HIV PHARMACY SPECIALTY RESIDENCY

DESIGN OF A NEEDS-BASED HIV / AIDS PHARMACEUTICAL CARE CERTIFICATE PROGRAM FOR ONTARIO PHARMACISTS

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ABSTRACT

Objectives: To assess the educational needs of Ontario pharmacists who provide or wish to provide pharmaceutical care to ambulatory HIV – infected patients and to design a needs – based HIV / AIDS pharmaceutical care certificate program for Ontario pharmacists.

Methods: The educational needs of Ontario pharmacists were evaluated in three steps. 1) An eight - page needs assessment survey was mailed to 500 Ontario community pharmacists (group 1) and distributed to approximately 150 Toronto pharmacists attending a Metropolitan Toronto Pharmacy Association meeting (group 2). This survey evaluated pharmacists' preparedness, knowledge, attitudes, perceived learning needs, interests for an HIV / AIDS certificate program and demographics. 2) HIV – related queries received at the Ontario Pharmacists' Association (OPA) Drug Information and Research Centre in 2000 and 2001 were analyzed. 3) Five pharmacists with experience in HIV pharmaceutical care participated in a key informant discussion on the role of pharmacists in HIV / AIDS patient care. The results from the three parts of the needs assessment helped establish the learning objectives, educational content, teaching strategies and program evaluation of the HIV / AIDS certificate program.

Results: 22. 4 % (n = 110) and 19 % (n = 28) of pharmacists in group 1 and 2, respectively, completed the needs assessment survey. The respondents felt "unprepared" to "somewhat prepared" to offer pharmaceutical care to HIV – infected patients. The knowledge scores of the respondents were low as approximately half of the true or false questions in the survey were answered correctly. The attitudes of the respondents were sub-optimal. Pharmacists' need to improve their perception of the positive impacts related to counselling on safe sexual habits and the use of clean needles. 30 % of respondents were interested in doing an HIV / AIDS certificate program. Respondents desired a program that includes lectures, at home readings, case studies and a take home theoretical and case-based exam. Pharmacists desired an in-depth review of antiretroviral

– related educational topics and a general review of the HIV disease process. In the OPA HIV –related queries analysis, more than 25 % of questions pertained to identifying the names, abbreviations and doses of antiretrovirals. This result demonstrates that Ontario pharmacists need a beginner or level – 1 certificate program on HIV / AIDS before complex topics such as viral resistance patterns, antiretroviral salvage regimens, and therapeutic drug monitoring can be taught. Results from the key informant discussion confirm the need for a level – 1 certificate program.

An HIV / AIDS certificate program was designed that consists of mandatory pre-readings, a two and a half – day symposium, and a take home exam. The symposium will include lectures and workshops. Pharmacists will be asked to actively participate in workshops, which will focus on the detection, management and monitoring of HIV and antiretroviral – related problems.

Conclusion: Ontario pharmacists desire and need a level – 1 certificate program on HIV / AIDS to improve their knowledge, skills and attitudes. The conceptual design of an HIV / AIDS pharmaceutical care certificate program is proposed to the OPA for further development. It is believed that this certificate program can enhance pharmacists' ability to care for ambulatory HIV – infected patients.

Key words: HIV, AIDS, pharmaceutical care, needs assessment, knowledge, preparedness, attitudes, certificate program, continuing pharmacy education

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

Page

TABLE OF CONTENTS (continued)

Page

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF TABLES (continued)

LIST OF FIGURES

LIST OF ABBREVIATIONS

(listed in alphabetical order)

ACT	AIDS Committee of Toronto
ACTG	AIDS clinical trials group
AIDS	Acquired immunodeficiency syndrome
ARV	Antiretroviral
CATIE	Canadian AIDS Treatment Information Exchange
DOT	Directly observed therapy
HAART	Highly active antiretroviral therapy
HIV	Human immunodeficiency virus
HIV PSG	HIV Pharmacy Professional Specialty Group (Ontario branch)
MTPA	Metropolitan Toronto Pharmacy Association
NNRTI	Non-nucleoside reverse transcriptase inhibitor
NRTI	Nucleoside reverse transcriptase inhibitor
OCP	Ontario College of Pharmacists
OPA	Ontario Pharmacists' Association
PI	Protease inhibitor
PWA	People with AIDS

CHAPTER I - Introduction

1. INTRODUCTION

Community, ambulatory and hospital pharmacists who deliver pharmaceutical care to human immunodeficiency virus (HIV) - infected patients face important challenges. Without adequate education and training, it is difficult for them to provide various services that will be beneficial to the patients.[1-5] A few examples of tasks that community, ambulatory and hospital pharmacists should perform include ensuring the proper dosing of antiretrovirals (ARVs), antibiotics and other concomitant medications, counselling patients on ARVs, encouraging adherence to ARV therapy, participating in the detection and management of adverse drug reactions and drug interactions, and organizing proper medication acquisition and reimbursement.[3] With the continued arrival of new treatments, the complexity related to the pharmacotherapeutic management of asymptomatic and symptomatic HIV infection, acquired immunodeficiency syndrome (AIDS) and opportunistic infections has increased drastically.[3,5] The pharmacist who cares for HIV - infected patients must continuously strive to expand and update his or her knowledge and skills as new therapeutic guidelines and clinical practices emerge from the ever-growing mass of scientific literature.

For the majority of pharmacists, the HIV / AIDS pharmacotherapeutic principles learned during the pharmacy baccalaureate program are absent or completely outdated. To ensure the continued provision of optimal pharmaceutical care, the pharmacists should yearly engage in self-directed continuing education on HIV / AIDS. At the present time

in Ontario, no well-structured continuing education program for HIV / AIDS is available to educate a substantial number of pharmacists. The HIV pharmacy specialty residency offered by Toronto General Hospital and St. Michael's Hospital allows the training of only one specialized pharmacist per year.[6] Although it is not necessary to transform every pharmacist into an HIV / AIDS specialist, pharmacists should have a basic level of knowledge and have the opportunity to develop specific skills needed to provide HIV / AIDS pharmaceutical care. Ideally, this should be done through an organized continuing education activity.

Taking into consideration the heightened complexity of treating HIV / AIDS, the massive quantity of research, the rapid evolution of new developments in this field, and the limited and perhaps outdated education received on HIV / AIDS during the baccalaureate pharmacy program, it is reasonable to assume that most pharmacists who have not undertaken continuing education on HIV / AIDS therapeutics lack sufficient knowledge and skills to provide pharmaceutical care to HIV - infected patients. This project aimed to: 1) assess the needs of Ontario pharmacists with respect to pharmaceutical care directed to HIV - infected patients, and 2) design a certificate program on HIV / AIDS for pharmacists based on the results of the needs assessment.

The needs of Ontario pharmacists were evaluated in three steps: a needs assessment survey, the evaluation of HIV – related queries addressed to the Ontario Pharmacists' Association (OPA) Drug Information and Research Centre, and a key informant discussion. The methods and results of the three components of the needs assessment are presented in chapter II.

The development of a certificate program on HIV / AIDS therapeutics is one way to enhance pharmacists' knowledge and skills. This will help pharmacists provide better pharmaceutical care to ambulatory patients living with HIV. The concept of designing and developing a certificate program on HIV / AIDS for Ontario pharmacists initially came from Ms. Donna Lowe, Co-Chair of the Ontario HIV Pharmacy Professional Specialty Group (HIV PSG) and Ms. Sandra Winkelbauer, Director of Continuing Education at the OPA. The design of the conceptual framework of the certificate program based on the results of the needs assessment is presented in chapter III. The development and implementation of the certificate program is beyond the scope of this residency project and will be orchestrated in the upcoming year by members of the HIV PSG and the OPA.

2. EXISTING INFORMATION

The following background information is essential to comprehend how the needs assessment was developed as well as how the certificate program was designed. The first part (section 2.1) reviews published data on pharmaceutical care pharmacists should offer HIV – infected patients. This information was helpful in developing the needs assessment questionnaire and suggesting the educational content for the certificate program. Section 2.2 summarizes needs assessment techniques and previous needs assessments done with pharmacists. Finally, section 2.3 discusses basic principles related to adult learning and continuing pharmacy education. These principles were helpful in proposing the design for the certificate program.

2.1 Pharmaceutical care in HIV / AIDS

The Canadian HIV / AIDS Pharmacy Network recently identified nine areas for which practice guidelines were necessary for pharmacists who provide pharmaceutical care to HIV - infected patients. These include adherence to therapy, patient counselling, management of drug interactions and adverse drug reactions, medication acquisition and payment, drug information, research, complementary and alternative therapy, pediatric issues and the needs of special populations.[3] Pharmacists can also play an important role in HIV prevention.[1] A few of these topics are discussed in more detail below.

2.1.1 Promoting adherence to antiretroviral therapy

Perhaps the most important role of pharmacists caring for HIV – infected patients is encouraging adherence to ARV therapy. As Paterson and colleagues have demonstrated in a prospective trial evaluating the influence of protease inhibitor (PI) adherence on viral suppression, the percentage of patients who are able to achieve complete viral suppression decreases when patients are less than 95% adherent to their ARV regimens.[7] An increase in $CD4^+$ cell count and a decrease in the prevalence of opportunistic infections have also been shown with enhanced adherence.[8] Encouraging adherence is therefore crucial. A prospective, case-controlled study evaluated the impact of intensive adherence interventions done by pharmacists on virologic response to ARV therapy. At 48 weeks, a higher percentage of patients having received intensive adherence interventions had an undetectable viral load as compared to controls.[9] Knobel and colleagues also demonstrated that patients are more adherent to ARVs when they are

closely followed by a pharmacist and when their ARV regimens are adapted to their lifestyle.[10]

Pharmacists need to assess the individual patient and minimize the barriers to adherence.[3] This can be achieved through various strategies such as simplifying the ARV treatment regimen when possible, individualizing medication schedules so that they do not disrupt the patient's daily activities, simplifying drug acquisition, reducing the cost of ARVs, preventing, detecting and quickly managing adverse drug reactions and interactions, and providing adherence aids such as pillboxes and electronic reminder devices.[3,4,11,12] Pharmacists must ensure that ARV dose omissions are minimized as much as possible, that proper food and fluid requirements pertaining to each ARV agent are met and that proper doses and administration intervals are respected.[3] The pharmacist involved in HIV / AIDS pharmaceutical care can also be a valuable and economical means of reporting non-adherence to the treating physicians by analyzing the refill records of the patients.[2] In addition, as more pharmacokinetic studies tend to favour once daily administration of certain ARVs, community pharmacists might play an active and crucial role in directly observed therapy (DOT) strategies to enhance adherence.[2,12] The DOT strategies are particularly feasible with patients in prisons or patients who are receiving methadone at their community pharmacy. Modified DOT programs, where patients present themselves to their pharmacy to receive the morning dose only and then take the responsibility for the night and weekend doses, have also been studied. These programs can be considered for a short-term period (3 – 6 months) to enforce adherence.[12]

By undertaking the adherence promoting strategies listed above, pharmacists are valuable health care providers that can indirectly beneficially influence virologic outcome.

2.1.2 Patient counselling

Pharmacists can also contribute to HIV / AIDS patient care by counselling patients on their ARV therapy. Topics that are useful include essential notions on how medications function, appropriate doses and dosing intervals, food and fluid requirements, precautions, most frequently reported adverse drug reactions, interactions with other prescription, over-the-counter or natural medicines, and importance of ARV adherence. This information must be offered to patients in a private setting to ensure optimal patient confidentiality.[3] Studies conducted in the past have demonstrated that patients also request this type of education. For example, in a survey in the early 1990s done in Toronto with HIV – infected patients on zidovudine, it was reported that 60% of the patients wanted to learn more about their ARV therapy and thought that the pharmacist should be the health professional who provided this information.[13]

2.1.3 Managing drug interactions and adverse drug reactions

HIV – infected patients, in particular more severely immunosuppressed patients, have a higher incidence of adverse drug reactions compared to HIV - negative patients.[3,14] This is partly because HIV – infected patients are exposed to numerous potent medications including ARVs, antibiotics, antifungals and sometimes chemotherapy. This important polypharmacy can inherently explain an increased risk of

adverse drug reactions. However, there are other factors which contribute to this heightened susceptibility, specifically immunosuppression.[14] In a retrospective study conducted by St. Michael's Hospital in Toronto, 21.4% of hospitalized patients taking highly active antiretroviral therapy (HAART) had adverse drug reactions. Sixty percent of the adverse drug reactions were AIDS clinical trials group (ACTG) grades 3 to 4 and 85% of these reactions were the main or an important contributing reason for admission.[15] ARV – related adverse drug reactions include gastrointestinal symptoms, peripheral neuropathy, pancreatitis, headache, myopathy, fever, rash and hypersensitivity reactions, bone marrow suppression, hepatotoxicity, dyslipidemia, glucose intolerance, diabetes, and lipodystrophy.[14,16]

Counselling patients on potential adverse drug reactions can lead to early detection and ultimately improved adherence. Furthermore, community and hospital pharmacists who detect the presence of adverse drug reactions can bring this to the attention of the treating physician. In order to recognize and properly participate in the management of the adverse drug reactions, however, the pharmacist must be familiar with their incidence, severity, common presentation and management.[3]

The prevention, detection and management of pharmacodynamic and pharmacokinetic interactions are crucial components of pharmaceutical care. The pharmacists should be familiar with drug-disease, drug-food and drug-drug interactions which are related to the ARVs and other medications commonly used. Particular attention must be paid to the PIs and to the non-nucleoside reverse transcriptase inhibitors (NNRTIs) since they are substrates of the cytochrome P450 isoenzymes. The PIs are for the most part potent inhibitors of certain cytochrome P450 isoenzymes and the NNRTIs

are either cytochrome P450 3A4 inhibitors or inducers, depending on the agent. A pharmacist should learn how to consult pertinent scientific literature on drug interactions and decipher between clinically significant or non-significant interactions. By understanding the pharmacokinetics of the ARVs, the pharmacist should also be able to anticipate potential drug interactions, even if they are not reported in the literature.[17] Pharmacists who comprehend the increasingly complex ARV – associated interactions can play a valuable part in a healthcare team and can decrease unexpected adverse drug reactions.

2.1.4 Medication acquisition and reimbursement of costs

In 1997, in the United States, the cost related to prescribed medications and the use of over-the-counter medications and nontraditional therapies over a 90 day period was evaluated at $1237.62 ± $ 1751.59 US for HIV - infected patients and $1610.92 ± $ 2015. 08 US for AIDS patients.[18] Although the cost related to inpatient hospital services has gradually decreased over the years, due to improved ARV therapy and better prophylaxis of opportunistic infections, the cost of medications in an outpatient setting has risen.[19,20] The increase in medication costs is partly explained by the availability of new ARVs, the greater use of combination therapy as well as prophylaxis.[18] The rise in medication costs was quite visible in a study done in southern Alberta that compared the direct cost of ARVs for outpatients before and after the introduction of HAART. In 1995, when more than 90% of the HIV - infected treated population received either mono or dual therapy, the average monthly cost of ARV therapy was $ 159.00 CAN. In 2000, when 90% of the HIV – infected treated population received three or more ARVs, the

average monthly cost was $ 969.00 CAN. The cost was significantly higher when patients had low $CD4^+$ cell counts.[21]

The community pharmacist is the primary healthcare provider who can ensure that the patients have access to these costly medications without negatively influencing their ability to obtain essential needs (ie: housing, food, and clothing). The community pharmacists must be familiar with the reimbursement modalities for the ARVs and adjuvant medications in Ontario (Ontario Drug Benefit, Trillium program, private insurance companies, local public health departments, etc.) and must make the process of obtaining coverage as painless as possible for the patient. If medications cannot be provided through these programs, the community pharmacist must consider alternative means to facilitate drug acquisition. A few examples are special access programs, clinical investigation programs, and financial assistance from patient advocacy groups. In order to prevent the development of viral resistance, the community pharmacist must also comprehend the importance of ensuring uninterrupted medication supply.[3]

2.1.5 Use of complementary and alternative therapies

In a recent survey, 67% of HIV – infected patients admitted using complementary and alternative therapies to control HIV at some time since they were infected, and 40% of the patients were currently on these therapies. The complementary and alternative therapies included dietary supplements (37%), herbal medications (26%) and megavitamins (24%). The quality of life assessment carried out with the users of these types of treatments demonstrated that the patients believed that their overall health was better and that they had a decreased prevalence of adverse drug reactions.[22] A similar

survey was conducted in Ontario in various HIV treatment sites. Ninety-three per cent of females and 70 % of males surveyed admitted using complementary and alternative medicines. Interestingly, the HIV physicians were aware of the use of only 37% of these medicines.[23]

Pharmacists must counsel patients on natural medicines in order to permit safe utilization of these therapies.[3] In particular, they must have access to the literature on newly recognized drug-drug interactions between natural medicines and ARVs and interpret this literature appropriately.

2.1.6 Drug information

Fundamental and clinical research in the field of HIV / AIDS is extensive. As a result, information on HIV / AIDS changes rapidly.[3] Pharmacists who care for HIV - infected patients must be able to quickly obtain new information. Possible sources include specialized journals on HIV / AIDS, medical and pharmaceutical internet sites, conference abstracts and posters, continuing medical or pharmacy education sessions from HIV experts and recent textbooks.[3] Unfortunately, a lot of the HIV information is outdated even before it is published in medical journals and textbooks. A strong incentive for pharmacists and other health professionals to participate in continuing HIV education is taking care of highly knowledgeable patients. In many cases, patients have been very motivated to become current in HIV research and clinical practices by participating in conferences, doing internet searches, and accessing information provided by consumer organizations.[3,24]

2.1.7 HIV prevention

In the past, community pharmacists have been recognized as key healthcare professionals in the prevention of HIV transmission. In a survey conducted in Wales and England in 1995, 80.5% of the community pharmacists considered that they had an important role to play concerning substance abuse and preventing the spread of HIV. Certain activities included organizing needle exchange programs and supervising the consumption of methadone. More than 70 % of the community pharmacists, however, requested supplementary training. In Sheridan's study, compared to pharmacists who had not received prior training on drug misuse and HIV, a higher percentage of pharmacists who participated in continuing education programs had a better attitude toward patient care of HIV – infected patients and offered more services to drug misusers.[1]

2.2 Needs assessment

Assessing health professional learning needs is the cornerstone of continuing education program development. Needs assessments can analyze knowledge, skills, attitudes and behaviors.[25] Various needs assessment methods exist. These include questionnaires, focus groups, verbal interviews, Delphi technique, nominal groups, environmental scanning, clinical recall interviews, standardized patients, chart audits and reviews of third-party data.[25,26] Questionnaires have many advantages over the other techniques. They remain one of the least expensive ways of surveying the population. If confidentiality is optimized and if the questionnaire is well designed, it can be perceived

by the respondents as non-threatening and reduce biased socially expected responses. The costs related to questionnaire surveys include the cost of staff time for designing and testing the questionnaire and then analyzing the results, and the cost of postage and printing. Unfortunately, the response rate is often below 50% and follow-up techniques such as reminder postcards, second mailings of questionnaires and telephone calls are often necessary. Also, it can take several months before the questionnaires are received.[26] Once the questionnaires are completed and the data compiled, a continuing education advisory committee must then determine the best course design and interventions to respond to the needs identified by the survey.[25]

2.2.1 Continuing education interests of pharmacists in Ontario

In 2000, the Ontario College of Pharmacists (OCP) randomly surveyed 20% of the community and hospital pharmacists licensed in Ontario. The primary objective of this survey was to identify the continuing education topics that interested pharmacists. In the results, the therapeutic topics were presented in order of priority and with respect to the electoral districts of the pharmacists. Districts 1, 3-6 and 7 listed AIDS in second place, districts 2 and 16 listed AIDS in third place, district 11 listed AIDS in fifth place and district 8 listed AIDS in eighth place. For the remaining districts, continuing education on AIDS was not amongst the top ten priorities. The municipalities of Ontario associated with each electoral district and the number of pharmacists in each district as of December 1999 are presented in Table 1. This survey only identified the therapeutic areas of interest. It was not designed to characterize the attitudes, knowledge and skills of the pharmacists with respect to pharmaceutical care in HIV / AIDS nor their specific

educational needs.[27] A similar survey on Ontario pharmacists' interest for continuing education programs was undertaken by the OPA. Thirty-five percent of pharmacists were interested in HIV / AIDS continuing education activities.[28]

In summary, Ontario pharmacists seem interested in participating in continuing education activities on HIV / AIDS. Hence, developing a certificate program on HIV / AIDS appears feasible.

2.2.2 Needs assessments of pharmacists regarding HIV / AIDS

An assessment of Arizona pharmacists' attitudes, preparedness, comfort and knowledge regarding HIV and AIDS was published in 1995. A survey was sent to 479 pharmacists in the state of Arizona. This 7-page survey included demographic items and five sections (preparedness, knowledge, attitudes, comfort, and willingness to participate in educational endeavors). Except for the assessment of knowledge, all sections used Likert-type scales (for example, 1 = very unprepared, 6 = very prepared). To evaluate the pharmacists' knowledge, the respondents were asked to answer 13 questions on HIV treatment and disease. Before being distributed, the questionnaire's face validity was tested by allowing four pharmacists to complete it.[29]

The total response rate after the follow-up mailing was 46%. Overall, the perception of preparedness and comfort was elevated amongst the pharmacists. The respondents also demonstrated positive attitudes. The pharmacists' knowledge level, however, was low. Inpatient pharmacists had a higher level of knowledge ($p < 0.0001$) and were more willing to work with HIV / AIDS patients ($p = 0.05$) as compared to community pharmacists. The levels of preparedness ($p < 0.0001$), comfort ($p = 0.01$) and knowledge

($p < 0.0001$) were significantly higher if the pharmacists had attended at least one continuing education activity on HIV / AIDS. Finally, more than half of the pharmacists surveyed believed that continuing education programs on HIV / AIDS should be mandatory.[29]

The needs assessment questionnaire constructed for this project was inspired by the needs assessments mentioned above. The development of the questionnaire will be discussed in greater detail in chapter II.

