from hospital. However there is a limited Australian data – and even less in the rural setting, to identify exactly what medications patients are actually taking in the first few weeks after discharge from hospital, and how that relates to the medical record as presented in the discharge summary.

OBJECTIVES

This research project attempts to identify whether problems exist in the continuum of medication management after discharge from a NSW rural hospital and aims to gain information as to the extent and nature of any discrepancies that may be arising.

The aim of this study was to investigate the research question: Are patients discharged from an Australian rural hospital taking their medication as documented in their hospital discharge summary within one month of discharge?

In addition to this main research question the study also aimed to identify any factors which may contribute to any medication error and discrepancy such as:

- Patient age
- Patient gender
- Number of medications on discharge
- Medication administration aid in use
- Pharmacy medication list provided at discharge
- Patient adherence score

Furthermore, if medication discrepancies were present, the study aimed to identify at what point in the health care cycle the discrepancy occurred and what reason for the discrepancy was identified by the participant, such as:

- Medical Officer medication adjustments post discharge – considered an intentional discrepancy
- Patient medication adjustments post discharge:
    - Reversion to previous regime
    - medication not considered significant
    - side effects of medication/s
    - cost of medication
    - other (specified by patient)

METHODS

This study was conducted under the auspices of 2011 Rural Research Capacity Building Program provided by the Health Education and Training Institute – Rural Directorate. Ethics approval was granted by the Human Research Ethics Unit University of Wollongong, in March 2012: Ethics Number: HE12/012 Au RED Number:

HREC/12/WGONG/4 and also approved by the Research Directorate of the Illawarra Shoalhaven Local Health District on 3rd April 2012.

STUDY SETTING

Shoalhaven District Memorial Hospital is a 162 bed general hospital located in Nowra, the central administrative and commercial centre of the Shoalhaven Region, on the coast of NSW 160km south of Sydney. The population in 2012 was estimated at 96,717 distributed through some 49 towns and villages. Shoalhaven City has a higher proportion of people at post retirement age than Regional NSW, with approximately 31% of the population 60 or older, as of the 2011 Census. The area has a relatively high level of socio-economic disadvantage, with high unemployment and household income well below the state averages (26).

STUDY DESIGN

This study is a cross sectional survey involving a telephone questionnaire of patients discharged from Shoalhaven District Memorial Hospital. The questionnaire was designed by the researcher based on previous experience with elucidating medication history, and incorporated the Morisky adherence scale – a validated adherence tool (27). An initial pilot study was undertaken to ensure that the questions were appropriate and in the correct sequence. Only minor changes in the sequence of questions were deemed necessary.

PARTICIPANTS

Participants were recruited from medical patients discharged from Shoalhaven District Memorial Hospital. Eligible participants were identified from the participating hospital's iSoft Patient Management (IPM) data base. This provided a daily summary of admissions to the hospital under a medical team specialty. Every 10th patient admitted was identified and assessed for compliance with the inclusion criteria, which were:

- age over 18 years;
- not pregnant;
- able to understand English;
- a functioning telephone contact number;
- living at home, within the referral area of the hospital;
- length of stay in hospital greater than one day;
- on three or more medications, as recorded on the discharge summary (if completed), the pharmacy discharge prescriptions or medication list;

If this patient did not meet the inclusion criteria the next patient who complied with the inclusion criteria was identified by the researcher. For eligible patients who were cognitively impaired, as documented in their medical record, and living in the community setting, family carers, or the designated responsible person, were approached to invite them to participate in the study on the patient's behalf. Once identified, and deemed sufficiently well by the nurse in charge of their care, the patients were approached by the researcher and invited to participate in the study. A participant information leaflet was given to the patient or their carer, and discussed by the principal researcher; patients or carers consenting to participate were asked to sign a participant consent form. If a participant's situation changed during their admission and they no longer fitted the inclusion criteria these participants were excluded. At discharge a final group was selected who met all the inclusion criteria. These participants were then telephoned by the researcher as close to two weeks after discharge as feasible, to arrange a convenient time for a telephone interview.

Recruitment was conducted in two parts. Initial recruitment to pilot the study was conducted throughout April 2012 during which time 5 people were recruited to the study and 4 people were interviewed. This was then

followed by the main recruitment period which took place between 8th August 2012 and 14th December 2012. Interviews began on 24th August and the final interview was completed on 30th December 2012.

