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Integrating Geriatric Principles into the Healthcare System: A Comprehensive Conceptual Framework and Literature Study on the Complexity of Aging with HIV in Vietnam

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Abstract
The rapid technological and medical advancements of the 21st century, particularly the widespread administration of combination antiretroviral therapy (ART), have fundamentally transformed the global trajectory of the HIV/AIDS epidemic. What was once universally considered a rapidly fatal infectious disease has transitioned into a manageable chronic condition. Consequently, the life expectancy of persons living with HIV (PLWH) has increased dramatically, shifting the demographic landscape toward a rapidly aging population. The primary aim of this extensive literature study is to critically analyze the multidimensional complexity of aging with HIV and to establish a robust, expansive conceptual framework for integrating geriatric principles into the existing healthcare system. Utilizing a qualitative literature study and content analysis approach, this paper synthesizes the profound clinical, psychological, and systemic challenges faced by Older People Living with HIV (OPLH). The analysis evaluates these intertwined challenges under the global mandates of the 2030 Sustainable Development Goals (SDGs) and the UNAIDS 95-95-95 targets. By rigorously applying the Health Policy Triangle (evaluating Context, Content, Process, and Actors), this paper provides a detailed, actionable implementation pathway for a national healthcare provider training program centered entirely on the Geriatric 5Ms framework (What Matters Most, The Mind, Mobility, Medications, Multi-complexity). The findings unequivocally assert that integrating this framework into routine HIV care is not only highly feasible but absolutely critical for delivering sustainable, evidence-based, and non-discriminatory care at the grassroots and community levels, ultimately preventing unnecessary complications and reducing systemic healthcare burdens.

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1. Introduction

Through the first decade of the HIV epidemic, the prognosis for a person diagnosed with the virus was exceptionally bleak, with life expectancy typically restricted to a mere 1 to 2 years following the onset of advanced clinical symptoms [1]. During this initial era, medical interventions were almost entirely palliative, focusing on the management of acute opportunistic infections and terminal care. However, the global medical landscape experienced a profound paradigm shift nearly thirty years ago with the introduction, optimization, and scaling of combination antiretroviral therapy (ART) [2]. For persons living with HIV (PLWH) who consistently maintain high adherence to their treatment regimens and achieve sustained, undetectable viral loads, life spans

have extended to parallel those of the uninfected general population [3]. This medical triumph stands as one of the most significant public health victories of the modern era; however, it has inadvertently given rise to a novel, highly complex public health phenomenon: the graying of the HIV epidemic [1].

Globally, epidemiologists indicate that by the end of this decade, more than half of the total population of PLWH will be aged 50 years and older. As this population ages, individuals face an accelerated trajectory of biological decline that differs markedly from natural aging. This phenomenon is driven primarily by persistent, low-grade systemic inflammation and premature immunosenescence [2]. Even when circulating viral copies are suppressed below detectable limits, the structural presence of the virus within anatomical reservoirs continuously stimulates the immune system. This constant activation accelerates cellular aging, endothelial dysfunction, and multi-system metabolic degradation, leaving Older People Living with HIV (OPLH) highly vulnerable to a gánh nặng từ các bệnh mạn tính đồng mắc [3].

These profound clinical complexities do not exist in an analytical vacuum; they are deeply compounded by a dense, destructive web of psychosocial vulnerabilities [4]. In many societies, and particularly within transitional economies like Vietnam, OPLH are caught at the intersection of ageism and deep-seated HIV-related stigma. This social isolation is frequently exacerbated by post-retirement financial insecurity, physical disabilities, cognitive decline, and significant logistical barriers to healthcare access. The traditional healthcare infrastructure, originally designed as a vertical, single-disease specialty system focused primarily on acute viral suppression, rapid triage, and maternal/youth prevention paradigms, is structurally underprepared to manage the holistic, long-term biopsychosocial needs of an aging cohort [1].

To align with contemporary global health mandates—specifically the UNAIDS 95-95-95 targets and the United Nations Sustainable Development Goals (SDGs) for 2030—national healthcare policies must adapt dynamically [5]. The primary objective of this extensive study is to systematically synthesize the existing literature on the complexities of aging with HIV and to propose an integrated, systemic conceptual framework based on health policy analysis and geriatric care principles [5]. This integration aims to optimize healthcare delivery, minimize systemic disparities, limit unnecessary upline hospital transfers, and ensure equitable access to comprehensive care for the aging HIV population in Vietnam.

2. Methods

This research employs a qualitative methodology grounded in comprehensive literature study and systematic content analysis. The study was meticulously designed to explore the systemic intersections of chronic infectious disease management, clinical gerontology, and public health policy.