2.3 Adult learning

Adult learning has been described by adult education theorists as follows. Adult learning is for the most part self-initiated, that is, that adults recognize a need to learn and take responsibility for their own learning. Also, the learning activities tend to be controlled or developed by the learner. Third, adults will engage in learning activities if they feel that the obtained knowledge will be beneficial for their occupation. Three forms of self-directed learning have been identified in healthcare professionals: 1) informal, ongoing, habitual activities to maintain competencies; 2) semi-structured learning experiences to solve patient problems; and 3) formal, intentional, planned activities.[30] Although learning strategies for adults should be more patient-centered, the traditional continuing education programs that emphasize passive, didactic learning remain more popular than innovative, active teaching strategies.[31]

Numerous studies have looked at the different teaching strategies and their success rate in improving the practice of health professionals and patient outcomes.

Printed educational materials mailed to or handed to health professionals have small benefit, which is of uncertain clinical significance. The benefit of printed educational materials ranges from – 3 % to 243.4 % for practice outcomes and from – 16.1% to 175.6% for patient outcomes. Printed educational materials in addition to other interventions seem more effective.[32] `Educational outreach visits offer small to moderate benefits on clinical practice and patient outcomes. Educational outreach visits are face to face visits that usually combine written materials and verbal presentations. These are sometimes accompanied by social marketing techniques that can amplify their effectiveness. For example, outreach visits have shown to reduce inappropriate prescribing habits by 24 to 50%. The systematic review of the studies which evaluate outreach visits was unable to determine if knowledge and skills gained by an initial visit deteriorates with time and if multiple visits are cost-effective.[33] Audit and feedback techniques which consist of presenting the clinical performance of health care professionals on a certain topic during a specified period of time can provide small to moderate benefits on professional practice and patient outcomes. In many cases, this should not be the sole approach used.[34] Perhaps the most effective method of changing practice behaviors is through interactive workshops. A systematic review of the literature on the benefits of continuing education meetings and workshops documented in *The Cochrane Library* by Thomson and colleagues showed that interactive workshops alone or in combination with didactic lectures produce moderate to moderately large effects on professional practice. Very little benefit is obtained when didactic presentations are the only educational method used.[35]

2.3.1 Pharmacy continuing education

Continuing education in pharmacy can take many forms. After completing a pharmacy baccalaureate program, pharmacists can undertake various educational programs or activities: one-year general hospital or community pharmacy residency, Doctor of Pharmacy degree, master / doctor in pharmacy research, specialty residency, fellowship, certificate program, conference, self-directed reading, etc.

Certificate programs have been defined as follows[36]:

….A postgraduate course, or series of courses, composed of didactic (lecture/recitation) and experiential components (practicum/laboratory/clerkship) of sufficient depth and duration to ensure mastery of a content area. A typical course would involve approximately 40-60 hours of instruction aimed at specific job-enhancement objectives. A certificate would be awarded upon satisfactory completion of a course or series of courses.

Certificate programs distinguish themselves from activities such as attending conferences by offering more intensive knowledge in a specific area and by evaluating and acknowledging the acquisition of this knowledge.[36] Certificate programs also place a greater emphasis on self-directed and active learning because these programs usually contain preparatory readings and they ask the participants to demonstrate that they have been able to put into practice the acquired theoretical content. One must be cautious not to confuse certificate programs with board certification. Board certification is not linked to completing a structured educational program, but is a title assigned after passing an exam that is developed by an independent professional body. The topics that need to be studied for board certification are usually broader than topics covered during certificate

programs. Also, board certification is more widely recognized than certificate programs. For example, in the United States, pharmacists can study for board certification in specialties such as pharmacotherapy and oncology. Similar board certifications are not available in Canada.

A survey conducted in West Virginia to determine which types of educational activities and teaching methods pharmacists prefer demonstrated that pharmacists were more willing to participate in short continuing education conferences than a certificate program. Approximately 45% of the respondents, however, showed interest in beginning a certificate program. The majority of pharmacists who preferred certificate programs wished to do the programs during the spring over a five to ten week period. Fifty-four per cent of the participants were willing to pay an average of $700 US for a 40 to 45 hour program. Amongst the various teaching methods proposed, most pharmacists preferred live lectures, followed in order by written materials, videotapes, interactive television, audiotapes and telephone conferences. The pharmacists believed there were five main incentives to complete a certificate program: enhance job performance, employee provision of paid time off, enhance job satisfaction, employer tuition reimbursement, and competitive advantage when seeking a job.[36]

In the survey completed by the OPA, only 18 % of respondents considered doing a certificate program and the majority of pharmacists preferred evening events (38 %). The teaching strategies of choice identified by pharmacists who participated in the OPA survey were home study correspondence courses, live educational programs, or computer program activities (internet based or CD-ROMS). Videotapes and audiotapes were less popular teaching strategies. Interestingly, almost all participants had access to the

internet at home or in the workplace.[28] It is noteworthy to specify that the OPA continuing education survey, as well as the continuing education survey conducted in West Virginia, were not specific to HIV / AIDS pharmacotherapy.[28,36]

Currently, three certificate programs exist that have been organized by the OPA: woman's health, psychiatry, and cardiovascular pharmacotherapy. All three certificate programs are similar in design. The pharmacists receive mandatory readings to be completed prior to a two and a half-day symposium. This symposium usually occurs during three consecutive days (Friday – Sunday). The morning sessions are comprised of didactic lectures whereas the afternoons are filled with case studies and panel discussions. The participants then leave with a take-home exam. After successful completion (70 % passing mark), the participants are rewarded with a certificate. Approximately 60 to 80 participants are allowed to participate and the program is repeated. The fee per participant is between $400 to 500 CAN. On average, the total cost of a certificate program is $20 000 to 30 000 CAN. Outside funding from pharmaceutical companies and other organizations is often necessary.[37]

Specific to HIV / AIDS, an extensive literature and internet search has identified several correspondence continuing education programs for pharmacists. These programs, however, do not lead to a certificate. The University at Buffalo is presently designing an HIV / AIDS certificate program. This program will be mostly on-line. Pharmacists will have study modules and will be asked to present HIV / AIDS cases on the assigned web site.[38]

In summary, continuing pharmacy education programs should use teaching strategies that favor active, patient – centered learning. Furthermore, studies have shown

that interactive workshops with or without didactic lectures can beneficially modify professional practice. Finally, 20 to 50 % of pharmacists are interested in doing certificate programs. These 40 to 60 hour programs can be more appropriate than one day conferences as they allow more time to cover topics in greater depth.

3. PROJECT OBJECTIVES

3.1 General objectives

1. Assess the educational needs of Ontario pharmacists who provide or wish to provide pharmaceutical care to ambulatory HIV-infected patients.
2. Design an HIV / AIDS pharmaceutical care certificate program that meets the needs of Ontario pharmacists.

3.2 Specific objectives

1. Assess the present knowledge, preparedness and attitudes of Ontario pharmacists who provide or wish to provide pharmaceutical care to ambulatory HIV-infected patients.
2. Determine the educational needs of Ontario pharmacists with regards to HIV / AIDS - related patient care.
3. Assess the interests of the Ontario pharmacists for an HIV / AIDS certificate program.

4. Identify the learning objectives of the HIV / AIDS certificate program based on educational needs.
5. Identify the educational content needed to meet the learning objectives of the HIV / AIDS certificate program.
6. Identify the best teaching strategies to include in the HIV / AIDS certificate program to meet the learning objectives.
7. Identify the best evaluation methods for the HIV / AIDS certificate program.

CHAPTER II – Needs Assessment

1. METHODS

1.1 Formation of an advisory committee

An advisory committee was formed to assist with the needs assessment and with the design of the HIV / AIDS certificate program. The advisory committee consisted of eleven members including preceptors of the HIV pharmacy specialty residency program, community pharmacists with experience in HIV, members of the HIV PSG and of the OPA, the director of the Doctor of Pharmacy Program and a physician with HIV expertise. The committee met four times during the year. The responsibilities of the advisory committee included: reviewing and approving the needs assessment questionnaire, commenting on and approving the analysis of the needs assessment results, and commenting on and approving the suggested design of the HIV / AIDS certificate program.

Three methods were used to assess the needs of Ontario pharmacists regarding HIV / AIDS education: a written needs assessment survey, the compilation of HIV – related drug queries asked by pharmacists over the last two years to the OPA Drug Information and Research Centre, and a key informant discussion on HIV / AIDS pharmaceutical care. The methods of each is discussed below.

1.2 Development of a needs assessment survey

1.2.1 Development of the needs assessment questionnaire

An eight page questionnaire was developed based on a questionnaire used to assess the needs of pharmacists with respect to HIV pharmaceutical care, a questionnaire unspecific to HIV used to assess the interests of pharmacists for continuing education, and based on literature on constructing questionnaires.[1,29,36,39] The questionnaire was accompanied by a one page cover letter that reviewed the purpose of the needs assessment. Once developed, the questionnaire and cover letter were reviewed by the advisory committee to establish face and content validity. The questionnaire and cover letter were pre-tested by seven community pharmacists who were not members of the advisory committee. The goal of the pre-test was to ensure that the items were well understood, unambiguous and jargon-free. Appropriate modifications were made to the questionnaire and cover letter and the final version was approved by the advisory committee.

1.2.2 Description of the needs assessment questionnaire

The needs assessment questionnaire (Appendix 3) includes six sections: preparedness, knowledge, attitudes, learning needs, interest for a certificate program and demographics. In part I (preparedness) the respondents were asked how prepared they felt they were to undertake various tasks related to HIV / AIDS pharmaceutical care. The tasks that were included in this section were based on the practice guidelines outlined by the Canadian HIV / AIDS Pharmacy Network.[3] A Likert-type scale from one to five

(very unprepared to very prepared) was used to assess items in part I. In part II (knowledge), the respondents' knowledge on ARV therapy and HIV / AIDS was evaluated with ten true or false questions. The respondents also had the possibility of answering "I don't know" if they were unsure of the answer. An open-ended question on adherence was also included. In part III (attitudes), respondents were asked to use a Likert-type scale from one to five (strongly disagree to strongly agree) to comment on ten statements which pertain to pharmacists' behaviors regarding HIV / AIDS. In part IV (learning needs), respondents were asked to state for several HIV – related educational topics if they needed a general overview, an in-depth review or no review. In part V (certificate program), respondents were asked if they were interested in participating in a certificate program on HIV / AIDS. Those who answered "yes" or "not sure" completed the remainder of this section. The objective of part V was to identify the preferred teaching strategies and evaluation methods for the certificate program. Finally, in part VI, various demographic information about the respondents were asked. These items included the following: age, year since graduation, number of years practicing pharmacy, pharmacy degrees other than a bachelor's degree, number of hours worked per week in a community pharmacy and in other settings, number of HIV – infected patients counselled per week, and past participation in HIV / AIDS continuing education activities.

1.2.3 Selection of the pharmacist sample

The population evaluated by the needs assessment survey were pharmacists who are members of the OCP and whose principal place of practice is in a community pharmacy. This population, as of December 1999, consisted of 7 459 pharmacists.[27] This

population was chosen to align with the initial goal of the HIV PSG that was to offer a certificate program to community pharmacists.

The pharmacists in the sample were chosen randomly from the OCP database. The sample was computer generated. These pharmacists worked in electoral districts 1, 2, 3-6, 7, 8 and 11. These districts represented the areas in the province of Ontario where pharmacists showed a specific interest in HIV / AIDS continuing education in the 2000 OCP survey.[27] Electoral districts 16 and 17 were not included since these districts only include hospital pharmacists. A random sample size of 500 pharmacists was chosen as the funding for this project did not allow sending the survey to a greater number of pharmacists. Because 5 395 Ontario pharmacists worked in districts 1, 2, 3-6, 7, 8 and 11 in 1999, the chosen sample size represented approximately 9% of the population. The number of pharmacists chosen from each electoral district allowed proportional representation of the population of pharmacists in these electoral districts.

The needs assessment questionnaire was sent by mail to 500 pharmacists with a self-addressed postage-stamped return envelope on January 21, 2002. A second mailing with a modified cover letter was sent to pharmacists who did not return their needs assessment by February 22, 2002. Pharmacists had until March 22, 2002 to complete the needs assessment.

In order to increase the response rate, pharmacists were offered a 10% discount off the price of the certificate program if they completed and returned the needs assessment survey.

As the response rate was only 20 % by mid-March, members of the advisory committee suggested that the needs assessment questionnaire be distributed to

pharmacists attending the Metropolitan Toronto Pharmacy Association (MTPA) meeting that was held in Toronto on March 19, 2002. The needs assessment was given to all interested pharmacists. Approximately 150 community and / or hospital pharmacists from the Toronto region attended this meeting.

1.2.4 Data collection and statistical analysis

All the data from the close-ended questions in the needs assessment questionnaire were entered into an Excel spreadsheet. The data from the open-ended questions were collected and analyzed separately. The statistical analyses were done by a statistician using the SAS 8.0 software. The data from the needs assessment questionnaires mailed to the pharmacists (sample 1) were analyzed separately from the data obtained from the needs assessment questionnaires completed at the MTPA meeting (sample 2) because it was unknown if the two groups would be comparable.

The statistical analyses done for the six parts of the needs assessment questionnaire are presented below.

- Part I (Preparedness): The number and the proportion of respondents answering each score in the Likert-type scale (1 to 5) will be presented in frequency tables. The mean score and the standard deviation for each question were calculated as well as a global preparedness score. The global preparedness score was calculated by averaging the scores of question 1 to 11 for each respondent and then calculating the overall mean and standard deviation.
- Part II (Knowledge): Each question was marked prior to data collection. The data was entered as a “Correct answer”, an “Incorrect answer” or “I don’t know”. The

number and the proportion of respondents in each category will be presented in frequency tables. A global knowledge score was calculated for each respondent by giving one point per correct answer for each question (question 12 to 21; maximum score = 10). The mean and standard deviation of the global knowledge score were calculated.

- Part III (Attitudes): The number and proportion of respondents answering each score in the Likert-type scale (1 to 5) will be presented in frequency tables. The mean score and the standard deviation for each question were calculated.
- Part IV (Learning needs): The proportion of respondents answering "General overview", "In-depth review" and "No review" for each educational topic was calculated.
- Part V and Part VI (Interest in the certificate program and demographics): Means and standard deviations were calculated for the continuous variables and proportions were calculated for the categorical variables.

Pearson correlation was calculated to measure the strength of the linear relationship between the global preparedness score and the global knowledge score.

Demographics were compared between the two samples (mailed needs assessment versus surveys handed out at the MTPA meeting) and between early and late responders of the mailed needs assessment. Early responders were pharmacists who returned their needs assessment before February 22, 2002, whereas late responders were participants who returned their needs assessment between February 22 and March 22, 2002. The Chi-Square test was used to compare the categorical demographic variables between the

groups. T-tests were used to compare the continuous variables. The Chi-Square test was also used to identify if there were any categorical demographic variables that were related to the interest to do the certificate program (Question # 61 of the needs assessment survey). An ANOVA was run to see if the continuous demographic variables (years since graduation and years practicing pharmacy) were related to the interest to do the certificate program. When statistically significant results were obtained from the ANOVA, pair-wise comparisons were done with Tukey's test. The interest to do the certificate program was also compared between early and late responders and between the two samples using the Chi-Square test. A p value less than 0.05 was considered statistically significant for all of these analyses.

Multiple regression analyses were done to study the influence of demographic variables on the global preparedness score and on the global knowledge score of the respondents. The following variables were included into the model: age (20-29, 30-39, 40-49, >/= 50), number of years since graduation, number of years practicing pharmacy, number of hours worked per week in a community pharmacy (</= 40 hours, > 40 hours), number of HIV – infected patients counselled per week (0 patient, >/= 1 patient), attendance to continuing education activities in HIV (1 activity, > 1 activity), interest in doing a certificate program (yes, not sure, no), pharmacy degree obtained after the bachelors degree (no, yes), practice in a setting other than a community pharmacy (no, yes), and type of respondent (early versus late responder). Many of these variables align with the variables studied by Katz and colleagues.[29] The statistician proceeded by backward selection until only the variables that were or approached statistical significance remained in the model.

1.2.5 Ethical considerations

This study was exclusively directed towards pharmacists and no patient information was obtained, therefore the residency advisory committee judged that it was unnecessary to obtain approval from the University Health Network or St. Michael's Hospital ethics committee.

The data obtained from the needs assessment questionnaire was kept confidential at all times. The questionnaires were anonymous except for an identification number that helped determine who did not need to receive a second mailing of the needs assessment. The list of identification numbers and corresponding names of pharmacists were accessible only to the primary investigator. The identification number also specified the electoral district of the pharmacist. Respondents who accepted the 10% discount off the price of the certificate program were asked to specify their name and address on a request form (see Appendix 3). Once received, this request form was separated from the needs assessment in order to keep the answers confidential.

1.3 Ontario Pharmacists' Association: HIV-related queries

The OPA's Drug Information and Research Centre receives pharmacotherapeutic questions from pharmacists across the province of Ontario. Most community pharmacies in Ontario, except for those in the London, Chatham and Ottawa region, consult the OPA Drug Information and Research Centre as do approximately 40 to 50 small hospital pharmacies outside the Metropolitan Toronto region. All questions are kept in an electronic database and are therefore easily accessible.[37]

For the purpose of this study, the OPA Drug Information and Research Centre was able to supply a list of all HIV – related queries received in the years 2000 and 2001. All questions with the letters "HIV" were retrieved from the database. The questions then had to be reviewed manually to extract all irrelevant questions that appeared because they contained words such as *hiv*es or arc*hiv*es. The term AIDS was not used as it was anticipated that this term was broad and would include many questions unrelated to HIV. Demographic information on the pharmacists was not available.

The questions were sorted into twelve categories that aligned with the subjects studied in the needs assessment questionnaire: 1) HIV infection, 2) identification of ARVs and doses, 3) patient counselling, 4) ARV adverse drug reactions, 5) ARV drug interactions, 6) acquisition and reimbursement of ARVs, 7) HIV literature searches, 8) complementary and alternative medicines (including interactions with these agents), 9) HIV prevention and post-exposure prophylaxis, 10) prophylaxis and treatment of opportunistic infections, 11) adherence, and 12) miscellaneous. The number of questions in each category in 2000 and 2001 will be presented.

1.4 Key informant meeting

A one – hour discussion was held on March 20, 2002 with five experienced pharmacists in HIV / AIDS pharmaceutical care. The purpose of this discussion was to enhance understanding, from the perspective of HIV – experienced pharmacists, on 1) the pharmaceutical services community pharmacists should offer HIV - infected patients; 2) the knowledge that community pharmacists need to acquire to provide care to this

population, and on 3) how knowledge acquired in a continuing education activity can be transferred into practice.

The five participants were pharmacists presently working in the Toronto region in hospital and / or community pharmacies. They were chosen to participate since they had experience working with HIV - infected patients. Hence, they were viewed as key informants. Their past experience is essential to help characterize the knowledge and skills needed by pharmacists to offer pharmaceutical care to HIV - infected patients.

The principal investigator acted as the discussion facilitator. At the beginning, the structure for the planned discussion as well as an overview of the residency project was explained to the participants. The participants were asked to introduce themselves and give a brief history of their experience in HIV. The investigator was mostly an observer but interrupted at a few instances to ask some questions or stimulate the conversation. The participants were asked questions that pertained to the three goals outlined above. To assess the pharmacists' needed level of knowledge, the participants were asked to put in order of importance ten educational topics related to HIV that pharmacists should learn to effectively provide pharmaceutical care to HIV – infected patients. The ten educational topics were as follows: HIV epidemiology, laboratory parameters ($CD4^+$ cell count, HIV-RNA viral load), HIV treatment guidelines, ARV mechanisms of action, ARV adverse drug reactions, ARV drug interactions, adherence, resistance to ARVs, ARV therapeutic drug monitoring, and social, psychological, emotional and ethical concerns. When appropriate, a few preliminary results from the needs assessment survey were communicated. Although the key informant discussion was not designed to help explain the results from the needs assessment survey (qualitative research after

quantitative research), a few results were given to obtain their interpretations and comments.

All participants gave their consent for the discussion to be recorded. Once completed, the recorded discussion was transcribed. To maintain confidentiality only the first letter of the first name of the participants was used to identify them. The five pharmacists were given a small honorarium for having participated.

2. RESULTS

2.1 Needs assessment survey

From the original mailed needs assessment sample (n = 500), six pharmacists moved and did not leave a forwarding address and three pharmacists were no longer practicing pharmacy. Of the 491 usable surveys, 110 were returned leaving a 22.4 % response rate. The response rate per electoral district is shown in Table 2. Electoral districts 3 and 6, districts that are part of Metropolitan Toronto, had the lowest response rates. The Ottawa (electoral district 1) and Windsor (electoral district 11) regions had the highest response rates, 38.5 % and 31.4 %, respectively. The needs assessment surveys distributed at the MTPA meeting were completed by 28 pharmacists, representing approximately 19 % (28 completed / 150 handed out) of the sample.

The demographics of the respondents from the two samples, the mailed needs assessment and the MTPA meeting, are shown in Table 3. The majority of the respondents from the mailed needs assessment sample were between 30 to 49 years of

age, obtained their pharmacy degree 18.34 ± 11.29 years ago and have been practicing pharmacy for 17.52 ± 11.29 years. Few respondents continued their pharmacy education after obtaining their undergraduate degree. However, 10.0 % of the respondents in this sample completed a one-year general hospital residency. The majority of the respondents worked between 31 to 40 hours per week in a community pharmacy and only 13.6 % of respondents worked in a different setting. Almost 70 % of the respondents stated that they counsel on average zero HIV - infected patients per week and very few pharmacists (1.8%) counsel more than 5 HIV - infected patients per week. The majority of the pharmacists have never attended a continuing education activity on HIV / AIDS.

The demographics of the respondents attending the MTPA meeting are similar to the first sample. A comparison of the two samples, however, did show a few discrepancies. A greater number of pharmacists in the MTPA group worked in a setting other than a community pharmacy compared to the other mailed survey sample (28.5 % vs 13.6 %, p = 0.0189). In fact, 21.4% of the pharmacists in the MTPA group worked in hospital pharmacies versus only 3.6 % in the mailed survey sample. Also, a greater number of pharmacists in the MTPA sample counselled more than five HIV – infected patients per week than in the mailed survey sample (10.7 % vs 1.8 %, p = 0.0254). Although not statistically significant, pharmacists in the MTPA sample tended to be older and work fewer hours per week in a community pharmacy than the mailed survey sample. For the other demographic variables, no statistically significant differences between the two groups were noted. Since the MTPA sample differed from the mailed needs assessment sample it was decided to keep these two groups separate for statistical analyses.

