

From One Syndrome to Many: Incorporating Geriatric Consultation Into HIV Care

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(See the Editorial Commentary by Guaraldi and Rockwood on pages 507–9.)

Antiretroviral therapy has enabled people to live long lives with human immunodeficiency virus (HIV). As a result, most HIV-infected adults in the United States are >50 years of age. In light of this changing epidemiology, HIV providers must recognize and manage multiple comorbidities and aging-related syndromes. Geriatric principles can help meet this new challenge, as preservation of function and optimization of social and psychological health are relevant to the care of aging HIV-infected adults, even those who are not yet old. Nonetheless, the field is still in its infancy. Although other subspecialties have started to explore the role of geriatricians, little is known about their role in HIV care, and few clinics have incorporated geriatricians. This article introduces basic geriatric nomenclature and principles, examines several geriatric consultation models from other subspecialties, and describes our HIV and Aging clinical program to encourage investigation of best practices for the care of this population.

Keywords. geriatric consultation; HIV; aging; NYC.

Survival among human immunodeficiency virus (HIV)–infected adults has dramatically improved with the introduction of effective antiretroviral therapy. Modeling now suggests near-normal longevity, especially for those who did not acquire HIV via injection drug use and who have restored or maintained CD4 cell counts [1]. Recent models from the Netherlands predict that >70% of HIV-infected patients will be 50 years of age or older by 2030 [2]. That same study estimates that 28% of HIV-infected patients in 2030 will have at least 3 age-related comorbidities [2]. In addition to multiple comorbidities (multimorbidity), the aging HIV-infected population is at risk for geriatric (henceforth termed aging-related) syndromes, such as frailty, falls, delirium, and functional impairment [3].

While the Centers for Disease Control and Prevention's original designation of acquired immune deficiency syndrome (AIDS) in 1982 was based on the occurrence of “a disease, at least moderately predictive of a defect in cell-mediated immunity, occurring in a person with no known cause for diminished resistance to that disease” [4], AIDS is now defined by the occurrence of opportunistic illness or nadir CD4 count <200 cells/μL in a host with HIV infection. The term “AIDS” has

become anachronistic; its etiology understood, it is no longer a syndrome per se. Instead, as most persons with HIV infection are living longer lives, they are developing not only medical comorbidities but also *multiple* syndromes related to aging.

These aging-related syndromes and multimorbidity—common to elderly patients and well understood by geriatricians—may go unrecognized by HIV providers. To date, there is no formal guidance on incorporating assessment and care for these problems among HIV-infected adults. Preventive healthcare poses similar dilemmas. Cancer screening, for example, is now part of the primary care of all HIV-infected patients, but there are no guidelines on when or whether to stop preventive screening.

How can geriatric principles assist with the healthcare of this population? Awareness of these problems has increased, and there are now regional and international scientific and clinical conferences on HIV and aging, but clinical care recommendations are still largely based on expert opinion. In this article, we review the principles of aging with HIV and then examine the literature of geriatric consultation for corroborating evidence to support geriatric input in the care of people aging with HIV. We conclude with issues to consider when incorporating geriatric consultation into the care of this population.

THE IMPORTANCE OF GERIATRIC PRINCIPLES

Antiretroviral therapy has controlled HIV infection and improved quantity of life; the primary care of adults with HIV infection has become more complicated as they live longer with other, often multiple comorbidities [5]. Management of multiple

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aging-related syndromes and comorbidities may require far more of the clinician's time and attention than the HIV infection itself. People aging with HIV are at risk for a diminished quality of life [6, 7]; even though they are not chronologically geriatric, they may benefit from a geriatric approach to evaluating and maintaining functional status.

How HIV infection affects aging itself is a controversial topic. The debate centers on whether HIV speeds up aging processes through established mechanisms for aging in general or whether HIV infection is an additive or synergistic risk factor [8]. Arguments for the biologic plausibility of HIV causing accelerated aging typically draw parallels between the pathophysiology of treated HIV infection and aging in general, including the prognostic significance of low CD4:CD8 ratios, potential shared immunosenescence phenotypes, and the roles of coinfections such as cytomegalovirus. A detailed discussion of this controversial topic is beyond the scope of this article and has been reviewed elsewhere [8–10]. Other approaches, such as through epigenetic analysis, are also being used to try to answer the question of whether HIV accelerates aging [11, 12].

