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HIV and aging: A primer for NPs

Abstract: Estimates indicate 70% of all individuals with HIV will be age 50 or older by 2030. Chronic conditions, including cardiovascular disease, diabetes mellitus, kidney disease, malignancies, neurocognitive disorders, and osteopenia or osteoporosis, occur more frequently in patients with HIV and have become the leading cause of morbidity in this population. NPs play an integral role in helping this population age healthfully.

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Effective HIV antiretroviral therapy (ART) has allowed many people living with HIV (PLWH) to age into older adulthood. Approximately 50% of the 1.1 million PLWH in the US are age 50 or older, and that number is expected to increase to 70% by 2030.[1] Chronic conditions, such as cardiovascular disease (CVD), diabetes mellitus, kidney disease, bone disease such as osteoporosis, and malignancies, are now the leading cause of morbidity for PLWH.[2] Additionally, evidence suggests that comorbidity is not only more common among PLWH but is seen at earlier ages than in people without HIV.[3] Although the exact cause of higher comorbidity prevalence in PLWH is not well understood, theories associated with chronic immune activation and consequences of long-term ART have been suggested as an underlying pathophysiologic mechanism.[4]

Limited data exist on optimal screening and management of comorbid chronic conditions in older PLWH. Disease-specific management guidelines for

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co-occurring conditions for non-HIV-infected individuals are typically applied to PLWH. Understanding the impact of HIV on the aging process is essential for NPs caring for this patient population. This article discusses pharmacologic considerations, reviews common co-occurring conditions, and highlights key clinical considerations of caring for aging PLWH.

ART in older PLWH

The goals of ART are to suppress the HIV viral load to undetectable levels and increase CD4+ cells to improve immune function. Older PLWH respond similarly to younger people in terms of achieving viral suppression, but CD4+ cell recovery is less robust.[5] This difference in immune response highlights the importance of detecting HIV early and getting individuals on ART as soon as possible to preserve immune function. Approximately 35% of older adults are not diagnosed with HIV until the disease is more advanced because of a lack of routine HIV screening and assumptions among some healthcare providers and patients alike that older adults are not at risk for HIV.[1]

Recommended ART is the same for PLWH regardless of age. A combination of drugs from at least two different classes of antiretrovirals is recommended.[5] The most common regimens include two nucleoside reverse transcriptase inhibitors (NRTIs) with an integrase strand transfer inhibitor (INSTI). Other combinations include NRTIs with protease inhibitors (PIs), nonnucleoside reverse transcriptase inhibitors (NNRTIs), or entry inhibitors. The selection and choice of ART depends on viral drug resistance history; co-occurring conditions such as kidney, cardiovascular, or hepatic disease; use of other medications that may have drug-drug interactions; pill burden; and dosing restrictions (with meals versus without meals).[6]

Several ART combinations are available as single-tablet regimens (STRs), which improve adherence and decrease pill burden. (See *Approved STRs for HIV treatment*.) Most STRs are indicated for patients initiating therapy as well as those wishing to modify therapy because of adverse reactions, pill burden, or dosing preferences. Use caution before modifying ART in patients with an extensive ART treatment history. Individuals with a history of drug resistance to one or more classes of ART may not be eligible for an STR. Clinicians considering modifying regimens should check for archived ART drug resistance, either through a review of previous drug resistance assays or through lab-based testing that detects archived drug resistance.[6] Consultation with an HIV-experienced clinician may be warranted.

Approved STRs for HIV treatment[7]

INSTIs with NRTIs

- dolutegravir + abacavir + lamivudine (Triumeq)
- bictegravir + tenofovir AF* + emtricitabine (Biktarvy)
- elvitegravir + cobicistat + tenofovir AF* + emtricitabine (Genvoya)
- elvitegravir + cobicistat + tenofovir DF** + emtricitabine (Stribild)

