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HIV and Aging: Reconsidering the Approach to Management of Co-Morbidities

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Over the past thirty years, HIV has transformed from a near uniformly fatal infection to a chronic condition, fueled in part by the tremendous efforts of advocates, dedication of scientists, and determination of providers and patients. Today, those who survived the early epidemic of HIV are now living well into their 50s, 60s, 70s, and beyond. The Centers for Disease Control and Prevention estimate that nearly 50% of persons with HIV in the U.S. are aged 50 years and older[1] (referred to herein as older adults living with HIV). Estimates from some European countries predict a “silver tsunami” within the HIV community mirroring that of the general population, with those aged 50 or older accounting for nearly 70% of people with HIV by 2030[2]. Although many of these survivors now have well-controlled HIV infection, they may have experienced marked immune suppression, toxic early antiretroviral therapy (ART) regimens, and profound loss through the untimely death of partners, close friends, and community members. In addition to these long-term survivors, many older people with HIV were diagnosed after the advent of effective ART, or acquired HIV at an older age, and were never exposed to early toxic ART or profound immune suppression. Thus, the health status of older people with HIV today is highly heterogeneous based on differences in exposure to ART, immunosuppression, trauma, and stigma, all of which are hypothesized to impact the aging progress.

The increasing effectiveness and lower toxicity of ART contributed to significant decreases in AIDS-associated conditions, while the prevalence of chronic end organ diseases has increased[3]. World- wide, more than two-thirds of deaths among people with HIV are now attributable to non-HIV associated diseases[4–8]. Some non-infectious co-morbidities, such as heart disease, malignancy, and cognitive decline,[9–13] occur in excess and at chronologically

younger ages among people with HIV[14] (roughly ten years prior to HIV-uninfected persons)[15,16]. In fact, 83% of people with HIV aged 50 and older and 63% aged 18–49 have at least one co-morbidity other than HIV[17]. All people with HIV ≥75 years have at least one co-morbidity apart from HIV and over two-thirds have multi-morbidity (more than two co-morbidities)[18]. Recent literature in middle-aged HIV cohorts also describes the presence of "geriatric syndromes" such as frailty, falls, and cognitive decline[19].

The accumulating burden of medical and psychiatric multi-morbidities of people with HIV[20] contributes to impairments in physical, social and mental health function, and higher levels of stress and depression[21–23]. Multi-morbidity also contributes to very high costs of care. In California, the mean estimated cost of caring for one people with HIV with no co-morbidities per year is an estimated $30,312 but this incrementally increases with each co-morbidity to $219,000 for persons with eleven or more[24] People with HIV also experience social isolation, loneliness, stress, and stigma from HIV and age (internal and perceived external)[25–28] in part due to losses during the AIDS epidemic[29]. This lack of informal support, and other barriers to seeking support from family and peers[30] (i.e., fear of disclosure of HIV status[31], stigma[32,33]) drive many people with HIV to pursue professional care provision (i.e. home care) when they can no longer care for themselves[34,35]. Professional care further increases costs for people with HIV and does not ensure they receive care free of discrimination, rejection or abuse[36,37].

Considerations in Co-Morbidity Screening and Management of Older Adults with HIV

The HIV Primary Care guidelines[38] provide recommendations for routine screening and preventive care in people with HIV, much of which applies to older adults with HIV. Recommendations for specific comorbidity management and considerations in older adults with HIV are also published and regularly updated at HIV-Age.org[39]. Several factors including system-barriers, a lack of HIV-specific recommendations, and differing epidemiology of some co-morbidities may impact the implementation of co-morbidity management. Furthermore, the high co-morbidity burden of many older adults with HIV, transportation difficulties, navigation of complex medical systems, and competing priorities make adherence to these guidelines difficult. Thus, it is not surprising that many studies demonstrate low or only moderate adherence with published recommendations[40–42]. For example, although people with HIV have a markedly elevated cardiovascular disease risk in comparison to the general population, adherence to risk assessment and management of risk factors remains low[40,42,43]. Studies have shown that fewer than 1 in 5 eligible people with HIV receive aspirin prevention[44]. Use of anti-platelet therapy (5%) and statins (24%) are significantly lower in pe compared to uninfected controls (14% and 36%, respectively), and smoking cessation advice or pharmacotherapy was provided to only 19% of people with HIV[43].