Because the vocabulary of geriatrics and gerontology can be confusing, Table 1 provides definitions of commonly used terms. Several principles are noteworthy:

- *Aging cannot be defined or measured solely by the presence of disease.* That is not to say that aging and disease are entirely distinct, but rather that it may be deceptive to ascribe comorbidities to aging or, in the case of HIV infection, attribute increased prevalence of comorbidities to “accelerated” or “accentuated” aging.
- *The impact of multimorbidity is not the same as that of adding the impacts of multiple individual comorbidities.* Clinical

practice guidelines are designed for individual diseases and are often inappropriate/unfeasible for individuals with multimorbidity [13]; optimizing therapies in a patient with multimorbidity not only requires examination of the clinical evidence but must also take patient preferences, prognosis, and clinical feasibility into account [14].

- *Aging-related (geriatric) syndromes are distinct from classic medical syndromes* [15, 16]. They are common and often seen in combination. Examples include frailty or functional decline, which are distinct from specific motor or sensorineural losses. These syndromes, rather than comorbidity, are often the primary focus of geriatric evaluation and interventions.
- *Aging-related syndromes can be seen among HIV-infected adults before they are chronologically elderly* [3]. We recommend using the term “aging-related” to increase the likelihood that providers and patients will appreciate their relevance. This is essential, as these kinds of syndromes often frame the management of the older patient who may simultaneously have several comorbidities.

Caring for people aging with HIV has required negotiating several clinical challenges. The first is the predominance of non-AIDS-defining comorbidities such as cardiac disease, renal impairment, and non-HIV malignancies as causes of chronic illness and mortality [17], leading to an increase in subspecialty consultation (eg, cardiology, nephrology, oncology) to co-manage the HIV-infected patient. The second challenge is the increased prevalence of multimorbidity, which requires coordination and prioritization of subspecialty care. The third is the high prevalence of aging-related syndromes and the need for geriatric care, even in those who are well below 65 years of age [18]. Clinical management requires preparing patients

Table 1. Aging-Related Vocabulary

Vocabulary	Definitions
Aging	A process that “is characterized by a progressive loss of physiological integrity, leading to impaired function and increased vulnerability to death” [32].
Multimorbidity	“The co-existence of 2 or more chronic conditions, where one is not necessarily more central than the others” [13].
Syndrome	A clinical condition that (unlike a disease) is of unknown etiology and is “mostly defined by a complex and often non-fixed combination of clinical signs and symptoms” [15]. The classic definition emphasizes its rarity, mystery, and multiplicity of presentations.
Geriatric or aging-related syndromes	“Clinical conditions in older persons that do not fit into discrete disease categories” and instead “cross organ systems and discipline-based boundaries” [16]. How geriatric syndromes differ from classic syndromes [15]: <ul style="list-style-type: none"> • They are common. • They are often defined by a single symptom (eg, urinary incontinence). • Single etiologies may precipitate multiple syndromes: falls and delirium might herald pneumonia. • Individual syndromes may have multiple etiologies: delirium might be caused by an infection, dehydration, and/or a new medication in the setting of an underlying dementia. • Older patients often have multiple geriatric syndromes at one time.
Frailty	One of the original geriatric syndromes, it is a state of diminished reserve and heightened vulnerability. Frailty has been conceptualized and measured both as a physical phenotype and as an accumulation of health deficits [33].
Basic and instrumental activities of daily living	Basic activities of daily living are basic functional tasks (eg, dressing, bathing, feeding, and transferring). Instrumental activities of daily living represent higher-order functions such as using the phone, shopping, managing medications, and finances [34].

in their 50s for healthy aging (as a way of trying to forestall or prevent these syndromes) as well as assessment and care of those who have aging-related syndromes [5].

Recognizing these new crossroads in the field of HIV medicine, the American Geriatrics Society, the American Academy of HIV Medicine, and ACRIA first published a set of guidelines in 2011 to address the management of the aging HIV population [19]. Since then, the major American HIV treatment guideline groups, the Department of Health and Human Services and the International Antiviral Society–USA, have added in small sections on aging, as well [20, 21]. However, the majority of the guidelines (although not all, eg, [22]), remain organ-based and do not address the methodology and value of geriatric consultation head-on.

