HIV/AIDS and Aging
An A to Z look at a Growing Population
Treatment

Iván Meléndez-Rivera, MD
Assistant Professor of Family Medicine
Ponce School of Medicine, Ponce PR, USA
Fellow American Academy of Family Physicians
Board Member American Academy of HIV Medicine
Vice President HIV Treaters Medical Association of Puerto Rico
Faculty Florida Caribbean Aids Education and Training Center
Medical Director – Centro Ararat, Inc Ponce PR, USA
Conflict of Interest Disclosures

- **Speaker/Consultant/Advisory Board**
  - Abbott
  - Boehringer Ingelheim
  - Bristol-Myers Squibb
  - Genentech (Roche)
  - Gilead Sciences
  - Glaxo SmithKline
  - Merck Sharp & Dohm
  - Monogram Bioscience
  - Pfizer
  - Tibotec
  - ViiV

- **Research Funding**
  - Abbott
  - Boehringer Ingelheim
  - Bristol-Myers Squibb
  - Elli Lily
  - Genentech (Roche)
  - Glaxo SmithKline
  - Merck Sharp & Dohm
  - Napo Pharmaceutical
  - Salix Pharmaceutical
  - Pfizer
  - ViiV

- **Organizations**
  - American Academy of HIV Medicine – BOD
  - HIV Treaters Medical Association of Puerto Rico-BOD
Introduction

- By 2015, it is estimated that more than half of the HIV-infected population will be older than 50 years of age.\[1\]
- The following changes observed in HIV-infected patients suggest that premature aging may occur in HIV:
  - Immune activation and inflammation
  - Comorbidities (Diabetes, CVD)
  - Physiological alterations (osteoporosis, atherosclerosis, and neurocognitive decline)

Introduction

The number of older (ie, aged 50 years or older) HIV-infected patients has greatly increased since the advent of effective combination antiretroviral therapy. [CDC 1998; Muñoz 1997; Effros 2008]

Living with HIV has an effect on life expectancy.

- 10 years shorter in late HAART-era patients compared with HIV-negative controls. Lohse and colleagues [14]

DEFINITIONS & DIAGNOSIS
## Defining “Aging Adult”

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior</td>
<td>50-64 years old</td>
</tr>
<tr>
<td>Elderly Senior</td>
<td>65+ (no ADL loss)</td>
</tr>
<tr>
<td>Young Old</td>
<td>65-74 y/o</td>
</tr>
<tr>
<td>Older-elderly</td>
<td>75-84 y/o</td>
</tr>
<tr>
<td>Oldest-old (old-old)</td>
<td>&gt;85 y/o</td>
</tr>
<tr>
<td>Frail (fragile) elders</td>
<td>Those over 50y dependent on others for day-to-day care</td>
</tr>
</tbody>
</table>

**ADL:** Activity of Daily Living

Florida Caribbean AETC Suellen T. Cirelli MSN ARNP AAHIVS
Aging: The process of becoming older, a process that is genetically determined and environmentally modulated. 

- Smoking
- Heavy Drinking
- Inappropriate Diet
- Sedentary Life
- Motor vehicles
- Poor illumination
- Uneven floors
- Protein Denaturalization
- Impairment of DNA replicative System
- T cell Functions Decreased
- Cellular Toxic waste accumulation
- Infections
- Toxic Agents
- Cellular Damage
- Physical Danger
Normal Aging Process

- Loss of Bone and Muscle Mass
- Weight Loss
- Decrease in GFR
- Memory Loss

- Immunosenescence
  - Increase susceptibility to infections
  - Decrease responsiveness to vaccines
  - Impaired antitumor responses
  - Lower thymic score
Why are older patients getting infected?
HIV and Elders: Health Professionals Myths

- People over 50
  - Not interested in sex
  - If sexually active, 3M only
    - Male/female
    - Monogamous
    - Missionary

- Don’t use illegal drugs*
- Don’t abuse drugs/alcohol*
  - *OK, if they did it was so long ago it doesn’t matter

- Seniors not considered at risk: “don’t ask, don’t tell”
HIV and Elders: Patient view

- Patient lack of awareness of HIV risk factors
  - Belief that HIV only affects younger people
  - Lack of HIV prevention education targeted for older people

- Unprotected sexual activity “NO condoms”
  - No risk for pregnancy due to menopause
  - No training in safer sexual activities

- After menopause, increase the risk of micro-tears and of sexual transmitted infections due to
  - vaginal tissues thinning
  - ↓ natural lubrication

- Availability of Viagra and other ED drugs may contribute to increased rates of sexual activity “Social Security Syndrome”

Boskey E., Age is Not a Condom: Old Sex Does Not Mean Safe Sex e-file in About.com Guide Updated March 24, 2010
“In all health-care settings, screening for HIV infection should be performed routinely for all patients aged 13--64 years”

“The target population for this guideline is all adult and adolescent (age ≥13 years) patients seen in health care settings”
HEALTH DISPARITY & LITERACY
How to use a condom after 50

First: prepare for the action

Then, choose the condom

And finally, give the proper usage!
Health Disparities Grows as People Live Longer

- Older people are less likely than younger people to:
  - Talk about their **sex lives** or **drug use** with their doctors.
  - **Know** about HIV/AIDS and STDs
  - **Get Tested** (mistakes between the symptoms of HIV with the aches and pains of normal aging)

- The elderly have been neglected by:
  - Those responsible for education and prevention messages.
  - Doctors who don't tend to ask them about sex or drug use.

HIV/AIDS and Older People. National Institute on Aging
http://www.nia.nih.gov/HealthInformation/Publications/
Health Disparities Grows as People Live Longer

- Visual problems
- Literacy
- Promotional material not prepare to capture the attention of older people
- Poverty (Less income, more expending on medicines)
- Access to care (Transportation)
- Poor Clinical Trial recruitment and participation

HIV/AIDS and Older People. National Institute on Aging
http://www.nia.nih.gov/HealthInformation/Publications
“The most common way people give up their power is by thinking they don’t have any.”

~ Alice Walker
Immune process in HIV “accelerated” Aging

- Suboptimal CD4+ gains
- Residual viral replication
  - Persistent virus expression (in lymph nodes)
  - Loss of immunoregulatory cells
  - Collagen deposition
  - Microbial translocation
  - High pathogen load (CMV, HBV, HCV)
  - Thymic dysfunction
- Increased risk of premature age associated to non AIDS related events in treated HIV patient

Adapted from: Deeks SG. Top HIV Med. 2009; 17:118-23.
Common Immune Findings between HIV+ people and Aging

HIV+ (looks as accelerate Aging)

- ↑ CD4 & CD8 Cell turnover \(^{(12)}\)
- Chronic immune activation
- Reduce thymic volume and function
- T cells with shorter telomeres \(^{(13)}\)
  - Neurocognitive disease

≥70 years (No HIV)

- Reduced level of naïve CD8+ cells
- Increased T cell activation \(^{(11)}\)
- Reduced T cell proliferation\(^{(11)}\)
- Increased levels of inflammatory markers\(^{(11)}\)
- Slow immunologic restoration
- ↓ drugs clearance

11. Deeks SG. Immune Dysfunction, Inflammation and Accelerated Aging in Patients on Antiretroviral Therapy, Top HIV Med. 2009; 17:118-23
Treatment Issues in Older HIV Patients

- Older people may have age-related losses of kidney and/or liver function which may change metabolism of drugs
  - Drug-drug interactions
  - Significant Toxicities

- Older people often excluded from many clinical trials and few subgroup analysis in older patients
  - Little pharmacokinetic data at extremes of age
Adherence:
Some things do get better with Age

Overall 95% Adherence

Hinkin. AIDS. 2004
Virologic Response in Younger (<40 Years) and Older (≥50 Years) HIV-1-Infected Patients on ART

Prospective study in treatment-naïve HIV-infected patients treated by Johns Hopkins University AIDS Service between 1989 and 2006 (N=819)

- Time to virologic suppression (HIV-1 RNA ≤400 copies/mL) was shorter in patients ≥50 as compared to <40 years (3.2 vs 4.4 months, \( P = .001 \))

Clinical Results in people ≥50

Positive
- Better virological response [5]
- Better adherence
- Less treatment interruption
- More Tolerability

NOT so positive
- ↑ HIV RNA at seroconversion [16]
- Blunted CD4 reconstitution [6]
- Higher rates of AIDS-defining events
- ↑ risk of toxicity [9]
- ↑ risk of drugs interactions [9]
- ↑ Mortality
- More likely to die within 12 m of being Dx with HIV infection [CDC 2008]

Pharmacokinetic & Pharmacodynamics

- The 4 steps in Pharmacokinetic are affected with Aging
  - Absorption
    - Altered by drug effect (e.g. PPI)
  - Distribution
    - Lean body mass & body water decreases, fat rises then decreases
  - Metabolism
    - Aging effect on P binding, UGT and CYP450 is less clear
  - Excretion
    - Decrease in Renal Clearance increase drugs levels in the body

- Polypharmacy in older patients increases risk of:
  - Drug interactions
  - Adverse events
  - Geriatric syndromes and morbidity/mortality
  - Non adherence associated with complexity

UNIQUE CARE
CO-MORBIDITIES & COMPLICATIONS
Considerations of Non-HIV Medical Conditions in Older HIV-Infected Patients

Co Morbidities
- Neurocognitive disorders
  - Depression/Mental health
- Insulin resistance and diabetes mellitus
- Hypertension
- Hyperlipidemia
- Metabolic Syndrome
- Frailty
- Smoking
- Sexually transmitted diseases

Accelerate course of age – related conditions
- Renal disease
- Cardiovascular disease
- Cirrhosis
- Bone health
- Cancer
- Vitamin D Deficiency
- Hypogonadism
- Cognitive function
- Dementia
- Morphologic Changes

Increasing Prevalence in Diabetes With Age in Both HIV and Non-HIV Populations

- DM diagnosed by ICD-9 codes
- 7,101,180 person-years

<table>
<thead>
<tr>
<th>Age Group</th>
<th>HIV Incidence Rates (per 100 person-years)</th>
<th>Non-HIV Incidence Rates (per 100 person-years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>25-34</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>35-44</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>45-54</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>55-64</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>65+</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

Currier J et al. 9th CROI. 2002; Seattle. Abstract 677.
Factors Contributing to Insulin Resistance in HIV-Infected Patients

Classic Risk Factors
- Obesity (abdominal)
- Physical inactivity
- Genetic
  - Family history
  - Race/ethnicity
- Older age
- Dyslipidemia

HIV Risk Factors
- Peripheral lipoatrophy
- Reduced adiponectin
- Increased liver/muscle fat
- Inflammatory cytokines
- Low testosterone
- Oxidant stress
- Hepatitis C virus infection
- Protease inhibitors

As with diabetes in the general population, there will be diverse factors that contribute to the risk of impaired glucose tolerance, insulin resistance, and diabetes

Prevalence of the Metabolic Syndrome Among US Adults: NHANES 1999-2000 *

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Defining Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abd obesity</td>
<td></td>
</tr>
<tr>
<td>-men</td>
<td>&gt;102 cm (&gt;40 in)</td>
</tr>
<tr>
<td>-women</td>
<td>&gt;88 cm (&gt;35 in)</td>
</tr>
<tr>
<td>TG</td>
<td>≥150 mg/dL</td>
</tr>
<tr>
<td>HDL</td>
<td>&lt;40 mg/dL</td>
</tr>
<tr>
<td>-men</td>
<td>&lt;50 mg/dL</td>
</tr>
<tr>
<td>-women</td>
<td>≥130/≥85 mm Hg</td>
</tr>
<tr>
<td>FBG</td>
<td>≥100 mg/dL</td>
</tr>
</tbody>
</table>

Defined by the NCEP/ATP III revised definition (3 or more abnormalities).

*National Health and Nutrition Examination Survey

FBG, fasting blood glucose.

Frailty-Related Phenotype Increases With Age and Is Accelerated by HIV Infection in Homosexual Men

A self-reported survey of participants in the Multicenter AIDS Cohort Study (MACS)

Prevalence of Frailty

- Data collected MACS cohort study participants (all male) between April 1994 and January 1996 (N=2150)
- HIV infected (n=245); HIV negative (n=1905)
- Characteristics of frailty were identified by patient survey
- Age and duration of HIV infection were found to be independently associated with increased prevalence of frailty

Frailty-related phenotype was defined as at least 3 of the following: physical shrinking, exhaustion, slowness, low physical activity level. Weakness is also a component of frailty, but was not measured in this study.

A Higher Percentage of HIV-infected Individuals Smoke as Compared to the General Population

HIV-infected patients entering treatment at an HIV clinic in Baltimore, Maryland between 1999 and 2003 (n=1,750)

General population of the state of Maryland; adults ages 25 to 54 years

Smoking habits reported by HIV-infected individuals who were current smokers when entering HIV treatment (69% of total):
- ≤1/2 pack/day (31%)
- 1 pack/day (41%)
- 1-2 packs/day (17%)
- ≥2 packs/day (11%)

Prevalence of Chronic Kidney Disease in the General Population Increases with Age

Eight year cross-sectional Norwegian survey subjects ≥20 yrs of age

N = 65,605
1995-1997
Hallan SI et al. BMJ. 2006; 333:1047.
Adjusted Incidence of ESRD due to Diabetes, by Age and Race/Ethnicity (General Population)

Older Patients: White and Black

Incident ESRD Patients, Adjusted for Gender

Rate per Million Population

Factors Associated with the Development of Hypertension in HIV-infected Individuals

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hazard Ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male)</td>
<td>1.62 (1.37-1.91)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-38</td>
<td>1.25 (1.06-1.49)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>39-43</td>
<td>1.48 (1.24-1.76)</td>
<td></td>
</tr>
<tr>
<td>44-81</td>
<td>2.26 (1.92-2.66)</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-30</td>
<td>1.56 (1.37-1.78)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>&gt;30</td>
<td>2.93 (2.24-3.83)</td>
<td></td>
</tr>
<tr>
<td>Lipodystrophy</td>
<td>1.21 (1.05-1.39)</td>
<td>0.01</td>
</tr>
<tr>
<td>TC (mmol/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥6.2</td>
<td>1.22 (1.05-1.41)</td>
<td>0.02</td>
</tr>
<tr>
<td>unknown</td>
<td>0.87 (0.60-1.26)</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.31 (0.97-1.76)</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Age is the 2nd Hazard Ratio for develop Hypertension, surpass only by BMI >30

• 14.5% (1304/8984) developed hypertension and/or were prescribed antihypertensive medication during the 24-month follow up period

Hypertension defined as: systolic BP ≥140 mm Hg and/or diastolic BP ≥90 mm Hg

Body Mass Index=BMI; Total Cholesterol=TC

Reference values: Gender (female); BMI (18-25 kg/m²); TC (<6.2 mmol/L)

Cardiovascular Risk Factors in an HIV-Infected Population: The D:A:D Study

*p<0.002 for all risk factor, except Family history of CHD (p<0.009)

Unmodifiable
Potentially modifiable
Lipid abnormalities – potentially modifiable

N= 17,852
MI Rates by Age Group in HIV-Infected and HIV-Uninfected Patients

- Acute MI rates determined in 3851 HIV-infected and 1,044,589 HIV-uninfected patients from 1996-2004
- Overall rates per 1000 person-years higher in HIV-infected vs HIV-uninfected patients: 11.13 vs 6.98

SUN Study
Prevalence of Osteopenia/Osteoporosis in HIV+ Patients

- Prospective study of 625 HIV+ patients with baseline DEXA bone densitometry compared with matched pairs from NHANES
  - Longitudinal follow-up ongoing
- ↑ in reduced bone density at the femoral neck in HIV+ vs controls
  - Osteopenia: 51.7% vs 29.1%
  - Osteoporosis: 9.8% vs 1.0%

Comparison of Femoral Neck T-Scores Among SUN Study Participants and Matched Controls

Multivariate Analysis: Factors Related to Osteoporosis

<table>
<thead>
<tr>
<th>Factor</th>
<th>OR (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &lt;22.6 kg/m²</td>
<td>3.01 (2.24-6.89)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Age &gt;46 years</td>
<td>2.35 (1.33-4.16)</td>
<td>.003</td>
</tr>
<tr>
<td>BL CD4+ &lt;308</td>
<td>2.10 (1.16-3.78)</td>
<td>.013</td>
</tr>
<tr>
<td>HIV &gt; 97.7 mos</td>
<td>1.98 (1.09-3.55)</td>
<td>.023</td>
</tr>
</tbody>
</table>

Overton T et al. 14th CROI; 2007; Los Angeles.. Abstract 836.
### Increased Risk of Non AIDS Malignancy

<table>
<thead>
<tr>
<th>MALIGNANCY</th>
<th>INCREASED RELATIVE RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ano-genital squamous cell carcinomas</td>
<td>30-40</td>
</tr>
<tr>
<td>Hodgkin’s lymphoma</td>
<td>8-18</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>12-20</td>
</tr>
<tr>
<td>Squamous cell carcinoma of head/neck</td>
<td>5-13</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>5-7</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>4-5</td>
</tr>
<tr>
<td>Leukemias (AML, ALL)</td>
<td>5-7</td>
</tr>
<tr>
<td>Brain malignancies (Non-lymphoma)</td>
<td>4-5</td>
</tr>
<tr>
<td>Testicular cancer (Non-seminoma)</td>
<td>4-5</td>
</tr>
<tr>
<td>Hepatocellular carcinoma</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Courtesy of Jeffrey A. Beal, MD & Joanne J. Orrick, Pharm
Vitamin D Deficiency

- Hypovitaminosis D Definition (25(OH)-vitD)
  - Insufficiency: <75 nmol/l
  - Deficiency <30 nmol/l

- Traditional risk factors for vitamin D deficiency are confirmed.
  - AGE, nationality, BMI, seasonality, immunodepression, high viral load.

- HIV+ individuals with vitamin D insufficiency present a predictive risk of subsequent development of severe events such as cardiovascular, renal disease and diabetes.

- Conclusion: Due to both the high prevalence of hypovitaminosis D and the safety of cholecalciferol administration, vitamin D supplements might be taken into account in our therapeutic choices.

Prevalence of VitD insufficiency and deficiency according to patients characteristics

Adapted from: Borderi M. et al *Prevalence of Hypovitaminosis D among HIV+ Patients Enrolled in a Large Italian Cohort*, 17th CROI Feb 16-19 2010 San Francisco Poster 751
Hypogonadism

**FIG. 3. Hypogonadism in aging men (HIV-)** *Bar height* indicates the percent of men in each 10-yr interval, from the third to the ninth decades, with at least one T value in the hypogonadal range. *Numbers above each pair of bars* indicate the number of men studied in the corresponding decade. The fraction of men who are hypogonadal increases progressively after age 50 by either criterion. **More men are hypogonadal by free T index than by total T after age 50,** and there seems to be a progressively greater difference, with increasing age, between the two criteria.

Neurocognitive Impairment

Neurocognitive decline in Young AIDS patients as seen on Non HIV Elderly


Dementia decrease response to ARV's???

Morphologic Abnormalities: Risk Factors and Correlations in HIV Positive Patients

**Lipoatrophy (moderate/severe)**
- Older age\(^1-2,4\)
- Time since AIDS diagnosis\(^1\)
- Certain NRTIs\(^1-2\)
- Certain PIs\(^1\)
- Race\(^1,3\)
- Gender\(^4\)
- Low BMI or BMI loss\(^1,3\)
- Low nadir CD4\(^1-3\)
- Genetic susceptibility\(^5\)

**Lipohypertrophy**
- Older age\(^1-2,4\)
- High BMI or BMI gain\(^1-2\)
- Certain PIs\(^4\)
- Hemophilia\(^1\)
- Increased HAART duration\(^1\)
- Duration of Therapy\(^1,4\)
- Undetectable VL ≥2 years\(^1\)
- Genetic susceptibility\(^5\)

5. Ranade K et al. 8th Lipodystrophy Workshop; 2006; San Francisco, CA. Abstract 13.
WHAT CAN WE DO WITH OUR AGING HIV-INFECTED PATIENTS?
Selected Lifestyle Recommendations for Risk Reduction

**Nutrition¹**
- Consume a diet rich in vegetables, fruits, whole-grain and high-fiber foods
- Avoid foods high in saturated fat and sugar, minimize sodium
- Balance calorie intake and physical activity to achieve or maintain a healthy body weight

**Exercise²**
- Perform moderate-intensity aerobic activity for a minimum of 30 minutes 5 times/week or vigorous-intensity aerobic activity for a minimum of 20 minutes 3 times/week
- Perform strength-training activities (2/week minimum)

**Smoking¹**
- Do not use tobacco products

Pretreatment Assessment for Metabolic Complications in HIV

1. Identify Presence of CHD
   - MI
   - Unstable/stable angina
   - Previous coronary procedures
   - Myocardial ischemia

2. Identify Presence of CHD Equivalents
   - Peripheral artery disease
   - Abdominal aortic aneurysm
   - Coronary artery disease
   - Diabetes

3. Medical History
   - Hypertension
   - Cigarette smoking
   - Family history of CHD
   - Low HDL
   - Perform fasting plasma glucose and lipid measurements*

Calculate 10-year CV risk

*Measurements should be performed yearly after HAART initiation and more frequently if dyslipidemia, glucose intolerance, or diabetes develops.

What can we do with our Aging HIV-Infected Patients?

- Start Antiretrovirals early
- Aggressively manage traditional risk factors (eg, incorporate use of statins, aspirin, others)
- Avoid offending ARV medications
- Treat co-infections (HCV, HBV)
- Consider immune-base therapies: (research studies): CCR5 antagonist, interleukin-7, growth hormone

Adapted from: Deeks SG. Top HIV Med. 2009; 17:118-23.
- Clinical trials involving older patients
  - Enhance our understanding about the correlation between HIV infection and aging
  - Develop specifically targeted treatment, prophylaxis and care activities.

- Marketing study to develop information campaigns specifically directed to patients > 50 years and to their practitioners to reduce the current delay in HIV diagnosis.

- Improve understanding and management of:
  - Neuropsychiatric or neurocognitive disease
  - Non-AIDS defining malignancy
  - Cardiovascular disease

- Compare parameters of activation and inflammation in HIV-infected patients vs HIV-negative
  - How biomarkers might be used in clinical practice

- Pharmacologic interaction studies.
Summary

- The overall age of the HIV-infected population in the United States is increasing due to:
  - Extended survival with ART
  - New infections in older patients
- Compared to younger patients, older HIV patients have: Better virologic response, Less immunologic boost, Shortened survival
- Advanced age is associated with comorbidities including: hypertension, diabetes, vascular, pulmonary, and renal disease, as well as other non-HIV medical conditions
- Accelerated changes that typically accompany aging occur in multiple organ systems, and are associated with premature onset of disease RESULT: Multi-morbidity
- Polypharmacy pose a challenge in the management of older HIV-infected patients
- Is necessary to increase the Clinical Trials involving older patients

Reference studies discussed in this slide deck
Partners ready to help this cohort

"LOTS OF THINGS COME WITH AGE"

HIV doesn’t have to be one of them.

National Association on HIV Over Fifty
www.hivoverfifty.org
Ivan Melendez-Rivera, MD, AAHIVM
imelendez@centroararat.org
787-284-5884 – Office
787-284-5874 – