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Evaluation of a Pharmacist led Medication Reconciliation Process in Primary Care

Benjamin T. Gatlin

University of Kentucky, benjamin.gatlin@uky.edu

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Benjamin T. Gatlin, Student

Sarah Wackerbarth, PhD, Committee Chair

Dr. Corrine Williams, Director of Graduate Studies

Evaluation of a Pharmacist led Medication Reconciliation Process in Primary Care

Capstone Project Paper

Submitted in partial fulfilment of the requirements for the degree of Master of Public Health in the University of Kentucky College of Public Health

By: Benjamin Trevor Gatlin
Madisonville, KY

Capstone Committee:

Sarah Wackerbarth, Ph.D. (Chair)
Richard Ingram, Dr. P.H.
Frank Romanelli, PharmD, MPH

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Abstract

Medication safety should be at the forefront of public health initiatives. Medication reconciliations in primary care are key to successful, accurate, and safe medication use. Pharmacists are well positioned and educated to have an impact on medication safety by conducting reconciliations in primary care centers. Guidelines for training pharmacists on how to conduct medication reconciliations would be a useful tool for any health board striving to improve medication safety. This study uses observations from pharmacists currently conducting medication reconciliations in primary care to propose such guidelines in the form of a flow sheet. The resulting flow sheet and observations are provided.

Introduction

The Scottish Government defines medicine reconciliation as: ‘The process the healthcare team undertakes to ensure the list of medication, both prescribed and over the counter, that I am taking is exactly the same as the list I or my carers, general practitioner, community pharmacist and hospital team have. This is achieved in partnership with me through obtaining an up-to-date and accurate medication list that has been compared with the most recently available information and has documented any discrepancies, changes, deletions or additions resulting in a complete list of medicines accurately communicated.’⁽¹⁾ Medication reconciliation as defined by Bandrés et al. is “the process of reviewing patients complete previous medication regimen, comparing it with current prescriptions, and analyzing or resolving any discrepancies that the pharmacist does not believe to be intentional.”⁽²⁾

There is evidence of greater risk of error and potential harm from medicines at the interface between care settings.⁽¹⁾ Some sources have indicated that more than half of all medication errors occur at these transitions.⁽²⁾ The Scottish Patient Safety Programme (SPSP) is a national initiative which aims to reduce harm. A core work stream of the program is to achieve safe systems for reconciling medicines in General Practitioner (GP) practices following hospital discharge.⁽³⁾ A care bundle for the medicine reconciliation (MR) process has been developed by the SPSP.⁽⁴⁾ NHS Greater Glasgow and Clyde tested the care bundle on a small scale and followed with large scale implementation. Of the 200 GP practices responding, 85% reported the MR work had improved patient safety and 80% reported that it had led to improved practice processes.⁽⁴⁾ Although the process required additional time, this was offset by time saved correcting medication issues at a later stage. Quality improvement methodology was used in a UK hospital with the aim of reducing discrepancies in

transcribing medication at admission to hospital and improving documentation and communication of MR on hospital discharge. Immediate discharge letters and clinic letters serve as the avenue of communication between the patient's primary care provider and the hospital or specialty clinic responsible for discharge. This communication is crucial to the proper management of the patient's medications and highlights a strikingly obvious potential failure in continuity of care. Post study audit of discharge summaries showed reliable documentation improved from 49.2% to 85.2%.⁽⁵⁾ Local SPSP audit data reported a reduction in error rate on hospital immediate discharge letters (IDLs) of 87% and an increase in accuracy following a change in the structure of the IDL template and addition of a second senior doctor signature.⁽⁶⁾ This supports the use of IDLs for effective transitions; if the process of using the information provided can be effectively implemented in primary care.

Evaluation of the medication reconciliation process in primary care to identify and categorize the care issues arising from inpatient and outpatient immediate discharge letters is important for ensuring cost-effective and safe transitions of care in Scotland. Increasingly, pharmacists are contributing to the medication reconciliation process in GP practices around Scotland. However, it has been shown that identification of errors or discrepancies does not always lead to an improvement in workload.⁽⁷⁾ Thus, the NIH in Scotland has resolved to ensure proper implementation of a medication reconciliation system. The efficiency of this system could be enhanced following a review of the process of writing, sending, receiving, and acting upon clinic letters and IDLs as part of the medication reconciliation process. A medicine reconciliation guideline in primary care in the form of a flowchart incorporating the SPSP care bundle could lead to improved transitions, workload, and patient outcomes. This flow diagram was developed as a guideline for all primary care

pharmacists carrying out MR in GP practices. Through careful evaluation of the logistics and actions needed to provide accurate medication reconciliation for patients, a standardized process will be recommended for all GP practices. Standardization of this process increases the level of patient care by reducing medication errors, increasing the validity of the patient's medication list found in GP records upon discharge from outpatient clinics and inpatient stays, and improving workflow in primary care clinics across the NIH.

