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Measuring Performance Indicators in Clinical Pharmacy Services with a Personal Digital Assistant

Apotex Award

Mark F. Collins, BSc(Pharm), MSc(Pharmacol)

Background: Continuous Quality Improvement (CQI) specifies that process and outcome indicators of quality shall be measured and analyzed in order to identify opportunities for improvement.

Objective: To develop and implement an electronic form for use on a Personal Digital Assistant (PDA) which documents the processes and outcomes of the pharmacist's care plan.

Methods: In place of the usual paper forms, pharmacists on acute care wards of a 285 bed community hospital used PDAs with a custom designed electronic Patient Care (ePCARE) log to keep track of their patients' drug related issues. Data from the PDA were downloaded and analyzed to measure process and outcome performance indicators that were reported to the staff at regular intervals.

Results: During the initial 12-week period, pharmacists completed ePCARE records for 1034 drug related issues in 398 patients. Pharmacists received feedback about process and outcome performance indicators every four weeks. The incidence of patient counseling improved over the implementation phase, 16 percent at 4 weeks, 38 percent at 8 weeks and 37 percent at 12 weeks. Also, assessment of patient knowledge was reported with increasing frequency, 60 percent at 4 weeks, 78 percent at 8 weeks and 72 percent at 12 weeks.

Conclusions: Implementation of an electronic form on a PDA made it possible to measure and to report in a timely manner the process and outcome performance indicators for clinical pharmacy services.

Key words: continuous quality improvement, personal digital assistants, performance indicators, clinical pharmacy

Impact of Statins on Mortality in Seniors with Cardiovascular Disease

Aventis Award

Charmaine Cooke, BSc (Pharm), MSc candidate; Susan Kirkland, PhD; Ingrid Sketris, PharmD, MHSA; Jafna Cox, MD

Background: Mortality from cardiovascular disease (CVD) is the leading cause of death in Canada. Randomized controlled trials have established the efficacy of cholesterol reduction with statin medications in decreasing mortality in the secondary prevention of CVD, but their effectiveness in real-world settings in not established in seniors.

Objective: To determine if seniors hospitalized with unstable angina or myocardial infarction who received statins after hospital discharge, had decreased mortality compared to seniors who did not receive statins.

Methods: Administrative and clinical data were collected retrospectively and linked via encrypted health card number. Cox proportional hazards models, with propensity adjustment, were used to determine the relationship between mortality and statin use.

Results: There were 4232 patients in the cohort with 38% receiving a statin after discharge. After propensity adjustment, statin use decreased mortality by 26% (HR 0.74 95% CI 0.63-0.88). However, after stratification by time after discharge from hospital to filling a statin prescription, mortality benefits were not evident in seniors receiving a statin within 180 days of discharge from hospital.

Conclusions: Statins are associated with significant reductions in mortality in seniors after discharge from hospital. Future research is needed to clarify the optimal time after hospital discharge to begin statin therapy.

Key words: cardiovascular disease, seniors, statins, mortality

Implementation of a Personal Digital Assistant-Based Drug-Related Problem Documentation Tool for Pharmacy Practice in a Multi-site Healthcare Organization Setting

Baxa Award

Sumit Raybardhan, B.Sc. (Pharm.); Robert M. Balen, Pharm.D; Nilufar Partovi, Pharm.D, FCSHP; Peter Loewen, Pharm.D, FCSHP; Gwen Liu, Pharm.D; Peter J. Jewesson, Ph.D., FCSHP

Background: Documentation of patient care interventions is an essential component of the pharmaceutical care process. Personal digital assistants (PDAs) can facilitate this documentation process.

Objective: To develop, implement and evaluate the utility of a scaleable, multi-user PDA-based documentation tool designed to facilitate the documentation of pharmacist-identified drug-related problems (DRP) in a multi-site, acute care hospital environment.

Method: A PDA-based documentation tool was developed using Pendragon® Forms database development software. Pharmacists were trained and PDA synchronization stations were configured to transmit encrypted data to a central server. Analysis of data was undertaken using commercially available software. User opinion survey data were solicited to assess utility.

Results: Twenty-eight PDAs containing a 15-field database were deployed to 39 pharmacists in 31 service areas across 3 hospital sites. Over a 2-month period, 5,084 DRPs were documented with 90% considered resolved at data entry. The most frequent DRP types were 'need to add drug' (31%) and 'unnecessary drug' (15%). Most pharmacists found the tool easy to use, integrated well with workflow, and spent less than 30 minutes/day documenting DRPs.

Conclusions: A PDA-based documentation tool to collect DRP data was successfully implemented across a multi-site health-care organization. Initial experience with this process suggests that PDAs can be used for efficient collection analysis of pharmacist intervention documentation.

