

The Role of the Pharmacist Caring for People Living with HIV/AIDS: A Canadian Position Paper

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ABSTRACT

The degree of complexity involved in caring for patients with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS) has increased dramatically since 1996. The Canadian Collaborative HIV/AIDS Pharmacy Network was developed to bring together pharmacists with a clinical and research focus in HIV/AIDS to optimize patient outcomes and to promote the profession of pharmacy through communication, education, research, and clinical practice. The purpose of this Canadian position paper is to provide pharmacists with guidelines for the role that a pharmacist may have in caring for HIV/AIDS patients. The Network identified several areas in which pharmacists need guidelines for practice: adherence with therapy, patient counselling, management of drug interactions and adverse reactions, medication acquisition and payment, drug information, research, complementary and alternative therapy, pediatric issues, and the needs of special populations. Each of these areas is covered in this position paper. Pharmacists caring for HIV/AIDS patients in the hospital, the community, and other ambulatory settings have an important opportunity to positively affect patient outcome. This position paper is based on currently available information, and as new information becomes available, our role in the care of these patients must also evolve.

Key words: HIV, AIDS, pharmacist's role

RÉSUMÉ

L'étendue et la complexité des soins à donner aux patients infectés par le virus d'immunodéficience humaine (VIH) ou du syndrome d'immunodéficience acquise (SIDA) se sont accrues considérablement depuis 1996. Le « Canadian Collaborative HIV/AIDS Pharmacy Network » a été mis sur pied pour rassembler les pharmaciens ayant un intérêt en pratique clinique et en recherche sur le VIH/SIDA dans le but d'optimiser les résultats des traitements et de promouvoir la profession de pharmacien par le biais des communications, de l'éducation, de la recherche et de la pratique clinique. Le but de cette déclaration de principe canadienne est d'offrir aux pharmaciens des lignes directrices sur le rôle du pharmacien dans les soins qu'il pourrait apporter aux patients souffrant du VIH/SIDA. Le réseau a identifié plusieurs domaines pour lesquels les pharmaciens ont besoin de lignes directrices dans leur pratique : la fidélité au traitement, le counselling, la prise en charge des réactions indésirables et des interactions médicamenteuses, l'obtention et le paiement des médicaments, l'information sur les médicaments, la recherche, la médecine douce ou parallèle, les questions pédiatriques, et les besoins des populations spéciales. Chacun de ces domaines est traité dans cette déclaration de principe. Les pharmaciens qui donnent des soins aux patients atteints du VIH/SIDA en établissement de santé, dans la communauté ou dans d'autres milieux ambulatoires ont une occasion unique d'influer positivement sur l'issue du traitement de ces patients. Cette déclaration de principe s'appuie sur l'information actuellement disponible, et le rôle du pharmacien dans les soins à prodiguer à de tels patients doit évoluer à la lumière des nouvelles informations.

Mots clés : VIH, SIDA, rôle du pharmacien



INTRODUCTION

The degree of complexity involved in caring for patients with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS) has increased dramatically since 1996, with the advent of several new antiretroviral medications, evidence about the advantages of combination antiretroviral therapy, advances in our knowledge about HIV replication throughout all stages of the disease, and the ability to measure HIV viral load in patients.¹ Pharmacists caring for HIV/AIDS patients are presented with many opportunities to positively affect patient outcome. The Canadian Collaborative HIV/AIDS Pharmacy Network was developed to bring together pharmacists with a clinical and research focus in HIV/AIDS to optimize patient outcomes and to promote the profession of pharmacy through communication, education, research, and clinical practice. The purpose of this Canadian position paper is to provide pharmacists with guidelines for the role that a pharmacist may have in caring for HIV/AIDS patients. The Canadian Collaborative HIV/AIDS Pharmacy Network identified the following areas in which pharmacists need guidelines for practice: adherence to therapy, patient counselling, management of drug interactions and adverse reactions, medication acquisition and payment, drug information, research, complementary or alternative therapy, pediatric issues, and the needs of special populations. Each of these areas is covered in this position paper.