DATA SOURCES/MEASUREMENTS

On enrolment, demographic and more specific data about participants was collected by the researcher from the electronic Medical Record (eMR) including age, gender, length of stay and principal diagnosis. The medications as noted in the discharge summary were accessed and recorded prior to the telephone interview. The interviews were conducted by the principal researcher using the questionnaire (see Appendix A). In addition to the interview questions the participants were asked to have their medication by the telephone and to have any other information about their medication available. In situations where the participant could not be contacted in the first instance the researcher made 3 further attempts to contact them at different times of the day and week. If there was no response to these calls the potential participant was rated 'could not contact'.

OUTCOME MEASURES / VARIABLES

The main outcome measure was the number of participants taking their medication exactly as described in the discharge summary.

Discrepancies between the medication recorded on the discharge summary and the medications reported to be taken by the participants at the time of interview were documented, classified and counted. Discrepancies were categorised as: omissions compared to the hospital discharge summary; additions compared to the hospital discharge summary, changed daily dose (dosage or frequency), or changed medication belonging to the same therapeutic class.

Variations in the time of medication dosing, or omission or changed frequency of a "when necessary" (prn) medication such as pain or bowel medication was not counted as a discrepancy. Discrepancies were further categorised according to whether the medications added or omitted were prescription medications or OTC or CAMs. Medication were also categorised according to the classification system used by the Australian Medicines Handbook (AMH 2013) (28) such as analgesics, blood and electrolytes, cardiovascular medication, and further classified as High Risk medicines using the Clinical Excellence Commission classification of High Risk drugs –which uses the acronym A PINCH to identify the high risk medicine groups being: Anti-infective agents, Potassium, Insulin, Narcotics and sedative agents, Chemotherapy and Heparin and other anticoagulants. Some medicines that could be obtained either through prescription or OTC (such as aspirin, proton pump inhibitors like pantoprazole, and salbutamol) were classified as prescription medicines for the purpose of this study. For combination products each active ingredient was counted separately. Calcium and Vitamin D preparations were included in the OTC category.

The reason for the discrepancy, as reported by the participant, was documented and categorised according to whether the change of therapy was instigated after consultation with their medical officer or whether it was patient led. Participant led variations were then categorised as to the reason for the change: specifically: reversion to previous regime; medication not considered significant- script not filled; medication too expensive, medication caused side effects or some other reason specified by the participant.

STUDY SIZE

From the literature review discrepancy rates ranged from a low of 36.5% to 94.7%. Thus sample size was determined based on a very conservative anticipated medication discrepancy rate of 20% and anticipating use of a one-tailed test. Based on this conservative anticipated discrepancy rate (20%) the sample size calculation estimated that at least 44 participants were required to achieve results with at least 95% power.

QUANTITATIVE VARIABLES

All quantitative variables were categorized according to clinical relevance. Due to the small numbers, ages were aggregated into three 20 year categories: a):40-59; (b): 60-79; (c): 80+. Note that although inclusion criteria included patients over 18 years of age the youngest patient eligible for recruitment was 42. The number of medications recorded on discharge summary was recorded as a continuous variable, however this was further divided into four groups for analysis: (a) :< 5 medications; (b): 6-9; (c):10-13; (d): > 13 medication. Adherence score (based on Morisky adherence scale (27) a validated tool) was categorised: a):8=high; (b):6-7= moderate; (c): <6 = low

STATISTICAL METHODS

Simple descriptive statistics were used to characterise the number of participants with discrepancies, the types of discrepancies and the reasons for the observed discrepancies.

A Shapiro-Wilk test for normality was applied to each variable. The number of discrepancies per participant was found to violate normality assumptions required for parametric t-tests and ANOVA, and as such the non-parametric Kruskal-Wallis method was used to test for an association between the number of discrepancies and each of the categorical explanatory variables.

Characteristics of participants with various discrepancy rates were analysed to determine if any participant characteristic was associated with increasing discrepancy rates.