To evaluate if there was non respondent bias, the demographic variables of the early and late responders of the mailed needs assessment were compared. No statistically significant differences were identified for any of the variables.

The results to part I of the needs assessment survey (preparedness) are presented in Tables 4 and 5. Figures 1 and 2 schematically display these results. In general, the respondents felt "unprepared" to "somewhat prepared" to offer the following services: counselling on HIV, verifying ARV prescriptions, counselling on ARVs, managing ARV - related adverse drug reactions and interactions, assessing ARV adherence, ensuring ARV reimbursement, doing literature and internet searches to answer questions related to HIV and ensuring proper prophylaxis and treatment of opportunistic infections. They felt very unprepared to unprepared to counsel patients on complementary and alternative medicines used in the HIV – infected population. The global preparedness score for all these pharmaceutical services was 2.54 ± 0.62 in the first sample and 2.61 ± 0.48 in the MTPA sample. This mean score is midway between feeling unprepared and somewhat prepared to do the pharmaceutical care activities.

Tables 6 and 7 as well as Figures 3 and 4 present the results of part II of the needs assessment survey, that is the knowledge of Ontario pharmacists on HIV and HIV pharmacotherapy. The mean global knowledge score in the mailed needs assessment sample is 5.12 ± 2.09 versus 4.89 ± 2.23 in the MTPA sample. More than 85 % of the respondents correctly answered the questions corresponding to HIV terminology and diagnosis, ARV accessibility and HIV prevention (Questions 12, 17, 20, respectively). Less than or equal to 50 % of respondents correctly answered the questions pertaining to ARV dose adjustments, ARV – related liquid requirements, ARV adverse drug reactions,

ARV interactions, HIV treatment guidelines, and prophylaxis and treatment of opportunistic infections (Questions 13, 14, 15, 16, 18, 21, respectively). A little more than 50 % of respondents knew that St. John's Wort interacts with the PIs (Question 19). For many questions, a high proportion of respondents answered "I don't know". These answers were regarded as incorrect for the calculation of the mean global knowledge score.

The global knowledge score and the global preparedness score were compared for each respondent of the mailed needs assessment (n = 110). The Pearson correlation coefficient was 0.57884. This correlation can be visualized in Figure 5. A diagonal line which runs from top to bottom can be imagined, though certain respondents apparently have discordant knowledge and preparedness scores. For example, some respondents received a very poor score in the knowledge portion of the needs assessment while responding that they felt prepared to offer most pharmaceutical care services to HIV – infected patients. The opposite was also seen. This analysis was not done for the MTPA sample as too few respondents were part of this sample.

Multiple regression analyses showed that three variables correspond with a higher global preparedness score. In the mailed needs assessment, respondents who answered that they were interested in doing the certificate program had a 0.3614 increase in their global preparedness score ($p = 0.0149$) compared to pharmacists who were not interested. Respondents working in a setting other than a community pharmacy had a mean global preparedness score that was greater by 0.4613, compared to pharmacists working uniquely in a community pharmacy ($p = 0.0132$). When both samples were combined (n = 138), respondents who counselled at least one HIV – infected patient per week had a

higher global preparedness score than pharmacists who did not counsel any HIV – infected patients per week ($p = 0.0465$).

Similarly, in the mailed needs assessment, pharmacists interested in doing the certificate program had a 1.5880 increase in the mean global knowledge score ($p = 0.0039$) compared to pharmacists who were uninterested. When both samples were combined ($n = 138$), respondents who completed a supplementary pharmacy degree after their bachelors degree had a higher global knowledge score than pharmacists with only a bachelors degree (mean increase = 1.0175, $p = 0.0388$). With this analysis ($n = 138$), an interest in doing the certificate program remained related to a higher global knowledge score ($p = 0.0009$). Multiple regression analyses for the MTPA sample are not presented as it is believed that the sample size is too small to draw any firm conclusions.

In question 22 of the needs assessment questionnaire, pharmacists were asked to describe in their own words why ARV adherence is important. The accepted answers and the corresponding percentage of participants giving each answer is presented. In the mailed needs assessment sample, the responses were as follows: prevent resistance (33.6%), maintain viral suppression (31.0 %), prevent morbidity (30.0 %), improve immunity ($CD4^+$) (12.7 %), maintain adequate ARV concentrations (10.9%) and to prolong survival (9.1 %). The corresponding figures for the MTPA sample are 17.8 %, 10.7 %, 17.9 %, 7.1 %, 7.1 % and 7.1 %, respectively. Unfortunately, 30.1 % of respondents in sample 1 and 46.4 % of respondents in sample 2 did not complete this open – ended question.

Tables 8 and 9 present the results from part III of the needs assessment questionnaire which addresses the attitudes of Ontario pharmacists. Close to 60 % of the respondents

disagreed or strongly disagreed that HIV / AIDS pharmacotherapy is too complex to learn and more than 95 % of respondents disagreed or strongly disagreed that they might become infected with HIV when counselling HIV - infected patients. Close to or greater than 85 % of respondents agreed or strongly agreed that confidentiality is crucial, that pharmacists can influence ARV adherence, and that the level of care offered to HIV - infected patients should not be affected by their transmission risk factors. 31.5 % of the respondents in sample 1 somewhat agreed that continuing education in HIV / AIDS could be a waste of time, whereas 65 % disagreed or strongly disagreed in the MTPA sample. As for the inventory management of ARVs in a pharmacy, responses varied tremendously. In sample 1, up to 42.3 % of respondents agreed or strongly agreed that keeping ARVs in stock was too expensive versus only 33.3 % in the MTPA sample. Many pharmacists (22.8 % in sample 1 and 48.2 % in sample 2) disagreed or strongly disagreed that educating clients on safe sex will change their sexual habits. Also, the majority of pharmacists somewhat agreed that counselling on the importance of clean needles can prevent transmission. Nearly 60 % of respondents agreed or strongly agreed that pharmacists play an important role in HIV prevention.

Pharmacists were asked to specify if they believed they needed a general overview, an in-depth review, or no review of various HIV-related educational topics. The results are presented in Tables 10 and 11. On average, pharmacists believed they needed a general overview of the following topics: HIV pathogenesis, HIV diagnosis, HIV natural history, laboratory parameters, HIV epidemiology, ARV pharmacokinetics, treatment of HIV in children and during pregnancy, medication acquisition and reimbursement, social, psychological, emotional and ethical concerns, implementation of an HIV / AIDS patient

care service and HIV literature and electronic database searches. An in-depth review of the following educational topics was believed to be necessary by the respondents: ARV indications and contraindications, ARV dosage and administration requirements, ARV adverse drug reactions, ARV interactions, HIV treatment guidelines, importance of adherence, prophylaxis and treatment of opportunistic infections, HIV counselling techniques, and over-the-counter medications and HIV. The interest for a general overview and an in-depth review was almost evenly distributed for the remaining topics; that is, HIV transmission and prevention, ARV mechanism of action, therapeutic drug monitoring, resistance to ARV, complementary and alternative therapies and post-exposure prophylaxis. The pharmacists in the MTPA sample preferred to receive an in-depth review of ARV pharmacokinetics and post-exposure prophylaxis. Few pharmacists responded that they needed no review of these educational topics. According to the respondents, a review on the social, psychological, emotional and ethical concerns, on the implementation of an HIV / AIDS patient care service and on HIV literature and electronic database searches are the least needed.

The pharmacists' interest to do a certificate program on HIV / AIDS was assessed in part V of the needs assessment. Table 12 presents these results. Thirty per cent of pharmacists in the mailed needs assessment sample were interested in doing the program versus 46.4 % of the pharmacists in the MTPA sample. Approximately 25 to 36 % were uncertain whether they would be interested in a certificate program and approximately 29 to 34 % had no interest in doing this continuing education activity. The majority of the pharmacists wished to invest less than 40 hours for the completion of the certificate program and pay less than $ 300 CAN for registration fees. Interestingly, approximately

25 to 37 % of pharmacists had employers who pay their continuing education activities. The respondents preferred doing the certificate program in September to November or March to May, that is, not during the Christmas and summer vacations.

Pharmacists were asked to describe which teaching strategies they would prefer in the HIV / AIDS certificate program. These results are presented in Tables 13 and 14. The six teaching strategies preferred by the respondents from the mailed needs assessment sample, in order of preference were: 1) live lectures during a convention or symposium, 2) at home readings, 3) case studies in groups, 4) seminars with small group discussions, 5) web site and CD-ROM educational activities, and 6) videotapes. Teaching strategies such as telephone conferences, telemedicine, audiotapes, internet discussion groups or chatrooms, and case studies with standardized patients were the least liked. For the evaluation of the certificate program, pharmacists preferred a take home exam that is both theoretical and case-based. The results were similar in the MTPA sample.

The pharmacists were asked to provide in their own words what in their opinion would make this certificate program the best continuing education activity ever attended. As many valuable comments were provided the majority of these are summarized in Table 15.

An ANOVA demonstrated that certain demographic variables appear to be related to pharmacists' interests in doing the HIV / AIDS certificate program. The number of years since graduation and the number of years practicing pharmacy influence pharmacists' interest. A pair-wise comparison with Tukey's test showed that pharmacists who answered "no" to question 61 (not interested in doing the certificate program) graduated

earlier and have been practicing pharmacy for 7.344 years more than those answering "yes" ($p < 0.05$). The Chi-Squared test showed that pharmacists who counsel at least one HIV – infected patient per week have a higher likelihood of wishing to do the certificate program than pharmacists who do not counsel any HIV – infected patients per week ($p = 0.0012$). Although not statistically significant, pharmacists who have completed more than one continuing education activity in HIV in the past tend to have less interest in doing the certificate program ($p = 0.0576$). The early and late responders of the mailed needs assessment sample did not differ in their interest in doing the certificate program.

2.2 Ontario Pharmacists' Association: HIV - related queries

A description of the HIV – related queries received by the OPA Drug Information and Research Centre in 2000 and 2001 is presented in Table 16. Overall, in 2000 and 2001, 198 and 62 HIV – related questions, respectively, were answered by the OPA.

Approximately 26 % of all questions were specific to ARV identification and doses. Pharmacists frequently called the OPA simply to know the names and corresponding abbreviations of the ARVs. The number of questions on ARV interactions increased from 2000 to 2001, passing from 10.6 % to 16.1 % of the questions. Drug – drug interactions between different ARVs or between ARVs and methadone, oral contraceptives, antipsychotics and antidepressants were common. Also, many questions were on drug interactions with complementary and alternative medicines. Community pharmacists appear to receive many questions from clients on the availability of HIV tests that can be done at the pharmacy or directly at home. There also seems to be a

relatively elevated number of questions relating to HIV transmission and prevention. In 2000, almost 20 % of questions were related to post-exposure prophylaxis and methods of preventing transmission (i.e.: condoms, safe use of needles, etc.). Finally, Ontario pharmacists also needed information on patient counselling techniques, acquisition and reimbursement of ARVs, ARV adverse drug reactions, management of HIV complications, prophylaxis and treatment of opportunistic infections, investigational drugs and structured treatment interruptions.

2.3 Key informant meeting

The pharmacists participating in the key informant meeting provided their professional opinion on the following topics: the pharmaceutical services pharmacists should offer HIV – infected patients, the knowledge base needed to offer pharmaceutical care to this population, and the teaching methods that would aid pharmacists transfer the gained knowledge into skills.

Table 17 presents the key informants' opinion on the services pharmacists should offer HIV – infected clients. The discussion was more orientated towards community pharmacists. Ten components of HIV / AIDS pharmaceutical care were identified. Other than ARV prescription verification, much emphasis was placed on the pharmacists' role in counselling HIV – infected patients. Counselling in a confidential setting on goals of therapy, administration requirements, importance of adherence, and possible adverse drug reactions and interactions were considered key components of HIV / AIDS pharmaceutical care. Furthermore, ensuring the acquisition and reimbursement of ARVs

were identified as services pharmacists should offer their HIV – infected patients. Finally, the key informants also specified that pharmacists need to show empathy.

Second, pharmacists were presented with ten HIV – related educational topics. They were asked to prioritize these topics from the most important to the least important. Important was defined as valuable knowledge needed to offer pharmaceutical care to HIV – infected clients. The members were informed that the purpose was not to identify the order of presentation of these educational topics in the certificate program. Due to the participants' indecisiveness and due to the lack of time, the facilitator allowed the members to place more than one educational topic in first, second, third and fourth position. The order established by the key informants is presented in Table 18.

Learning the relevance of the laboratory parameters was judged essential in order to understand and explain to patients the goals of ARV therapy. Also, the HIV treatment guidelines were positioned in first place as it provides an overall view of the management of HIV, in particular the possible ARV regimens. The participants then believed it was important for pharmacists to get more specific information on ARV mechanisms of action, drug interactions and adverse drug reactions. Adherence was positioned next as the presence of adverse drug reactions is significantly related to non-adherence. Although not placed in the first three positions, learning about social, psychological, emotional and ethical concerns was deemed crucial because the first step of pharmaceutical care is establishing a good relationship with the patient. The key informants specified that they did not consider it necessary for community pharmacists to be familiar with the actual viral mutations that decrease ARV efficacy but rather simply understand, in general, the consequences of non-adherence and of viral resistance.

Therapeutic drug monitoring of ARVs was considered the least important educational topic. Though knowledge of the names and doses of antiretrovirals was not included in the exercise, participants clearly stated that this should be viewed as the first priority.

The third key question asked of the participants was how pharmacists participating in the certificate program could acquire the needed skills to offer the services outlined earlier. The first suggestion mentioned was meeting people infected with HIV and listening to their concerns and complications (ie: emotional, psychological and social concerns, adverse drug reactions, pill burden). The participants suggested this might also help in developing empathy. Other options noted were case studies and a half-day rotation in an HIV clinic with specialists. The key informants also specified that activities should be organized to help the pharmacists develop the skill of searching for HIV – related drug information.

Some of the results of the needs assessment survey were presented during the key informant meeting to solicit comments and suggestions. They were informed that less than 35% of pharmacists answering the survey knew that adherence was important to prevent the development of viral resistance. The key informants expressed that they were impressed by this result as they expected the percentage to be quite lower. Also, some of the results from the OPA HIV-related queries analysis were shared with the group. The key informants were not surprised that 15 to 20 % of pharmacists call the OPA to obtain help in identifying the names of ARVs. They believed this was secondary to the lack of exposure to patients who receive ARVs.

3. DISCUSSION

In general, the three portions of the needs assessment showed that Ontario pharmacists' knowledge and preparedness regarding pharmaceutical care in HIV is inadequate. Both the needs assessment survey and the OPA HIV–related queries demonstrated that pharmacists lack knowledge on all the following topics: HIV disease, names and abbreviations of ARVs, appropriate doses of ARVs, food and liquid requirements of ARVs, ARV-related adverse drug reactions and interactions, the importance of adherence, HIV prevention, post-exposure prophylaxis, complementary and alternative medicines used by HIV – infected patients, prophylaxis and treatment of opportunistic infections, and sources of HIV information.

Studying the types of HIV-related questions asked by Ontario pharmacists to the OPA Drug Information and Research Centre was valuable and helped determine pharmacists' knowledge gaps. This was concrete information that reflected their daily needs. Since the pharmacists' perception of preparedness might not correlate with actual needs and since the knowledge score obtained in the needs assessment survey might be influenced by various factors, the analysis of the OPA HIV-related questions was a realistic complement to the needs assessment survey.

Perhaps the most valuable data is from the OPA HIV-related queries. As the majority of the questions pertained to simply identifying the ARVs, it clearly shows that a certificate program must be designed as a beginner program or a level–1 program. The needs assessment survey and the key informant meeting demonstrates that educational topics related to ARVs should be covered in-depth in a certificate program, whereas the

HIV disease process can be provided as an overview. The existence of viral resistance patterns and therapeutic drug monitoring can be briefly introduced, but these topics should not be covered in-depth for a level-1 certificate program.

Multivariate analyses showed that pharmacists who work in a setting other than a community pharmacy and counsel at least one HIV – infected patient per week feel more prepared to offer pharmaceutical care to HIV – infected patients. The global knowledge score was also higher when pharmacists had completed a supplementary pharmacy degree after the bachelors in science in pharmacy program. It is logical that higher education and increased exposure to counselling HIV – infected patients improves knowledge and preparedness. However, pharmacists who counsel at least one HIV – infected patient per week did not have a higher global knowledge score than pharmacists who do not counsel any HIV – infected patients. This is somewhat surprising and can perhaps be explained as follows. Pharmacists might have increased exposure to HIV – infected patients and perceive they are prepared to offer pharmaceutical care to this population. At the same time, pharmacists might not actively participate in HIV / AIDS continuing education and therefore not update the HIV / AIDS pharmacotherapeutic notions. This in turn would explain a global knowledge score that is similar to the one obtained by pharmacists with little HIV experience.

Unless pharmacists have developed an expertise in HIV over the years, it is suggested that pharmacists with higher education or with some HIV – related experience still undertake a level 1 HIV / AIDS certificate program before advancing to more complex topics.

The pharmacists' attitudes regarding the impact of pharmaceutical care in HIV was mediocre. Ideally, pharmacists should believe in the positive impact of counselling clients on HIV prevention methods, whether it be related to safer sexual habits or to the use of clean needles. To change their perception on the impact of counselling, more HIV prevention programs and campaigns should be launched across the province and country. It is unlikely that this can be remedied simply through lectures or workshops in the certificate program. Also, in order to improve the acquisition of ARVs by patients, pharmacists need to change their attitudes about keeping ARVs in stock in community pharmacies. Although the needs assessment survey was anonymous, one cannot exclude the possibility that pharmacists gave socially acceptable responses to the attitudinal statements. Therefore, it is possible that the results of this section of the needs assessment survey does not fully reflect their true attitudes.

Thirty percent of pharmacists who completed the needs assessment survey answered that they would be interested in doing a certificate program on HIV / AIDS. The survey was sent arbitrarily to only 9 % of Ontario pharmacists in certain electoral districts. Therefore, it can be expected that over 350 pharmacists in these electoral districts would be willing to participate in a certificate program. The total number of interested pharmacists could be higher if one assumes that pharmacists from the other electoral districts and from other provinces would also be interested. Based on the data, it appears that it is desirable and feasible to offer a certificate program on HIV / AIDS.

The pharmacists who were interested in a certificate program were in general younger, had practiced pharmacy for a shorter period of time, had never attended continuing education activities on HIV / AIDS, and did not see many HIV – infected

patients in their practice. The pharmacists' preferred teaching strategies such as lectures, at home readings and case studies. These teaching strategies are more passive and reflect the instruction methods the pharmacists have been exposed to during their bachelors degree. Also, the preference for passive teaching methods can be explained by the pharmacists' lack of basic knowledge on HIV / AIDS. Interactive workshops as well as self-directed learning can be difficult to accomplish without basic understanding of key concepts. The needs assessment survey respondents and the members of the key informant meeting have both noted that they believe having HIV – infected patients talk during the certificate program would be beneficial to increase exposure and comprehension of important issues.

The results of the needs assessment in this study are quite similar to the results obtained by Katz and colleagues. The Arizona pharmacists had very low knowledge scores for the following topics: HIV transmission and prevention, HIV testing, treatment of opportunistic infections, ARV regimens, and management of ARV drug reactions. Also, the Arizona pharmacists felt unprepared to counsel patients on HIV disease progression, HIV treatment, ARV drug reactions and ARV interactions.[29] Since the questions in the knowledge section of the needs assessment in the current study were not the same as in the study done by Katz, it is difficult to compare the knowledge of Arizona pharmacists to that of Ontario pharmacists. Also, as the complexity of HIV pharmacotherapy has drastically increased since 1993 one can expect the knowledge gap in 2002 to be greater. This, however, can not be confirmed with this study as it was not the purpose.

Katz also described that pharmacists believe counselling on safe sexual habits produces only a modest benefit. Contrary to the current results, the majority of pharmacists in Katz' study believed that keeping ARVs in stock is not too expensive.[29] One factor which might explain this discrepancy is that the number and cost of ARVs has significantly increased since 1993.

Scott and colleagues' study of West Virginia pharmacists' interests in doing continuing education activities provided different data than the current study. In the current study, pharmacists preferred doing programs that last less than 40 hours and cost less than $300 CAN. In contrary, West Virginia pharmacists were willing to dedicate 40 to 60 hours to do a certificate program and pay approximately $700 US. In both studies, close to 25% of pharmacists had financial support from their employer to cover the costs of continuing education activities. In Scott's study, the three preferred teaching strategies were lectures, readings and videotapes.[36] These are similar to the current study except case studies were more popular than videotapes in the present study. The comparison with Scott's study must be done cautiously as their study was not specific to HIV.

3.1 Strengths and limitations of the needs assessment

Although it was initially planned that the needs assessment be sent out only to community pharmacists, the final sample contained a number of pharmacists who worked in other settings. Instead of removing these respondents from the sample it was decided to include them as the certificate program will be offered to all Ontario pharmacists. Therefore, one limitation of this study is that the initial sample does not necessarily

reflect the pharmacists who will be participating in the certificate program. The primary aim is to offer a level – 1 certificate program on HIV / AIDS that is more specific to treating ambulatory patients than hospitalized patients. However, it is likely that more hospital pharmacists will participate than was initially planned. Their personal needs and learning objectives might be different than the ones described in this needs assessment. For this reason, it will have to be clear when advertising the certificate program that it is a level – 1 program meant for ambulatory care practice.

A response rate of 22.4 % is a significant concern. A low response rate can lead to the introduction of systematic errors caused by differences in the characteristics of the people who chose to complete the survey versus those who chose not to. This is known as non respondent bias. Measures were taken to evaluate the presence of non respondent bias. Walters describes that non respondent bias can be measured by comparing early responders to late responders as the latter most likely resemble non responders.[40] In this study, the demographics of early responders and late responders of the needs assessment survey were not significantly different. Also, the proportion of early and late responders interested in doing the certificate program was similar. The results from this comparison suggest that non respondent bias is minimal. Another method of evaluating non respondent bias is by comparing the demographics of the total study sample (n = 500) to the demographics of the respondents. Unfortunately, the demographics of the study sample could not be supplied to us by the OCP.