GERIATRIC EVALUATION AND CONSULTATION IN OTHER SETTINGS

The history of comprehensive geriatric assessment (CGA) began with Marjorie Warren, who in the mid-20th century devised a way to triage chronically ill neglected inpatients in a hospital by creating the first geriatric assessment/treatment team. She systematically evaluated patients to determine who would benefit from medical intervention or rehabilitation efforts and was able to discharge one-third of >700 inpatient “incurables” to either home or to a residential facility [23]. Over the ensuing decades, CGA has been updated to include multiple domains (Table 2) encompassing biomedical, social, and economic concerns.

CGA has been studied both as a primary, hospital-based program and as an outpatient consultative service (integrated or separate) to other subspecialties of medicine such as cardiology [24], nephrology [25, 26], and oncology [27]. The evidence behind the effectiveness of CGA is mixed; it has resulted in improved outcomes or no effect. Geriatric evaluation has proven most valuable in inpatient settings. It has also helped clinicians prognosticate and identify problems that are often overlooked in standard medical visits. Table 3 includes recent systematic reviews and meta-analyses of studies in the general population examining the feasibility of geriatric assessment in both the outpatient and inpatient settings and the impact of CGA on treatment decision-making and outcomes (mortality and hospitalization).

Table 2. Components of Comprehensive Geriatric Assessment

Basic activities of daily living
Instrumental activities of daily living
Frailty
Nutritional status
Social network and financial status
Living situation and accessibility
Affective assessment
Cognitive assessment
Medical comorbidities
Medication appropriateness
Advance directives

CGA often provides important information when counseling about goals of care and determining the role of prevention. Eprognosis, a Web-based prognostic tool, has aggregated and assessed a number of prognostic calculators for the general older population specific to location (eg, community, nursing home) and time frame (<http://eprognosis.ucsf.edu/bubbleview.php>). While these calculators have not been validated specifically for HIV-infected persons, there is one mortality predictor that has been validated in the HIV population, the Veterans Aging Cohort Study (VACS) calculator (<https://vacs-apps2.med.yale.edu/calculator>) [28]. Although prognostically useful, the VACS calculator is not descriptive; it does not incorporate function, cognition, or direct measures of all components of multimorbidity.

The literature on geriatric consultation in other subspecialties can provide some inferences about the feasibility and usefulness of CGA. Examples of clinical models relevant to HIV care include outpatient consultative, outpatient integrative, inpatient consultation, or CGA by primary care teams as illustrated by the following representative examples.

Referral to Geriatric Clinic

Kalsi et al created an intervention where oncology patients aged 70 and older completed a screening questionnaire, and those found to be at high risk (or who were referred directly by their physician) underwent CGA by a geriatric consultant in an outpatient clinic prior to initiating chemotherapy [27]. This model was evaluated in a nonrandomized, prospective cohort study (N = 135), and patients in the intervention group were more likely than controls to complete cancer treatment. A prescreening model has been used for outpatient aging HIV patients; Ruiz and Cefalu used a CGA screen to identify appropriate patients for referral to a geriatric HIV program [29].

Assessment Within the Practice

Hall et al compared 2 models of geriatric assessment within Veterans Affairs outpatient nephrology clinics [25]. In the first model, an embedded geriatrician conducted CGA; in the second model a nephrologist with 16 hours of geriatric training or a nurse practitioner dually certified in gerontology and nephrology performed the assessments. In both models, geriatric assessment was able to identify high-impact problems such as cognitive impairment, functional impairment, and difficulty with instrumental activities of daily living (IADLs). The authors concluded that a geriatrician’s treatment recommendations were necessary when nephrologists had limited experience, but that with limited training in geriatrics, nephrologists could learn how to use the basic CGA tools on their own. The authors also believed that CGA assisted in guiding care of chronic kidney disease and decisions about dialysis both by uncovering functional and cognitive problems and by identifying those who were aging well [25].

