



Initiating Therapy

Improving Adherence

Medication Errors

Drug Interactions

PHARMACISTS: PRESCRIBING BETTER CARE

Pharmacists have a major role to play in the treatment of HIV/AIDS. They receive more training than any other health care professional in the preparation, use, and effects of drugs,¹ making them uniquely positioned to participate in care teams. "Thirty years of research have shown that pharmacists who actively manage drug therapy can improve patient outcomes. As a result, 32 states currently allow physicians and pharmacists to enter into voluntary written agreements, or collaborative practice protocols, to manage drug therapy."¹

Experts interviewed for this article noted that pharmacists work in a wide variety of HIV-related fields: They conduct laboratory research; check eligibility for insurance program pharmacy benefits; work as administrators or managers within local, State, and Federal government agencies; and serve as educators and trainers. They also work as formulary consultants at pharmaceutical companies or State Ryan White AIDS Drug Assistance Programs (ADAPs), on clinical care teams, and at community (or retail) pharmacies.

This article focuses specifically on community and clinical pharmacists, who have the most direct contact with people living with HIV/AIDS (PLWHA) and play the most immediate roles in HIV/AIDS care.

CLINICAL PHARMACISTS

Clinical pharmacists involved in HIV/AIDS care typically work in clinics and hospitals and provide direct patient care services within a multidisciplinary care team. To become a clinical pharmacist specializing in

DID YOU KNOW?

Pharmacists in HIV care can improve the capacity of medical providers, quality of prescribing, and patient knowledge.²

Inpatient providers may not be familiar with the complexity of highly active antiretroviral therapy (HAART) regimens; without the assistance of pharmacists, hospitalized people living with HIV disease are especially vulnerable to medication errors.^{3,4}



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When most people think of pharmacists, they think of a person behind a counter filling pill bottles. Dispensing medications is important, but it is only one role pharmacists working in HIV play. As “drug experts,” pharmacists may be involved in every step of HIV medication from research to adherence and everything in between.

Pharmacists have seen firsthand how highly active anti-retroviral therapy has improved—but also complicated—medication therapy. Today, patients may control their HIV with as little as one pill a day but take many more pills to treat coinfections, comorbidities, and age-related conditions. As the number of medications increases, so does the risk for medication errors, including drug interactions.

Pharmacists can play a role in identifying errors and improving patient health outcomes. For example, pharmacists can serve as “gatekeepers” of patient medication histories, particularly when physicians across disciplines fail to communicate with one another. For these reasons, we dedicate this newsletter to examining the role of pharmacists in HIV and the many ways they can—and do—improve care.

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Cover: a client at the PATH Center, Brooklyn, NY, holding HIV and other medications: © See Change.

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HIV care, a postgraduate training or pharmacy residency program is commonly required. In a Kaiser Permanente study, PLWHA treated by care teams with clinical pharmacists were twice as likely to achieve complete viral control. Results were even greater in economically disadvantaged areas.⁵ Consistent with their importance, pharmacists are included on the list of medical providers who may participate in the American Academy of HIV Medicine’s HIV specialist credentialing program.

Clinical pharmacists in institutional settings may help manage hospital drug approval systems, regulate new drugs in the hospital formulary, and oversee systems programmed to flag for potential drug interactions.^{6,7} Hospital pharmacists play a vital role in patient care: A Pri-Med Institute study found that hospital pharmacists, on average, propose changes to 1 in 4 prescriptions because of incorrect dosage, potential drug interactions, or an alternative drug on the patient’s insurer’s formulary.⁸

As part of a clinical team, pharmacists work on disease management and care plans. They assess patients for medication-related factors and serve as a resource on HIV pharmacotherapies, consulting on drug interactions, dosing, and genotypic resistance assay interpretation.⁹ They also work with physicians to review drug therapies and ensure that patients receive the full benefit of their medications;¹ for patients with comorbidities, pharmacists need to understand the relationships between HIV and those comorbidities and potential interactions among treatments. Clinical pharmacists also check risk for opportunistic infections and work to initiate or discontinue use of prophylaxis.¹⁰

Clinical pharmacists collaborate with nutritionists to discuss food–drug interactions and nutritional complications and requirements related to HIV or HIV medications, such as wasting, changes in lipid levels, and weight management. They work with nutritionists, patients, and caregivers to make them aware of any dietary restrictions.¹⁰ “Some drugs have to be taken with food [or cannot be taken with certain foods], some on an empty stomach, and many have to be taken on a very specific schedule so that the drug’s con-

centration in the bloodstream doesn't vary,"¹¹ explains Jennifer Cocohoba, a health sciences assistant clinical pharmacy professor at the University of California–San Francisco. Unless clinical pharmacists are based in “one-stop-shops” or within community health clinics, they often do not dispense drugs onsite.