RESULTS

PARTICIPANTS

Even though 96 participants initially consented to participate in the study, only 71 (74%) participants were finally interviewed by telephone between 13 days and 25 days post discharge. Twenty five participants were lost to follow up – 14 participants could not be contacted after at least three attempts; seven participants were transferred to another care facility after discharge; four participants withdrew their consent on telephone contact. For five of the 71 participants who were interviewed the discharge summary was never completed, and could not be suitably analysed, which is why data for only 66 (68%) participants was finally used for analysis.

DESCRIPTIVE DATA

Demographic characteristics for the study participants are described in Table 2. This table highlights several important factors which included: the average age for the study participants was 75 years and there was a slight excess of females to males in the study group (53%:47%). On discharge the number of medications taken ranged from 2-19, the mean number of medications taken by participants was 8.8 – a median of nine medications; and on average participants had three changes to their medication during their hospital stay. The main diagnoses of participants related to the circulatory system (30%), Infectious diseases (17%) and respiratory diseases (15%). In the majority of cases (77%) participants managed their own medication themselves. Thirty three per cent used a dosage administration aid to help them manage their medication and importantly in most cases (60%) were considered to have high medication adherence scores (Table1).

TABLE 1: STUDY POPULATION CHARACTERISTICS

CHARACTERISTICS	Mean (range)
Age in years	75 (42-92)
Length of stay days	5.5 (2-26)
Number of medications on discharge summary	8.8 (2-19)
Median number of medication on discharge summary	9 (6-10.8) *
Number of medication changes during admission from discharge summary	3 (0-10)
	N (%)
Gender	
Male	31 (47%)
Female	35 (53%)
Principal Diagnosis †	
Diseases and disorders of the nervous system	5 (7.6%)
Diseases and disorders of the respiratory system	10 (15.2%)
Diseases and disorders of the circulatory system	20 (30.3%)
Diseases and disorders of the digestive system	5 (7.6%)
Diseases and disorders of the musculoskeletal system and connective tissue	7 (10.6%)
Diseases and disorders of the skin, subcutaneous tissue and breast	1 (1.5%)
Diseases and disorders of the kidney and urinary tract	1 (1.5%)
Diseases and disorders of the blood and blood forming organs and immunological disorders	4 (6%)
Infectious and parasitic diseases	11 (16.7%)
Mental diseases and disorders	1 (1.5%)
Alcohol/drug use and alcohol/drug induced organic mental disorders	1 (1.5%)
Appointment with Medical officer post discharge	55 (83%)
Within 7 days (46 with GP 3 with specialist)	49 (74%)
Longer than 7 days	6 (9%)
No medical officer appointment between discharge and follow up phone call (>13 days)	11 (17%)
Contact with other health support service or health care worker	25 (38%)
Hospital discharge support service (TACT‡/EDTT§/STACS‖)	10 (15%)
Chronic care support service, Palliative Care/Oncology support service	5
Community nurses	4
Counsellor/ social worker	4
Physiotherapist	2
Discharge information given at discharge – as reported by participant (%)	
Yes	25 (38%)
No	29 (44%)
Don't remember	12 (18%)
Pharmacy Medication list given - as reported by participant	
Yes	45 (68%)
No or don't remember	21 (32%)
Medication manager	
Self	50 (77%)
Carer	12 (18%)
Both	4 (6%)
Adherence Measure¶	
Low	13 (20%)
Medium	14 (21%)
High	39 (59%)
Dosage Administration Aid used	
Yes	20 (33%)
No	46 (66%)

*Median(Interquartile Range) †WHO Disease classifications;[27]; ‡The Ambulatory Care Team(TACT); §Early Discharge Therapy Team(EDTT); ‖Shoalhaven Transitional Ambulatory Care Service (STACS) ¶Morisky Adherence Scale(27)

Basic analysis of participants lost to follow up revealed that they tended to be from a younger age group with an average age of 64 years which was 10 years younger than the respondent's average 75 years of age. Furthermore more women were represented in the 'lost to follow up' group – 60% as compared to 53% of the respondent group.

Main Results

Only five of the 66 participants (7.6%) had no medication discrepancies and were taking the medications exactly as described in their discharge summaries, which means that 61 participants (92.4%) encountered medication discrepancies. Table 2 summarises the number of participants with individual number of discrepancies and how each of the discrepancies was categorised. Note that the majority of discrepancies involved the addition of a medication not recorded in the discharge summary, followed by medications recorded on the discharge summary but omitted by the participant following their discharge from hospital.