Development of a Pharmacy Seamless Care Strategy and Tool for Chronic Renal Failure Patients

Baxter Award

Annemarie Cesta, BScPhm; Stephanie Ong, BScPhm; Olavo Fernandes, PharmD; Marisa Battistella, PharmD; Jana Bajcar, MScPhm, EdD, FCSHP

Background: Continuity of care is required as patients move from the care of one pharmacist to another. The appropriate transfer of information to pharmacists as well as to patients at these times is essential in order to prevent drug related problems (DRPs) from occurring.

Objectives: To develop a strategy and tool to transfer medication related information between pharmacists caring for chronic renal failure patients.

Methods: The project consisted of three phases including data collection, tool design and developmental pilot. The data collection phase consisted of a literature review, evaluation of patients' drug related problems on admission and a needs assessment of stakeholders. Qualitative research methods were used for data collection and data analysis. Data collected was used in phase 2 to develop the most optimal tool and strategy for medication information transfer in dialysis patients. In phase 3 the developed tool was tested with various pharmacists to assess feasibility.

Results: The tool created called "Dear Pharmacist Letter" communicates pertinent medication related information to community or clinic pharmacists including an up to date list of the patient's medications. The tool also creates two different formats of a patient medication schedule to be given to the patient when they are discharged from the hospital.

Conclusion: The "Dear Pharmacist Letter" is hoped to address the large proportion of DRPs occurring in dialysis patients, which were found to be related to a lack of appropriate information transfer between health care professionals, as well as to the patient.

Key words: seamless care, pharmacists, information-transfer, drug-related problems

Implementation of a Personal Digital Assistant-Based Drug-Related Problem Documentation Tool for Pharmacy Practice in a Multi-site Healthcare Organization Setting

Bristol-Myers Squibb Award

Sumit Raybardhan, B.Sc. (Pharm.); Robert M. Balen, Pharm.D; Nilufar Partovi, Pharm.D, FCSHP; Peter Loewen, Pharm.D, FCSHP; Gwen Liu, Pharm.D; Peter J. Jewesson, Ph.D., FCSHP

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Effects of Switching Patients from Coumadin® to a Generic Warfarin Product

Hoffmann-La Roche Award

Chole Campbell, BSc Pharm; Geoff Lewis, MSc Pharm; Kirsten Woodend, RN, MSc, PhD; Phil Wells, MD

Background: On June 7, 2001, two generic warfarin products, Taro-Warfarin and Apo®-Warfarin were designated as interchangeable with Bristol-Myers Squibb brand warfarin, Coumadin®, in Ontario. Currently, no trials, either randomized or observational have been conducted in Canada to determine the effect on International Normalized Ratio (INR) value, dosage, and/or frequency of INR testing in patients changed from Coumadin® to a generic warfarin product.

Objective: The primary objective was to determine if a switch from Coumadin® to a generic warfarin product results in a significant change in average weekly oral anticoagulant dose.

Methods: A retrospective database review was conducted. Patients who were switched from Coumadin® to a generic warfarin product and who fit the selection criteria were included in the study (n=94). The eight-week period before the warfarin brand switch was compared to the eight-week period after the brand switch. Average weekly oral anticoagulant dose, frequency of INR monitoring and proportion of out-of-range INR values were assessed.

Results: The mean difference in average weekly dose was 0.14 mg per week (95% CI –0.43, 0.72; p=0.62). The mean difference in the number of INR tests was –0.075 (95% CI –0.36, 0.22; p=0.61). The mean difference in out-of-range INR values was 0.013 (95% CI –0.058, 0.08; p=0.722).

Conclusion: Switching patients from the Bristol-Myers Squibb brand warfarin product Coumadin® to a Canadian generic brand of warfarin (Apo® or Taro) does not require a change in dose or frequency of monitoring.

Temozolomide for Malignant Gliomas in British Columbia: A Population-Based Cost-Effectiveness Analysis

Mayne Pharma Award

Erica Greanya, BScPharm; Suzanne Taylor, PharmD, FCSHP

Background: Based on promising results from phase II trials, temozolomide has largely replaced lomustine in the first-line therapy of recurrent malignant glioma, however phase III comparative studies and cost-effectiveness data are lacking.

Study Objectives: To evaluate the cost-effectiveness and outcomes achieved in patients with recurrent malignant glioma treated with temozolomide versus lomustine in British Columbia.

Methods: A retrospective analysis was conducted to identify patients who received single-agent temozolomide or lomustine during successive, pre-specified time periods. Data were collected on survival, disease progression, duration of therapy, cost of drug, labour and supplies, and successive or prior chemotherapy.

