

FY 2024 How to Best Meet the Need

Special Workgroup #1 - HIV & Aging

10:30 a.m., Monday May 8, 2023

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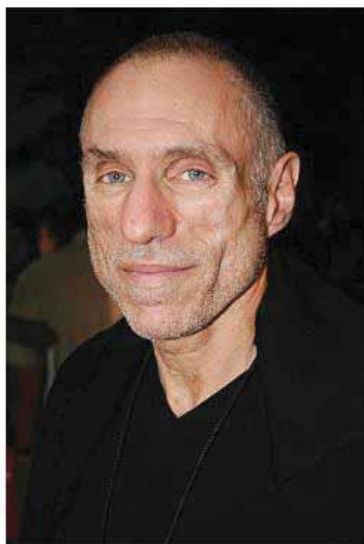
Three advocates on developing resilience for communities of people living and aging with HIV

By Theo Smart and Lance Sherriff | May 28, 2019

There are serious challenges ahead for people aging with HIV who have a potentially high number of comorbidities, and heightened risks of serious complications and disabilities—but our health care and social services systems are not prepared to respond to the more complex needs of people living with HIV (PLWH) as we age. Our goal is to explore how to build resiliency in ourselves, in our health care, and in our community.

One way to build resiliency is through community building, mobilization, and activism, so we sought input on what should be done from three activists working in this space: Jules Levin of the National AIDS Treatment Advocacy Project (NATAP), ...

Each of these activists are contributing in their own way to raise the profile of the unmet needs of OAWH. Nevertheless, as Jules says, the larger community of people living with HIV need to hold our community-based and advocacy organizations accountable. They need to engage in activism for OAWH in a much more substantive and effective way. In “Addressing the needs of older adults living with HIV,” Stephen Karpiak makes some recommendations for HIV-service organizations to provide more relevant and useful services, and to represent our agenda to the national policy makers.



“It’s the number one problem that’s getting no attention. Everybody’s talking about cure and PrEP, and they’re all-important—but no one’s paying attention to aging.”

Jules Levin

National AIDS Treatment Advocacy Project (NATAP)

EXERPT FROM <https://www.positivelyaware.com/articles/activists>

Jules Levin is the most tenacious AIDS activist one could ever hope to meet. We met in the early '90s, when he was just learning about treatment—before the advent of effective antiretroviral therapy (ART). There is arguably no one more knowledgeable about HIV and treatment literature than Jules. However, he is frustrated by what he sees as the lack of engagement on the part of the community and research establishment to respond to the needs of older adults living with HIV (OAWH). The following is a compilation of a number of statements Jules has made publicly and in online discussions about HIV and aging.

“It’s the number one problem that’s getting no attention. Everybody’s talking about ‘cure’ and ‘PrEP,’ and they’re all-important—but no one’s paying attention to aging.

“I’ve been working on the aging problem for more than 15 years. Well, it’s 15 years later now and so everyone’s older, and a lot of older people with HIV don’t even realize what’s going on. Every comorbidity is worse in people aging with HIV.”

- We have more comorbidities (three to eight on average) compared to HIV-negative people the same age.
- We have fifty percent more heart disease (cardiovascular disease, myocardial infarctions, and stroke rates are much greater among people living with HIV).
- We have higher rates of death from stroke.
- We have a much greater prevalence of kidney disease.
- HIV-positive people are at greater risk for fatty liver/non-alcoholic hepatic steatosis (NASH) as we have all the risk factors: diabetes, heart disease, lipid abnormalities, hypertension, metabolic abnormalities—it’s estimated NASH will one day be the greatest cause for liver transplantation.
- We have twice the rate of osteoporosis, fractures, and falls.
- Women aging with HIV face more health challenges than men.
- Depression, anxiety, and insomnia are three to seven times higher among OAWH.
- We have a greater burden of polypharmacy, more disability, more cognitive impairment, and a loss of daily independent functioning.
- A recent study from London reported that 77% of deaths among PLWH were due to comorbidities—AIDS-related conditions were the cause of death in only 15–25% of deaths.

There are only two HIV and aging/geriatric clinics in the U.S.—at Cornell and the University of California—San Francisco—but the problem extends far beyond those two clinics. Jules says we need clinics everywhere that provide special support services for OAWH and that offer better education for clinicians and expanded broader research.

Many people who are stuck in overwhelmed HIV clinics do not get the attention they deserve. One study last year found that 50% of OAWH in Washington, D.C. did not get treatment for comorbidities. In New York City, a significant number of OAWH are already homebound, depressed, and socially isolated. They do not have the wherewithal to seek out expensive treatments—which may or may not work.

Jules explains that special care and better coordination are vital to ensure that patients see the specialists they need and receive necessary treatment and services. These include better patient contact and follow-up, detailed in-depth attention, homecare, food shopping, and household maintenance. “We need to address social isolation and the fact that many are emotionally and physically impaired. With increasing disability, the need will also increase for housing and institutionalizing of those who are unable to care for themselves at home. Integral to the HIV epidemic is a population who are often living alone—having lost friends and family, unlike the HIV-negative general population, who are more likely to have family and children to assist who can care for them as they age.” As he points out, many OAWH do not have this.

EXERPT FROM <https://www.positivelyaware.com/articles/activists>

Jules says that some older patients are so cognitively impaired they are unable to stay in follow-up; they don't even recall what their specialists recommended. Moreover, their primary care provider does not have the time to address this either—which is why he says we need extended visit times, care coordination, and special support services.

Jules feels that the large community-based AIDS service organizations in major U.S. cities and Washington, D.C. policy groups have done little to influence federal or local officials to address these needs.

He points to the work being done in Europe, where the community has formed an aging coalition and meetings have been held across the continent to influence government officials. “The European AIDS Treatment Group (EATG) and many other advocates are leading this movement, but there is nothing like this in the U.S.,” says Jules.

As determined and tireless as Jules is, he can't affect these policy changes on his own. His call to action needs an engaged community response. We asked Jules what we need to do.

“Please tell U.S. government officials and advocates that we need to better address this ‘new’ HIV epidemic.”

- We need special support services for those aging who need them in their clinics.
- We need more education for clinicians regarding prevention, care and treatment for key comorbid diseases including heart disease; brain, neurologic and cognitive impairment; and depression and social isolation—reaching out to the homebound.
- We need broader and expanded research, including more patient-focused research. NIAID [National Institute on Allergy and Infectious Diseases] priorities list aging/comorbidities in the top five, but this is a red herring. In reality NIAID and OAR [Office of AIDS Research] have made it clear to researchers that funding is severely limited in this field. Many study funding requests are denied. Requests to NIAID, the Department of Health and Human Services, and OAR to begin addressing these problems are ignored. Long-term care and living plans are not even discussed.

REVIEW ARTICLE

Why we need to re-define long-term success for people living with HIV

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Abstract

Over the past few decades, the life expectancy of people living with HIV has markedly improved due to the advances in HIV diagnosis, linkage to care, and treatment. However, with these advances, a new set of challenges has emerged that must be addressed to ensure the long-term well-being of people living with HIV. In this article, as part of a wider journal supplement, we explore the unmet needs and challenges across the HIV continuum of care and re-define what long-term success looks like to support the healthy ageing of all people affected by HIV.

KEYWORDS

AIDS, antiretroviral therapy, health-related quality of life, HIV, person-centred health systems, stigma, well-being

Globally, approximately 38 million people are living with HIV, and an estimated 1.5 million new infections occur each year [1]. This translates to 4000 new HIV infections every day [1]. Despite a substantial reduction in the number

of new annual infections from a peak of 3.2 million in 1996 [1], the number of people living longer with HIV has been increasing due to the successful scale-up of antiretroviral therapy (ART) and subsequent gains in life expectancy [2].

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Since the discovery in the 1980s that HIV causes AIDS, a global multidisciplinary effort has led to the development of novel and effective HIV treatments and preventive strategies [3–5]. This effort has resulted in over 30 antiretroviral drugs being approved by regulatory authorities [5] and has paved the way for a new era of effective combination therapies [6]. ARTs can achieve long-term treatment success by durably maintaining reductions in viral load, often to undetectable levels [6], offering people living with HIV the potential for improved life expectancy approximating that of the general population [7]. The development of such effective treatments, alongside the ability to rapidly diagnose people living with HIV, has transformed the HIV management landscape and provided hope for those affected. As such, HIV infection has become a chronic, medically manageable condition for most people who have access to ART [8]. However, with these advancements, new challenges have emerged that need to be addressed if the sustained well-being of people living with HIV is to be achieved.

A substantial proportion of people living with HIV do not consistently receive ART, despite programmes that support global access to these medications [1]. As of 2021, it was estimated that 9.7 million people living with HIV worldwide were not receiving ART [1]. The structural and societal barriers that persist across the HIV continuum of care have continued to impede access, uptake, and maintenance of ART and have thus affected the ability of people living with HIV to achieve and sustain undetectable viral loads [9]. Individuals who are not receiving ART remain at higher risk of opportunistic conditions and premature death than those benefitting from ready access to ART [10]. To maintain and achieve epidemic control, universal access to ART must become the global standard for treating people living with HIV [11].

Among those with access to effective HIV therapies, durable viral suppression, and the longevity it offers, has meant that addressing new and perennial challenges to well-being is now essential. Compared with the general population, people living with HIV have a greater risk of multimorbidity, including physical and mental health conditions, which can impact their health-related quality of life (HRQoL) [12]. Many conditions associated with ageing, such as cardiovascular disease, fatty liver disease, central nervous system disorders, fracture risk, and osteoporosis, are more common in people living with HIV than in the general population [13, 14]. The synergistic effects of ageing with HIV can promote progression to states of frailty that reduce the HRQoL of people affected by HIV [15]. As such, in addition to viraemic control, the prevention and management of comorbidities has become a priority objective for most healthcare professionals (HCPs) caring for people living with HIV where ART is freely accessible. Much of the discourse on HIV-

associated comorbidities has focussed on organ systems, with less attention paid to the substantial impact of mental health conditions, which are disproportionately prevalent among people living with HIV [16]. Often, mental health conditions are undetected and remain untreated [16–19], and this has been further exacerbated by the COVID-19 pandemic [20]. As a result, mental health conditions persist as obstacles to engagement in care and healthy ageing [16].

The physical and mental health issues that people living with HIV encounter as they age can be compounded by societal forces, such as stigma and discrimination [21]. HIV-related stigma is a complex phenomenon with diverse manifestations and intersections, occurring at different levels, such as institutional, organizational, community, interpersonal, and intrapersonal levels [22]. Both stigmatization of HIV and discrimination against those who live with HIV have a significant impact on HRQoL and health outcomes, including increased rates of depression and reduced levels of adherence to treatment [21]. Internalized stigma (i.e., felt or self-stigma) is particularly prevalent among people living with and at risk for HIV and can compromise HIV prevention, care, and treatment as well as HRQoL [23]. In addition to their direct impact on the individual, stigma and discrimination can also be barriers at each point along the HIV care continuum, from testing and linkage to care to viral suppression and beyond [24]. Although attitudes are changing, stigma and discrimination can still occur from a variety of sources, ranging from healthcare workers and employers to friends and family [25]. For example, in The People Living with HIV Stigma Index survey, conducted in over 50 countries, one in eight people living with HIV reported having been denied access to healthcare services due to their HIV status [26]. In addition, at least 68 countries have laws that specifically criminalize HIV non-disclosure, exposure, or transmission [27].

Alongside these sources of stigma and discrimination, structural factors, including poverty and isolation, can further challenge the well-being of people living with HIV [12]. Circumstances of poverty, such as food insecurity and unstable housing, are highly prevalent among people living with HIV, particularly as they age [28–30]. Evidence suggests that the presence of poverty impedes even the most ambitious efforts to end the HIV epidemic [31]. Social isolation and exclusion, often experienced by people living with HIV, also lead to health inequities [32] and can have a negative impact on physical and mental health [33]. This demands a need for the scale-up of novel approaches that recognize and address structural drivers of health and social disparities.

The COVID-19 pandemic has exacerbated many of the threats to the well-being of people living with HIV. Mitigation strategies, including mass physical distancing

and social isolation, led to increased social isolation and loneliness, which are already epidemic among people living with HIV [34]. Policies also designed to reduce SARS-CoV-2 transmission restricted access to clinics and care, resulting in an increase in online services as an alternative approach to in-person HIV care [35]. While the benefits and barriers of these services have been noted, as we emerge from the pandemic, consideration of patient preference will be key to ensuring a person-centred approach and avoid a digital divide in which some key populations are less able to access the care they need [35]. With ongoing financial, political, and climate crises, it is critical that people living with HIV are specifically considered in any governmental or organizational interventions to protect them from further health consequences.

Another barrier key to addressing the myriad of existing challenges to living long and well with HIV is the fact that HIV care is not always integrated with other care needs and services [36]. HCPs and people living with HIV note a lack of continuity of healthcare service provision between primary and speciality care [37, 38]. Poorly integrated care can be time consuming, waste resources, result in conflicting advice and, ultimately, reduced adherence to treatment and loss of engagement in care [37, 39, 40]. Multidisciplinary teams currently face several communication and coordination-related challenges that can impede the efficiency and consistency of services. For example, some people may lack confidence that other HCPs adequately understand the complexities and challenges of HIV and may also be uncertain about where to find support for managing their long-term conditions [37]. Implementing an integrated approach, one that is sensitive to the diverse needs of people living with HIV, can help improve long-term health [41].

In 2014, in response to the shift in approach for HIV management, the Joint United Nations Programme on HIV/AIDS (UNAIDS) developed a series of ambitious targets to end the AIDS epidemic by 2030. The UNAIDS 90-90-90 treatment targets aimed for 90% of people living with HIV to know their HIV status, 90% of people living with HIV to be receiving ART, and 90% of people receiving ART to achieve viral suppression [42]. Recent figures indicate that the viral suppression target is close to being achieved, with an estimated 88% of people living with HIV globally and receiving ART having already reached this goal [11]. A set of interim targets for 2025 were subsequently developed, which maintain the same overall approach but adopt a more ambitious target of 95% for each of the steps of the cascade [11]. These targets also align with the World Health Organization's (WHO) 2022–2030 global health sector strategy for HIV, which calls for a more focused effort, including a wide range of targets, on reaching those most affected and at risk for HIV in order to address inequities [43].

While sustained viral suppression is essential to improving life expectancy for people living with HIV [7, 11], reducing secondary transmission [44] and meeting UNAIDS and WHO targets [42, 43], controlling viraemia alone is not a sufficient defining point for achieving long-term success (LTS) for people living with HIV. As discussed, it has become evident that all people affected by HIV still must confront both persisting and new challenges to their HRQoL and overall well-being. Therefore, there is a need for HCPs, policymakers, and commissioners of HIV services and treatments to adjust their focus from viral suppression alone to a broader vision that considers control of viraemia as a minimum and essential contributor to LTS. With this in mind, Lazarus and colleagues proposed a fourth target to complement the three aforementioned UNAIDS targets [45]. This additional target aims for 90% of people living with HIV to have good HRQoL and is directed at three key domains focussing on multimorbidity, self-perceived QoL, and stigma and discrimination [12].

With the threat of progression to AIDS largely removed, the communities of HCPs and people living with HIV are challenged to co-produce strategies that support every person living with HIV being able to live their best life. Creating the conditions for successful long-term medical management will move us past laboratory metrics as measures of treatment success to recognizing the aforementioned determinates of healthy living and ageing with HIV. Given the complexity of the experience of living with HIV, a multidisciplinary, integrated, person-centred approach with active patient participation that reflects the major concerns of people living with HIV is increasingly being adopted in HIV management. With this approach, the HIV clinical care perspective is widened to integrate overall well-being and healthy ageing in a supportive environment. As a complement to the traditional management and monitoring of HIV, more person-centred, self-reported assessments of health and well-being (e.g., patient-reported outcomes) should be harnessed to help identify priority issues that could then be addressed [46, 47]. This holistic approach recognizes HIV treatment as one part of a larger vision that defines LTS in living and thriving with HIV. In our subsequent article, we detail a new framework developed to help guide clinical practice, incorporating elements of holistic care alongside effective treatments, and establishing LTS as a new goal in the next phase of HIV management. Reaching this goal will require the HIV community and wider society to work together to make LTS a reality for everyone living with HIV.

AUTHOR CONTRIBUTIONS

All authors were part of the expert panel mentioned in this supplement. All authors contributed to the concept of this supplement and in drafting and revising the text. All authors read and approved the final version for publication.

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Frailty in People Living with HIV

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Abstract

Purpose of Review Different factors contribute to the decreased overall long-term survival in treated people living with HIV (PLWH). This paper will review the state of physical frailty which limits successful aging in PLWH.

Recent Findings Identifiable events on the continuum from clinical normality to heightened risk of adverse health outcomes contribute to frailty. These center on chronic inflammation leading to destabilization of autoregulated physiologic systems challenged by environmental and biologic challenges. Frailty assessment can inform the profile of aging PLWH at increased risk of common age-related disorders and geriatric syndromes. Biologic and psychosocial risk factors promoting progression to and reversion from a dynamic state of frailty are being investigated, allowing for preventative interventions to be considered.

Summary Insights gained from studying frail PLWH will help adapt an interdisciplinary geriatric model of health care for selected PLWH. This will improve the health and well-being of aging PLWH.

Keywords Frailty · HIV · Aging · Chronic inflammation · Geriatric syndromes

Introduction

This paper will review the current status of the physical frailty syndrome in people living with HIV (PLWH). Other types of frailty, including social frailty [1] and cognitive frailty [2], are also being investigated in the general population. This review will focus on physical frailty.

The course of HIV infection has changed dramatically in less than a generation. HIV is now a chronic illness for most PLWH with consistent access to effective combination antiretroviral therapy (cART) [3]. Long-term survival approaches that of the general population, and is similar in an increasing minority of PLWH [4]. This, plus the increasing age of recent seroconverters, of whom 20% are older than 50 [5], has resulted in the mean age of PLWH in high-income

countries to currently be in the 50's [4]. By 2030, 73% will be older than 50 and 39% older than 60 [6]. This will significantly impact the type of health care required to assure ongoing improvement in healthspan.

Despite cART-related benefits on health and quality of life (QOL), an increase in some common age-related conditions also occurs [7]. This may represent an accelerated aging phenotype, whereby the increased rate of complications occurs earlier than in a control group of the same age. This is supported by studies of DNA-methylation [8], telomere length [9], and immune-senescence [10]. An alternative explanation, termed accentuated aging [11••], postulates that these comorbidities occur more frequently but at a similar age in PLWH. Incomplete cART-dependent control of HIV replication leads to immune activation and chronic inflammation which increases vulnerability to these conditions [12], as occurs in the elderly population [13]. A recent study in male PLWH using a 10 marker aging panel (MARK-AGE) interpreted age advancement of approximately 13 years compared with controls as consistent with accentuated aging [14•]. In contrast, an analysis of age-related diseases in PLWH and matched seronegative controls in Denmark showed that the age-standardized and relative risks of most conditions did not increase after HIV diagnosis [15].

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Geriatric Syndromes in PLWH

An increase in geriatric syndromes also occurs in older PLWH [16•]. These include frailty, polypharmacy, falls and impaired mobility, cognitive decline and mood disorders, sensory dysfunction (vision, hearing, smell), incontinence, and sarcopenia. Broadly, these conditions occur often in the elderly, do not fit into discrete disease categories, have multifactorial etiologies, non-specific clinical presentations, typically involve multiple organ systems, and are challenging to manage [17•]. Frailty may be the most difficult to define, evaluate, and treat.

Frailty as a Geriatric Syndrome

Fundamentally, frailty represents a unique condition of increased risk. The word frailty is derived from the Latin word *fragilis*, meaning breakable. Fried promoted the concept that frailty was a complex syndrome in the elderly with manifestations distinct from concurrent disabilities or co-morbidities. This was operationalized as the Frailty Phenotype (FP) in a cohort of men and women older than 65 enrolled in the Cardiovascular Health Study (CHS) [18••]. Rockwood proposed an alternative view, the Frailty Index (FI), which considers frailty as a state determined by the interaction between diverse assets and deficits and predicts an older person's ability to function independently [19••].

Diagnosis, Epidemiology, and Outcomes of Frailty

Clinicians and investigators agree on its fundamental attributes and outcomes, although the ability to easily diagnose frailty is limited by the lack of a simple operational definition. At least 67 metrics with overlapping criteria have been developed [20]. Both the FP and the FI are used to diagnose frailty mostly in research rather than in clinical settings.

The FP is more commonly used and is diagnosed if any three of five predefined physical conditions exist: unintentional weight loss, self-reported exhaustion, weak hand grip strength, slow gait speed, and low physical activity [18••]. Persons with one or two conditions are pre-frail, while those without any are non-frail.

The FI is based on the age-related accumulation of diverse health deficits. The FI is calculated as the proportion of common health deficits an individual has from among a predetermined set of conditions, regardless of whether they are clinical signs, symptoms,

physical, cognitive or social impairments, or specific laboratory tests and diagnoses. The risk of adverse outcomes correlates with an increasing FI. Although the continuous nature of the FI does not readily allow for a diagnosis of frailty, a FI > 0.25 generally identifies a state of frailty in older community-living persons [21]. A FI above 0.7 identifies an individual with multiple acute conditions with poor short-term prognosis. Importantly, the choice of deficits assessed is not fixed as long as certain basic criteria are met [22] although a minimum of 30 conditions are required.

While the FP may be easier to apply, as it utilizes three questions and two physical tests, the necessary evaluations are not routinely performed in the common clinic settings and require personnel trained to administer them. Conversely, although the FI may seem challenging to operationalize, it has greater precision to discriminate individual risk. It can also be easily determined if an electronic health record (EHR) is available [23].

Both models identify subgroups who are frail in the absence of disabilities or co-morbidities. Few studies have focused attention on this subgroup, the prevalence of which varies from 2 to 25% [18, 24, 25]. Importantly, both major models agree that frailty is a dynamic condition and may be reversible [26].

Both scores have been validated in diverse populations and predict similar outcomes. The prevalence of prefrailty and frailty in the originally described CHS cohort was about 57% and 7%, respectively, in subjects over 65, with more women than men being frail. The prevalence of being FP+ was about 30% in those older than 80 [18••]. The prevalence of frailty using the FI was 22% for persons living in the community older than 65 and more than 40% in those older than 85 [21]. In studies comparing the two scores, the correlation between them is 0.65 [27].

Other more accessible tools to diagnose frailty have been developed. These include the 9-point clinical frailty scale [28], the multidimensional Edmonton frail scale (EFS) [29], the 5 item FRAIL questionnaire [30], the combined patient derived and provider determined Gerontopole instrument [31], and self-administered scores [32], among others.

A recent meta-analysis showed that the most commonly used frailty metrics were all significantly associated with an increased risk of overall mortality, hospitalization and loss of independence, disability, referring to deficits in activities of daily living (ADLs) and instrumental activities of daily living (IADLs), as well as falls, fractures, and cognitive decline. Significantly, prefrailty was also associated with an increased risk of mortality, hospitalization, institutionalization, disabilities in either ADLs or IADLs, as well as falls and fractures [33•].

Biology of Frailty

General Population

A progressive loss of normal homeostatic processes in diverse physiologic systems occurring in response to environmental and biologic stressors leads to frailty. This results in adverse outcomes which can be characterized at the cellular, tissue, organ and whole person level [34]. Although these changes also occur in physiologic aging, a heightened degree of dysfunction is central to the development of frailty [35].

Immuno-senescence plays a key role, as determined by activation of the multiple cellular components of the innate immune system, plus changes in the adaptive immune system. This results in a chronic inflammatory state [36] characterized by reduced numbers of naïve T cells, an increase in terminally differentiated CD8+ and CD28– T cells and a low CD4+/CD8+ T-cell ratio [37]. Chronic CMV infection contributes to both immune-senescence and frailty [38]. The combination of immune features plus CMV seropositivity is referred to as the Immune Risk Profile (IRP) and increases risk of mortality in the very old [39, 40]. Interestingly most centenarians have a normal CD4/CD8 T cell ratio [41]. The term inflammaging encompasses the aging-related dysregulation between the innate and adaptive immune systems [42]. Triggers include accumulation of damaged cells and their impaired elimination, entry of microbial products into the circulation via an aging and leaky gastrointestinal tract alongside changes in the gut microbiome, accumulation of senescent cells secreting proinflammatory cytokines, increased activation of the coagulation system, impaired regulation of the complement cascade, and mitochondrialopathies [43••].

Commonly determined serum markers of these processes include increased levels of proinflammatory cytokines, particularly C-reactive protein (CRP), interleukin 6 (IL-6), tumor necrosis factor alpha (TNF- α), and coagulation factors including fibrinogen, Factor VIII, and D-dimer [44]. A meta-analysis confirmed the increased levels of these markers in both frail and pre-frail elderly subjects [45].

Contributing hormonal changes include decreased insulin-like growth factor-1 levels, decreased testosterone and dehydroepiandrosterone-sulfate levels, and abnormalities in cortisol secretion characteristic of a chronic stress response [46]. An important consequence is sarcopenia, a geriatric syndrome characterized by progressive loss of muscle mass and power which occurs frequently in persons with physical frailty [47].

Other fundamental contributors include epigenetic changes [48], telomere shortening associated with the frailty phenotype [49], genetic regulation of fundamental biologic pathways controlling apoptosis, transcription and biosynthesis [50], and age-related body composition changes. These include abdominal obesity, itself

contributing to chronic inflammation, and loss of lean muscle mass [51].

Persons Living with HIV

Several determinants of frailty in the elderly also occur in PLWH, including sarcopenia [52] and abdominal obesity. The latter is of multifactorial etiology including toxicities associated with several early generation antiretroviral drugs [53] but may occur even with recently introduced ones [54•]. Telomere changes [55], and both HIV [56] and drug induced mitochondrial dysfunction also occur [57]. The IRP profile has been identified in PLWH [58]. A persistently low CD4/CD8 ratio occurring in most treated PLWH has clinical implications [59•] and has been associated with frailty [60, 61].

Factors unique to PLWH include untreated HIV infection causing significant immune activation which improves but does not return to baseline with cART [62]. This is related to ongoing low-level HIV replication in lymphoid tissues and sanctuary sites, microbial translocation of bacterial products into the circulation via an imperfectly cART-restored gastrointestinal epithelium, and frequent coinfection with Hepatitis B, C, and CMV [63].

The Multicenter AIDS Cohort Study (MACS) demonstrated elevated levels of the immune activation markers CD8+/CD38+, CD8+/HLA-DR+, and IL-6 in frail subjects [64]. CRP was 50% higher in frail PLWH compared with non-frail subjects [65]. The association between frailty and increased proinflammatory cytokines, decreased-free testosterone, and dehydroepiandrosterone supports the multifactorial etiology of frailty [66]. However, important differences in the nature of immune dysregulation in the two populations were suggested by distinct interactions between CD4+ regulatory T cells (Tregs) in frail PLWH and controls [67]. A role for CMV as a cofactor was demonstrated in both PLWH and controls, although the highest IL-2 responses to CMV predicted frailty only in the controls [68].

Frailty Assessment in Aging PLWH

Frailty has been evaluated in non-elderly populations, including dialysis patients [69], and persons with collagen-vascular diseases [70]. A recent UK study found that between 3 and 5% of healthy, middle-aged persons were FP+ [71•]. Although concern has been raised whether frailty described in older persons can be adapted to younger populations using similar metrics, the clinical utility of these models is supported as they reliably predict similar outcomes. Similar issues have been raised in regard to PLWH, although reassurance was provided by the same distribution of abnormal FP parameters in both PLWH and controls [72].

Frailty in the Multicenter AIDS Cohort Study (MACS)

The MACS initially investigated similarities between frailty in the elderly and PLWH using a four-item adapted frailty-related phenotype (aFRP). In untreated, seropositive, Caucasian, college-educated men, with a mean age of 55, the prevalence of frailty, 3.4%, was similar to that of HIV seronegative males older than 65 from the same cohort [73]. An association between frailty and immuno-virologic parameters was demonstrated by an increasing risk of being FRP+ relative to a CD4 count $< 500/\text{mm}^3$ and an HIV viral load $> 50,000$ copies/mL [74]. The clinical consequences of frailty were shown by an increased risk of AIDS or death in treatment naïve PLWH starting cART [75]. Frailty, regardless of HIV status, occurred without concurrent co-morbidities. Risk factors included older age and non-Hispanic black ethnicity. Potentially manageable risks included a history of AIDS, cigarette smoking, hepatitis C infection, depression, diabetes, and kidney disease. Higher education was protective. Although frailty is dynamic, PLWH who became frail were more likely than controls to remain frail at follow-up. [76].

