Standards of Clinical Practice for Renal Pharmacists

Colette B Raymond, Lori D Wazny, and Amy R Sood

INTRODUCTION

The prevalence of chronic kidney disease (CKD) continues to increase.[1] Patients with stage 1 to 5 CKD and those undergoing dialysis are at extremely high risk for drug therapy problems (DTPs).[2,3] In controlled trials involving general patient populations, clinical pharmacist interventions have reduced hospital admissions, length of hospital stay, readmissions, and emergency department visits.[4-7] The activities of pharmacists most strongly associated with improved patient outcomes include participating on rounds, interviewing patients, performing medication reconciliation, counselling patients on discharge, and conducting postdischarge follow-up.[5] A systematic review of 8 controlled trials involving patients with CKD showed that clinical pharmacist interventions improved management of anemia, blood pressure, and lipids, as well as calcium and phosphate parameters.[8] In this patient population, clinical pharmacists' interventions reduced hospital admissions, length of hospital stay, and incidence of end-stage renal disease or death.[8]

The Manitoba Renal Program (MRP) provides comprehensive renal care throughout the province of Manitoba, Canada (population 1.2 million). The program provides care at 4 urban hospitals and 12 rural hemodialysis units. Health services offered include in-centre and home hemodialysis, peritoneal dialysis, and interprofessional renal health clinics for individuals with stage 1 to 5 CKD who do not require renal replacement therapy. At the time this article was prepared, in mid-2013, the MRP had approximately 1100 hemodialysis patients, 285 peritoneal dialysis patients, and nearly 4500 patients with stage 1 to 5 CKD.

DESCRIPTION OF PHARMACY PRACTICE MODEL

The MRP pharmacists operate within a patient-centred medication therapy management model to provide care for patients with stage 1 to 5 CKD and patients undergoing dialysis within the program.[9] The MRP has a unique funding structure, with one full-time equivalent (FTE) clinical pharmacist for every 100 hemodialysis patients, 200 peritoneal dialysis or home hemodialysis patients, or 300 patients with stage 1 to 5 CKD.[10] This funding structure provides equitable and consistent patient care across the province and allows the pharmacists to perform patient care, conduct research, and serve as educators. As of 2013, the MRP employed 19 individual pharmacists, whose time devoted to the program ranged from 0.2 to 1.0 FTE, for an overall total of 11.8 FTE clinical pharmacists. On average, these pharmacists spend 90% (range 20%–100%) of their MRP time performing activities related to direct patient care within the program, with the remainder of their time spent performing drug distribution in the hospital inpatient pharmacy. The MRP pharmacists attend all nephrologist clinics. In clinics for patients with stage 1 to 5 CKD, the pharmacists focus on those patients who have stage 4 or 5 CKD, as well as patients with stage 1 to 3 CKD who are receiving pharmacotherapy for glomerulonephritis. In clinics for peritoneal dialysis, home hemodialysis, and rural hemodialysis, the pharmacists see all patients. The pharmacists also staff the in-centre hemodialysis units at each urban hospital and liaise by telephone with the 16 rural hemodialysis units. The MRP pharmacists have a highly diverse practice, working at a variety of institutions that are geographically separate and that have different pharmacy managers, practice patterns, clinic structures, and patient populations; they also interact with different nephrologists within the MRP. However, to ensure consistency in patient care, the MRP pharmacists meet at least every 2 months in person and by teleconference to discuss the clinical and operational issues affecting them. Two of the pharmacists have postbaccalaureate Doctor of Pharmacy training, and they serve as clinical practice leaders for the other MRP pharmacists, focusing on hemodialysis and peritoneal dialysis, respectively.

DEVELOPMENT AND EVALUATION OF STANDARDS OF PRACTICE FOR THE MRP PHARMACISTS

Working collaboratively with pharmacy managers, MRP pharmacists, and the MRP itself, we sought to develop standards of clinical practice for the MRP pharmacists. The purpose of doing so was to define and prioritize the core activities that these renal pharmacists must perform on a regular weekday with full staffing levels. We evaluated the literature describing the role of renal clinical pharmacists, surveyed MRP pharmacists about existing clinical pharmacist services, met with pharmacy and MRP stakeholders, and evaluated existing pharmacist standards of practice and existing activities and practices of the MRP pharmacists.[11] A small working group of MRP pharmacists developed a draft set of

Box 1. Standards of Clinical Practice for Renal Pharmacists in the Manitoba Renal Program (MRP)

The pharmacist *must* perform these core clinical activities on fully staffed weekdays* (in order of priority):