GUIDELINES FOR PRACTICE

Adherence Issues

Adherence to drug therapy has emerged as a crucial factor affecting the extent and duration of response to HIV pharmacotherapy.² The advent of “highly active antiretroviral therapy” means that patients are taking multiple medications on a prolonged basis.³ In addition, newer antiretroviral medications such as the protease inhibitors and non-nucleoside reverse transcriptase inhibitors have narrow therapeutic indices, and maintenance of minimum drug concentrations is suggested to achieve optimal therapeutic benefit. To further complicate matters, many of these medications have rigorous dosing and administration requirements, require the ingestion of several pills each day, may cause bothersome adverse reactions, have strict storage restrictions, are associated with numerous drug interactions, and have prohibitive acquisition costs.^{4,5}

Table 1. Factors Affecting Adherence to Medication Regimen

Patient-related factors

Perceived severity of illness or susceptibility to illness (positive correlation)¹³⁻¹⁵
Depression and psychological disturbances^{9,15,16}
Disbelief in potential effectiveness of therapy^{13,17}
Misunderstanding of therapeutic goals¹³
Environment (level of emotional support, basic needs such as food and shelter)^{18,19}
Relationships with health-care providers^{14,18,19}
Changes in daily routines²⁰
Language or cultural barriers
Active alcohol or substance use*^{21,22}

Medication-related factors²³⁻²⁵

Number of pills per day
Dosing frequency
Complexity of medication regimen
Duration of therapy
Adverse effects
Unpleasant taste
Medication costs

* Past substance use or current methadone use are not predictors of nonadherence.

All of these factors may affect a patient's ability to take the medications “as prescribed”. Lack of adherence to therapy may be manifested in various forms, including not filling or refilling the prescription, taking an incorrect dose, taking the medication at the wrong times, not taking the medication properly with respect to meals, sharing medications with friends, forgetting to take one or more doses, and stopping the medication too soon.⁶

Suboptimal adherence to antiretroviral medications and medications for prophylaxis of opportunistic infection may have devastating consequences for the HIV-positive patient.^{2,7-11} These consequences include increased viral load,^{7-9,11} development of resistance to the current antiretroviral regimen,² reduced efficacy of future regimens,² and more admissions to hospital.¹⁰ Paterson and colleagues⁹ observed a highly significant relationship between suboptimal adherence and risk of virologic failure, as well as better outcomes with adherence rates as high as 95% or more. Adherence is the single most important factor controlled by the patient to achieve desired therapeutic outcomes. To assess and promote adherence, pharmacists need to be aware of both patient and medication factors that may influence this aspect of therapy¹² (Table 1). Pharmacists can play an important role in HIV therapy by minimizing barriers to adherence. Methods that the pharmacist can use to improve a patient's adherence to his or her medication regimen are listed in Table 2.



Table 2. Strategies for Improving Adherence to Medication Regimen

Assess the patient

Identify the patient's needs and lifestyle.
Determine the patient's knowledge of his or her disease and his or her expectations of treatment.
Determine the patient's social situation.
Identify whether the assistance of other health-care professionals is required; refer if necessary.

Simplify the therapy

If possible, streamline and simplify therapy (after discussion with the patient's physician).

Reduce the dosage frequency

If appropriate, reduce the frequency of dosing medications on the basis of recent literature.

Individualize medication schedules

Individualize medication schedules to accommodate the patient's lifestyle (including temporary adjustments to schedules for patients travelling through different time zones). Consider software programs such as HIV Therapy Scheduler® (HTS; available free of charge, in English and French, from Merck Frosst Canada, 800.567.2594) or the HIV Medication Guide® (available free of charge, in English and French, from Glaxo Wellcome and BioChem Pharma, 800.463.6314).

Educate the patient

Inform the patient about optimal medication use, including dietary restrictions, adverse reactions and how to treat them, procedures for missed doses, and drug interactions. Supplement general information of this type with personalized, written information when possible. Fact sheets about HIV medications have been produced by the Ontario HIV Pharmacy Specialty Group in conjunction with the Ontario HIV Clinic Coordinators Group and are available at the Web site of the Immunodeficiency Clinic — University Health Network (<http://www.tthivclinic.com>). A patient information booklet, *Questions and Answers on Taking Antiretrovirals*, is also available at this Web site or it may be ordered free of charge from the National AIDS Clearing House, 613.725.3434.

Recommend use of "dosettes"

"Dosettes" are multicompartiment pill containers designed to accommodate the HIV/AIDS patient's complex medication regimens. Examples are the Glaxo Wellcome 7-day dosette; Merck Frosst Canada's daily pill container, which accommodates up to 8 dosing times per day; and Hoffmann — LaRoche Canada's weekly medication organizer. All are available from the manufacturers free of charge.