Other Studies Using the FP to Diagnose Frailty

The AIDS Linked to the Intravenous Experience (ALIVE) cohort showed that 12% of mostly male, African-American injection drug users with a median age of 49 were FP+. Risk factors for frailty included HIV infection, older age and female sex, while potentially controllable risks, as in the MACS, included advanced HIV disease, lower education, depression and multimorbidity. Being frail, regardless of HIV status, was a risk factor for overall mortality [77], all-cause hospitalizations, as well as chronic conditions such as psychiatric, cardiovascular, and pulmonary diseases [78].

Disability, determined as impairments in IADLs, was investigated in the HAILO (HIV Infection, Aging, and Immune Function Long-Term Observational Study) Cohort, a prospective, observational, long-term study of treatment naïve PLWH starting cART, with median age 51. The prevalence of pre-frailty and being FP+ was 37% and 6% respectively. There was minimal overlap between frailty and disability, although 52% of frail PLH had at least 1 disability [79]. Frailty was associated with increased incidence of CVD, type II diabetes, and with increased mortality [80]. Modifiable risk factors for frailty including neurocognitive impairment, obesity, smoking, choice of initial cART (with NNRTI [non-nucleoside reverse transcriptase inhibitor]-based cART increasing risk of frailty), and level of education. Physical activity and moderate alcohol use were protective [81].

More seropositive women than men are FP+ [82, 83], as in the general population [84]. In the Women's Interagency HIV Study (WIHS), consisting of mostly low-income, African-American non-Hispanic women, most with secondary

education and a mean age of 39, 17.3% of seropositives were FP+ versus 10.0% of uninfected women [85]. Impaired bone health is more common in FP+ PLWH [80, 86, 87]. Functional impairment, determined by reduced gait speed and poor performance on the Short Physical Performance Battery (SPPB), occurred in 20% and 55%, respectively, in a cohort of Spanish PLWH with a median age of 61, of whom 51% were pre-frail and 15% were FP+ [61]. In an analysis of mostly non-Caucasian Brazilian PLWH with a median age of 55, the 19% who were FP+ were more likely to have a poor quality of life determined using the 36-item Short Form Survey [82]. In a study of younger, treated PLWH in South Africa with a mean age of 41, 19.4% were frail using an adapted FP, compared with 13.3% of seronegative controls [83]. This finding in a low-income country highlights the economic burden and impact on healthcare delivery that frailty will have as the prevalence of aging PLWH increases in all regions.

Frailty Assessment of PLWH Using Other Metrics

Veterans Aging Cohort Study Index (VACS-I)

The VACS-I was developed as a multifactorial mortality index in HIV infected and uninfected American veterans using commonly available clinical and laboratory parameters in addition to standard HIV-related metrics. It is associated with increased risk of all-cause mortality, hospitalization, admission to intensive care units, physical functional status, cognitive decline, and increased markers of inflammation [88, 89]. Because these outcomes are similar to those in frail persons, it has also been considered as a frailty index [86], analogous to the deficit accumulation model [90]. A higher VACS-I was associated with being either pre-frail or FP+, although the baseline score could not predict change in frailty status [91]. The VACS-I also predicted hospitalization or mortality more accurately than an adapted FP. However, the prevalence of being FP+ in PLWH with undetectable HIV-RNA or in uninfected controls was similar, 2% and 2.8%, respectively [90].

Frailty Index

Frailty determined using the FI has been extensively studied by the Modena HIV Metabolic Clinic (MHMC) cohort. Using a 37-item-derived FI, which importantly did not include any HIV-related variables, the median FI was 0.30 in the cohort of treated, mostly male PLWH with a mean age of 46. The FI was a significant predictor of survival and development of new multimorbidity [92]. A further study showed that potentially modifiable personal, environmental and HIV-related factors were independent contributors to the FI [93]. The MHMC cohort also showed that CT determined-thymus size, an essential component of immune function in the general population, and of immune recovery in treated PLWH [94], was

inversely related to the FI, supporting the interaction between immunity and frailty [95]. An Australian study in males with a median age of 59, diagnosed as frail using the FI, found an independent association with sCD163, suggesting that the FI may identify frailty biomarkers [96].

Frailty and Other Clinical Conditions in PLWH

Several studies have shown an association between measures of abdominal obesity and being FP+, regardless of HIV status, [72, 97, 98] highlighting this as a potentially reversible lifestyle factor for frailty. Potentially treatable mild-to-moderate depression is diagnosed in about 50% of frail PLWH [99, 100], and occurs often in PLWH with neurocognitive impairment. Asymptomatic neurocognitive impairment (NCI) is a feature of aging PLWH [101]. Studies have investigated whether physical frailty is a risk factor for NCI in PLWH. A higher VACS-I, suggestive of frailty, predicted the presence of NCI in a cohort with a mean age of 41 [99]. The Italian MHMC cohort study found that a lower FI was associated with successful cognitive aging, defined as the absence of depression, cognitive, and functional impairment [102]. Participants in the HAILO study who were both FP+ and had NCI had an increased risk of adverse health events including falls, disability, and overall mortality [103]. Being FP+ has also been associated with NCI in PLWH in diverse geographic regions including China [98] and Mexico [104]. These consistent findings using different metrics support the emerging construct of cognitive frailty as an important condition in PLWH.

Studies Comparing Frailty Metrics in PLWH

As in the general population [105], studies have compared frailty classifications in PLWH. In a subgroup of the MHMC cohort with a mean age of 46, the VACS-I, compared with the FI, more accurately predicted 2-year but not 5-year mortality [92]. The FI was compared with the FP in a different subgroup of the MHMC cohort with a mean age of 54, of whom 52% were pre-frail and 3.1% were FP+. The FI had a greater association than the FP with baseline factors of age, nadir CD4 count and with adverse events including co-morbidities, falls, and disability [106]. Overall, it is premature to recommend a particular frailty metric as more reliable to use for all PLWH.

Screening for Frailty and Management Principles

Screening

Diagnosing an older individual as frail has relevance beyond simply identifying a condition associated with adverse

outcomes. For example, frailty is an important risk factor for perioperative complications. Pre-habilitation clinics, where identified preoperative risks for postoperative morbidity can be modified, improve outcomes [107]. An interdisciplinary geriatric approach is increasingly recommended for selected aging PLWH, particularly those diagnosed as frail [108]. Other surrogates besides frailty can help to identify those PLWH who may benefit from a geriatric evaluation. These include polypharmacy, which is more common in PLWH compared to controls [109], impaired functional status as determined by gait speed or the comprehensive SPPB, and the presence of geriatric syndromes. Although distinct conditions, important interactions occur in PLWH between frailty, functional status, and disabilities [110]. Both functional impairment and disabilities occur in PLWH [111], especially in those with concurrent geriatric syndromes [110]. A combination of immune parameters, (e.g., a low nadir CD4 count < 200, a 'plateau' CD4 < 500 on suppressive cART, and a CD4/CD8 ratio < 1.0) may also identify frail PLWH requiring a geriatric evaluation [60, 61].

Frailty is a dynamic state. In a study of over 300 treated PLWH over a 12-month follow-up period, most non-frail and pre-frail persons maintained their status, whereas most who were frail reverted to prefrailty [91]. Pre-frailty, occurring in 30–60% of PLWH, is important to identify, as it is also associated with adverse outcomes. Factors associated with progression to frailty in PLWH in the MACS have been described above. Only younger age was associated with reversion from frailty [76]. Guaraldi investigated predictors of frailty transition over 4 years in the MHMC Cohort. Baseline FI, female sex, duration of HIV infection and cART exposure, and smoking history independently predicted FI at follow-up [93].

At present, the clinical utility of geriatric referrals remains untested, and no guidelines are in place regarding which PLWH to refer. In the general population, persons older than 70 should be screened for frailty [112]. Based on data suggesting age-advancement of PLWH, it is reasonable to consider screening PLWH older than 50. The role of geriatricians as either expert consultants or as active members of the managing team is being clarified.

Management of Frail PLWH

An algorithm to identify PLWH who may benefit from an HIV-geriatrics assessment, including a Comprehensive Geriatric Assessment (CGA), has been proposed [113]. The goals of the CGA in the general population, in addition to assessing and managing multimorbidity and geriatric syndromes, are also to ensure follow-up with primary care providers and evaluating the impact of recommended interventions. The CGA has been evaluated in diverse clinical settings. Collectively, and accounting for logistic differences, the CGA improves quality of life, decreases the need for emergency

room visits and hospitalization, and maintains independence [114]. However, outcomes in one type of setting (e.g., acute care unit) do not necessarily translate to a different one (e.g., community clinic) [115]. Importantly, the process of performing a CGA need not be uniform, while maintaining the recommended “5 M’s” approach, assessing the following: mind and mood; mobility; medications; multimorbidity; and matters most (e.g., discharge from hospital, end-of-life planning) [116]. Rather than simply adopting the CGA model to PLWH, it is essential to determine how best to adapt it to this population. A modification applicable to PLWH has been recently suggested [117]. Various locally responsive models of providing care to older PLWH have been organized [118]. An early report reviewed the first 76 older PLWH (median age 67) referred to a dedicated academic geriatric-HIV clinic for a CGA on the basis of perceived need, but with no specific referral criteria. Adherence to recommendations was about 30% [119].

The general approach to managing frailty in the geriatric population includes specific recommendations arising from a CGA, exercise and appropriate rehabilitation interventions, nutritional support, and cognitive care. The long-term effectiveness of regular, multicomponent, long-duration exercise programs on reducing frailty remains to be established but a targeted approach is often successful [120]. PLWH with more impaired baseline functional status may achieve similar or greater improvements in exercise domains compared with controls [121]. Priorities for rehabilitation interventions to limit disability in PLWH have been established and early outcomes have been encouraging [122]. Sarcopenia, diagnosed most reliably by dual energy X-ray absorptiometry, is increasingly recognized in PLWH [123] and may respond to judicious exercise and nutritional supplements [124], awaiting the introduction of more specific pharmacotherapies.

cART reduces the prevalence of frailty [74]. A recent modeling analysis showed that the burden of frailty using the FI model has decreased in PLWH older than 50 over the past 10 years and is projected to decrease further from 26% to 7% between 2015 and 2030. However, frailty will increase from 43 to 52% in PLWH older than 75. This was interpreted as the “compression of frailty” in older age, a successful feature of current therapies [125]. These results support the current recommendations of the early diagnosis of HIV and prompt initiation of cART in older PLWH. A post hoc analysis of the START study showed that older PLWH were the main beneficiaries of early initiation of cART [126].

It is essential that the assessments and interventions discussed in regard to frailty in aging PLWH go beyond increasing survival and shift the focus to maintaining and improving functional status and QoL, as in the geriatric population. Quality of life represents an ongoing hurdle to fulfilling the proposed “fourth 90” of the UNAIDS 90-90-90 goals for PLWH [127]. The paradigm of successful aging emphasizes

better understanding of physical, social, and cognitive resilience as well as the evolving interactions between HIV, frailty, and intrinsic capacity [128, 129].

Conclusions

Pre-frailty and frailty affect more than 50% of effectively treated older PLWH. These states represent the clinical expression of the multifactorial decline of normally coordinated biologic systems to maintain physiologic homeostasis. Regardless of the tools used to diagnose them, they are associated with an increased risk of adverse health outcomes which contribute to the overall reduced survival and QoL of PLWH.

Both pre-frailty and frailty are potentially preventable and reversible. Risk factors increasing progression to, and importantly, promoting reversion from frailty, are under investigation. Encouragingly, several are lifestyle related and amenable to prevention and change, which does not need to be financially burdensome. Just as early cART was the main driver behind turning HIV/AIDS from a fatal disease into a chronic condition, so current cART may also be a key factor in reducing the progression along the frailty continuum. The vital lessons learned in providing humane and effective holistic patient-centered care to the elderly can be adapted to meet the latest challenges to confront aging PLWH. These will surely be met with the same vigorous determination which has marked the last 40 years struggle against HIV.

Compliance with Ethical Standards

Conflict of Interest No potential conflicts of interest relevant to this article were reported.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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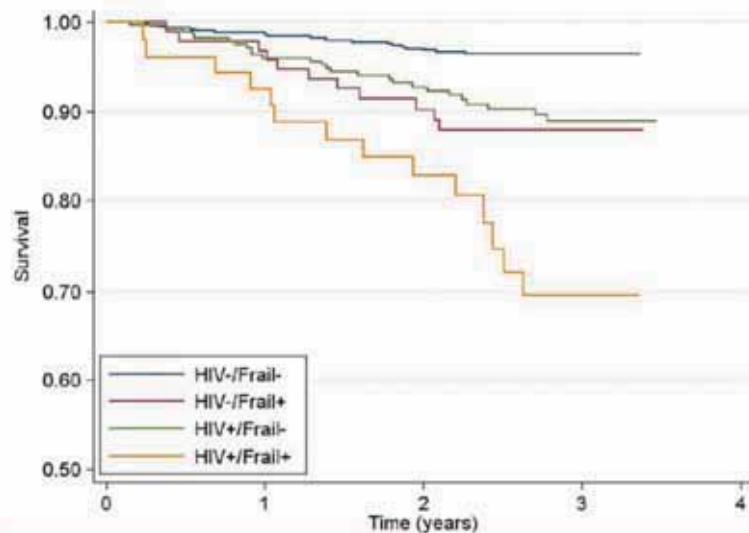
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Risk factors for Frailty in PLWH

Slides from NATAP webinar on Frailty by Kristine Erlandson.

Frailty is Associated with Lower Survival, Especially in PWH (ALIVE Cohort)



de 31 of 89

Piggott, et al. PLoS One 2013

Frailty or Physical Function Impairment may Predict Falls in Middle-Aged/Older Adults with or at Risk for HIV

Recurrent falls in ~ 30-40%

Falls associated with

- Difficulty with balance
- Exhaustion (from frailty)
- Weight loss (from frailty)
- Diabetes
- Medications:
 - Antidepressants
 - Opioids
 - Didanosine
 - Sleeping pills

Falls in MACS Associated with:

- Time to stand
- Pre-frailty (but not frailty)
- Confidence with balance

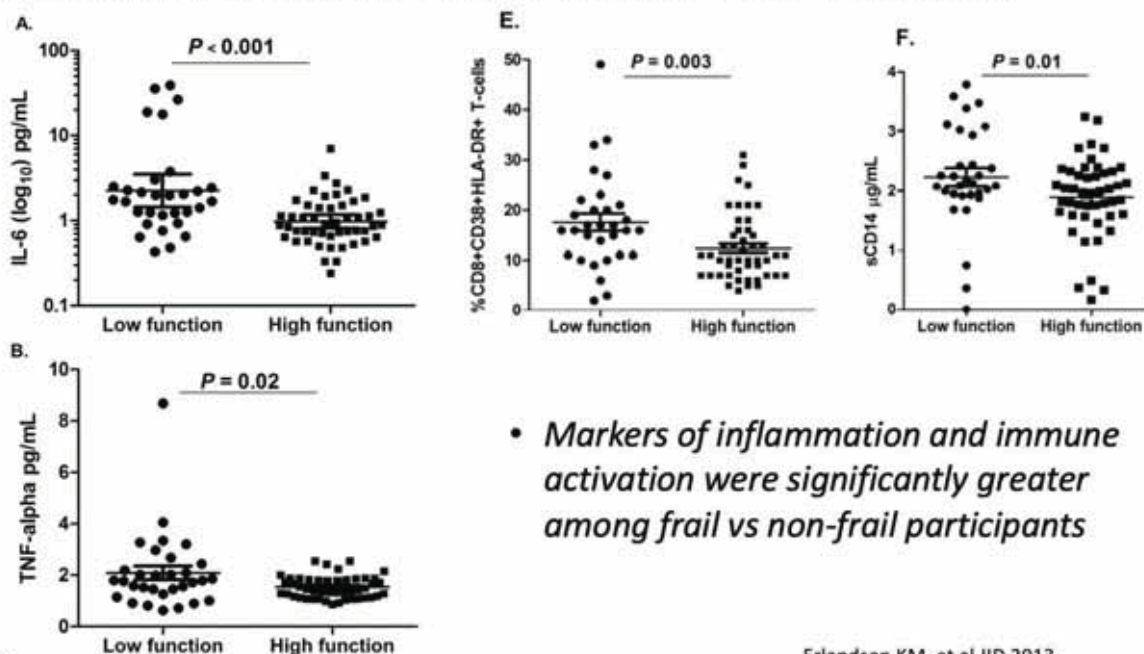
Falls in WIHS Associated with:

- Frailty
- Exhaustion (from frailty)
- Weight loss

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Erlandson JAIDS 2012; Erlandson JAIDS 2019; Sharma Antivir Ther 2019

Inflammation and Immune Activation



slide 29 of 1

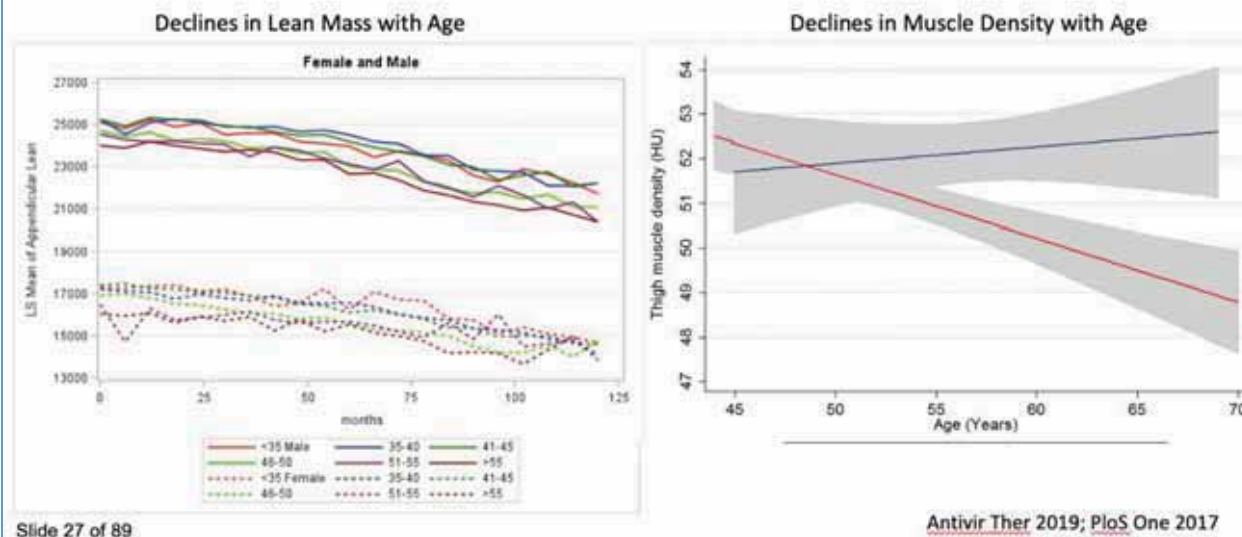
Do These Factors Contribute to Frailty in HIV?

- HAILO Cohort, n ~ 1000, age 45 and older, >90% undetectable VL
 - Frailty:
 - Age
 - Education
 - Insurance
 - Obesity
 - Lower **physical activity**
 - Initial randomized NNRTI
 - Smoking
 - Neurocognitive impairment
- Modifiable risk factors:
Smoking, weight, and physical activity
- ART may play a role
- NOT comorbidity driven

slide 28 of 89

Excellent review in Brothers, TD, et al JID 2014
Erlandson JID 2017

Muscle Changes in HIV with Aging



What do we know about ART on skeletal muscle mass & function?

- ART initiation typically associated with lean body mass gain (estimate of muscle mass) “return to health”
- Follow-up scans 7 years later found that after the initial ~ 3 years, lean body mass declined with ART (A5318)
- Re-read CT scans for area and density of the trunk (back/abdominal muscles)
 - The total muscle area increased, but not the ‘lean’ part of the muscle
 - Significant decreases in muscle density (ie, ↑↑ fat)
 - Gains in lean mass with initial ART may represent an increase in lower quality, fat-infiltrated muscle with ART

McComsey Clin Infect Dis 2016; Grant, et al. under review; Yareskeski, J Gerontol Biol Sci 2011

What Happens to Muscle with Age?

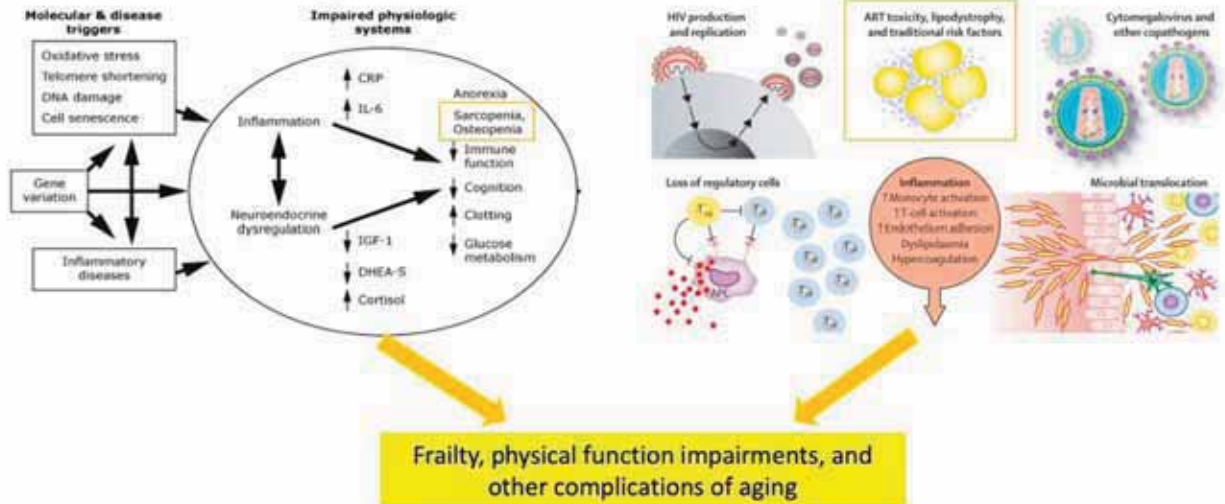
- Decline in muscle quantity (mass) and quality (function) begins ~ age 30-40
- Decline in *function* (such as strength) happens before a *muscle mass* decline
- Loss of both function and mass = sarcopenia, which is a strong predictor of increased morbidity and mortality
- Aging is also associated with increased fat within the muscle

Does Lipodystrophy (or similar fat changes) Contribute to Frailty

- Higher waist-to-hip ratio (marker of lipodystrophy of hip muscles, lipodystrophy abdomen) was associated with frailty
- Higher body mass index, greater fat mass, and trunk fat with lipodystrophy associated with frailty among older women with HIV
- Higher waist circumference associated frailty among older men with HIV

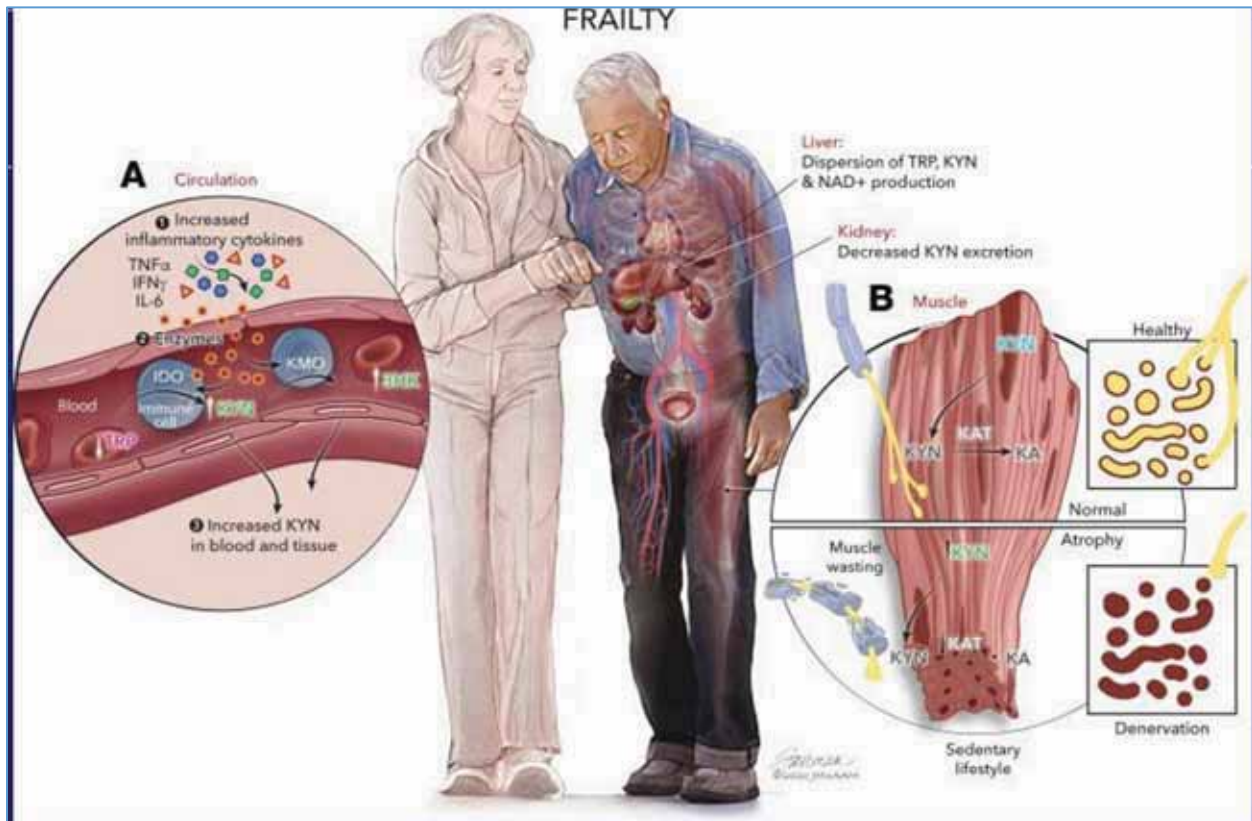
Kooij, AIDS 2016; Shah JAGS 2012; Hawkins AIDS 2018

What Factors Contribute to Frailty/Physical Function Impairment in HIV?