Multi-level system barriers (knowledge of recommendations, availability/affordability, varying efficacy of the test/treatment in HIV, patient compliance) contribute to poor real-world guideline adherence. For example, bone density screening in people with HIV is

recommended for all post- menopausal women and men aged ≥50, due to high-fracture risk[38,45,46]. Yet screening remains markedly low[47]: a national audit of the British HIV Association found that among older adults with HIV, only 17% of men aged ≥70 or women aged ≥65 had bone density measured[41]. In the U.S., Medicare, a primary insurer for many older adults with HIV, only covers densitometry for post-menopausal women, for men taking osteoporosis therapy or corticosteroids, or in persons with osteoporosis or stress-fracture[48].Furthermore, although some studies demonstrate that low bone density is associated with increased fracture risk in people with HIV[49], other studies report that measurement of bone density and use of estimation indices (i.e., FRAX score) insufficiently assesses fracture risk[5051–53].

Other co-morbidity screening or preventive care recommendations are limited by a lack of guidelines for older adults with HIV, such as the Advisory Committee on Immunization Practices (ACIP) guidelines for immunization against herpes zoster (HZ)[54]. Although risk for HZ remains higher in people living with HIV, even with suppressed HIV-1 and normal CD4 T-lymphocyte count[55], older adults with HIV are considerably less likely to receive HZ vaccination than their uninfected peers[55,56]. Despite several studies demonstrating safety of both the live HZ vaccine[57,58] and the newly licensed recombinant, adjuvanted HZ subunit vaccine in people with HIV,[59] the 2018 ACIP guidelines, the Infectious Diseases Society of America guideline for immunocompromised hosts[60] and primary care guidelines[38] fail to provide a formal recommendation. This lack of formal guideline recommendations appear to contribute, in part, to low rates of immunization[56].

Finally, some co-morbidities, such as cancer, have anticipated shifts in epidemiology with the changing age and immunosuppression of today's older adults with HIV. Compared to uninfected populations, people with HIV are at greater risk of some cancers (anal, lung, liver, and oral cavity/pharyngeal cancers)[61,62], and lower risk of others (breast, prostate, and colorectal cancer)[63]. Current cancer screening guidelines do not differ from the general population, with the exception of anal and cervical cancer. Although cancer burden among adults with HIV is estimated to decrease with continued improvement in immunosuppression[64], cancer-attributable deaths have steadily increased over the past decade[65] and the combination of HIV and cancer is associated with greater than expected mortality than either condition alone[66]. Indeed, evidence suggests lower survival among people with HIV and with a cancer diagnoses[67] and emphasizes the importance of ongoing cancer screening for early diagnosis and management.[96]

As we learn more about aging among people with HIV, consideration for evaluation for many other co-morbidities and conditions have been proposed, including routine evaluation of neurocognitive function, falls risk, presence of frailty or physical function impairment, and other "geriatric syndromes". Completing the screening and management of the general population in addition to HIV-specific recommendations is increasingly challenging, with visit length limitations, feasibility of completion of recommendations, patient burden/adherence to recommendations. As detailed in Table 1[38,46,68–74], the recommended co-morbidity screening and management of older adults with HIV has become overwhelming for providers *and* patients.

How does the Busy HIV Provider Manage and Prioritize the Care of Older Adults with HIV?