Interestingly, the response rates from electoral districts 3 to 6 (metropolitan Toronto) were the lowest. This is surprising as it also represents the area in Ontario where there is the greatest prevalence of HIV infection. One possible explanation is that

community pharmacists in Metropolitan Toronto might feel less concerned since patients have more access to HIV clinics with HIV pharmacotherapy specialists. Pharmacists in smaller urban cities or in rural centres where HIV clinics are not available may feel greater pressure to increase their HIV – related knowledge and skills.

The response rate in Katz's study was 40%. They used a 7-page questionnaire and sent a follow-up mailing to the non respondents.[29] In Scott's study, the response rate was similar to the current study, that is 24.1 %. They also had a follow-up mailing but their questionnaire was 23 pages long.[36]

Factors that can help explain a low response rate in the current study are the length of the questionnaire (eight pages, 100 questions) and the discrimination that is still unfortunately associated with HIV / AIDS. A study evaluated the mean response rates of surveys published in medical journals in 1991. The mean response rate was 60 %. Financial incentives and anonymity were not associated with higher response rates. Also, longer surveys seemed to be associated with better response rates. Not surprisingly, a follow-up mailing of the survey with the tool and telephone follow-ups increase the response rate by 13 % each.[41] Therefore, a method that could have been used to increase the response rate is telephone follow-ups. Although possibly effective, this method would have increased the cost of the study and would have been very time consuming. In the current study, it is not believed that a higher number of completed needs assessment surveys would have significantly changed the results, conclusions and the overall design of the certificate program.

One limitation of the OPA HIV-related queries analysis is that not all questions - related to HIV / AIDS might have been detected since a search with the term "AIDS" was

not performed. This was because we suspected that the term AIDS was too non-specific and would have provided an unmanageable number of questions. It remains unclear why there was a 69 % decrease in the number of HIV – related queries from 2000 to 2001. This was not to be expected considering the increased prevalence of HIV, the availability of new ARVs, and the continuing heightened complexity of HIV pharmacotherapeutics.

One major limitation of the key informant meeting was the lack of time to discuss certain topics in detail. Ideally, a three hour session instead of a one hour session would have allowed the group to explore the issues in greater depth.

Finally, the development of an advisory committee was very advantageous. The members were valuable since they had experience in HIV and in planning certificate programs and other continuing education activities. Their participation provided a forum for discussion and validated the process and results. This approach may have helped to limit potential errors and create a valid questionnaire.

Overall, the information collected in the three portions of the needs assessment was valuable for the design of the HIV / AIDS patient care – level 1 certificate program. The next section will focus on the preliminary design of the certificate program, suggested based on the information gathered during the needs assessment.

CHAPTER III – Design of the certificate program

1. INTRODUCTION

This chapter describes the proposed conceptual design of the HIV / AIDS Patient Care: Level 1 Certificate Program that will be developed by the OPA and the Ontario HIV PSG. The design of the certificate program was based on the *Interactive Model of Program Planning* for adult learners described by Caffarella.[42] This model includes twelve steps. The first three steps of Caffarella's model, discerning the context, building a solid base of support, and identifying program ideas have already been completed with the advisory committee and the needs assessment. The design of the program presented in this chapter includes the next six steps of Caffarella's process: sorting and prioritizing program ideas, developing program objectives, designing instructional plans, devising transfer-of-learning plans and formulating evaluation plans. The last three steps of the planning process are beyond the scope of this residency project and will be completed by a separate development team who will undertake the following: selecting formats, schedules and staff needs, preparing budgets and marketing plans, coordinating facilities and on-site events, finding speakers, preparing the written materials, developing the evaluation tools, applying for Canadian Counsel on Continuing Education in Pharmacy accreditation, evaluating the certificate program and communicating the results of the evaluation. The development team will consist of members of the OPA and of the HIV PSG.

The design of the certificate program considers the results from the needs assessment. Efforts were made to distinguish between actual education needs and perceived education

needs of pharmacists. The objectives and content selected for the certificate program also reflect the position paper on the role of the pharmacist caring for people living with HIV / AIDS.[3] The teaching methods chosen for the certificate program included when possible the preferences identified by the pharmacists in the needs assessment. The teaching format selected places greater emphasis on case discussions and active participation. The program objectives, outcome-based learning objectives, educational content, teaching methods, preliminary program outline, evaluation procedure and need for recertification are detailed below.

2. TARGET AUDIENCE

All Canadian pharmacists interested in HIV / AIDS pharmaceutical care will be invited to participate in the certificate program. Since this certificate program is meant to be an introductory course (Level 1), no preliminary knowledge and / or experience in HIV / AIDS pharmaceutical care will be mandatory prior to the program.

The development team for the certificate program will advertise the certificate program in Ontario pharmaceutical journals and bulletins. The certificate program might also be advertised in Canadian pharmaceutical journals allowing pharmacists from provinces other than Ontario to participate. Also, a few places in the certificate program will be made available for HIV pharmaceutical representatives from pharmaceutical companies that have agreed to sponsor the certificate program. Inviting pharmaceutical representatives is meant for educational purposes and not to promote marketing during the conferences and workshops. The exact number of participants from each group

(Ontario pharmacists, pharmacists from other provinces and pharmaceutical representatives) will be determined by the OPA and the development team. When advertising the certificate program, the target audience and level of complexity of the certificate program will have to be clearly stated.

In order for the workshops and other group activities to function properly, the recommended number of participants should be limited to less than 50. This number only includes the pharmacists and pharmaceutical representatives that will be participating in the workshops. It does not include the speakers, learning facilitators and certificate program organizers. This number of participants as been chosen because it is believed that eight work tables for interactive workshops will be available and that six participants per table will lead to effective learning and discussion.

2.1 Characteristics of the potential participant

The demographics of pharmacists who completed the needs assessment provides some insight as to the characteristics of the future participants of the certificate program. From the results of the needs assessment survey, it can be expected that many of the participants will be full-time community pharmacists aged between 30 and 50 years. Participants will most likely have completed their pharmacy degree 5 to 25 years ago and have very little experience counselling HIV – infected patients.

These characteristics are important factors that influence the dynamic of the certificate program. Pharmacists who have graduated 15 to 25 years ago have never studied HIV / AIDS during pharmacy school and unless they have kept constantly up to

date with numerous continuing education activities and personal readings will probably have large gaps in knowledge, skills and attitudes relating to HIV care. Even pharmacists who have graduated five years ago are likely to have outdated information because knowledge in the HIV field is changing very rapidly. The needs assessment demonstrated that only 21.8 % of pharmacists have done one or more continuing education activities on HIV / AIDS. Taking all this into consideration, it is important to focus on basic content related to HIV / AIDS and limit complex topics.

As compared to a program on hypertension or diabetes, pharmacists participating will likely not be able to contribute many past experiences during the workshop discussions. Consequently, this will limit their ability to easily actively participate. For this reason, it is suggested that the certificate program be more case-orientated. This will provide real concrete examples of actual drug-related problems seen frequently in practice. In the suggested design of the certificate program, participation of HIV – infected patients is recommended. People living with HIV / AIDS can talk to the pharmacists about important issues: need for confidentiality, adverse drug reactions and other complications, pill burden, challenges related to adherence, as well as social, psychological, emotional and ethical considerations. Hopefully, these teaching strategies will help increase comprehension of important patient-related issues that must be taken into consideration when providing pharmaceutical care to HIV – infected patients.

3. OBJECTIVES

3.1 Statement of purpose

It is proposed that the purpose of this certificate program be to enhance pharmacists' knowledge and skills, which should improve their ability to care for ambulatory HIV-infected patients.

By training pharmacists on HIV / AIDS pharmacotherapy, the certificate program could contribute to enhancing the judicious use of ARVs. Judicious use of ARVs, in turn, could positively contribute to improved patient outcomes such as lessened morbidity and better quality of life. Also, this program could increase the pharmacists' self-confidence in delivering pharmaceutical care to HIV – infected patients. Completing an HIV / AIDS certificate program can also be advantageous for community pharmacists who wish to attract business, as HIV specialized physicians will want to direct their patients to knowledgeable pharmacists.

3.2 Program objectives

1) To increase the participants' knowledge on ARVs and other medications used for the management of HIV / AIDS and opportunistic infections in patients infected with HIV.

2) To increase the participants' ability to identify, manage and monitor drug-related problems seen in HIV – infected patients and collaborate, when necessary, with other health professionals.
3) To increase the participants' awareness of social, psychological, emotional and ethical issues which accompany HIV infection.

3.3 Learning objectives

The learning objectives were determined based on the key informants' discussion and on the position paper published by the Canadian HIV / AIDS Pharmacy Network.[3] Both these sources describe the services pharmacists should be able to offer HIV – infected patients. It is proposed that the learning objectives be outcome-based in that they describe the tasks pharmacists should be able to do after completing the certificate program.

The proposed learning objectives are presented in Table 19. They are divided into four sections: HIV – disease, antiretrovirals, opportunistic infections and miscellaneous. Each learning objective is placed into two categories: content – based and skilled - based learning objectives. However, this subdivision is difficult to make as most skills require underlying knowledge. In reality, most of the learning objectives could be placed in both categories.

4. EDUCATIONAL CONTENT

Table 20 details the educational topics that are suggested for the HIV / AIDS certificate program. This table presents for each educational topic the type of teaching strategy proposed (lectures, workshops with case discussions and other activities, information booths, etc.), the degree of coverage (general overview versus in-depth review) and the approximate number of hours associated to each topic. The educational topics chosen and the degree of coverage reflect the results of the three portions of the needs assessment: the survey, the OPA HIV-related queries analysis and the key informant meeting. Also, Table 20 reflects the learning objectives suggested in Table 19.

5. PROGRAM OUTLINE

The suggested model for the certificate program is similar to the instructional format used for other certificate programs already offered by the OPA. It is anticipated that participants will have to invest approximately 40 hours to complete the certificate program. Mandatory readings will be given to the participants and they will then be asked to attend a two and a half day symposium, likely held in Toronto.

5.1 Mandatory readings

The participants will be asked to read the following five documents before attending the symposium. The exact articles chosen for the pre-readings will be determined by members of the development team.

- DHHS guidelines for the use of ARV agents in HIV – infected adults and adolescents
- USPHS / IDSA guidelines for the prevention of opportunistic infections in persons infected with human immunodeficiency virus
- General article on ARVs
- General article on adherence to ARVs
- General article on drug interactions with ARVs

Other readings will also be included in the written material. These do not need to be read before the symposium but questions on the final examination might originate from these documents.

- Article on HIV prevention
- Article on post-exposure prophylaxis
- Article or guidelines on the management of HIV infection in pregnant women
- Article or guidelines on the management of HIV infection in children

5.2 Symposium outline

The following outline is proposed to be used by the development team to implement the symposium. The final outline prepared by the development team might differ depending on some planning issues (room availability for workshops, speakers, etc,).

This outline tries to respect the educational topics, teaching strategies and hours of instruction listed in Table 20.

5.2.1 Day 1

8:00 – 8:30 Breakfast and registration

8:30 – 8:45 Introduction

8:45 – 9:30 **HIV Disease and Prevention**

- Epidemiology
- Diagnosis
- Pathogenesis
- Natural History
- $CD4^+$ / viral load
- Transmission
- Prevention

9:30 – 10:30 **Antiretrovirals : Part I**

- Names, abbreviations, classes
- Mechanisms of action
- Indications, contraindications, precautions
- Doses and dose adjustments
- Food and liquid requirements
- Basic pharmacokinetics

10:30 - 10:45 Break

10:45 - 11:30 **Antiretrovirals: Part II**

- Reimbursement and acquisition
- Initiating therapy; recommended regimens
- Goals of therapy
- Monitoring therapy

11:30 – 12:30 **Panel discussion: Living with HIV / AIDS**

- Social, emotional, psychological and ethical concerns:

  A patients' perspective

12:30 – 13:30 Lunch

13:30 – 14:30 **Adverse Drug Reactions**

- Short term adverse drug reactions
- Long term adverse drug reactions

14:30 – 16:00 **Workshop 1**

- Verifying prescriptions and reimbursement of ARVs

16:00 – 16:30 **Expert panel discussion**

5.2.2 Day 2

8:00 – 8:30 Breakfast

8:30 – 9:15 **Antiretroviral regimens**

- Choosing a regimen
- Advantages and disadvantages: efficacy, toxicity and adherence
- Brief introduction to resistance

9:15 - 10:15 **Antiretroviral drug interactions**

- Pharmacodynamic interactions
- Pharmacokinetic interactions
  - with other ARVs
  - with other prescribed medications
  - with over-the-counter medications, natural products and illicit drugs

10:15 – 10:30 Break

10:30 – 11:30 **Opportunstic infections**

- Primary and secondary prophylaxis
- Treatment

11:30 – 12:00 **Resources for the HIV – infected patient and healthcare professional**

- Providing referrals to other healthcare professionals
- Educational material, web sites and community organizations

12:00 – 12:30 **Special populations: IV drug users**

- Special considerations
- Methadone

12:30 – 13:30 Lunch

13:30 – 14:45 **Workshop 2**

- Case studies: Adverse drug reactions and opportunistic infections

14:45 - 16:00 **Workshop 3**

- Case studies: Drug interactions

16:00 – 16:30 **Expert panel discussion**

5.2.3 Day 3

8:00 – 8:30 Breakfast

8:30 – 9:30 **Complementary and alternative medicines in HIV**

- Natural products and vitamins commonly used in HIV
- Doses, efficacy and toxicity

9:30 – 10:15 **Adherence**

- Importance of adherence
- Barriers to adherence
- Assessing adherence

10:15 – 10:30 Break

10:30 – 12:50 **Workshop IV**

- Counselling patients with HIV / AIDS

12:50 – 13:00 Wrap-up, program evaluation, distribution of take-home exam

13:00 – 14:00 Lunch

6. EDUCATIONAL MATERIAL

A teaching manual containing the elements mentioned in section 5.1 will be sent to all participants at least one month prior to the symposium. This is to allow for sufficient time for participants to complete the mandatory readings. The manual will also contain a list of pertinent references related to HIV / AIDS. Furthermore, a list of interesting web sites related to HIV for healthcare professionals and patients will be provided. Tables on ARVs will be included. The tables will contain information such as

doses, formulations, storage and administration requirements, pharmacokinetic parameters, accessibility and reimbursement modalities, adverse drug reactions, monitoring, drug-drug interactions and resistance. Also, tables on medications used for the treatment and prophylaxis of opportunistic infections will be included. This manual will also contain patient information such as medication pamphlets and newsletters from different organizations (People with AIDS (PWA), Canadian AIDS Treatment Information Exchange (CATIE) or AIDS Committee of Toronto (ACT)). If possible, participants will receive a copy of the HIV ARV handbook.[43]

A second booklet will be given to participants on arrival to the symposium. This booklet will include: plan of the symposium, learning objectives, speaker biographies, slides, synopsis of each presentation, and instructions and cases for workshops.

7. TEACHING STRATEGIES

7.1 Preliminary readings

The readings were selected to introduce many key concepts that are the basis of HIV / AIDS pharmaceutical care, specifically ARVs, HIV and opportunistic infection management guidelines and adherence. The preparatory readings will help the group proceed more rapidly through the educational content. In turn, participation during the workshops should be enhanced. Non mandatory readings will also be suggested. These readings might be necessary to complete the final evaluation.

7.2 Lectures

The lectures will be given by HIV expert pharmacists, physicians, nurses, and by people living with HIV. Health professionals will be chosen by the development team based on the topics and the specific expertise and credentials of the specialists. Once chosen, the speakers who accept to participate will receive the outline of the content to be discussed during the talk (see 5.2). The speakers will be asked to write approximately three specific objectives for their talk. Any educational material (ie: slides) will need to be returned to the development team before a certain deadline accompanied by a biography and a synopsis of the talk. Speakers asked to give a one hour talk will be asked to devote at least 10 minutes to a question and answer period and speakers who give a talk of 45 minutes or less will be asked to devote at least 5 minutes to a question and answer period. Throughout the talk, the speakers will be asked to present two to three short cases to demonstrate the relevance of the subject matter to daily practice.

7.3 Workshops

Four workshops will be held during the symposium. It is proposed that the goals of the workshops are to apply the knowledge gained during the lectures to case studies and to learn to identify, manage and monitor HIV drug-related problems. The following strategies will be used: case studies, counselling, observation and reflection. Also, the manual sent to the participants prior to the symposium will include a list of internet sites relevant to pharmaceutical care in HIV / AIDS. The participants will be asked to do some web-based searches at home to enhance this skill.

Ideally, the participants will be divided into eight groups of six people. If possible, there will be four tables in two separate conference rooms. The groups do not have to contain the same participants at each workshop. A learning facilitator will be seated at each table. In all, eight learning facilitators will be trained to guide the participants during the workshops. The exact cases that will be presented will be prepared by the development team.

Prior to the symposium, the learning facilitators will be chosen and will meet to review all the activity instructions and cases. The development team must ensure that the learning facilitators have the knowledge, skill and confidence to handle the workshop activities.

At the beginning of the first workshop each learning facilitator will briefly review the teaching manual with the participants to ensure that they are aware of the content available in the tables. The tables will be valuable tools for the workshops.

7.3.1 Workshop 1: Verifying prescriptions and reimbursement of antiretrovirals

In this first workshop, the participants will be asked to simply verify prescriptions (ARVs and other concomitant medications), taking into consideration the data provided for each case. These case studies will be kept as realistic as possible for community pharmacists. Participants will need to focus on the identification of ARVs, doses, dose adjustments, administration intervals, food / fluid requirements, etc. Different modalities for the reimbursement of the antiretrovirals will also be reviewed.

Workshop 2 and 3 will occur concurrently in two different rooms. Half of the group will do workshop 2 first and then switch rooms after the break. The other half of the group will do the opposite. The learning facilitators will be trained to offer just one workshop (4 in each conference room) and will stay in the same location for the afternoon.

7.3.2 Workshop 2: Case studies: Adverse drug reactions and opportunistic infections

Written cases on adverse drug reactions and /or the prophylaxis and treatment of opportunistic infections will be presented by the learning facilitators. The participants will be asked to detect drug-related problems and propose solutions. Monitoring elements will also be discussed.

7.3.3 Workshop 3: Case studies: Drug interactions

During this session written cases on drug interactions (ARVs, concomitant prescribed medications, over-the-counter medications, natural products and illicit drugs) will be presented by the learning facilitators. The participants will be asked to work together to detect the interaction, propose possible solutions for the management of the interaction, choose one solution and discuss how they would implement and monitor this solution. The learning facilitators will help guide the discussion.

7.3.4 Workshop 4: Counselling patients with HIV / AIDS

Live simulations and observation will be used to practice patient counselling. Two activities are suggested and will need to be approved and / or modified by the development team. The first activity will require the active participation of the learners. The learning facilitator in this activity will simply explain the instructions and answer any questions during the activity. The participants will work in pairs during this activity. Each participant will be handed a paper with a brief description of a patient who comes to a pharmacy for counselling (either new prescription or question). Each person will have a different case. The participants will have five minutes to prepare for counselling. Person A and person B in the pair will switch papers. Person A will then read the description out loud as if he/she was the patient and then person B will have 10 minutes to do the counselling. Person A (the patient / observer) will then comment on person B's counselling and identify strengths as well as weaknesses that need improvement. This process will then be repeated with person A doing the counselling. A 10 minute period at the end will be used for discussion amongst the group. A second method of doing this activity is with standardized patients. One of the pharmacists in the group could do the counselling while the other pharmacists in the group observe the counselling and give constructive feedback.

The second activity suggested is a group discussion following the viewing of a video with a pharmacist counselling an HIV – infected patient. The facilitator will direct the discussion and the participants will be asked to comment on ways to improve counselling.

7.3.5 Reflection

At the end of each workshop, the participant will be asked to complete a one-page self-evaluation. The participant will be asked to reflect on what has been learned during the workshop and how this can be relevant to his / her practice. The participant will also be asked to describe skills that still need to be improved. Ten minutes will be reserved for this exercise at the end of each workshop. The exact tool will be made by the development team.

The participants will also be asked to identify one specific aspect related to the workshop that they wish to improve or change in their practice. The proposed improvement / change for each workshop (four in all) will be written on a separate page with a carbon copy. The participant will keep one copy as a reminder of his / her personal transfer of learning objectives. The other copy will be returned to the organizers and used in the evaluation. This document will be called the *Commitment to pharmaceutical care in HIV/AIDS* and will be identified by the participants' name. This approach has already been studied by continuing education researchers.[44] The purpose of this exercise is to encourage effective application of what was learned during the certificate program.

7.4 Panel discussions

It is suggested that the panel discussions be held at the end of the first and second day of the symposium. A summary of the days' activities will be given by one of the program organizers and the experts present will be available to answer questions during a

30 minute period. Also, this time can be used to review certain points that the learning facilitators judge have not been well understood during the workshops.

8. PROGRAM EVALUATION

As described by Dixon[45], four levels of criteria to evaluate continuing education programs exist. These are 1) perceptions and opinions about the course, 2) knowledge and attitudes, 3) professional behaviors in actual clinical work, and 4) impact on patient status.[45,46] The first level relates to asking the participants' opinions on the program format, organization, content, speakers and activities. The second level is the evaluation of the participants with respect to the outcome-based learning objectives. An evaluation should attempt to measure changes in knowledge, skills and attitudes. The third level reflects the evaluation of transfer of learning processes; that is, has the participant been able to successfully apply to his / her own practice the knowledge and skills learned during the program? Finally, the last level is associated with patient outcomes. For example, the evaluation could help describe the impact of the certificate program on patient satisfaction, morbidity, mortality and quality of life. The evaluation processes proposed below consider the first three levels of criteria to evaluate continuing education programs. Evaluating the impact of the certificate program on patient status is not suggested for practical reasons. Such a study is not feasible as this would necessitate ethics approval from numerous research committees across the province.

8.1 Evaluation of the participants

Four methods for evaluation of the participants are recommended for the HIV / AIDS patient care – level 1certificate program.

First, participants will be asked to complete a short pre-test and return it on the first day of the symposium. This is meant to evaluate pharmacists' knowledge before the symposium and hopefully motivate them to complete the mandatory readings. Since pre-test questions will be less complex than questions in the final examination, it will be difficult to make solid comparisons. However, it is believed that this information will be beneficial to evaluate the pharmacists' progress.