The issues and processes discussed above are of immense public health importance for many reasons. First, the primary care sector of healthcare is well known for deficiencies in access. Additionally, it is well known that transitions of care between different healthcare environments such as from hospitals and medical centers to the general practitioners' offices lead to medication errors and in return unnecessary healthcare dollar expenditures relayed to errors. Pharmacist's facilitated cost savings has been demonstrated through medication reconciliations, collaborative drug therapy management, and therapeutic alternative substitutions.⁽⁸⁾ Additionally, it has been shown that pharmacists in close working relationships with physicians in the inpatient setting can lead to a decrease length of stay and avoidance of preventable adverse drug reactions.⁽⁹⁾ A study examining medication reconciliation from Spain found that physicians agreed with pharmacists clinical judgment for evaluating errors 93% of the time.⁽²⁾ Furthermore, it has been shown that pharmacist led interventions have been more effective at identifying clinically impactful discrepancies than usual methods for transitions of care.^(10,11) Due to the potential benefit pharmacists can have on transitions of care, adverse drug events, medication errors, time, and cost savings, a stream of pharmacists moving towards more clinical roles in the primary care setting should be a natural public health objective. This is supported by Ensing et al., who

reported that close collaboration between pharmacists and physicians integrated across many settings and locations is beneficial for identifying potentially serious medication errors.⁽¹²⁾ Furthermore, proper implementation of pharmacists in these primary care setting is essential for ensuring public health benefit.

Aim

To undertake an evaluation of the medicine reconciliation process in primary care in a Scottish health board.

Objectives

1. Design a medication reconciliation procedure specific to the GP Practices where pharmacist driven reconciliation is undertaken.
2. Design and pilot a data collection tool to record information from observations of general practitioners and pharmacists undertaking the medication reconciliation process.
3. Improve the efficiency and accuracy of pharmacist led medication reconciliation by providing standardized guidelines in the form of a flow chart for the process of medication reconciliation based on study results.
4. To record care issues identified in the medication reconciliation process, categorize them, and rate their severity of care issues using recognized tools.

Design

The study design was a prospective observation of pharmacists' and general practitioners' medication reconciliation processes within the primary care setting in a Scottish Health Board. Potential medication reconciliations were identified in GP practices as IDLs from hospital inpatient admissions or outpatient clinic letters received at the practice.

Local approval was sought from the Pharmacy Quality Improvement Team of NHS Lothian. Individual GP and pharmacist permission for observation of the reconciliation process was requested, those who accepted completed an agreement form (appendix 1) and a copy of the protocol was provided. All discharges from clinics and hospitals to the identified GP practices were eligible. All pharmacists were chosen on a convenience and willingness basis. Patients were excluded if the hospital stay resulted in death or if the patient was admitted and discharged with no medications. Letters or discharges that were deemed duplicates were counted, but left out of any statistical information.

Methods

A template (appendix 2) was designed to incorporate all elements involved in the MR process in GP practices. A guideline was incorporated and the template completed for the individual GP practices where pharmacists were currently performing MRs to form a procedure specific to primary care pharmacy practice in the identified GP practices.

A data collection tool was designed and piloted through observation of a pharmacist undertaking MR in one GP practice. Next, data was collected over a three-week period in four GP practices through observance by the investigator of four pharmacists with the aim of collecting approximately 100 patient MR episodes. GP MR was intended to be observed in practices where there is no pharmacist contribution to the MR process. The tool was targeted at collecting process data including: time spent to complete a MR event, date of IDL received and date of discharge or clinic attendance, number of medicines per MR event, number of MR events requiring follow up and type of follow up, whether patient has medication compliance aid. The tool used can be found in appendix 3.

Process totals and percentages were reported and can be found in appendix 4. Data from pharmacist MR and GP MR were compared and contrasted. A report was produced and an oral presentation of results was made to the primary and secondary care pharmacy team meeting. Results were obtained by weighting each of the four practices equally in order to avoid skewing of the data based on unequal sample sizes.

The tool recorded the number of care issues identified by pharmacists and GPs in the MR process for each patient. The investigator subsequently categorized the issues and rated the severity (minor, significant, serious, and potentially lethal) according to the EQUIP5 criteria. Significant and potentially lethal issues were recorded in a situation, background, assessment, recommendation (SBAR) format. Care issue categorization and severity rating were peer reviewed by the supervisor.