Recommend other patient reminder devices

Encourage patients to use other reminder devices, such as programmable alarms on watches, beepers, electronic pill boxes, and "counter caps". Counter caps fit on regular medication vials and indicate the day of the week as well as the number of doses taken on a given day. Merck Frosst Canada has developed and distributed a beeper device known as the ALR ("A Little Reminder") beeper, which can be programmed with up to 8 dosing times per day and thus can accommodate more complex regimens.

Ensure timely acquisition

Ensure that patients get their medication supply promptly after it is prescribed.

Minimize medication costs

Help the patient to minimize medication costs by becoming familiar with government and third-party payment plans in your province.

Follow up appropriately

Implement a follow-up system to monitor patient compliance and provide support (for example, a pharmacist-initiated telephone call-back system).

Patient Counselling

Counselling about medications is of paramount importance in the care of HIV-positive patients. Before initiating therapy, it is vital that patients be fully aware of the reasons for taking their medications, how the medications should be taken and for how long, as well as any potential medication-related problems.

HIV-related disease has crossed many borders relating to sex, age, race, culture, socioeconomic status, language, and lifestyle choices. It is important to recognize that different patients will have very different foci and issues regarding their medications.

Therefore, it is imperative that the pharmacist first interview the patient to assess his or her current health, medical and medication history, personal situation, education level, and understanding of his or her illness and medications. This interview will allow the pharmacist to identify any specific issues or conditions that need to be addressed during the ongoing care and support of that patient. The pharmacist should then tailor all subsequent discussions with the patient to ensure that his or her specific needs are met. By establishing a more personal relationship with the patient, the pharmacist can provide a safer and more accessible support system to the patient.



Each pharmacist will have a personal approach to counselling patients about their medications. However, it has been observed that as soon as they leave the physician's office, patients forget 50% of the information that has been communicated verbally to them.²⁶ Therefore, all verbal discussions should be preceded or followed up with written information that emphasizes important points. Written information should be at grade-8 literacy level. In addition, the pharmacist should prioritize essential information so that the most important points are made while the patient is still focussed. In some circumstances, an interpreter or handouts in other languages (or both) may be necessary. The presence of family members, partners, or supportive friends during the counselling session can be very helpful for reinforcement and ongoing patient support.

The pharmacist can also be a referral source for other support and educational tools that may be of interest and use to the patient. These include printed medication profiles and time charts, pill boxes for precounting medications, medication time alarms, blister packaging, Web sites with drug information or other patient-related information, community support groups, and counselling about other related issues (such as safe sex, healthy lifestyles, nutrition, and vitamins). It is important that the pharmacist be aware of what is available in the community in the way of support (medical, social, and peer) and have a good communication line with the patient's treating physician.

Patient confidentiality is always a pharmacist's priority, especially when dealing with HIV disease. It is crucial to protect patients' right to privacy while ensuring that they receive the necessary information to start or continue their medications. Private counselling rooms or areas are optimal. Patients should be encouraged to make appointments with the pharmacist to allow adequate time and privacy for the counselling session, especially for first-time dispensing situations. Pharmacists in pharmacies without private counselling areas should use discretion in communicating with HIV/AIDS patients, by using first names only, bagging the medications before giving them to the patient, and offering telephone counselling to provide more privacy.

Although discussions between the patient and the physician are important, the pharmacist is in a key position to reinforce and provide additional information to help patients with the logistics, practicalities, and realities of living with their medications.

Managing Drug Interactions and Adverse Reactions

In addition to their antiretroviral therapy, many patients are taking medications to treat and prevent opportunistic infections, as well as antidepressants, analgesics, antiemetics, sedatives, food supplements, and complementary or alternative therapy. As a result, there is the potential for clinically significant drug interactions and adverse drug reactions, which may affect patient outcome. Consequences of either drug interactions or adverse drug reactions include nonadherence leading to medication failure, development of resistance to antiretroviral medication because of subtherapeutic drug concentrations, and toxic effects due to pharmacokinetic and pharmacodynamic interactions.^{10,27-29}

Pharmacists should be aware of the different types and mechanisms of drug interactions to manage them effectively. The 3 categories are drug-drug (including nonprescription medications, alternative therapy, and recreational drugs), drug-food, and drug-disease. Interactions can be further classified as pharmacokinetic or pharmacodynamic. Pharmacokinetic interactions resulting from hepatic enzyme inhibition and induction are becoming increasingly more complex in the care of HIV/AIDS patients. Pharmacists must now be aware of the various hepatic cytochrome P450 isoenzymes to effectively understand and manage drug interactions. The field of HIV-related drug interactions is growing rapidly, which is rendering many of the common drug information resources outdated. Pharmacists must use up-to-date sources of information to make an accurate assessment (Table 3)³⁰⁻³³ Because many interactions with HIV therapies are still unknown, pharmacists need to have an understanding of a medication's pharmacokinetics, in order to identify potential drug interactions.^{30,32,34,35}