Second, to obtain a certificate, participants will have to successfully complete a take-home exam. Each speaker will prepare one short case containing two or three multiple-choice questions. The questions should not seek to only evaluate knowledge but require participants to use problem-solving skills to answer questions. Ideally, one or two short open-ended questions (5 to 10 lines) will be included to try and better evaluate the participants' comprehension. Speakers will be asked to return the exam questions to the development team before a certain deadline. The development team will then prepare the examination. Certain questions might need to be slightly altered. Every effort will be made to ensure that the level of difficulty of the questions reflect a level 1 certificate program and that questions resemble the cases seen during the workshops. The time needed to complete the exam will be approximately three hours. The participant will be asked to return the exam by mail one or two months after the symposium.

Third, a self-evaluation will be done during the workshops as mentioned in section 7.3.5 (reflection). This self-evaluation will be kept anonymous and collected at the end of each workshop.

Finally, nine to twelve months after the symposium, a short questionnaire (2 pages) will be sent to each participant. This questionnaire will be accompanied by a copy of the participants' personal *Commitment to pharmaceutical care in HIV/AIDS.* The questionnaire will be developed by the development team and will evaluate the participants' perception of the impact of participation in the certificate program on their practice with HIV –infected patients. The questionnaire will also ask the participants if they have achieved their personal goals described in their *Commitment to pharmaceutical care in HIV/AIDS.* The questionnaires will be identified by a number and will be kept confidential.

8.2 Evaluation of the certificate program

Three tools will be prepared by the development team to evaluate the certificate program: evaluation of the speakers, evaluation of the activities (workshops) and overall evaluation of the program. These will be adapted from evaluation tools already constructed and implemented for previous OPA certificate programs.

8.3 Requirements to obtain a certificate

To be awarded a certificate, a participant will be expected to do the following:

- complete the pre-readings and submit a completed pre-test
- attend the two and a half - day symposium and the workshops
- obtain a minimum score of 70% on the take-home examination

8.4 Communication of results

The participants will receive their examination mark through the mail. This will be accompanied, when merited, by a certificate.

The global results of the examination, as well as results from the questionnaire sent nine to twelve months after the symposium, will be published and/or presented at a pharmacy convention with a description of the certificate program.

The results of speaker evaluations will be sent to the speakers. These results as well as the results for the evaluation of the workshops and the overall program will be analyzed by the OPA and the development team and used to modify the certificate program as deemed necessary.

9. RECERTIFICATION

As part of the conceptual design for the certificate program, it is proposed that a process be developed to ensure compulsory recertification of pharmacists having completed the HIV / AIDS patient care – level 1 certificate program. Recertification is believed to be necessary in the case of HIV / AIDS pharmacotherapeutics as knowledge gained in this field is quickly outdated. The goal of recertification is not to introduce

more complex topics such as therapeutic drug monitoring or viral resistance, but to simply ensure that pharmacists are aware of new ARVs and changes in treatment guidelines.

It is recommended that pharmacists who have completed the certificate program participate yearly in continuing education activities on HIV / AIDS. Such continuing education activities could include the following: one day HIV / AIDS update conferences, HIV / AIDS videoconferences, teleconferences on specialized HIV / AIDS web sites (ie: "CME on HIV"), and reading HIV / AIDS update bulletins provided on the Toronto General Hospital Immunodeficiency Clinic or the OPA web sites. The pharmacists could be asked to complete some theoretical and case-based questions after participating in these activities to obtain continuing education credits.

Furthermore, as a support for pharmacists completing the certificate program, it is suggested that a mentorship program be developed. A small group of pharmacists specialized in HIV / AIDS could volunteer to be available to answer HIV – related questions. A list of specialized pharmacists participating in the mentorship program could be given to the participants at the end of the certificate program.

10. DISCUSSION

The design presented in this project will be submitted to the OPA for approval. Changes will likely be made if certain parts of the design (ie: workshop procedures) are thought to be unfeasible.

Whenever possible, the proposed design of the certificate program was based on the needs assessment completed in the first part of the study. The results from the needs assessment survey were interpreted cautiously by taking into consideration the results from the OPA HIV – related queries analysis and the key informant meeting. For example, the survey in this study evaluates the perceived needs as identified by the pharmacists whereas the OPA HIV-related queries analysis provides information on the pharmacists' actual needs. These at times were conflicting. For this reason, the preferences of pharmacists communicated through the survey were not always fully incorporated in the final design. One example is the preferred teaching strategies. Lectures still remain the preferred teaching method even though they have been proven in the literature to be less effective than other active teaching methods.[35] It is suggested that more emphasis be placed on case studies than in the other OPA certificate programs. Considering pharmacists have very little experience with HIV – infected patients, devoting more time to case studies than lectures is an important step to increase comprehension of issues related to HIV pharmaceutical care.

It was decided to base the design of the certificate program on the results from the needs assessment surveys received from all respondents instead of just those interested in doing the certificate program. Since multivariate analyses showed that pharmacists interested in doing the certificate program had a higher global preparedness and knowledge score than pharmacists uninterested in doing the certificate program, modeling the design of the certificate program only on the needs of those interested in doing the certificate program would mean increasing the complexity of the program. This was not desired because the results from the OPA HIV-related queries analysis

suggested that the certificate program should be simplified as much as possible. For this reason, the educational needs were based on the results from all the survey respondents. In the survey, however, only pharmacists interested in doing the certificate program identified their preferred teaching strategies.

One limitation of this design is the time pharmacists will need to devote to the program. On average, it will take pharmacists 35 to 40 hours to receive a certificate. Since the needs assessment survey showed that pharmacists lack knowledge on all the aspects of HIV disease and pharmacotherapy, this time may be insufficient to effectively meet all the learning objectives. Even though this certificate program is meant to be a level 1 course, it is extremely difficult to review all the needed educational topics during a two and a half-day symposium. Also, though the workshops will introduce the process of solving HIV drug-related problems, it is unlikely that the pharmacists will be completely prepared to function independently following the symposium. The pharmacists will need to be motivated to put into practice the gained knowledge. The transfer of learning strategies suggested will be crucial for the pharmacists' continued progress.

A longer certificate program was not recommended in this study because it was feared that the interest in doing the program would drop drastically. A longer certificate program would also be problematic for all pharmacists who do not live in the Metropolitan Toronto area.

Finally, clerkships with HIV specialists would be beneficial, however the lack of specialized pharmacists is a significant obstacle. Another option would be a 4 to 6 month on-line certificate program, similar in nature to the certificate program being developed

by the University at Buffalo. This option was not studied in great detail as many pharmacists have internet access at work but not at home.

CHAPTER IV – Closing comments

1. FUTURE STUDIES

It was demonstrated with the OPA HIV-related queries analysis that many pharmacists have difficulties identifying the names of antiretrovirals. Therefore, learning complex topics such as viral resistance patterns, salvage ARV regimens and therapeutic drug monitoring should be of lower priority. Once the participants have completed this level –1 course, however, there might be a need to offer a level – 2 course the following year. The model for the advanced certificate program could be similar to the level – 1program.

Second, as suggested in the evaluation plan, the HIV / AIDS patient care – level 1 certificate program could be evaluated nine to twelve months following the completion of the first group. The goal of this evaluation is to analyze if the pharmacists believe their professional behaviors in a clinical setting have changed due to the certificate program. Also, it would be an opportunity to evaluate if the *Commitment to pharmaceutical care in HIV / AIDS* transfer of learning strategy was effective.

These future projects could be conducted by the development team of the certificate program, the OPA and / or the HIV PSG. They could also be interesting projects for future pharmacy residents, whether the next HIV pharmacy specialty resident, a general community pharmacy resident or a general hospital pharmacy resident.

2. CONCLUSION

This residency project confirms the initial prediction that many pharmacists have insufficient knowledge and skills to provide pharmaceutical care to HIV - infected patients. The results from the needs assessment survey suggest that the majority of Ontario pharmacists feel unprepared to somewhat prepared to offer HIV / AIDS pharmaceutical care. Furthermore, pharmacists lack very basic knowledge on ARVs, including their names, abbreviations and appropriate doses. These results can be explained by the rapidly growing complexity of HIV pharmacotherapy and by the fact that many pharmacists follow very few HIV – infected patients in the community setting.

With the goal of improving the present situation, an HIV/ AIDS patient care – level 1 certificate program was designed and should be offered to Canadian pharmacists in September or October 2003. It is proposed that this program consist of pre-readings, a two and a half-day symposium, and a final take-home exam. Emphasis is placed on pharmacist participation through various workshops. Ideally, numerous case studies will be presented to increase the pharmacists' exposure to common HIV or ARV-related problems.

Although the benefits of this residency project are not easily measurable, I believe increasing the number of pharmacists who are competent in delivering HIV / AIDS pharmaceutical care will help improve the judicious use of ARVs. Consequently, this should improve patients' quality of life by decreasing morbidity (and perhaps even mortality) caused by virologic failure, medication errors, adverse drug reactions and clinically significant drug interactions.

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APPENDICES

APPENDIX 1

COLLABORATORS

Alice Tseng, Pharm.D:	HIV clinical pharmacist and residency program coordinator, Toronto General Hospital
Laura Park-Wyllie, Pharm.D:	HIV clinical pharmacist and residency program coordinator, St. Michael's Hospital, Health Centre at 410
Tony Antoniou, Pharm.D:	HIV clinical pharmacist, St. Michael's Hospital, Health Centre at 410
Jana Bajcar, M.Sc.Phm:	Doctor in Pharmacy Program director, University of Toronto
Darcy Berthiaume, B.Sc.Phm:	Community pharmacist
Bernie DesRoches, B.Sc.Phm:	Continuing education department, Ontario College of Pharmacists
David Fletcher, M.D:	Internal Medicine Specialist, Maple Leaf Clinic
Suzanne Gill, B.Sc.Phm:	Hospital pharmacist, Toronto East General Hospital Co-Chair, Ontario HIV Pharmacy Professional Specialty Group
Susan Halasi, M.Sc.Phm:	Ontario Pharmacists' Association, Drug Information and Research Centre
Helene Lau, B.Sc.Phm:	Hospital pharmacist, Sunnybrook Hospital
François Lemay:	HIV project manager, GlaxoSmithKline
Donna Lowe, B.Sc.Phm:	Hospital pharmacist, Toronto General Hospital Co-Chair, Ontario HIV Pharmacy Professional Specialty Group
Marie-Josée Martel, M.Sc.Pharm:	Medical information manager (HIV division) GlaxoSmithKline
Ruxandra Pinto, Ph.D:	Biostatistician, University Health Network

COLLABORATORS (continued)

Celia Powell:	Continuing education programs, Ontario College of Pharmacists
Linda Robinson, B.Sc.Phm:	HIV clinical pharmacist, Tecumseh clinic, Windsor Regional Hospital
Janet Sio, B.Sc.Phm:	Hospital pharmacist, Toronto General Hospital
Derek Thaczuk:	People with AIDS – Toronto (PWA)
Sharon Walmsley, M.D:	Infectious Disease Specialist, Immunodeficiency Clinic, Toronto General Hospital
Alice Watt, B.Sc.Phm:	Hospital and community pharmacist, Toronto East General Hospital
Sandra Winkelbauer, B.Sc.Phm:	Ontario Pharmacists' Association, Director of continuing education
Deborah Yoong, B.Sc.Phm:	HIV clinical pharmacist, St. Michael's Hospital

APPENDIX 2

Table 1: Electoral districts of the Ontario College of Pharmacists and the interests of pharmacists for continuing education on AIDS

Electoral district number	Municipalities in Ontario[†]	Number of pharmacists as of December 1999*	AIDS as a continuing education topic: Priority of pharmacists *[‡] (1 being the highest)
1	United counties of Stormont, Dundas and Glengarry, Leeds and Grenville, and Prescott and Russell, the counties of Lanark and Renfrew and The Regional Municipality of Ottawa-Carleton	702	2
2	United counties of Lennox and Addington, the counties of Frontenac, Hastings, Haliburton, Northumberland, Peter-borough, Prince Edward and Victoria, and the Regional Municipality of Durham	602	3
3-6	The Municipality of Metropolitan Toronto and The Regional Municipality of Peel comprising the City of Mississauga	2514	2
7	County of Simcoe, The Regional Municipality of York and The District Municipality of Muskoka	664	2
8	Regional municipalities of Halton and Hamilton-Wentworth and that part of The Regional Municipality of Haldimand-Norfolk formerly known as the County of Haldimand except that part comprising the Town of Dunnville	544	8

Table 1 (continued)

Electoral district number	Municipalities in Ontario†	Number of pharmacists as of December 1999*	AIDS as a continuing education topic: Priority of pharmacists *‡ (1 being the highest)
11	Counties of Essex, Kent and Lambton	369	5
16	Hospital pharmacists working in The Municipality of Toronto and that part of The Regional Municipality of Peel comprising the City of Mississauga	553	3

†: Information obtained from: Pharmacy Act, 1991. Ontario Regulation 202/94.

*: Information obtained from: Communication with Celia Powell, Continuing Education Programs, Ontario College of Pharmacists, September 28th, 2001.

‡: Survey conducted with 20% of the community and hospital pharmacists in Ontario to help determine their interests for continuing education.

APPENDIX 3

Needs assessment questionnaire and example of cover letter

Dear pharmacist,

I am doing a one-year HIV pharmacy specialty residency at Toronto General Hospital and St. Michael's Hospital with Drs. Alice Tseng and Laura Park-Wyllie. As part of this program, I must complete a residency project. I am collaborating with Ontario Pharmacists' Association and the Ontario HIV Pharmacy Professional Specialty Group to develop a certificate program in HIV/AIDS for Ontario pharmacists. A very general survey conducted in 2000 by the Ontario College of Pharmacists showed that Ontario pharmacists want continuing education activities in HIV/AIDS. The following document is a needs assessment. We want to evaluate your specific learning needs and interests to help us design a program that will be the most beneficial to **you**.

We realize that this needs assessment will require 15 to 20 minutes of your time to complete. However, the answers to each question are important to help us serve you better. The results obtained will remain strictly confidential. It is not mandatory to identify your name on this needs assessment. The needs assessment is identified by a number to help us determine to whom we must send a follow-up mailing. I, the primary investigator, will be the only person who will have access to the list of identification numbers. This list will be kept separate from the returned needs assessments.

The pharmacists who return the completed needs assessment before March 22, 2002 will receive a 10% discount on the price of the HIV/AIDS certificate program, which they will have the possibility of using in the five years that follow (approximate worth $50). The first certificate program should be offered in 2003. If you are interested in this discount and/or if you wish to obtain the results of the needs assessment please complete the last page of this package. This page will be kept separate from the needs assessment to ensure that the results remain anonymous. The results of the needs assessment will be available as soon as June 15, 2002.

I graciously ask for your time and collaboration. Your participation will ensure the development of a dynamic and stimulating educational program tailored by your needs in your day to day practice.

Please return the completed needs assessment by **March 22, 2002**. You may use the enclosed stamped envelope.

I, as well as the members of the Ontario Pharmacist's Association and the HIV Pharmacy Professional Specialty Group, would like to thank you for your time and effort. We will greatly appreciate your participation.

Sincerely,

Nancy Sheehan, B.Sc.Phm, M.Sc.Phm
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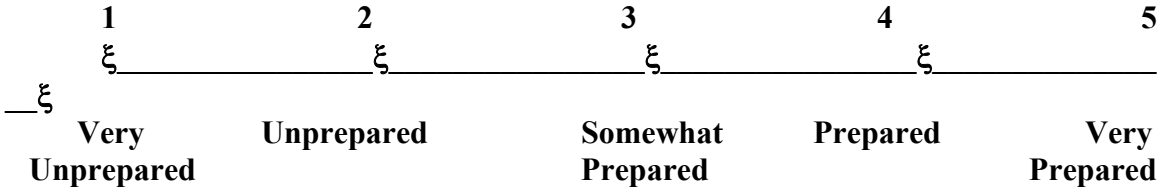
ASSESSING THE NEEDS OF ONTARIO PHARMACISTS

WITH RESPECT TO PHARMACEUTICAL CARE IN HIV/AIDS

This needs assessment includes six parts: preparedness, knowledge, attitudes, learning needs, certificate program, and demographics and other items. Each part of this needs assessment will provide essential information to design a certificate program that meets the needs of Ontario pharmacists.

PART I : Preparedness

Pharmacists who provide pharmaceutical care to HIV infected clients need to do various tasks. In your opinion, how <u>prepared</u> are you to undertake the following tasks. That is, do you believe that you have the knowledge and skills to do these tasks effectively. Please answer by giving the number from 1 to 5 (see scale) that best corresponds to your level of preparedness. Please use whole numbers.



Task	Specify 1, 2, 3, 4 or 5 for each statement
1. Explaining to clients basic concepts related to HIV infection (e.g.: transmission, disease progression, complications)	
2. Verifying new prescriptions of antiretrovirals (e.g.: correct doses, administration intervals)	
3. Counseling clients on newly prescribed antiretrovirals	
4. Detecting and managing adverse events related to antiretrovirals	
5. Detecting and managing drug-drug interactions related to antiretrovirals	
6. Assessing the adherence of HIV infected clients to their antiretroviral medications	
7. Ensuring that the costs related to the antiretrovirals are reimbursed (for example, through the Ontario Drug Benefit program, private insurance companies, special access programs, etc.)	
8. Searching through pertinent HIV literature and appropriate electronic databases to answer questions related to antiretroviral therapy	
9. Counseling HIV infected clients on complementary and alternative medicines	
10. Counseling clients on HIV prevention	
11. Ensuring that the HIV infected clients receive proper prophylaxis against opportunistic infections	

PART II : Knowledge

In this part, we want to measure pharmacists' present knowledge on antiretroviral therapy and HIV/AIDS. Please answer each question by answering true, false or I don't know. Put a check mark in the appropriate box. Exceptionally, you must answer question 22 in your own words.

		True	False	I Don't know
12.	Being infected with HIV and being diagnosed with AIDS are the same thing.[1]	π	π	π
13.	The doses of the protease inhibitors must be adjusted according to a person's renal function.	π	π	π
14.	A person who takes indinavir (Crixivan®) must drink a lot of water (≥ 1.5 L/day).	π	π	π
15.	Non nucleoside reverse transcriptase inhibitors (e.g.: efavirenz, nevirapine, delavirdine) can cause a rash.	π	π	π
16.	The nucleoside reverse transcriptase inhibitors (e.g: zidovudine, didanosine) are largely metabolized by the CYP3A4 and therefore can cause many interactions with other medications.	π	π	π
17.	Certain antiretrovirals can be obtained through special access programs.	π	π	π
18.	Guidelines on the use of antiretroviral agents in pediatric HIV infection are not available.	π	π	π
19.	St. John's Wort can interact with the protease inhibitors (e.g: ritonavir, indinavir).	π	π	π
20.	Prompt washing of a needlestick injury with soap and water is sufficient to prevent HIV infection.[1]	π	π	π
21.	When an HIV infected person's $CD4^+$ count drops below 200 cells/mm^3, he/she should be started on clarithromycin for pneumocystis carinii pneumonia (PCP).	π	π	π

22. Adherence to antiretroviral therapy is crucial. Provide reasons that explain why this is so important.

_____
_____

PART III: Attitudes

On a scale from 1 to 5, please specify if you agree or disagree with the following statements. Please use whole numbers.

1 2 3 4 5

ξ_____ξ_____ξ_____ξ_____ξ

Strongly Disagree Disagree Somewhat Agree Agree Strongly Agree

Statement	Specify 1,2,3,4 or 5 for each statement
23. HIV/AIDS pharmacotherapy is too complex and specialized for me to learn.	
24. Considering the number of HIV infected clients that I see in my practice, learning about HIV/AIDS pharmacotherapy is not worth my time.	
25. Keeping antiretroviral medications in stock at the pharmacy is poor management of the resources since these medications are very expensive.	
26. Educating clients on safe sex will change their sexual habits.	
27. Educating IV drug users on the importance of clean needles to prevent the spread of HIV will change their behaviour.	
28. Pharmacists can play an important role in HIV prevention.	
29. Pharmacists can influence adherence to antiretroviral therapy.	
30. Clients infected by HIV through heterosexual intercourse, homosexual intercourse, IV drug use and blood transfusions should receive the same care.	
31. I might become infected by HIV if I counsel HIV/AIDS clients.	
32. It is important to counsel HIV infected clients in a confidential environment.	

You have completed the first three parts of the needs assessment. These three parts as well as the following part will help us determine the content of the certificate program in HIV/AIDS. The last two parts of the needs assessment will help us understand how to format the certificate program. Your collaboration is tremendously appreciated.

PART IV: Learning needs

Amongst the following educational topics related to HIV/AIDS and HIV/AIDS pharmaceutical care, which topics do you believe would be beneficial to you in a continuing education activity? Please place a check mark in the appropriate box for each educational topic. Do you think that a general overview, an in-depth review or no review of the following topics would be needed? (Note: ARV = antiretroviral)

Educational topic	General Overview	In-depth Review	No Review
Disease-related			
33. Pathogenesis of HIV infection	π	π	π
34. Diagnosis of HIV infection	π	π	π
35. Natural history of HIV infection	π	π	π
36. Laboratory parameters: viral load, CD4	π	π	π
37. Epidemiology	π	π	π
38. HIV transmission / prevention	π	π	π
Antiretroviral-related			
39. ARV: mechanism of action	π	π	π
40. ARV: pharmacokinetics	π	π	π
41. ARV: indications / contraindications	π	π	π
42. ARV: dosage, administration	π	π	π
43. ARV: adverse events / monitoring	π	π	π
44. ARV: drug-drug and drug-food interactions	π	π	π
45. Guidelines to the use of ARV	π	π	π
46. Therapeutic drug monitoring (pharmacokinetic levels)	π	π	π
47. Resistance to ARV	π	π	π
48. Importance of adherence to ARV	π	π	π
Miscellaneous			
49. Special groups: pediatrics, pregnancy	π	π	π
50. Prophylaxis and treatment of opportunistic infections	π	π	π
51. HIV client counseling techniques	π	π	π
52. Medication acquisition / reimbursement	π	π	π
53. OTC medications and HIV	π	π	π
54. Complementary and alternative therapy	π	π	π
55. Post-exposure prophylaxis	π	π	π
56. Social, psychological, emotional and ethical concerns	π	π	π
57. Implementation of an HIV/AIDS patient care service	π	π	π
58. HIV literature and electronic database searches	π	π	π
Other (Specify)			

59. _____ π π π
60. _____ π π π

PART V: Certificate program

A certificate program can be defined as follows[2]:

….A postgraduate course, or series of courses, composed of didactic (lecture/recitation) and experiential components (practicum/laboratory/clerkship) of sufficient depth and duration to ensure mastery of a content area. A typical course would involve approximately 40-60 hours of instruction aimed at specific job-enhancement objectives. A certificate would be awarded upon satisfactory completion of a course or series of courses.