Results

The template for developing the necessary procedures during MR was proposed in the beginning of the study. This template included all aspects of the suspected MR process map, this document can be found in appendix 2.

The data collection tool can be found in appendix 3. This tool was developed using the template and then piloted successfully based on observation of five MRs tasked to a pharmacist from one GP practice and then updated accordingly for this study. After three weeks of data collection, 93 total MRs were observed. There were nine duplicates found in this sample (9.6%) leaving 84 total observations. Of the four GP practices surveyed, the distribution for contribution to our study was not equal.

This is exemplified in the following chart:

Table 1: Overview of Observations

Practice Number	Number of Observations
Practice 1	9
Practice 2	14
Practice 3	21
Practice 4	40
Total	84

There were no results available from observation of GPs as this aspect of the intended study was not successfully completed. There was a retrospective analysis of seven MRs completed by GPs in which 0% of the changes made by the GP were noted in the patient's chart using the MR read-code.

The next section of results concentrates on quantitative workflow measures. Starting with the process of letters being received by the GP practices, notably the largest delay in information was seen between the patient's visit or discharge and the day their letter was written by the discharging entity (5.2 ± 4.6 days on average). The second longest delay was between the day the letter was written and when it was received by the GP practice (2.6 ± 0.3 days on average). Lastly, the shortest delay was found between the day the letter was received by the practice and the day it was processed by a pharmacist (1.3 ± 0.8 days on average). Additionally, pharmacists completed the medication reconciliations within 48 hours of the letter being received about 91% of the time on average.

Next, pharmacists' completion of the MR process was timed. The average amount of time for processing a discharge letter was 7.0 ± 0.7 minutes, while the average for a clinic letter was 9.6 ± 3.6 minutes. Interestingly, Practice 1, a sample of

8 observations, had an average clinic letter completion time of 14.8 minutes and no discharge letters in the sample, this was not seen in the observations from other practices.

Qualitative process validation and quality assurance results were gathered using the tool developed for this study. First, the proportion of medication reconciliations which found an error in the clinic or discharge letter varied greatly. Changes were made to the patient's chart 82.2% of the time between the practices. If there were no changes to be noted on the chart the observation was not counted towards our calculation of the proportion of MRs in which pharmacists added the proper changes to the chart. Importantly, the medication reconciliation read-code was used on average 92.3% of the time.

Next, it was found that whether or not the pharmacist analyzed the patient's repeat list for other changes to be made unrelated to the letter received varied greatly between practices. This is evident in that Practice 4 attempted to remove outdated repeats 100% of the time, while Practice 2 analyzed the other repeats on 46.1% of the medication reconciliations. Similarly, allergies were checked by some practices, 100% of the time by Practice 4, but never by practice 2 at 0%. Lastly, patients and caregivers were contacted 33.25% of the time on average.

MRs in which errors were found were forwarded to GPs for further assistance 18.3% of the time. Pharmacists exercised their clinical decision making skills on 38.7% of the MRs with in some capacity. Notably, the amount of clinical decision making varied with 71.4% of the errors at Practice 4 resolved by the pharmacist compared to 16.7% of those at Practice 1. There are no results from any SBARs (situation, background, assessment, recommendation) for the issues encountered as

the information was not as readily available as anticipated. A more detailed breakdown of the results can be found in appendix 4.

Discussion

The template for conducting this project was useful for developing both the data collection tool and final flow diagram. The data collection tool was useful for the purposes it was designed. However, some of the findings in this study cannot be explained using statistics. Specifically, it became extremely difficult to understand the process utilized by GPs to perform medication reconciliations. This is in part due to the technique the GPs utilize in terms of time management with MRs. The observed standard for GPs is that MRs fit into random slots of spare time, making planned observation for study purposes nearly impossible. Upon speaking with GPs it became clear that they tend to make all necessary medication changes highlighted in the letters received, without adding any notes in the patient's chart. Additionally, GPs do not use the medication reconciliation read-code. The importance of the read-code is that it enables fellow professionals to search the patient's chart regarding the information contained in the letter where the changes originated. Without these events coded into the patient chart, finding the letter from which the changes were made involves an inefficient search through the Docman system. The Docman system holds electronic copies of letters regarding that patient throughout the course of their care, thus it can be cumbersome to find specific documents. This was somewhat supported by the retrospective analysis of seven MRs completed by GPs. Illustrating the importance of this read-code to GPs could be a beneficial exercise.