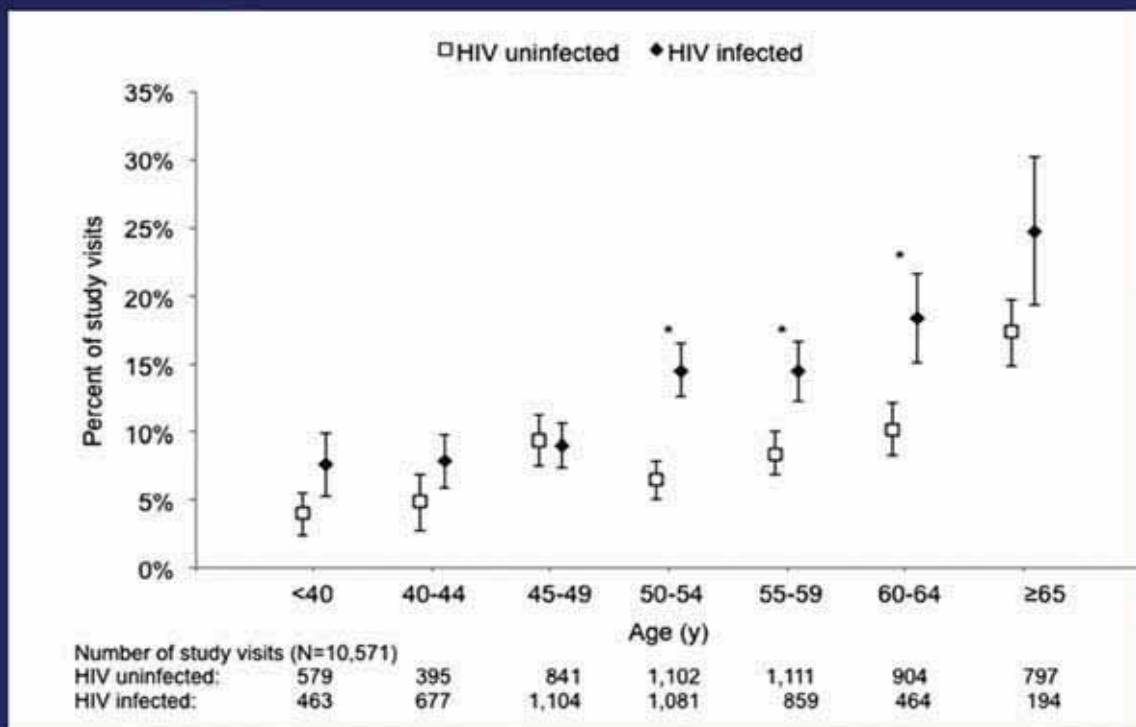
Slide 19 of 89

Deeks Lancet 2013



Westbrook, JCI, 2022

HIV+ Men Are More Frail At a Younger Age vs HIV- Men: MACS

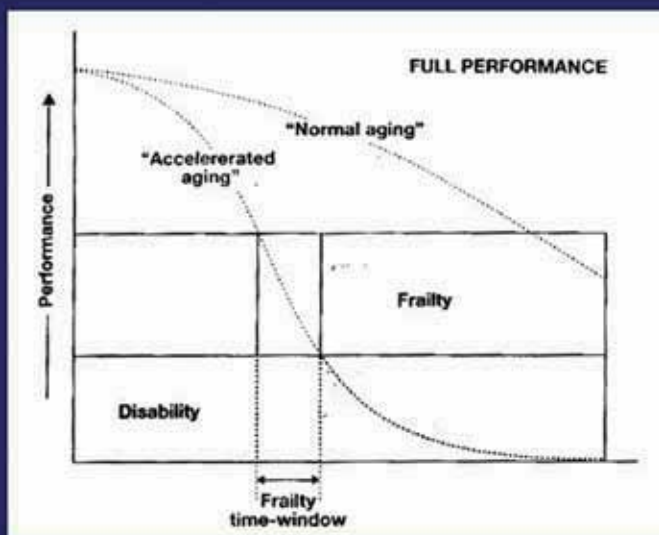


Althoff, J of Gerontology, 2013

Frailty: A Brief Overview

Slide 42

- **Weight loss**
- **Weakness**
- **Exhaustion**
- **Slowness**
- **↓ Physical Activity**



Fried LP, et al. 2005

Slide 1

Aging, Comorbidities, & HIV: CROI Update 2023



Todd T. Brown, MD, PhD
Professor of Medicine and Epidemiology
Division of Endocrinology, Diabetes, and Metabolism
Johns Hopkins University

Slide 2

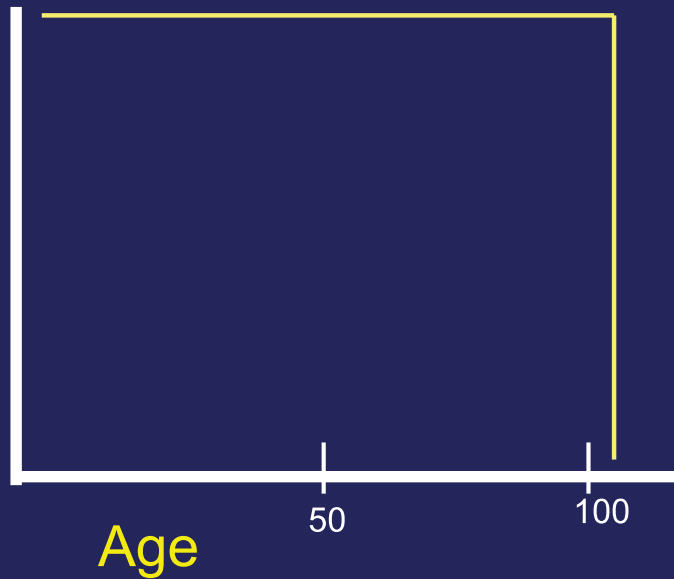
Disclosures

- Dr Brown has served as a consultant to Gilead, ViiV Healthcare, Merck, and Janssen.

Slide 3

The Ideal Life: Quality x Time

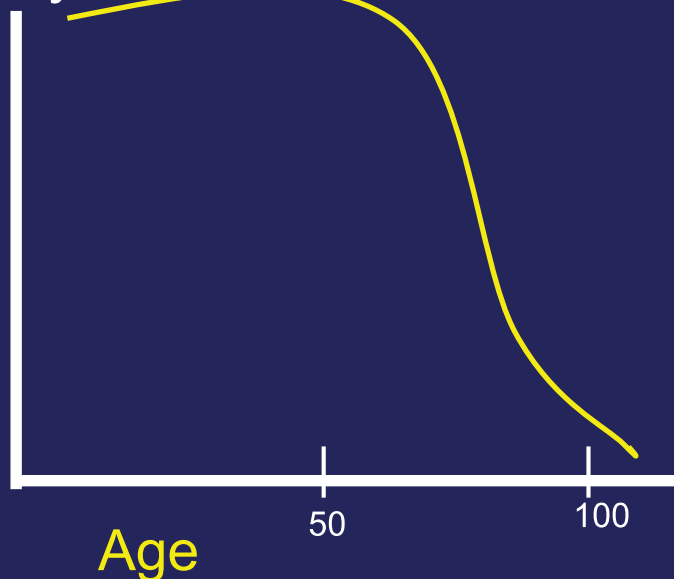
Quality of Life/
Physical &
Cognitive
Function



Slide 4

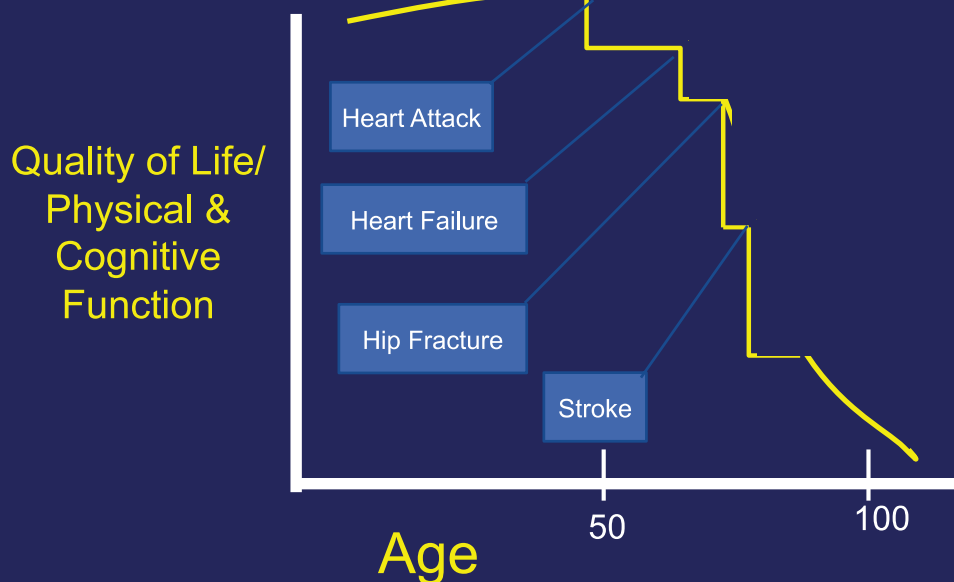
Physical & cognitive function generally declines over time

Quality of Life/
Physical &
Cognitive
Function



Decline in Function May Not Be Gradual

Slide 5



Prevention of Comorbid Events is Essential and Achievable

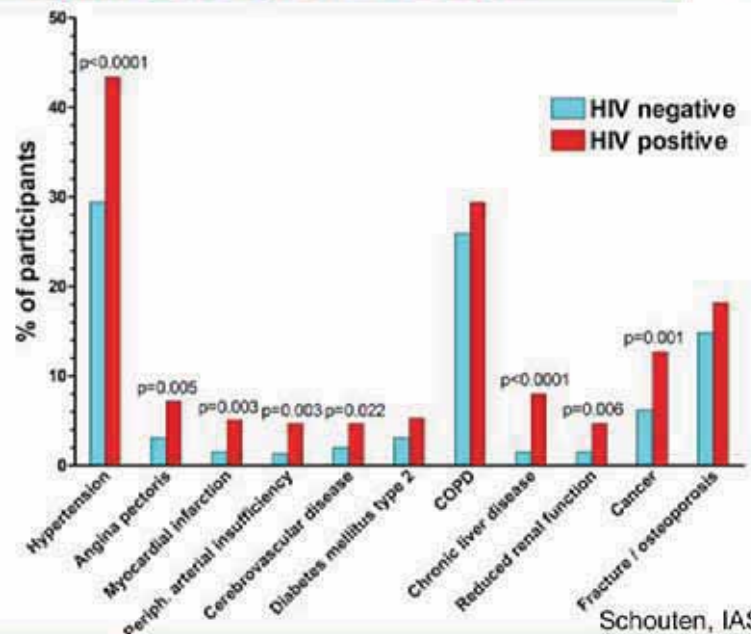
Slide 6

- Good screening tests are available for comorbid conditions
- Many behavioral factors contribute to comorbid conditions and can be modified
- Early treatment is important
- Good treatments exist that can decrease the risk of events (cardiovascular disease, fracture)
- Preventing complications can alter the aging process

Comorbidity distribution



Slide 7

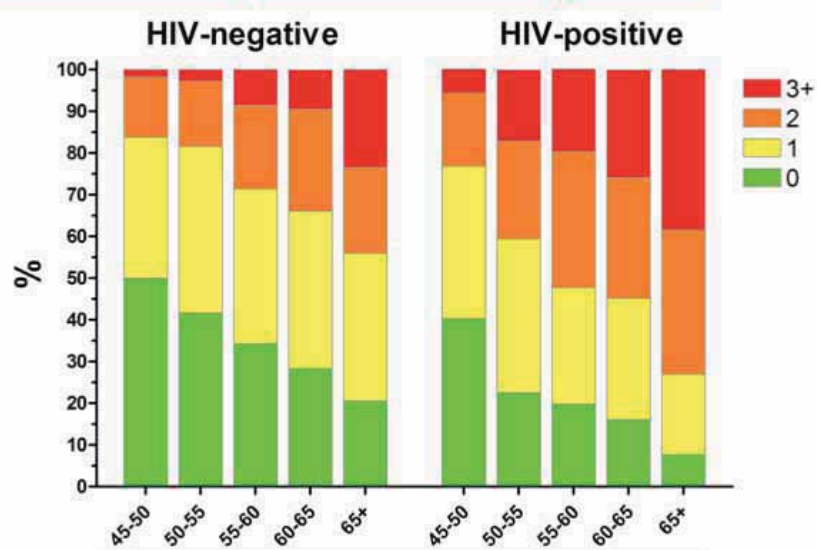


Schouten, IAS, 2012

Comorbidity in relation to age



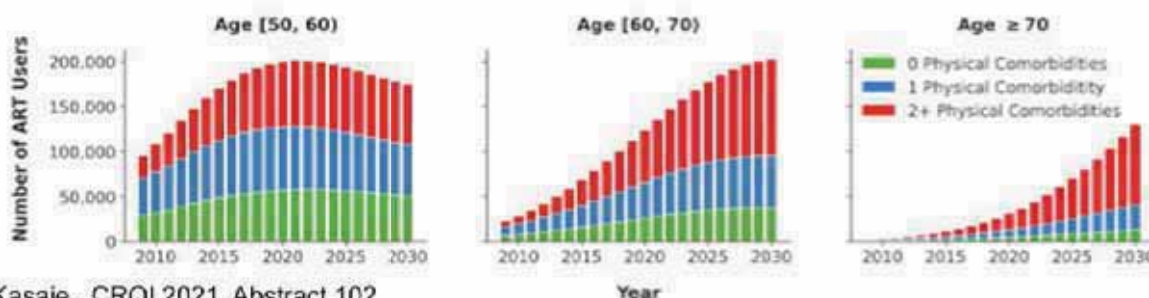
Slide 8



HIV-negative		HIV-positive								
Mean number of AANCC	0.68	0.80	1.03	1.15	1.47	0.89	1.35	1.52	1.65	2.04
Number of participants	166	108	70	53	34	159	111	86	62	52

Multimorbidity will increase markedly in PLWH over the next 10 years Slide 9

- Older age-groups experience an **increase in population size and prevalence of multimorbidity**
- Among those ≥ 70 yrs, the projected prevalence of multimorbidity increases from 58% (in 2020) to 69% (in 2030), corresponding to an additional 71,000 individuals living with 2+ physical comorbidities beside HIV by 2030



Kasaie, CROI 2021, Abstract 102

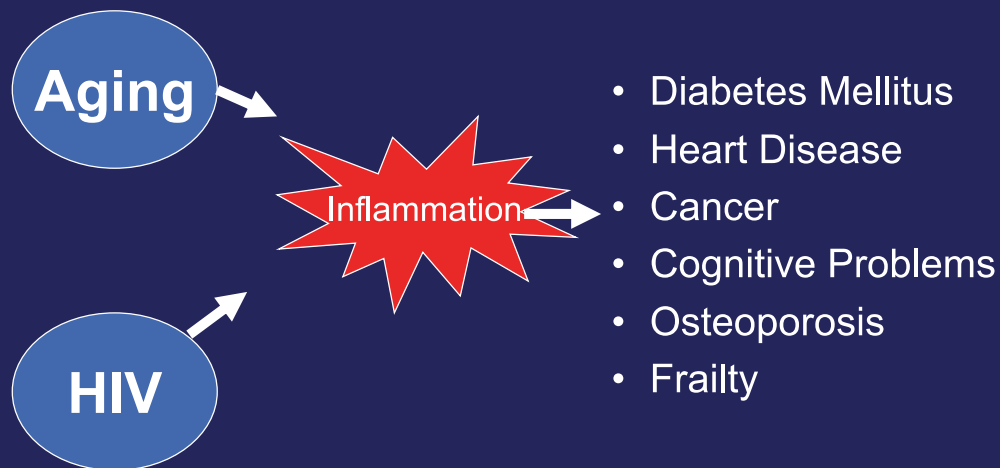
Inflammation and Immune Dysfunction: A Central Mechanism for Aging Slide 10



- Diabetes Mellitus
- Heart Disease
- Cancer
- Cognitive Problems
- Osteoporosis
- Frailty

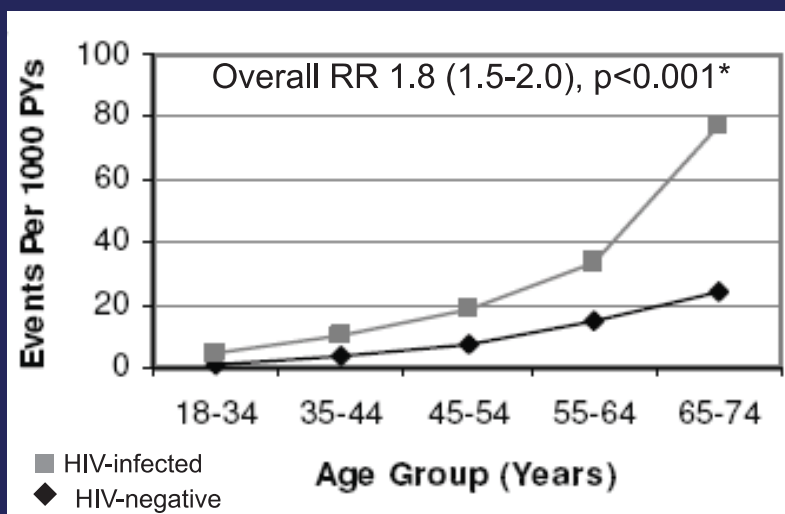
Slide 11

Aging & HIV: The Inflammation Double Whammy



Slide 12

Myocardial Infarction in People with and Without HIV: MGH Study

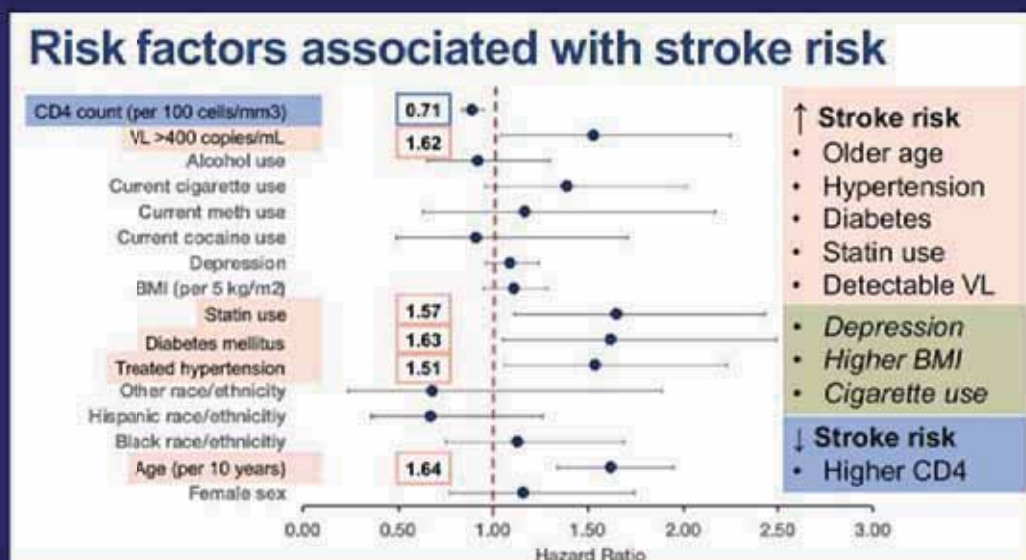


*adjusted for age, gender, race, HTN, DM, dyslipidemia

Triant, JCEM, 2007

Cardiovascular Disease at CROI 2023

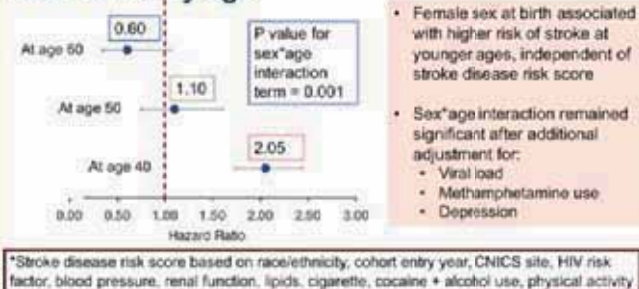
Risk Factors for Stroke in the CNICS Population



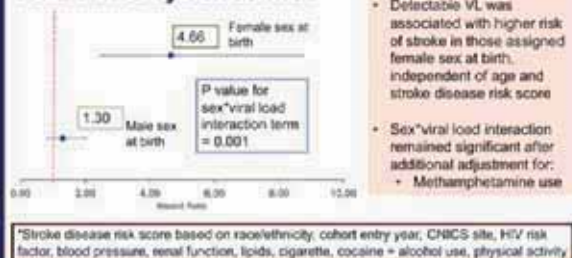
Stroke More Common in Women than Men at Younger Ages

Slide 15

Risk of stroke associated with female sex at birth varies by age



Risk of stroke associated with detectable viral load varies by sex at birth



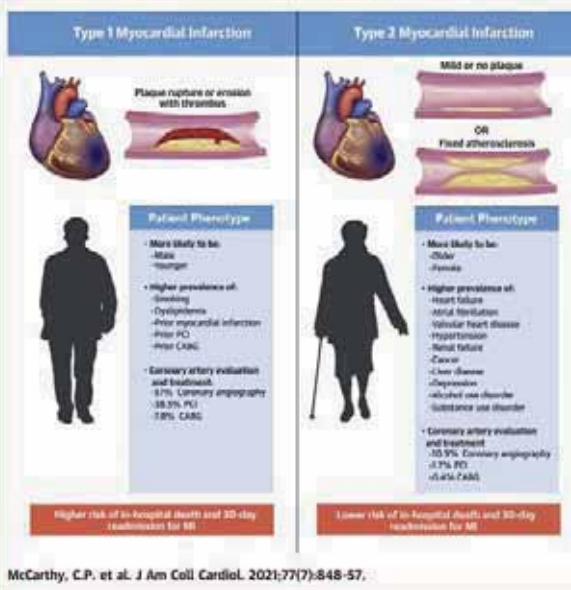
Detectable HIV viral load is a risk factor for stroke in women but not men

Chow, 183

- Two types of heart attack:
- 1) Type 1: Plaque in wall of artery ruptures
 - 2) Type 2: Demand for oxygen not met

Slide 16

CENTRAL ILLUSTRATION: Differences in Clinical Characteristics Between Patients With Type 1 and Type 2 Myocardial Infarction



Slide 17

Depression is related to Type 1 MI in PWH

Risk of incident Type 1 MI among PWH with versus without a diagnosis of depression or anxiety

	aHR	95% CI	
Demographics			Model is additionally adjusted for: <ul style="list-style-type: none"> • Race/ethnicity • HIV acquisition group • At-risk alcohol use • Cannabis use • Body mass index • History of AIDS • History of HCV • CD4 at ART initiation • VL at ART initiation • Time-varying CD4
Male at birth	1.55	1.13, 2.14	
Age (scaled by 10 years)	1.50	1.35, 1.66	
Substance use			
Tobacco (ever/never)	1.88	1.45, 2.43	
Cocaine (ever/never)	0.97	0.71, 1.31	
Traditional CVD risk factors			
Hypertension	2.81	2.26, 3.49	
Diabetes Mellitus	1.33	1.05, 1.68	
Elevated total cholesterol or statin use	2.39	1.94, 2.96	
Chronic Kidney Disease (eGFR<60 mL/min)	1.36	1.07, 1.74	
HIV-related risk factors			
History of protease inhibitor use (ever/never)	1.49	1.23, 1.81	
History of detectable viral load (ever/never)	1.13	0.85, 1.49	
Mental health comorbidities			
Anxiety	0.92	0.74, 1.16	
Depression	1.23	1.02, 1.49	

Hyle, CROI 2023, #145

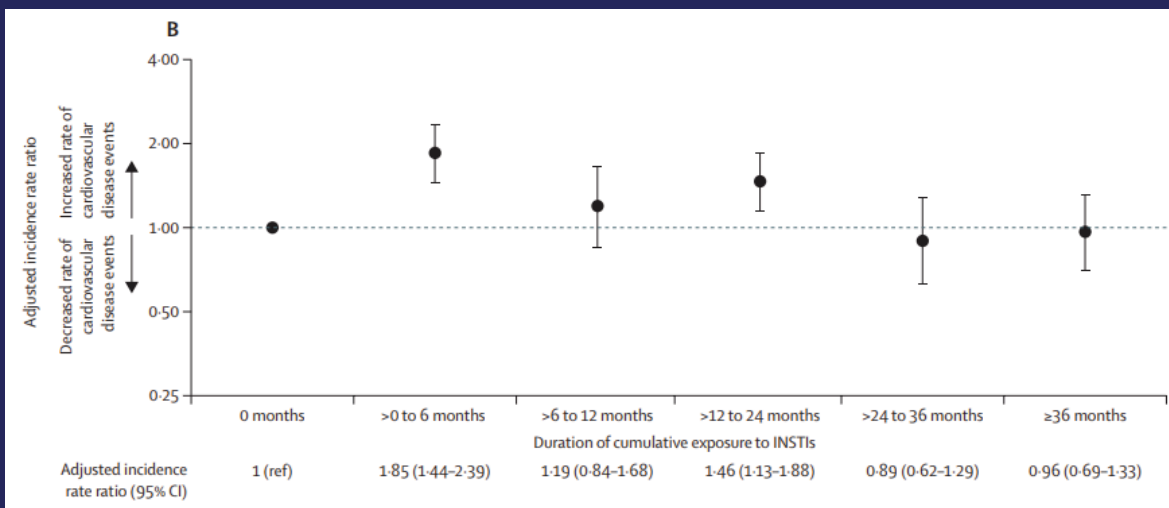
Slide 18

Anxiety is related to Type 2 MI in PWH

Risk of incident Type 2 MI among PWH with versus without a diagnosis of depression or anxiety

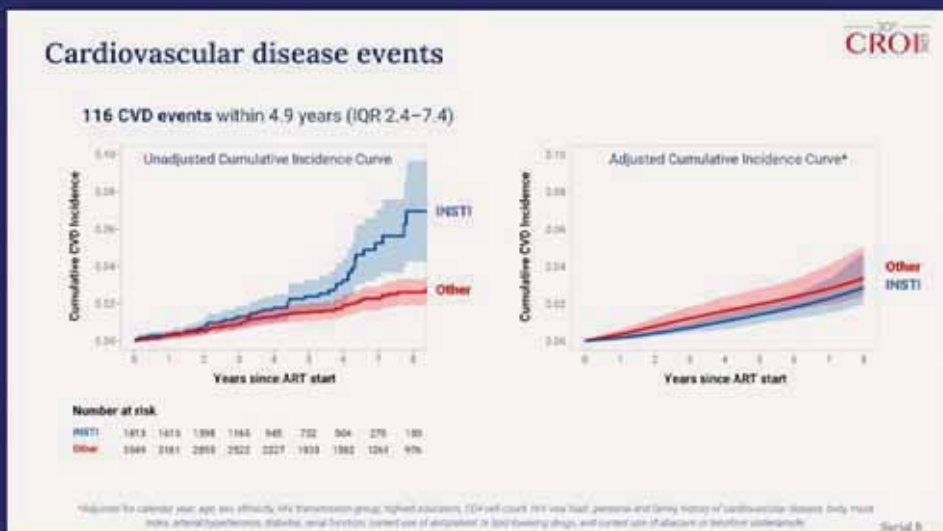
	aHR	95% CI	
Demographics			Model is additionally adjusted for: <ul style="list-style-type: none"> • Race/ethnicity • HIV risk acquisition group • At-risk alcohol use • Cannabis use • Body mass index • History of AIDS • History of HCV • CD4 at ART initiation • VL at ART initiation • Time-varying CD4
Male at birth	0.98	0.72, 1.32	
Age (scaled by 10 years)	1.18	1.05, 1.33	
Substance use			
Tobacco (ever/never)	1.36	1.01, 1.84	
Cocaine (ever/never)	1.49	1.11, 1.99	
Traditional CVD risk factors			
Hypertension	2.50	1.93, 3.25	
Diabetes Mellitus	2.39	1.84, 3.11	
Elevated total cholesterol or statin use	1.02	0.80, 1.30	
Chronic Kidney Disease (eGFR<60 mL/min)	3.05	2.37, 3.93	
HIV-related risk factors			
History of protease inhibitor use (ever/never)	1.07	0.85, 1.34	
History of detectable viral load (ever/never)	1.35	1.02, 1.79	
Mental health comorbidities			
Anxiety	1.42	1.10, 1.83	
Depression	1.20	0.96, 1.51	

Are integrase inhibitors associated with heart attack?: RESPOND Study



Neegaard, Lancet HIV, 2022

ART-initiation with integrase inhibitors not associated with CVD events in Swiss Cohort



Surial, 149

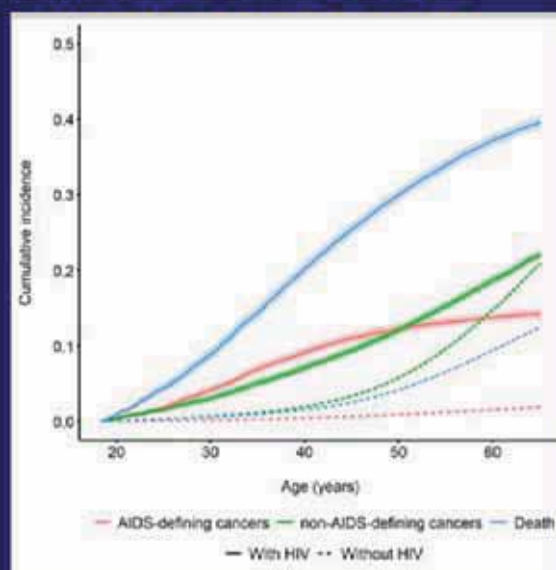
Cancer at CROI 2023

New Cancers in Medicare Recipients by HIV Serostatus: 2001-2015

AIDS-defining cancers:
Kaposi's sarcoma, cervical,
and non-Hodgkin's lymphoma

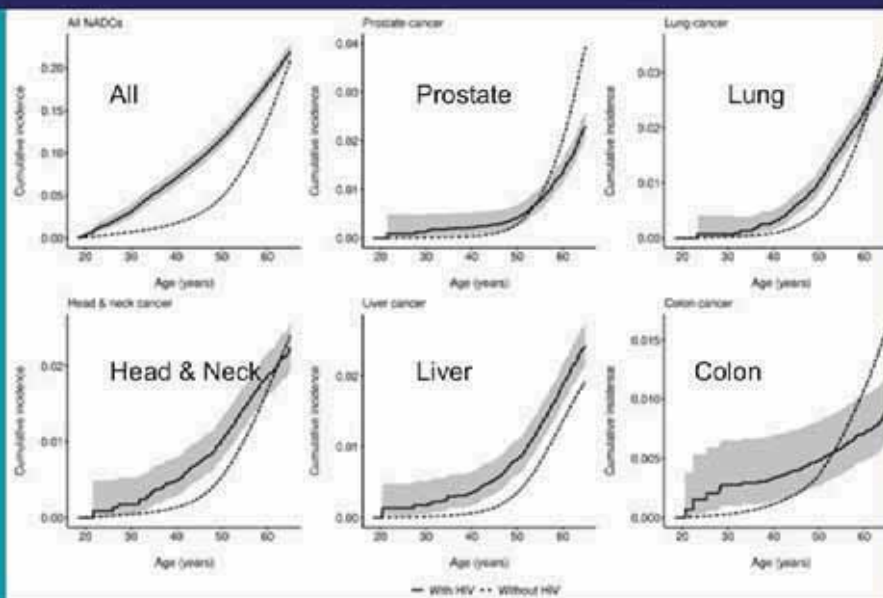
Non-AIDS-defining cancers:
breast, colon, head/neck,
kidney, larynx, leukemia, liver,
lung, oropharynx, pancreatic,
prostate, anal, Hodgkin's
lymphoma