NNRTIs with NRTIs

- doravirine + tenofovir DF** + lamivudine (Delstrigo)***
- efavirenz + tenofovir DF** + emtricitabine (Atripla)
- efavirenz + tenofovir DF** + lamivudine (Symfi, Symfi Lo)
- rilpivirine + tenofovir AF* + emtricitabine (Odefsey)
- rilpivirine + tenofovir DF** + emtricitabine (Complera)

PI with NRTIs

- darunavir + cobicistat**** + tenofovir AF* + emtricitabine (Symtuza)

INSTI with NNRTI

- dolutegravir + rilpivirine (Juluca)*****

*alafenamide

**disoproxil fumarate

***for antiretroviral-naive individuals

****Cobicistat is only approved for use in combination with elvitegravir, darunavir, and atazanavir. It has no activity against HIV, but is used as a pharmacologic enhancer through inhibition of the cytochrome P450 (CYP3A) enzyme.

*****for patients who are virologically suppressed for >6 months with no resistance to either components of the drug

Polypharmacy, drug-drug interactions, and pharmacokinetics. As with the general population, the prevalence of conditions such as CVD or diabetes increases with age. These conditions typically require one or more medications specific to each disease, which can lead to polypharmacy. Awareness of and proper practices related to polypharmacy are particularly important in the aging population because

Chronic conditions, such as CVD, diabetes, kidney disease, and malignancies, are now the leading cause of morbidity for PLWH.

of the risk of drug-drug interactions, drug toxicities, and nonadherence.[8] Given that comorbid chronic conditions are more prevalent in PLWH, this patient population is more likely to take more concomitant medications at an earlier age compared with those without HIV.[9]

One of the principles of managing medications in older adult patients is minimizing drugs that may be unnecessary and stopping or limiting medications with high risk of adverse events. The Beers Criteria was developed as a means of identifying high-risk medications in older adults.[10] Unfortunately, limited data exist on the use of the Beer's Criteria in older PLWH.[11] Nonetheless, the principle of assessing the risk-benefit of medications should be monitored regularly.

Several classes of ART have the potential for significant drug-drug interactions. NNRTIs and PIs have the highest likelihood of drug-drug interactions attributable to the effects of the cytochrome P450 enzyme system (CYP450). Interactions with the CYP450 metabolic pathway can result in either drug toxicity or subtherapeutic drug levels. Even over-the-counter medications, such as proton pump inhibitors or histamine 2 blockers, can lower therapeutic levels of ART, rendering them ineffective.[6] Additionally, INSTIs may interact with medications such as metformin and cation-containing products, such as iron, magnesium, aluminum, or calcium. With each drug added, the potential for drug-drug interactions increases. Providers should reconcile all prescribed and nonprescribed medications and supplements at every visit.

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Age-related physiologic changes also play a role in medication management. Changes in the proportion of fat to lean muscle mass, altered body water content, changes in body weight, and changes in kidney and hepatic function can affect pharmacodynamics and pharmacokinetics. Decreases in kidney function are important, especially with some of the STR combinations, as several have restrictions on dosing based on creatinine clearance. Clinicians should routinely monitor and assess for these changes and consider dose modification when necessary.

Adherence. Adherence to ART is a critical aspect of HIV care. Nonadherence is associated with drug resistance and poor health outcomes. With the increased availability of STRs, adherence is improved. Because PLWH may take medications for other conditions, pill burden remains an issue. Clinicians should assess for barriers that impact medication adherence and implement strategies to minimize nonadherence, such as looking for combination tablets of certain medications to reduce the number of pills, eliminating nonessential medications, and using alarms or other reminders to help patients remember to take their medications.

Monitoring of viral suppression and response to ART. Monitoring viral suppression in older PLWH is similar to how this is handled for younger adults. HIV viral load should be checked every 3 to 4 months for patients on ART.[6] Patients who have had an undetectable HIV viral load for at least 2 years may be monitored every 6 months.[6]

Some individuals may have episodic blips or increases in viral load (typically less than 200 copies/mL).[6] However, if the viral load continues to rise (for example, 500 copies/mL or more), assess for drug failure, nonadherence, or drug-drug interactions. Order HIV drug resistance testing in PLWH with rising viral loads and consider consultation with an HIV specialist for new treatment options.