Results: 6-month progression free survival (PFS) occurred in 52% and 42.9% of patients in the temozolomide and lomustine cohorts respectively (p = 0.44). 6-month overall survival and median overall survival (OS) were 72% and 40.86 weeks for temozolomide patients and 64.3% and 46.7 weeks for lomustine patients (p > 0.05). Median cost per temozolomide patient was $11,660 (CAN), compared with $189 (CAN) per lomustine patient. For median OS, temozolomide was not a cost-effective alternative, and for 6-month PFS, the incremental cost effectiveness ratio of temozolomide was $1,261 (CAN) for each additional percent of patients progression free at 6-months.

Conclusions: When only survival outcomes and direct treatment costs are considered, lomustine is a more cost-effective treatment strategy in the specific setting of recurrent malignant glioma.

Complete Switch to Darbepoetin in a Hemodialysis Unit

Merck Frosst Award

Karen F. Shalansky, Pharm.D, FCSHP; Jacek Jastrzebski, MD, FRCP(C

Background: There are two erythropoietic agents available in Canada for treatment of anemia in patients with end-stage renal disease: human recombinant erythropoietin (rHuEPO) and darbepoetin. In March 2003, our hemodialysis unit switched all patients from subcutaneous (SC) rHuEPO to intravenous (IV) darbepoetin.

Objectives: The primary outcome was to assess the efficacy of IV darbepoetin to maintain target serum hemoglobin (Hb) compared to SC rHuEPO. Secondary outcomes were to evaluate the manufacturer's recommended guidelines for conversion of rHuEPO to darbepoetin, and to assess the cost implications of darbepoetin therapy.

Methods: This was an 18-month open-label observational study of 95 hemodialysis patients. At the time of the switch to darbepoetin (baseline), data were collected retrospectively for 6 months and prospectively for 12 months, at 3-month intervals. The first 6 months of darbepoetin therapy was considered a dose titration phase, thus data were analyzed comparing two 6-month periods: (-) 6 months to baseline (rHuEPO phase) and (+) 6 to 12 months (darbepoetin phase). Doses were titrated to a target Hb of 120-135 g/L.

Results: There was no significant difference in Hb between phases at any time point. Mean Hb ranged from 119.6-121.5 g/L for rHuEPO and 121.9-123.4 g/L for darbepoetin. The median darbepoetin dose remained stable throughout the analysis at 30 mcg/week while the median dose of rHuEPO rose from 8000 U/week at minus 6 months to 9000 U/week at baseline. Median 12-month cost savings associated with the administration of darbepoetin were estimated at $240,000. The recommended darbepoetin dose from the manufacturer's conversion table was deemed too low for baseline rHuEPO doses above 17,000 U/week. A more simplified dose conversion nomogram was created.

Conclusion: Darbepoetin was able to maintain similar serum Hb levels compared to rHuEPO at a substantially reduced cost.

Trends in Fluoroquinolone Use in Nova Scotia Hospitals and the Effect of Policies on Use

Novartis Award

Andrea Kent, Ingrid Sketris, Lynn Johnston, Ryan Sommers

Background: Antimicrobial resistance results in increased morbidity and mortality. Evidence suggests an association between antimicrobial use in hospitals and resistance. Fluoroquinolones are useful in the treatment of a variety of infections, unfortunately, overuse and inappropriate use may occur.

Objective: To evaluate the use of fluoroquinolones in hospitals and determine whether utilization policies affect use.

Methods: Purchasing data expressed as drug volume and expenditures were obtained from the Provincial Drug Distribution Program (PDDP) and aggregated using the World Health Organization (WHO)/ Anatomical Therapeutic Chemical (ATC) Defined Daily Dose (DDD) system for the fiscal years of 1997-2003. Fluoroquinolone drug utilization was expressed as DDD/ acute-care bed day/year and DDD/hospitalized community-acquired pneumonia event (CAP)/year. Policy data were obtained from surveys mailed to each district.

Results: All provincial hospitals administering fluoroquinolones were included (n = 31). Total fluoroquinolone use increased over the six years studied; mean DDD/1000 bed days 48 in 1997 to 172 in 2003 (p<0.01). Use of respiratory fluoroquinolones increased from a mean DDD/100 CAP/year of 3.4 to 1747.5 over the study period. Variations in use existed among districts and according to size (small, medium, large). The presence of utilization policies trended toward lower use of fluoroquinolones but was not statistically significant.

Conclusion: Through the WHO ATC/ DDD methodology we demonstrated a significant increase in fluoroquinolone use over time. The presence of utilization policies trended toward lower use, suggesting that further studies are warranted. Lack of resources for education and follow-up may prevent hospitals from gaining full impact of the interventions.