COMMUNITY PHARMACISTS

Community pharmacists typically work at retail pharmacies. They are not usually specialized in HIV, but they play an important role in monitoring not only HIV medication refills but also their potential for interactions with other prescriptions and their potential side effects.

Because community pharmacists are typically the dispensing pharmacists and because prescribers may not communicate with one another, community pharmacists often have the only complete record of a client's medication information and can play a major role in catching drug interactions. For example, antacid and heartburn medications can interact with certain anti-retrovirals,* as can medication for lowering cholesterol.†

With more than 3.4 billion prescriptions dispensed every year¹² from among the more than 10,000 prescription drugs on the market and thousands more available over the counter (OTC), the risk of drug-related problems is significant.¹ The potential for problems is particularly relevant for PLWHA, who are likely to have numerous prescriptions. Community pharmacists' ability to offer patient education and medication monitoring is vital.

Community pharmacists can play an important role not only in catching errors but also with adherence by providing patient counseling, phone call reminders for refills, resolving payor issues impeding medication access, and even notifying the patient's prescribing provider when adherence issues arise.

PHARMACIST OPPORTUNITIES

Initiating Therapy

Clinical pharmacists can be a key resource for selecting HIV treatment regimens and educating patients. Many protocols require an initial counseling session between the clinical pharmacist and patient, which is critical because the first regimen of therapy often offers the greatest likelihood for viral suppression.^{9,11,13} In this session, pharmacists should review the following information:

- ▶ All medication names (trade name, generic name, abbreviations)
- ▶ Purpose, strength, and dose of the medication
- ▶ Frequency with which medication should be taken
- ▶ Missed dose instructions, and storage requirements
- ▶ Any related special instructions.^{14,15}

Pharmacists can also answer patient questions and outline possible medication side effects—a highly valuable service, because side effects and their impact on quality of life are a primary reason that patients discontinue medication.¹⁶ Insufficient or overly complex information is another major reason for discontinuation.¹⁷

Kirsten Balano, a clinical pharmacist in a Part C–funded clinic, notes, “One strategy is to have patients articulate a goal of therapy. . . . If they are unable to do so, we need to reevaluate [whether] that person is ready.” Balano also suggests asking patients to explain what they find most difficult in taking medications as a route to identifying barriers. “One common response is that taking meds reminds them of their HIV status. Some people are still struggling with coping strategies, in which case we'll talk about bringing in a therapist and enrolling them in a support group,” she explains.

Improving Adherence

Pharmacists can help improve adherence and help the care team with adherence strategies. Many adherence interventions, such as medication therapy management (MTM), require the involvement of a pharmacist. MTM includes community pharmacist–led interventions and services separate from medication dispensing, in order to improve patient care and empower patients to self-manage their medications. These activities also involve pharmacists collaborating with other health care providers to facilitate continuity of care. MTM services can result in improved clinical outcomes, including reduction of viral load, improved CD4 count, and greater likelihood of remaining on a single type of antiretroviral regimen.¹⁸ Allotting time for pharmacists to provide—and bill for—MTM services can dramatically increase patient knowledge (See: <http://tinyurl.com/yz8deu4>).

Given the large number of medications PLWHA may require, pharmacists use medisets (i.e., prefilled pill boxes) and medipacks (i.e., prepackaged pills to be taken together) to help patients take the appropriate medi-

* Personal communication with Kirsten Balano, clinical pharmacist, Sonoma County Center and Pacific AETC faculty, April 21, 2009.