1. Attend all MRP clinics (includes PD, home and rural HD, and CKD stages 1–5 clinics; total of 24 half-day clinics per week):
   - o Review laboratory test results and medications for all patients.
   - o Document in health record any recommendations, suggestions, or further patient information required for patients not seen by a pharmacist.
   - o For patients seen by a pharmacist, generate best possible medication history and perform medication reconciliation[12] and detailed medication review.
2. Attend multidisciplinary patient care rounds (twice weekly for HD and PD patients):
   - o Contribute to interprofessional discussion about patients.
   - o Identify admitted patients for discharge medication reconciliation.
   - o Identify patients for medication review by a pharmacist.
3. Perform discharge (and transfer) medication reconciliation for admitted patients receiving dialysis before discharge or at first subsequent dialysis session (HD patients only).[12]
   - o Reconcile inpatient medications with home and in-centre HD medications.
   - o Perform detailed medication review (see Box 2) and document recommendations in the patient's medical record.
   - o Write discharge prescription for medications, including appropriate medications for in-centre HD and new medications started in hospital. Contact prescribing nephrologist to make recommendations and confirm prescription.
   - o Provide patient with medication card and counselling.
4. Review monthly laboratory test results for HD patients.
5. Perform detailed medication review for new starts to HD or PD (see Box 2) within 2 weeks.
6. Perform detailed medication review for other patients (see Box 2).

The pharmacist will perform the following "*must do*" activities (prioritized according to pharmacist's professional judgment):

- Ensure follow-up laboratory tests are ordered, according to pharmacist's recommendations.
- Ensure patients have adequate prescriptions and refills.
- Liaise with community pharmacy as appropriate (e.g., to facilitate prescription delivery, compliance aid, drug coverage).
- Liaise with patient, caregivers, family members, and other health care professionals as appropriate to provide medication-related information to or for patients.
- Provide drug information for immediate patient care that day.
- Provide education to pharmacy students and residents.
- Provide monitoring and follow-up for recommendations.†
- Provide communication between MRP and other pharmacists within the facility.†

The pharmacist shall perform the following *desirable* activities as appropriate and as pharmacist is available:

- Participate in MRP and pharmacy program initiatives (e.g., development of drug protocols, review of preprinted orders, participation on committees, development of policy and procedures, responses to drug shortages).
- Provide education-related activities to health care professionals.
- Provide communication between MRP and other pharmacists at other facilities.
- Provide drug information not needed immediately.
- Perform drug-use management activities, including prospective audits.
- Participate in projects or research.
- Investigate medication incidents or errors.
- Review or triage medication orders to identify drug therapy problems related to appropriateness, duration, and dosing of each medication, as well as drug interactions (as an activity separate from medication review, medication reconciliation, or MRP clinic visit).

CKD = chronic kidney disease, HD = hemodialysis, PD = peritoneal dialysis.
*Evening HD patients are reviewed and seen by pharmacists who work later shifts periodically, in order that all patients are seen by a pharmacist. Weekend pharmacist coverage consists of centralized dispensary pharmacist coverage at each site.
†When the pharmacy is short-staffed, these are considered "should do" (rather than "must do") activities.

Box 2. Steps in Review of Patients with Chronic Kidney Disease for Drug Therapy Problems (DTPs)

General medication review:
- For new dialysis patients, before nephrologist review or clinic visit (every 6 months to 1 year) or at the request of another health care professional (see Appendix 1)
- Interview patient, caregivers, family members, and other health care professionals
- Generate best possible medication history and perform medication reconciliation[12]
- Review laboratory test results, investigations, physical findings, and medications to identify DTPs
- Document medication review, DTPs, and recommendations in the medical record
- Identify and resolve actual/potential DTPs during discharges, medication reviews, clinic visits, between clinic visits (after review of laboratory test results), on medication order review, or detailed medication review

Assess patient for general DTPs[13-19]:
- allergies and intolerances
- drug–drug interactions
- adverse drug reactions
- medication causing or exacerbating a symptom
- duplication of pharmacologically or therapeutically similar medications
- appropriate dosage form and route of administration
- medication therapy not indicated
- medication indicated but not utilized
- medication adherence
- problems related to IV administration
- medications that require renal dose adjustments
- medications that are contraindicated in CKD or that should be minimized
- medications that are no longer required in dialysis