For example, in the past, certificate programs have consisted of preparatory readings at home, a 3 day symposium with lectures and workshops and a take-home exam.

61. Would you be interested in completing a certificate program on HIV/AIDS pharmaceutical care?

Yes ρ Not sure π No ρ ⟹ If you answered no, go to PART VI

62. How many hours of instruction (personal or group) would you be willing to invest in a certificate program?

< 20 ρ 21-30 ρ 31-40 ρ 41-50 ρ 51-60 ρ > 60 ρ

63. How much money would you be willing to pay to register for a certificate program?

< $300 ρ $300- 399 ρ $400 – 499 ρ $500 – 599 ρ

$600 – 699 ρ $700-800 ρ > $800 ρ

64. Does your employer cover the costs of educational programs?

Yes ρ No ρ Don't know π

65. During which part of the year would you prefer to participate in a certificate program?

September – November ρ December – February ρ

March – May ρ June – August ρ

66. What would make this program the most useful continuing education event that you have attended?

_____
_____
_____
_____

_____
_____

Part V: Continued

Using a 5 point scale, how would you evaluate each teaching strategy? Please use whole numbers.

1 2 3 4 5

ξ_____ξ_____ξ_____ξ_____ξ

Dislike Very much Dislike No opinion Like Like Very much

Teaching Strategies	**Specify 1, 2, 3, 4, or 5 for each strategy (use whole numbers)**
67. Live lectures during a convention / symposium	
68. At home readings (written material)	
69. Videotapes	
70. Audiotapes	
71. Telephone conferences	
72. Panel discussions	
73. Seminars: small group discussions on educational topics	
74. Case studies in small groups	
75. Case studies with role playing (standardized patients)	
76. Clerkship with an HIV specialist	
77. Computer CD-ROMS or educational web sites	
78. Internet with private discussion group and live chat	
79. Telemedicine	
80. Other (specify)	

Which method(s) do you think should be used to evaluate the HIV/AIDS certificate program participants? You may choose more than one. (Note: a theoretical exam evaluates factual knowledge whereas a case-based exam evaluates one's ability to apply knowledge).

81. Take home theoretical exam ρ

82. In class theoretical exam ρ

83. Take home case-based exam ρ

84. In class case-based exam ρ

85. Research question ρ

86. Written case presentations ρ

87. Verbal case presentations ρ

88. Take home exam: theoretical + case-based ρ

89. In class exam: theoretical + case-based ρ

PART VI: Demographics and other items

This is the last section of the needs assessment. Hang in there!

90. In which age group do you belong?

20 – 29 ρ 30 - 39 ρ 40 - 49 ρ 50 – 59 ρ 60 – 69 ρ > 69 ρ

91. In what year did you obtain your pharmacy degree (B.Sc.Phm)?

_____

92. Are you presently working as a pharmacist?

Yes π No π

93. How many years have you practiced pharmacy?

_____ years

94. What are the university <u>pharmacy</u> degrees or university affiliated <u>pharmacy</u> programs that you have completed? (You may check more than one)

B.Sc.Phm ρ Pharm.D ρ M.Sc. ρ Ph.D.ρ

One year general hospital residency ρ One year general community pharmacy residency ρ

Post graduate specialization program ρ Post graduate fellowship ρ

Other (Specify): _____

95. How many hours a week do you work in a community pharmacy?

0 ρ 1-10 ρ 11-20 ρ 21-30 ρ 31-40 ρ 41-50 ρ > 50 ρ

96. Do you work in a practice setting other than a community pharmacy?

Yes ρ No ρ ⟹ If you answered no, go to question 98

Part VI: Continued

97. If you answered yes at question 96, specify in which practice setting and specify the number of hours a week you work in each setting.

		# hours / week
Hospital Pharmacy	ρ	_____
Pharmacist Association (ie: OPA, OCP)	ρ	_____
Government	ρ	_____
Military	ρ	_____
Other (Specify): _____		_____

98. On average, how many HIV infected clients do you see or speak to in a week?

0 ρ 1 – 5 ρ 6 – 10 ρ 11 –15 ρ 16 – 20 ρ > 20 ρ

99. Have you already attended a continuing pharmacy education activity on HIV/AIDS?

Yes ρ No ρ ⟹ **If you answered no, you have completed!**

100. If you answered yes at question 99, how many activities have you attended?

1 ρ 2 ρ 3 ρ 4 ρ 5 ρ > 5 ρ

The survey is now completed. Thank you sincerely for having taken the time to complete this questionnaire. <u>We greatly appreciate it.</u> It will permit the development of a certificate program specific to <u>your</u> needs.

References:

47. Stine GJ. AIDS update 2001: An annual overview of acquired immune deficiency syndrome. New Jersey: Prentice-Hall, Inc.; 2001: 522pp.

48. Scott VG, Amonkar MM, Madhavan SS. Pharmacists' preferences for continuing education and certificate programs. Ann Pharmacother 2001; 35: 289-99.

49. Katz MD, Draugalis JR, Lai RP. HIV infection and AIDS: Attitudes and knowledge of Arizona pharmacists. Ann Pharmacother 1995; 29: 1218-23.

OPTIONAL

Please put a check mark in the following boxes if you are interested in receiving these items. Please provide your name and address so that we can send them to you.

π **I wish to receive a 10% discount on the price of the HIV/AIDS certificate program. To have the right to receive the discount certificate, I know that I must return the completed needs assessment before March 22, 2002. This discount will be valid for five years. (approximate worth $50)**

π **I wish to receive the overall results of the needs assessment.**

Name : _____

Address: _____

_____

_____

E-Mail: _____

APPENDIX 4

Results of the needs assessment survey

Table 2: Response rate per Ontario College of Pharmacists electoral district for the mailed needs assessment survey

Electoral district	Initial number of needs assessment surveys sent in each electoral district	Number of needs assessment surveys returned per electoral district	% response rate per electoral district
1	65	25	38.5
2	55	12	21.8
3	50	7	14.0
4	55	12	21.8
5	45	8	17.7
6	85	8	9.4
7	60	13	21.7
8	50	14	28.0
11	35	11	31.4

Table 3: Demographics of the needs assessment survey respondents

Variable	Mailed Needs Assessment (n = 110)	MTPA (n = 28)
Age		
- 20 – 29	12 (10.9 %)	4 (14.3 %)
- 30 – 39	40 (36.4 %)	5 (17.9 %)
- 40 – 49	31 (28.2 %)	12 (42.9 %)
- 50 – 59	20 (18.2 %)	5 (17.9 %)
- 60 – 69	5 (4.6 %)	1 (3.6 %)
- > 69	2 (1.8 %)	1 (3.6 %)
Mean number of years since graduation	18.34 ± 11.29	20.56 ± 11.69
Mean number of years practicing pharmacy	17.52 ± 11.29	18.67 ± 11.56
Pharmacy degrees other than bachelors in pharmacy		
- Pharm. D	2 (1.8 %)	2 (7.1 %)
- M.Sc	4 (3.6 %)	2 (7.1 %)
- Ph.D	1 (0.9 %)	0 (0.0 %)
- Hospital residency	11 (10.0 %)	2 (7.1 %)
- Community pharmacy residency	7 (6.4 %)	4 (14.3 %)
- Specialized residency	3 (2.7 %)	0 (0.0 %)
- Fellowship	0 (0.0 %)	0 (0.0 %)
- Other	2 (1.8 %)	0 (0.0 %)
Number hours worked / week in a community pharmacy		
- 0	8 (7.3 %)	4 (14.3 %)
- 1 – 10	4 (3.6 %)	2 (7.1 %)
- 11 – 20	12 (10.9 %)	0 (0.0 %)
- 21 – 30	13 (11.8 %)	1 (3.6 %)
- 31 – 40	43 (39.1 %)	17 (60.7 %)
- 41 – 50	24 (21. 8 %)	3 (10.7 %)
- > 50	6 (5.5 %)	1 (3.6 %)

Table 3 (continued)

Variable	Mailed Needs Assessment (n = 110)	MTPA (n = 28)
Pharmacists working in a setting other than a community pharmacy / mean number of hours		
- hospital pharmacy	4 (3.6 %) / 21.63 ± 19.80	6 (21.4 %) / 32.90 ± 10.01
- pharmacist association	1 (0.9 %) / 30.00 ± ----	0 (0.0 %) / ----
- government	5 (4.6 %) / 37.13 ± 2.17	0 (0.0 %) / ----
- military	1 (0.9 %) / 40.00 ± ----	0 (0.0 %) / ----
- other	4 (3.6 %) / 15.00 ± 7.07	2 (7.1 %) / 37.50 ± ----
Number HIV – infected patients counselled per week		
- 0	76 (69.7 %)	15 (53.6 %)
- 1 –5	31 (28.4 %)	10 (35.7 %)
- 6 – 10	1 (0.9 %)	2 (7.1 %)
- 11 – 15	1 (0.9 %)	1 (3.6 %)
- 16 – 20	0 (0.0 %)	0 (0.0 %)
- > 20	0 (0.0 %)	0 (0.0 %)
Past attendance in an HIV continuing education activity		
- yes	24 (21.8 %)	4 (14.3 %)
- no	86 (78.2 %)	24 (85.7 %)
- If yes, number of HIV continuing education activities attended		
- 1	15 (65.2 %)	2 (50.0 %)
- 2	5 (21.7 %)	0 (0.0 %)
- 3	1 (4.4 %)	0 (0.0 %
- 4	1 (4.4 %)	1 (25.0 %)
- 5	0 (0.0 %)	0 (0.0 %)
- > 5	1 (4.4 %)	1 (25.0 %)

Electoral district		(all 3 to 6)
- 1	25 (22.7 %)	-
- 2	12 (10.9 %)	-
- 3	7 (6.4 %)	-
- 4	12 (10.9 %)	-
- 5	8 (7.3 %)	-
- 6	8 (7.3 %)	-
- 7	13 (11.8 %)	-
- 8	14 (12.7 %)	-
- 11	11 (10.0 %)	-
Type of responder		
- Early responder	75 (68.2 %)	-
- Late responder	35 (31.8 %)	-

Table 4: Ontario pharmacists' perception of preparedness to offer pharmaceutical services to HIV – infected patients (mailed needs assessment) (n = 110)

	Responses* [n (%)]					
Pharmaceutical service	1	2	3	4	5	**Mean ± SD**
-Counselling on HIV infection	1 (0.9 %)	31 (28.2 %)	49 (44.6 %)	25 (22.7 %)	4 (3.6 %)	3.00 ± 0.84
-Verifying ARV prescriptions	18 (16.4 %)	41 (37.3 %)	36 (32.7 %)	14 (12.7 %)	1 (0.9 %)	2.45 ± 0.94
-Counselling on ARV	27 (24.5 %)	45 (40.9 %)	31 (28.2 %)	6 (5.5 %)	1 (0.9 %)	2.17 ± 0.90
-Managing ARV adverse reactions	31 (28.2 %)	46 (41.8 %)	28 (25.5 %)	5 (4.6 %)	0 (0.0 %)	2.06 ± 0.85
-Managing ARV interactions	29 (26.6 %)	47 (43.1 %)	26 (23.9 %)	7 (6.4 %)	0 (0.0 %)	2.10 ± 0.87
-Assessing ARV adherence	15 (13.9 %)	30 (27.8 %)	41 (38.0 %)	20 (18.5 %)	2 (1.9 %)	2.67 ± 1.00
-Ensuring ARV reimbursement	6 (5.5 %)	24 (21.8 %)	50 (45.5 %)	25 (22.7 %)	5 (4.6 %)	2.89 ± 0.89
-HIV literature / internet searches	14	32	38	20	6	2.75 ± 1.07

	(12.7 %)	(29.1 %)	(34.6%)	(18.2 %)	(5.5 %)	
-Counselling on complementary and alternative medicines	36 (33.3 %)	51 (47.2 %)	19 (17.6 %)	1 (0.9 %)	1 (0.9 %)	1.89 ± 0.79
-Counselling on HIV prevention	3 (2.8 %)	10 (9.3 %)	42 (38.9 %)	42 (38.9 %)	11 (10.2 %)	3.44 ± 0.90
-Ensuring proper prophylaxis and treatment of opportunistic infections	8 (7.3 %)	52 (47.3 %)	41 (37.3 %)	9 (8.2 %)	0 (0.0 %)	2.46 ± 0.75
Global preparedness score						**2.54 ± 0.62**

***** 1 = Very unprepared, 2 = Unprepared, 3 = Somewhat prepared, 4 = Prepared, 5 = Very prepared

Table 5: Ontario pharmacists' perception of preparedness to offer pharmaceutical services to HIV – infected patients (MTPA) (n = 27)

	Responses* [n (%)]					
Pharmaceutical services	1	2	3	4	5	**Mean ± SD**
-Counselling on HIV infection	4 (14.8 %)	5 (18.5 %)	12 (44.4 %)	5 (18.5 %)	1 (3.7 %)	2.78 ± 1.05
-Verifying ARV prescriptions	2 (7.4 %)	9 (33.3 %)	13 (48.2 %)	2 (7.4 %)	1 (3.7 %)	2.67 ± 0.88
-Counselling on ARV	1 (3.7 %)	14 (51.9 %)	11 (40.7 %)	1 (3.7 %)	0 (0.0 %)	2.44 ± 0.64
-Managing ARV adverse reactions	3 (11.1 %)	15 (55.6 %)	9 (33.3 %)	0 (0.0 %)	0 (0.0 %)	2.22 ± 0.64
-Managing ARV interactions	4 (14.8 %)	12 (44.4 %)	10 (37.0 %)	1 (3.7 %)	0 (0.0 %)	2.30 ± 0.78
-Assessing ARV adherence	1 (3.9 %)	13 (50.0 %)	8 (30.1 %)	4 (15.4 %)	0 (0.0 %)	2.58 ± 0.81
-Ensuring ARV reimbursement	3 (11.1 %)	3 (11.1 %)	15 (55.6 %)	6 (22.2 %)	0 (0.0 %)	2.89 ± 0.89
-HIV literature / internet searches	1 (3.7 %)	13 (48.2 %)	10 (37.0 %)	3 (11.1 %)	0 (0.0 %)	2.56 ± 0.75

-Counselling on complementary and alternative medicines	7 (25.9 %)	10 (37.0 %)	9 (33.3 %)	1 (3.7 %)	0 (0.0 %)	2.15 ± 0.86
-Counselling on HIV prevention	0 (0.0 %)	3 (11.1 %)	10 (37.0 %)	13 (48.2 %)	1 (3.7 %)	3.44 ± 0.75
-Ensuring proper prophylaxis and treatment of opportunistic infections	2 (7.4 %)	6 (22.2 %)	18 (66.7 %)	1 (3.7 %)	0 (0.0 %)	2.67 ± 0.68
Global preparedness score						**2.61 ± 0.48**

***** 1 = Very unprepared, 2 = Unprepared, 3 = Somewhat prepared, 4 = Prepared, 5 = Very prepared

Table 6: Knowledge of Ontario pharmacists on HIV and HIV pharmacotherapy (mailed needs assessment) (n = 110)

	Answer [n (%)]		
Question (correct answer)*	Correct	Incorrect	Don't know
Being infected with HIV and being diagnosed with AIDS are the same thing. (F)	102 (93.6 %)	7 (6.4 %)	0 (0.0 %)
The doses of the protease inhibitors must be adjusted according to a person's renal function. (F)	21 (19.1 %)	33 (30.0 %)	56 (50.1 %)
A person who takes indinavir (Crixivan®) must drink a lot of water (≥ 1.5 L /day). (T)	48 (44.0 %)	0 (0.0 %)	61 (56.0 %)
Non nucleoside reverse transcriptase inhibitors (e.g: efavirenz, nevirapine, delavirdine) can cause a rash. (T)	55 (50.0 %)	2 (1.8 %)	53 (48.2 %)
The nucleoside reverse transcriptase inhibitors (e.g: zidovudine, didanosine) are largely metabolized by the CYP3A4 and therefore can cause many interactions with other medications. (F)	24 (22.2 %)	24 (22.2 %)	60 (55.6 %)
Certain antiretrovirals can be obtained through special access programs. (T)	94 (85.5 %)	1 (0.9 %)	15 (13.6 %)
Guidelines on the use of antiretroviral agents in pediatric HIV infection are not available. (F)	47 (43.1 %)	2 (1.8 %)	60 (55.1 %)
St. John's Wort can interact with the protease	56	1	51

inhibitors (e.g: ritonavir, indinavir). (T)	(51.9 %)	(0.9 %)	(47.2 %)
Prompt washing of a needlestick injury with soap and water is sufficient to prevent HIV infection. (F)	98 (89.1 %)	2 (1.8 %)	10 (9.1 %)
When an HIV – infected person's $CD4^+$ count drops below 200 cells/mm^3, he / she should be started on clarithromycin for *pneumocystis carinii* pneumonia (PCP). (F)	18 (16.7 %)	25 (23.2 %)	65 (60.2 %)
Global knowledge score	**5.12 ± 2.09**		

*** T = True, F = False**

Table 7: Knowledge of Ontario pharmacists on HIV and HIV pharmacotherapy (MTPA) (n = 27)

	Answer [n (%)]		
Question (correct answer)*	Correct	Incorrect	Don't know
Being infected with HIV and being diagnosed with AIDS are the same thing. (F)	23 (85.2 %)	3 (11.1 %)	1 (3.7 %)
The doses of the protease inhibitors must be adjusted according to a person's renal function. (F)	0 (0.0 %)	17 (63.0 %)	10 (37.0 %)
A person who takes indinavir (Crixivan®) must drink a lot of water (≥ 1.5 L /day). (T)	13 (48.2 %)	0 (0.0 %)	14 (51.9 %)
Non nucleoside reverse transcriptase inhibitors (e.g: efavirenz, nevirapine, delavirdine) can cause a rash. (T)	17 (63.0 %)	0 (0.0 %)	10 (37.0 %)
The nucleoside reverse transcriptase inhibitors (e.g.: zidovudine, didanosine) are largely metabolized by the CYP3A4 and therefore can cause many interactions with other medications. (F)	2 (7.7 %)	11 (42.3%)	13 (50.0 %)
Certain antiretrovirals can be obtained through special access programs. (T)	26 (96.3 %)	0 (0.0 %)	1 (3.7 %)
Guidelines on the use of antiretroviral agents in pediatric HIV infection are not available. (F)	10 (37.0 %)	3 (11.1 %)	14 (51.9 %)
St. John's Wort can interact with the protease inhibitors (e.g: ritonavir, indinavir). (T)	16 (61.5 %)	1 (3.9 %)	9 (34.6 %)

Prompt washing of a needlestick injury with soap and water is sufficient to prevent HIV infection. (F)	23 (85.2 %)	0 (0.0 %)	4 (14.8 %)
When an HIV – infected person's $CD4^+$ count drops below 200 cells/mm^3, he / she should be started on clarithromycin for *pneumocystis carinii* pneumonia (PCP). (F)	7 (26.9 %)	3 (11.5 %)	16 (61.5 %)
Global knowledge score	**4.89 ± 2.23**		

*** T = True, F = False**

Table 8: Attitudes of Ontario pharmacists with respect to HIV / AIDS pharmaceutical care (mailed needs assessment) (n = 110)

	Responses* [n (%)]					
Statement	1	2	3	4	5	**Mean ± SD**
HIV / AIDS pharmacotherapy is too complex and specialized for me to learn.	13 (11.8 %)	63 (57.3 %)	24 (21.8 %)	10 (9.1 %)	0 (0.0 %)	2.28 ± 0.79
Considering the number of HIV infected clients that I see in my practice, learning about HIV/AIDS pharmacotherapy is not worth my time.	13 (12.0 %)	32 (29.6 %)	34 (31.5 %)	20 (18.5 %)	9 (8.3 %)	2.81 ± 1.13
Keeping antiretroviral medications in stock at the pharmacy is poor management of the resources since these medications are very expensive.	9 (8.3 %)	18 (16.5 %)	36 (33.0 %)	26 (23.9 %)	20 (18.4 %)	3.28 ± 1.19
Educating clients on safe sex will change their sexual habits.	5 (4.6 %)	20 (18.2 %)	52 (47.3 %)	26 (23.6 %)	7 (6.4 %)	3.09 ± 0.92
Educating IV drug users on the importance of clean needles to prevent the spread of HIV will change their behavior.	0 (0.0 %)	21 (19.1 %)	54 (49.1 %)	27 (24.6 %)	8 (7.3 %)	3.20 ± 0.83
Pharmacists can play an important role in HIV prevention.	1 (0.9 %)	8 (7.3 %)	38 (34.9 %)	43 (39.5 %)	19 (17.4 %)	3.65 ± 0.89
Pharmacists can influence adherence to antiretroviral therapy.	0 (0.0 %)	0 (0.0 %)	16 (14.8 %)	69 (63.9 %)	23 (21.3 %)	4.06 ± 0.60
Clients infected by HIV through heterosexual intercourse, homosexual	2 (1.8 %)	3 (2.7 %)	7 (6.4 %)	40 (36.4 %)	58 (52.7 %)	4.35 ± 0.86

intercourse, IV drug use and blood transfusions should receive the same care.						
I might become infected with HIV if I counsel HIV / AIDS clients.	84 (76.4 %)	23 (20.9 %)	2 (1.8 %)	1 (0.9 %)	0 (0.0 %)	1.27 ± 0.54
It is important to counsel HIV infected clients in a confidential environment.	5 (4.5 %)	1 (0.9 %)	3 (2.7 %)	25 (22.7 %)	76 (69.1 %)	4.51 ± 0.96

* 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat agree, 4 = Agree, 5 = Strongly agree

Table 9: Attitudes of Ontario pharmacists with respect to HIV / AIDS pharmaceutical care (MTPA) (n = 27)