Table 2 Number of discrepancies per Participant

NUMBER OF DISCREPANCIES PER PARTICIPANT	NUMBER OF PARTICIPANTS	TYPE OF DISCREPANCIES				TOTAL NUMBER OF DISCREPANCIES
		ADDITIONS	OMISSIONS	CHANGED DRUG SAME CLASS	CHANGED DOSE	
0	**5**	0	0	0	0	**0**
1	**8**	4	3	0	1	**8**
2	**19**	18	11	4	5	**38**
3	**10**	22	4	1	3	**30**
4	**6**	16	8	0	0	**24**
5	**6**	17	9	2	2	**30**
6	**5**	23	4	1	2	**30**
7	**3**	18	0	1	2	**21**
> 8	**4**	30	12	1	4	**47**

Table3 further summarises and highlights important information from Table 2, by clearly identifying that 61 (92.4%) participants had at least 1 medication discrepancy. A total of 228 discrepancies were identified between the patient's self-reported medication regimes following discharge and that documented in their discharge summaries. Thirty three (50%) had at least 3 medication discrepancies, 18 (27%) had at least 5 medication discrepancies, and 4 participants had 8 or more discrepancies each.

Table 3 Number of Participants with increasing numbers of discrepancies

NUMBER OF DISCREPANCIES PER PARTICIPANT	NUMBER OF PARTICIPANTS	TYPE OF DISCREPANCIES				TOTAL NUMBER OF DISCREPANCIES
		ADDITIONS	OMISSIONS	CHANGED DRUG SAME CLASS	CHANGED DOSE	
0	5	0	0	0	0	0
1 or more	61	148	51	10	19	228
3 or more	33	124	38	5	13	180
5 or more	18	88	26	5	10	129
8 or more	4	30	13	1	4	48

Table 4 Type of discrepancy

	N (%)
Total number of discrepancies	**228 (100%)**
Additions – compared to discharge summary	148 (64.9%)
Additions - excluding OTC and CAM	82 (36%)
Omissions – compared to discharge summary	51 (22.4%)
Omissions – excluding OTC and CAM	45 (19.7%)
Changed drug – same pharmacological class -	10 (4.4%)
Changed dose - compared to discharge summary	19 (8.3%)

Table 4 summaries the type of discrepancies. The majority were medications taken additional to those recorded on the discharge summary - 64.9%, followed by medications noted on the discharge summary but omitted by the participant - 22.4%.

The majority of additional prescription medications (Table 5) belonged to the cardiovascular group of medication. Analgesics were the second most frequent classification of added medication, followed by respiratory medications such as inhalers (e.g. "Seretide®", and "Symbicort®", tiotropium, salbutamol) in 15 cases. Importantly six medications which had been added post discharge were medications classified as high risk, such as anticoagulants (e.g. warfarin) in two cases.

TABLE 5 ADDITIONAL MEDICATION

DRUG GROUP	EXAMPLE OF MEDICATIONS
Analgesics	Oxycodone, paracetamol/codeine, tramadol, gabapentin
Blood and electrolytes	Warfarin x 2, Potassium chloride,
Cardivascular	amiodarone, atorvastatin, digoxin, diltiazem, frusemide, glyceryl trinitrate patch, spironolactone, telmisartan + hydrochlorothiazide
Endocrine	risedronate
Gastrointestinal	esomeprazole, pantoprazole, sucralfate
Genitourinary	oxybutynin
Immunomodulators	prednisolone
Muscular skeletal	allopurinol
Psychotropic	diazepam, mirtazepine, nitrazepam, risperidone
Respiratory	salbutamol, tiotropium, Seretide®, Symbicort®, (numerous)

In addition to prescription medication being added to the patient's regime post discharge, so too were OTC and CAM: Thirty four (51%) of the 66 participants were taking one or more of these OTC or CAM medicines that were not listed on the discharge summary. Of the 65 additional OTC/CAM medications recorded the most frequent were Omega 3 supplements - fish oil /krill oil; Vitamin D; Calcium; lubricant eye drops or ointments; glucosamine and multivitamin preparations.

