



the Translator

Canadian Pharmacy ▶ Research ▶ Health Policy ▶ Practice ▶ Better Health

Pharmacists increase patient adherence to drug therapy, improving health outcomes and lowering health care costs

As defined by the World Health Organization, adherence is the extent to which a person's behaviour (e.g., taking medications, following a diet and/or executing lifestyle changes) corresponds with agreed-upon recommendations from a health care provider.¹ Patients' non-adherence to medications leads to poor health outcomes and costs the Canadian health care system billions of dollars every year.² This issue of *the Translator* identifies pharmacist opportunities to improve adherence, as well as the related costs and patient outcomes:

- **Community pharmacist participation in a periodic patient education program improves patient adherence to statins, bisphosphonates and antihypertensives**
- **Ontario focus groups of postmenopausal women taking osteoporosis therapy provide valuable insights for pharmacists to improve patient adherence**
- **Saskatchewan family physicians are willing to collaborate with community pharmacists to promote patient adherence, but require additional time and financial compensation**
- **A pharmacy care program improves medication adherence and cardiovascular risk factors in the elderly**
- **A pharmacist intervention improves adherence to cardiovascular medications in heart failure and decreases health care use and costs**

Community pharmacist participation in a periodic patient education program improves patient adherence to statins, bisphosphonates and antihypertensives

McLean W. An adherence study of prescription refill data, with and without a periodic patient education program. *Can Pharm J* 2007;140(2):104-106.

Issue: Poor adherence to medications, especially for chronic diseases, is detrimental to health outcomes. These conditions include coronary artery disease, hypertension, dyslipidemia, osteoporosis, asthma, diabetes, dementia and others. Furthermore,

A periodic patient education program provides an important opportunity for pharmacists to improve patient adherence in an effective and practical manner suited for community practice

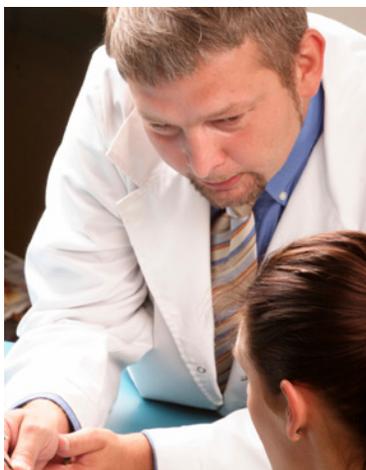
poor adherence costs the Canadian health care system billions of dollars every year. Non-adherent patients can mislead pharmacists and other health care providers into believing that they require either no further clinical intervention (since they

¹ World Health Organization. Adherence to long-term therapies: evidence for action. January 2003. Available: www.who.int/entity/chp/knowledge/publications/adherence_full_report.pdf (accessed November 4, 2011).

² McLean W. An adherence study of prescription refill data, with and without a periodic patient education program. *Can Pharm J* 2007;140(2):104-106.

already have the appropriate medication), or require additional medication (because health outcomes do not appear to improve). Either assumption risks a lack of clinician reinforcement on proper use of current therapy, resulting in a potentially endless cycle of poor adherence and poor outcomes.

A solution: Rx Canada is a provider of e-health solutions focused on developing standardized patient adherence programs tailored to specific disease states for pharmacies.¹ Its “Health Inform” program mails out brochures from the participating pharmacy to its patients that include: 1) information on the disease, 2) information on the medication’s action and side effects, 3) administration of the medication and 4) reinforcement of the commitment to take the medication as prescribed. Mailing occurs every two months over a 12-month period. In 2005, eight pharmacy chains and 2100 independent pharmacies were reimbursed for participating in and offering this program to their patients. The program



enrolled over 135,000 patients and sent out more than 400,000 mailings.

This study analyzed prescription data from participating pharmacies to determine the impact of periodic mailings on patient adherence. The outcome measured is persistence – a type of adherence that calculates the percentage of patients who continue to renew their prescriptions every three months. The results showed that at

the end of one year, enrolled patients demonstrated higher persistence to statins, bisphosphonates and antihypertensives than those who were not invited to the program (i.e., “comparison patients”) by 11.7%, 11.9% and 14.3%, respectively ($p < 0.01$).