† Personal communication with Andrea Hotton, RPh, pharmacy manager, Castro Street Pharmacy, San Francisco, May 13, 2009.

cations at the right time. Pharmacists also offer patients the option to receive medications (including medisets and medipacks) at a retail pharmacy or in the mail.^{9,19}

Pharmacists may still face challenges with adherence, however. As Balano notes, “Patients may not want something mailed that comes with any educational sheets and names of medications because it could disclose their status—but then, there may be barriers to getting to the clinic.” Pharmacists work to ensure that mailed refills are as confidential as possible; to ease patient convenience, other clinic activities (e.g., filling out paperwork for housing) are scheduled at the same time.

“Another strategy,” says Balano, is giving patients medications of only 3 or 4 months, so when the refill request comes in, it can trigger us to reevaluate to see if the patient has been seen regularly, if their lab work was done, and if there’s any gaps in medication refills.” Pharmacists should follow up if patients miss refills or do not refill prescriptions on time.

“If we’re writing a new antiretroviral [prescription], sometimes we’ll have patients bring it into the clinic first and check that they received the right medication and... the whole regimen. Sometimes insurance may not have gone through for a particular medication, and what the patient picked up is incomplete,” Balano adds.

Because nonadherence increases risk for drug resistance and viral replication,²⁰ enlisting pharmacists’ help in adherence monitoring is another valuable strategy. For clinical pharmacists, this task may involve tracking CD4 counts and viral load to document a patient’s response to therapy, whereas for community pharmacists, it may require monitoring refills. (See table, page 5, for a complete list of pharmacist adherence measures.)

Reducing Medication Errors

Medication errors pose major health problems for PLWHA. According to a study in *Clinical Infectious Diseases*, medication errors occurred in 25 percent of HIV-positive patients at the time of hospital admission.²¹

Medication errors occur when medications are prescribed, dispensed, or used incorrectly. Causes of errors range from ambiguities in product names to poor communication.⁶ Examples of HAART errors include “incomplete regimens (e.g., use of two antiretroviral agents), incorrect dosage, incorrect schedule, medication–disease interaction (e.g., failure to adjust for renal failure), incorrect formulation. . . incorrect antiretroviral, duplication of therapy, or drug–drug interaction.”²³ In addition, resis-

tance to nonnucleoside reverse transcriptase inhibitors and nucleoside cytosine analogues can develop particularly quickly, so correct prescription and use is vital.³

An AIDS Education and Training Center (AETC) publication titled *The Role of the Pharmacist in HIV Care: A Collection of Monographs* puts forth strategies to help reduce medication errors, including pharmacists’ requests that providers write both brand and generic names on prescriptions, avoid writing abbreviations and, in inpatient settings, use preprinted HIV order sheets. The monograph also suggests checking databases for drug interactions and errors.²²

Pharmacists may also use computerized order-form systems to record providers’ orders for medications. When applied to electronic medical records, such systems can help identify potential medication errors.³

Advising on Drug Interactions

“Research with existing products and the emergence of new antiretroviral agents [are] continuing to amplify the number of known drug interactions.”²³ Vitamin, mineral, nutritional supplement, and non-traditional herbal therapies can create medication-related complications as well.²⁴ The continual growth of nontraditional therapies involving untested or unknown ingredients creates a challenge for people working to identify potential medication interactions. Part of a pharmacist’s job is to stay abreast of the changing HIV medication landscape; as such, clinical pharmacists are uniquely positioned to catch drug interactions. Community pharmacists also play a big role in identifying drug interactions because they see all the medications a patient is taking. Thus, it is important that clinical and community pharmacist communicate with one another.

Negative drug interactions have occurred when indinavir/ritonavir are administered with meperidine.²⁵ But interactions not only occur among the drugs patients are taking; they may also occur when discontinuing a prescription, because discontinuation may make a medication regimen unstable.²² For example, stopping carbamazepine while on theophylline could cause plasma concentrations in the blood to reach toxic levels.²⁶ Irregular drug use may also create interactions. For patients with abacavir hypersensitivity reactions, discontinued and subsequent restarting of medication has resulted in fatalities.²² Thus, it is imperative that patients talk with their clinical team before stopping

