

*Assessing Frailty and Functional Capacity

Overlapping geriatric syndromes such as “frailty”, “disability”, “multimorbidity”, and “polypharmacy” require adaptation for those aging with HIV infection to account for the ongoing role of HIV infection and its treatment in modifying the aging process. Several complementary approaches to the measurement of frailty have evolved within the geriatric literature and these have been variably applied among those aging with HIV. The approach most often employed in the HIV literature, uses a triad of wasting, slowing, and weakness and is characterized by the frailty phenotype and the frailty related phenotype (Desquilbet et al, 2011; Fried et al., 2001). Another approach focuses on cumulative deficits across multiple physiologic systems (Clegg et al., 2013), but it requires 30 separate measures and has been deemed less feasible for routine care. Rockwood et al have proposed a reduction in the number of measures from 30 to 10. Some have suggested that a single measure of function, such as grip strength or the six minute walk test, might serve.

Whether you prefer a phenotype, accumulated deficits, or a test of strength or speed, the clinical variables most likely to indicate increased vulnerability among those aging with HIV infection are likely different than in the overall aging population. Immunodeficiency and persistent viral burden are important. Similarly, anemia, hepatitis C coinfection, renal and liver disease are also more common and likely, important. As mentioned above, gross functional limitations are rare. Wasting is increasingly rare after ART initiation. In contrast, obesity is increasing (especially after ART) but may or may not have the

same implications as obesity among uninfected individuals.

The Veterans Aging Cohort Study Index (VACS Index) combines routine clinical measures of immunodeficiency, viral load, and organ system compromise (CD4 count, HIV-1 RNA, hemoglobin, creatinine, aspartate and alanine transferase, platelets, and HCV status) to estimate risk of morbidity and mortality (Justice et al. 2009). It has demonstrated generalizable predictive accuracy for all cause (Justice et al. 2013), and cause specific mortality (Tate et al., 2013) and for hospitalization (Akgun et al., 2013), medical intensive care unit admissions (Akgun et al., 2013), and fragility fractures (Womack et al., 2013). It is cross-sectionally associated with markers of chronic inflammation (Justice et al., 2012), cognitive performance (Franklin et al, 2013), and functional performance (Erlandson et al., 2013). Its discriminatory accuracy is consistent across important clinical subgroups. The VACS Index appears to be a reasonable measure of frailty that is clinically feasible. Whether it can be improved by the addition of a measure of functional performance, sarcopenia, cognitive performance, multimorbidity, or additional measures of physiologic compromise remains to be determined.

Like those aging without HIV infection, vulnerability to injury resulting from depleted physiologic reserve is caused by multiple overlapping and interacting mechanisms including multiple comorbid conditions (multimorbidity) and polypharmacy. Compared to those without HIV infection, individuals aging with HIV infection are at increased risk of multimorbidity due to hepatitis C coinfection and HIV Associated Non AIDS (HANA) conditions which are increased after adjusting for established risk factors. Those with HIV experience multimorbidity (Goulet et al., 2007) and polypharmacy (5 or

more medications) (Edelman et al., 2013a; Edelman et al., 2013b) earlier than demographically matched uninfected comparators.

Recent data suggests that low social support translates into increased hospitalization mortality in this population (Greysen et al., 2013). Almost 70% live alone, estranged from their families and friends as a function of AIDS associated stigma (Brennan et al. 2011; Emler 2006; Shippy & Karpiak 2005; Karpiak 2006; Brennan et al. 2009). As a result they have fragile social networks that are not a resource for the informal caregiving they will need in order to age successfully (Shippy & Karpiak 2005; Brennan-Ing et al., 2014). Ostracized and rejected, many isolate themselves with a self-protective withdrawal where they hide their HIV status. Others choose to be isolated because they have lost their friends and extended families to HIV/AIDS. Without functional social supports from which care and assistance can be obtained this population will seek more formal supports in a period of reduced economic resources (Storholm, E. D., et al. (2013; Longmire-Avital, et al. (2012). Without such support they will be relegated at early ages to costly home health care services and long-term care facilities (Brennan-Ing et al., 2014). Choosing treatment strategies for an older adult with HIV must consider their often poor support networks (Emler 2006; Vance et al. 2011; Vance et al. 2010; Shippy & Karpiak 2005; Karpiak 2006).

In addition the co-occurrence of mental health issues and substance use is a common characteristic for this population. But middle aged and older adults with HIV are not typical of the general aging population (Karpiak 2006; Brennan et al. 2009). They evidence high rates of depression and suicidal ideation that contribute to reduced health outcomes

(Havlik et al. 2011) (Oursler et al. 2006). As they age, many use alcohol, tobacco, and/or illicit drugs, further compromising their health (Groves et al. 2010; Golub et al. 2010; Siconolfi, D. E., et al. (2013). This is an older, but not senior, population that has difficulties with day-to-day tasks, including housekeeping, transportation, meal preparation, employment, finances, and entitlements (Oursler et al. 2011, Oursler et al. 2006; Oursler et al. 2009; Brennan-Ing et al., 2014).