Key words: drug utilization, antimicrobials, fluoroquinolones, policies

Development of an Educational Video for Patients with Heart Failure — The Congestive Heart Failure Outreach Program of Education (COPE) Study

Novopharm Award

Ross T. Tsuyuki, BSc(Pharm), PharmD, MSc, FCSHP; Evan E. Lockwood, MD, FRCP(C); Miriam Fradette, BSc(Pharm)

Introduction: The majority of acute precipitants of congestive heart failure (CHF) relate to poor self care by patients. Most patients with CHF have a very poor awareness and understanding about their disease and self care measures. This may also impact medication adherence. Previous patient education and support programs have been shown to improve patient outcomes (such as hospitalizations and emergency room visits), however are very resource-intensive. A simpler, more practical educational program is needed.

Objective: To develop a "stand-alone" video-based education prgram for patients with CHF.

Methods: A multidisciplinary team (including a nurse, dietician, physician, pharmacist, educational design consultant, and multimedia producer) was assembled to review previously produced educational videos and develop simple key messages for patients with CHF. The key messages were condensed to: Avoid salt, Importance of daily weights/symptom monitoring, and Importance of taking medications as directed. The video features a focus on the 3 key messages, which are repeated often with text overlays to highlight them, and messages delivered mostly by patients (rather than healthcare providers). In addition, the patient is given a copy of the video to keep along with an accompanying booklet provides more detail and reinforces key messages and 3 newsletters over 6 months of follow-up.

Results/Discussion: The 23-minute video and accompanying booklet are now complete, and are being tested in a multicentre randomized trial which will evaluate the effect of these materials in patients with CHF on emergency room visits and rehospitalizations over 6 months of follow-up.

This project is funded by a grant from the Heart and Stroke Foundation of Canada. The video development has been partially funded by an unrestricted grant from Merck Frosst Canada Ltd.

The Role of a Pharmacist in a Primary Health Centre for Older Adults

Pfizer Award

Krystal Horudko-Napper, BSP, ACRP; Jane Richardson, BSP, Ph D; Shannan Neubauer, BSP, Pharm D

Background: Primary health care teams provide a holistic and comprehensive range of services offered by a range of professions to enhance overall patient care. Seniors are influenced by multiple factors that predispose them drug-related problems (DRP). Pharmacists are trained to identify and prevent various DRPs. This study's goal was to develop and evaluate a pharmacist's role in a primary health centre (PHC) for seniors.

Objectives: To develop the role of a pharmacist in a PHC for older adults; to describe activities and functions of a pharmacist; to measure pharmacotherapy recommendation acceptance and patient and team satisfaction.

Methods: Health and medication data were collected from patients. Recommendations and follow-up were provided when appropriate. Pre and post assessment questionnaires evaluated patient opinions and perceptions. Team members were asked to evaluate the pharmacist's activities.

Results: Twenty-three patients had on average 5.6 DRPs. Acceptance rate of recommendations made by the pharmacist was 89.1%. Positive responses made by patients and the PHC team support continuation of the pharmacist position.

Conclusions: The activities of the pharmacist were well received by both the patients and the team members. Following the study completion, a community pharmacist will continue to provide pharmacy services to the PHC.

Key words: primary health care, pharmacist, pharmaceutical care, senior

Prospective Identification of Hospital Adverse Drug Events Using Structured Pharmacist Surveillance

Pharmascience Award

Michael Tierney, BScPhm, MSc; Roland Halil, BScPharm; Alan Forster MD, MSc, FRCPC

Background: Improving the safety of the medication delivery system requires ongoing identification and measurement of adverse drug events (ADEs) and medication errors.

Objective: To measure the incidence of ADEs, preventable ADEs, and potential ADEs using surveillance by a pharmacist.

Methods: A trained pharmacist performed surveillance on a 30-bed general medical ward to identify any new symptoms, abnormal physiologic parameters, critical laboratory values, and medication errors. Surveillance consisted of daily communications with staff, daily chart reviews and investigation of spontaneous incident reports. Events were rated independently by two clinicians to determine if the outcome was an ADE, a preventable ADE or a potential ADE.

Results: During 543 patient-days of observation, 24 ADEs, 14 preventable ADEs and 13 potential ADEs were identified. The incidence of these outcomes per 100 patient days are 4.4 (95% confidence interval (CI) 3.0-6.5), 2.6 (95% CI 1.5-4.3) and 2.4 (95% CI 1.4-4.1), respectively. Of all ADEs, three (12%) were life threatening, 11 (48%) were serious, and 10 (40%) were significant. Drug classes associated with ADEs include: antidiabetic agents (25%), antibiotics (21%), glucocorticoids (13%) and sedative/hypnotics (13%).

Conclusion: ADEs occur commonly. We have identified specific drug classes to target to improve patient safety. This research demonstrates the feasibility and utility of one method of identifying ADEs.