Background or research methods: Anonymous prescription data were collected by Rx Canada from the software systems of participating pharmacies and independently reviewed by researchers. Persistence (P_{12}) was calculated as the percentage of patients continuing to renew their prescriptions every three months up to the 12-month mark. The average number of days per month (ADM) on therapy was calculated for all patients based on the average supply of medication over the 18-month study period. Differences in ADM of 5% or greater between patient groups were defined by the investigator as clinically significant differences for P_{12} . Results were also submitted for chi-square analysis for statistical significance.

Implications: A periodic patient education program like Health Inform provides an important opportunity for pharmacists to improve patient adherence in an effective and practical manner suited for community practice. Pharmacist participation in such programs is crucial in addressing some alarmingly low adherence rates revealed by current literature; patient persistence to statins, key agents

known to prevent cardiovascular disease, falls to 40% after the first year. Persistence to bisphosphonates, cornerstone therapies for both prevention and treatment of osteoporosis, drops even lower after the first year to less than 40%.

It should be noted that the selection of enrolled and comparison patients was not random. Also, persistence is a rather general measurement of adherence based on

refill activity over three-month periods, instead of true adherence on a day-to-day basis. Lastly, program delivery may not be standardized; some participating pharmacies may offer face-to-face discussions about patients’ medications in addition to mailings.

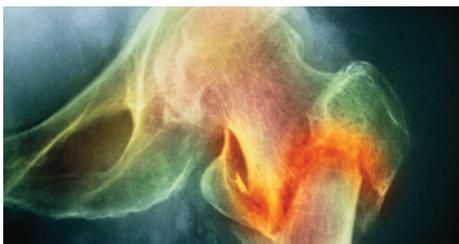
Financial support: Funding for this study was provided by Rx Canada.

¹ Rx Canada – Innovative e-Health Solutions for Pharmacy. About Rx Canada. 2007. Available: https://www.rxcanda.ca/en/about_rx_canada/ (accessed November 4, 2011).

Ontario focus groups of postmenopausal women taking osteoporosis therapy provide valuable insights for pharmacists to improve patient adherence

Lau E, Papaioannou A, Dolovich L, et al. Patients’ adherence to osteoporosis therapy – exploring the perceptions of postmenopausal women. *Can Fam Physician* 2008;54:394-402.

Issue: Osteoporosis medications, if taken consistently for at least six months, are effective at reducing the risk of fragility fractures and chronic disability in postmenopausal women. In fact, fracture risk was shown to be reduced by 26% among patients who were more than 80% adherent to their medications. Despite abundant evidence pointing to the necessity of adherence, studies show that half of women who start osteoporosis therapy discontinue it



within one year. Despite attempts to understand such behaviour, researchers could explain only 6% of the variation in adher-

ence after adjusting for significant known predictors of non-adherence such as medication adverse effects.

A solution: This study set out to explore the factors that influence adherence to osteoporosis medications and the perceptions of strategies attempted to improve adherence from the perspectives of postmenopausal women. From focus group discussions with 37 women, five main

themes emerged: 1) existing beliefs that affirm or refute the importance of taking osteoporosis medications, 2) concerns about medication-specific factors, including strict administration requirements and adverse effects, 3) preconceived notions and past negative experiences about medications in general, 4) the need to have trusting and supportive relationships with health care providers, and 5) the need to obtain complete, consistent and easily understandable information about the medication from pharmacists and physicians.

The investigators mapped each of these themes with one or more stages in the medication-taking process: patient requires

This in-depth analysis of patient perspectives serves as a valuable guide for pharmacists in their efforts to improve adherence to osteoporosis therapy in postmenopausal patients

medication, medication is prescribed, patient decides to have prescription filled and initial and continued adherence to medications, all of which are key target points for strategies to improve adherence.

Background or research methods: Patient participants were recruited for seven focus

groups held in Hamilton, Ontario. Participants were postmenopausal women of various age groups, currently taking at least one prescription or over-the-counter medication for osteoporosis for various lengths of time, and who were perceived by their health care providers to be non-adherent to current treatment. Patients answered ten open-ended questions about their perceptions of their osteoporosis medications, their reasons for adherence and non-adherence to therapy, and the effectiveness of strategies they attempted in order to improve adherence. Participants were allowed to build on each other's ideas about perceived factors affecting adherence.

Implications: This in-depth analysis of patient perspectives serves as a valuable guide for pharmacists in their efforts to improve adherence to osteoporosis therapy in postmenopausal women. Pharmacists are in a position to address all of the above themes by:

- Helping patients understand osteoporosis as a serious condition and screen for risk factors, e.g., family history or long-term use of glucocorticoids, especially since the disease is asymptomatic
- Taking the time to explain the purpose and benefits of the medication
- Providing complete information for

managing any adverse effects and specific administration instructions

- Simplifying these instructions as necessary, such as offering the option of once-weekly or once-monthly dosing
- Providing support for patients if they experience adverse effects or other forms of discouragement by following up on an ongoing basis

It should be noted that the selection of focus group participants was not random. Participants self-reported as being mostly adherent to medications, thus more information was gathered on facilitators than barriers to adherence. Also, it was difficult

for patients to share perceptions related strictly to osteoporosis medications, so some themes may have emerged from other therapy types. Last, patients unable to communicate in English were excluded. This may result in cultural biases in the collected patient perceptions of osteoporosis and its therapies.

Financial support: Funding for this study was provided by a grant-in-aid from Merck Frosst Canada, the Canadian Institute for Health Research and the Team for Individualizing Pharmacotherapy in Primary Care for Seniors.

Saskatchewan family physicians are willing to collaborate with community pharmacists to promote patient adherence, but require additional time and financial compensation

Laubscher T, Evans C, Blackburn D, et al. Collaboration between family physicians and community pharmacists to enhance adherence to chronic medications. *Can Fam Physician* 2009;55:e69-75.

Issue: Non-adherence to medications is a considerable barrier to the successful management of chronic diseases. Studies have demonstrated that pharmacist-physician collaborations can improve patient adherence to chronic medications. However, in real-world practice, the extent of these collaborations and the opinions of physicians regarding such collaboration are unknown.

A solution: This study aimed to determine family physicians' opinions regarding patient adherence to chronic medications and the potential role of pharmacists in facilitating adherence. It also attempted to determine the current level of collaboration between family physicians and community

Rural practices may serve as an effective model for pharmacists and physicians in urban communities looking to improve their communication and collaborative efforts

pharmacists regarding adherence.

Most physicians either partially or strongly agreed that non-adherence to chronic medications was an issue for their patients. When asked to rank from a list the top five reasons believed to be responsible for non-adherence, medication cost and side effects were most commonly ranked the highest. Almost all respondents

believed that community pharmacists had a role in promoting adherence to chronic medications, primarily by emphasizing medication benefits over side effects and notifying physicians of potential non-adherence. In fact, 97% of respondents indicated they would like pharmacists to notify them of patients not regularly refilling their chronic medications.

Most respondents agreed that some level of collaboration could be achieved with community pharmacists. However, only a quarter of respondents indicated that they communicated with community pharmacists at least once weekly regarding adherence issues. Among this quarter, over half practice in rural communities. Physicians practising

for more than 10 years were less willing to provide additional clinical information on prescriptions such as clinical indications or identify potential barriers to adherence, in order to assist pharmacists with targeting adherence issues. Respondents explained that such activities would require additional time, effort and financial compensation and would risk patient confidentiality.

Background or research methods: The study was conducted in early 2008. A current list of names and addresses of family



physicians or general practitioners licensed in Saskatchewan was obtained from the

College of Physicians and Surgeons of Saskatchewan. Physicians working primarily in hospital settings or administration were excluded. A 19-item questionnaire designed by all research team members was sent to each of the 747 physicians, with a second mailing six weeks later to all non-respondents. The study collection period closed 12 weeks after the first mailing, and 286 (39.4%) completed questionnaires were available for analysis. Statistical analysis was carried out using chi-square and ANOVA tests.