TABLE: ADVANTAGES and DISADVANTAGES to VARIOUS PHARMACIST-LED ADHERENCE MEASURES

Method	Advantages	Disadvantages
Self-report: Pharmacists can ask: "How many pills did you miss in the last 3 days?"	<ul style="list-style-type: none"> ▶ Easily completed using patient interview or questionnaire (report of nonadherence is more reliable than report of adherence). ▶ Inexpensive. 	<ul style="list-style-type: none"> ▶ Overestimates adherence. ▶ Correlation is dependent on patient's relationship with staff. Patients may tell prescribers what they perceive as socially desirable or "right" responses.
Pill counts: "Brown bag sessions"	<ul style="list-style-type: none"> ▶ Useful adjunct to self-report. ▶ Unannounced pill counts may be more accurate. ▶ Direct costs are minimal. 	<ul style="list-style-type: none"> ▶ Tends to overestimate adherence as a result of pills being "dumped" prior to visit. ▶ Casts prescriber in the role of medication monitor and not ally or advocate ▶ Does not prove that patient actually took medication.
Electronic monitoring: Medication Event Monitoring System caps	<ul style="list-style-type: none"> ▶ Best correlation with virologic outcomes. ▶ Allows more detailed view of nonadherence patterns. ▶ Most accurate measure. 	<ul style="list-style-type: none"> ▶ Expensive and generally reserved for clinical trials. ▶ Precludes use of pillbox. ▶ Fails if multiple medications are kept in a single bottle or if multiple doses are taken out at a time. ▶ Requires carrying the container.
Pharmacy refill monitoring	<ul style="list-style-type: none"> ▶ Easy, minimal time commitment. ▶ Timely refilling of prescriptions correlates well with adherence. ▶ Most successful when limited to patient using one pharmacist. ▶ Is a useful adjunct to self-report. 	<ul style="list-style-type: none"> ▶ Does not equate with taking medication. ▶ Patients may use more than one pharmacy. ▶ Medication may be shared or sold.
Therapeutic drug monitoring	<ul style="list-style-type: none"> ▶ Confirms patient reporting. 	<ul style="list-style-type: none"> ▶ Pharmacokinetic levels for most drugs are not well established. ▶ Only confirms the premeasurement adherence; long-term adherence is still unknown.
Hematologic monitoring using either complete blood counts or expanded chemistry panels	<ul style="list-style-type: none"> ▶ Confirms patient reporting. 	<ul style="list-style-type: none"> ▶ Only effective for certain drugs, such as zidovudine, stavudine—increased mean corpuscular volume. ▶ Indinavir—increased bilirubin. ▶ Not always reliable.
Directly observed therapy	<ul style="list-style-type: none"> ▶ 100 percent adherence, in theory. ▶ Ideal method for institutional settings (e.g., prisons, nursing homes). 	<ul style="list-style-type: none"> ▶ Labor intensive. ▶ Concern for development of resistance if plan not followed.
Modified directly observed therapy	<ul style="list-style-type: none"> ▶ 100 percent adherence, in theory. ▶ Ideal method for ambulatory settings. ▶ Assumes patient takes nonmonitored drugs correctly. 	<ul style="list-style-type: none"> ▶ Labor intensive. ▶ Concern for development of resistance if plan not followed.
Viral load	<ul style="list-style-type: none"> ▶ Can correlate with adherence. ▶ Although poor adherence is associated with virologic failure, not all patients with virologic failure will be poor adherers. 	<ul style="list-style-type: none"> ▶ Does not necessarily indicate nonadherence. ▶ May overestimate adherence. ▶ Virologic failure can be indicative of drug resistance.
Prescriber estimation	<ul style="list-style-type: none"> ▶ None. 	<ul style="list-style-type: none"> ▶ Prescriber estimation is more poorly correlated with actual adherence.