The largest group of omitted medications (Table 6) post discharge based on the participant' s response belonged to the gastrointestinal classification of medications – particularly proton pump inhibitors (PPIs) such as omeprazole and pantoprazole. Nine other medicines omitted included cardiovascular drugs and seven were drugs affecting blood and electrolytes, including once again high risk drugs such as the antiplatelet medication aspirin.

TABLE 6 OMITTED MEDICATION

DRUG GROUP	EXAMPLE OF MEDICATIONS
Analgesics	Gabapentin, oxycodone
Blood and electrolytes	Aspirin x 4, potassium chloride,
Cardivascular	diltiazem, irbesartan + hydrochlorothiazide, spironolactone,
Ear Nose Throat	betahistine
Gastrointestinal	esomeprazole, pantoprazole, prochlorperazine, metoclopramide
Genitourinary	Prazosin tamsulosin
Respiratory	Bromhexine, tiotropium, 'Seretide', 'Symbicort'
OTC and CAM	calcium, cyanocobalamin, magnesium, thiamine, vitamin D

REASONS FOR MEDICATION DISCREPANCIES

The reason for the medication discrepancies as identified by the participant varied considerably as highlighted in Table 7. Thirty two per cent (32%) of discrepancies are considered intentional discrepancies and followed therapeutic decisions initiated by their community based treating medical officer. However in the majority of

cases (57%), medication discrepancies were due to participants recommencing medication that they had been taking prior to their hospitalisation– suggesting that the discharge summary may have been incorrect or incomplete. Eleven per cent of discrepancies arose because the participant thought the medication unnecessary or did not realise it was ongoing.

TABLE 7 REASON FOR DISCREPANCIES

REASON	N (%)
Medical officer therapeutic change post discharge - number of intentional discrepancies (%)	**73 (32%)**
Participant led change – total	**155 (68%)**
Participant continuing previous medication	129 (56.6%)
Prescribed medication thought not necessary – didn't fill script or buy medicine	20 (8.8%)
Participant didn't know of changes/forgot	4 (1.75%)
Medication too expensive	1 (0.44%)
Medication caused side effect – ceased	1 (0.44%)

Of the three participants (5%) who developed side effects to the medication in the few weeks since discharge from hospital, as seen in Table 5, two discussed the side effect with their GP before ceasing or changing therapy, whilst the remaining participant decided to cease their high risk medication – aspirin - without consulting their GP. Only one participant ceased a medication (tamsulosin) because of expense – a medication not subsidised by the PBS.

OTHER ANALYSES

In addition to the main research outcomes described above no significant relationship was found between the number of discrepancies reported and any participant level characteristics analysed (e.g. gender, age group, medication list provided on discharge, dosage administration aid use, number of medications, and medication adherence scores) based on univariate Kruskal-Wallis test results (Table 6). This suggests that there was no significant relationship between the number of discrepancies reported and any person level characteristics investigated.

TABLE 8 STATISTICAL ANALYSIS OF RELATIONSHIP OF PARTICIPANT CHARACTERISTICS TO DISCREPANCIES

Variable	N	Median	Interquartile Range (Lower-Upper)	Chi-square statistic	p-value
Gender					
Male	31	2	1-5	1.34	0.25
Female	35	3	2-5		
Age Groups					
40-59	8	2.5	2-5		
60-79	27	2	2-5	0.58	0.75
80+	31	2	2-5		
Medication list provided at discharge					
Yes	45	2	2-5	3.42	0.06
No	21	4	2-5		
Use of Webster pack or dosage aid					
Yes	20	2.5	1.5-5	0.01	0.92
No	46	2.5	2-4		
Number of medications recorded on discharge summary					
0-5	16	2	1-4		
6-9	28	2	2-4.5		
10-13	14	4	3-6	5.50	0.14
14+	8	2	1-5		
Adherence level					
Low	13	4	2-4		
Medium	14	2	2-3	0.78	0.68
High	39	2	1-5		