The care for people with HIV is often provided within the context of prioritizing goals unique to HIV infection (ART adherence and toxicity)[75]. Yet it is steadily becoming clear that the management of other co-morbidities is paramount to ensuring that older adults with HIV age well. Most HIV care providers have undergone training in the management of individual chronic diseases (Internal Medicine, Family Practice), and have employed strategies that allow them to optimize the management of co-morbidities through small to modest changes to current HIV practices. This may include additional appointments, health maintenance reminders in the electronic medical record, and collaborative care with general providers to allow HIV specialists to focus only on HIV. However, the question remains if it is appropriate and beneficial for HIV care providers to apply aggressive screening and treatment guidelines (Table 1) developed in a population without complex chronic disease to a population with multi-morbidity (i.e. HIV)[76]. Instead, should HIV providers embrace the approach of geriatricians and prioritize care based on individual morbidity and mortality risk, factors that are feasibly modifiable, and personal goals?[77,78]

The geriatric approach to care focuses less on optimizing individual co-morbidities and more on geriatric syndromes (multifactorial conditions that result from deficits in multiple domains) that impact an individual's ability to function, with a focus on quality of life[79]. The goals of geriatricians can be summarized into five "Ms": Mind, Mobility, Medications, Multi-complexity and Matters Most[80] (Table 2). We propose emphasizing a sixth "M" of modifiable factors within the context of the aging HIV epidemic. Integrating these concepts into HIV care has the potential to improve care for older adults with HIV and multi-morbidity without overwhelming or overworking HIV providers and patients.

The "Mind" goes beyond HIV-associated neurocognitive diseases, and other emerging causes of dementia, to also incorporate mental health[81]. Depression and other mood disorders are more prevalent in older adults with HIV compared to uninfected persons; 27% report recent thoughts about taking their own life[82–84]. Ongoing depression clearly contributes to higher levels of emotional distress and poorer health-related quality of life[84,85] and is associated with loneliness and HIV stigma[25,83]. Thus social prescriptions may be an adjunctive approach to depression management, particularly if loneliness is a key component.

"Mobility" is a cornerstone of older adult evaluation, and one of the most important factors in maintaining independence with aging[86]. Older adults with HIV have greater than expected impairment in mobility measures such as gait speed[87], and appear to experience a more rapid decline in mobility with age than uninfected controls[88]. Frailty, a vulnerable physical state that impacts mobility[89] is still relatively uncommon in older adults with HIV. However, "pre-frailty" occurs in 40–60% of middle-aged or older adults with HIV[87,90–92]. Moreover, mobility impairments contribute to the high risk of falls observed in older adults with HIV[93,90,94,95]. In one study, 30% of middle-aged people with HIV reported at least one fall in the prior year, and 18% were recurrent fallers; poor balance was the strongest

contributing factor to falls[93]. Identification of mobility impairments as falls risk factors can guide development of more effective fall interventions[97–99].

"Medications" are particularly relevant in the care of older adults with HIV. The American Geriatrics Society developed the Beers criteria to assist clinicians in identifying potentially inappropriate medications for older adults, supported by research that demonstrate a high risk-over-benefit profile[100]. This list contains commonly used medications among older adults with HIV including antidepressants, antipsychotics, benzodiazepines, hypnotics, testosterone, among many others. Polypharmacy (i.e., ≥5 medications), is also very common in older adults with HIV, and contributes to negative drug-drug interactions, poorer adherence, and increased mortality in both people with HIV and uninfected controls[101–103,102,103]. Among 248 older adults with HIV in one clinic, the average number of non-ART medications was 11.6, with 35% receiving ≥16 medications and 63% receiving inappropriate medication by Beers Criteria.