Source: Adapted with permission from the New York State Department of Health (NYSDOH) AIDS Institute Clinical Guidelines Development Program. *Pharmacists: partners in health care for HIV-infected patients*. Albany, NY: NYSDOH; 2006:6-7. Available at: www.hivguidelines.org/GuidelineDocuments/ph-pharmacy-1.pdf. Accessed June 30, 2009.

certain drugs. In such situations, the pharmacist can be especially helpful.²⁶

Avoiding drug interactions requires communication not only across disciplines but also within interdisciplinary teams. "The nurse takes the medication history, but the pharmacist does as well, as a safety net. We review

charts. I'll also present a seminar with everyone here on staff where I discuss drug interactions, and as new drugs come out, we'll send e-mail alerts about any new interactions to keep on radar," explains Frank Romanelli, a pharmacy educator at the University of Kentucky and Kentucky's AETC.

When discussing drug interactions and medication use, patients are encouraged to list prescribed medications as well as everything else they take. "I'll regularly ask folks to bring in all their medications with everything at home and we go through it. We discuss what they are using and how regularly. . . . It's eye opening seeing all the bottles. We have caught duplications, so I strongly encourage physicians if meds are being discontinued that when they write a new prescription, they also write a discontinuation of the other med so both can be given to the dispensing pharmacy," says Balano.

TOOLS FOR PHARMACISTS

AETCs have offered many trainings and activities that are specific to pharmacists, including the benefits of teleconferencing; partnering with national retail pharmacies to provide trainings to their pharmacists; and using actors with assigned charts, symptoms, and psychosocial markers to assist pharmacists in practicing adherence counseling.

To help community pharmacists in need of more HIV-specific training, the National AETC has developed a training guide, *Developing AETC Training Programs for Community Pharmacists* (available at <http://aidsetc.org/aidsetc?page=cf-pharm-te>). The guidebook is targeted to program directors and includes training, preceptorship, and marketing information.¹⁹

Culturally competent pharmacists can help build patient trust and improve receipt of information, development of drug therapy plans, and understanding of medication instructions. As a result, pharmacy colleges are increasingly incorporating cultural competency into the curricula.²⁷ University of California–San Francisco doctor of pharmacy (PharmD) students, as part of an HIV specialty program, spend 1 day a week at the Castro Street pharmacy, where many HIV patients fill prescriptions. PharmD students review patient records and take information back to the clinic for follow-up.¹¹

At Drake University's College of Pharmacy and Health PharmD program, students participated in the following cultural competency activities:

- ▶ Developing culturally sensitive communications
- ▶ Using Spanish interpreters and the Language Line (a telephone interpreter service)
- ▶ Visiting the HIV/AIDS clinic and homeless shelter to be aware of community resources

- ▶ Visiting a Mexican grocery store to learn about nutrition and adapting disease management programs to patients' lifestyle and food preferences
- ▶ Applying "Kleinman's questions," a set of questions to determine a patient's perception of a problem (To learn more, visit <http://depts.washington.edu/fammed/predoc/clerkship/resources/cultKlein.>)
- ▶ Learning methods for eliciting health beliefs like the LEARN (Listen, Explain, Acknowledge, Recommend, Negotiate) Model and the RESPECT (Rapport, Empathy, Support, Partnership, Explanations, Cultural Competence, Trust) Model. (Visit [http://cirrie.buffalo.edu/curriculum/resources/models.php.](http://cirrie.buffalo.edu/curriculum/resources/models.php))
- ▶ Understanding the role and cultural importance of alternative medicine and traditional healers (curanderos) in Hispanic communities.²⁷

BARRIERS TO EFFECTIVENESS

Work Environment

"[I]n a statewide survey of pharmacists in North Carolina, 59 [percent] of community pharmacist respondents indicated that they did not have enough time to provide adherence counseling to their HIV/AIDS patients."²⁸ Lack of time constitutes one of the major barriers community pharmacists face. They are obliged to fill more and more prescriptions, work longer hours, shift tasks to pharmacy technicians, and curtail patient counseling.^{6,24} According to analysis by the New York/New Jersey AETC, other constraints include insufficient education and training to provide effective HIV medication counseling to customers and lack of compensation from third-party payers for time spent delivering MTM to HIV patients.²⁹

Yet, patient counseling may be more needed than ever. "The expanding availability of OTC drugs reclassified from prescription status offers consumers greater choices. However, with these choices and greater selection opportunity come confusion and questions and/or advice for which consumers consult their pharmacists. These consumer-generated questions are important in providing good pharmaceutical care but also increase the number of distractions and decrease the time available for prescription pharmaceutical care."²⁴

Workforce

Professional qualifications of pharmacists have been strengthened, thanks to nationwide entry-level require-

ments for a PharmD degree rather than a bachelors degree in pharmacy.⁶ Raising the financial, time, and resource requirements for pharmacy degree candidates, however, contributes to declining numbers of pharmacists in the workforce and creates a strain on pharmaceutical faculty.⁶ The scarcity of pharmacists in rural areas is particularly disconcerting because rural pharmacies are often the sole local provider of pharmacy services.