Scottish patient safety program guidelines note all letters should be processed within 48 hours of being received. Pharmacists managed to reach this guideline 91% of the time. The greatest time lag in the process is between the patient visit or

discharge and the day the letter is actually written. There are no guidelines in place to ensure efficient writing and delivery of these letters for each patient visit. It is paradoxical to have guidelines urging GP practices to process a letter within 48 hours when it's possible that letter was written two weeks after the patient's visit or discharge. This sheds light on future study ambitions in order to streamline the MR processing between healthcare locations.

The time for pharmacists to complete MRs was found to be very similar across three of the practices with a range of 6.2-7.5 minutes for discharge letters and 6.7-8.9 for clinic letters. The results gathered do become confounded by Practice 1, which had an average completion time of 14.8 minutes. Notably, observations of clinic letters and no IDLs were obtained at this practice. Possible implications of this are that the overall pharmacists' time spent on average for clinic letters is skewed by this practice, while the IDL average is not. This difference could account for the 9.6-minute average for clinic letters versus the 7.0-minute average for IDLs. Explanations for this possible anomaly include a small sample size since Practice 1 was the smallest sample in the study. Another explanation could be that the pharmacist in that practice is not as experienced with MR. However, it is especially worth noting that the cases could have been more complicated on average, which may be reflected in the rate of errors found being more than double that of any other practice. Interestingly, 72.7% of errors in the study were found in clinic letters. More information on the errors and their severity are highlighted in appendix 6 and will be discussed below.

Our findings identified pharmacists as important members of the primary care team through their dedication to updating patients' charts. It was clear early on that pharmacist's consistently use the MR read-code (92.3%). In some cases, pharmacists would input the read-code and letter information after a GP had already seen the letter

and made changes. This illuminates the GPs tendency to make changes, but not input the letter details so they could be easily tracked.

Pharmacists did seem to diverge in the process upon continued evaluation. The data showed that some pharmacist always checked and attempted to update allergy information during the MR process while some never did. The same was found for pharmacist's ensuring the patient's repeat list could not be updated. The repeat list that has been referred to thus far may be misunderstood by healthcare professionals in the United States; however, it simply refers to the medications a patient is intended to get every month, similar to a list of maintenance medications. However, medications not intended to be part of the patient's medication list chronically are often added to the repeat list. This mistake occurs when the patient calls the GP for a given medication, that they were meant to be taking acutely, to be filled again. Then due to time constraints a GP may never fully review whether or not that patient should be taking the medication chronically, unfortunately a "repeat request" may be the only information seen, so they give them another month's supply to avoid further conflict/disgruntlement from the patient. Eventually, it becomes easier for a given medication to be added to the patient's repeat list than it is to deal with the repeat (refill) request monthly. Once the medication is on the patient's repeat list, they are able to go to any pharmacy and obtain the medication as long as their number of repeats does not run out. This seems very similar to the practice in the United States; however, providers in Scotland will often add "999" when they are prompted for the number of repeats as the medication is being added to the repeat list. Thus, the patient may receive a medication, for years that was meant to be used only once for an acute event, from their pharmacy upon request without this medication being reviewed by any professional regularly. Pharmacists have the ability to play an important role in

combating the repeat issue. The pharmacist from Practice 4 always attempted to “clean up” the repeat list, while this was done less than 50% of the time by others. These findings illustrate a need for a standardized procedure and teaching guideline.

The last notable observation was that pharmacists perform MR were calling their patients regarding the changes made to their medications a small percentage of the time. This finding led to the crucial action of contacting the patient with all changes being a required step in the Medication Reconciliation Flow Sheet. Most of the hesitation surrounding this contact came from pharmacists not wanting to be redundant. However, contacting their patients with medication changes should be seen as the duty of any pharmacist, regardless of who contacted them previously. This could build the pharmacist-patient relationship; as well as, plant pharmacists as part of the foundation for improved primary care services.

These observations led to the development of the Medication Reconciliation Flow Sheet as a standardized guide to follow. This resulting flow chart can be found in appendix 5. This was invented using the data found in this section to identify ways in which pharmacists diverge in conducting MRs in hopes of streamlining the process for everyone. This flow chart will serve as a guide for all future pharmacists doing primary care medication reconciliations in this region going forward.