Pharmacodynamic drug-drug interactions may be additive, synergistic, or antagonistic in the overall effect of the drug combination on efficacy or toxicity. Desirable pharmacodynamic drug-drug interactions may either enhance clinical efficacy or reduce toxicity. An example of a beneficial pharmacodynamic drug-drug interaction is the use of dual protease inhibitor combinations, such as ritonavir and saquinavir. This combination has demonstrated in vitro synergy against HIV along with long-term viral suppression in protease-inhibitor-naïve patients.^{36,37} An example of an undesirable HIV-related pharmacodynamic drug-drug interaction is the combination of zidovudine with ganci-



Table 3. Suggested Web Sites for Patients with HIV/AIDS

Site	URL*
Aegis HIV education	http://www.aegis.com
AIDS Clinical Trials Information Service (ACTIS)	http://www.actis.org/
AIDS.org (Immunet), including treatment information for HIV/AIDS caregivers	http://www.immunet.org
American Foundation for AIDS Research (amfAR)	http://www.amfar.org
Canadian HIV Trials Network	http://www.hivnet.ubc.ca/ctn.html
CDC Divisions of HIV/AIDS Prevention	http://www.cdc.gov/nchstp/hiv_aids/dhap.htm
CDC National Prevention Information Network†	http://www.cdcnpin.org
Conference on Retroviruses and Opportunistic Infections	http://www.retroconference.org/
FDA Center for Drug Evaluation and Research guidance documents‡	http://www.fda.gov/cder/guidance/
Harvard AIDS Institute	http://www.hsph.harvard.edu/hai/
HIV InSite (University of California San Francisco and San Francisco General Hospital Medical Center) ‡	http://hivinsite.ucsf.edu/
Immunodeficiency Clinic — Toronto Health Network‡	http://www.tthivclinic.com
JAMA HIV/AIDS Information Center	http://www.ama-assn.org/special/hiv/
Liverpool Pharmacology HIV Group‡	http://www.liv.ac.UK/~hivgroup/home.html
Parkhurst Online: international abstracts on HIV/AIDS	http://www.bestmdsite.com/abstracts/abstracts-HIVAIDS-home.html
Southern Alberta Clinic, Calgary Regional Health Authority‡	http://www.crha-health.ab.ca/clin/sac/sac.htm
The Body – an AIDS and HIV Information Resource	http://www.thebody.com

CDC = US Centers for Disease Control and Prevention, FDA = US Food and Drug Administration.

* URLs (uniform resource locators) are up to date as of February 2000.

† Previously known as the National AIDS Clearinghouse.

‡ Information about drug interactions and adverse drug reactions is available at these Web sites.

clovir. This combination is associated with an increased risk of hematologic toxicity.^{38,39}

Adverse drug reactions may significantly affect a patient's overall quality of life. This is particularly problematic in asymptomatic HIV patients who must take many toxic medications to prevent disease progression and opportunistic infections. In addition, patients with HIV experience higher rates of adverse drug reactions than the general population.⁴⁰⁻⁴³ Pharmacists need to be aware of a medication's adverse drug reaction profile, including incidence, severity, time course, and management options. Patients should be informed about a medication's adverse drug reactions, given guidance about when it is important to seek medical assistance, and advised on how to manage less serious adverse reactions. Because many of these medications are newly marketed or still experimental, it is important for the pharmacist to watch closely for new adverse reactions and to report them to the manufacturer, Health Canada, or both. More complete information on how to identify drug interactions and adverse drug reactions is provided elsewhere.^{30-32,44}

Medication Acquisition and Payment

One of the few health-care professionals likely to

have access to information about medication acquisition and payment plans is the pharmacist. The pharmacist needs to know the type of drug insurance coverage a patient has and whether the prescribed therapy is accessible and affordable for the patient. This information may influence both the selection of medications and when the patient can start therapy.