2.1. Research Design and Procedure

The investigative procedure followed a highly structured, four-phase analytical framework:

Problem Formulation: This initial phase rigorously defined the core clinical, psychosocial, and systemic barriers that continuously hinder optimal health outcomes for OPLH. The problem formulation established the parameters for exploring how multimorbidity, late diagnosis, stigma, and accessibility interact to create a cycle of vulnerability [1, 2].

Literature Search Strategy: A systematic retrieval of evidence was conducted across prominent digital academic databases and global health repositories, including PubMed, Embase, the Cochrane Database of Systematic Reviews, and official policy portals of WHO and UNAIDS. The search architecture utilized combinations of controlled vocabulary (MeSH terms) and free-text keywords, including: ("HIV" OR "Acquired Immunodeficiency Syndrome") AND ("Aging" OR "Elderly" OR "Geriatrics") AND ("Multimorbidity" OR "Comorbidities" OR "Polypharmacy") AND ("Health Policy" OR "Delivery of Health Care"). The search was restricted to English and Vietnamese language publications.

Data Evaluation: Source materials were critically assessed against stringent criteria of thematic relevance, methodological reliability, and practical applicability to modern, decentralized healthcare infrastructures. Special emphasis was placed on literature examining the context of low-to-middle-income countries and healthcare systems undergoing transitional reforms, such as Vietnam. Articles focusing solely on basic virological mechanics without a health systems or clinical management focus were excluded.

Data Analysis and Interpretation: The extracted evidence was synthesized using advanced content analysis techniques. The aggregated data regarding the complexities of aging with HIV was then systematically mapped onto the established Health Policy Triangle framework—evaluating Context, Content, Process, and Actors—to construct a comprehensive, actionable model for health system transformation [8-10].

2.2. Inclusion Criteria and Content Analysis Technique

To ensure the academic validity and rigor of the synthesized evidence, strict inclusion and exclusion criteria were applied during the data evaluation phase. Eligible sources comprised peer-reviewed journal articles, international epidemiological consensus reports, and global health policy guidelines published between 2004 and 2026. Selected literature was required to explicitly address the clinical or psychosocial intersections of aging and chronic HIV management. Documents focusing solely on cellular-level virological mechanics without health system or clinical care delivery implications were excluded.

Following data collection, a rigorous qualitative content analysis was executed. This technique involved thematic coding of the text to extract core variables related to older people living with HIV (OPLH), specifically tracking somatic comorbidities, mental health deteriorations, and systemic access limitations. These extracted codes were subsequently mapped onto the structural dimensions of the Health Policy Triangle to formulate the integrated national training roadmap. This conceptual approach allowed for the translation of high-level epidemiological data into actionable front-line guidelines, ensuring that the final framework remains both structurally sound and contextually appropriate for the Vietnamese healthcare ecosystem.

3. Results and Discussion

3.1. Results

The extensive literature search and subsequent data evaluation yielded a robust, irrefutable foundation of evidence illuminating the direct, cyclical interactions between chronic HIV management, geriatric syndromes, and structural healthcare policy requirements.

Table 1: Comprehensive Results of Literature Study on the Complexity of Aging with HIV

No	Title	Year	Writer	Research result
1.	Sublette NK, Perez S. (2019) [1]	Aging With HIV: Policy Considerations for a Graying Epidemic	Identifies a severe systemic knowledge gap; traditional HIV specialists and critical care providers are predominantly unfamiliar with complex geriatric and end-of-life care, necessitating urgent, systemic policy adaptation for OPLH.	Sublette NK, Perez S. (2019) [1]
2.	Erlandson KM, Karris MY. (2019) [2]	HIV and aging: reconsidering the approach to management of comorbidities	Demonstrates the direct biological links between chronic HIV-induced inflammation, immunosenescence, and multi-system organ decline, establishing the absolute necessity for integrated co-management models.	Erlandson KM, Karris MY. (2019) [2]
3.	Williams ND, *et al*. (2021) [3]	The changing patterns of comorbidities associated with human immunodeficiency virus infection	Through a massive longitudinal cohort analysis of 411,904 HIV-positive patients, the study confirms that out of 66 comorbidities, 19 are strongly associated with HIV, emphasizing the complex medical landscape for aging cohorts.	Williams ND, *et al*. (2021) [3]
4.	DeMarco RF, *et al*. (2017) [4]	Ageism, Aging and HIV: Community Responses to Prevention, Treatment, Care	Uncovers widespread social misperceptions and deep cultural taboos regarding the sexual health of older adults, which act as primary drivers for delayed HIV testing and late-stage diagnoses.	DeMarco RF, *et al*. (2017) [4]
5.	Sundermann EE, *et al*. (2019) [5]	Current challenges and solutions in research and clinical care of older persons living with HIV	Proposes the clinical integration of the "5Ms of geriatrics" as a highly standardized, interdisciplinary framework to accurately assess, treat, and rehabilitate the complex needs of older PLWH.	Sundermann EE, *et al*. (2019) [5]
6.	Morales DR, *et al*. (2022) [6]	Health conditions in adults with HIV compared with the general population	Reinforces that the burden of health conditions will continue to increase as the HIV population ages, requiring complex co-management that is difficult to deliver in single-disease clinics.	Morales DR, *et al*. (2022) [6]
7.	Rubtsova AA, *et al*. (2017) [7]	Healthy aging in older women living with HIV infection: a systematic review	Highlights that beyond physical ailments, people with HIV experience profound social isolation, loneliness, stress, and intersectional stigma derived from both HIV status and age.	Rubtsova AA, *et al*. (2017) [7]

