Winter 2013, Volume 7, Issue 1

the Translator

Canadian Pharmacy ➤ Research ➤ Health Policy ➤ Practice ➤ Better Health

The role of pharmacists in optimizing human immunodeficiency virus (HIV) pharmacotherapy

Between 2005 and 2008, the prevalence of HIV in Canada rose 14% from 57,000 to 65,000 people. It is estimated that in 2008, there were 2300 to 4300 new cases of HIV infections.[1] With no vaccine or cure, antiretroviral treatment is imperative for patients living with HIV, who must take these medications for the rest of their lives. These patients require routine refills, often resulting in pharmacists being their most frequent contact with a health care provider. This issue of *the Translator* highlights the roles of pharmacists in managing HIV medication therapy and adherence:

- **A pharmacist-managed adherence clinic improves antiretroviral adherence among patients with HIV**
- **One-to-one pharmacist counselling increases the likelihood that HIV patients are able to completely describe antiviral drug resistance**
- **HIV clinical pharmacist modification of antiretroviral therapy results in lower pill burden, higher adherence and improved clinical outcomes**
- **Community pharmacist medication therapy management consistently boosts antiretroviral therapy adherence and appropriateness in HIV/AIDS patients**

A pharmacist-managed adherence clinic improves antiretroviral adherence among patients with HIV

Henderson KC, Hindman J, Johnson SC, et al. Assessing the effectiveness of pharmacy-based adherence interventions on antiretroviral adherence in persons with HIV. *AIDS Patient Care STDS.* 2011;25(4):221-8.

Issue: Rigorous antiretroviral therapy (ART) adherence is central to effective treatment of HIV. Low adherence, characterized as less than 70%, is associated with five times the risk of HIV progression due to sub-therapeutic levels of drug in the plasma. Meanwhile, higher degrees of adherence, characterized as 90% or higher, have been demonstrated to lead to delayed virologic failure, increased CD4 counts, a reduced likelihood of progression to acquired immunodeficiency syndrome (AIDS) and ultimately, a decreased risk of death. A survey conducted among patients with HIV revealed a desire to receive additional consultation regarding drug interactions, side effects and proper dosing, all of which can be addressed by pharmacists.

The ability of pharmacists to help raise patients' adherence to near-perfect rates underlines the crucial role of pharmacists in HIV treatment

A solution: The University of Colorado Hospital houses a pharmacist-managed adherence clinic at the Infectious Disease Group

[1] Health Canada. It's Your Health: HIV/AIDS. 2010. Available: www.hc-sc.gc.ca/hl-vs/iyh-vsv/diseases-maladies/hiv-vih-eng.php (accessed November 13, 2012).

The Translator is an initiative by the Canadian Pharmacists Association to support the knowledge translation between pharmacy practice research and health policy. Each issue selects a number of pharmacy practice research articles, briefly summarizes them and discusses the health care policy implications. These articles are submitted by researchers who have a strong desire to support evidence-based health care policy and best practices.

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A pharmacist-managed adherence clinic improves antiretroviral adherence among patients with HIV (cont.)

Practice (IDGP), which is responsible for the care of approximately 1800 patients with HIV/AIDS. Patients were referred to the clinic if they showed signs of nonadherence through self-reports, medication refills that were at least two weeks late or surrogate markers including decreased CD4 count and a HIV-1 viral load higher than 50 copies/mL. Interventions were customized for patients and consisted of an initial in-person consultation with the pharmacist, follow-up visits at two weeks, one month and every two months afterwards for a total of five visits. Pharmacists discussed barriers to adherence with patients and offered suggestions to overcome these barriers. Topics frequently discussed included the use of pill boxes, how to manage ART side effects and education regarding the magnitude of adherence as well as its consequences. Additionally, patients received monthly telephone calls from a pharmacy staff member to remind them of upcoming refills. The proportion of participants who attained 95% or higher adherence increased from 7% to 32% after pharmacist intervention ($p=0.01$). Average baseline adherence levels were 60% and increased to 81% after intervention ($p<0.0001$).