HIV+: 181, 030
HIV-: 43.9 M



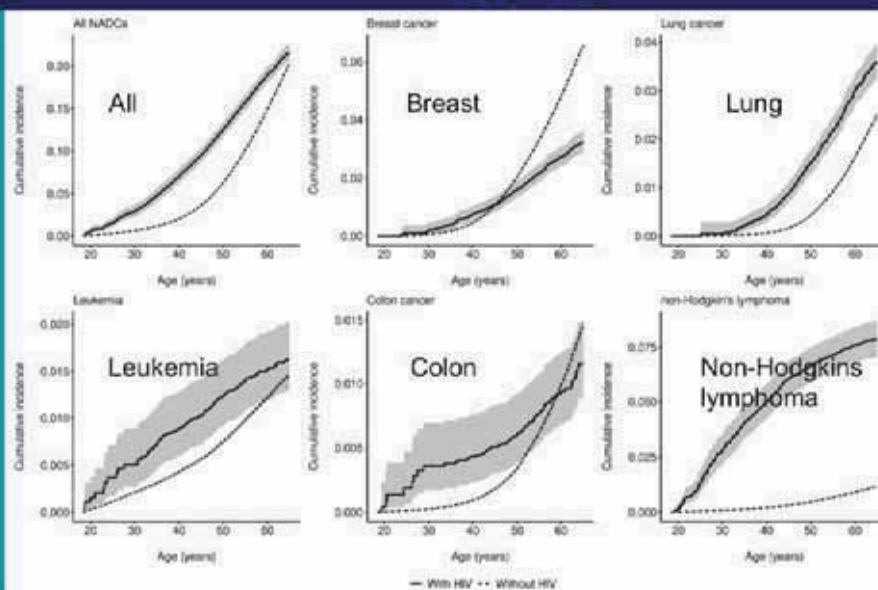
Cancer Incidence by Age: Men

Male Beneficiaries



Cancer Incidence by Age: Women

Female Beneficiaries



Slide 25

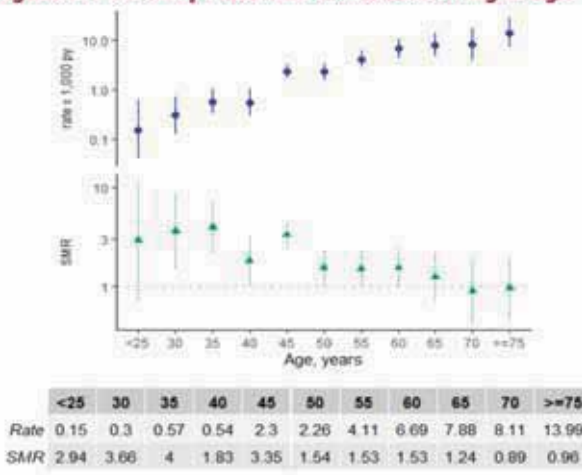
Cancer Mortality Higher in PWH Compared to General Spanish Population

Table 1. Participants characteristics at enrollment 2004-2020 (N=17,329)

♂	85% (N=14,801) males
📅	35 years old median age [IQR 29-43]
🔄	62% (N=10,755) HIV transm through homo/blsexual contact
🌐	69.4% (N=12,022) from Europe
🚬	41% (N= 5,168) current smokers
🩺	391 cell/ μ L median CD4 count [IQR 213-583]
🕒	34% (N= 5,877) viral load >100,000 copies/mL
🏠	13% (N= 2,168) AIDS diagnosis
⚙️	10% (N= 1,674) hepatitis C virus antibodies
⚙️	3% (N= 582) hepatitis B surface antigens

Factors associated with cancer mortality in PWH:
 Smoking
 Viral Hepatitis
 Lower CD4 cell count

Figure 2. Mortality rates and SMRs according to age



Rava, 871

Slide 26

Increasing Prevalence of Obesity in US

Obesity (BMI ≥ 30 kg/m²)



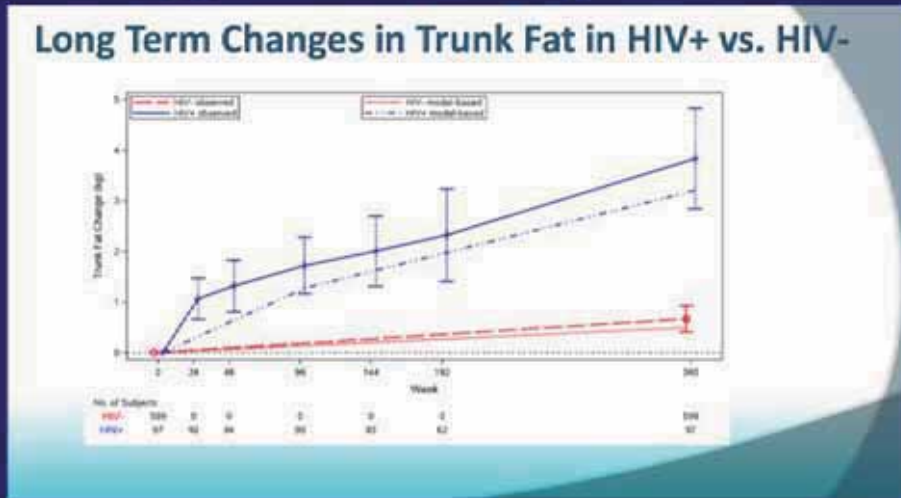
No Data
 <14.0%
 14.0%–17.9%
 18.0%–21.9%
 22.0%–25.9%
 $\geq 26.0\%$



NOTE: Survey method changes in 2011 may impact trends. <http://www.cdc.gov/surveillance/practices/nps/nps-brfss/brfss.html>
 CDC's Division of Diabetes Translation, United States Diabetes Surveillance System available at
<http://www.cdc.gov/diabetes/data>

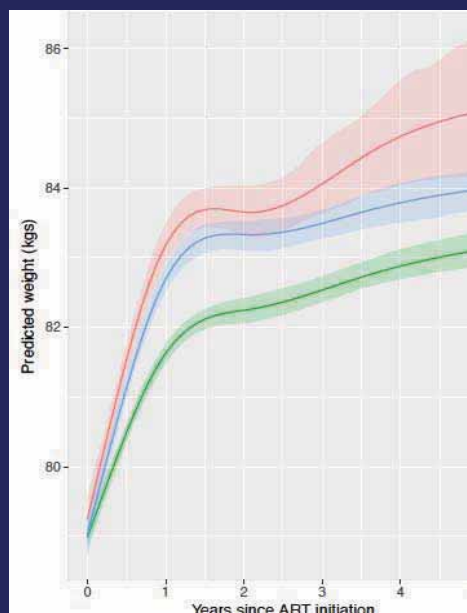


Central fat increases with ART initiation are greater than expected



Grant, AIDS, 2016

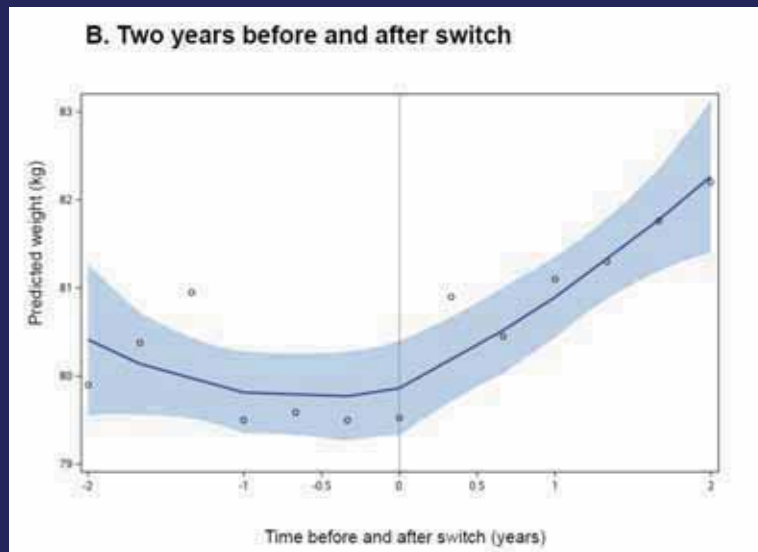
Weight Gain is Greater with INSTI in NA-ACCORD



INSTI
 PI
 NNRTI

Lake, 20th IWCADRH, 2018

Switching to INSTI: HAILO Study



Lake, CID, 2020

Does switching off of integrase inhibitors decrease weight?

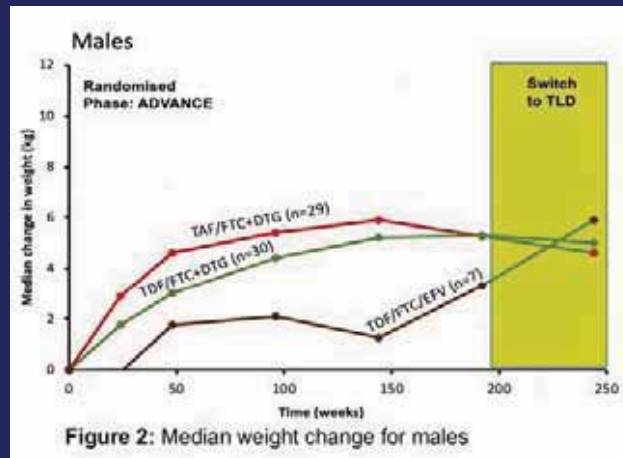
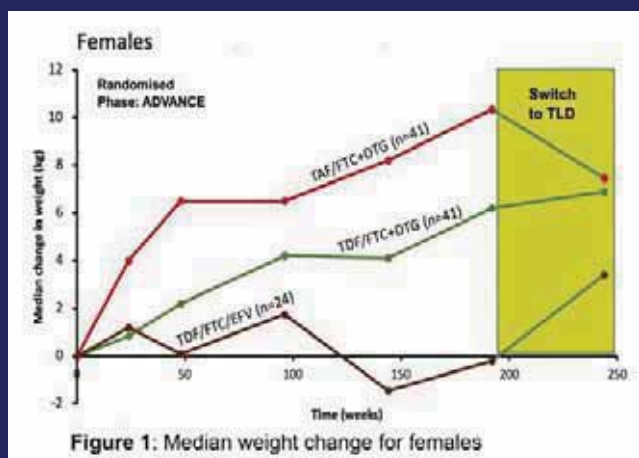
SOLAR:

- PWH on F/TAF/BIC randomized 2:1 to CAB LA or stay on F/TAF/BIC over 12M.
- Median age 37, 88% men, 60% overweight or obese.

Change in Weight Through Month 12 by Treatment Regimen*



Switching off TAF to TDF decreases weight in women: CHARACTERISE



Bosch, 671

Switching from F/TAF/BIC to DTG/3TC

METHODS

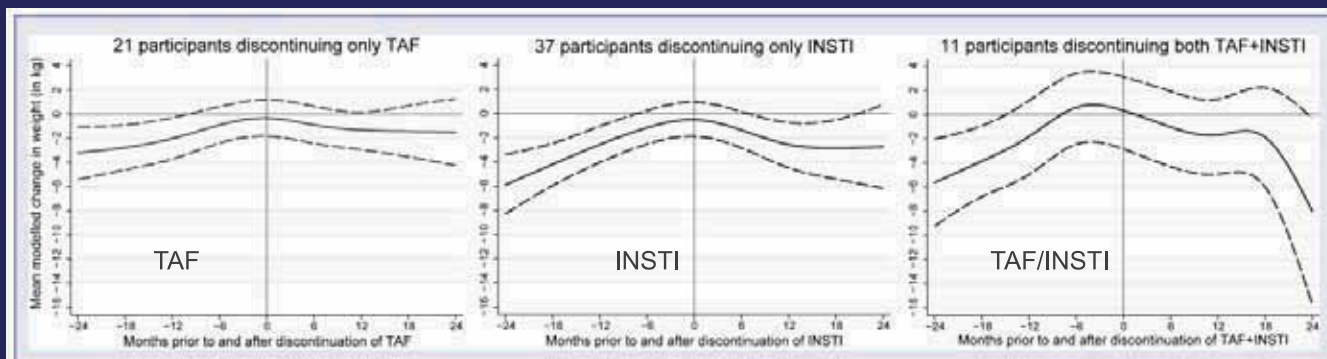
- Randomized, open-label controlled trial (2:1)
- Longitudinal follow-up: baseline, week 24, week 48
- Outcomes (Zary): weight, BMI, waist, lipids, insulin resistance, DXA scan, fibroscan
- Linear mixed models with covariance patterns
- Intention to treat – exposed analysis

	DTG/3TC	BIC/FTC/TAF	p-value
ALT (U/L)	-0.73	+4.55	0.040
HDL (mg/L)	-0.043	-2.84	0.043
Lean trunk mass (gram)	+112	-474	0.032
Trunk fat mass (gram)	+41	+719	0.043
Fat percentage	-0.04	+1.32	0.003



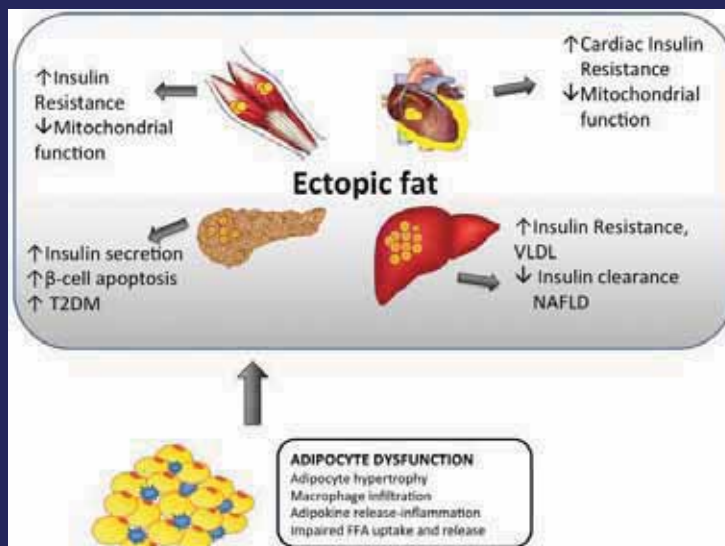
Degroote, CROI 2023, 672

Switching off of TAF, INSTIs, or Both in PWH with >7% weight gain: ATHENA Cohort



Verburgh, 673

What is Ectopic Fat?



Gaggini M, et al. Horm Mol Biol Clin Investig 2015;22:7-18

Increase in Liver Fat after switch to INSTIs

Figure 1. Cross Sectional Study Schema. One FibroScan conducted at varying time-point post-INSTI switch or comparable time-point in non-INSTI group.

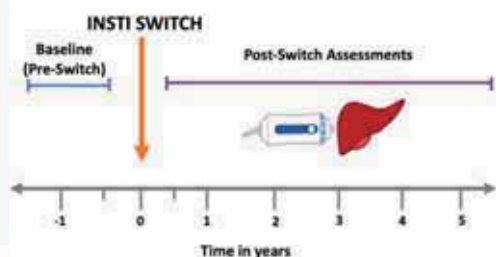


Figure 3. Model-adjusted odds of hepatic steatosis and moderate fibrosis in INSTI vs non-INSTI groups. Women on INSTIs had a **3.6 greater odds of having hepatic steatosis** within 1 year of switch compared to non-INSTI Controls.

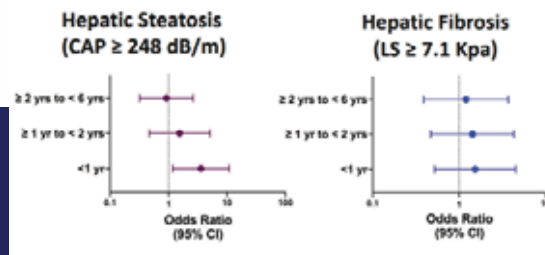


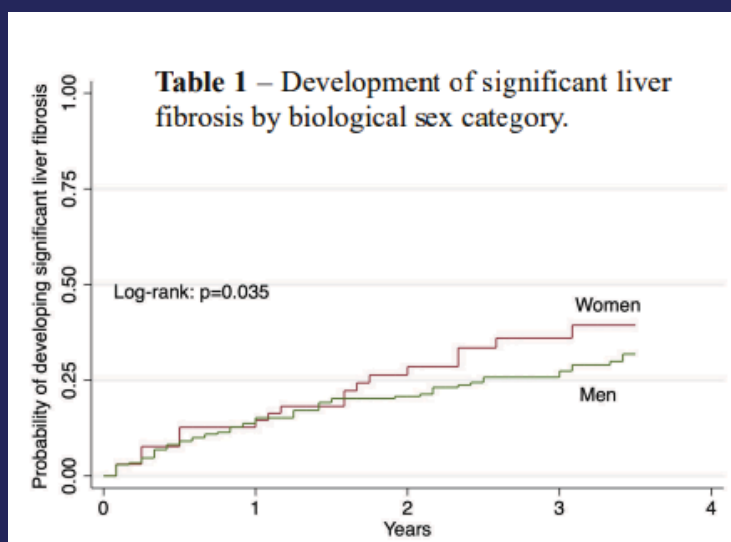
Table 1. Cohort characteristics, n=257

Mean (SD) or n(%)	INSTI N=123	Non-INSTI N=134
Age, years	50 (8)	49 (8)
Black race	82 (67)	107 (80)
BMI, kg/m ²	32 (8)	32 (8)

Lahiri, 610

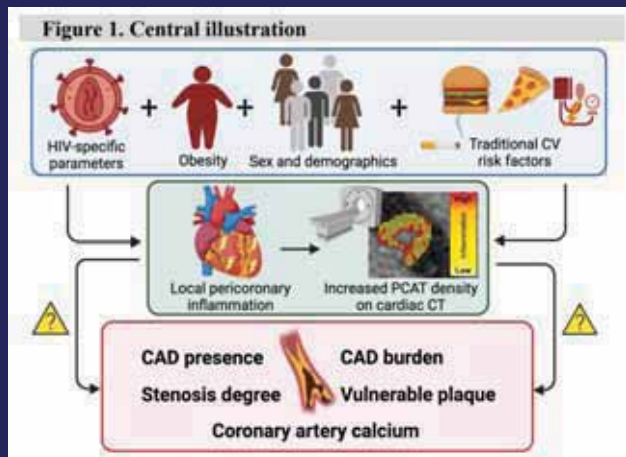
Women had lower prevalence of fatty liver, but a greater progression to fibrosis

Population characteristics		
Population characteristics (N= 1359)		
Age	51.8 (9.9)	
Female	25%	
BMI	25.1 (4.4)	
Ethnicity	25% black, 64% white	
HIV duration	17.2 (9.5) years	
Baseline characteristics		
	Female	Male
Prevalence of MAFLD	17.7%	24.3%
Prevalence of liver fibrosis	10.7%	13.4%
Black ethnicity	48%	17%
ALT	26.4	33.4
HDL cholesterol	1.46	1.11
Triglycerides	1.69	2.47



Kablawi, 611

Inflammation in fat surrounding coronary arteries associated with coronary plaque



Multivariable regression relating PCAT to plaque phenotypes

•PCAT density was associated with CT-derived CAD measures independent of ASCVD risk score, smoking & substance use, BMI, ART parameters and systemic inflammatory biomarkers (Table 2).

Table 2: Association of PCAT density with CAD in REPRIEVE

Presence of	Univariable			Model 1			Model 2		
	OR	95%CI	p	OR	95%CI	p	OR	95%CI	p
Coronary Plaque	1.3	1.13-1.50	<0.001	1.3	1.10-1.50	0.002	1.4	1.21-1.70	<0.001
Coronary Calcium	1.5	1.28-1.74	<0.001	1.5	1.26-1.75	<0.001	1.6	1.35-1.94	<0.001
Vulnerable plaque	1.3	1.10-1.54	0.002	1.3	1.06-1.51	0.01	1.3	1.07-1.57	0.008
Leaman >5	1.5	1.27-1.87	<0.001	1.6	1.27-1.93	<0.001	1.9	1.47-2.37	<0.001

Model 1: ASCVD risk, substance use, BMI, HIV parameters; Model 2: Model 1 + systemic biomarkers (MCP-1, IL-6, LpPLA2, oxLDL, hsCRP). ORs are per 10 HU of PCAT density.

Foldyna, 649

Fat within the muscle associated with coronary artery disease: REPRIEVE

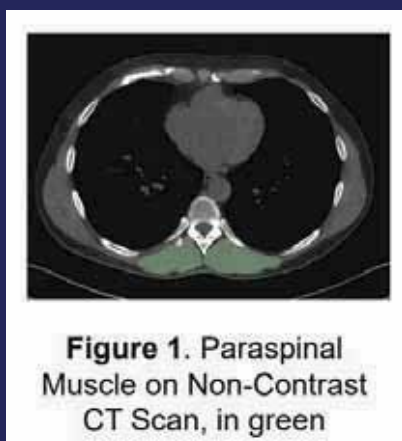
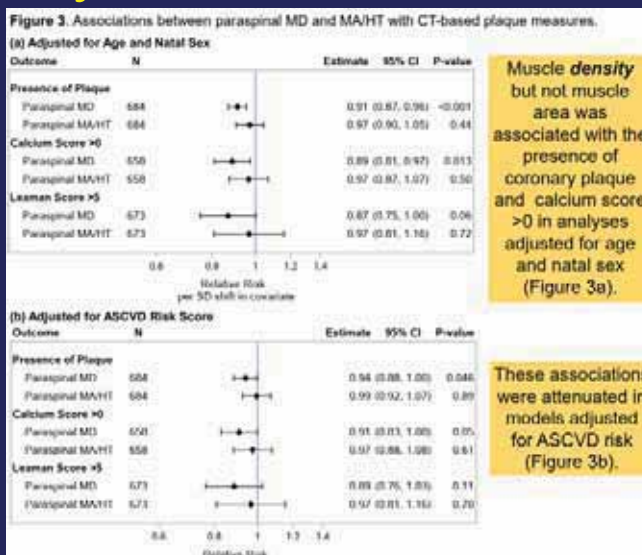


Figure 1. Paraspinal Muscle on Non-Contrast CT Scan, in green



Muscle density but not muscle area was associated with the presence of coronary plaque and calcium score >0 in analyses adjusted for age and natal sex (Figure 3a).

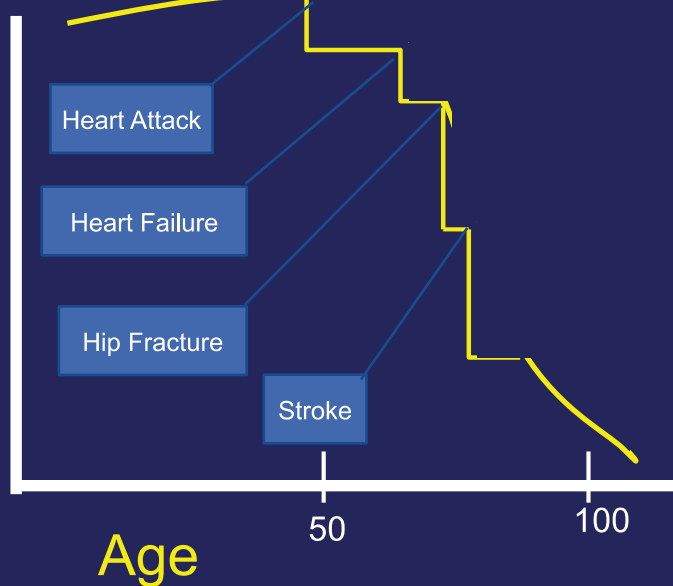
These associations were attenuated in models adjusted for ASCVD risk (Figure 3b).

Erlandson, 648

Decline in Function May Not Be Gradual

Slide 39

Quality of Life/
Physical &
Cognitive
Function



Let's Get Screened!

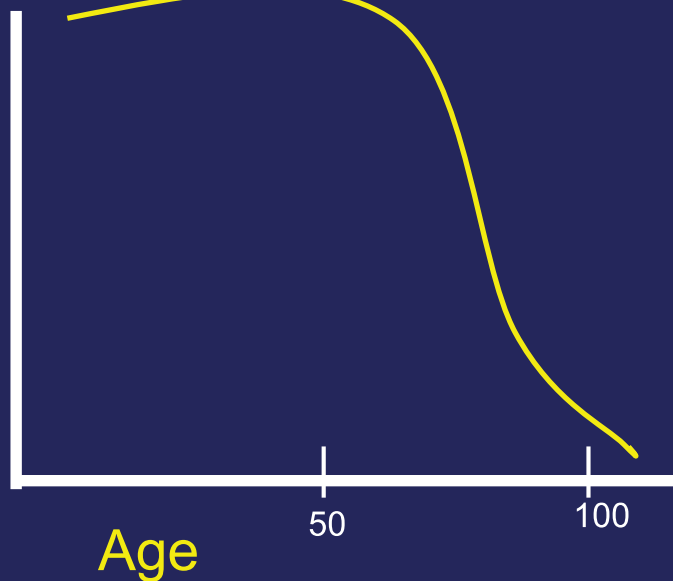
Slide 40

Condition	Tests	Frequency
Diabetes	Fasting Glucose Hgb A1C	Yearly
High Cholesterol	Lipid Panel	Yearly
High Blood Pressure	BP Measurement	At least Yearly
Kidney Disease	Serum Creatinine Urine protein test	Every 6-12 months
Osteoporosis	DXA Scan	Age 50+
Anal/Cervical Cancer	Pap test	Yearly
Lung Cancer	CT (if smoker)	debated
Liver Cancer	Ultrasound (if HBV or HCV+)	Yearly
Breast Cancer	Mammogram	Yearly
Colon Cancer	Colonoscopy	Every 5 years
Prostate Cancer	PSA	debated

Physical function generally declines over time

Slide 41

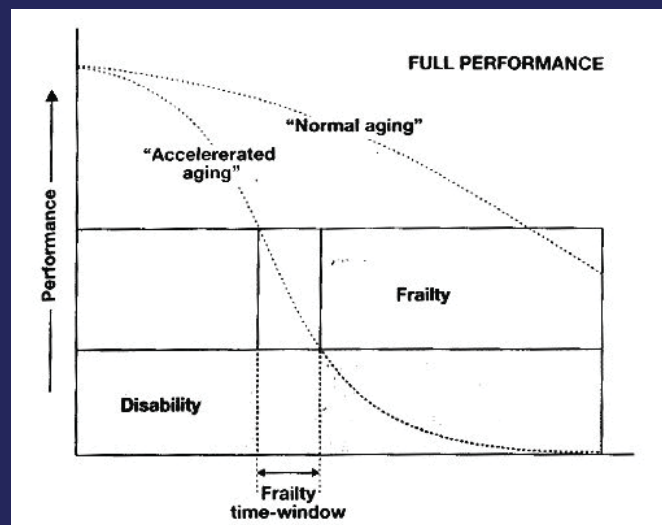
Quality of Life/
Physical &
Cognitive
Function



Frailty: A Brief Overview

Slide 42

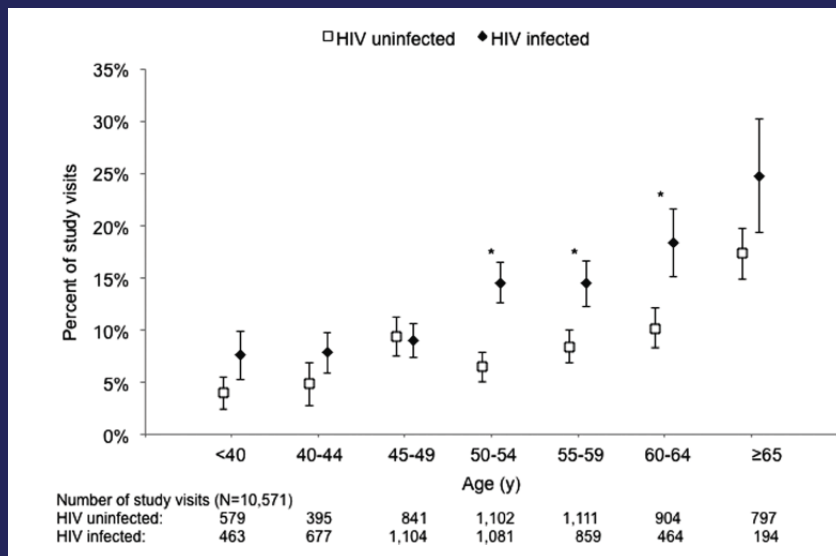
- **Weight loss**
- **Weakness**
- **Exhaustion**
- **Slowness**
- **↓ Physical Activity**



Fried LP, *et al.* 2005

HIV+ Men Are More Frail At a Younger Age vs HIV- Men: MACS

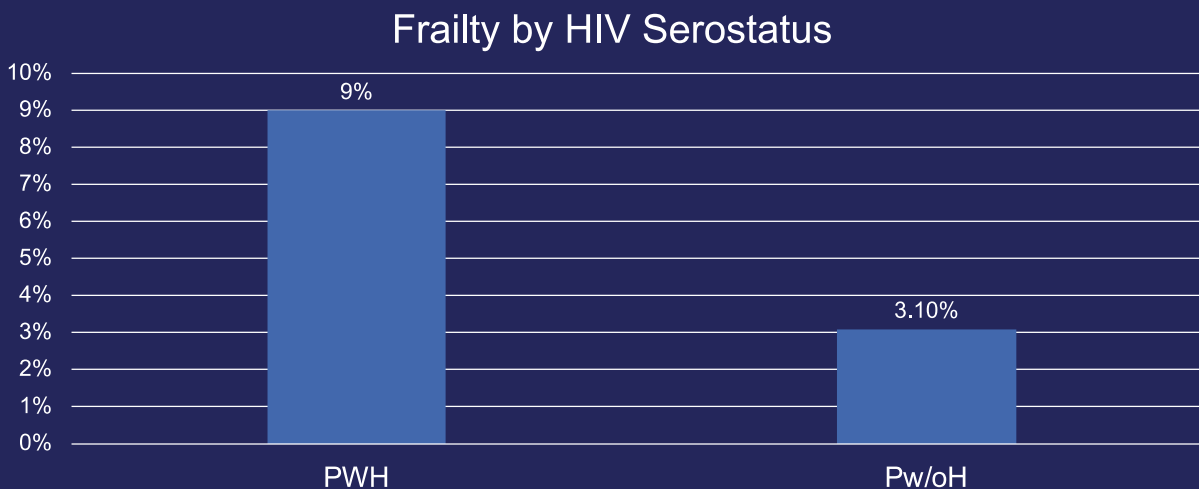
Slide 43



Althoff, J of Gerontology, 2013

Frailty more common PWH compared to Pw/oH: Thai HIV-NAT

Slide 44



Su Lwin, 696

Slide 45

Lower trunk muscle area associated with lower grip strength

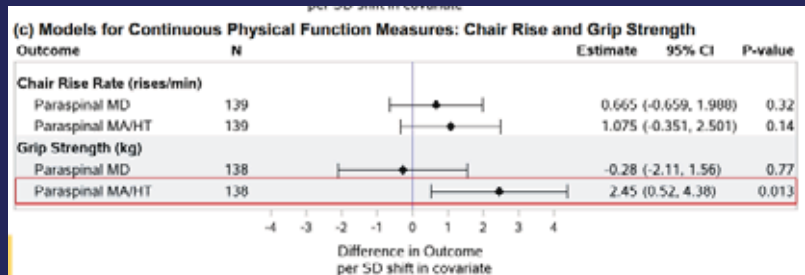


Figure 1. Paraspinal Muscle on Non-Contrast CT Scan, in green

Erlanson, 648

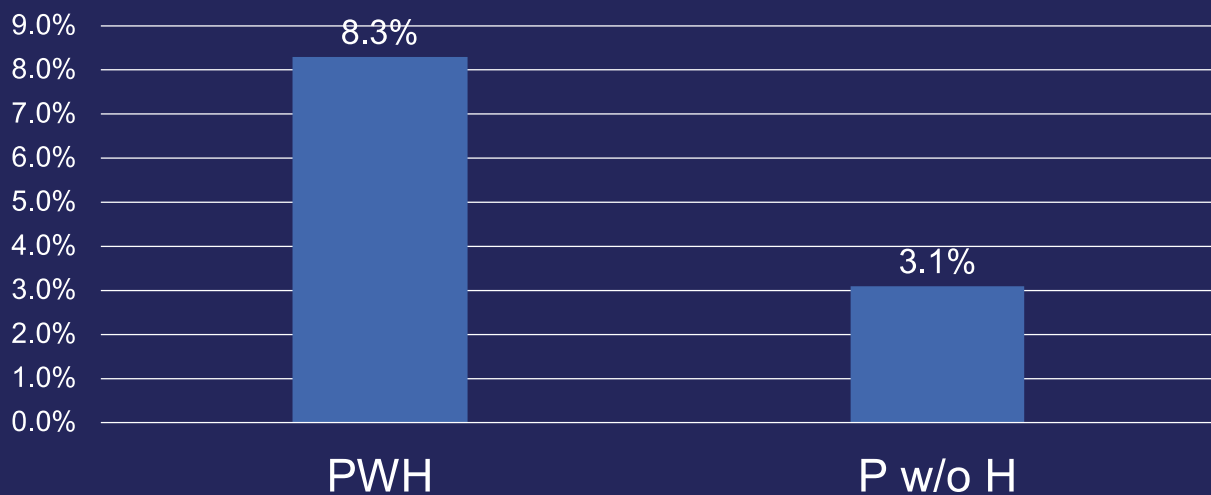
RESULTS (continued)

- Lower MD (as outcome) was associated with older age, female sex, thymidine analogue exposure, greater BMI and waist circumference, and hsCRP, MCP-1, sTNFR-1, and the inflammatory index score (data not shown).
- Smaller MA/HT (as outcome) was associated with older age, female sex, non-Black race, greater ASCVD risk, and MCP-1 (data not shown).



Slide 46

Sarcopenia more common in PWH vs Pw/oH: Thai HIV-NAT



Sarcopenia: low grip strength, low walk speed, and low muscle mass

Slide 47

Factors associated with falls in CNICS

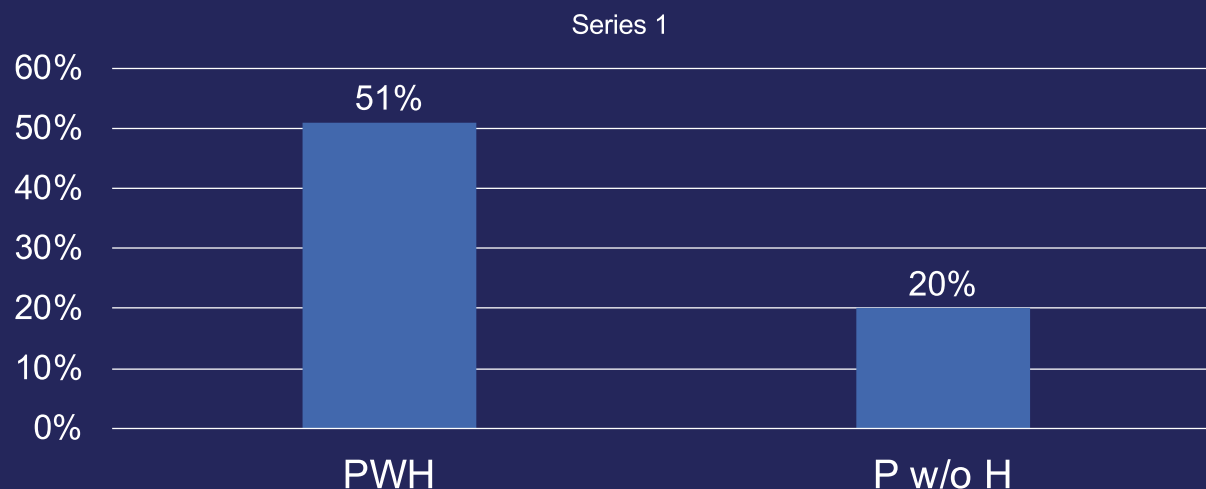
		Any Falls (N=435)	1 vs 0 Falls (N=218)	2 vs 0 Falls (N=120)	3 vs 0 Falls (N=97)
		RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Neuropathy symptoms: (None = REF)	Not/ a little bothersome	1.74 (1.41, 2.15)	1.50 (1.12, 2.01)	1.69 (1.06, 2.69)	2.35 (1.47, 3.77)
	Bothersome/ highly bothersome	2.85 (2.34, 3.46)	1.76 (1.30, 2.40)	2.41 (1.62, 3.59)	6.77 (4.39, 10.4)
Difficulty remembering: (None = REF)	Not/ a little bothersome	2.18 (1.79, 2.65)	1.62 (1.24, 2.13)	3.35 (2.29, 4.90)	1.65 (1.06, 2.60)
	Bothersome/ highly bothersome	3.18 (2.67, 3.95)	1.71 (1.21, 2.42)	3.98 (2.63, 6.01)	4.37 (2.81, 6.80)
Fatigue or Loss of Energy: (None = REF)	Not/ a little bothersome	2.39 (1.89, 3.02)	1.59 (1.18, 2.15)	3.24 (2.08, 5.03)	2.09 (1.25, 3.51)
	Bothersome/ highly bothersome	3.57 (2.83, 4.51)	2.04 (1.49, 2.79)	4.09 (2.62, 6.40)	4.81 (2.93, 7.92)
Feeling dizzy: (None = REF)	Not/ a little bothersome	2.49 (2.07, 3.00)	1.70 (1.28, 2.24)	2.78 (1.93, 3.99)	3.29 (2.22, 4.89)
	Bothersome/ highly bothersome	3.91 (3.20, 4.77)	1.49 (0.98, 2.30)	4.95 (3.34, 7.34)	6.90 (4.60, 10.3)
Frailty Phenotype: (None = REF)	Prefrail	2.42 (1.94, 3.01)	1.71 (1.30, 2.25)	1.64 (1.10, 2.44)	4.45 (2.82, 7.02)
	Frail	4.67 (3.69, 5.92)	1.69 (1.14, 2.52)	4.22 (2.70, 6.60)	10.13 (6.42, 16.0)
Depression Symptoms: (None = REF)	Mild/ moderate	2.33 (1.95, 2.78)	1.97 (1.52, 2.56)	2.15 (1.50, 3.08)	3.07 (2.06, 4.59)
	Moderately severe/ Severe	3.50 (2.72, 4.50)	1.72 (1.08, 2.75)	2.61 (1.49, 4.56)	6.39 (4.07, 10.04)
Diabetes		1.43 (1.20, 1.72)	1.44 (1.09, 1.90)	1.34 (0.91, 1.97)	1.58 (1.04, 2.42)
Quality of Life index	per 1 standard deviation	0.41 (0.35, 0.47)	0.54 (0.46, 0.62)	0.45 (0.38, 0.53)	0.30 (0.25, 0.36)
# Emergency visits (in the past 2 years)	per visit	1.07 (1.05, 1.09)	1.09 (1.03, 1.15)	1.10 (1.03, 1.17)	1.18 (1.12, 1.25)

- Neuropathy
- Cognitive Problems
- Dizziness
- Depression
- Frailty
- Diabetes
- Low QOL
- ED visits

Ruderman, 699

Slide 48

Among people over 65, falls more common in PWH: GEPO Cohort

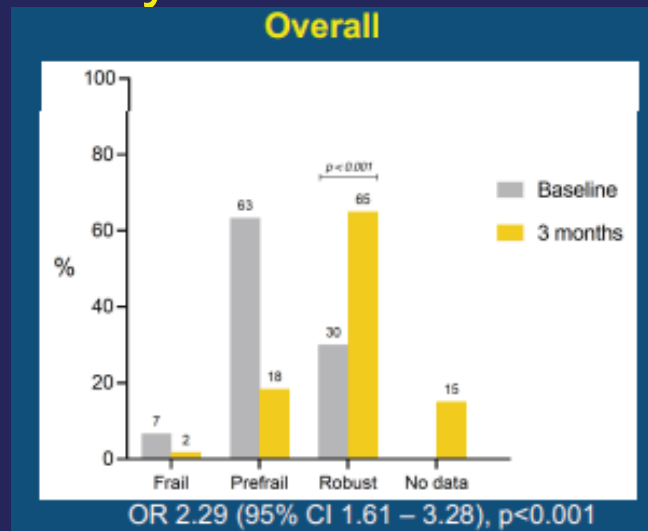


Foca, 700

Slide 49

12 week exercise program can reverse frailty

- 51 participants (31 HIV+, 20 HIV)
- Median age 57 (53-63) years
- 25% women.
- Personalized multicomponent exercise program (resistance, endurance, balance, and flexibility training)
- Also, improvements in quality of life
- Intervention worked regardless of HIV status

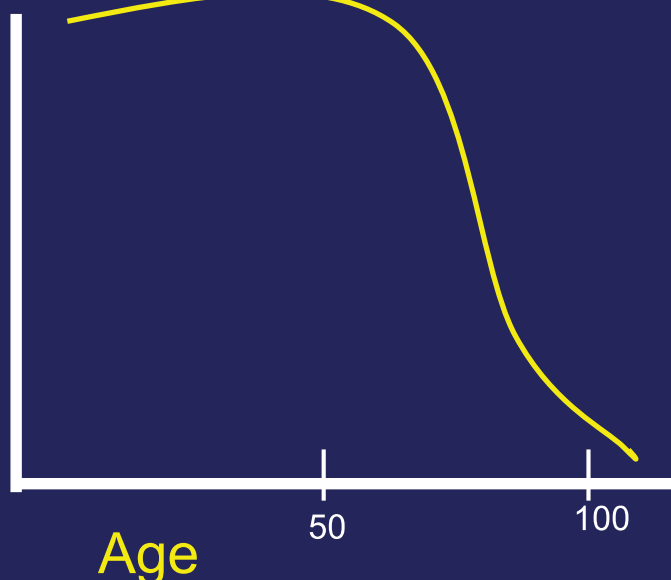


Branas, 701

Slide 50

Cognitive function generally declines over time

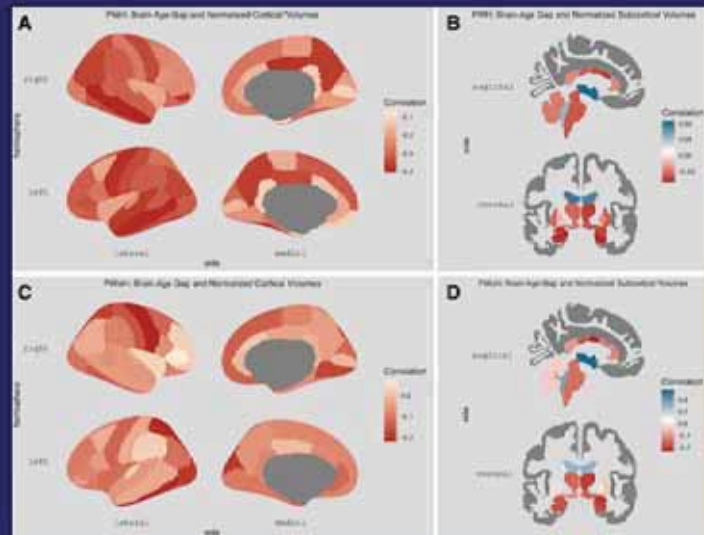
Quality of Life/
Physical &
Cognitive
Function



Slide 51

Brain-age gap greater in PWH vs Pw/oH

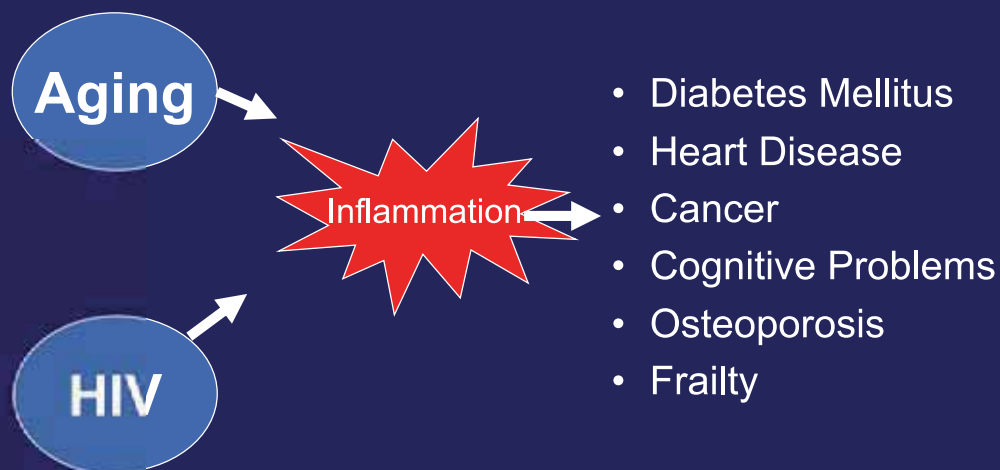
- Brain-age gap related to:
 - CVD risk
 - HCV
 - Detectable VL
 - Early life stress
 - Socioeconomic challenges
- Brain regions were affected differently in those with and without HIV



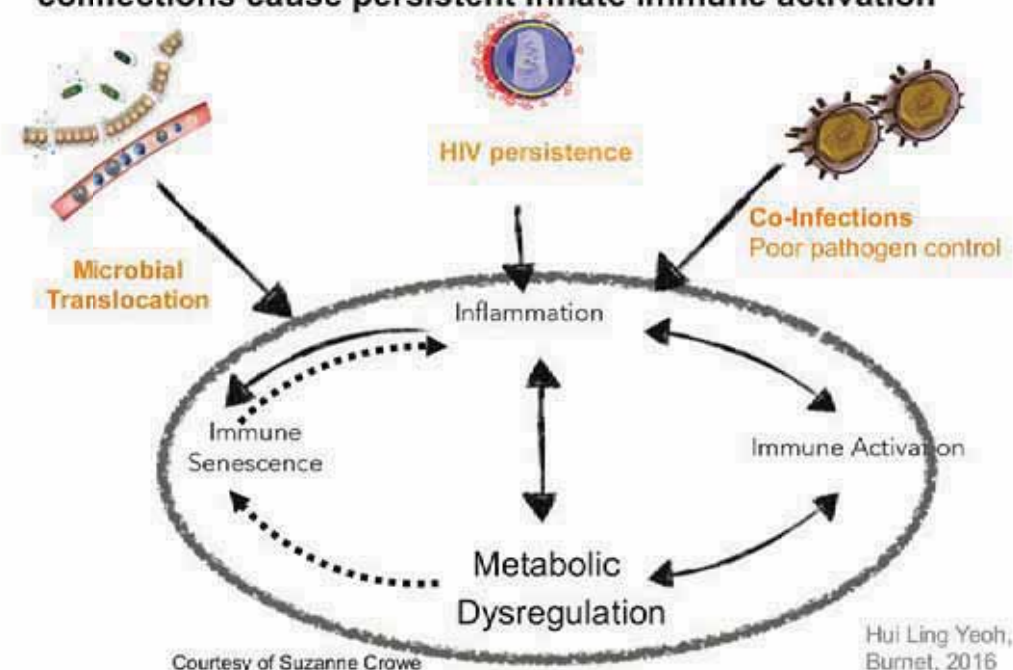
Petersen 186

Slide 52

Aging & HIV: The Inflammation Double Whammy



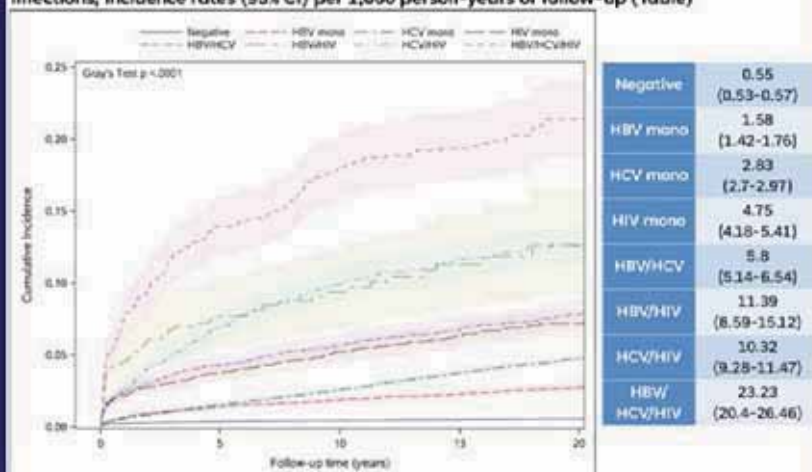
Microbial translocation, HIV persistence and coinfections cause persistent innate immune activation



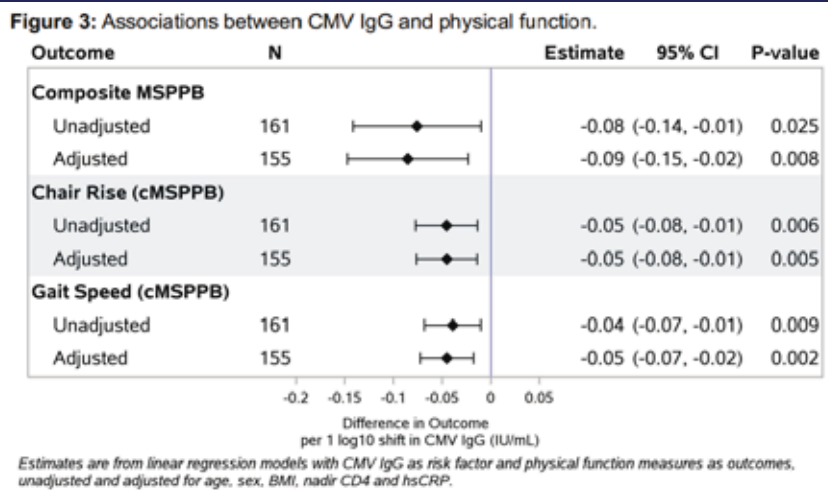
Viral hepatitis increases risk of kidney failure

- n=690,873
- 5552 ESRD, 49753 deaths over 6.3 years
- Results even stronger in those with diabetes or hypertension

Figure 1. Cumulative incidence curves for incident ESRD among individuals with chronic viral infections, incidence rates (95% CI) per 1,000 person-years of follow-up (Table)



Antibody titer for CMV associated with poorer physical function in REPRIEVE



Erlanson, 697

Serious Non-AIDS Events associated with low level viremia

Definitions for the primary exposure of interest

• **Non-suppressed viremia**

- A single VL ≥ 1000 copies/mL, OR
- VL ≥ 200 copies/mL on two or more consecutive determinations at least 3 months apart

- **High-level viremia:** VL of 200-999 copies/mL, that does not meet the criteria for a blip or non suppressed viremia

- **Low-level viremia:** VL of 51-199 copies/mL, which do not meet criteria for a blip

• **Viriological suppression**

- VL ≤ 50 copies/mL OR
- Blips: Isolated VL of 51-999 copies/mL, which is preceded and followed by a VL ≤ 50 copies/mL

Worst/Viremia Status	Overall (n=2818)	No SNAEs (n=2228)	SNAEs (n=590)
VL	520 (43.3)	124 (9.7)	178 (29.9)
Blip	320 (11.3)	248 (11.1)	59 (18.1)
LLV	221 (7.8)	194 (8.7)	25 (11.3)
HLV	122 (4.3)	102 (4.6)	20 (16.3)
NS	877 (30.9)	870 (38.8)	207 (34.9)

	HR	Adjusted 95% CI	P
Time updated viral load categories (Reference: VS)			
LLV	1.249	1.161 - 1.343	<.0001
HLV	1.566	1.453 - 1.689	<.0001
NS	1.713	1.641 - 1.788	<.0001
Gender			
Female vs. Male	1.355	1.28 - 1.436	<.0001

Ganesan, 689

Slide 57

How to Beat Inflammation: A Patient's Guide

- Continue your HIV medications. Stay undetectable
- Stop smoking
- Maintain normal weight
- If overweight, lose at least 5-10% of body weight
- Exercise
- Have a healthy diet
- Cut down on alcohol, avoid drugs
- Get your hepatitis C cured
- Maintain dental health
- Practice good sleep hygiene

Slide 58

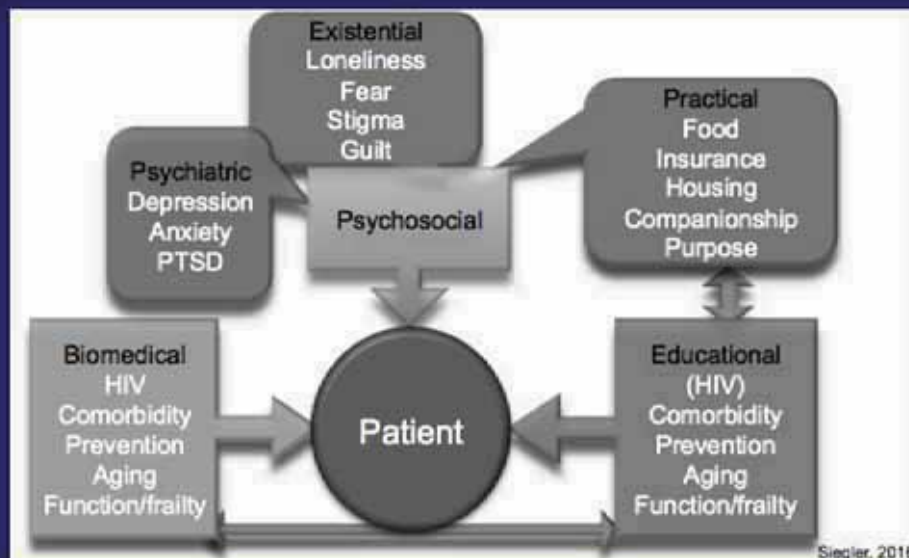
The Faces of Frailty



Thurn & Gustafson, *Current HIV/AIDS Reports*, 2017.