Polypharmacy is one of the challenges born from "Multi-complexity" of older adults with HIV, and is one potential consequences of aggressive screening and management of this population. Managing multiple conditions can often result in a prescribing cascade, where the side effects of a medication are misdiagnosed as a new condition[104,105]. For example, a 70-year old man with HIV, peripheral neuropathy, chronic kidney disease and heart failure who is taking ritonavir-boosted darunavir, emtricitabine and tenofovir alafenamide, gabapentin, and lisinopril is prescribed amlodipine for improved blood pressure control; subsequent edema is treated with furosemide rather than cessation of amlodipine, and the subsequent nocturnal urinary frequency with furosemide is treated with prazosin and zolpidem. Ultimately, he experiences confusion and falls. Approaching multi-complexity by taking a step back to see the whole person rather than a collection of conditions is useful in avoiding such clinical care pitfalls. Multi-complexity also embraces evaluation and management of persons within their socioeconomic situation. Encouraging HIV case management and social work to develop a better understanding of the resources available for older adults may enhance the team care of older adults with HIV

Lastly, geriatricians actively incorporate what "Matters most": patients' personal goals and priorities into medical decision-making and risk/benefit counseling. This allows management prioritization within the context of multi-complexity and is likely to improve patient adherence to recommendations. Considering what matters most may also allow smooth transitions to discussions regarding advanced care planning and overall goals of care.

Introducing the 6th M for Older Adults with HIV: Modifiable

HIV-associated chronic inflammation, direct HIV-1 effects, ART-related toxicities on aging-related biologic pathways, and higher rates of co-occurring psychosocial conditions are thought to contribute to the aging phenotype observed in older adults with HIV[106–109]. Although we cannot change the historic impact that more toxic ART and immune suppression have had on the aging process of older adults with HIV, we can and should focus on the contributing factors that are modifiable. Arguably one of the most important

targets of screening and management of older adults with HIV with multimorbidity are lifestyle factors that maximize health span and decrease medication burden. Lifestyle management is often not addressed in the clinical setting[43], although studies suggest that adherence is improved with provider- recommended lifestyle changes in the context of a clinic visit[110–114]. The U.S. Preventative Services Task Force recognizes the importance of behavior change interventions through an evidence level "B" recommendation for intensive behavioral counseling interventions for physical activity and diet among adults with obesity or additional cardiovascular risk[115]. Multiple organizations including the American Heart Association have emphasized the importance of physical activity in comorbidity management, with a call for routine identification of physical inactivity as a "vital sign" and better incorporation of physical activity counseling throughout multiple levels of care. As in the general population, the importance of addressing these lifestyle factors *across the lifespan* of people with HIV cannot be emphasized enough. Improvement of lifestyle factors such as smoking cessation and other substance use counseling, routine physical activity, and a healthy diet can improve comorbidity burden, mood, inflammation and the immune system, and life expectancy among people with HIV (*Montoya, under review*). Recommendations on smoking cessation among older adults with HIV exist[39], and recent publications provide practical guidelines for obesity management[69] and physical activity (*Montoya, under review)*. Both the U.S. HIV ART[68] and primary care guidelines[38] provide essentially no emphasis on screening or management of these modifiable factors. As the magnitude of these lifestyle effects increases with increasing lifespan, behavioral counseling and therapy should become standard metrics of excellence assessed by U.S. Health Resources and Services Administration and Ryan White, and treatment guidelines should emphasize the importance of these factors in the long-term care of all people with HIV.

Conclusions

The healthcare of older adults with HIV can be highly complex, resource intensive, with high administrative burden. Thus, improving the health span and wellness of older adults with HIV will likely require changes to the current model of HIV care. Unfortunately, research guiding the clinical management of older adults with HIV is still in a nascent stage with many unanswered questions. For example, should HIV providers consider an annual "Medicare" wellness visit to focus on co-morbidity screening and management? Should primary care physicians be integrated into HIV specialty clinics? Should we be performing comprehensive geriatric assessments for all older adults with HIV, or providing regular screening for cognitive impairment, frailty, and physical function? Do we pursue the integration of providers dual-trained in geriatrics and HIV[116,117]? Do we broadly implement these interventions across all older adults with HIV, or stratify based on measures such as the Veterans Aging Cohort Study Index? When do we stop screening, and aggressively managing co-morbidities?