Table 3. Examples of Geriatric Assessments in Other Subspecialties

Reference and Methods	Specialty	Assessment Types	Findings
Caillet et al, 2014 [35]. Systematic review of 29 prospective observational or interventional studies. Age group: ≥65 y	Oncology	Studies included at least 5 domains of CGA	Aging-related syndromes and comorbidities were identified that could interfere with treatment or lead to death. Among a subgroup analysis of CGA, the authors estimated that that 21%–49% of treatment decisions might be affected by CGA, with nutritional status and function having the strongest effect.
Hamaker et al, 2014 [36]. Systematic review of observational cohort studies of older patients. 18 publications from 15 studies. Age group: median, 73 y	Hematologic malignancies	Geriatric assessment of at least 2 domains; median number assessed was 4 domains	ADL impairments were present in >25%; IADL impairments in 44% and depression in nearly 33% of studies. Physical function and nutritional status were associated with mortality.
Kallenberg et al, 2016 [37]. Systematic review of 30 longitudinal studies examining association between geriatric conditions and adverse outcomes. Age group: 52–84.2 y	ESRD	Assessments of functional impairment, cognitive impairment, and/or frailty	All 3 domains were associated with increase risk of mortality.
van Loon et al, 2016 [38]. Systematic review of 27 prospective studies assessing association of geriatric impairments with hospitalization or mortality in patients on or starting dialysis. Age group: 67–82 y	ESRD	At least one domain of geriatric assessment	Malnutrition, frailty, cognitive impairment, and functional impairment were associated with increased mortality. One study each links malnutrition, depression, and poor performance status to hospitalization.
Smith et al, 2016 [39]. Cochrane meta-analysis of 18 RCTs of interventions. Age group: adult	General outpatients with multimorbidity	Case coordination or multidisciplinary teamwork; or management/education interventions	Heterogeneous interventions and targets. Some evidence for improvement in mental health and functional outcomes, as well as patient and provider behaviors.
Ellis et al, 2011 [40]. Cochrane meta-analysis of 22 RCTs of hospitalized adults. Age group: ≥65 y	General inpatients	CGA by geriatric consultation teams or in geriatric units	Inpatient CGA reduces readmission, institutionalization, and mortality.

Abbreviations: ADLs, activities of daily living; CGA, comprehensive geriatric assessment; ESRD, end-stage renal disease; IADLs, instrumental activities of daily living; RCT, randomized controlled trial.

Assessment in the Home

Parlevliet and coworkers described a model where a nurse performed CGA on 50 patients on dialysis who were aged 65 years or older [26]. After completing a medical record review-based screening and sending questionnaires to be filled out by the patient and primary caregiver, the nurse then visited the patient's home and completed the CGA. Approximately 33% were found to be malnourished and 25% were depressed and/or in pain. Almost 60% had at least one IADL impairment. This model, while time-consuming, has the advantage of not requiring a geriatrician, but may not be feasible for people who do not live close to the office and do not have caregivers who can assist with the completion of forms.

Geriatric Evaluation and Consultation in Other Settings

HIV providers with limited time and geriatric knowledge focus primarily on comorbidity, antiretroviral management, and preventive care during routine visits. Whereas review described in Table 3 suggest there is value to geriatric consultation, and the above studies demonstrate feasibility of different consultation models, we do not yet know how to extrapolate these results for people aging with HIV. These populations all have serious, chronic illness in common, and it is not unreasonable to expect that CGA in people aging with HIV will uncover aging-related syndromes,

prognostic information, and overlooked comorbidities, and in so doing, improve the quality of care. There are a few HIV and Aging clinical programs with published data [3, 29], but no trials that examine CGA's effectiveness in this population. With so few current geriatric models, experience with multiple programs is needed to determine the optimal approach.