Slide 59

Treating the Whole Patient



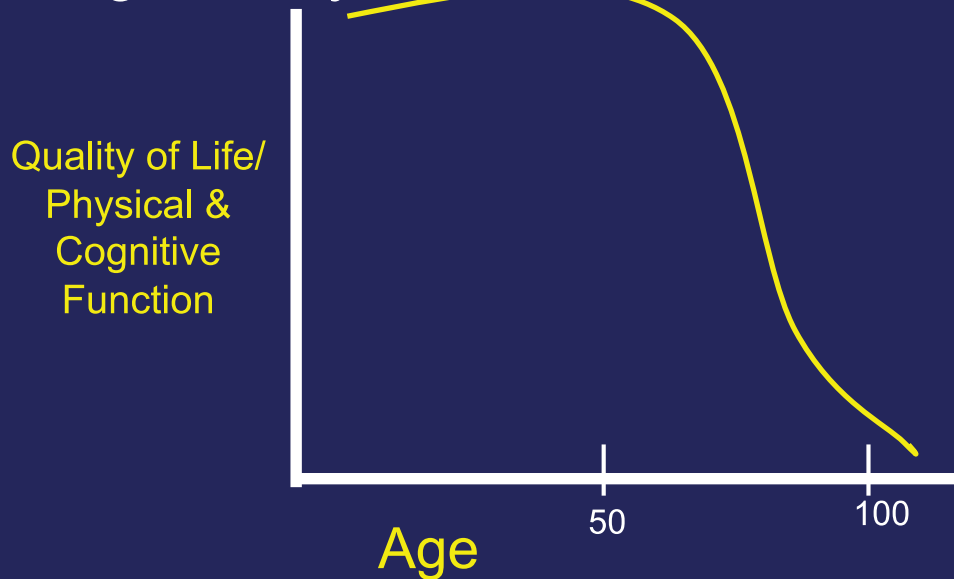
Slide 60

Major Challenges for Aging PLWH

- Multimorbidity: What is the best model for care?
- Access to Geriatric Care
- Health care navigation
- Access to mental health services
- Access to social services
- Prevention of disability
- Bias in long term care
- Health disparities by race/sexual minority
- Relative lack of data in women

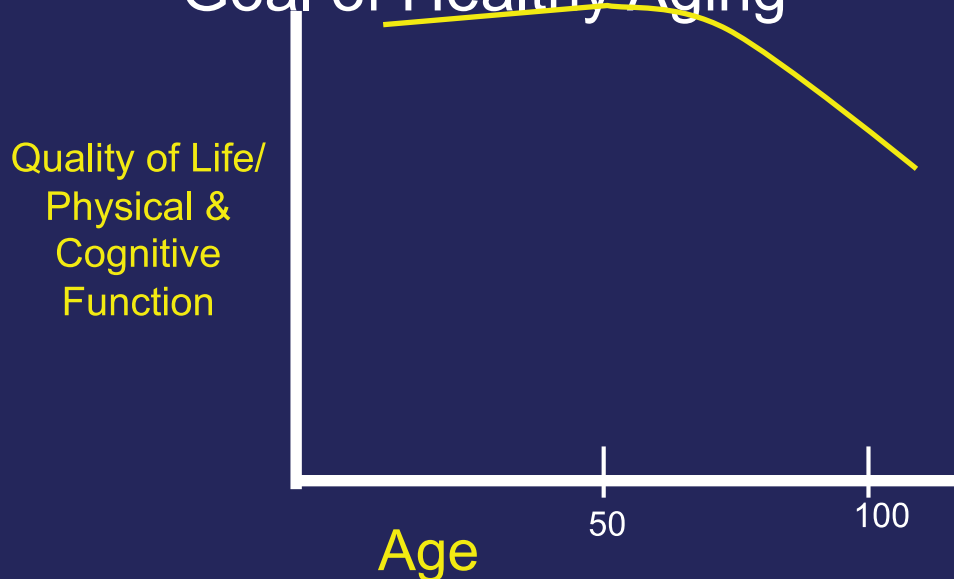
Physical & cognitive function generally declines over time

Slide 61



Bending the Curve Upwards is the Essential Goal of Healthy Aging

Slide 62



University of California San Francisco (<https://www.ucsf.edu/>)



Golden Compass

Helping People with HIV Navigate their Golden Years

People with HIV are living longer, healthier lives in the era of antiretroviral treatment (ART).

In San Francisco, over 60% of all people living with HIV are age 50 and older. Despite these successes, aging with HIV or later life diagnosis can bring new challenges. HIV can increase

the risk of conditions like heart disease, osteoporosis (thin bones), memory problems and cancer. These and other aging-related conditions may occur in HIV-positive adults at younger ages than HIV-negative adults. Older adults with HIV often face mental health issues like depression and may feel isolated from losing friends in the early days of the HIV/AIDS epidemic.

As a result, Ward 86 launched Golden Compass in 2017. The program focuses on four “points” (related to compass directions) that serve the medical and psychosocial needs of people over 50 living with HIV. The program provides multidisciplinary medical care on-site along with other comprehensive services, some of which are outlined below.

NORTH — Heart and Mind: A cardiologist with expertise in HIV now sees patients at Ward 86 in a designated HIV Cardiology Clinic; Memory concerns are evaluated and a class to learn about brain and memory with some practical tips on improving memory is held regularly.

EAST — Bones and Strength: Exercise classes for PLWH Age 50 or older are offered, focusing on preventing falls and supporting bone health.

WEST — Dental, Hearing and Vision: Ward 86 helps link people to the appropriate screenings and services.



SOUTH — Network and Navigation: A monthly support group provides an opportunity to come together, share experiences, and relieve loneliness.

For more information or to contribute to this initiative, contact goldencompass@ucsf.edu (<mailto:goldencompass@ucsf.edu>) or (628) 206-2473.

Ward 86 and the Golden Compass Program



https://youtu.be/fB-_MP0V69k (3 minute video)




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The Golden Compass Program: Overview of the Initial Implementation of a Comprehensive Program for Older Adults Living with HIV

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Abstract

The population with HIV is aging and has unique health needs. We present findings from an evaluation of the geriatric-HIV program, Golden Compass, at San Francisco General Hospital. We used the implementation science framework, RE-AIM (*Reach, Effectiveness, Adoption, Implementation, Maintenance*) to guide the evaluation and used quantitative and qualitative methods to assess RE-AIM dimensions. From January 2017 to June 2018, 198 adults age ≥ 50 years participated in the program, with an estimated *reach* of 17%. Providers and patients indicated high acceptability of the program and were satisfied with clinics and classes. Colocation of services, specific pharmacy and geriatric assessments, and social support from classes were valued (*effectiveness*). Provider *adoption* was high, and the program was *implemented* as originally designed. Areas for improvement included challenges of framing aging services to patients. Future efforts will focus on expanding the reach of the program and examining long-term outcomes.

Keywords

HIV, aging, geriatrics

Date received: 2 July 2019; revised: 27 April 2020; accepted: 26 May 2020.

Introduction

With expanded access to antiretroviral therapy, life expectancy for people living with HIV (PLWH) has improved, approaching that of the general population.¹⁻³ As a result, the number of older adults living with HIV has steadily increased. Worldwide in 2016, 5.7 million PLWH were age 50 years or older, a number estimated to increase to at least 7.5 million older adults in 2020.¹ While the majority of older PLWH live in low- and middle-income countries, in high-income countries like the United States, the proportion of older PLWH is higher, with 50% of PLWH in the United States now age ≥ 50 .^{1,4} Although most older adults living with HIV were diagnosed at younger ages and have “aged with HIV,” new HIV diagnoses in people aged 50 years or older also occur. In the United States, people aged 50 years or older account for 17% of new HIV diagnoses.⁴

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What Do We Already Know about This Topic?

People living with HIV are aging, and new care models are needed to address the health needs of this population, including comorbidities and geriatric conditions.

How Does Your Research Contribute to the Field?

We describe the successes and challenges from the implementation of the Golden Compass geriatric-HIV program based at San Francisco General Hospital using an implementation science framework Reach-Effectiveness-Adoption-Implementation-Maintenance (RE-AIM).

What Are Your Research's Implications toward Theory, Practice, or Policy?

The use of the RE-AIM framework allows for knowledge learned from our program implementation to be applied to other settings or practices.

Age 50 is commonly used to define “older” for PLWH in part due to studies showing that PLWH are at increased risk of age-related comorbidities like cardiovascular disease and osteoporosis and that PLWH experience geriatric conditions such as falls and frailty at relatively younger ages than the general population.⁵⁻⁹ This increased risk of other comorbid diseases stems from a combination of factors, including chronic inflammation from HIV infection, antiretroviral medication toxicities, and lifestyle factors such as alcohol and tobacco use.^{10,11} Older PLWH often experience multiple comorbid conditions, or multimorbidity, which can lead to polypharmacy.¹²⁻¹⁴ Adding to this medical complexity, some older PLWH also face mental health conditions and psychosocial issues such as substance use, loneliness and social isolation, and stigma.^{11,15-17} The combined burden of HIV, comorbidities, and geriatric conditions in this population necessitates a shift in HIV care from a focus primarily on HIV-related outcomes toward more holistic models of care aimed at treating comorbidities and improving quality of life. Addressing geriatric conditions can be especially important as conditions such as functional and neurocognitive impairments are associated with poorer quality of life in PLWH.^{18,19} This paradigm shift, dubbed “geriatric-HIV medicine,” endorses that geriatricians and HIV providers start sharing the “same language” and incorporate geriatric medicine principles when caring for this burgeoning population.²⁰⁻²²

In response to this needed shift in care, a small number of geriatric-HIV programs have emerged worldwide, mostly in high-income countries in Europe and the United States.²³ A few programs, such as in Italy and Australia, emerged from clinics originally focused on metabolic complications of HIV and are now focused on multimorbidity and frailty.²³ Other programs are based on a consultative model where a consultant or team

conducts geriatric assessments focused on domains such as cognition, mental health, and physical function.²³ Examples of consultative models include a geriatrician-led weekly consultative clinic embedded in an HIV clinic (Center for Special Services clinic in New York City); an interdisciplinary review of geriatric screening results by a team comprised of a physician with geriatrics and infectious disease expertise, a pharmacist, a social worker, and a nurse practitioner (former Mmutu Clinic in New Orleans); and a separate, dedicated referral clinic consisting of an HIV consultant, nurse practitioner, pharmacist, and nutritionist (Over 50 clinic in London).^{20,23-25} Although 3 clinics (New York, New Orleans, London) have program descriptions reported in the literature, empirical data on such programs are lacking, especially program evaluation data.²⁵⁻²⁷ Few short-term outcomes are described, and we are unaware of data on concepts such as program acceptability, which is important for long-term programmatic success.²⁵⁻²⁷

The field of implementation science can help address this knowledge gap, to allow for better understanding of how geriatric-HIV programs address age-related challenges in real-world clinical settings. Broadly, implementation science can be defined as the study of the strategies used to translate research knowledge into clinical practice.²⁸ Implementation science research has been proposed as a solution to address gaps in HIV prevention and the HIV care continuum and could also be applied to help identify and address gaps in the care of older adults living with HIV.^{29,30} Further, implementation science frameworks provide a way to organize data for dissemination of program findings to other settings. Although multiple implementation science frameworks exist, the Reach-Effectiveness-Adoption-Implementation-Maintenance (RE-AIM) framework is an established framework used in public health settings for 20 years and has been specifically proposed for HIV research.³¹⁻³⁴

To expand on the current knowledge of geriatric-HIV programs, in this study, we evaluated the initial implementation of the Golden Compass Program, at the Ward 86 outpatient HIV clinic at San Francisco General Hospital, using the RE-AIM framework. The Golden Compass Program is a geriatric-HIV program designed to address key health-related challenges experienced by older PLWH and consists of consultative geriatrics and cardiology clinics located within the HIV clinic and participatory group classes for patients; the theory-based design of the program is described previously.³⁵ This evaluation focuses on the period from program inception in January 2017 through June 2018. Importantly, through the use of the RE-AIM framework, this article presents assessment of initial outcomes such as acceptability and satisfaction with the program among patients and providers.

Methods

Program Setting and Participants

The Ward 86 clinic is a Ryan White and public health funded clinic located on the San Francisco General Hospital campus. Ward 86 provides HIV primary care and specialty services to

approximately 2600 PLWH who are publicly insured or under-insured. From 2017 to 2018, the time frame of this study, approximately 1200 patients were age 50 years or older. All PLWH age ≥ 50 seen at Ward 86 were eligible to participate in the Golden Compass program. Although we focused on patients at Ward 86, programming was open to the larger San Francisco community.

Program Description

The Golden Compass Program launched in January 2017 involving a team of MDs (medical director, cardiologist, geriatrician), a registered nurse (RN), a pharmacist, a program coordinator, who managed classes, and a medical assistant. We developed the program with input from patients and providers, described in detail previously.³⁵ Specifically, the program name, including the idea of a compass, came from focus groups with patients who reported feeling unprepared for their “Golden Years” and who reported needing help navigating the health care system.³⁵ Using this input, we conceptualized the Golden Compass program as a comprehensive care program for PLWH aged 50 years or older, framed around the 4 points of a compass: (1) **Heart and Mind** (Northern Point) includes on-site cardiology, cognitive evaluations, and brain health classes; (2) **Bones and Strength** (Eastern Point) focuses on bone health, fitness, and physical function, through exercise classes and on-site geriatric consultation; (3) **Dental, Hearing, and Vision** (Western Point) ensures appropriate screenings and linkage to dental, audiology, and optometric/ophthalmology services; and (4) **Networking and Navigation** (Southern Point) focuses on social and community-building activities.³⁵ Key features of this program are that patients maintain their primary care provider and access the Golden Compass program within their HIV primary care setting. Consultations and class programming, including in-person visits with an HIV-focused geriatrician and cardiologist, are accessed in the same familiar clinic environment. Although conceptualized along the compass framework, not all services map precisely to a single point and are meant to overlap and be complementary. For example, while the cardiology clinic aligns directly with the Northern Point (Heart and Mind), the geriatrics clinic overlaps with Northern (Heart and Mind), Eastern (Bones and Strength), and Western Points (Dental, Hearing, Vision) by assessment of cognition, physical function and falls, and screening for sensory impairment, respectively.

Program Referrals

We employed a 2-pronged strategy to introduce the Golden Compass Program to patients and medical providers. First, program components were advertised to patients through flyers and handouts posted around the clinic. Second, we introduced the program to providers and staff via a series of routine staff meetings. To participate in the program, patients could be referred by their primary care provider (most common mechanism), or by a social worker or RN on their clinical care team, to 1 or more program components. Separate referrals existed for the

cardiology and geriatrics clinics, although a patient could be referred to both clinics. Participatory group classes (brain health and exercise classes) were attended on a drop-in basis and did not require provider referral. However, if a provider thought a patient might benefit from a class, they could share patient names with the program coordinator, who in turn contacted the patient with details and provided reminder calls for upcoming sessions. Additionally, participation in one programmatic component could facilitate participation in another component. For example, if a patient seen in geriatrics clinic was found to have cognitive concerns or problems with mobility and balance, they were offered participation in brain health or exercise classes. Through these systems, a patient could participate in one component (eg cardiology clinic) or multiple components (eg, geriatrics clinic and brain health classes). The extent of participation was determined by each patient and there were no time limits on participation.

Description of Initial Program Implementation

Initial program implementation focused on 3 programmatic components: (1) group classes, specifically exercise and brain health classes (Eastern and Northern Points, respectively); (2) a bimonthly consultative cardiology clinic (Northern Point); and (3) a weekly consultative geriatrics clinic (Eastern, Western, and Northern Points). All classes were on a drop-in basis and there were no limits or caps on the number of classes each patient could attend. Brain health classes were developed in conjunction with a community-based gerontologist, who led the classes. The curriculum was adapted to focus on cognitive domains relevant to HIV-associated neurocognitive disorder.³⁶ We conducted 3 series of brain health classes, occurring weekly for 9 weeks, between February 2017 and April 2018. Each class in the series was 2 hours long and concluded with a meal at the end. Content included strategies for addressing cognitive concerns and included sessions on mental health issues such as depression. Exercise classes, known as “Wellness Club,” focused on balance, cardiovascular, and strengthening exercises. Wellness club classes were conducted on a weekly basis over 2 time periods, between January and April 2017 and then from January 2018 on an ongoing basis. An exercise instructor with experience in leading classes for older adults in a medical setting, led the Wellness Club classes. Classes were 50 minutes in length and all exercises could be performed sitting in a chair or wheelchair.

For implementation of the cardiology clinic, a cardiologist with HIV expertise conducted cardiology consultations twice a month at Ward 86 for patients aged ≥ 50 years. Electrocardiography and laboratory specimens needed for cardiology clinic could be done at Ward 86, while other testing was done on the same hospital campus. For the geriatric consult clinic, a geriatrician with HIV expertise held a weekly consult clinic at Ward 86. Each initial geriatric consultation visit was scheduled for 60 minutes and included a consultation with the clinic pharmacist to review all medications. During this visit, geriatric assessments were performed and a treatment plan developed.

Table 1. Definitions and Data Sources of RE-AIM Dimensions.^a

RE-AIM dimension:	Definition	Source
Reach ^b	<ul style="list-style-type: none"> –Overall reach: Proportion and demographics of patients who participated in 1 or more program components –Proportion and demographics of patients seen in geriatrics and cardiology clinics; we compared demographics between those who attended clinic appointments and those who had cancelled/no-show –Class attendance and demographics of attendees –Number of patients screened for vision, hearing and dental issues 	<ul style="list-style-type: none"> –Manual tracking of geriatric and cardiology clinic visits including cancellations and no-show appointments –Tracking class attendance –Electronic medical record demographic data and surveys with demographic questions –Qualitative interviews with patients and providers
Effectiveness	<ul style="list-style-type: none"> –Patient satisfaction with and acceptability of program components –Patient satisfaction and feedback on classes –Provider/staff satisfaction with services, acceptability of program components –Provider/staff changes in knowledge, attitudes and beliefs about aging services –Reports of benefits from services 	<ul style="list-style-type: none"> –Surveys of patients and providers/staff regarding program satisfaction and acceptability (provider surveys also included questions about knowledge, attitudes, beliefs, patient surveys self-rated health) –Surveys of patients at end of each class cycle –Qualitative interviews with patients and providers
Adoption ^c	<ul style="list-style-type: none"> –Provider/staff referrals to program components, especially geriatrics and cardiology clinics 	<ul style="list-style-type: none"> –Manual tracking of providers who referred to clinics –Survey questions about reasons why did or did not make referrals –Qualitative interviews with patients and providers
Implementation	<ul style="list-style-type: none"> –Fidelity to proposed structure of clinics and programming 	<ul style="list-style-type: none"> –Internal notes/reports on activities and operations –Qualitative interviews with patients and providers

^aMaintenance phase not included.

^bReach defined at patient level.

^cAdoption defined at provider/staff level.

Assessments included depression screening (Patient Health Questionnaire-9), cognitive assessment (Montreal Cognitive Assessment), functional status (Activities of Daily Living and Instrumental Activities of Daily Living), falls and gait assessment, and assessment of social supports. In this initial program implementation, only patients who were seen in geriatrics clinic underwent geriatric assessment (eg, someone who only participated in Wellness Club did not undergo geriatric screening). For both geriatrics and cardiology clinics, the need for ongoing follow-up visits was at the discretion of the consultant. Consultant notes with assessment results and treatment plans were sent to primary care providers and any medication changes discussed with providers over email or phone.

Initial implementation of screenings for dental problems and sensory impairment (Western Point) focused on older adults seen in the geriatric consultation clinic. Standard single-item screening questions assessed vision, hearing, and dental concerns and dates of last screening exams.^{37,38} Referrals were made to appropriate services and information provided about discounted eyeglasses or hearing aids. Initial activities to address social isolation (Southern Point) focused on a pilot support group for older adults, along with linking patients, as appropriate, to community-based programs to address social isolation.

Evaluation Using the RE-AIM Framework

The implementation science framework RE-AIM focuses on the *reach* of a program to a representative proportion of the

target population (often defined at the patient level), *effectiveness* of the program on specific outcomes, *adoption* of the program in a specified setting (often defined at the provider level), fidelity to the originally planned *implementation*, and long-term effects including how a program becomes incorporated into routine practices, or program *maintenance*.^{31,32-34,39} For this initial evaluation of the first 1.5 years of the program (from January 2017 to June 2018), we did not examine the maintenance dimension of RE-AIM. We used both quantitative and qualitative methods as data sources for the RE-AIM dimensions. Satisfaction surveys for the overall program and consultant clinics were administered once in the fall of 2018, at the same time and one-on-one qualitative interviews with primary care providers and patients were conducted. Qualitative interviews provided important data on barriers and facilitators of each RE-AIM dimension as well as additional effectiveness data. Table 1 summarizes the definitions and data sources utilized in our study for each RE-AIM dimension.

RE-AIM Dimensions

Overall *reach* was defined as the proportion of patients who participated in ≥ 1 program components compared to the total number of patients aged ≥ 50 years listed as patients in the clinic. The primary data source was attendance at clinic appointments and classes. We also examined participant demographics and compared the demographics of those who attended clinic appointments in the cardiology and geriatrics

clinics to those who did not attend (cancelled and no-show appointments).

We examined *effectiveness* among patients, primary care providers, and staff in terms of the degrees of acceptability and satisfaction with the Golden Compass program. This was done through quantitative methods (satisfaction surveys done at one time point in the fall of 2018) and qualitative interviews with patients and primary care providers, for example, through benefits of the program reported during interviews. Acceptability was measured using a single item, "I would recommend *x* service to another person," rated on a Likert scale from strongly agree to strongly disagree.⁴⁰ We assessed satisfaction with program components using survey items, "How satisfied were you with *x*," rated on a Likert scale from very satisfied to very dissatisfied.

For patients who attended one of the consult clinics, we also assessed satisfaction with geriatrics and cardiology clinics using the 18-item Interpersonal Processes of Care scale,⁴¹ which focuses on communication and patient-centered decision-making (items scored between 1 "never" and 5 "always"). Self-rated health before and after geriatrics and cardiology clinics was assessed retrospectively using 2 items: "How would you rate your overall health before your appointment with Dr X?" and "How would you rate your overall health after your appointment with Dr X?" The response scale for each item ranged from "excellent," "very good," "good," "fair," to "poor." Items rating patient satisfaction with classes included satisfaction with instructors and open-ended questions about what participants liked most and least about classes, as well as any specific benefits observed or learned in classes ("Please describe any specific benefits achieved").

Among providers and staff, we also assessed changes in knowledge, attitudes, and beliefs about aging issues and services (eg, "As a result of the Golden Compass Program, I am knowledgeable in providing care to older adults," ranked on a Likert scale of strongly agree to strongly disagree).

Adoption was defined as provider uptake of the program, or the number of providers who made referrals to geriatrics and cardiology clinics. Provider referrals were assessed primarily through tracking scheduled appointments in each clinic. Provider satisfaction surveys also included questions about which program components they referred patients to and reasons for non-referral. Barriers and facilitators of provider adoption of the program were explored further in qualitative interviews.

We assessed fidelity to the proposed *implementation* of the program through internal notes, activity reports on operational changes, and through qualitative interviews of patients' and providers' experiences of the program.

Data Collection

Data on referrals and class attendance were collected from January 2017 through June 2018 (cardiology clinic began March 2017 and geriatrics clinic July 2016). We administered satisfaction surveys evaluating satisfaction and acceptability with the overall program and consultative clinics at a single

time point in the fall of 2018 with staff, providers, and patients. We also conducted one-on-one qualitative interviews with primary care providers and patients during this time. Patient satisfaction with classes was assessed at the end of each brain health class cycle (April 2017, September 2017, and April 2018) and at the end of the second series of exercise classes (June 2018).

Patients were recruited for surveys (approximately 15 minutes in length) and interviews (45-60 minutes in length) via flyers. Flyers were posted in the clinic and were also given to patients who attended the geriatrics and cardiology clinics by a medical assistant. The flyer included a brief description of the evaluation goals and a telephone contact. Patients in turn contacted the evaluation team if they were interested in completing surveys or interviews. All providers and staff were recruited through email with links to an online survey (approximately 10 minutes in length). Primary care providers who had referred at least 1 patient to the program were recruited over email to participate in qualitative interviews (20-45 minutes in length). Patient surveys were self-administered in person, either on paper or on a tablet device, with staff assistance if needed. Provider surveys were self-administered online directly through the secure UCSF REDCap survey platform. All survey data were entered and stored using REDCap electronic data capture tools hosted at UCSF.⁴² Interviews were conducted by researchers experienced in conducting qualitative research in person or via videoconference using a semi-structured interview guide with open-ended questions about experiences with the program. A transcription company approved by the UCSF Committee on Human Subjects Research transcribed interview data. Patients received a \$10 gift card for survey completion and a \$20 gift card for qualitative interviews. Providers who completed qualitative interviews received \$10 gift cards.

Data Analysis

We used descriptive statistics to summarize survey data and participant demographics. We used a framework analysis to analyze the qualitative interview data, with codes based on the RE-AIM dimensions.⁴³ Three coders independently reviewed the interview transcripts and met to discuss codes (JM, JT, CB). Representative quotes for each RE-AIM dimension were selected for this study.

Ethical Approval and Informed Consent

The study was conducted in accordance with the World Medical Association Declaration of Helsinki. All study procedures and activities were reviewed by the UCSF Committee for Human Subjects Research (study # 15-17859) and determined to be a project that includes program evaluations, quality improvement activities, or other activities which did not require further institutional review board oversight according to US federal regulations. Even with the exemption, we still followed principles of informed consent including emphasizing the voluntary nature of participation in the evaluation process.

Table 2. Demographics of Golden Compass Program Participants (n = 198).

Age in years, mean (SD)	62 (7.6)
Race	
White	78 (39%)
Black	43 (22%)
Asian	14 (7%)
American Indian/Alaska Native	10 (5%)
Other	33 (17%)
Hispanic/Latino ethnicity	31 (17%)
Male sex	178 (89%)
CD4 T cell (cell/mL), median (IQR)	514 (368-734)
Undetectable viral load (<40 copies/mL)	171 (91%)

Results

Results are reported in the context of each RE-AIM dimension. During the evaluation period of January 2017 to June 2018, a total of 39 providers and 28 staff worked at Ward 86, and 198 patients participated in the Golden Compass program. Sixty-three percent (n = 42) of staff and providers and 20% (n = 39) of patient participants completed satisfaction surveys. Ten patients and 9 primary care providers completed qualitative interviews.

Reach

In the first year-and-a-half since formal program launch, 198 individuals participated in 1 or more components of the Golden Compass program. Specifically, 119 were seen in geriatrics clinic, 48 in cardiology clinic, 40 attended brain health classes, and 32 attended exercise classes. Moreover, 30 (15%) participated in ≥ 2 components of the program. The mean age was 62 years (range 48-81); the majority were male (89%); 17% were Latino; 14 participants were from outside Ward 86. Other participant demographics are given in Table 2. Since 1200 adults aged 50 years or older are listed as patients of Ward 86, the estimated overall reach was approximately 17%.

In geriatrics clinic, 119 patients were seen for a total of 182 visits. An additional 34 patients were referred to clinic but did not attend. Compared to those who attended, there were no statistically significant differences by demographic characteristics including race and ethnicity, although it was noted that those who did not attend were relatively younger (59 versus 64 years, $P = .07$) and more likely to identify as female ($P = .08$). In cardiology clinic, 48 patients were seen for a total of 98 visits. In cardiology clinic, an additional 17 referred patients did not attend appointments. Compared to those who attended, patients who did not were more likely to identify as female (23% versus 6%, $P = .05$); no differences were seen by race, ethnicity, or age.

Attendance in Golden Compass classes increased over time. Brain health class attendance grew from a regular group of 4 participants to a group of 10. Similarly, attendance increased over time in the exercise classes with an initial group of 8 participants attending on average 2 weeks of classes, to a group of 30 participants attending on average 5 weeks of classes.

Notably, 7 participants attended ≥ 10 consecutive weeks of classes. For the Western point (Dental, Hearing, Vision), among geriatric clinic patients, 42 (34%) had difficulty seeing, 55 (45%) had difficulty hearing, and 45 (36%) noted dentition problems. Attendance in the support group (Southern Point) at Ward 86 was low, necessitating outside referrals.

In qualitative interviews, providers noted that convincing patients to participate in an aging-focused program was sometimes a barrier to *reach*. Many providers noted that discussing the program with younger patients (such as those in their early 50s) could be challenging. One provider noted that although cognitive assessments were valued (reflecting provider level *effectiveness*), cognitive impairment carries its own stigma, which could also be a barrier to patient reach. Table 3 includes example quotes related to the *reach* of the Golden Compass program.

Patient Effectiveness

Thirty-nine (20%) program participants completed satisfaction surveys. Overall satisfaction and acceptability with programmatic components were high (>90%; Table 4). Interpersonal processes of care scores also reflected high satisfaction with clinics (Table 4). Although self-rated health was assessed by retrospective report, patients reported higher self-rated health (more “excellent”, “very good” responses) after being seen in geriatrics clinic ($P = 0.015$; Table 4). Twenty-three participants completed class surveys about brain health classes and 9 completed surveys about Wellness Club. Across all 3 brain health class cycles, in response to the prompt “What did you like most about the class?”, the most common response was interactions with others. In a prompt about benefits gained from Wellness Club, participants reported improvements in balance and posture, with one-third noting improvements in mental health (“feel happier,” “more motivated,” “emotional health has improved”) and one-third noting connection with others.

In qualitative interviews, patients noted benefits of attending classes, including social aspects and interactions, as well as specific benefits such as learning how to “feel calm” in brain health classes. Patients appreciated meeting with the pharmacist to review medications during geriatrics clinic and appreciated a “more broad, wider” or holistic approach to health in geriatrics clinic including addressing mobility problems, which was noted as an issue for many older adults. Table 3 includes example patient quotes related to the *effectiveness* of the Golden Compass program.

Provider and Staff Effectiveness

Overall, 42 (63%) of staff and providers completed satisfaction surveys (16 staff and 26 providers, with 18 providers having referred at least 1 patient to geriatrics clinic and 14 providers having referred at least 1 patient to cardiology clinic). All disciplines were represented among survey respondents, with MD/NP providers (n = 22), nursing (n = 4), medical assistants (n = 8), and other staff (n = 8). Table 5 summarizes staff and provider satisfaction survey data. Satisfaction with the Golden

Table 3. Example Quotes for Each Re-AIM Dimension from Qualitative Interviews with Patients and Providers.