Growing data from aging longitudinal HIV cohorts and feedback from the HIV community suggest that the current model is not meeting the needs of older adults with HIV. In this review, we introduce the "6Ms" approach as a starting point to addressing the non-HIV specific health issues that increasingly impact older adults with HIV. This approach acknowledges the multi-complexity of older adults with HIV, simplifies geriatric principles

for non-geriatric trained providers, and minimizes extensive training and specialized screening tests or tools that may add to administrative burden.

Unfortunately, due to dissatisfaction with salary/reimbursement and substantial administrative burden[118] the projected workforce growth in HIV providers is unlikely to support the demand of a growing and complex population of older adults with HIV. Ultimately, we expect that caring for older adults with HIV will result in more frequent outpatient visits and depend on participation from other specialties, in- clinic pharmacists, case-managers, social workers, and strong collaborations with community groups and advocates. Successful and sustainable implementation of novel approaches to care will also require support at both the local and national levels of health care administrators and health insurance providers, and will likely depend on changes to the standards of care used to measure the quality of HIV clinics by the U.S. Health Resources and Services Administration and Ryan White.

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Synopsis

The healthcare of older adults living with HIV can be highly complex, resource intensive, and carry a high administrative burden. Data from aging longitudinal HIV cohorts, and feedback from the HIV community suggest that the current model is not meeting the needs of older adults with HIV: improving the health span and wellness of older adults with HIV will likely require changes to the current model of HIV care. In this review, we introduce the “6Ms” approach as a starting point to addressing the non-HIV specific health issues that increasingly impact older adults with HIV. This approach acknowledges the multi-complexity of older adults with HIV, simplifies geriatric principles for non-geriatric trained providers, and minimizes extensive training and specialized screening tests or tools. Successful and sustainable implementation of novel approaches to care will require support at both the local and national levels of health care administrators and health insurance providers, and will likely depend on changes to the standards of care used to measure the quality of HIV clinics by the U.S. Health Resources and Services Administration and Ryan White.

Key Points

1. Adherence to the screening and management recommendations for the general population in addition to HIV-specific guidelines is increasingly challenging and has become overwhelming for providers *and* patients.
2. The “6Ms” approach is a starting point to address the health issues impacting older adults with HIV. This approach acknowledges the multi-complexity of older adults with HIV, simplifies geriatric principles for non-geriatric trained providers, and minimizes extensive training and specialized screening tests or tools that may add to administrative burden.
3. Successful and sustainable implementation of novel approaches to care will require support at both the local and national levels of health care administrators and health insurance providers, and will likely depend on changes to the standards of care used to measure the quality of HIV clinics.

Table 1.