Assess patient for DTPs specific to CKD by assessing the following:
- *Anemia*: Assess hemoglobin, transferrin saturation, ferritin, use of erythropoietic-stimulating agent, iron, and renal multivitamin. Consider erythropoietin hyporesponsiveness.[20-25]
- *Mineral and bone disease*: Assess corrected calcium, serum phosphate, parathyroid hormone, alkaline phosphatase, albumin, calcium bath concentration, phosphate and calcium additives to the dialysate, surgical history (for parathyroidectomy), use of phosphate binders, vitamin D analogue, or cinacalcet. Liaise with dietitian about diet.[26,27]
- *Cardiovascular risk*: Assess for presence of cardiovascular disease and risk factors, and therapies to reduce this risk (antiplatelets, anticoagulants, antihypertensives, statins, antianginal therapies, and antiarrhythmics).[27-29]
- *Hypertension and proteinuria*: Assess blood pressure before, during, and after dialysis, in clinic and at home; assess dry weight, proteinuria, antihypertensives, and antiproteinuric therapies.[27,30]
- *Diabetes mellitus*: Assess glucose monitoring before and after dialysis, in clinic and at home, as well as glycated hemoglobin and use of hypoglycemic agents.[27,31-33]
- *Pain*: Assess source of pain, its quantity and quality, and use of opioids, NSAIDs, and adjunctive therapies.[34,35]
- *Peripheral neuropathy*: Assess source of pain, its quantity and quality, and use of antidepressants, anticonvulsants, and opioids.[36]
- *Restless leg syndrome*: Assess symptom severity and frequency, sleep disturbance, daytime fatigue, and use of dopamine agonists, gabapentin, levodopa, benzodiazepines, and opioids.[37,38]
- S*moking status*: Assess readiness to quit and use of nicotine replacement therapy, bupropion, or varenicline; provide education.[39]
- *Cramps*: Assess symptom severity and frequency, as well as use of quinine or vitamin E.[40]
- *Pruritus*: Assess symptom severity and use of topical or systemic agents.
- *Gastrointestinal issues (e.g., reflux, history of bleeding, ulcer, dyspepsia, constipation, diarrhea)*: Assess signs and symptoms, as well as use of antacids, laxatives, stool softeners, agents to treat diarrhea, NSAIDs, or corticosteroids.
- *Infectious diseases (e.g., IV catheter-related infections, skin infections, peritonitis) requiring treatment or prophylaxis, including antibiotic locks and intraperitoneal antibiotics*: Assess signs and symptoms, as well as culture and sensitivity results.[41-43]
- *Hyperkalemia (for stage 1–5 CKD patients)*: Assess serum potassium, presence of hemolysed sample, and use of potassium supplements, ACE inhibitors, ARBs, potassium-sparing diuretics, and other agents known to increase serum potassium. Assess use of potassium-binding resins and diuretics. Liaise with dietitian regarding diet.[44]
- *Metabolic acidosis (for stage 1–5 CKD patients)*: Assess serum bicarbonate concentrations and use of supplementation.[27]
- *Depression, anxiety, insomnia*: Assess consultations with other health care professionals and use of antidepressants, antipsychotics, benzodiazepines, and sedatives.[45]
- *Gout (for patients with stage 1–5 CKD)*: Assess serum uric acid level, frequency and severity of gout attacks, and use of colchicine, NSAIDs or corticosteroids, allopurinol, and febuxostat.[46]
- *Review patient for the use of the following high-alert medications*: digoxin, lithium, phenytoin, immunosuppressive therapy.
- Assess serology and vaccination status for hepatitis B, pneumonia, and influenza.[27, 47]

ACE = angiotensin-converting enzyme, ARB = angiotensin receptor blockers, CKD = chronic kidney disease, NSAID = nonsteroidal anti-inflammatory drug.

standards of clinical practice for renal pharmacists. The draft was distributed to all MRP pharmacists on multiple occasions to obtain feedback. Feedback for priority activities was also obtained from nephrologists. Consensus was achieved, and all MRP pharmacists, pharmacy managers, and nephrologist medical directors have adopted the final version of the standards of clinical practice for renal pharmacists (Box 1). These standards specify that MRP pharmacists should routinely evaluate their patients for the DTPs commonly experienced by people with CKD (listed in Box 2). The standards of clinical practice can be updated to reflect the incorporation of local policies and procedures, patient safety initiatives, and published guidelines.

IMPLICATIONS FOR PRACTICE

Creation of standards of clinical practice for renal pharmacists across diverse practice environments and numerous pharmacists has allowed for a common method to perform and prioritize clinical pharmacist activities and to aid in the training of new staff. Across the MRP, the pharmacists typically assess patients before the nephrologist does so. Therefore, the pharmacist's documentation is critical to ensuring that an accurate medication list is included in the chart and that DTPs are identified before the nephrologist's review. This streamlined approach helps to resolve existing DTPs quickly and prevents additional DTPs from occurring. The use of standards of practice as a common approach to patient assessment provides continuity of pharmacist care across the MRP. For example, the standards of practice have been used to develop a standard template for medication review for patients undergoing hemodialysis or peritoneal dialysis, which becomes part of the medical record (see Appendix 1). Within the MRP, we have used the standards of practice as guidelines and for training purposes. The standards could also be used to develop criteria for competency assessment or to inform performance appraisals.

