The crux of successful inhibition of viral replication, reversal of immunosuppression and prevention of the immune depletion and subsequent clinical disease induced by HIV infection, is strict adherence to antiretroviral (ART) regimens. Many studies have confirmed that interruption of therapy, skipping doses and intermittent compliance with combination ART regimens will result in the emergence of resistant viral strains through the induction of mutations (genotypic) as well as phenotypic variations with varying degrees of susceptibilities to the individual agents. Incarceration poses unusual challenges to adherence due to the limitations on inmates' abilities to self-administer medications, the timing of the dosages, the prohibition of pill boxes and organizers, and the fear of disclosure of HIV status within the prison system.

Problems With the Pill Line
In most jails and prisons, medications that require supervision or "directly observed therapy" (DOT) are administered through a "pill line" service, where a nurse observes the ingestion of the medication, pill, liquid or powder, usually requesting inmates to open their mouths and stick out their tongues to ensure that ingestion has occurred. Drugs that have "street value" and can be sold or exchanged are usually crushed if they are in a tablet form, mixed with water and then given by DOT. Fortunately, most combination ART regimens consist of fixed-dose combinations (e.g., Truvada [tenofovir/FTC], Trizivir [AZT/3TC/abacavir], Epzicom [abacavir/3TC, Kivexa], Atripla [efavirenz/tenofovir/FTC], etc.), which are taken either once daily or twice daily. In most prisons, a month's supply is dispensed to the inmate as KOP (keep on person) and inmates are expected to self-administer the correct doses and keep their medications stored in their lockers. The Federal Bureau of Prisons forbids using pill boxes, pill sorters or organizers, zip lock bags or any gadgets with alarms for storage of individual doses, thus all medications have to be stored in their labeled containers and are subject to being confiscated and thrown away if found loose or inside anything but the labeled containers.

As the pill line is usually at dinnertime, no meds can be administered at bedtime, requiring inmates to take them hours before they go to bed, which is inconvenient especially for meds that cause somnolence or lethargy. If the meds require the ingestion of food, inmates have to surreptitiously take their pills to the dining room and risk disclosure or having the meds confiscated.

Taking the pills with an adequate amount of water is also important to ensure proper absorption and to prevent esophageal erosions due to meds getting lodged in the esophagus or causing irritation to the esophageal mucosa as they are swallowed.

Electronic Refill Monitoring and Its Limits

At FCC Beaumont-Low, the low-security prison where I have been confined for the past six months, the infectious disease nurse coordinator, Ms. Whittington, agreed to be interviewed for this article and stated that the Federal Bureau of Prisons has established protocols to ensure adherence to ART through electronic monitoring of medication refills, the tracking of virologic and CD4 responses after initiation of therapy and through DOT programs for recalcitrant inmates. She stated that the clinical staff members, consisting of herself, the physician, the nursing staff and the pharmacist, follow the recommendations of the Clinical Practice Guidelines issued by the National Institutes of Health/Centers for Disease Control and Prevention in terms of when to start, change, stop or alter therapy regimens. She acknowledged the limitations placed on the system's ability to administer medications at bedtime or to force medication on noncompliant patients.

In addition, the electronic monitoring of refills can only attest to whether the inmate picked up the refill and not to whether the inmate actually took the proper dosage, skipped doses or took any of the prescribed medication. Specific medications may require them to be taken with food, on an empty stomach, co-administered with other medications or timed to avoid co-administration with acid suppressants or other drugs with which the drugs interact.

Regimen Requirements

If a regimen requires twice-daily dosing, an interval of at least 8-12 hours should be observed between doses. Some protease inhibitors also require co-administration of low doses of Norvir (ritonavir), which has a high affinity for the hepatic microsomal enzymes (cytochrome P450) and can increase the plasma level of the protease inhibitors to a therapeutic level. If Norvir is not co-administered with the protease inhibitor, a sub-therapeutic plasma level will result, which can eventually lead to viral resistance to the inhibitor. The
Norvir interaction also occurs with macrolide antibiotics, warfarin, rifabutin, calcium channel blockers, glucocorticosteroids and some chemotherapeutic agents used to treat Kaposi's sarcoma and lymphoma. Levels of Reyataz (atazaranvir) are also lower in the presence of Viread (tenofovir) or Sustiva (efavirenz, Stocrin) -- thus Norvir must be given along with these drugs in order to achieve therapeutic drug levels.

**Having Your Own Strategy**

For the HIV-positive inmate to achieve successful virologic control in the federal prison system, the bottom line is strict adherence to antiretroviral regimens by developing strategies to self-administer the meds appropriately without infringing on the established rules and regulations placed by the system. Although there is an electronic system monitoring compliance with refills, medical providers rely on laboratory evidence of virologic failure or worsening CD4 depletion before they activate DOT programs, which places the onus on inmates to develop strategies within the prison to avoid skipping or forgetting to take doses without the usual tools (pill organizers, alarm reminders, etc.).

Obviously, waiting for virologic or clinical failure before instituting a change in therapy or starting an inmate on a DOT program is counterproductive since it can rapidly exhaust the arsenal of available agents, as most of the drugs exhibit a fair amount of cross resistance with agents with the same mechanism of action or similar chemical structure. It behooves the inmate to know the virologic parameters of his or her particular HIV strain (genotype and phenotype) and be actively involved in the selection of both the initial ART regimen and subsequent regimens to ensure viral suppression and clinical success.

**Disclosure Concerns and Challenges**

Disclosure of HIV status can be a hindrance to adequate adherence to ART regimens, as inmates live in crowded quarters and will be subject to questioning by their fellow inmates as to the nature of medical conditions warranting daily medications. If an inmate is not open about his or her HIV status and is concerned about disclosure, he or she may opt not to take the meds in front of cellmate(s) and to take the meds only in private, which may lead to chronic nonadherence.

The best practice pattern to follow is to develop a strict schedule to take the meds when privacy can be assured (the cellmate is absent), usually at the same time each day, either upon waking or at bedtime, to avoid skipped doses. In general, openness about HIV status is preferred -- although it is totally understandable, having suffered the stigmatization myself in an inimical prison environment, that HIV status be disclosed only to those who would not place the inmate in peril.
for diagnosing or treating a health problem or a disease. It is not a substitute for professional care. If you have or suspect you may have a health problem, consult your health care provider.