Reach
<p>[My doctor] said [Golden Compass] was a program for people who were older . . . That I would meet those kind of people . . . I had a whole peer group die on me, and I'd like to have some peers and some people with HIV who are in their 60s or older. I know there are not too many of us, but I'd like to see if our experiences are similar or connect in any way. So that was my primary interest in the program. (Patient)</p> <p>Providers framing aging services</p> <p>I talk about as we get older it's nice to have somebody who that's their specialty, I do primary care, I'm an HIV specialist but it's also nice as we get older to have kind of global look at your overall health from that point of view, and it's not that you're old because a lot of people, they roll their eyes, "I'm 50 I don't want to get referred to as a geriatric." And I say, "Well it's not that you're so old now but what we want to do is look at ways to keep you healthy as you get older." (Provider)</p>
Effectiveness
<p>Overall effectiveness of Golden Compass</p> <p>[The program] is another set of eyes on taking care of my health, they're like, "How can we support this person, what could we do to make it easier for them?" (Patient)</p> <p>We often learn from our subspecialist colleagues and subsequent recommendations and notes. So, even though I don't always refer my patients who are over fifty, the assessments are actually quite helpful in informing how to approach all of my patients over fifty, even if they don't go to—or don't want to go to Golden Compass." (Provider)</p> <p>Benefits of classes</p> <p>[The classes] really taught you . . . Don't blame yourself . . . I didn't do anything wrong. Somebody just took [HIV] from themselves and just gave it to me . . . I got so sick. I didn't have no other choice. I got so sick I was on my knees crawling for somebody to take me to the hospital because I'm knowing but not believing. So the classes really taught me, calm yourself down. Just deal with whatever it is that you need to deal with. And you will never be okay but you'll be all right. All right. You know what you need to do to make yourself feel better. (Patient)</p> <p>I have had a couple patients attend [the classes] and they really like it. I sell it to them by saying that there will be people of their age group so they're not feeling like they're in an uncomfortable environment, with younger people, and maybe not being able to do things. Patients have really enjoyed it who have gone. So I often try and get [more of] them to go. (Provider)</p>
Adoption
<p>Satisfaction with prior experience facilitates adoption</p> <p>"And for the most part, part of what makes you want to refer a patient is the experience you have when one patient's been seen and in general my experience has been really good," (Provider)</p> <p>Staff can help facilitate referrals</p> <p>"The best way would be to have the nurses query the providers, because they do the scrubbing and the charts before [visits] for healthcare maintenance elements, and then just saying "Do you think that this [person] would be a candidate for a Golden Compass referral?" (Provider)</p>
Implementation
<p>I wish I can have all of my appointments here . . . I'm familiar with the building. When I [have to] go somewhere else, I still show up but it's just more far away and it's different, so I got to plan my timing and stuff. The area, the closeness, it's a plus. (Patient)</p> <p>I'll look at my clinic list and I'll have 70-year-olds, a bunch of 60-year-olds—that's my typical panel. Maybe not all 70s but 50s, 60s, definitely aging. So, [it is critical] having Golden Compass be an integral part of the clinic and provide routine follow-up as part of the person's care as well. Often I'll have a patient with psychiatric issues and, because they're a little bit disorganized and can't make appointments with a psychiatrist and all that, I'll end up managing, I'll prescribe their antipsychotics but then I'll want them to see the psychiatrist once a year just to check in, med check, give an overall global view of how things are going. [The benefit of] Golden Compass is not only just the initial consultation but also the following up. (Provider)</p>

Compass program was high, with 38 (90%) reporting very satisfied or satisfied with the program overall and with cardiology and geriatric clinics. A majority (90%) of staff and providers agreed or strongly agreed that the program improved the health of older adults at Ward 86. In open-ended survey responses, comments included phrases such as "pivotal program," or "welcomed addition." Areas for improvement in comments included appointment wait times, how to best communicate with specialists and refer to appointments, and advertising more effectively.

With regard to knowledge, attitudes, and beliefs about aging services among staff and providers, 30 (72%) strongly agreed

or agreed that their comfort in providing care for older adults had increased since program inception and 26 (62%) strongly agreed/agreed that they felt knowledgeable about caring for older adults since program inception. Similar responses were obtained regarding changes in confidence in ability to care for older adults, with 25 (59%) noting strongly agree/agree. Overall, 11 (76%) providers who referred to cardiology clinic felt the referral increased their knowledge of cardiology topics and 17 (94%) providers who referred to geriatrics clinic felt their knowledge of geriatric assessment and management increased.

Among the 9 primary care providers who completed qualitative interviews, combined they referred 70 patients to

Table 4. Patient Satisfaction with and Acceptability of Golden Compass Program Components.

Percentage reporting satisfied/very satisfied or agree/strongly agree, n = 39		
Satisfaction with care overall	97% (77% very satisfied)	
Geriatrics clinic		
Satisfaction with geriatrics clinic ^a	100% (75% very satisfied)	
Acceptability of geriatrics clinic ^b	93% (75% strongly agree)	
Self-rated health before and after geriatrics ^c clinic	Before	After
Excellent	3 (11%)	4 (14%)
Very good	2 (7%)	4 (14%)
Good	11 (40%)	12 (43%)
Fair	9 (32%)	8 (29%)
Poor	3 (11%)	0 (0%)
		P value = 0.015
Cardiology clinic		
Satisfaction with cardiology clinic ^a	100% (88% very satisfied)	
Self-rated health before and after cardiology ^c clinic	Before	After
Excellent	0 (0%)	0 (0%)
Very good	1 (13%)	4 (38%)
Good	6 (75%)	5 (62%)
Fair	1 (13%)	0 (0%)
Poor	0 (0%)	0 (0%)
		P value = 0.5
Acceptability of cardiology clinic ^b	100% (63% strongly agree)	
Interpersonal processes of care scores ^d		
Communication	Lack of clarity	1.12
	Elicited concerns	4.60
	Explained results	4.48
Decision-making	Decided together	4.24
Interpersonal style	Compassionate	4.83
	Discrimination	1.00
	Disrespectful office staff	1.03
Classes		
Satisfaction with brain health classes ^a	93% (80% very satisfied)	
Acceptability brain health classes ^b	100% (88% strongly agree)	
Satisfaction with Wellness Club ^a	100% (76% very satisfied)	
Acceptability Wellness Club ^b	100% (88% strongly agree)	

^aN = 28 for geriatrics clinic, 8 for cardiology clinic, 16 for brain health, 17 for Wellness Club.

^bAcceptability measured by "How strongly do you agree, "I would recommend the x to someone else?".

^cAsked at one time point, retrospectively, P values using Wilcoxon signed-rank test.

^dAsked for both cardiology and geriatrics clinics, reported as average scores from 1 to 5, with 1 being a low score or "never" and 5 being a high score or "always."

Table 5. Provider and Staff Satisfaction with and Acceptability of Golden Compass Program Components.

Percentage reporting strongly agree/agree or satisfied/very satisfied, n = 42	
Overall Golden Compass Program	
Satisfaction with Golden Compass Program	90%
Program improved health of patients age ≥50	90%
Acceptability ^a	96%
Geriatrics clinic ^b	
Satisfaction with geriatrics clinic	94%
Adequately addressed your clinical concern	100% (83% strongly agree)
Improved patient care	100% (67% strongly agree)
Communicated recommendations clearly	94%
Cardiology clinic ^b	
Satisfaction with cardiology clinic	94%
Adequately addressed your clinical concern	92%
Improved patient care	92%
Communicated recommendations clearly	83%
Classes	
Satisfaction with patient experience of Wellness Club	90%
Satisfaction with patient experience of Brain Health ^c	66%

^aAcceptability measured by "How strongly do you agree, "I would recommend the x to someone else?"

^bn = 18 for responses to geriatric consults, n = 14 for responses to cardiology consults.

^cNo one answered dissatisfied or very dissatisfied, but 29% answered "unsure" or that "patients referred did not participate."

cardiology and geriatrics clinics, with an average of 2 referrals to cardiology and 5 referrals to geriatrics. Complementary to survey data, reviewing consultants' notes and applying knowledge gained to other patients was noted during interviews (Table 3). Improvement in patients' lives, such as addressing cognition and mobility issues in geriatrics clinic, was another notable theme. Addressing polypharmacy and pharmacist support was viewed as a benefit to patients and helpful to providers. Providers also observed that patients benefitted from class participation (Table 3). A desire for increased mental health services for older adults was noted.

Adoption

A total of 39 providers and 28 staff were working at Ward 86 in 2017 to 2018. Through tracking clinic appointments, 33 (85%) providers had referred at least 1 patient to the geriatrics clinic, with a range of 1 to 16 patients referred. Twenty-three (59%) had referred to the cardiology clinic, with a range of 1 to 14 patients referred. The most common reasons for referral to geriatrics clinic included general evaluation ($n = 48$, 40%), cognition (37, 31%), and falls (14, 11%). The most common referral reasons to cardiology clinic included coronary artery disease (20, 42%), congestive heart failure (7, 15%), arrhythmias (including atrial fibrillation, $n = 5$, 10%), and pulmonary hypertension (5, 10%).

Among the staff and providers who completed surveys ($n = 42$, 63% of total staff and providers), 12 (80%) staff and 23 (90%) providers reported recommending 1 or more program components to patients. The majority of respondents had referred to geriatrics clinic ($n = 27$, 77%), brain health classes ($n = 25$, 72%) followed by exercise classes ($n = 21$, 60%), and cardiology clinic ($n = 17$, 49%). Staff ($n = 3$) who did not discuss the program with patients cited time constraints ($n = 1$) and role responsibilities as reasons (eg, more the role of the patient's primary care provider, $n = 2$). Two providers who had not referred to any program components indicated not knowing how to make a referral, being unaware of program components or not understanding what a geriatric consult provides.

In interviews with primary care providers, confusion over referral workflows to geriatrics and cardiology clinics was noted as a minor barrier to adoption. Value and perceived benefits to patients seen from prior referrals facilitated further referrals and overall adoption (Table 3).

Implementation

Overall, the program was implemented as originally planned. A few changes did occur including refocusing the Southern Point (social support) to our community partners with active support groups. Interviews supported fidelity to proposed implementation, including the flow of initial geriatrics clinic visits with the pharmacist and geriatrician (Table 3). Both providers and patients identified collocation of geriatrics and cardiology clinics at Ward 86 as helpful and important. Both groups noted lack of Spanish-language programming as a challenge. Providers noted

a need for clarity regarding the role of the Golden Compass team as either providing consultation or ongoing follow-up support, with some desiring more comanagement options (eg, ongoing geriatric care).

Discussion

As the field of "geriatric-HIV medicine" evolves, improved knowledge of existing geriatric-HIV programs is needed. In this study, we evaluate the initial implementation of the Golden Compass geriatric-HIV program in San Francisco, using the RE-AIM framework. The Golden Compass program offers comprehensive services with a focus not just on consultative clinics in geriatrics and cardiology but also on classes and fostering social connections. In the first year and a half, we reached approximately 17% of older adults at the Ward 86 HIV clinic with overall fidelity to the original program design. Provider adoption of services was high with 60% and 80% of providers referring at least 1 patient to cardiology and geriatrics clinic, respectively. Overall, patients and providers found the program to be highly acceptable and were satisfied with services. Our study helps address the knowledge gap about geriatric-HIV programs by providing evaluation data including data on short-term outcomes and acceptability of services.

Use of the implementation science framework RE-AIM is a strength of this evaluation, as it allowed us to consider and analyze relevant public health dimensions such as reach and effectiveness.^{29,32} Additionally, the qualitative and quantitative methods used to define the RE-AIM dimensions were complementary. For example, with regard to *reach*, during provider interviews, stigma against attending an "aging" program was perceived as a barrier to participation for some patients, especially those in their 50s. While we had heard that sentiment expressed by patients during program development, and intentionally omitted the word "HIV" or "geriatrics" or "aging," it can be challenging to frame the program to patients, especially to the geriatrics clinic, without using the term "aging." Indeed, those who did not attend geriatric clinic appointments (canceled or no-show appointments) were relatively younger compared to those who did attend (age 59 versus 64 years). Missed appointments also helps explain the high *adoption* rate of the Golden Compass Program through provider referrals yet lower overall reach. Provider suggestions on how to address this concern included framing the program as "staying healthy as you get older" or "living longer with HIV," both of which we plan to incorporate in the future.

Regarding *effectiveness*, we focused on early implementation outcomes, including satisfaction and acceptability of services. Overall, we found a high degree of satisfaction with all program components, often $\geq 90\%$ among both patients and providers. Patients retrospectively reported improvements in self-rated health after attending geriatrics clinic appointments, a measure which has been used as a single-item measure of quality of life in HIV clinics.⁴⁴ In interviews, providers and patients valued services through the program, especially addressing medications and mobility problems, although the need for greater mental health services was noted. Collocation

of services was also valued. The preliminary finding of improved self-rated health and the value of geriatric assessments supports the literature on geriatric assessment being associated with quality of life in older PLWH.^{18,19} The value of colocation of services supports a study of Ryan White HIV/AIDS program funded clinics, which also reported the importance of colocation of services.⁴⁵

A greater range of responses was seen in terms of knowledge, attitudes, and beliefs among providers and staff; 70% noted increases in comfort, confidence, and knowledge since program inception. Of note, initial program activities did not include specific educational outreach to staff and providers, which may explain the result. Overall *implementation* of the program proceeded as intended, except for the unexpected low attendance rate at the social support group, necessitating referrals to established community-based groups. Importantly, patients found support and connection through Wellness Club (exercise classes) and brain health classes offered, so may not have required an additional social support group.

Although it is difficult to make direct comparisons, for context on our RE-AIM findings, in terms of *reach*, the geriatric-HIV program in New Orleans (Mmutu Clinic) saw 60 of 160 eligible patients age ≥ 60 in 1 year; the Over 50 clinic in London saw 150 patients over 2 years, and the Center for Special Studies program in New York City saw 76 patients over 4 years (2800 patients all ages).²⁴⁻²⁶ The Center for Special Services program in New York reported that 7 of 10 providers found geriatric consultations very or extremely useful, which similar to our results suggest that providers find services valuable.²⁶

Another strength of using the RE-AIM framework in our evaluation is it provides a structure to organize key findings and how these findings might be applied or adapted to other settings.²⁹ For example, to expand the *reach* of geriatric-HIV programs, it is critical to not only frame services to avoid stigma from HIV but also agism. Through qualitative interviews, we learned more about the challenges of framing or advertising aging services to patients, despite our original best intentions of developing the program name, Golden Compass, to avoid “aging” or “geriatrics.” Another key finding relates to the preliminary *effectiveness* data, as patients reported developing new social connections through the program’s classes. This is important as more literature emerges about the hazards of isolation and loneliness on the overall health for older adults.^{15,46-48} We learned that fostering new social connections can occur through different types of programming and not just formal support groups. Also relevant to *effectiveness*, colocated services were valued by both patients and providers. We acknowledge that access to a colocated geriatrician may be difficult in some settings, given the limited numbers of geriatricians in the United States. Training HIV staff and interested providers in geriatric principles to conduct on-site geriatric assessments or using telemedicine consults could be adaptations, which still offer the spirit of colocated services. Furthermore, we found that the program was implemented largely as planned, which allows our program description to be reviewed by others and adapted to local resources. This is especially relevant as resources may vary

between urban settings like ours and rural areas in the United States, and especially relevant to differences in resources between high- and low- and middle-income countries.

Limitations do exist in our study, especially with our definition of *reach*. The denominator we used to examine *reach* is a current estimate of patients aged 50 years or older assigned to Ward 86, many of whom may not be actively engaged in services or attending clinic during the study time frame (2017-2018). Additionally, it is unclear that everyone age 50 years or older needs or would benefit from the Golden Compass services. Determining who would benefit most from aging services, especially geriatric consultative services, remains a gap in the literature. If anything, these limitations mean our current reach may be underestimated. In terms of effectiveness, we focused on satisfaction and acceptability in survey data and less on patient-reported outcomes, which is a future focus, including geriatric assessment results and prospective assessment of measures such as self-rated health. Our current retrospective measure of self-rated health limits interpretation of this result. However, survey data were enhanced by data from the qualitative interviews. We did not specifically evaluate the “maintenance” phase of RE-AIM, but funding for the program is ongoing and we are planning to use this study to further refine processes and improve services.

Our findings have important implications for further research and policy directions in “geriatric-HIV medicine.” Our *effectiveness* findings, such as satisfaction with and acceptability of services, not only fill a knowledge gap regarding geriatric-HIV programs but also provide early evidence for policy makers to support development and funding of these programs. Use of implementation science frameworks such as RE-AIM for program evaluation will be an important tool to advance the field, to allow for better comparisons across programs. The addition of qualitative methodology, as used in our study, is also an important tool to improve internal program processes and provide additional program outcome data, which in turn can support ongoing funding and program maintenance. For policy makers in the United States, where our program is based, 2 of the largest HIV service providers, the Veterans Health Administration (VA) and the Ryan White HIV/AIDS Program, may be ideal settings to implement a program like the Golden Compass program. Both settings could implement colocated services and programming such as classes. The VA has a strong tradition of geriatric services such as the Geriatric Research Education and Clinical Centers and the Ryan White program already emphasizes comprehensive colocated and wrap-around services which could be extended to geriatric and other subspecialist consultants.⁴⁹⁻⁵¹

A critical need exists for the development and improved understanding of geriatric-HIV programs for older PLWH, given the medical and psychosocial challenges facing this population. The Golden Compass program based at San Francisco General Hospital is an innovative program designed to address key issues facing older HIV-positive adults. This initial evaluation of the program holds key lessons for replication in other settings to serve the increasing number of older adults living with HIV.

Authors' Note

All study procedures and activities were reviewed by the UCSF Committee for Human Subjects Research (study # 15-17859) and determined to be a project that includes program evaluations, quality improvement activities, or other activities which did not require further IRB oversight according to the federal regulations summarized in 45 CFR 46.102(d).

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Geriatric HIV Medicine: Lessons from the Golden Compass Program

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Overview & Objectives

- Background: Aging of People with HIV, challenges and how geriatrics perspective can help
- Golden Compass Program:
 - Development
 - Activities and evaluation (& COVID-19 impact)
- Recent policy initiatives & future planning

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3

Case: 74 y/o diagnosed with HIV 1984

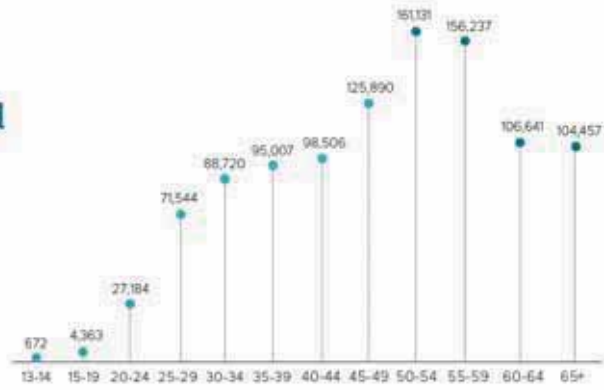
- CD4 count 440, viral load UD
- Hypertension, CKD, osteoporosis, depression, treated anal SCC
- 9+ medications daily
- Quit his job when diagnosed
- lost many friends in 80s/90s

“When you got HIV in those days it was a death sentence. That was what was expected—you would die. To live even 5 years was a surprise to me...”

Greene M. *JAMA* 2013

Adults and Adolescents with Diagnosed HIV in the US and Dependent Areas by Age, 2018

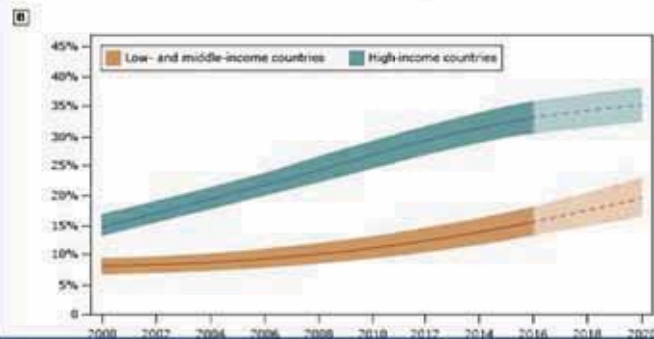
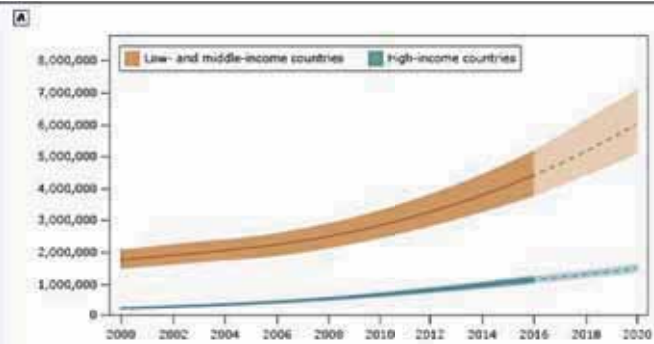
Over half of people with diagnosed HIV were aged 50 and older.



Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2018 (updated). *HIV Surveillance Report* 2020;31.

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Globally



From: Antunovich CJ, Beck KL, Steiner JL, et al. Global and regional trends of people living with HIV aged 50 and over: 2000-2020 and projections for 2025-2050. *PLoS One* 2020; 15:e0237700. Available at: <https://doi.org/10.1371/journal.pone.0237700>. Copyright © 2019 The Authors. Reproduced under the terms of the Creative Commons Attribution License 4.0.

New HIV Diagnoses in the US and Dependent Areas by Age, 2020

People aged 13 to 34 accounted for more than half (57%) of new HIV diagnoses in 2020.



Data for 2020 should be interpreted with caution due to the impact of the COVID-19 pandemic on access to HIV testing, care-related services, and case surveillance activities in state and local jurisdictions.
 Source: CDC. Diagnoses of HIV Infection in the United States and dependent areas, 2020. *HIV Surveillance Report* 2022;33

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Care Cascade Needs to Go Beyond Viral Suppression

People Aged 55 and Older with HIV in the 50 States and the District of Columbia

At the end of 2018, an estimated 1.2 MILLION AMERICANS had HIV. Of those, 379,000 were aged 55 and older.

9 in 10
 people aged 55 and older knew they had the virus.

It is important for people aged 50 and older to know their HIV status so they can take medicine to treat HIV if they have the virus. Taking HIV medicine every day can make the viral load undetectable. People who get and keep an undetectable viral load (or stay virally suppressed) can live a long and healthy life. They also have effectively no risk of transmitting HIV to HIV-negative sex partners.

Compared to all people with HIV, people aged 55 and older have higher viral suppression rates. In 2018, for every **100 people aged 55 and older with HIV**,



For comparison, for every **100 people overall with HIV**, **65** received some HIV care, **50** were retained in care, and **56** were virally suppressed.

* Had 2 viral load or CD4 tests at least 3 months apart in a year.
 † Based on most recent viral load test.

Source: CDC. Estimated HIV incidence and prevalence in the United States 2014–2018. *HIV Surveillance Supplemental Report*, 2018;25(1).
 Source: CDC. Selected national HIV prevention and care outcomes (slides).

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HIV = multimorbidity



Slide courtesy Steve Deeks

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Multimorbidity often leads Polypharmacy

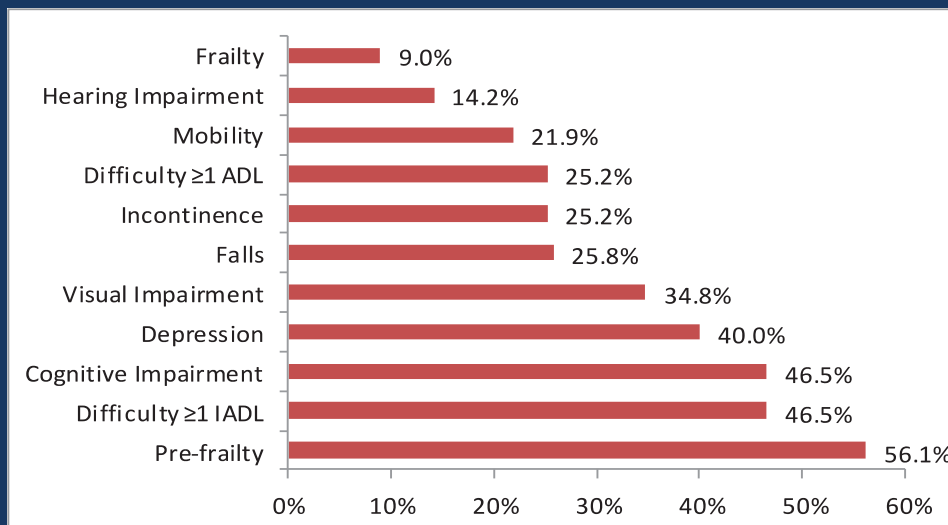
- Polypharmacy higher in PLWH, especially age >50
- May affect adherence to ART & non-ART meds
- Drug-drug interactions with ART
- Associations with falls, symptoms in PLWH



(Halloren, 2019), (Siefried, 2018), (Ware, 2018), (Kim, 2018)

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Geriatric Syndromes in Older HIV+ Adults



Greene M, *JAIDS*, 2015

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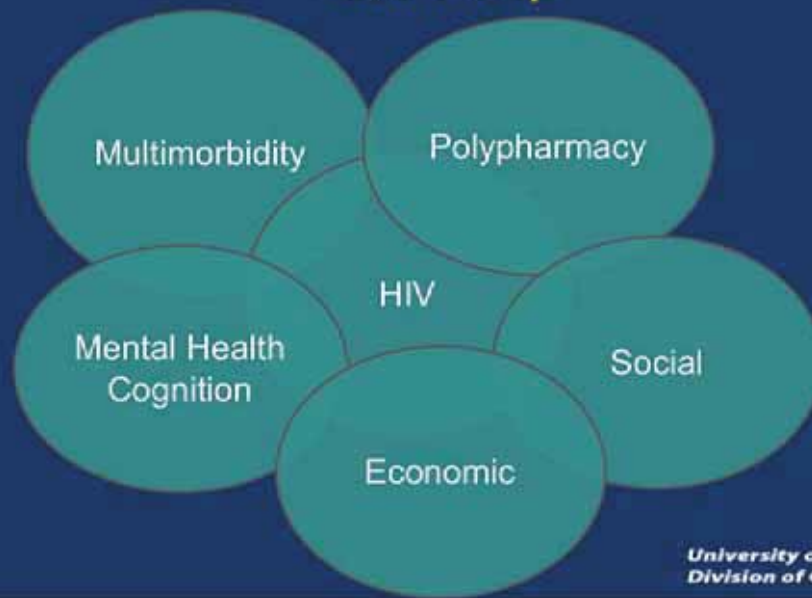
Not just Loneliness

- Traumatic Loss and Complicated Grief
- Stigma -- & often multiple stigmas
- Depression & Other Mood Disorders
- History of trauma
- Substance use disorders



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Increasing complexity: Geriatrics Approach can Help



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5Ms of Geriatrics

MMULTICOMPLEXITY

...describes the whole person, typically an older adult, living with multiple chronic conditions, advanced illness, and/or with complicated biopsychosocial needs



MMIND

- Mentation
- Dementia
- Delirium
- Depression

MMOBILITY

- Amount of mobility; function
- Impaired gait and balance
- Fall injury prevention

MMEDICATIONS

- Polypharmacy, deprescribing
- Optimal prescribing
- Adverse medication effects and medication burden

WWHAT MMATTERS MOST

- Each individual's own meaningful health outcome goals and care preferences

Geriatrics Perspective: similarities with HIV care

- Dealing with Complexity
- Focusing on social context of care/social determinants of health
- Working in multidisciplinary teams
 - Relevant to RWHAP clinics

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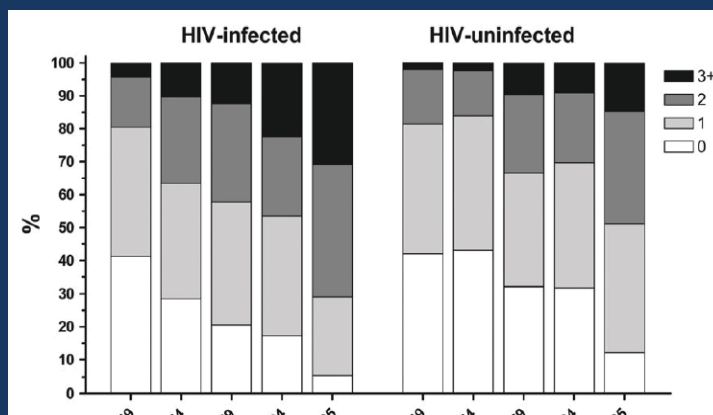
15

Multi-complexity: Relevance to HIV and geriatrics

Multi-morbidity
& polypharmacy

Geriatric Syndromes

Complex psychosocial
situations



Multimorbidity Higher in PWH

Conditions included: CAD, HTN, PAD, CVD, COPD, DM, Renal Dz, Non-AIDS CA, Osteoporosis

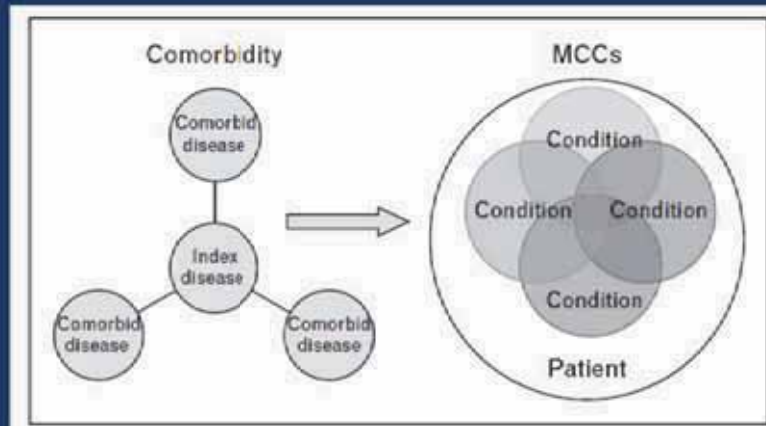
Schouten CID 2014

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Multimorbidity Requires a Different Approach

Not just individual problems on a problem list:

- Individual disease and screening guidelines focus on Dx and Rx- adding medications
- Treatment Interactions



Boyd, Lucas *Curr Opin HIV/AIDS* 2014

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Multimorbidity Requires a Different Approach

5 Domains for a Patient Centered Approach Multimorbidity:

1. Patient Preferences (M: What Matters Most)
2. Interpret the Evidence
3. Consider Prognosis (M: Mobility & Function)
4. Treatment Complexity & Feasibility (M: Medication)
5. Optimizing Therapies and Care Plan (M: Medication)

J Am Geriatr Soc 2012; Boyd *J Am Geriatr Soc* 2019

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Alzheimer's Disease vs. HIV Associated Dementia

Alzheimer's

- Cortical : Memory & Language first
- Progressive
- Mild cognitive impairment (MCI), dementia
- Mini-cog, MMSE, MOCA
- Rx: Anticholinesterase Inhibitors

HIV

- Subcortical: Executive & Motor first
- May Fluctuate
- HAND: Asymptomatic (ANI), Mild (MND), HIV Dementia (HAD)
- MOCA +?
- Rx: ARVs, +/- CNS penetration

Rubin *J. Neurovirol* 2019, Miliani *Curr HIV/AIDS rep* 2017, Valcour *CROI* 2019

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5Ms and HIV Clinical Guidelines

- Adverse drug events from ART and concomitant drugs may occur more frequently in older persons with HIV than in younger individuals with HIV. Therefore, the bone, kidney, metabolic, cardiovascular, cognitive, and liver health of older individuals with HIV should be monitored closely.
- Polypharmacy is common in older persons with HIV; therefore, there is a greater risk of drug-drug interactions between antiretroviral drugs and concomitant medications. Potential for drug-drug interactions should be assessed regularly, especially when starting or switching ART and concomitant medications.
- The decline in neurocognitive function with aging is faster in people with HIV than in people without HIV. HIV-associated neurocognitive disorder (HAND) is associated with reduced adherence to therapy and poorer health outcomes including increased risk of death. For persons with progressively worsening symptoms of HAND, referral to a neurologist for evaluation and management or a neuropsychologist for formal neurocognitive testing may be warranted (BIII).
- Mental health disorders are a growing concern in aging people with HIV. A heightened risk of mood disorders including anxiety and depression has been observed in this population. Screening for depression and management of mental health issues are critical in caring for persons with HIV.
- HIV experts, primary care providers, and other specialists should work together to optimize the medical care of older persons with HIV and complex comorbidities.