Others have developed and validated a list of criteria to assess medication safety and use issues in patients with CKD in order to identify DTPs.[48] However, that list of DTPs was based on interventions by community pharmacists. The specialized renal pharmacists have the advantage of access to patient care records and have developed trusting relationships with the nephrologists, both of which facilitate optimization of medication therapy. The renal pharmacist standards of practice document describes renal-specific DTPs, as well as processes and priorities for renal pharmacists functioning as members of an interprofessional team.

CONCLUSIONS

The standards of practice for renal pharmacists developed within the MRP are a unique set of evidence-based practice guidelines that can serve to educate and train renal pharmacists, students, or trainees completing a renal pharmacy rotation. Furthermore, the standards of practice can serve as a tool to standardize patient care, set priorities, develop criteria for competency assessment, and inform performance appraisals for renal pharmacists. Additionally, centres without renal pharmacists on staff could use the standards of practice to justify the funding needed to hire such specialized practitioners.

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See page 374 for Appendix 1

Appendix 1. Template for medication review performed by pharmacists in the Manitoba Renal Program. Copyright © 2013 Manitoba Renal Program. Reproduced by permission. ACE/ARB = angiotensin-converting enzyme inhibitor/angiotensin II receptor blocker, A.Fib = atrial fibrillation, ALKPhos = alkaline phosphatase, ASA = acetylsalicylic acid, BB = beta-blocker, BP = blood pressure, B.S. = blood sugar, Ca^{2}++ = calcium, CCB = calcium channel blocker, CHF = congestive heart failure, CorCa = calcium corrected for albumin, CVA = cerebrovascular accident, ESA = erythropoiesis-stimulating agent, ESRD = end-stage renal disease, GGT = gamma-glutamyl transferase, HbA1c = glycosylated hemoglobin, HD = hemodialysis, HDL = high-density lipoprotein, Hgb = hemoglobin, HR = heart rate, HTN = hypertension, INR = international normalized ratio, IV = intravenous, LDL = low-density lipoprotein, MI = myocardial infarction, NTG = nitroglycerin, OHA = oral hypoglycemic agent, OTC = over-the-counter, PO4 = phosphate, PTH = parathyroid hormone, RLS = restless leg syndrome, Rx = prescription, TC = total cholesterol, TG = triglycerides, TIA = transient ischemic attack, TSAT = transferrin saturation.

Date: _____ Seen: In Unit Clinic Site Visit

Compliance Tools: Bubble Pack Dosette Other: _____

Community Pharmacy: _____ Potassium binding resin at home Yes No

Medications verified with: Patient/Caregiver Rx Label Pharmacy
Electronic prescription record Chart reviewed

Herbal Products: No Yes _____

OTC (other than as Rx): No Yes _____

Allergies/Intolerances: _____

ESRD Secondary to: _____ HD initiated on: _____

Comments: _____

Anemia:

Hgb _____ ESA _____
TSAT _____ IV iron _____
Ferritin _____ Replavite Yes No

Mineral Metabolism:

CorCa _____ PO4 binders_____
PO4 _____ PTH_____
ALKPhos/GGT _____ Vitamin D_____
Ca^{2}++ bath _____ Parathyroidectomy No Yes _____

Cardiovascular disease:

History of: HTN Diabetes CVA/TIA MI A.fib CHF
Smoking Angina _____
Pre HD BP: _____ Post HD BP: _____ HR _____
Lipid profile: _____ (date)TC ____ HDL ____ LDL ____ TG ____ TC/HDL ___
BB _____ ACE/ARB_____ ASA Clopidogrel
Statin_____ CCB_____ Warfarin Diuretic
(INR target_____)
NTG Spray _____

Diabetes:

1 2 HbA1c: ____(date) Ophthalmologist Endocrinologist _____
No Pre/Post HD glucose: _____/_____ Home glucose: _____
B.S.<4: No Yes _____ Insulin _____
OHA: _____

Gastrointestinal Issues:

RLS/Leg Cramps:

Pruritus

Sleep Disturbances:

Pain Issues:

Therapeutic Drug Monitoring:

Other Issues:

Pharmacist Signature: _____ Date: _____