The original study protocol stated a workup including the situation, background, assessment, and recommendation would be completed on the most severe errors recorded. However, upon practice it was clear this was impossible due to the nature of our observations. The tendency when a severe issue arose was the initiation of follow up with the GP, clinic, hospital, or patient. This follow up was not instant and thus the resulting actions taken to resolve the errors were never observed. This is why the errors in appendix 6 simply state the issue and what steps the

pharmacist then took to resolve the error. It was possible to categorize the severity of these errors, which can also be found in appendix 6.

Another point of variation was how pharmacists resolved errors found during the MR process. Depending on the practice, some pharmacists were more likely to use their clinical judgment to resolve an issue, while others almost always deferred to GP's judgment. This could be explained by each individual's comfort level at their practice. Their comfort level could be reflected by length of employment at a particular practice and resultant familiarity with documentation systems. This information could also reflect a difference in pharmacist's knowledge or practice experience. This difference could not be resolved by our tool; however, further training focused on primary care pharmacy practice could be beneficial in future developments.

Finally, pharmacist led medication reconciliation is a public health issue because of the potential to improve health outcomes while reducing medication related errors. Pharmacists' involvement in this area of healthcare could reduce the number of overall prescriptions per person, reduce healthcare dollars spent on medications, prevent drug-drug and drug-disease interactions, and promote overall effective and safe medication use by patients in the community. Interestingly, this study may have difficulty impacting the current system in the United States. One barrier is the small number of pharmacists in primary care centers.⁽¹³⁾ Community pharmacies may not be the ideal setting for medication reconciliation services due to workflow issues.⁽¹⁴⁾ Two examples of these workflow issues could include barriers in communication between the pharmacist and a patient's primary care provider or simply pharmacies being too busy to take on additional responsibilities. Additional barriers to this practice coming to the United States include lack of awareness of the

roles pharmacists can play in primary care settings as well as laws and regulations surrounding pharmacists' payment in this setting.⁽¹⁵⁾ Thus, an interesting public health study would examine the potential pharmacists' hold for transitions of care in the primary care setting of the United States. Specifically, addressing the ways pharmacists take part in the primary care setting given the barriers present in the United States and how their role could be influenced if barriers were to change.

Conclusion

Pharmacists are uniquely positioned to have a lasting impact on primary care. The successful implementation of pharmacist driven medication reconciliation is a building block towards fewer medication errors, improved patient-pharmacist linkages, and improved pharmacist-physician relationships. The foundation of the MR process should be the guidelines presented in the Medication Reconciliation Flow Sheet for completing this processes in the primary care setting. Standardization of these guidelines will ensure current and future primary care pharmacists are being used efficiently and at the peak of their abilities. Future studies should examine differences seen in pharmacists' procedures after the implementation of these guidelines. Repeating this study at the same practices in a year after the implementation of the Pharmacist Medication Reconciliation Flow Sheet would be a worthwhile endeavor. Additionally, future directions should include GPs in the planning and execution of studies in an attempt to unify the medication reconciliation process in primary care across professions.

There are many aspects of this project that have increasing relevance to public health. As the discussion above indicates, pharmacist's involvement in primary care offices of the Scottish health board studied has the potential to reduce errors at transitions of care and improve the overall level of care the patient receives. However,

these changes cannot be successful without proper implementation. Therefore, the guideline and flow sheet described in this study support a public health initiative to improve primary care practices by providing necessary assistance for pharmacist entering this area of practice.

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Appendix 1 - Agreement Form for pharmacists participating in the project

Evaluation of the Medicine Reconciliation Process in Primary Care

----- (Print Name) agree to the pharmacy student observing my work while undertaking medicine reconciliation within _____ (GP Practice) as part of data collection of the above named evaluation project.

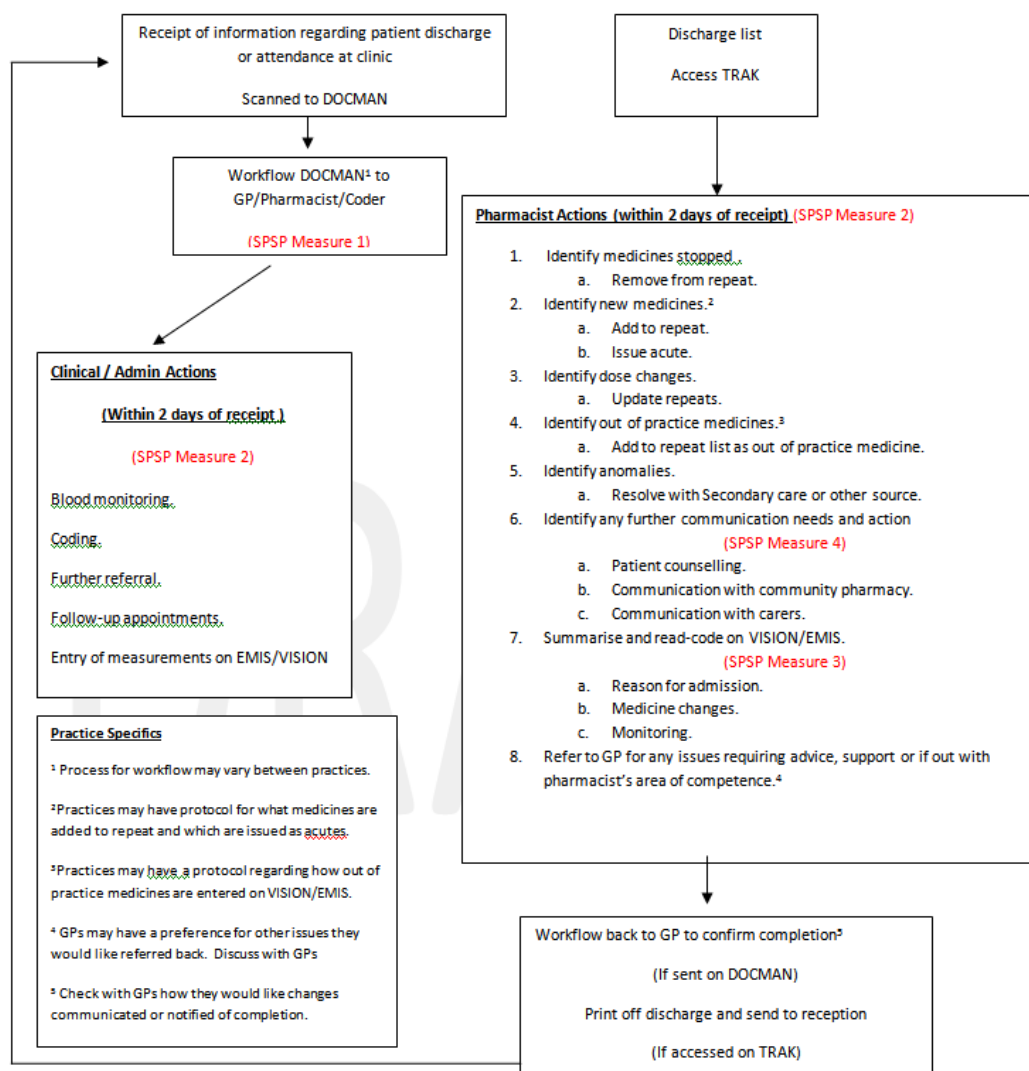
I have read and understood the protocol.