CHALLENGES TO THE GERIATRIC APPROACH

Just as there is a shortage of well-trained HIV providers [30], the supply of geriatricians is insufficient [14]. As of 2012, there were 7428 board-certified geriatricians in the United States [14]. The first hurdle to creating a program is finding a geriatrician who has time, interest, and salary support to work in an HIV practice. Moreover, because many HIV-infected adults already see a multitude of specialists, the addition of yet another provider might be overwhelming to the patient or even appear to undermine the primary care provider. The mere presence of a geriatrician is no guarantee that people aging with HIV will receive adequate care. Lee et al documented that even a geriatric primary care clinic focused on memory disorders found that constraints on time and resources limited their ability to manage aging-related syndromes and multimorbidity [31]. This may imply that CGA is not enough: Training,

Table 4. Aging With HIV Program at the Center for Special Studies, New York City

The HIV and Aging Program at New York–Presbyterian Hospital/Weill Cornell Medical Center was founded in 2014 to meet the needs of patients aged ≥ 50 years. The program is supported in part by foundation funding and has 2 goals. The first goal is to provide integrated geriatric care within the existing Center for Special Studies human immunodeficiency virus (HIV) clinic sites. Two geriatricians offer weekly geriatric consultation alternating at our 2 clinical sites. They document in the outpatient electronic health record and attend outpatient interdisciplinary rounds at the end of the day where all patients seen that day are discussed. They communicate actively with the physicians, social workers, psychiatrists, and nutritionists to identify problems and problem-solve interventions. Inpatient consultation is also provided to clinic patients admitted to the hospital.

The second goal is to provide patient-driven education and program opportunities both within and outside of the clinic, as determined by a focus group–based needs assessment. The program offers Gold Stars, an internal social worker–driven support group that focuses on providing the space for socialization and general support while educating group participants on a variety of topics relevant to aging with HIV. In addition, the program has sponsored an arts program and links with other community-based groups to organize opportunities for patients to attend group dances and long-term survivor support groups.

collaborative structure, and access to resources are also needed to optimize care for aging adults.

INCORPORATING GERIATRICS INTO HIV CARE

When incorporating geriatrics into HIV medicine, defining the role of the geriatrician and ensuring buy-in from the primary care providers will maximize benefit and avoid additional risks to the patient from lack of coordination of care. Bringing the geriatrician to the HIV clinic is feasible. We have embedded geriatricians in a long-standing HIV clinic that already includes social work, nursing, psychiatry, gynecology, and substance abuse counseling. The program is described in Table 4. Ours is specific to New York City, but the approach to needs assessment, community engagement, and training could be applied to other programs. These are some of the factors that HIV centers should take into account:

- *Needs assessment of patients:* How do patients feel about aging? What regional, national, or cultural needs should be explored and taken into account?
- *Needs assessment of care providers:* What do staff want to learn about aging and geriatrics? How do they want to work with the geriatricians? Will they require extra in-services or backup from gerontological nurse practitioners or social workers?
- *Choosing patients for consultation:* Will there be a minimum age for consultation? Who will take priority? How will primary providers be reminded to refer? Will patients from outside your clinical program be recruited to see the geriatrician?
- *Clarifying the role of the geriatrician:* Will the geriatricians see inpatients in addition to outpatients? Should the geriatrician provide palliative care in addition to CGA?
- *Space concerns:* Where will the geriatrician see patients? How often?
- *Determination of workflow.* How will the geriatrician communicate findings and recommendations? How will the clinic staff and physicians give feedback to the geriatricians? How will the geriatrician interface with the subspecialists?
- *Salary support:* How will the physician bill? Is there foundation or institutional support for salaries?

- *“Advertising” the program:* Once the program begins, how will patients and providers learn about it? How will the aging program and services be publicized?
- *Collaborating with community agencies:* How will the staff reach out to other community-based organizations? How will they choose the most effective partners?
- *Creating nonclinical programs for patients aging with HIV:* Will there be over-50 support groups and/or buddy programs? Are patients asking for specific programs such as arts- or exercise-based series? How will they be funded?

CONCLUSIONS

With continued improvements in antiretroviral therapy, the HIV-infected population is growing older and aging. Although recognizing and optimizing aging-related syndromes and comorbidities are the keys to ensuring patients' quality of life, HIV care providers face time constraints and lack training in geriatric assessment. Other subspecialties have successfully adopted comprehensive geriatric assessment, and HIV care can and should do the same. We have developed one such program that may improve the functional care of our aging HIV patients, and we encourage others to create geriatrics programs that take their patients' and clinical sites' needs into account. With time, we can determine the best practices to serve our patients.

Notes

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