	Responses* [n (%)]					
Statement	1	2	3	4	5	**Mean ± SD**
HIV / AIDS pharmacotherapy is too complex and specialized for me to learn.	2 (7.4 %)	12 (44.4 %)	10 (37.0 %)	3 (11.1 %)	0 (0.0 %)	2.52 ± 0.80
Considering the number of HIV infected clients that I see in my practice, learning about HIV/AIDS pharmacotherapy is not worth my time.	3 (11.5 %)	14 (53.9 %)	5 (19.2 %)	3 (11.5 %)	1 (3.9 %)	2.42 ± 0.99
Keeping antiretroviral medications in stock at the pharmacy is poor management of the resources since these medications are very expensive.	1 (3.7 %)	9 (33.3 %)	8 (29.6 %)	8 (29.6 %)	1 (3.7 %)	2.96 ± 0.98
Educating clients on safe sex will change their sexual habits.	0 (0.0 %)	13 (48.2 %)	9 (33.3 %)	4 (14.8 %)	1 (3.7 %)	2.74 ± 0.86
Educating IV drug users on the importance of clean needles to prevent the spread of HIV will change their behavior.	0 (0.0 %)	6 (22.2 %)	13 (48.2 %)	6 (22.2 %)	2 (7.4 %)	3.15 ± 0.86
Pharmacists can play an important role in HIV prevention.	0 (0.0 %)	2 (7.4 %)	9 (33.3 %)	11 (40.7 %)	5 (18.5 %)	3.70 ± 0.87
Pharmacists can influence adherence to antiretroviral therapy.	0 (0.0 %)	1 (3.7 %)	7 (25.9 %)	16 (59.3 %)	3 (11.1 %)	3.78 ± 0.70
Clients infected by HIV through	0	3	1	11	12	4.19 ± 0.96

heterosexual intercourse, homosexual intercourse, IV drug use and blood transfusions should receive the same care.	(0.0 %)	(11.1 %)	(3.7 %)	(40.7 %)	(44.4 %)	
I might become infected by HIV if I counsel HIV / AIDS clients.	22 (81.5 %)	4 (14.8 %)	1 (3.7 %)	0 (0.0 %)	0 (0.0 %)	1.22 ± 0.51
It is important to counsel HIV infected clients in a confidential environment.	3 (11.1 %)	1 (3.7 %)	1 (3.7 %)	7 (25.9 %)	15 (55.6 %)	4.11 ± 1.34

* 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat agree, 4 = Agree, 5 = Strongly agree

Table 10: Ontario pharmacists' perceptions of learning needs with respect to HIV / AIDS (mailed needs assessment) (n = 110)

Educational Topic	% respondents		
	General Overview	In-depth Review	No Review
Disease-related			
- Pathogenesis of HIV infection	75.0	20.4	4.6
- Diagnosis of HIV infection	79.6	14.8	5.6
- Natural history of HIV infection	77.8	13.0	9.3
- Laboratory parameters: viral load, $CD4^+$	64.5	31.8	3.7
- Epidemiology	68.2	24.3	7.5
- HIV transmission / prevention	48.2	45.4	6.5
Antiretroviral (ARV) – related			
- ARV: mechanism of action	45.8	50.5	3.7
- ARV: pharmacokinetics	57.4	37.0	5.6
- ARV: indications / contraindications	28.7	69.4	1.9
- ARV: dosage, administration	18.5	79.6	1.9
- ARV: adverse events / monitoring	20.4	76.9	2.8
- ARV: drug-drug and drug-food interactions	17.6	80.6	1.9
- Guidelines to the use of ARV	33.6	64.5	1.9
- Therapeutic drug monitoring	44.9	45.8	9.4
- Resistance to ARV	44.4	50.9	4.6
- Importance of adherence to ARV	38.3	57.0	4.7
Miscellaneous			
- Special groups: pediatrics, pregnancy	61.1	33.3	5.6
- Prophylaxis and treatment of opportunistic infections	38.0	59.3	2.8
- HIV client counselling techniques	31.5	61.1	7.4
- Medication acquisition / reimbursement	55.6	38.0	6.5
- OTC medications and HIV	36.5	60.8	2.8
- Complementary and alternative therapy	51.9	41.7	6.5

- Post-exposure prophylaxis	45.4	49.1	5.6
- Social, psychological, emotional and ethical concerns	71.3	18.5	10.2
- Implementation of an HIV/AIDS patient care service	64.2	24.5	11.3
- HIV literature and electronic database searches	64.8	28.7	6.5

Table 11: Ontario pharmacists' perceptions of learning needs with respect to HIV / AIDS (MTPA) (n = 28)

Educational Topic	% respondents		
	General Overview	In-depth Review	No Review
Disease-related			
- Pathogenesis of HIV infection	75.0	21.4	3.6
- Diagnosis of HIV infection	82.1	17.9	0.0
- Natural history of HIV infection	85.2	14.8	0.0
- Laboratory parameters: viral load, $CD4^+$	67.9	28.6	3.6
- Epidemiology	71.4	28.6	0.0
- HIV transmission / prevention	53.6	42.9	3.6
Antiretroviral (ARV) – related			
- ARV: mechanism of action	40.7	59.3	0.0
- ARV: pharmacokinetics	40.7	55.6	3.7
- ARV: indications / contraindications	25.0	75.0	0.0
- ARV: dosage, administration	22.2	74.1	3.7
- ARV: adverse events / monitoring	25.9	74.1	0.0
- ARV: drug-drug and drug-food interactions	22.2	77.8	0.0
- Guidelines to the use of ARV	37.0	63.0	0.0
- Therapeutic drug monitoring	44.4	51.9	3.7
- Resistance to ARV	48.2	51.9	0.0
- Importance of adherence to ARV	33.3	66.7	0.0
Miscellaneous			
- Special groups: pediatrics, pregnancy	77.8	22.2	0.0
- Prophylaxis and treatment of opportunistic infections	40.7	59.3	0.0
- HIV client counselling techniques	33.3	63.0	3.7
- Medication acquisition / reimbursement	70.4	25.9	3.7
- OTC medications and HIV	39.3	60.7	0.0
- Complementary and alternative therapy	42.9	57.1	0.0

- Post-exposure prophylaxis	39.3	60.7	0.0
- Social, psychological, emotional and ethical concerns	78.6	17.9	3.6
- Implementation of an HIV/AIDS patient care service	63.0	22.2	14.8
- HIV literature and electronic database searches	70.4	18.5	11.1

Table 12: Ontario pharmacists' interests for a certificate program on HIV / AIDS

	Mailed needs assessment (n = 73)*	**MTPA (n = 20)***
Interest in doing the certificate program		
-Yes	33 (30.0 %)	13 (46.4 %)
-Not sure	40 (36.4 %)	7 (25.0 %)
-No	37 (33.6 %)	8 (28.6 %)
# hours willing to invest in certificate program		
-< 20 h	16 (23.2 %)	6 (30.0 %)
-21-30	29 (42.0 %)	5 (25.0 %)
-31-40	14 (20.3 %)	5 (25.0 %)
-41-50	5 (7.3 %)	1 (5.0 %)
-51-60	3 (4.4 %)	1 (5.0 %)
-> 60	2 (2.9 %)	2 (10.0 %)
Money willing to pay for certificate program		
-< $ 300	46 (65.7 %)	16 (80.0 %)
-$ 300 – 399	16 (22.9 %)	3 (15.0 %)
-$ 400 – 499	7 (10.0 %)	0 (0.0 %)
-$ 500 – 599	1 (1.4 %)	1 (5.0 %)
-$ 600 – 699	0 (0.0 %)	0 (0.0 %)
-$ 700 – 800	0 (0.0 %)	0 (0.0 %)
-> $ 800	0 (0.0 %)	0 (0.0 %)
Preferred time of year for certificate program		
-September – November	22 (34.9 %)	4 (23.5 %)
-December – February	9 (14.1 %)	6 (35.3 %)
-March – May	23 (35.9 %)	4 (23.5 %)

-June - August	10 (15.6 %)	3 (17.7 %)
Costs of continuing education activities paid by employer		
-Yes	18 (25.4 %)	7 (36.8 %)
-No	29 (40.9 %)	7 (36.8 %)
-Does not know	24 (33. 8 %)	5 (26.3 %)

***** Only respondents answering "yes" or "not sure" at question 61 (interest in doing the certificate program) completed this section of the needs assessment.

Table 12 (continued)

	Mailed needs assessment (n = 73)*	**MTPA (n = 20)***
Evaluation methods		
-Take home theoretical exam	34 (47.2 %)	13 (65.0 %)
-In class theoretical exam	11 (15.3 %)	2 (10.0 %)
-Take home case-based exam	36 (50.0 %)	13 (65.0 %)
-In class case-based exam	13 (18.1 %)	0 (0.0 %)
-Research question	7 (9.7 %)	2 (10.0 %)
-Written case presentations	12 (16.7 %)	2 (10.0 %)
-Verbal case presentations	3 (4.2 %)	1 (5.0 %)
-Take home exam: theoretical + case-based	46 (63.9 %)	17 (85.0 %)
-In class exam: theoretical + case-based	14 (19.4 %)	3 (15.0 %)

***** Only respondents answering "yes" or "not sure" at question 61 (interest in doing the certificate program) completed this section of the needs assessment.

Table 13: Ontario pharmacists' preferred teaching strategies for the HIV / AIDS certificate program (mailed needs assessment) (n = 73)*

Teaching strategy	Responses* [n (%)] 1	2	3	4	5	Mean ± SD
Live lectures in convention	1 (1.4 %)	4 (5.6 %)	5 (7.0 %)	44 (62.0 %)	17 (23.9 %)	4.01 ± 0.82
At home readings	0 (0.0 %)	9 (12.5 %)	6 (8.3 %)	39 (54.2 %)	18 (25.0 %)	3.92 ± 0.92
Videotapes	2 (2.8 %)	19 (26.4 %)	11 (15.3 %)	30 (41.7 %)	10 (13.9 %)	3.38 ± 1.11
Audiotapes	8 (11.1 %)	33 (45.8 %)	18 (25.0 %)	12 (16.7 %)	1 (1.4 %)	2.51 ± 0.95
Telephone conferences	24 (33.3 %)	30 (41.7 %)	16 (22.2 %)	1 (1.4 %)	1 (1.4 %)	1.96 ± 0.86
Panel discussion	5 (6.9 %)	15 (20.8 %)	26 (36.1 %)	25 (34.7 %)	1 (1.4 %)	3.03 ± 0.95
Seminars: small group discussions on chosen topics	3 (4.2 %)	8 (11.1 %)	19 (26.4 %)	34 (47.2 %)	8 (11.1 %)	3.50 ± 0.98
Case studies in groups	3 (4.2 %)	8 (11. 1 %)	16 (22.2 %)	35 (48.6 %)	10 (13.9 %)	3.57 ± 1.00
Case studies with role playing (standardized patients)	11 (15.3 %)	23 (31.9 %)	19 (26.4 %)	16 (22.2 %)	3 (4.2 %)	2.68 ± 1.11
Clerkship with HIV specialist	4 (5.6 %)	9 (12.5 %)	30 (41.7 %)	22 (30.6 %)	7 (9.7 %)	3.26 ± 0.99
Web sites / CD-ROMS	3 (4.2 %)	12 (16.7 %)	17 (23.6 %)	30 (41.7 %)	10 (13.9 %)	3.44 ± 1.06
Internet with discussion group / live chat	11 (15.7 %)	23 (32.9 %)	27 (38.6 %)	7 (10.0 %)	2 (2.9 %)	2.51 ± 0.97

Telemedicine	12 (17.9 %)	16 (23.9 %)	34 (50.8 %)	4 (6.0 %)	1 (1.5 %)	2.49 ± 0.91

* Only respondents answering "yes" or "not sure" at question 61 (interest in doing the certificate program) completed this section of the needs assessment.

* 1 = Dislike very much, 2 = Dislike, 3 = No opinion, 4 = Like, 5 = Like very much

Table 14: Ontario pharmacists' preferred teaching strategies for the HIV / AIDS certificate program (MTPA) (n=20)*

	Responses* [n (%)]					
Teaching strategy	1	2	3	4	5	Mean ± SD
Live lectures in convention	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)	13 (65.0 %)	7 (35.0 %)	4.35 ± 0.49
At home readings	1 (5.0 %)	4 (20.0 %)	1 (5.0 %)	12 (60.0 %)	2 (10.0 %)	3.50 ± 1.10
Videotapes	1 (5.0 %)	1 (5.0 %)	1 (5.0 %)	15 (75.0 %)	2 (10.0 %)	3.80 ± 0.89
Audiotapes	1 (5.0 %)	6 (30.0 %)	4 (20.0 %)	8 (40.0 %)	1 (5.0 %)	3.10 ± 1.07
Telephone conferences	4 (20.0 %)	10 (50.0 %)	5 (25.0 %)	1 (5.0 %)	0 (0.0 %)	2.15 ± 0.81
Panel discussion	0 (0.0 %)	7 (35.0 %)	3 (15.0 %)	10 (50.0 %)	0 (0.0 %)	3.15 ± 0.93
Seminars: small group discussions on chosen topics	0 (0.0 %)	5 (25.0 %)	2 (10.0 %)	10 (50.0 %)	3 (15.0 %)	3.55 ± 1.05
Case studies in groups	0 (0.0 %)	5 (25.0 %)	4 (20.0 %)	9 (45.0 %)	2 (10.0 %)	3.40 ± 0.99
Case studies with role playing (standardized patients)	4 (20.0 %)	7 (35.0 %)	3 (15.0 %)	5 (25.0 %)	1 (5.0 %)	2.60 ± 1.23
Clerkship with HIV specialist	0 (0.0 %)	4 (20.0 %)	7 (35.0 %)	6 (30.0 %)	3 (15.0 %)	3.40 ± 0.99
Web sites / CD-ROMS	0 (0.0 %)	2 (10.0 %)	2 (10.0 %)	12 (60.0 %)	4 (20.0 %)	3.90 ± 0.85
Internet with discussion group / live chat	0 (0.0 %)	7 (36.8 %)	7 (36.8 %)	4 (21.0 %)	1 (5.3 %)	2.95 ± 0.91

Telemedicine	0 (0.0 %)	9 (52.9 %)	8 (47.0 %)	0 (0.0 %)	0 (0.0 %)	2.47 ± 0.51

***** Only respondents answering "yes" or "not sure" at question 61 (interest in doing the certificate program) completed this section of the needs assessment.

* 1 = Dislike very much, 2 = Dislike, 3 = No opinion, 4 = Like, 5 = Like very much

Table 15: Pharmacists' suggestions for an effective HIV / AIDS certificate program

Suggestions for an effective HIV / AIDS certificate program

Content / materials
- Tool set of algorithms, charts and graphs
- Well presented information, easy to understand
- Practical information relevant to daily practice
- Beneficial for community pharmacy practice
- Information which is not too detailed
- Up to date information
- References

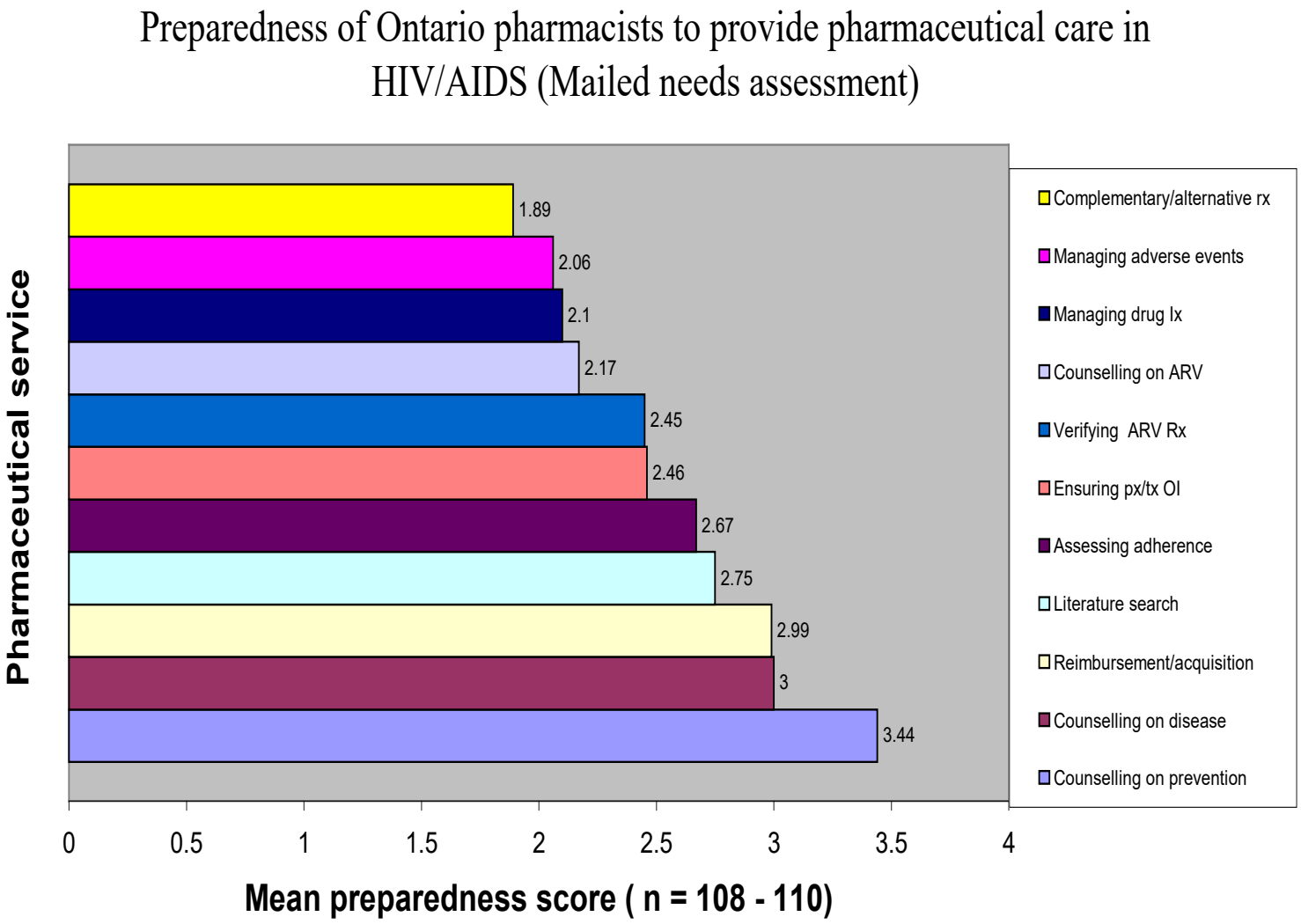
Speakers / participants
- Expert speakers in HIV (physicians and pharmacists in rural and urban communities)
- Interact with health care professionals and establish ties with other pharmacists
- Interested participants
- HIV – infected patients as speakers (talk on concerns, experiences and hopes)

Final outcomes desired
- Able to increase knowledge, confidence and comfort
- Be able to detect drug - related problems and suggest solutions for their management
- Be able to recommend treatment modalities
- Improve counselling techniques

Teaching modalities
- Case-based learning, actual cases
- Workshops in small groups
- Internet, CD-ROMS
- Clerkships with expert pharmacists
- Follow – up information through e-mail or a web site
- Point form summary at end

Interesting comments
- “Something totally new”
- “Start from scratch”
- “Free”

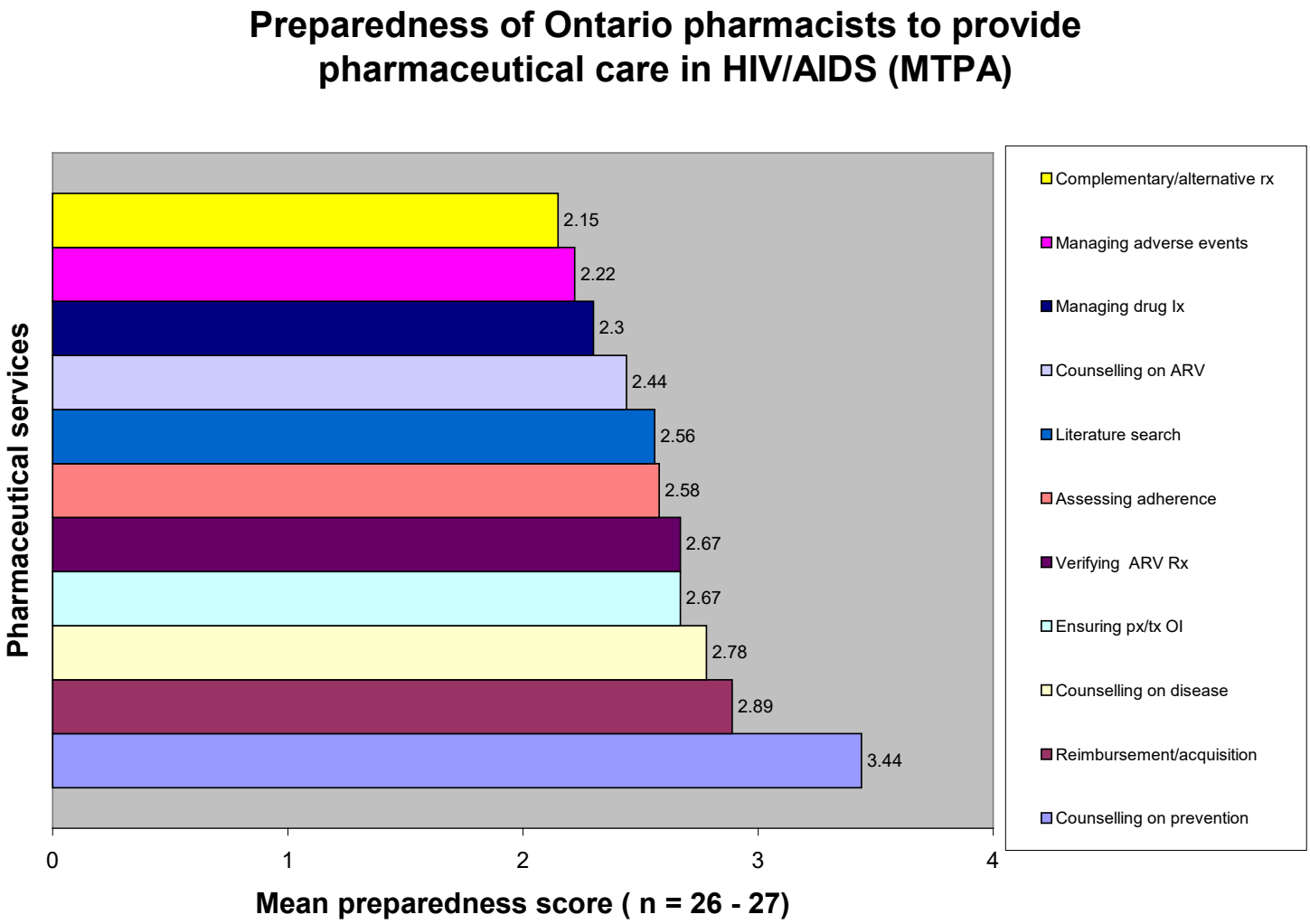
Figure 1



Preparedness score: 1 = very unprepared, 2 = unprepared, 3 = somewhat prepared, 4= prepared, 5 = very prepared