Signature_____

Date_____

Appendix 2 - Original NHS Medication Reconciliation Template Guideline

Medicines Reconciliation Guideline



Appendix 3- Observation Tool

Med Rec Tool

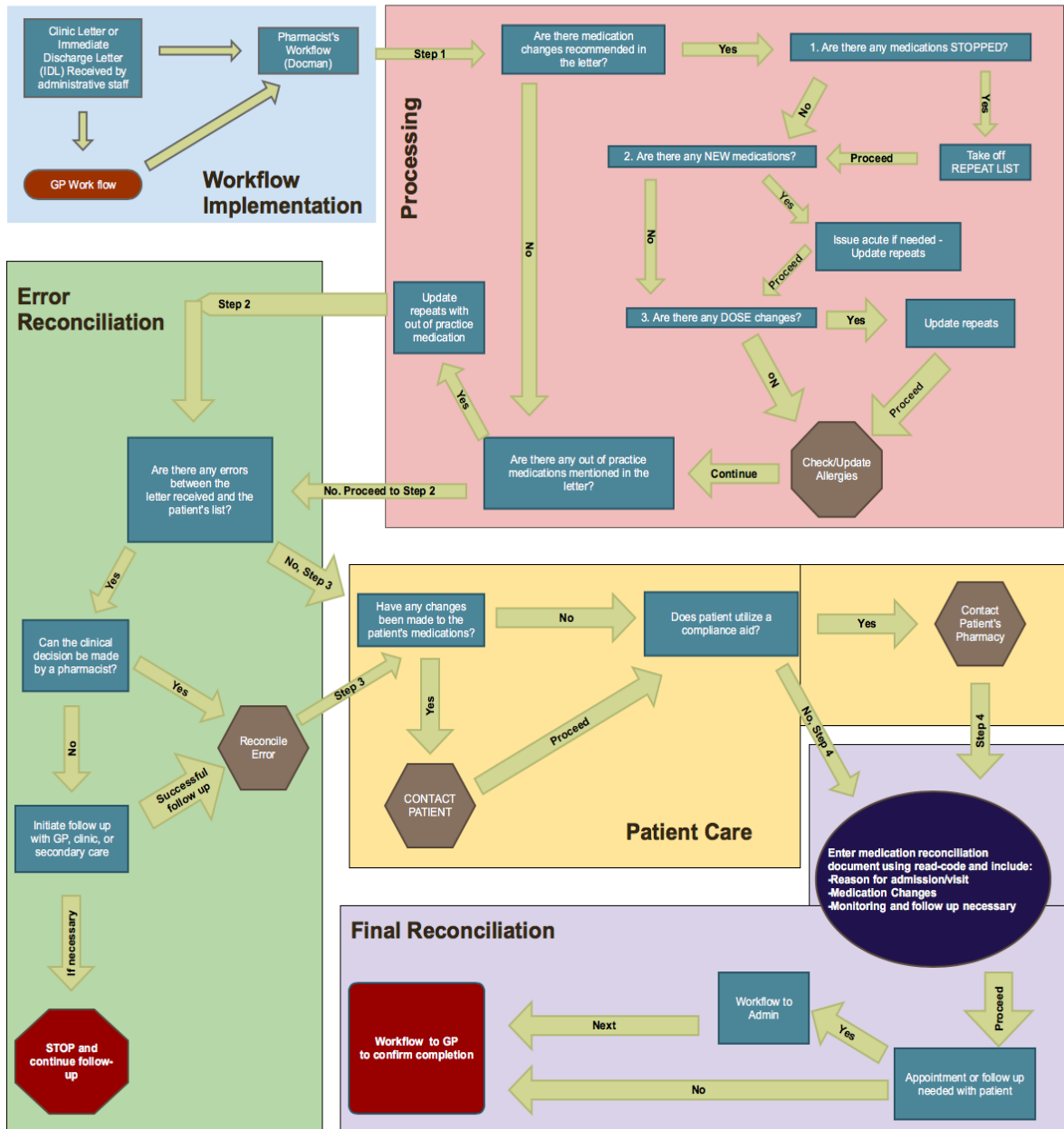
1. **Clinic Name**
Mark only one oval.
- Eskridge
 Riverside
 Trenton
 Bonnyrig
 Murryfield 1
2. **Who implemented the workflow?**
Mark only one oval.
- Doctor
 Pharmacist
 Admin Staff
3. **Start Time**
Example: 8:30 AM
4. **Clinic letter or Discharge?**
Mark only one oval.
- Clinic
 Discharge
 Duplicate
5. **Appointment/Discharge Date**
Example: December 15, 2012
6. **Date Written**
Example: December 15, 2012
7. **Date Received**
Example: December 15, 2012
8. **Date Processed**
Example: December 15, 2012
9. **MR Completed by?**
Mark only one oval.
- Pharmacist
 Doctor
 Nurse
10. **Changes made to medication list?**
Mark only one oval.
- Yes
 No
 N/A
11. **Number of Medications on List**
12. **Repeats analyzed to take out-dated meds?**
Mark only one oval.
- Yes
 No
 N/A
13. **Med Rec readcoding completed?**
Mark only one oval.
- Yes
 No
 Not Yet Finished
14. **Changes noted in patient chart?**
Mark only one oval.
- Yes
 No
 N/A
15. **Patient or Caregiver Contacted**
Mark only one oval.
- Yes
 No
 N/A

16. **Recommended Follow up initiated?**
Mark only one oval.
- Yes
 No
 N/A
17. **Patient has compliance Aid?**
Mark only one oval.
- Yes
 No
18. **Allergies checked/updated?**
Mark only one oval.
- Yes
 No
 N/A (Clinic Letter)
19. **Coding completed?**
Mark only one oval.
- Sent off
 Completed
 N/A
20. **Number of Errors in letter**
Mark only one oval.
- | | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
21. **Error Description**
- _____
- _____
- _____
- _____
22. **Clinical Decision made or follow up?**
Mark only one oval.
- Decision Made
 Follow up initiated
 N/A
23. **Did they read all pages of the letter?**
Mark only one oval.
- Yes
 No
24. **Prescription Issued?**
Mark only one oval.
- Yes
 No (Sent on for further review)
 N/A
25. **End Time**
Example: 8:30 AM
26. **Measure 2 reached? completed in 48hrs of receiving?**
Mark only one oval.
- Yes
 No
27. **Measure 3 Reached? Changes Documented?**
Mark only one oval.
- Yes
 No
 N/A
28. **Measure 4 Reached? Patient/family contacted?**
Mark only one oval.
- Yes
 No
 N/A