A patient's inability to afford costly medications may compromise other areas of his or her life, such as nutrition, housing, social interaction, and overall quality of life. Pharmacists need to make acquisition of medication as simple as possible and payment as inexpensive as possible. In addition to provincial medication plans and private insurance, pharmacists need to bear in mind other methods of acquisition and payment that may be beneficial for patients (for example, investigational and clinical drug trials; emergency-release, compassionate-access, and expanded-access programs; and financial assistance offered by advocacy groups).

It is important that the pharmacist obtain a complete list of all medications along with the location(s) where the patient is having prescriptions filled. Patients need to understand that not all community pharmacies will stock all the medications they require. Therefore, patients should be advised by the pharmacist to give the pharmacy a few days' advance notice, to ensure that the



Table 4. Ensuring an Uninterrupted Medication Supply for a Patient

Obtain a current list of the patient's medications
Explain the benefits of minimizing the number of pharmacies used
Encourage the patient to call in advance for refills to prevent interruptions in therapy
Establish a rapport with other health-care providers, so that changes in medications can be anticipated and planned
Be aware of alternative methods of medication acquisition (such as compassionate access, emergency medication release, patient advocacy agencies)
Be aware of the possibilities for therapeutic interchange
Consider a delivery service, especially for nonambulatory patients
Work with the patient to plan for medication supplies during weekends, holidays, travel, and other special circumstances
Inform the patient about number of refills and refill procedures
Be familiar with various payment plans available for HIV/AIDS patients in your province or region

pharmacy will have the required medications available when they are needed. Table 4 provides suggestions for ensuring an uninterrupted supply of medications.

Drug Information

Information about HIV and AIDS changes very rapidly, making it difficult for both patients and health-care providers to stay current. The challenge to the front-line pharmacist is to provide information to a patient population that generally has a broad knowledge base about the prescription and nonprescription medications used to treat their illness. Many HIV/AIDS patients access information about their illness and its treatment from sources such as the Internet and HIV/AIDS advocacy associations. In fact, the health-care practitioner is often in a position to learn from his or her patients rather than to educate them. This role reversal may initially be difficult for some. However, one of the pharmacist's roles in this area is to "learn" how to willingly obtain and appreciate information provided by the patient.

The vast amount of information currently available for HIV/AIDS treatment is intimidating, even to health-care practitioners practising specifically in the area. Table 5 presents a review of the resources available for pharmacists to increase our knowledge base and help keep us current in HIV/AIDS. Some of these resources focus on the professional and others on the consumer. Members of the Canadian Collaborative HIV Pharmacy Network may also be useful local resources. Tables 3, 6, and 7 provide specific information about other HIV/AIDS resources. Finally, the pharmacist should seek and use the expertise

Table 5. Drug Information Resources

Textbooks and other books

Provide basic background information
Information may be out of date

Databases (e.g., AIDSLINE, MEDLINE)

Literature search up to date within 6 months
Available at university libraries or over the Internet

Meeting abstracts

State-of-the-art information
Key HIV/AIDS meetings: World AIDS Conference, Conference on Retroviruses and Opportunistic Infections, annual meeting of the Canadian Association for HIV Research (CAHR), Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC)
Complete details about research may not be provided

Medical journals

Reputable, peer-reviewed general scientific journals (e.g., *Journal of the American Medical Association*, *New England Journal of Medicine*, *Annals of Internal Medicine*)
Journals specific to HIV research (e.g., *AIDS*, *Journal of AIDS*)

HIV/AIDS hotlines

Available in all provinces (see Table 7)

Internet Web sites

Many reputable, highly informative sites available (see Table 3)
Caution needed in evaluating information from non-mainstream Web sites that do not have a reliable source or peer review of information presented at the site

E-mail and news services

Extracts from news stories and medical literature pertaining to HIV/AIDS (e.g., CDC AIDS News)

Internet newsgroups and chat rooms

Open forum for discussion; not moderated; information may not be verifiable

Community and support groups

Support for patients and their families and friends (see Table 6)

Local HIV/AIDS physicians, nurses, and pharmacists

Provide local expertise and information on local practice patterns

CDC = US Centers for Disease Control and Prevention.

of other local health-care practitioners (such as physicians and nurses) who are caring for HIV/AIDS patients. By networking with all of these resources, the pharmacist will be better able to manage the vast amount of information about HIV/AIDS and contribute more effectively to patient care.