3.2. The Proposed Conceptual Framework

To synthesize these findings into an actionable policy instrument, a comprehensive Conceptual Framework for Aging with HIV is established based on the evaluated literature. This framework maps the cyclical, compounding interactions of the grey epidemic and interfaces them directly with global standards and localized healthcare execution.

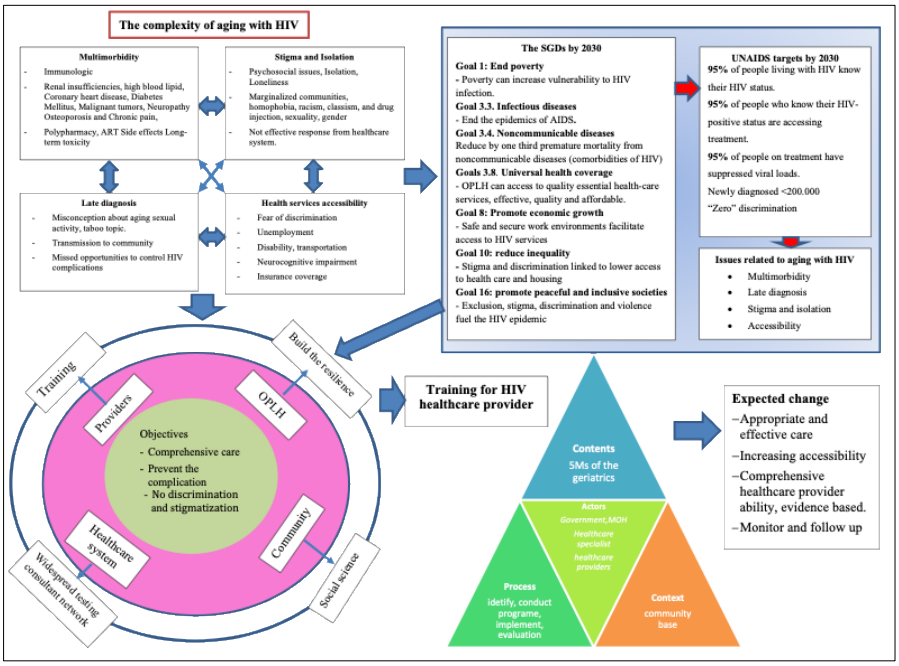

Fig 1: Conceptual Framework for Integrating the Geriatric 5Ms Model into HIV Care in Vietnam

4. Discussion

The extensive content analysis reveals that the myriad challenges facing OPLH do not occur in isolated clinical vacuums; rather, they form a compounding, destructive cycle [1]. Chronic, multi-system diseases interact relentlessly with structural socioeconomic barriers, creating a unique, highly fragile patient profile that traditional, single-disease HIV clinics are fundamentally ill-equipped to manage [1].

4.1. Clinical Multimorbidity and Biological Vulnerability

The clinical vulnerability of OPLH is severely heightened by the biological synergy between long-term viral infection and natural aging. With the success of ART, long-term viral suppression increases life expectancy, but research illustrates a definitive connection between HIV infection and the onset of cancer, accelerated cardiovascular breakdown, renal insufficiency, and neurocognitive deficits [2]. The chronic inflammatory process related to HIV and aging

immunosenescence negatively affects immunologic function and long-term survival, even in those with complete virologic suppression [2].