Appendix 4- Results from Observations

Practice Name	Practice 1	Practice 2	Practice 3	Practice 4	Pharmacists Av
Average days between visit and letter/IDL written	5.6	0.8 (outlier of 48)	10.9	3.6	5
Average days between letter/IDL written and received by the surgery	3.0	2.4	2.5	2.6	2
Average days between letter/IDL received and processed	2.3	0.5	1.0	1.4	1
Average time to complete a MR for the practice (minutes)	14.8**	7.9	7.8	6.9	7
Average time to complete the MR process - Clinic letter (minutes)	14.8	8.9	7.9	6.7	9
Average time to complete the MR process - IDL (minutes)	N/A	6.2	7.4	7.5	7
Proportion of MR with errors found in the letter/IDL during the Process	44.44%	21.43%	14.29%	15.00%	23.79
Percentage of MR with more than 10 medications on the patients repeat list (duplicates removed)	44.44%	42.86%	28.57%	22.50%	34.59
Percentage of MR in which changes were made to the Pt's medication list (if no changes MR excluded)	66.67%	77.78%	84.21%	100.00%	82.16
Were the repeats analysed during the MR?	88.89%	46.15%	90.48%	100.00%	81.38
Was the patient or caregiver contacted with changes?	55.56%	33.33%	13.33%	30.77%	33.25
Were allergies checked during the MR?	12.50%	0.00%	50.00%	100.00%	40.63
Was the MR read-coding completed?	88.89%	92.86%	90.00%	97.50%	92.31
MR forwarded to GP with questions about prescriptions?	44.44%	14.29%	9.52%	5.00%	18.31
Clinical decision made by pharmacist if there was an error	16.67%	33.33%	33.33%	71.43%	38.69
Was the MR completed within 48hrs of receiving the letter or IDL?	88.89%	100.00%	95.24%	80.00%	91.03
Percentage of letters/IDLs in workflow found to be duplicates	10.00%	17.65%	8.70%	6.98%	10.83

Appendix 5 - Medication Reconciliation Flow Chart



Appendix 6 – Errors found during observation of MRs

Pt/Type	Problem	Solution	NCC MERP	EQUIP
1 (Clinic Letter)	Unclear directions about how to increase the patient's anti-epileptic medications to the desired dose	Pharmacist sent to GP for follow up	Category E	Serious
2 (Clinic Letter)	Discrepancy between the clinic letter and patient's medication list. Clinic Letter says 300 mg Venlafaxine versus 337.5 mg on the surgeries medication list.	Pharmacist changed to acute so a GP would have to see it if she requested again.	Category D	Minor
3 (IDL)	Only first page of clinic letter received (1/2).	Pharmacist went forward with MR.	Category A	N/A
4 (IDL)	1. Lisinopril was omitted from the discharge letter.	Sent on to GP to look at.	Category D	Serious
4* (IDL)	2. Isosorbide Mononitrate has not been reordered by patient since May, may be causing headache, and it is still on repeat.	Sent on to GP to look at.	Category E	Serious
5 (Clinic Letter)	Discharge letter includes cetirizine; cetirizine not on repeat, only received once in march.	Email sent on to the physician regarding other potential conflicts found in the letter.	Category C	Minor
6 (Clinic Letter)	Unclear to pharmacist how the patient has been reducing their dose of steroid by 1 mg while the patient only gets 5mg tablets.	Pharmacist attempted to call patient.	Category E	Significant
7 (Clinic Letter)	Zolpidem dose was wrong in the letter in comparison to the current repeat. It is expected that the letter reflects the actual amount he is taking (half of a 7.5) while the chart itself only says 7.5mg.	Pharmacist decide they had missed the (1/2) tablet instructions.	Category C	Significant
8 (Clinic Letter)	Miscommunication about directions on the eye drop, two drops to right eye versus 1 drop to both eyes.	Pharmacist initiated follow up with physician	Category D	Serious
9 (Clinic Letter)	No dose listed on the letter (Paglaflozin).	Pharmacist chose 25 mg once daily	Category D	Serious
10 (Clinic Letter)	No dose or duration (Dexamethasone/neomycin)	Pharmacist initiated follow up	Category D	Significant
11 (IDL)	Patient usually on Pizotifen 500 micrograms, listed as 20MG in letter.	Pharmacist left at 500 mcg.	Category G	Potentially Lethal