Legend Abbreviations: Rx = prescription, px = prophylaxis, tx = treatment, Ix = interaction, ARV = antiretroviral, OI = opportunistic infection

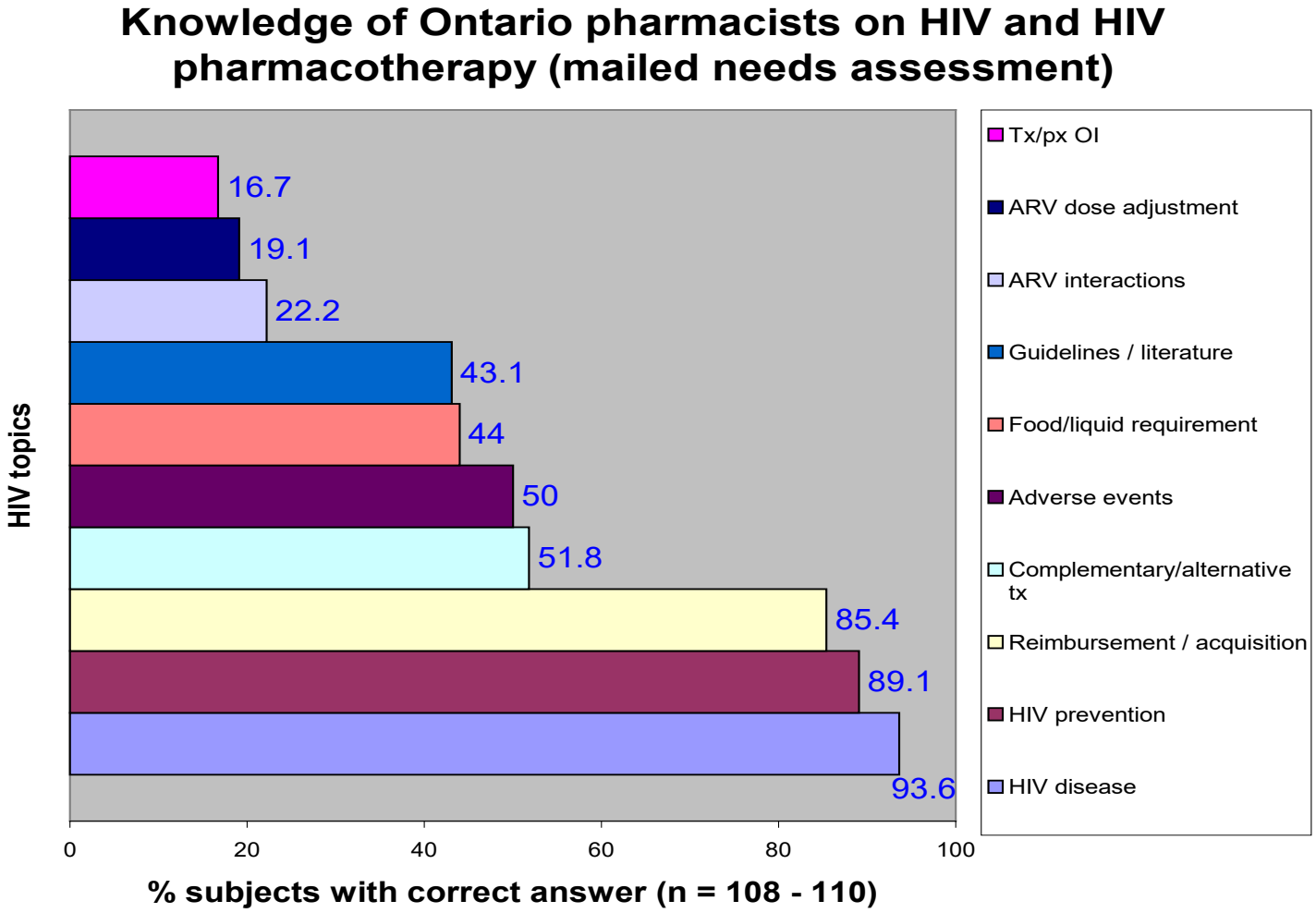
Figure 2



Preparedness score: 1 = very unprepared, 2 = unprepared, 3 = somewhat prepared, 4= prepared, 5 = very prepared

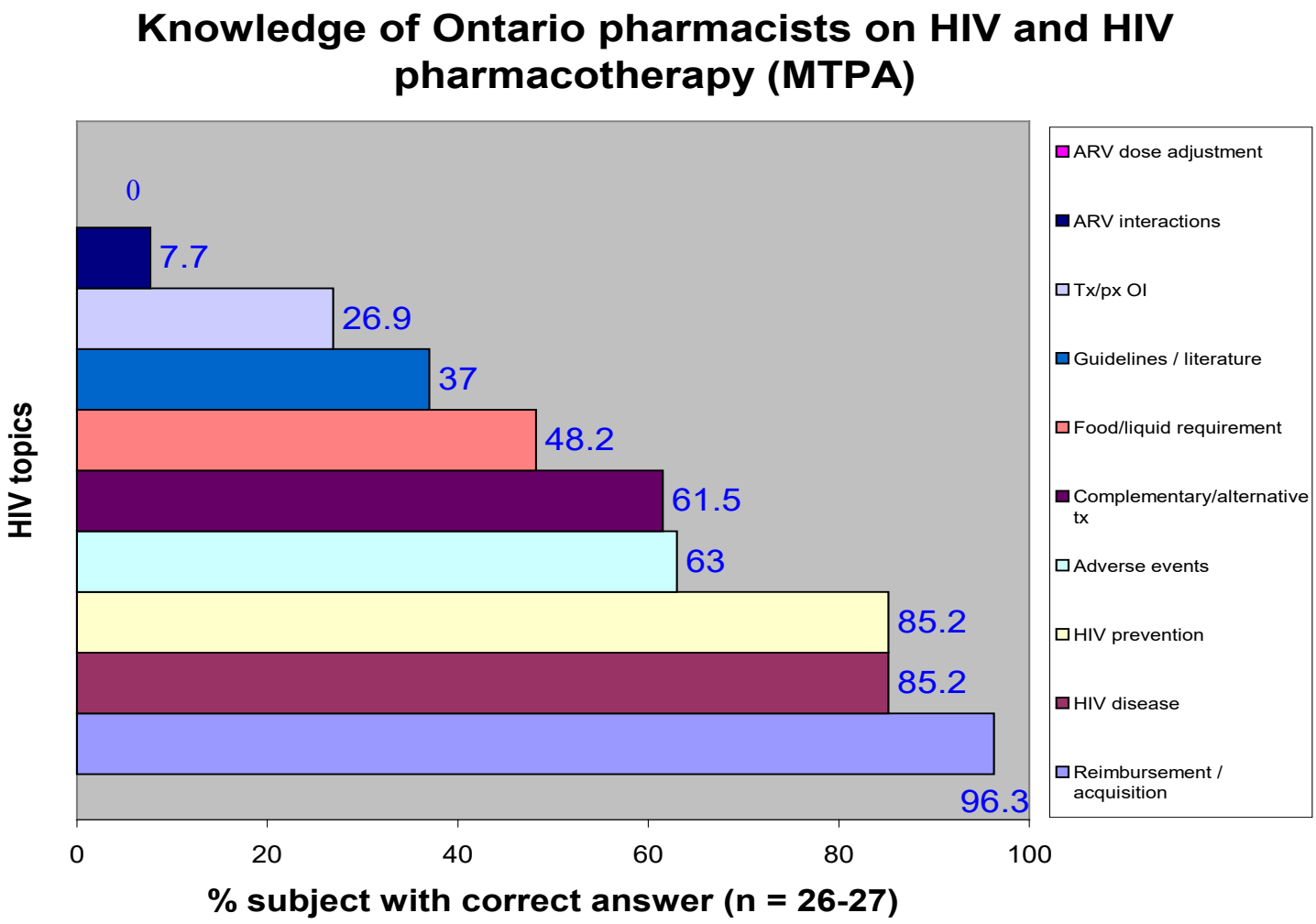
Legend Abbreviations: Rx = prescription, px = prophylaxis, tx = treatment, Ix = interaction, ARV = antiretroviral, OI = opportunistic infection

Figure 3



Legend abbreviations: OI = opportunistic infections, ARV = antiretroviral, tx = treatment, px = prophylaxis, HIV = human immunodeficiency virus

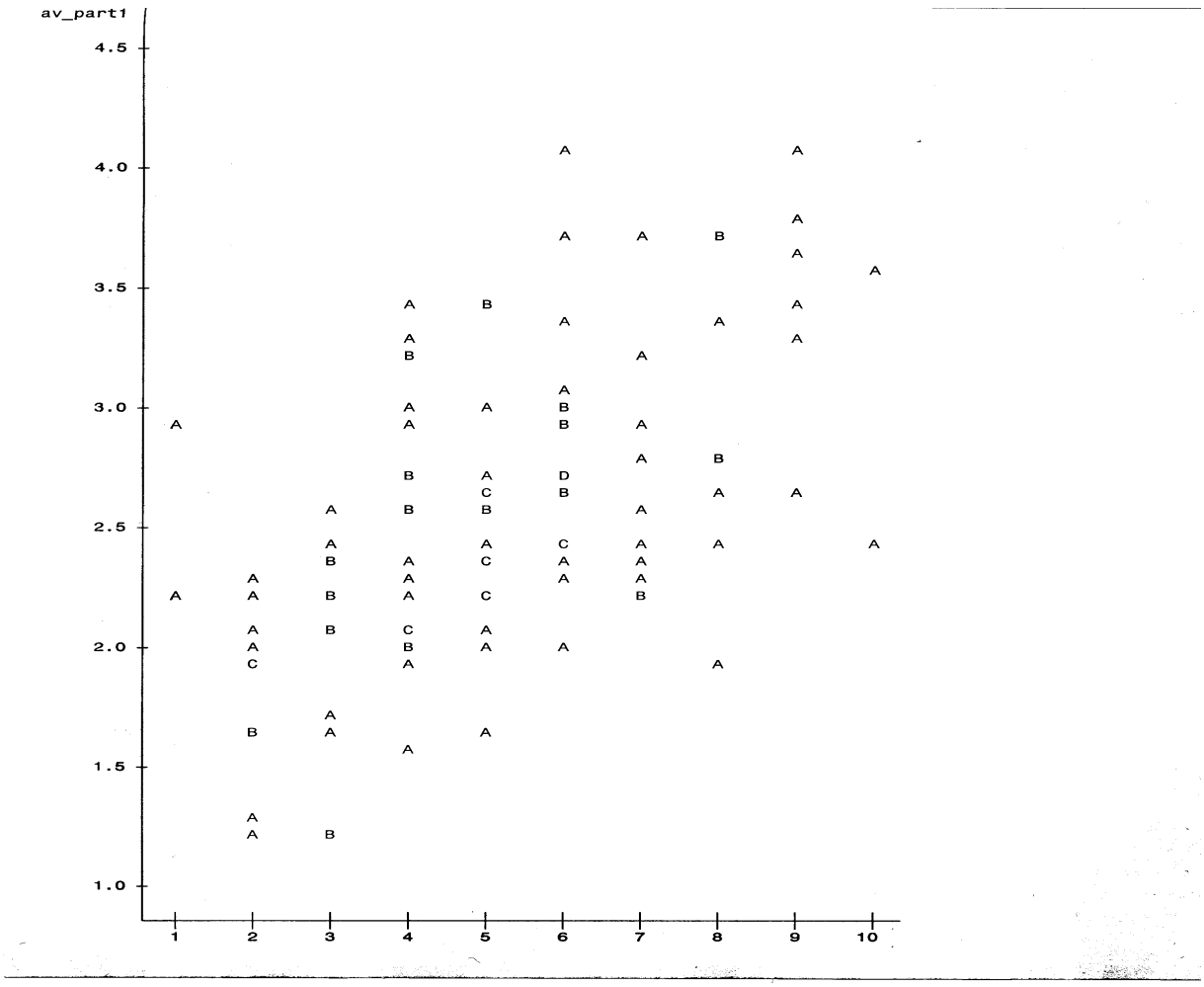
Figure 4



Legend abbreviations: OI = opportunistic infections, ARV = antiretrovirals, tx = treatment, px = prophylaxis, HIV = human immunodeficiency virus

Figure 5

Pearson correlation between global preparedness score (y axis) and global knowledge score (x axis) for each respondent (Mailed needs assessment) (n = 110)



Pearson correlation coefficient: r = 0.57884

APPENDIX 5

Results of the Ontario Pharmacists' Association HIV – related query analysis

Table 16: HIV–related queries received by the Ontario Pharmacists' Association Drug Information and Research Centre in 2000 and 2001

Category	2000 # questions (%)	2001 # questions (%)	Examples of topics or questions
HIV infection	23 (11.6 %)	4 (6.5 %)	-HIV testing -Home HIV test -HIV immunity
Identification of antiretrovirals, doses	52 (26.3 %)	16 (25.8 %)	-T3 prn for pain…Is this an antiretroviral? -Q4T for HIV ? -Spelling of cleetra? -Mevirapine, what is it? -Efavirenz dose? -List of antiretroviral names
Patient counselling	2 (1.0 %)	0 (0.0 %)	-Patient counselling information, pamphlets on antiretrovirals
Antiretroviral adverse drug reactions	10 (5.1 %)	1 (1.6 %)	-Peripheral neuropathy -Adverse reactions with post-exposure prophylaxis -Skin reactions with pyrimethamine
Antiretroviral drug interactions	21 (10.6 %)	10 (16.1 %)	-Drug interactions with stavudine, abacavir and Kaletra® -Interactions with oral contraceptives -Interactions with methadone -Interactions with buproprion -List of drug interactions with the antiretrovirals
Acquisition and reimbursement of antiretrovirals	6 (3.0 %)	5 (8.0 %)	-How to get tenofovir, amprenavir, clotrimazole troches? - Reimbursement of stavudine, saquinavir, ritonavir?
HIV literature searches	10 (5.1 %)	3 (4.8 %)	-Request for Trizivir product monograph -Request for review article on antiretrovirals -Request for article on HIV transmission and pregnancy

Table 16 (continued)

Category	2000 # questions (%)	2001 # questions (%)	Examples of topics or questions
Complementary and alternative medicines (including interactions with these agents)	8 (4.0 %)	5 (8.1 %)	-Interactions between antiretrovirals and l-carnitine, garlic, and multivitamins -Echinacea in HIV? -Marijuana: legal aspects
HIV prevention and post-exposure prophylaxis	35 (17.7 %)	4 (6.5 %)	-Post-exposure prophylaxis (majority of questions) -Use of condoms -Use of needles -Gel used to wash hands for policeman? -Post-exposure prophylaxis before exposure? -Does isopropyl alcohol kill HIV?
Prophylaxis and treatment of opportunistic infections	6 (3.0 %)	6 (9.7 %)	-Treatment of oral candidiasis -Treatment of mycobacterium avium complex -Chronic suppression of cryptococcal meningitis -Cross-reactivity between Septra® and dapsone
Adherence	0 (0.0 %)	0 (0.0 %)	
Miscellaneous	25 (12.6 %)	8 (12.9 %)	-Hepatitis B immunizations -HIV wasting -Structured treatment interruptions -Investigational agents
Total	198 (100.0 %)	62 (100.0 %)	

APPENDIX 6

Results from the key informant meeting

Table 17: Pharmaceutical services pharmacists should offer HIV-infected patients: results from the key informant meeting

Pharmaceutical care to HIV – infected patients should include:

1) Preliminary meeting with patient before starting antiretrovirals to counsel on the goals of therapy, the importance of adherence, the possible regimens and adverse drug reactions, and to assess barriers to adherence.
2) Preparation of a medication schedule.
3) Meeting with patient at the start of a new antiretroviral regimen to counsel on the medication schedule, the dosage, the food and liquid requirements, the possible adverse drug reactions and how to manage them, the possible interactions with other medications, and the importance of adherence.
4) Antiretroviral prescription verification: ensuring that the doses prescribed are appropriate and that no clinically significant interactions between the antiretrovirals and prescribed medications, over-the-counter medications or herbal products go unnoticed.
5) Ensuring the acquisition of antiretrovirals and other medications.
6) Ensuring the reimbursement of the antiretrovirals and other medications (Ontario Drug Benefits, section 8, special access programs, federal health programs for refugees, etc.).
7) Supplying adherence aids such as alarms, pillboxes or blister packs.
8) Telephone follow-ups or maintenance appointments to assess the presence of adverse drug reactions and to assess adherence.
9) Empathy.
10) Confidential environment for counselling.

Table 18: Prioritizing the knowledge pharmacists need to have to offer pharmaceutical care to HIV – infected patients: results from the key informant meeting

Order of importance	Educational topic
1	Laboratory parameters ($CD4^+$ cell count, HIV RNA viral load) = HIV treatment guidelines
2	Antiretroviral adverse drug reactions = Antiretroviral mechanisms of action
3	Antiretroviral drug interactions = Adherence
4	Social, psychological, emotional and ethical concerns = Resistance to antiretrovirals
5	HIV epidemiology
6	Antiretroviral therapeutic drug monitoring

APPENDIX 7

Design of the HIV / AIDS Patient Care – Level 1 Certificate Program

Table 19: Learning objectives for the HIV / AIDS patient care – level 1 certificate program

After completing all requirements of the certificate program, the participant will be able to:	Content - based	Skill – based
HIV disease		
- Counsel patients on how HIV is transmitted from one person to another, the natural progression of the infection, and on the possible complications related to immunosuppression		✔
- Counsel patients on HIV prevention		✔
- Recognize when to refer HIV – infected clients to a physician		✔
Antiretrovirals		
- Recognize and categorize by class and mechanism of action the antiretrovirals used for the treatment of HIV	✔	
- Contrast the general advantages and disadvantages of the various antiretroviral regimens	✔	
- Understand the importance of ensuring rapid and uninterrupted accessibility of the antiretrovirals for the patients	✔	
- Counsel patients on how, when and why antiretroviral therapy is begun and changed		✔
- Verify prescriptions of antiretrovirals and ensure that the doses and administration frequencies are adequate		✔
- Counsel patients on the use of antiretrovirals (goals of therapy, doses, schedule, possible adverse drug reactions and their management, precautions, interactions and storage)		✔
- Assess patient adherence to antiretrovirals and other medications		✔

Table 19 (Continued)

After completing all requirements of the certificate program, the participant will be able to:	Content - based	Skill – based
Antiretrovirals:		
- Counsel patients on the importance of adherence		✔
- Suggest solutions to the patient to help enhance adherence to antiretrovirals and other medications		✔
- Detect, manage and monitor adverse drug reactions related to antiretrovirals or other medications used by HIV – infected patients		✔
- Detect, manage, and monitor possible drug-food interactions		✔
- Detect, manage, and monitor possible drug-drug interactions between antiretrovirals		✔
- Detect, manage, and monitor possible drug-drug interactions between antiretrovirals and other prescribed medications, over-the-counter medications, vitamins and natural products		✔
- Facilitate the reimbursement of the costs related to antiretrovirals and other medications		✔
Opportunistic Infections		
- Evaluate, when possible, the need for prophylaxis and treatment of opportunistic infections		✔
- Suggest, if necessary, prophylaxis and treatment options for opportunistic infections		✔
- Counsel patients on medications used for the prophylaxis and treatment of opportunistic infections		✔
Miscellaneous		
- Counsel patients on the use of complementary and alternative medicines in HIV		✔

Table 20: Educational topics and teaching strategies suggested for the HIV / AIDS patient care – level 1 certificate program

Educational topic	In-depth (I) vs general (G) review	Teaching strategies* (hours) R	L	CS	IB	CW
HIV disease						
- Transmission	G					
- Pathogenesis	G					
- Diagnosis	G					
- Natural history	G	1.0	0.75		0.5	
- $CD4^+$ / Viral load	G					
- Epidemiology	G					
- Prevention	I					
Antiretrovirals						
- Names	I					
- Abbreviations	I					
- Mechanisms of action	I					
- Indications	I					
- Contraindications	I					
- Precautions	I	4.0	3.0	2.5		
- Pharmacokinetics	G					
- Doses	I					
- Dose adjustments	I					
- Fluid / food requirements	I					
- Adverse drug reactions	I					
- Drug-drug interactions	I					
- Reimbursement and acquisition	I					
Guidelines						
- Goals of therapy	I					
- When to start therapy	I					
- Initial regimens	I	4.0	0.75	0.50		
- Monitoring efficacy	I					
- When to change therapy	I					
Antiretroviral regimens						
- Advantages and disadvantages of certain regimens	G					
- Choosing a regimen	G	1.0	0.75			
- Changing regimen	G					
- Resistance	G					

Table 20 (continued)

Educational topic	In-depth (I) vs general (G) review	Teaching strategies* (hours) R	L	CS	IB	CW
Adherence						
- Barriers to adherence	I					
- Assessing adherence	I	1.0	0.75			1.0
- Tools for adherence	I					
Opportunistic infections						
- Primary prophylaxis	G					
- Secondary prophylaxis	G	3.0	1.0	0.5		
- Treatment	G					
Counselling HIV – infected patients	I					1.5
Complementary and alternative medicines in HIV	I		1.0	0.5		
Special populations						
- Pediatric	G	1.0				
- Pregnancy	G	1.0				
- Post-exposure prophylaxis	G	1.0				
- IV drug users	I		0.5			
Searching the literature and electronic databases for HIV drug information	G	0.5	0.5	0.5		
Social, psychological, emotional and ethical issues in HIV	G		1.0			

*** R = readings, L = lectures, CS = case studies, IB = information booth on prevention, CW = counselling workshop**