Implications: The referral of HIV patients to the pharmacist-managed adherence clinic significantly improved ART adherence rates over a period of six months. The ability of pharmacists to help raise patients' adherence to near-perfect rates underlines the crucial role of pharmacists in HIV treatment. In spite of only three participants being able to attend all five pharmacist one-on-one consultations, results of this study revealed that just one consultation with the pharmacist led to a higher Proportion of Days Covered (PDC) (87% compared to 59%, $p<0.001$). A limitation of this study is the small sample size and relatively short length of follow-up. As well, although PDC has been shown to accurately measure adherence, it cannot take into account whether patients truly took their medications as prescribed. Since participants received both pharmacist intervention and telephone reminders, it is difficult to conclude which intervention contributed more to the improved adherence rates.

Background or research methods: Inclusion criteria for participants of this prospective cohort study included patients between 18 and 75 years of age, prescribed ART for three months or more and used only the clinic pharmacy for prescription fills. Thirty-four patients who were suspected or confirmed to be nonadherent were referred to the clinic, 28 of whom agreed to participate in the study. Pharmacy refill records were examined, participants were given an adherence questionnaire and were asked to provide a 5 mL blood sample to measure blood ART levels. On average, pharmacist consultations lasted 45 minutes for the initial visit and 30 minutes for each follow-up visit. The PDC was applied to measure adherence using the formula PDC = (Total Days' Supply/Total Number of Days Evaluated) x 100.

One-to-one pharmacist counselling increases the likelihood that HIV patients are able to completely describe antiviral drug resistance

Racey CS, Zhang W, Brandson EK, et al. HIV antiviral drug resistance: Patient comprehension. *AIDS Care.* 2010;22(7):816-26.

Issue: Patients' understanding of their medication and treatment plan is critical to successful therapy. Antiretroviral (ARV) drug resistance occurs when common mutations in the viral genome of HIV-positive patients produce and replicate species that reduce the effectiveness of ARV drugs. ARV plasma levels below therapeutic range have been linked to the emergence of resistant strains. Once drug resistance has occurred, many options are severed; the use of certain drugs or even classes of drugs are eliminated. There exist studies on enhancing ARV adherence; however, there is limited research on patients' understanding of their HIV treatment, in particular, knowledge of ADR drug resistance.

A solution: The Longitudinal Investigations into Supportive and Ancillary health services (LISA) cohort studies patients over the age of 19 living with HIV in British Columbia and on highly active antiretroviral therapy (HAART). This study aimed to measure LISA participants' knowledge of ARV drug resistance. Participants were asked to define the development of HIV resistance and answers were evaluated according to a three-part definition comprising of the significance of adherence, the presence of viral resistance and the diminishment of medication efficacy. Of 363 participants who had conferred with a physician about HIV resistance, only 14 (3.9%) were able to describe all three factors of the definition and were considered to have a complete understanding. Results demonstrated that participants who received one-to-one counselling from a pharmacist were more likely to provide a complete or partial description of HIV resistance (OR = 2.14, 95% CI: 1.41-3.24) The likelihood that a participant could either completely or partially define resistance increased from 15.9% to 42.8% and 63.9% after receiving pharmacist counselling and after receiving counselling from both a pharmacist as well as a physician, respectively. Other factors that increased the probability of participants defining HIV resistance were younger age, higher education and provider trust.

One-to-one pharmacist counselling is identified as one area of development that should be given attention to, especially when commencing new treatment

Implications: Complete understanding of ARV drug resistance was low in this cohort of HIV patients. Despite 80% of participants who reported discussing the issue with their physician, only 4% were able to completely define HIV resistance, suggesting that patients may not comprehend all the health information they receive. A major challenge in HIV treatment is maintaining life-long drug therapy. Therefore, it is imperative that focus is

placed on educating patients and ensuring they are fully aware of their treatment plan, including the detrimental possibilities if the plan is not followed. Pharmacists have been shown to enhance patient understanding of HIV resistance, increasing overall patient knowledge of treatment. One-to-one pharmacist counselling is identified as one area of development that should receive attention, especially when commencing new treatment. This increases patient understanding of HIV resistance, which can ultimately lead to increased adherence and clinical outcomes. It is important to note that in this study, participants may have been able to demonstrate a better understanding of HIV adherence if more specific questions were asked to incite further details.