DISCUSSION

KEY RESULTS / INTERPRETATIONS

This study shows unequivocally that within one month of discharge from this rural hospital the participants are not taking their medication as documented in their hospital discharge. As many as 61 (92%) of the 66 participants were experiencing medication discrepancies within two to four weeks following discharge from hospital. This is a larger discrepancy rate than that reported in several Swedish studies where researchers found between 36.5% and 66% of patients had at least one medication discrepancy at point of discharge from hospital (10, 11). However our results confirm various US studies where only 5.3% and 9% of participants were taking their medication exactly as documented in the medical records – a discrepancy rate of 94.7% and 91% respectively (8,9). This study also supports findings from an Australian study (18)which found marked differences in the number of drugs taken between hospital discharge and a HMR (18). This has significant implications for continuity of care and ongoing medication management for the rural population.

The reported reasons for the discrepancies in the current study were varied, and included both intentional and unintentional discrepancies. In 32% of cases the discrepancies were therapeutic changes initiated by their community based medical officers, which are considered intentional discrepancies. No attempt was made to confirm these changes with the GP or specialist but given that for additional medications a prescription had been written and dispensed for the participant the assumption that this additional medicine was initiated by MO seems reasonable. Follow up with community medical prescribers would be required to confirm these results. However this study emphasises the likelihood of therapeutic changes to a patient's medications in the weeks following hospital discharge. It also highlights the ongoing difficulty of maintaining an up-to date and accurate record of a patient's medication regime, and the need for simple yet comprehensive mechanisms by which the medical record can be updated and communicated.

Of the medication changes which were participant instigated, in the majority of cases (57%) the participant reported that they were continuing a medication that they had previously been taking prior to hospitalisation. In these instances the participant commonly stated that they had been taking the medication for a significant period of time and had not been told to cease the medication whilst in hospital. This suggests either: inadequate admission medication history-taking and reconciliation in hospital – if the discharge summary was incomplete; or inadequate communication of medication changes whilst in hospital, if the changes in the discharge summary were intentional. It could be argued therefore that in some cases, perhaps many cases, the discharge summary was inaccurate. This finding is supported by the evidence of numerous overseas studies reporting medication discrepancies at point of discharge to both home and a care facility ranging from 36% to 91% (8, 10, 11, 16) Similarly Australian studies describe a discrepancy rate of 79.7% between hospital discharge summaries and discharge prescriptions (17), and documentation error rates between inpatient medication chart and electronic discharge summary of 13.3% (23).

Thirty two per cent of the medication discrepancies in the present study involved OTC or CAM. It must be recognised that this is an area historically not well documented in medical records. These results confirm the conclusion from the study at the Royal North Shore Hospital that documentation of OTC and CAM medicines in the hospital medical record is inadequate (19). Given their therapeutic value in some instances, and the possibility of interaction with conventional medication, this oversight should be corrected. For example Vitamin D and calcium (classified as OTC medication in this study) are therapeutically important for treatment and prevention of osteoporosis. Inadvertent discontinuation of Vitamin D supplement would therefore be inappropriate and could have therapeutic consequences.

Twenty medications were omitted because the participants thought the medication unnecessary or didn't realise the medications were ongoing. Importantly these omissions could have contributed to poor therapeutic

outcomes because they included medications such as preventer inhalers initiated in hospital for relief of exacerbations of COPD. Also an antiplatelet agent recommended for the prevention of heart attack or stroke which was discontinued by four participants. One participant completed the hospital discharge supply of this antiplatelet agent but did not continue as they reported being unaware that the medicine should be continued, indicating poor communication about this medication and the necessity for continued use. Again this emphasises the importance of communication of medication changes and their reasons to the patients whilst in hospital.

Three participants (5%) developed side effects from their medications within the month. These findings are consistent with the incidence of side effects as documented in the National Prescribing Service report (1) of 2009 which suggested that as many as 10% of general practice patients in Australia reported experiencing an ADE including an adverse drug reaction in the previous six months.

Based on the findings in this study, no specific participant characteristic's significantly impacted on the number of medication discrepancies. Contrary to evidence from various reviews and studies (24) this study could not establish any relationship between increasing age, or increasing numbers of medication, and increasing medication errors. There was only one participant in this study who discontinued their medication – tamsulosin - because of cost. This was a medication not subsidised under the PBS, which, in line with studies in Australia (22), suggests that high out of pocket expenses may result in patients discontinuing use of medications. Notably however the study was completed in the second half of the calendar year and most people reported that they had reached their "PBS Safety Net' meaning their medication was either free or substantially cheaper during this time of the year. It would be interesting to repeat this survey in the early part of the year before participants had qualified for subsidised medication to determine whether this may have resulted in the omission of other medications.