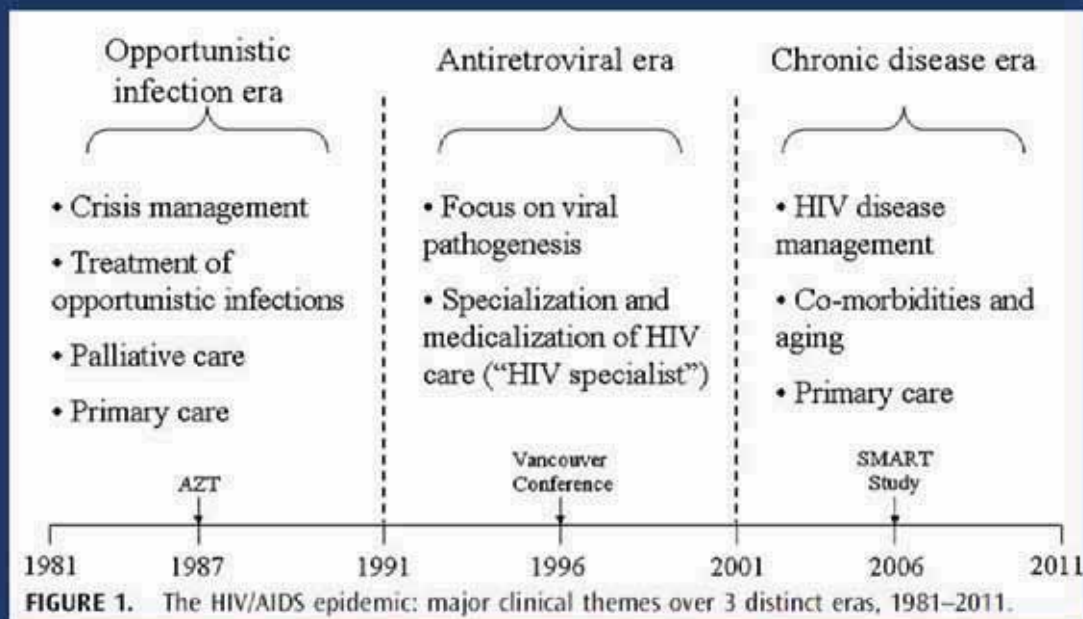
<https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/hiv-and-older-person>

JAMA 2020

Box 6. Recommendations for Polypharmacy, Frailty, and Cognitive Function Screening for Older People With HIV

- Close and sustained attention to polypharmacy is recommended in the management of older people with HIV (evidence rating: AIII)
- Assessment of mobility and frailty is recommended for patients aged 50 years or older using a frailty assessment that is validated in all persons with HIV (evidence rating: BIIa); the frequency of frailty assessment is guided by the baseline assessment and should be more frequent (every 1-2 years) in patients who are frail or before becoming frail, and less frequent (up to 5 yearly) in patients who are robust (evidence rating: BIII)
- In patients who are frail or prefrail, management of polypharmacy, referral for complete geriatric assessment, exercise and physical therapy, and nutrition advice is recommended (evidence rating: AIII)
- Routine assessment of cognitive function every other year using a validated instrument is recommended for people with HIV who are older than 60 years (evidence rating: BIII)

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Chu & Selwyn *J Urban health* 2011

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2021- The current era

Geriatric-HIV Medicine Is Born

Giovanni Guaraldi¹ and Kenneth Rockwood²

¹University of Modena and Reggio Emilia, Italy and ²Dalhousie University, Halifax, Nova Scotia, Canada

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Example Geriatric HIV Programs

Location	Clinic/name	Resource	Venue	Comment
Boston (US)	Mass General Hospital/ Aging Positively	Fitch	Biweekly in ID clinic	Providers may refer anyone over 50 NP sees patients; develops plan with rest of team
Brighton (UK)	Brighton and Sussex U Hosp Silver Clinic	Vera	Monthly clinic sessions	Referral criteria: >50, difficulty coping at home, multimorbidity, polypharmacy; HIV MD, geriatrician, HIV Clin NS, Pharm
Denver (US)	University of Colorado	Erlandson	Outside consultation	Geriatrician, pharmacist see complicated patients 1-3 times – refer back to 1° care
London (UK)	Chelsea/ Westminster	Waters	Separate multidisciplinary clinic	Referral criterion: age Consultant, HIV NP, trainee; supported by specialist pharm and dietician
Montreal (CA)	McGill	Falutz	In HIV Clinic	Geriatrician sees referrals as needed as needed; planning pharm, CGA for >60
New York (US)	CSS at WCM/NYPH	Siegler	Geriatrician weekly visit w/in HIV clinic	No fixed referral criteria Geriatrician follows longitudinally Sponsors arts, support groups, inservices
Salem, VA (US)	SAVI	Oursler	VA clinic	Assess multimorb, sarcopenia, frailty, cognition; Staff: Pharm, neurolog, RD, endo
San Francisco (US)	Ward 86/ Golden Compass	Greene	Geriatric HIV clinic: pharm, screen, geri consult	Referral >70, falls; "navigation": heart/ mind; strength/bones; screening/link to dental, vision, etc; SW, CBSS, support groups <small>J Int AIDS Soc. 2018 Oct;21(10):e25188. doi: 10.1002/jia2.25188</small>

Siegler JIAS 2018

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Strengths and Challenges of Various Models of Geriatric Consultation for Older Adults Living With Human Immunodeficiency Virus

Amelia J. Davis,¹ Meredith Greene,² Eugenia Siegler,³ Kathleen Y. Fitch,⁴ Sarah A. Schmalzle,⁵ Alysia Krain,⁶ Jaime H. Vera,⁷ Marta Boffito,⁸ Julian Falutz,⁹ and Kristine M. Erlandson¹⁰

Model Type	Overall Description	Institution Name	Location
Model 1: Outpatient referral/consultation	Referral to a geriatrician for recommendations to enhance a patient's care plan; HIV provider remains as primary provider	Positive Aging Consultation, University of Colorado	Aurora, Colorado
Model 2: Combined HIV/geriatric multidisciplinary clinic	A multidisciplinary team is incorporated into existing HIV/infectious disease clinics to provide a comprehensive assessment and evaluation of each patient; primary care providers are provided with full evaluation and recommendations from the multidisciplinary team	The THRIVE Program	Baltimore, Maryland
		Comprehensive HIV and Aging Initiative of the Chronic Viral Illness Service, McGill University Hospital Center	Montreal, Quebec, Canada
		Chelsea and Westminster Hospital [11]	London, United Kingdom
		Silver Clinic [12]	Brighton, United Kingdom
		Golden Compass Program, University of California; San Francisco/Zuckerberg San Francisco General Hospital [14, 16]	San Francisco, California
Center for Special Studies, New York Presbyterian/Weill Cornell Medical Center [13, 15]	New York City, New York		
Model 3: Dually trained providers	An HIV provider with an invested interest in geriatric care performs assessments and provides recommendations	Age Positively Program, Massachusetts General Hospital	Boston, Massachusetts
	Dually boarded provider: a single provider with both geriatric and HIV expertise in 1 clinical home	Penn Community Practice and Penn Geriatrics, University of Pennsylvania Medical Center	Philadelphia, Pennsylvania

Development of a designated HIV & Aging care program in San Francisco

- 1) Literature review
- 2) Demonstration/pilot program (Silver Project)
- 3) Surveys and focus groups with patients and providers --- stakeholder engagement



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Context: San Francisco & Ward 86



		Age ≥ 50 years
		Number (%)
Total		11,195
Gender^a	Cis Men	10,493 (93)
	Cis Women	196 (2)
	Trans Women	104 (1)
Race/Ethnicity	White	7,199 (64)
	Black/African American	1,177 (11)
	Latinx	1,884 (17)
	Asian/Pacific Islander	140 (1)
	Native American	37 (<1)
	Other/Unknown	158 (1)
Transmission Category	MSM	8,463 (75)
	TWSM	98 (1)
	PWID	633 (6)
	MSM-PWID	1,479 (13)
	TWSM-PWID	103 (1)
	Heterosexual	161 (1)
	Other/Unidentified	158 (1)
Age In Years	50-54	2,133 (20)
	55-59	3,017 (27)
	60-64	2,482 (22)
	65+	3,563 (32)

- Part of San Francisco Health Network Clinics (safety net system)
- Ryan White funding recipient
- 2400 publically insured and uninsured PLWH
>1200 are age 50 or older

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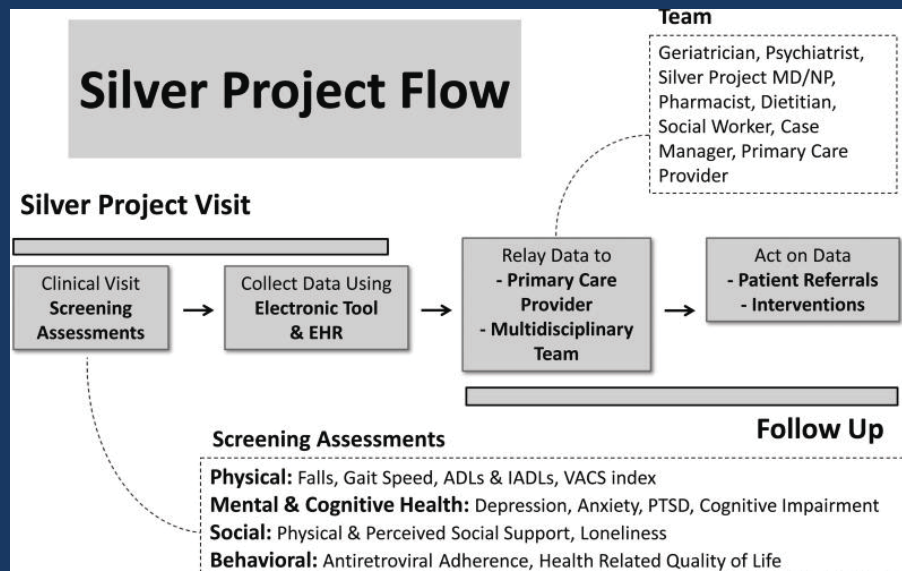
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Photo: Steve Ringman

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Silver Project: 2012-2014



Patient and Provider Perspectives on Geriatric Assessments

Patients

- Depression
- HIV Med Adherence
- Social Support
- Falls
- Memory
- Function

Providers

- Falls
- Memory
- Depression
- Function
- Loneliness
- HIV Med Adherence

Themes from Focus Groups

- Four overarching themes:
 - 1) Knowledge of HIV and aging topics
 - 2) Health/aging needs for Older HIV+ adults
 - 3) Importance of Social Networks
 - 4) Need for integrated services
 - consultative services
- **Program name:** theme of navigation healthcare systems; “golden years” acceptable term for aging

Golden Compass: Helping PLWH Navigate their Golden Years



Greene M,
PLOS One 2018

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Pre-covid Operations

- **Northern Point (Heart & Mind)**
 - Monthly cardiology clinic by HIV-cardiologist Dr. Hsue
 - Recurrent offerings Brain Health Classes
 - Cognitive screenings and assessments in geriatrics clinic
- **Western Point (Dental, Hearing, & Vision)**
 - Screenings & linkage to services to address sensory impairment



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Pre-covid Operations, continued

- **Eastern Point (Bones & Strength)**

- Assess functional status geriatrics clinic

- Weekly chair based exercise class “Wellness Club”



- **Southern Point (Networking & Navigation)**

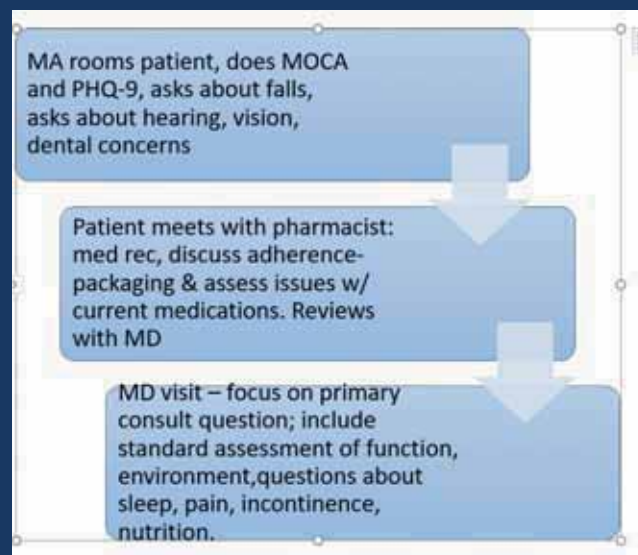
- Coordinate with community partners/services

- Networking in classes

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Geriatrics Clinic in Golden Compass



Common reasons for referral:

- General evaluation
- Cognition
- Falls

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Initial Evaluation of Golden Compass

RE-AIM framework:

Reach: number/demographics participants

Effectiveness: satisfaction, acceptability

Adoption: referrals by providers

Implementation: fidelity to what proposed

Maintenance



Greene M, JIAPAC 2020

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Initial Evaluation of Golden Compass

January 2017- June 2018; using RE-AIM framework

	How Measured	Results
Reach (patient level)	Number & demographics patients who participated	200 adults -Difficulty discussing “aging specialist”
Effectiveness	Satisfaction with services Acceptability of services	>90% patients & providers satisfied -Medications, mobility, cognitive evals important
Adoption (provider level)	Referrals by providers to specialty clinics	85% providers referred ≥1 patient to geriatrics clinic
Implementation	Fidelity to what proposed	-Co-location services important

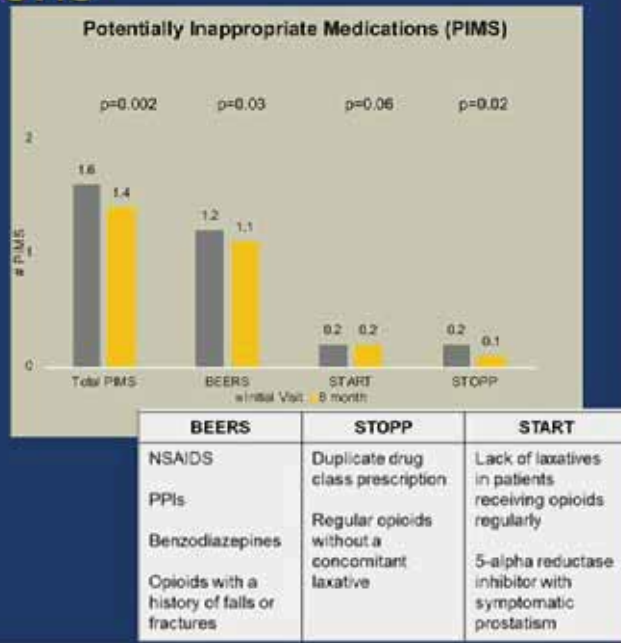
Greene M, JIAPAC 2020

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Reduction in Potentially Inappropriate Medications

Patient meets with pharmacist: med rec, discuss adherence-packaging & assess issues w/ current medications. Reviews with MD

- Potentially Inappropriate Medications
- Drug-Drug Interactions
- Assess for side effects
- Other Medication Concerns



Southern Point- Fostering New Connections



On classes: “....helped me a lot because there’s a social aspect to it, I get to meet other people that are just like me, and that, I think, is very healthy, to connect to other individuals that are going through the same things that I’m going through.”

Lessons Learned

- Framing still a challenge– addressing ageism & stigmas
- Takes time to develop and implement
- Outcome evaluation –especially for consultative models
- Funding mechanisms (sustainable, long term funding)
- Challenges for the field
 - Should everyone over 50 be seen/who benefits most
 - Role of consultant

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One story



- 62 y/o Latino male, long term survivor
 - Geriatrics clinic: dizzy; bp/prostate meds adjusted & dizziness resolved
 - Grieving loss family member; isolated : connected to volunteer who still meets with him weekly
 - Highly engaged in all classes

Reflecting on improvements in both physical and mental health: *"I'm in a good place compared to how I was before I started in the program."*

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Looking forward

Expand program reach

- E-consult/chart review
- Expanded screenings done by RNs

Increasing geriatrics knowledge providers & patients

- Partnering with HRSA Bureau of Health Workforce: Geriatric Workforce Enhancement Program (GWEP)



The Optimizing Aging Collaborative at UCSF is empowering San Francisco to meet the needs facing older adults.

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Then COVID-19 happened

- Telehealth visits
- Classes moved to virtual platform
- Outreach calls to older adults

Highlighted issues of digital divide

- For some telehealth platforms can improve access

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Even more important since Covid-19 pandemic

- Increased isolation
- Increase in mental health comorbidities
- Decreased physical activity (fear leaving home)
- Difficulty keeping caregivers

Decline in cognitive and physical function, increase in falls



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Geriatric Assessment During COVID

- Telehealth is here to stay –hopefully (& as supplement)
- Self-report of falls, function can be asked on phone
- Can still observe gait, getting up out of chair
- Advantages to video visits in home:
 - See parts of environment
 - Med review!!!
 - Improve access limited mobility

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Digital Divide Among Older Adults at Ward 86

Phone surveys 65+

(147 called, 80 answered) *almost 30 no working phone number

-1/3 did not have internet access (a few had but did not know how to access)

-1/3 did not have an email address or know how to use email

-50% had a device (smartphone etc.) but 13% did not know how to use device

Focus groups

-Among those who could access zoom via phone or video

-In person preferred over zoom but zoom did help address isolation and loneliness

-video /telehealth option improved access for those with limited mobility and transportation difficulties

HIV & Aging International Workshop 2022
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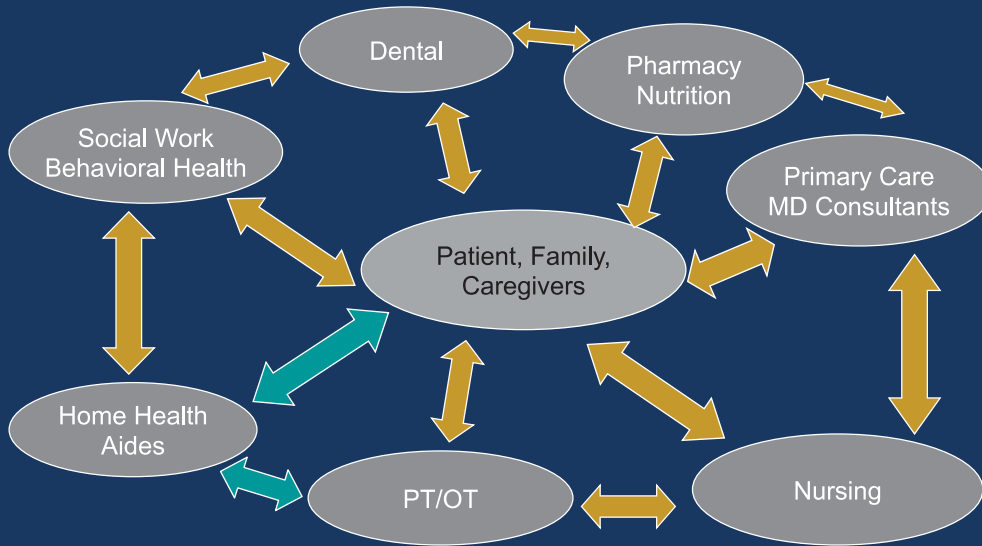
What if you don't have a geriatrician in clinic?

- What are your local resources?
 - Telehealth options with geriatrics?
- Which areas (like in 5Ms) are you already addressing?
 - Pick one to start;
- What is your staffing and availability to help with doing assessments?
 - and follow-up after screening/assessment
 - team approach but can break into visits or telehealth sessions

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It Takes a Village....



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It also takes policy....



Ryan White TargetHIV:
<https://targethiv.org/library/topics/aging>

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SPNS Aging with HIV

Initiative Participants



<https://targethiv.org/aging-initiative>

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Quality of Life in National HIV/AIDS Strategy

- Multi-dimensional:
 - Self rated health
 - Mental health
 - Nutrition/Food insecurity
 - Employment
 - Housing



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State Initiatives

California

- 2021: SB 258 passed includes older people with HIV “greatest social need”
- \$5 million for 5 demonstration projects across the state

New York

- 2022: NYSDOH \$4 million People Aging with HIV Pilot– up to 10 entities
- LTS pilot screening tool project

<https://www.sfaf.org/collections/beta/california-activists-celebrate-historic-victories-for-older-people-living-with-hiv/>

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Good Planning Requires Addressing All of these Factors *Before* Incapacity (Medical-Legal Approach)



I-HELP® National Center for the Medical-Legal Partnership

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Policy planning: Medicare & Long-Term Care

- More costs care shifting to Medicare
 - ART remains protected class
- Older adults with HIV may rely more on formal long term care supports
 - Less known about quality of HIV care in LTC settings
 - Limited knowledge by staff, care providers HIV



- Oliveri-Mui B, Assessing the Quality of HIV Care in Nursing Homes JAGS 2020.
- Walker J, HIV Training Requirements for Nursing Home Staff
- Fleming S, Trends in Health care Resource Utilization and Costs among Medicare Beneficiaries Living with HIV, 2014-2019

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SAN FRANCISCO HEALTH

Long term HIV survivors find familial support in unique S.F. group home

Jessica D. Rhodes
Feb. 15, 2023



From left, residents Brian Bourassa, Paul Aguilera and Michael Kouppep during a monthly members meeting at Marty's Place on Feb. 16, 2023.

San Francisco

LOCAL

They survived one plague. Now HIV/AIDS survivors face down the coronavirus



Ryan Kazi

April 10, 2020 | Updated: April 11, 2020 12:26 AM



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The San Francisco Principles



The Glasgow Manifesto

International Coalition of Older People
with HIV (iCOPE HIV)

Working Together to Address Challenges



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Summary

- Older PWH are experiencing increasing complexity including multimorbidity, polypharmacy & geriatric conditions
 - This requires a shift in focus to geriatrics principles or the 5Ms (Mind, Mobility, Medications, Matters Most, Multicomplexity)
- Several emerging geriatric HIV are developed— many include consultation with geriatrician
 - In depth look at implementation & initial evaluation of our program in SF
- COVID-19 has impacted delivery of care (which can create opportunities) and further highlighted need for policy approaches

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Additional Resources

- AETC resources
- Geriatric Workforce Enhancement Program (GWEP)
- HIV-age.org

Recommended Treatment
Strategies for Clinicians Managing
Older Patients with HIV



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Acknowledgments

Patients, providers & staff at Ward 86

Monica Gandhi, MD, MPH

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Bill Olson, MS

Myriam Beltran, MSW and Alberto Rangel, LCSW

Janet Grochowski & Anthonia Chimezie, PharmDs

Yenifer Breganza Lopez

Priscilla Hsue, MD

Mary Lawrence Hicks and Jon Oskarsson

Judy Tan, Janet Myers, Cinthia Blat



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Thank you!

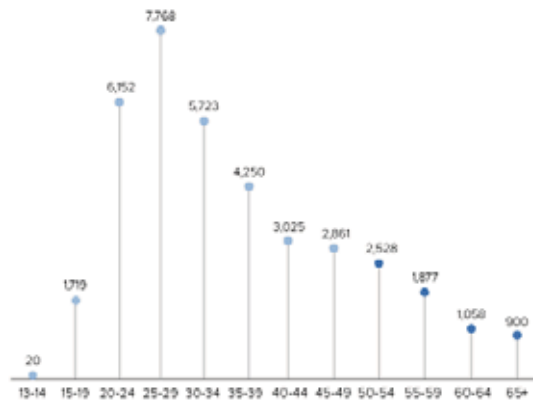
Questions?

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New HIV Diagnoses Among Adults and Adolescents in the US and Dependent Areas by Age, 2018

1 in 6 new HIV diagnoses were among people aged 50 and older.



Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2018 (updated). *HIV Surveillance Report* 2020;31.

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Medical-Legal Advance Care Planning

Medical Planning:

Goals of Care (living will, advance directive, POLST)

Appoint Healthcare Agent (advance directive or durable POAH)

Financial/Legal Planning:

Appoint Fiduciaries (durable POAF, rep payee, VA fiduciary, trustee)

Plan to pay for long term care supports & services

Living Trust or Will

Income/benefit advocacy (e.g. Medi-Cal, pensions)

Housing (accommodations, habitability, reverse mortgages)

Employment (caregiving agreements, job protection)

Legal Status (immigration, LGBT, veteran)

Personal stability (elder abuse, conservatorship)

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