Background or research methods: The study was conducted at the Drug Treatment Program (DTP) at the British Columbia Centre for Excellence in HIV/AIDS (BC-CfE), where ARVs are provided for free to eligible patients with HIV. Surveys were conducted on a total of 457 participants to gather data on socio-demographic variables. Evaluation of HIV resistance knowledge was gauged using a two-part question. In the first part, participants were asked if their physician discussed the meaning of "HIV resistance," while the second component asked participants to define this term. Those who recognized all, one or two or none of the three factors were classified as "complete," "partially complete" and "incomplete," respectively. The LISA study was funded by the Canadian Institute for Health Research (CIHR).

HIV clinical pharmacist modification of antiretroviral therapy results in lower pill burden, higher adherence and improved clinical outcomes

Ma A, Chen DM, Chau FM, et al. Improving adherence and clinical outcomes through an HIV pharmacist's interventions. *AIDS Care.* 2010;22(10):1189-94.

Issue: Antiretroviral (ARV) drug treatment for HIV is long-term and often complex, presenting a roadblock to adherence for HIV-positive patients. Dosing regimens frequently involve a multitude of pills taken multiple times a day. There exists an abundance of further patient barriers to ART adherence, including comorbidities adding to pill burden, medication toxicities, poor literacy, stigma and substance abuse. Evidence has been established that clinical pharmacists have a substantial impact on the care of patients with HIV; however, the outcomes of HIV-specialized clinical pharmacists modifying ADR regimens have not been well documented.

96% of patients were able to accomplish or maintain undetectable viral loads post-intervention compared to 63% pre-intervention

A solution: This study aimed to evaluate the clinical outcomes of an HIV clinical pharmacist intervention to decrease ARV dose frequency and quantity at an infectious diseases clinic. Suggestions by the pharmacist included the use of combination medications and minimization of the use of ARVs that require multiple dosing or increase risk of adverse effects. These suggestions were reviewed by a physician before implementation. Subsequently, the pharmacist, either in collaboration with the physician or independently, prescribed and counselled patients on their altered treatment plans and adherence. Six months prior to pharmacist intervention, a cohort of 75 patients averaged 7.2 pills/day, 2 times/day and adherence was 81%. Six months after pharmacist intervention, medication quantity and dosing decreased to 5.4 pills/day, 1.5 times/day ($p<0.001$) and adherence increased to 89% ($p=0.003$). Furthermore, CD4+ cell count and CD4% improved significantly and HIV viral loads decreased post-intervention ($p<0.001$).

Implications: HIV clinical pharmacist interventions to modify ARV regimens translated into virologic suppression, enhanced immunologic response and improved adherence in HIV-positive patients in this clinic. The medication expertise that pharmacists possess enables them to analyze patient medical records to successfully pinpoint areas for improvement in ARV therapy, taking into consideration patient factors such as medication history, resistance test results, comorbidities, drug interactions and aberrant laboratory test results. Based on the Department of Health and Human Services (DHHS) Panel on Antiretroviral Guidelines for Adults and Adolescents, the most significant marker of ARV therapy response in patients is the HIV viral load, which is aimed to become undetectable within 16 to 24 weeks after therapy initiation. Implementation of HIV pharmacist interventions in simplifying ARV regimens along with other clinical pharmacist duties (such as adherence counselling) was associated with better drug therapy outcomes, with 96% of patients able to accomplish or maintain undetectable viral loads post-intervention compared to 63% pre-intervention ($p<0.0001$). As patient follow-up was conducted for only six months after intervention in this study, further research should investigate the long-term effects of pharmacist intervention.

Background or research methods: This retrospective cohort study was conducted at the Kaiser Permanente (KP) Medical Care Program in Vallejo, California, where patient information such as diagnoses and laboratory values are contained in an electronic database. Study participants were patients of KP who obtained ARV therapy from the KP pharmacy system and had their ARV therapy changed by the clinical pharmacist with HIV specialty training between September 2006 and September 2008. There were 263 patients with HIV who belonged to the clinic and 100 patients had their ARV regime modified by the pharmacist within this time period. Twenty-five of these patients were excluded from the study because either they did not have prescription data in the KP pharmacy system or ARV therapy was newly initiated. Adherence was calculated using the formula: [(pills dispensed/pills prescribed per day)/days between refills] x 100.