This study has demonstrated a problem with the continuity of care with regards to medication management of patients discharged from a rural hospital. Several mechanisms have been suggested in the literature to improve this continuity of care. At present the existing evidence supports the view that the process of medication reconciliation reduces medication discrepancies, potential adverse drug events and adverse drug events at hospital admissions, at transfer of care and at discharge, and many overseas studies recommend medication reconciliation at all points of the health care cycle. In Australian hospitals this medication reconciliation process is also recommended, which has resulted in a Medication Management Plan form being introduced in NSW hospitals in 2011. Unfortunately to date the implementation is inconsistent. The process is labour intensive and recurrent and will require policy makers to support and fund its implementation to ensure effectiveness. Rigorous follow up studies will be required to determine best practice to implement medication reconciliation and to assess the effectiveness of this measure at reducing medication error.

In addition to the medication reconciliation process to ensure an accurate medical record, improved communication with the patient to ensure medication changes are adequately explained is also necessary. The patient, as has been shown in this study, is an active participant in their health care and needs to be informed about changes that have been instigated in hospital and the reason behind the change. Without this information patients are likely to revert to their previous medication regime following discharge from hospital.

Processes to continuously update the health care record – particularly the medication record - after further health care interventions are necessary. Adoption and promotion of the government's eHealth record may be an example of one positive step to ensure patient taking centre stage in the maintenance of their health record (PCEHR) which would include an up to date medication list. However until we have seen widespread uptake of this system and evaluation of its effectiveness we will be unable to ascertain if this strategy will reduce medication discrepancy and error and ultimately patient harm.

STRENGTHS AND LIMITATIONS

The main limitation that needs to be acknowledged is that the study relies on participants self -reporting their medication regime. Ethics approval did not allow further follow up with local medical officers or community pharmacies to corroborate the information provided. However in an attempt to minimize the recall bias the chief investigator asked the participant have their medication on hand and also had several prompts to aid participant recall. Participants were prompted about "puffers and sprays", "drops", "injections" and complementary and alternative medicine and the patient discharge summaries were used to prompt when discrepancies were noted. The questionnaire, which included some valid and reliable instruments such as the Morisky Adherence Scale questions (27), also included questions that were not based on validated tools. That said the questions were pilot tested and adjusted to minimise any misinterpretations and several open-ended questions were included to elucidate further information.

GENERALISABILITY

Since the results in this study are based on a small cross section of medical patients discharged from a rural hospital, they may not be generalizable among the entire patient population. These results do however, provide some very important insight into the medication discrepancy rates among patients discharged from a rural Australian hospital, which appear to be just as problematic, and if not more so, as discrepancy rates cited among patients in larger metropolitan hospitals cited in the literature.

CONCLUSION

In conclusion, this study has demonstrated that within a month after discharge from an Australian rural hospital the participants are not taking their medication as documented in their hospital discharge summary. No particular participant characteristic could be associated with the medication discrepancy rate.

32% of the changes were intentional discrepancies initiated by their community based treating medical officer. These intentional discrepancies highlight the rapidity of change in the medication record and the need to ensure such changes are documented and communicated appropriately. In 68% of cases medication changes were initiated by the participant: 57% continued a previous medication. This suggests either inadequate admission medication history-taking and reconciliation in hospital – if the discharge summary was incomplete; or inadequate communication of medication changes whilst in hospital, if the changes in the discharge summary were intentional. Eleven per cent omitted a medication they thought unnecessary or didn't know they were to continue, again highlighting inadequate communication.

The discharge medication summary *should* be the most up to date and accurate medication list at that point. It is used by other health providers as a guide for future medication management. There is an urgent need to look at processes to improve the accuracy of this record and thereafter to maintain up to date medication documentation through ongoing encounters with health care professionals, thus improving the continuity of health care for the community.