CD4+ cell counts should be done every 3 to 4 months after initiating ART and continued if the CD4+ cell count is less than 300 cells/microliter (mcL).[6] For those with a CD4+ cell counts between 300 to 500 cells/mcL, consider monitoring every 12 months. For those with CD4+ cell counts 500 cells/mcL or more, monitoring CD4+ cell count is considered optional because the risk of opportunistic infection is reduced.[6]

Chronic conditions and comorbidities

Older PLWH are prone to a variety of chronic comorbidities. The prevalence and impact of these conditions in the context of HIV requires additional vigilance and monitoring. (See *Summary of screening and monitoring for common comorbid conditions and complications in the older PLWH.*)

CVD. CVD, including atherosclerotic disease, dyslipidemia, hypertension, and myocardial infarction, has been shown to occur more frequently in PLWH.[13] Even when adjusting for other atherosclerotic risk factors, the risk of myocardial infarction was nearly twice as high in PLWH compared with those without HIV.[14] Use of certain ART, chronic inflammation, and tobacco use are thought to be associated with these differences.[15]

Tools to predict CVD risk, such as the Framingham Risk Score or the American College of Cardiology/American Heart Association risk calculator, have been shown to underestimate cardiac risk in PLWH because of occult issues of underlying immune activation.[16] Unfortunately, alternate CVD risk prediction tools have yet to be developed.

Counsel patients with known CVD risk, such as those with a strong family history of CVD, dyslipidemia, hypertension, diabetes, or tobacco use, on modifying risk by discussing tobacco cessation, diet, and maintaining a healthy weight. For those with established CVD, clinical management is the same as that for patients without HIV. HMG-CoA reductase inhibitors (statins), antihypertensives, antiarrhythmics, antiplatelets, and anticoagulants can be used, but be mindful of potential drug-drug interactions with these medications and ART.

Diabetes mellitus. Diabetes and altered glucose metabolism affect nearly 25% of all US adults age 65 and older.[17] In PLWH, type 2 diabetes mellitus has been found to be nearly four times more prevalent compared with people without HIV.[18] Factors associated with higher rates of type 2 diabetes mellitus in PLWH include chronic inflammation from persistent HIV infection, the use of ART, or coinfection with hepatitis C virus.[19] Additionally, the use of ART, in particular NRTI and PI therapies, can increase the mean corpuscular volume of red blood cells, resulting in underestimation of hemoglobin A1C (A1C) levels in PLWH.[20] Guidelines recommend that PLWH be screened at least annually for diabetes with either a fasting plasma glucose (FPG) test or A1C level.[20] Given that A1C may be falsely lower in PLWH, use of FPG may be more appropriate in people with prediabetes or those at high risk for diabetes. Treatment targets for those with established diabetes have not been modified, even though A1C levels may underpredict mean glucose levels. Clinicians should follow treatment recommendations established by the American Diabetes

Summary of screening and monitoring for common comorbid conditions and complications in the older PLWH[6,12]

CVD
- Check fasting lipid profile prior to starting ART.
- Check fasting lipid profile 3 to 6 months after initiating or switching ART, then every 12 months thereafter.
- Check BP, weight, and BMI at least annually.

Diabetes
- Check FPG or A1C prior to starting ART.
- Repeat FPG or A1C 3 to 6 months after ART initiation or after modifying ART.
- If FPG or A1C is abnormal, continue to monitor every 3 to 6 months.
- If FPG or A1C is normal, may repeat annually.

Kidney disease
- Assess kidney function with eGFR and urinalysis prior to initiating ART.
- Check kidney function 2 to 8 weeks after initiating or modifying ART.
- If kidney function is normal, monitor every 3 to 6 months.

Osteopenia/osteoporosis
- Assess for fragility fracture with the FRAX for all PLWH 40 to 49 years of age.
- DXA:
  - in men over 50
  - postmenopausal women
  - patients with a history of fragility fracture
  - patients receiving chronic glucocorticoid treatment
  - patients at high risk for falls.