Implications: Pharmacists have an important role in promoting and supporting adherence to chronic therapies. Monitoring prescription refill records is an effective and inexpensive method for identifying non-adherent patients and bringing them to the attention of family physicians. Pharmacists may also spend more time explaining medication side effects to patients and providing ongoing follow-up to gauge the patient's motivation to continue therapy. When medication cost is an issue, pharmacists may discuss more affordable yet comparably effective alternatives with the physician or inform patients of viable options for drug coverage. Rural practices, where phar-

macists and physicians tend to know one another and have more interaction, may serve as an effective model for pharmacists and physicians in urban communities looking to improve their communication and collaborative efforts. Continued research is needed to further explore the opinions of patients, physicians and pharmacists in Canada regarding medication adherence and to study various collaborative models between pharmacists and other health care professionals.

Study limitations should be noted. Volunteer and non-response bias may exist. Respondents who have participated in Saskatchewan's chronic disease management program over the past 3 years

may have biased the survey responses in favour of increased collaboration with community pharmacists. Also, respondents may vary in their interpretations of the Likert scale ratings used in the survey.

Financial support: Funding for this study was provided by the University of Saskatchewan through an unrestricted research start-up grant held by Dr. Laubscher, a Saskatchewan Health-Merck Frosst-Schering Canada research contract held by Dr. Blackburn and a Canadian Institutes of Health Research Clinical Research Initiative Fellowship held by Ms. Evans.

A pharmacy care program improves medication adherence and cardiovascular risk factors in the elderly

Lee JK, Grace KA, Taylor AJ. Effect of a pharmacy care program on medication adherence and persistence, blood pressure and low-density lipoprotein cholesterol – a randomized controlled trial. *JAMA* 2006;296(21):2563-2571.

Issue: By 2041, the number of Canadian seniors is expected to reach 9.2 million, becoming nearly a quarter of the nation's population.¹ A majority of seniors take at least one medication,² with some taking 15 or more.³ As such, elderly patients are susceptible to barriers to medication adherence, notably complex drug regimens, treatment of asymptomatic conditions and convenience factors relating to medication administration. As of the writing of this article, effective strategies to improve adherence in the elderly had not been investigated and their potential effects on meaningful health outcomes had not been identified.

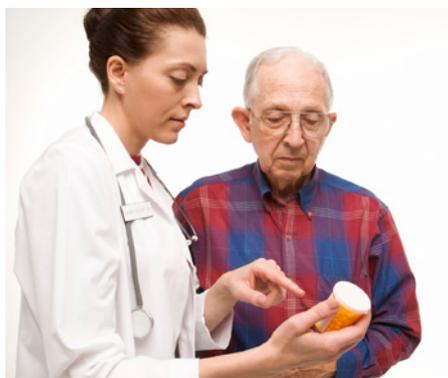
A solution: The Federal Study of Adherence to Medications in the Elderly (FAME)

At the end of a 6-month pharmacy care program, the baseline proportion of patients reaching an acceptable adherence rate rose 16-fold from 5% to 98.7%

attempted to address the above knowledge gaps by testing the efficacy of a comprehensive pharmacy care program for elderly patients to improve medication adherence and its associated effects on blood pressure (BP) and low-density lipoprotein cholesterol (LDL-C) – surrogates for cardiovascular risk factors. The pharmacy care program consisted of three elements: 1) an hour of individualized medication education

and regimen tailoring using standardized checklists at the initial pharmacist visit, 2) medications dispensed in blister packs and 3) 30-minute follow-ups every two months. This two-year multiphase study was conducted with 200 community-based patients aged 65 years or older who were taking at least four chronic medications.