Recommended Routine Healthcare Maintenance for the Older Adult Living with HIV

Screening/Prevention	Frequency	Comments
HIV Specific Monitoring		
Retention	Regularly	
Adherence	Regularly	
Tolerability	Regularly	Regular monitoring of bone, kidney, metabolic, cardiovascular, and liver health
CD4 count	See comment	Every 3–6 months during the first 2 years of care, if viremic while on ART, or if CD4 count <300 cells/μl; every 12 mo if CD4 300–500 cells/μL; optional if CD4 >500 cells/μL
HIV-1 RNA	Every 3–6 months	
OI prophylaxis	See comment	If CD4 count <200 cells/μL or history of OI
Safer sex	Every visit	
Immunizations		
Influenza	Annually[a]	Live attenuated vaccine contraindicated; consider high-dose in those ≥65
Pneumonia (PCV13)	Once	
Pneumonia (PPSV23)	>8 weeks after PCV13 (preferred)	2nd dose > 5 years after the first dose; if given before age 65, administer another dose after age 65 and >5 years after most recent dose
Tdap/Td	Once, then q10 years	1 dose Tdap, then Td booster
MenACQY	2 doses, >8 weeks apart	Booster every 5 years
Hepatitis A	If not immune	Among men who have sex with men, intravenous drug use, travel to endemic area, chronic liver disease, Hepatitis B or C
Hepatitis B	2, 3, or 4 dose schedule, depending on vaccine used	Confirm antibody response 1–2 months after completion, or subsequent visit
Recombinant zoster	2 doses, 2–6 months apart ≥50 years[a]	ACIP provides no recommendation for HIV. Should be administered even if prior receipt of live zoster vaccine
Varicella	See comments	If CD4 ≥200 cells/μL and no evidence of varicella infection
MMR	2 doses, ≥28 days apart	If CD4 ≥200 cells/μL for >6 months and no evidence of immunity
Infection Screening		
Hepatitis C antibody	Annually if risk[b]	
Interferon-γ release assay/tuberculin skin test	Annually/biannually if risk	At least once on entry into care
Treponemal antibody	Annually if risk[b]	
GC/chlamydia amplified DNA probe	Annually if risk[b]	Testing should include all sites of risk
Trichomoniasis screening	Annually in women[b]	
General Screening		
Smoking	Regularly	USPSTF recommendation: ask and advise all adults regarding tobacco use; provide behavioral interventions and FDA–approved pharmacotherapy

Screening/Prevention	Frequency	Comments
Alcohol	Regularly	USPSTF recommendation: screen and provide brief behavioral counseling for persons engaged in risky or hazardous drinking.
Marijuana use	Regularly	
Chronic pain	As needed	Pain contract, regularly toxicology, clinical evaluation q3 months
Other substance use	Regularly	
Domestic violence	See comment	Highest risk among women of reproductive age
Gun safety	At least once	
Seat belt, helmet use	At least once	
Comorbidity Screening		
Weight/height	At least annually	USPSTF recommendation: offer or refer adults with a body mass index of ≥30 to intensive, multicomponent behavioral interventions
Waist circumference	Annually	
Blood pressure	At least annually[a]	
Physical activity	Every visit	
Nutrition/food security	At least annually	
Depression screen	At least annually	
Glucose/A1c	Q6–12 months	USPSTF recommendation: offfer or refer patients with abnormal blood glucose to intensive behavioral counseling interventions to promote a healthful diet and physical activity
CBC with differential	Q6 months	
Complete metabolic panel	Q3–6 months	
Lipid panel	Q6–12 months	
Calculate CVD risk	Every 1–3 years	
Statin need	At least annually	Per ACC/AHA risk assessment
Aspirin need	At least annually	Low-dose aspirin in adults aged 50–59 years who have ≥10% 10-year cardiovascular risk, no increased risk for bleeding, life expectancy ≥10 years, and willing to take low-dose aspirin daily ≥10 years.
25-OH vitamin D	See comment	If laboratory values suggestive of deficiency, or other risk (low bone density, fragility fracture, high-fall risk, chronic kidney disease); consider screening in all HIV due to increased risk of osteoporosis
Consider vitamin D and calcium	See comment	In patients with known low vitamin D, chronic kidney disease, osteopenia/osteoporosis, or TDF/TAF-based therapy
DXA scan/FRAX if DXA not available	≥50 in all men; after menopause in women	
Urinalysis	Q6–12 months	Q6 months if on TAF/TDF
TSH	If symptomatic	
Ophthamologic exam	See comments	Comprehensive exam once at age 40, follow-up as recommended until age 60; every 1–2 years after age 60; annual dilated retinal exam if diabetes
Hearing screen	If symptomatic	Consider regular symptom assessment
Dental exam	Q3–12 months	