Research

Pharmacists may be frightened by the idea of doing research. However, the definition of what constitutes research is broad. Research may be as simple as writing a case report or as complex as designing a clinical trial. Thus, the role of the pharmacist in HIV-based research is diverse. The area of HIV/AIDS, perhaps more than any other area, is associated with a rapid rate of change in medical care of patients. For this reason, providers are often unable to find support in the literature to guide



Table 6. HIV/AIDS Information Resources

Resource	Telephone Number
AIDS Action Now (social action group)	416.928.2206
AIDS Committee of Toronto (ACT)	416.926.0063
Canadian AIDS Society (CAS)	613.230.3580
Canadian Association for HIV Research (CAHR)	514.340.8261
Canadian Foundation for AIDS Research (CANFAR)	416.361.6281
Canadian Haemophilia Society (CHS)	514.848.0503
Canadian HIV Trials Network	604.631.5327
	800.661.4664
Canadian Public Health Association (CPHA) National AIDS Clearinghouse	613.725.3769
Community AIDS Treatment Information Exchange (CATIE)	416.944.1916
	800.263.1638
Health Protection Branch (HPB), Health Canada	613.941.2108
HIV/AIDS Cultural Network of Metropolitan Toronto and Surrounding Area	416.923.9347
HIV/AIDS Epidemiology, Laboratory Centre for Disease Control, Health Canada	613.957.1777
HIV Fax Delivery Service	613.941.3900
National AIDS Secretariat	613.957.7477
National Tuberculosis Laboratory	613.957.1818
Ontario AIDS Bureau	416.327.8797
	800.268.6066
Sunnybrook and Women's College Health Sciences Centre HIV Project Centre	416.480.4551
Telelink for HIV-positive women	519.748.5566

Table 7. Canadian AIDS Hotlines

Province	Telephone Number
Alberta	800.772.2437
British Columbia	800.661.4337
Manitoba	800.782.2437
New Brunswick	800.561.4009
Newfoundland	800.563.1575
Northwest Territories (Western Region)	800.661.0844
Northwest Territories (Eastern Arctic)	800.265.3333
Nova Scotia	800.566.2437
Ontario (English)	800.668.2437
Ontario (French)	800.267.7432
Prince Edward Island	800.314.2437
Quebec — general	800.463.5656
Quebec — for health-care professionals	800.363.4814
Saskatchewan	800.667.6876
Yukon Territory	800.661.0507

them in the management of specific patients. Unfortunately, this may be the result of the failure of a provider to publish his or her own previous experience. It is a professional responsibility to share information by contributing to the literature. In fact, leaders of our profession have stated that a group that does not conduct research has no future.⁴⁵

One relatively simple form of research that a pharmacist may initiate or participate in is the reporting of new drug interactions and adverse drug reactions. Other potential avenues of pharmacy-based research in HIV/AIDS include case series, surveys, clinical trials, research sponsored by the pharmaceutical industry, and pharmacokinetic and pharmacodynamic studies.

Table 8. Funding Resources

AIDS Positive Action Fund
American College of Clinical Pharmacists
Canadian College of Clinical Pharmacists
Canadian Society of Hospital Pharmacists
Local hospital grants or foundations
Medical Research Council of Canada
Pharmaceutical companies
Provincial ministries of health
Society of Infectious Diseases Pharmacists

Once the decision is made to participate in research, the next step is a thorough evaluation of the published literature (Tables 3 and 5). It is important to determine whether information on the specific topic already exists, or whether there are gaps in the existing literature that your case report or study may fill.

Funding may be required for a research project. There are several different funding sources for research in HIV/AIDS (Table 8). Finally, research is not complete until it is published. It is important to become familiar with the different journals available and what types of information they publish. When this information is known, then it is possible to choose the single journal to which it would be most appropriate to submit your publication.

Complementary or Alternative Therapy

Complementary or alternative medicines are treatments used in conjunction with or in lieu of conventional mainstream therapies. Kassler and



Table 9. Pharmacist's Role in Providing Care to HIV/AIDS Patients Taking Complementary or Alternative Medicines

Counselling

Be an objective, active listener.
 Do not be judgemental.
 Understand that patients need to participate in their own health care.
By establishing a caring, nonjudgemental, trusting relationship, pharmacists will have a better opportunity to guide a patient's decision to use complementary or alternative medicines responsibly.

Monitoring adherence

Educate the patient about the importance of continuing to adhere to traditional antiretroviral therapy.
 Work with the patient to design a medication administration schedule that allows the patient to take both conventional products and complementary or alternative medicines.
 Do periodic telephone call-backs to determine patient adherence.