At the end of a 6-month pharmacy care program, mean baseline medication adherence rose from 61.2% to 96.9% ($p < 0.001$). The proportion of patients in whom all chronic medications were taken with an adherence rate of at least 80%, a commonly accepted cut point defining an acceptable level of medication adherence, increased from 5% to 98.7% ($p < 0.001$). In patients with drug-treated hypertension ($n = 184$), mean systolic BP decreased from 133.2 to



129.9 mm Hg ($p = 0.02$). In patients with drug-treated dyslipidemia ($n = 162$), mean LDL-C decreased from 91.7 to 86.8 mg/dL ($p = 0.001$). The next phase was a 6-month randomized controlled trial where patients

received either continued pharmacy care or baseline usual care, where medication education was not provided and medications were dispensed in vials. Continued pharmacy care patients sustained a mean adherence rate of 95.5%, whereas this value dropped to 69.1% for usual care patients. Systolic BP in the continued pharmacy care group was 124.4 mm Hg, a 6.9 mm Hg reduction from baseline. This was a larger decline than in the usual care group ($p < 0.04$), where baseline systolic BP decreased only by 1 mm Hg to 133.3 mm Hg.

Background or research methods: The FAME trial was conducted with military health care beneficiaries from the Walter

Reed Army Medical Center in Washington DC. Patients were elderly (>65) men and women taking at least four chronic medications daily. During the run-in phase, baseline data were collected on demographics, medication lists, medication adherence, BP and LDL-C. Phase one was a prospective, observational study on the impact of the pharmacy care program on adherence, BP and LDL-C determined every 2 months for 6 months. These same variables were collected in phase two, where patients were randomized to receive either baseline or continued pharmacy care. Adherence was expressed as the percentage of pills taken relative to the number of pills prescribed.

Implications: This study is one of few prospective studies/randomized controlled trials that demonstrate a marked and sustained positive impact of a comprehensive pharmacy care program on both patient adherence and major cardiovascular risk factors. It also provides insight into the required program duration that is more likely to produce positive results in elderly patients. As Canada's population ages, pharmacists have a unique and important opportunity to develop and maintain similar programs tailored to the complex drug therapy needs of the

elderly. A combination of individualized patient education, sustained reminder packaging of medications such as blister packing and serial follow-up as used in the study can serve as a good starting point.

Study limitations should be noted. Due to the nature of the intervention, blinding was not possible. BP and LDL-C are only surrogate markers for long-term morbidity and mortality outcomes. To measure the effect of adherence programs on hard outcomes such as death or stroke, larger sample sizes and lon-

ger study durations would be required. Study participants were eligible for military health care benefits that provide all medications at no cost. A lack of financial constraint – a common adherence barrier in the overall patient population – may reduce the generalizability of the study findings.

Financial support: Partial funding for this study was provided by a grant award from the American Society of Health-System Pharmacists Research and Education Foundation.

¹ Ontario Pharmacists' Association. An analysis of economic value & health system benefits for pharmacy professional services. September 1, 2009. Available: www.opatoday.com/members/documents/FULL_REPORT_OPA_Value_of_Pharmacy_Sep09_pdf.pdf (accessed November 6, 2011).

² Statistics Canada. Medication use among senior Canadians. March 2009. Available: www.statcan.gc.ca/pub/82-003-x/2009001/article/10801-eng.pdf (accessed November 6, 2011).

³ Farrell B, Szeto W, Shamji S. Drug-related problems in the frail elderly. *Can Fam Physician* 2011;57(2):168-169.

A pharmacist intervention improves adherence to cardiovascular medications in heart failure and decreases health care use and costs

Murray MD, Young J, Hoke S, et al. Pharmacist intervention to improve medication adherence in heart failure. *Ann Intern Med* 2007;146:714-725.

Issue: Canadian data show that patients with heart failure have a poor prognosis, with an average one-year mortality rate of 33%.¹ In addition, heart failure is a chronic disease with hospital readmission rates approaching 25% within one year,¹ creating a significant burden on both the patient's quality of life and on health care resources. These circumstances accentuate the importance of patient adherence to cardiovascular medications used for heart failure. Unfortunately, few studies designed to improve adherence to

Considering the cost of the intervention (\$205) and the overall cost of health care (\$3165 less in the intervention group), the intervention saved \$2960 per patient

therapy had been rigorously tested.