HAND
- No single definitive screening tool exists.
- Some experts recommend use of the MoCA. This test may miss more milder forms of cognitive impairment.

Falls
- Screen at least annually. Inquire if patient has experienced:
  - Two or more falls in prior 12 months
  - Difficulty with walking or balance.

Lower extremity function
- Administer Short Physical Performance Battery (SPPB) available at: www.nia.nih.gov/research/resource/short-physical-performance-battery-sppb.

Depression
- Screen all patients.
- Several tools available including:
  - GDS
  - Patient Health Questionnaire (PHQ) (PHQ2 or PHQ9).
- Recommendations on frequency vary based on guidelines, some recommend screening at every visit.

Substance use disorder
- Screen all patients at least annually.
- Several standard tools available including:
  - Alcohol Use Disorders Identification Test (AUDIT),
  - Michigan Alcoholism Screening Test – Geriatric Version (MAST-G).

Association, which include screening for diabetes-associated complications.[21,22]

Kidney disease. Kidney disease, in the form of acute kidney injury, chronic kidney disease (CKD), and HIV-associated nephropathy, is another comorbidity disproportionately affecting PLWH.[23] Toxicity from ART (in particular indinavir, atazanavir, and tenofovir disoproxil fumarate [TDF]), hepatitis C infection, and conditions such as diabetes have been attributed to the higher prevalence of kidney disease in PLWH.[24] Assessment of kidney function is critical because dose adjustment of some medications may be required as kidney function declines. Clinicians should obtain a urinalysis and an estimated glomerular filtration rate (eGFR) in all PLWH at least twice yearly.[25]

Clinicians should regularly screen patients for depression with a standardized screening tool, such as the Geriatric Depression Scale (GDS).

For individuals with CKD and a creatinine clearance less than 50 mL/min, TDF should be avoided because it may contribute to renal toxicity.[26] Additionally, limiting nephrotoxic drugs (such as nonsteroidal anti-inflammatory drugs) is recommended.[27] Similar to those without HIV, use of angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers should be considered for those with CKD and evidence of proteinuria or for those who need an antihypertensive drug.[27]

For patients with end-stage renal disease (ESRD), criteria for dialysis or kidney transplant are the same in PLWH as those without HIV. Despite earlier concerns that posttransplant immunosuppression may lead to worsening of HIV, studies in PLWH have found that survival and long-term outcomes in PLWH are like those without HIV.[28] It is recommended that patients with new onset or worsening CKD and those with ESRD be managed in collaboration with a nephrologist.

Malignancies. Prevalence of lung, liver, anal, and pharyngeal cancers is higher in PLWH.[29] The frequency of AIDS-defining cancers (Kaposi sarcoma, non-Hodgkin lymphoma, and invasive cervical cancer) has been decreasing in part because of improved access to ART. Rates of breast and prostate cancer are comparable to rates in people without HIV. Clinicians should follow recommended age-based cancer screening guidelines for colon, breast, prostate, and lung cancer, keeping in mind overall life expectancy and the risks and benefits of screening.[30] Of note, cervical cancer screening for PLWH differs in that the screening interval with cytology and human papilloma virus (HPV) cotesting is 3 years and is recommended to continue after age 65 because of increased risk of HPV-related cancer.[31] Similarly, anal cancer associated with HPV has been reported as significantly more prevalent in PLWH.[30] An annual rectal exam for anal masses is recommended in both men and women living with HIV.[30] Alternatively, cytology screening (with an anal Pap test) has also been recommended by some experts.[31] (See *Cancer screening recommendations in older PLWH*.) Given that tobacco use is frequently associated with increased risk of several types of cancer, screening for tobacco use and assisting current users with cessation can modify risk and mortality associated with these conditions.