In addition, programs like Medicare Part D increase financial access to prescription medications for beneficiaries and may provide mail order prescriptions to patients without pharmacies. Moreover, some insurance companies encourage patients to order medications in bulk when doing so reduces costs. In other words, private and public insurers' programs are creating downward pressure on medication costs, so although patients may benefit from particular prescription plans, pharmacies are negatively affected. This situation is especially true for independent pharmacies, which may have less leverage to negotiate drug prices with wholesalers, rely more heavily on drug sales for revenue, and receive lower payment reimbursement from such plans.³⁰

Research indicates that rural independent pharmacies may struggle to adapt to changing policies of private insurers, Medicare, and Medicaid. For example, from January 2006 to January 2007, a study of 51 such pharmacies reported that "the gross margin they received on Medicare Part D prescriptions was below what they needed to stay in business."³⁰ Because of these and other issues, a net loss of 503 independently owned rural pharmacies occurred between May 2006 and December 2008.³¹ During that same time, the number of pharmacies in 213 rural communities dropped to zero.³²

MOVING FORWARD

Pharmacists are working in laboratories, administrative positions, clinics, and retail pharmacies to catch errors and improve medication adherence and patient care. But a number of barriers prevent pharmacists from achieving full participation and potential.

HRSA is committed to addressing those barriers by improving pharmacy care through AETC trainings and publications and building on previous workforce efforts by HRSA's Bureau of Health Professions. In addition, a 2008 HRSA HIV/AIDS Workforce Meeting identified best practices to maximize workforce outreach and retention, identify shortage areas, and target resources appropri-

ately. Finally, the National Rural Underserved Workforce Summit and the HRSA-funded Health Workforce Information Center (www.healthworkforceinfo.org/) demonstrate HRSA's ongoing efforts to increase the number of pharmacists in HIV care and enhance their role in improving patient health today and well into tomorrow.

➔ ONLINE RESOURCES

HIV Guidelines: www.aidsinfo.nih.gov/guidelines/; www.aids-ed.org/aidsetc?page=et-00-guidelines/; www.faetc.org/Guidelines/; www.hivguidelines.org/Content.aspx

HIV Medication Tables for Pharmacists: www.nynjaetc.org/documents/NYNJAETCPharmacyWallChart.pdf

Drug Interaction Tools: www.aids-ed.org/aidsetc?page=et-30-09&catid=arvtinter&pid=1

Psychiatric Medications and HIV Antiretrovirals: www.aids-ed.org/pdf/tools/nynj_psych-guide.pdf

Recreational Drugs and HIV Antiretrovirals: www.aids-ed.org/pdf/tools/nynj_rec_drug_interactions.pdf

National HIV/AIDS Clinicians' Consultation Center: www.nccc.ucsf.edu/Hotlines/Warmline.html

➔ THE 340B DRUG PRICING PROGRAM

The 340B Drug Pricing Program of the Public Health Service Act limits the cost of covered outpatient drugs to certain Federal grantees, Federally Qualified Health Centers, and qualified hospitals, resulting in savings on pharmaceuticals. HRSA has partnered with the Pharmacy Services Support Center of the American Pharmacists Association to help eligible providers optimize the value of this program by providing comprehensive pharmacy services, program guidance, and free technical assistance to all 340B-covered entities. To learn more, visit <http://pssc.aphanet.org/> or call (800) 628-6297.

In addition to cost savings through the 340B Program, the 340B Prime Vendor Program provides additional savings to improve access to affordable medications for 340B participants. The program is free to 340B-covered entities, but it requires enrollment. For more information, visit www.340bpvp.com/public/ or call (888) 340-2787.



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