Consequently, OPLH now experience common comorbid conditions historically associated with elderly populations, appearing up to a decade earlier than in uninfected cohorts [3]. To ensure maximum academic accuracy and to facilitate standardized electronic medical tracking within healthcare systems, it is imperative to formally code these clinical priorities: Coronary heart disease (ICD-10: I25.1), Diabetes Mellitus (ICD-10: E11), Neuropathy (ICD-10: G62.9)

The concurrent management of these diseases invariably leads to extreme polypharmacy, exposing patients to severe risks of long-term ART toxicity, adverse medication reactions, and a massive medication burden [3]. Clinicians must be cognizant of the complexities related to the co-management of concomitant conditions, including the potential for severe drug-drug interactions [2]. For instance, interactions between cytochrome P450 inhibitors used in HIV regimens and standard cardiovascular statins or oral hypoglycemics require precise pharmacological modulation, which traditional single-disease providers are seldom trained to handle.

4.2. The Crisis of Late Diagnosis

When these somatic chronic illnesses collide with entrenched social taboos, the healthcare system experiences a dangerously high rate of late-stage diagnoses. Traditionally, the number of newly diagnosed HIV-infected individuals reflects the status of an epidemic; however, this indicator is not sensitive enough for the aging population [3]. Despite massive improvements in routine screening among younger high-risk groups, older adults are systematically missed by routine diagnostic public health infrastructure [3].

HIV testing is often delayed in older persons because basic knowledge regarding HIV transmission is clouded by extreme stigma related to the sexual activity of older persons [4]. The concept of sexual activity among older adults remains a major cultural taboo topic, leading to a widespread misperception among older adults, service providers, and society that HIV risk is low or non-existent as one ages [4]. For these individuals, late diagnosis represents tragic, irreversible missed opportunities to obtain medical care that would improve long-term health outcomes and lower the risk of ongoing HIV transmission to the community [4]. Consequently, older patients are frequently diagnosed only when presenting with profound immunologic failure or fully developed opportunistic infections.

4.3. Intersectional Stigma and Psychiatric Decline

This clinical delay is severely worsened by intersectional stigma. OPLH endure the dual burden of ageism and HIV-related stigma [4]. This is often experienced intersectionally with other deeply rooted sources of stigmatization, such as homophobia, classism, and history of drug injection [7]. In the specific socio-cultural context of Vietnam, deep-seated cultural beliefs and historical media campaigns have often erroneously associated HIV exclusively with criminal behaviors or severe moral failures [1].

This profound stigma causes elderly patients to conceal their status, actively avoid clinical settings, and suffer from profound isolation from family members, local communities, and formal health systems [4]. The resulting social isolation directly triggers and exacerbates severe psychological and neurocognitive disorders, which must be rigorously monitored and managed in clinical settings: Dementia (ICD-10: F03.90), Depression (ICD-10: F32.9), Delirium (ICD-10: F05).

These cognitive syndromic interactions present a major clinical barrier that can only be minimized through integrated geriatric tracking protocols [5]. When neurocognitive impairment goes unmonitored, patients face severe difficulties in maintaining treatment compliance, accelerating a downward spiral of virological failure and clinical decline.

4.4. Health Service Accessibility Deficits

Finally, the accessibility of health services for OPLH remains critically low due to compounding socioeconomic factors. Many PLWH experience profound structural problems related to the successful long-term navigation of a chronic illness, including the high cost of appropriate, continuous, and specialized care [12]. Following diagnosis, employment rates drop drastically; studies show that after 30 months, a massive percentage of people diagnosed with HIV could not continue full-time jobs due to physical frailty or workplace discrimination, leading to chronic unemployment and low-income conditions post-retirement [14].

Furthermore, limitations in national health insurance frameworks create insurmountable financial barriers. In Vietnam, the national health insurance has several limitations for OPLH, such as homecare visit costs, outpatient specialized physical therapy, and home-based clinical nursing not being covered by insurance [15]. OPLH experience severe disparities in tangible healthcare access, economic insecurity, employment discrimination, thin support networks, and fear of discrimination when accessing healthcare services [13]. These physical and structural boundaries make it almost impossible for frail, low-income elderly patients to travel frequently to centralized provincial facilities.

4.5. Policy Intervention: Operationalizing the Geriatric 5Ms via the Policy Triangle

To achieve the 2030 global mandates—including UNAIDS 95-95-95 targets and SDGs 1, 3.3, 3.4, 3.8, 8, 10, and 16—health policies must forcefully shift toward comprehensive, decentralized training [10]. Applying the Health Policy Triangle provides a structured mechanism to break down and deploy this intervention successfully [10].

Contextual Realities in Vietnam:

Vietnam possesses an established, community-centered HIV infrastructure, wherein provincial Centers for Disease Control (CDCs) regulate HIV/AIDS departments at the district level, supported by social workers and commune health stations at the grassroots level. However, healthcare professionals at these centers are primarily responsible for treating HIV and preventing transmission, lacking comprehensive assessments of the physical, social, and mental health of PWLH. When complications arise, patients are routinely referred upline to over-congested provincial or national hospitals, fracturing the continuity of care.

Content: The 5Ms of Geriatrics:

The content of the proposed training programs must deeply integrate the 5Ms of Geriatrics into everyday clinical routines to enable person-centered care [5]:

1. **What Matters Most:** Knowing and acting upon each person's own health outcome goals and care preferences, aligning medical choices with active lifestyle

maintenance and functional independence.
2. **The Mind:** Understanding neurocognitive functioning, including strict assessment protocols for dementia, depression, and delirium [5].
3. **Mobility:** Identifying impairments in gait and balance, implementing individualized fall prevention programs, and creating environments that promote safe physical activity.
4. **Medications:** Optimal prescribing, including actively adjusting doses and deprescribing to reduce polypharmacy, adverse medication reactions, and overwhelming medication burden.
5. **Multi-complexity:** Identifying and proactively managing multimorbidity and highly complex biopsychosocial situations.

Actors and Stakeholder Collaboration: Program implementation demands structured, hierarchical collaboration. The Government and Ministry of Health (MOH) must act as the central managerial organization preparing the agenda and resources. Healthcare specialists (HIV experts, geriatricians, clinical pharmacists, social specialists) act as trainers. The primary trainees are the HIV healthcare providers who directly care for PWLH at district departments and commune social workers.

Process: The Implementation Pathway

Execution of this policy must follow a rigorous, multi-step implementation pathway to bridge the gap between academic theory and clinical practice:

1. Establish an expert multi-disciplinary oversight committee uniting infectious disease specialists, geriatricians, clinical pharmacists, and public health professors.
2. Conduct an extensive baseline survey utilizing 5Ms metrics to identify the exact needs of OPLH and current provider competency gaps.
3. Draft a training program with clear learning objectives, content, and evaluation methods. Because trainees include both medical professionals and social workers, the program should consider separating into two tracks or using a "Training of Trainers" model [9]. The medical track will focus deeply on complex diagnostics and pharmacology, while the social work track will focus on grassroots psychosocial evaluation, anti-stigma counseling, and community monitoring.
4. Prepare up-to-date, evidence-based instruments and tools tailored for rapid deployment in busy settings.
5. Implement pilot training for small groups and evaluate effectiveness before adjusting for the final national program.
6. Implement at the national level across provincial and district health networks.
7. Conduct regular evaluations that measure actual clinical indicators and services provided in real-world settings, rather than just knowledge limits [8].

4.6. Expected Systemic Changes

The nationwide implementation of this training policy will drive massive structural improvements. OPLH will receive appropriate and effective care for their multiple medical conditions easily and locally [12]. The care capacity of healthcare workers will become comprehensive, covering mental, physical, and social aspects, thereby significantly limiting the transfer of patients to upline hospitals [1]. Furthermore, clinical guidelines will be translated into clinical practice using evidence-based tools [2]. Social workers will strengthen their capacity to monitor and follow up with patients, actively combating isolation and building long-term resilience.

5. Conclusion

Based on the shattered boundaries identified in the literature and modeled within the proposed conceptual framework, managing HIV purely as a localized infectious disease is an obsolete paradigm. Older People Living with HIV (OPLH) navigate a highly complex, interconnected matrix of multi-system illnesses, diagnostic delays, severe social stigma, and profound financial accessibility barriers. The policy cannot solve the complexity of aging with HIV unless a synchronous, system-wide solution is deployed [1].

Implementing an integrated national training program centered on the geriatric 5Ms framework offers a highly strategic, evidence-based, and sustainable solution [5]. By rigorously building the clinical and psychosocial capacity of district and commune healthcare networks, the health system can successfully transition to a comprehensive, decentralized care model. This proactive transition will decisively reduce unnecessary hospital transfers, lower long-term complication rates, build patient resilience, and secure equitable, non-discriminatory universal health access for all older adults living with HIV, successfully aligning with the 2030 global mandates [1, 5].

6. Thank-You Note

The author expresses sincere and profound gratitude to the public health researchers, clinical epidemiologists, and policy analysts whose foundational work made this comprehensive synthesis possible. Their dedicated development of the health policy triangle and the geriatric 5Ms model provides the essential academic building blocks required to optimize healthcare delivery for older adults living with HIV in Vietnam and across the globe.

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