HIV-associated neurocognitive disorder. More than half of older adults with HIV will experience some level of neurocognitive impairment as they age.[34] HIV-associated neurocognitive disorder (HAND) refers to a spectrum of disorders that include asymptomatic neurocognitive impairment, mild neurocognitive disorder, and HIV-associated dementia. The impact of HAND on PLWH can lead to poor ART adherence, worsening depression, and earlier mortality.[34] Several screening tools exist for cognitive deficits, but many can miss more subtle presentations of HAND and may not be applicable across all cultures. The Montreal Cognitive Assessment (MoCA) is a brief 10-minute assessment that has been recommended as an initial screening test.[35] Individuals who screen positive should be referred for more extensive neurocognitive testing.

Limited treatment options exist for HAND. Initiation of ART is recommended for those not on therapy, as is addressing any reversible or underlying causes, such as thyroid disease or vitamin B12 deficiency.[36] Nonpharmacologic interventions, such as exercise, may be effective in preventing or delaying progression of HAND.[36] For patients with severe or worsening decline in cognition, lumbar puncture and assessment of HIV viral load in the cerebrospinal fluid (CSF) is

Cancer screening recommendations in older PLWH[31-33]

Cervical

- Screen with cytology (Pap) or cytology plus HPV cotesting.
- If using cytology screening alone, screen annually. May extend to every 3 years after 3 consecutive negative tests.
- If using cytology screening plus HPV cotesting, screening interval is every 3 years.
- Screening should continue after age 65, taking into account life expectancy and risk of developing cancer.

Anal

- Annual digital exam may be useful in detecting masses.
- Use of cytology testing of anal canal is recommended by some experts.
- Abnormal anal cytology results need to be followed up by high-resolution anoscopy (HRA), which is similar to cervical colposcopy.
- It is recommended to defer anal cytology if HRA is not available.

Lung

- The American Cancer Society (ACS) recommends low-dose computed tomography (CT) scan for current or former smokers ages 55 to 74 in good health with at least a 30-pack-year of smoking or who have quit within the past 15 years and have at least a 30-pack-year smoking history.
- Individuals should also receive evidence-based smoking cessation counseling, if they are current smokers.
- Candidates should also have undergone a process of informed/shared decision-making that includes the benefits, limitations, harms of screening with low-dose CT and have access to a high-volume, high-quality lung cancer screening and treatment center.

Colorectal

Several guidelines exist regarding age at which to begin screening. All guidelines agree that screening should begin no later than age 50, and the ACS recommends screening beginning at age 45 through age 75 for average-risk asymptomatic adults. Several screening options are available including colonoscopy, fecal immunochemical test, CT colonography, and sigmoidoscopy. Refer to the guidelines below for additional information:

- **American College of Gastroenterology**
  https://gi.org/guideline/colorectal-cancer-screening-recommendations-for-physicians-and-patients-from-the-u-s-multi-society-task-force-on-colorectal-cancer
- **US Preventive Services Task Force (USPSTF) guidelines**
  www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/colorectal-cancer-screening2
- **American Cancer Society**
  www.cancer.org/health-care-professionals/american-cancer-society-prevention-early-detection-guidelines/colorectal-cancer-screening-guidelines.html

Prostate

Several guidelines exist regarding utility and age parameters for routine screening. Consult the following sources for additional information.

- **American Urologic Association (AUA)**
  www.auanet.org/guidelines/prostate-cancer-early-detection-(2013-reviewed-for-currency-2018)
- **US Preventive Services Task Force (USPSTF) guidelines**
  www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/prostate-cancer-screening1?ds=1&s=prostate

Breast

Screening recommendations differ on the age and frequency of screening. Consult current guidelines for additional information.

- **US Preventive Services Task Force (USPSTF) guidelines**
  www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/breast-cancer-screening1
- **American Cancer Society**
  www.cancer.org/health-care-professionals/american-cancer-society-prevention-early-detection-guidelines/breast-cancer-screening-guidelines.html

recommended.[36] If there is detectable HIV CSF levels, switching ART in collaboration with an HIV treatment specialist is recommended.