Screening/Prevention	Frequency	Comments
Abdominal US	Once, men aged 65–75 with smoking history	
Sleep apnea	Annually	
Cancer Screening		
Colonoscopy	Starting at age 50[c]	Consider alternative screening if colonoscopy not available
Prostate specific antigen	Starting at age 50[c]	Screening based on shared decision making
Digital rectal exam	Annually	For rectal cancer (any age) and prostate cancer (50+)
Anal pap smear	Consider annually, if high-resolution anoscopy available	Pending randomized clinical trial results
BRCA gene screening	If family history	
Mammography	Q1–2 years beginning at age 50 (or 40)[c]	Screening initiation and frequency varies on guidelines, risk, and patient preference
Cervical pap smear	Q1–3 years	Annually x 3 years, then every 3 years if 3 consecutive tests are negative; if HPV co-testing available. See footnote for further details
Low-dose chest CT scan	Annually, starting at age 55 if risk (see comment)	Adults ages 55– 80 years with a 30 pack-year smoking history, who currently smoke or have quit ≤15 years.
Hepatocellular carcinoma screening	If cirrhosis or HBV/HCV with additional risk	
Skin cancer screening	Periodic skin exam if high-risk	
Additional Considerations for Geriatric/Aging Issues		
Loneliness	Consider at least annually[a]	
Elder mistreatment		
Safety in home		
Driving safety		
Financial support		
Social support		
Activities of daily living		
IADLs		
Gait and balance		
Cognition		
Bowel/bladder function		
Sexual function		
Polypharmacy and drug-drug interactions	Every visit	
Goals of care	Regularly	
Advanced directives	Annually[b]	
Falls	Every visit	
Fall prevention interventions	Exercise interventions, especially if high-risk	
Serum testosterone	If symptoms	

OI, opportunistic infection; PCV, pneumococcal conjugate vaccine; PPSV, pneumococcal polysaccharide vaccine; Tdap, tetanus diphtheria acellular pertussis; MenACQY, meningitis subtypes A, C, Q, and Y; ACIP, Advisory Committee on Immunization Practices; MMR, measles mumps rubella; GC, gonococcus; HBV, hepatitis B virus; HCV, hepatitis C vaccine; IADLs, instrumental activities of daily living

[a] In the opinion of the authors;

[b] More frequently, depending on risk;

[c] Earlier screening may be indicated dependent upon family history;

[d] If co-test are both negative, repeat q3 years; If HPV16 or HPV16/18 are detected, refer for colposcopy. If negative pap but positive co-test for other HPV types, repeat in 1 year and refer for colposcopy of either co-test positive. If ASC-US pap, repeat if HPV co-test is negative, refer to colposcopy of HPV is positive. If LSIL or greater, refer for colposcopy. Recommendations based on references [38,46,68–74].

Table 2.

A New Approach to Prioritizing Key Care Components for the Older Adult with HIV: The Six M's

		Components	Interventions
*__MODIFIABLE:__ Prioritization of interventions that target the most modifiable risk factors (physical activity, obesity, nutrition, substance use) that impact multiple bio/psycho/social systems	**MIND**	Cognition, depression, mood	• Evaluate and treat mood disorders • Evaluate/treat comorbidities and polypharmacy that may contribute to cognitive decline • Physical activity and mentally stimulating activities across the lifespan to maintain cognitive function • Ensure safety (i.e., consideration of driving safety, social support at home, medication administration)
	MOBILITY	Gait, balance, falls	• Fall intervention programs • Physical activity • Physical/occupational therapy • Home safety assessments
	MEDICATIONS	Polypharmacy and drug-drug interactions	• Reduce polypharmacy • Prescribe treatments specific for older person's needs • Identify medication adverse effects
	MULTI-COMPLEXITY	Consideration of comorbidities within complex social circumstances and limitations	• Consideration of the highest priority screening and treatment guidelines, without contributing to polypharmacy. • Assess living conditions and competing priorities • Help older adults manage a variety of health conditions
	MATTERS MOST TO ME	An individual's own health outcome goals and care preferences	• Coordinate advance care planning • Manage goals of care • Risk/benefit discussions when considering priorities and goals of care

*added to the Geriatric 35 M's Model