RECOMMENDATIONS

There is an urgent need to examine processes to improve the accuracy of the medication record and to maintain its integrity through ongoing encounters with health care professionals, and thus:

- Medication reconciliation is essential at all points of the health care cycle and implementation should be appropriately supported.
- Improved communication and documentation of medication changes during hospitalisation is required.

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APPENDICES

APPENDIX A: TELEPHONE INTERVIEW QUESTIONS: MEDICATION MANAGEMENT AFTER DISCHARGE FROM A RURAL DISTRICT HOSPITAL

Note: this questionnaire is to be used by the researcher to record the semi- structured telephone interview with participant.

1. What information did you get about your medications from Shoalhaven hospital on discharge:
    a. Discharge letter: YES / NO
    b. Medication list from Hospital Pharmacy or hospital doctor: YES / NO
    c. Written information about your medication such as Consumer Medication Information: YES / NO
    d. Other: such as COPD action plan, flexible diuretic regime, chest pain action plan, smoking cessation plan, _____
    _____

2. How confident did you feel on leaving hospital that you understood your medications? VERY….. SOMEWHAT…….NOT AT ALL
_____
_____

3. Since your discharge from Hospital:
    a. Have you been to see your GP? YES / NO
    b. How long did it take you to get an appointment with your GP? _____ days
    c. Did you have enough of all your medications until you saw your GP? YES / NO
    d. If not what did you do? _____
    _____
    _____

4. Since your discharge from Shoalhaven hospital have you been seen by any other health professionals such as Early Discharge Therapy Team (EDTT), The Ambulatory Care Team (TACT), a Community Nurse….
    a. YES / NO
    b. Type of service:_____
    _____

5. Can you collect your medication and tell me what medication you are taking now:

Medication name @ Discharge (From discharge summary)	**New /changed during admission y/n (from discharge summary/eMR)**	**Strength**	**Frequency**	**Consistent /Added / Omitted cp discharge Summary**
Other – not on discharge summary				

For above table:

Can you tell me what medications are new or changed from your hospital admission?

Did you have any medication stopped during your admission: YES/NO/DON"T KNOW

a. Can you tell me the name of the medication that was stopped?
b. Can you tell me why this medication was stopped:

I notice the following discrepancy/ies between discharge and current medications?

Discrepancy – d/c summary	**Can you explain to me ……**
	Always on this medication – d/c summary incomplete/incorrect

Discrepancy - medication	**GP change: reason given by GP**	**Pt decision**				
	Such as: Course finished / no longer necessary/ changed medication/causing side effects	Didn't fill script	Medication thought not necessary	Medication caused side effects	Couldn't afford script	other

Notes: _____
_____
_____
_____

6. Pharmacist issues:
    a. Do you have a regular chemist? YES / NO
    b. Do you use a dosage aid or Webster pack? YES / NO
    c. Have you ever had trouble paying for prescriptions? YES / NO
    d. Do you discuss your medication with your pharmacist/chemist? YES / NO
    e. Does your pharmacist/chemist provide you with information about your medication? YES / NO If yes what?
    _____

7. Adherence – Individuals have identified several issues regarding their medication-taking behaviour and we are interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experience with your medication:
    a. Do you sometimes forget to take your medication? YES /NO
    b. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine? YES / NO
    c. Have you ever cut back or stopped taking your medication without telling your doctor, because you feel worse when you took it? YES / NO
    d. When you travel or leave home, do you sometimes forget to bring along your medication? YES / NO
    e. Did you take your medicine yesterday? YES / NO
    f. When you feel like your illness is under control, do you sometimes stop taking your medication? YES / NO
    g. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan YES / NO
    h. How often do you have difficulty remembering to take all your medications? (Please circle the correct number)
        i. Never/Rarely……0
        ii. Once in a while……1
        iii. Sometimes……..2
        iv. Usually……3
        v. All the time……..4

8. How confident do you feel about managing your medications now? VERY….. SOMEWHAT…….NOT AT ALL

9. Would you like more, or different information, about your medication? YES / NO

If yes – what sort of information would you find helpful? _____

_____

_____

10. Do you have any other issues with managing your medication that you would like to discuss? YES / NO

If yes

_____

_____

_____

_____

_____

_____

_____