Assessing therapeutic needs

Obtain a complete medication history (prescription and nonprescription medications, vitamins, street drugs, and complementary or alternative medicines). Obtain the name of each medication, the dose and duration of use, the patient's reason for use, the patient's perceived benefit, and adverse reactions.
 Check all available resources for information on indications, safe dosage ranges, adverse reactions, impact on antiretroviral as well as other therapy, and pharmacokinetic and pharmacodynamic interactions.
 Evaluate all medications for overlapping toxicities.
 Determine a mutually agreeable time period over which some evidence of benefit and lack of toxic effects should be observed. At the end of the trial period, reevaluate with the patient the need for the complementary or alternative medicine. This agreement may involve not only the pharmacist and the patient, but also the provider of the complementary or alternative medicine.
 Assist the patient in streamlining selection of complementary or alternative medicines, to avoid duplications.
 Inform the patient about the importance of complete disclosure of information about use of complementary or alternative medicines to his or her physician, and offer to provide a complete medication history to the physician.
 Advise and encourage the patient to include his or her physician in the decision-making process for complementary or alternative medicines.

Drug information

Provide accurate, responsible information about complementary or alternative medicines to the patient. Explain what is known and what is unknown about the products, so that the patient can appreciate the uncertainties associated with different choices.

Research, publication, presentation, and education

Participate in opportunities for research, publication, presentation, and education for both professional peers and patients.

colleagues⁴⁶ reported that of 114 randomly selected HIV patients, 22% reported taking one or more herbal preparations during the 3 months preceding the study.

These investigators also reported that the mean number of complementary or alternative medicines per patient was 4.5 and that some patients took as many as 10 such products daily (up to 21 tablets per day).³³

The use of complementary or alternative medicines is associated with several potential advantages and disadvantages. The potential advantages include giving the patient hope, an opportunity for the patient to take some control over his or her own health care, the fact that complementary or alternative medicine providers may spend more time with patients than traditional health-care providers, a placebo effect, and possible therapeutic effects.^{47,48} Pharmacists, along with other health-care professionals, practise using an evidence-based approach. However, in contrast to conventional medications, most complementary or alternative medicine products are not licensed, and manufacturers are not required to demonstrate efficacy, safety, bioavailability, or stability, as is required for conventional medications before marketing.³⁶ The medical claims associated with many herbal products are largely untested. In addition, many consumers have the misconception that complementary or alternative medicine products are harmless because they are "natural", yet a number of adverse effects associated with these products have been reported.^{46,49} Other disadvantages associated with complementary or alternative medicines include limited information about drug interactions and patients either delaying or abandoning traditional therapy.^{47,48,50,51} The primary functions of the HIV/AIDS pharmacist dealing with complementary or alternative medicines include counselling, monitoring compliance, assessing therapeutic needs, and providing drug information (Table 9). Secondary roles include collaborative research, publication, and education.

Pediatric Issues

The significant lag time in the availability of recommendations for pediatric dosing of antiretroviral medications, based on pharmacokinetic, pharmacodynamic, and toxicity data for children, along with the lack of palatable, convenient dosage forms, creates special demands for pharmacists practising pharmaceutical care in the pediatric setting.

Dispensing for HIV-positive children is associated with unique practical issues. Pharmacists need to be aware of the need to frequently change dosages as children grow. Adverse drug reactions often occur at different frequencies in children than in adults.⁵²



Pharmacists may be asked to design dosing schedules with restricted options due to limited pediatric access to research protocols, limited availability of pediatric products and formulations, and limited success at masking intolerable taste. Practical dosing schedules need to be designed to avoid administration of antiretroviral agents during daycare or school hours, so as to prevent disclosure of diagnoses through identification of medications.

Several challenges face the child's caregiver(s) in that there are few alternatives available for the selection of a convenient pediatric antiretroviral dosing regimen. The caregiver, who may be ill with the same disease as the child, is required to administer life-saving medications several times daily to a potentially uncooperative child. These medications commonly render the child unwell with nausea and loss of appetite, are foul-tasting, must be taken in large volumes, and are gritty in texture. Therefore, the caregiver and the child are faced with the daily burden associated with administering medications.