Community pharmacist medication therapy management consistently boosts antiretroviral therapy adherence and appropriateness in HIV/AIDS patients

Hirsch JD, Gonzales M, Rosenquist A, et al. Antiretroviral therapy adherence, medication use, and health care costs during 3 years of a community pharmacy medication therapy management program for Medi-Cal beneficiaries with HIV/AIDS. *J Manag Care Pharm.* 2011;17(3):213-23.

Issue: Managing antiretroviral therapy (ART) is not an easy task. The dosing regimen is complicated, as it involves the use of medications from at least two of the three key antiretroviral drug classes. Additionally, there are specific storage requirements and unpleasant side effects. Rigorous adherence to ART is critical for HIV/AIDS patients to lessen viral load and prolong survival. Deviation from the ART plan can lead to failed treatment, after which the drugs used will no longer be effective for the same patient. Since there only three main drug classes, medication options become minimal. The benefits of pharmacist-provided medication therapy management (MTM) in relation to outcomes for HIV/AIDS patients are a relatively fresh area of interest. There is a lack of longer-term research available on the results of this type of intervention using a large sample size of patients.

A solution: A pilot program offering pharmacists compensation for providing MTM services to HIV/AIDS patients of California's Medicaid program, Medi-Cal, was launched in 2005 at 10 community pharmacies. Pharmacists provided various types of MTM services according to their own preferences. Examples of MTM services offered involved managing adverse reactions, modifying dosing according to lifestyle or needs, scheduling appointments to discuss ART and routine follow-ups. Compared to 47.3% at non-pilot pharmacies, 69.4% of patients in pilot pharmacies were adherent to ART (2007, $p<0.001$). Pilot pharmacy patients were more likely to stay on the same type of ART regimen and less likely to refill medications in excess or be on contraindicated therapy (2007: 71.7%, 12.9% and 8.9% respectively) in contrast to non-pilot pharmacy patients (2007: 49.1%, 35.5% and 12.2% respectively).

MTM services offered involved managing adverse reactions, modifying dosing according to lifestyle or needs, scheduling appointments to discuss ART and routine follow-ups

Implications: Pharmacist-provided MTMs are invaluable to HIV/AIDS patients for a variety of reasons. The increased likelihood of medication adherence and use of only a single type of ART regimen would result in less medication resistance. In ART, it is ideal to minimize exposure to different ARVs in order to preserve more options for future therapy. The total heath care expenditure for each patient did not differ significantly between pilot and non-pilot patients; however, the medication costs for patients at pilot pharmacies were higher. This was attributed to the increased amount of medications received by patients in pilot pharmacies to manage the adverse effects of ART, which can contribute to better adherence and quality of life. Furthermore, patients who received the MTM service had significantly lower inpatient costs and financial compensation added less than 3% to total costs. It should be noted that patients were not randomly assigned to pilot or non-pilot pharmacies; therefore, results may have been influenced by the characteristics of patients who chose to attend pilot over non-pilot pharmacies. The authors suggest that future research should evaluate other outcomes of pharmacist MTMs, such as employment, sick days and productivity.

Background or research methods: The cohort studied was comprised of 2234 HIV/AIDS patients aged 18 or older examined over a period of three years. Pharmacists at pilot pharmacies had special training in HIV/AIDS care. Patients who filled at least half of their ART medications at a pilot community pharmacy were considered pilot pharmacy patients. Adherence was measured using a medication possession ratio (MPR = total number days supply ART for year/365.25 days), with adherence described as 80% to 120% and excess fills as over 120%. Total medical costs included claims for inpatient, outpatient, hospital outpatient, mental health, lab/x-ray and the AIDS Waiver Program, which provides services to patients in the home or community as opposed to a nursing facility or hospital.

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Contributors
Samantha Thai, Pharmacy Student
Philip Emberley, PharmD, MBA

Reviewers
Jennifer J. Kiser, PharmD
C. Sarai Racey, MPH, PhD Candidate
Parya Saberi, PharmD, MAS
Jan D. Hirsch, RPh, PhD
Christine LeBlanc, B. Journalism

Contact Information
Philip Emberley
Director, Pharmacy Innovation
Canadian Pharmacists Association
pemberley@pharmacists.ca
613-523-7877, ext. 220
1-800-917-9489

www.pharmacists.ca/research

To receive an e-copy of new issues of *the Translator*, contact us at **research@pharmacists.ca**.

The dissemination of this innovative publication is made possible in part through an unrestricted educational grant from Pfizer.