A solution: A 9-month randomized controlled trial (followed by a 3-month post-

intervention assessment) was conducted to determine the effect of a pharmacist intervention on 314 socioeconomically disadvantaged patients with heart failure. In the test group, an intervention pharmacist with advanced training obtained baseline medication histories; provided patient-centred verbal instructions, a reminder timeline and written materials (aimed at patients with low health literacy) about the medications upon dispensing; monitored medication use, body weight and other clinical

data. Patients in the usual care group had no further contact with the intervention pharmacist after the baseline medication history was taken.

Primary outcomes were three types of adherence: taking (percentage of prescribed medication taken), scheduling (consistency in administration times) and refill (supplies of medications received relative to amount prescribed). Overall, taking adherence was 67.9% and 78.8% in the usual care and intervention groups, respectively ($p < 0.05$). Taking adherences for common heart failure medications, including ACE inhibitors, beta-blockers, digoxin and loop diuretics, were all higher in the intervention group ($p < 0.05$). Overall scheduling adherence and refill adherence were also higher in the intervention group at 53.1% and 109.4%, respec-

tively, compared to 47.2% and 105.2% in the usual care group ($p < 0.05$). Improvements in taking and scheduling adherence dissipated in the 3-month post-intervention period.

Secondary outcomes measured were heart failure exacerbations and costs. The intervention group had 19.4% fewer exacerbations on the combined endpoint of hospital admissions or emergency department visits. Overall improvement in patient satisfaction from baseline to 12 months was greater in the intervention group ($p = 0.022$). On an average-per-patient basis, considering the cost of the intervention (\$205) and the overall cost of health care (\$3165 less in the intervention group [$p < 0.05$]), the intervention saved \$2960 per patient. No significant differences were noted in quality of life.

Background or research methods: Patients were recruited from Wishard Health Services in Indianapolis, Indiana, which serves socioeconomically disadvantaged and medically vulnerable patients. The intervention pharmacist was trained by an interdisciplinary team of clinicians who were experts in patient education and cardiovascular pharmacotherapy. Medication adherence was assessed using electronic monitoring chips in prescription container lids and a medical record system. Heart failure exacerbations were assessed using hospital admission data from emergency visits. Patient participants assessed disease-specific quality of life using the Chronic Heart Failure Questionnaire that consists of four dimensions: fatigue, dyspnea, emotion and mastery.

Implications: This study uniquely demonstrates how a pharmacist intervention can improve patient adherence to drug therapy in one of the most fatal disease states, which in turn results in improved health outcomes, increased patient satisfaction and almost \$3000 in health care savings per patient, an equivalent of a \$14 return on investment per dollar spent. The dissipated effects seen in the post-intervention period suggest that such an intervention must be ongoing in order to observe continued posi-

tive results, consistent with implications of a previous study by Lee et al.² In light of these findings, pharmacists and health policy makers may benefit from focusing their efforts into developing and funding adherence programs for diseases that have poor prognosis, result in poor quality of life and are resource-intensive.

Several factors limited the generalizability of the study findings. Patients were recruited from a health centre that serves a predominantly indigent population. To ascertain adherence, patients were

required to use electronically monitored containers, thereby excluding those who used pill box aids. Because all interventions were delivered by a single pharmacist, other factors such as pharmacist attitudes and behaviours that may have promoted delivery of the intervention were not explored.

Financial support: Funding for this study was provided by the (U. S.) National Institutes of Health.

¹ Lee DS, Johansen H, Gong Y, et al. Regional outcomes of heart failure in Canada. *Can J Cardiol* 2004;20(6):599-607.

² Lee JK, Grace KA, Taylor AJ. Effect of a pharmacy care program on medication adherence and persistence, blood pressure and low-density lipoprotein cholesterol – a randomized controlled trial. *JAMA* 2006;296(21):2563-2571.

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