By extrapolation from adult data, combination therapy with 2 nucleoside analogue reverse transcriptase inhibitors and 1 protease inhibitor is currently recommended as the initial antiretroviral therapy for children.⁵³ The nucleoside analogue reverse transcriptase inhibitors offer several acceptable options for children. Zidovudine comes in a 10 mg/mL strawberry-flavoured syrup. The 10 mg/mL strawberry-banana solution of lamivudine is very palatable. Stavudine comes in several capsule sizes, the contents of which can be easily mixed with food. Children may consider the required volume of stavudine liquid (1 mg/mL fruit-flavoured preparation) too large, and they may prefer the capsules. The didanosine oral solution (10 mg/mL) is mixed with equal parts antacid, and many children do not like its chalky taste. Of the protease inhibitors, ritonavir, nelfinavir and amprenavir are currently available in liquid formulations. The twice-daily dosing schedule of ritonavir avoids confidentiality issues concerning administration of a midday dose by school or daycare staff. Ritonavir is available for pediatric use as a concentrated peppermint and caramel solution (80 mg/mL), but this preparation has been described by patients as tasting as they imagine gasoline would taste. In addition, it has an unpleasant lingering aftertaste. The oral administration of nelfinavir powder requires large volumes of a gritty mixture that is too thick for administration by gastric tube. Children may prefer to have the tablets crushed and mixed with food. The volume of amprenavir liquid (15 mg/mL) required for each dose is large. Nevirapine is a non-nucleoside

reverse transcriptase inhibitor that is available in liquid formulation (10 mg/mL sweet-flavoured syrup); however, a large volume is required for each dose. Efavirenz is available in several capsule sizes. These capsules can be opened and the contents mixed with food or liquid.⁵³

Through publications and the dissemination of pediatric HIV/AIDS information, the Canadian Collaborative HIV/AIDS Pharmacy Network is dedicated to promoting awareness of pediatric pharmaceutical issues and providing information support to improve pediatric patient care. Pharmacists are also in an excellent position to promote the development of oral formulations with accompanying stability data, including the mixing of medication with food, as each new antiretroviral agent is launched on the market.

Needs of Special Populations

A number of groups require special consideration by pharmacists providing HIV/AIDS care. Marginalized members of society, such as homeless people, injection drug users, and those with coexisting psychiatric disorders, may have additional individual needs.

Patients admitting to recreational drug use, including intravenous drugs, should be encouraged to provide a comprehensive list of the recreational drugs that they use. This information is necessary for the pharmacist to evaluate the potential for drug interactions with recreational drugs and their excipients. The importance of this disclosure must be explained to the patient in terms he or she can understand. In addition, the frequency, route, and type of recreational drugs used may affect adherence to the HIV/AIDS medication regimen. Pharmacists should support patients seeking methadone maintenance or needle-exchange programs. The high incidence of co-infection with hepatitis C virus should be considered when evaluating hepatic function in both injection drug users and hemophiliac patients. Other issues to consider in patients with hemophilia include alteration in the frequency of bleeding episodes because of protease inhibitors and the importance of adequate analgesia for patients with joint pain due to bleeding.

Many patients do not have access to refrigeration or safe storage of medications, transportation for appointments, telephones for follow-up, or housing. Whenever possible, medication regimens should minimize frequency of administration. Medications should be provided in small quantities from an easily accessible location. Compliance aids should be readily available at little or no cost, and frequent follow-up undertaken whenever possible. Pharmacists may enlist the help of patient advocates or community caregivers to achieve



continuity of medication availability and administration. Follow-up visits may be brief, so counselling sessions should be concise and should take into consideration the educational and cultural background of the patient.

Women and families provide unique challenges for pharmacists. The HIV-infected woman who is caring for her infected partner and children often requires additional support from all members of the health-care team. Pharmacists should be comfortable in discussing methods of contraception and drug interactions related to oral contraceptives. For pregnant women, the known or potential effects of HIV infection or medications on the fetus is a major issue, and referral to the appropriate resource is crucial. In Canada, a national counselling service for pregnant women at risk from HIV is available to the public and health-care professionals by calling the Motherisk HIV Healthline at 888.246.5840. Specific studies on gender-related differences in dosing of, response to, and adverse effects of HIV/AIDS medications are currently under way.

CONCLUSIONS

Pharmacists caring for HIV/AIDS patients in the hospital, community, and other ambulatory settings have an important opportunity to positively affect patient outcome in terms of both morbidity and mortality. The Canadian Collaborative HIV/AIDS Pharmacy Network has published this Canadian position paper, which is based on currently available information, to assist pharmacists caring for HIV/AIDS patients. As new information becomes available, our role in the care of these patients must also evolve.

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