Osteopenia and osteoporosis. The odds of developing osteopenia and osteoporosis is nearly twice what it is for individuals who do not have HIV, and the risk of fracture has been estimated as high as 60% greater in PLWH.[37,38] Risk factors associated with osteopenia and osteoporosis include older age, history of bone fracture, low body mass index (BMI), low body weight, hypogonadism, smoking, and lower CD4+ cell count. Use of PIs and TDF have also been associated with decreased bone mineral density.[38]

One of the greatest concerns regarding people with osteopenia and osteoporosis is the risk of fragility fractures, which greatly impacts morbidity and mortality. Guidelines recommend assessment of fragility fracture with the Fracture Risk Assessment Tool (FRAX) for all PLWH ages 40 to 49, and dual energy X-ray absorptiometry (DXA) in men age 50 and older, postmenopausal women, patients with a history of fragility fracture, patients receiving chronic glucocorticoid treatment, and patients at high risk for falls.[39]

Recommended vaccines for older PLWH[50]

Influenza

Administer inactivated, adjuvant inactivated, or high-dose inactivated influenza vaccine annually. Live attenuated influenza vaccine is not recommended.

Tdap/Td

One dose of Tdap if not previously vaccinated, then Td booster every 10 years.

Hepatitis A

- Hepatitis A vaccine: initial dose, then the second dose at 6 to 12 months.
- Hepatitis A vaccine, inactivated: initial dose, then the second dose at 6 to 18 months.
- Hepatitis A-hepatitis B: initial dose, then the second dose in 1 month, and third dose in 6 months.

Hepatitis B

Single-antigen hepatitis B vaccine: two or three doses depending on the vaccine or administer the combined hepatitis A and hepatitis B vaccine: initial dose, then the second dose 1 month later, and third dose 6 months later.

Meningitis

- Two doses of serogroup A, C, W, and Y meningococcal vaccine (MenACWY) 2 months apart; revaccinate every 5 years through age 55.
- Serogroup B meningococcal vaccine (MenB) is not recommended.

Measles, mumps, rubella

- Two doses if born after 1957 and/or CD4+ count ≥200 cells/mcL (if not previously vaccinated).
- Do not administer if CD4+ count <200 cells/mcL.

Varicella

- Two doses if CD4+ count is ≥200 cells/mcL.
- Do not administer if CD4+ count is <200 cells/mcL.

Herpes zoster

Do not administer the zoster vaccine live if CD4+ counts <200 cell/mcL. Consider the zoster vaccine recombinant for PLWH age 60 or older with CD4+ counts >200 cells/mcL.

Pneumococcal disease

Under age 65

- Pneumococcal 13-valent conjugate vaccine (PCV13) x one dose followed by pneumococcal 23-valent polysaccharide vaccine (PPSV23) at least 8 weeks after.
- Revaccinate with PPSV23 after 5 years (max two doses of PPSV23 under age 65).
- Administer final dose after age 65. Final dose should be at least 5 years after second dose.
- Total of three lifetime doses of PPSV23.

Age 65 or older

If not previously vaccinated:

- give one dose PCV13 followed by PPSV23 at least 8 weeks after.
- If PPSV23 is administered first, wait at least 1 year before administering PCV13.

Treatment includes minimizing or avoiding use of TDF and PIs, adding bisphosphonate therapy, optimizing calcium and vitamin D intake, limiting or reducing alcohol and tobacco, and incorporation of weight-bearing exercise.[39]

Other aspects of caring for older PLWH

Mental health. An estimated 1% to 5% of community-dwelling older adults, regardless of HIV status, suffer from major depression, with higher rates in those requiring home health services or those who are hospitalized.[40] An analysis assessed health-related quality of life and prevalence of anxiety and depression among older PLWH compared with older adults with other chronic conditions.[41] There was no significant difference seen between these two groups. Clinicians should regularly screen patients for depression with a standardized screening tool, such as the Geriatric Depression Scale (GDS). Assessment of other psychosocial issues that may impact mental health, such as economic and financial issues, social engagement, and risk of violence, should be incorporated into an assessment.[42] Treatment of depression and anxiety is the same for PLWH and patients without HIV.[42]

Substance use. Substance use disorders, including alcohol use, have been noted to be higher and to persist over time in older PLWH compared with the general population.[43] The impact of substance use includes poor adherence, cognitive impairment, and risk of HIV transmission through sexual behaviors or injection drug use behaviors such as using shared needles.[44] Substance use screening and assessment with standardized tools such as AUDIT-C or the Short Michigan Alcoholism Screening Test-Geriatric Version (SMAST-G) can be used.[44] Patients testing positive should be referred for treatment or assistance to a mental health or substance use disorder specialist.[45]

Mobility, physical function, and frailty. As with all older adults, mobility and physical function are critical aspects of aging. Decreased mobility and physical function in PLWH is associated with depression, multimorbidity, neurocognitive impairment, and low CD4+ cell count.[46] Presence of functional decline and frailty have been found nearly twice as much in PLWH compared with non-HIV populations.[47]

Clinicians caring for older adults can assess function through a combination of patient self-report and

in-office performance tests. Queries about ability to perform daily tasks, driving, managing money, taking medications, and any falls or injuries are important to incorporate into history taking. The Short Physical Performance Battery (SPPB) developed by the National Institute on Aging provides a composite assessment of balance, walking speed, and ability to stand from a sitting position.[48] Low SPPB scores predict risk for falls, impaired mobility, decline in physical performance, and mortality.

If mobility or physical functional deficits are identified, evaluate the patient's socioenvironmental condition and mental status. Social isolation, decreased physical activity, poor diet, multimorbidity, depression, and ART nonadherence contribute to decline in activities of daily living (ADLs) and instrumental ADLs (IADLs), and increases the risk of falls.[47] Educate patients at risk for falls on aerobic and weight-bearing exercises to increase muscle mass, strength, flexibility, and balance.[49]

Lack of acknowledgment of sexual activity means that older adults at risk for HIV may not be screened.

Immunizations. Like those without HIV, vaccines and immunizations are an integral part of comprehensive preventive care in older PLWH. Recommended vaccines for PLWH are based on the Advisory Committee on Immunization Practices.[50] (See *Recommended vaccines for older PLWH*.)

Sexual health. Sexual health is typically ignored during medical visits, yet it affects quality of life for older adults.[51] Sexual health can be influenced by mobility, mood disorders, adverse reactions to medication, complications of other chronic illnesses, and physiologic changes such as vaginal dryness.[52] Incorporating sexual health counseling as part of the overall assessment normalizes discussions about sex.

New data support that there is no risk of sexual transmission from PLWH who are undetectable (defined as an HIV viral load of less than 200 copies/mL).[53] Referred to as "undetectable equals untransmittable" or (U = U), this prevention message is endorsed by the National Institute of Allergy and Infectious Diseases as a way of reducing stigma of living with HIV and promotes adherence to keep individuals on ART.[54] Clinicians caring for older PLWH can incorporate this information into patient education counseling sessions. Patients should still be counseled on safer sex practices to prevent transmission of other sexually transmitted infections, even if there is not a risk of HIV transmission.

Lack of acknowledgment of sexual activity means that older adults at risk for HIV may not be screened. The US Preventive Services Task Force recommends routine HIV testing for people ages 15 to 65, and other guidelines have removed the upper age limit for testing.[55,56]

Preexposure prophylaxis (PrEP) is an intervention to reduce the risk of HIV infection. The combination tablet containing TDF and emtricitabine (FTC; Truvada) is currently approved for PrEP.[57] Individuals without HIV who have a recent STI, report more than one partner, have a history of inconsistent or no condom use, inject drugs, or have a partner with untreated HIV may be candidates for PrEP.[57] Potential adverse reactions of TDF/FTC include altered kidney function and decreased bone mineral density. Monitoring of kidney function is recommended every 3 to 6 months while on PrEP. The frequency of bone mineral density testing has not been established.

Conclusion

The number of aging PLWH is increasing. Many of these individuals will receive care in a variety of healthcare settings. NPs should be familiar with the health challenges experienced by older PLWH. Given the complexities of aging, HIV, and multimorbidity, NPs are ideally positioned to provide a holistic approach to help individuals age successfully into older adulthood.

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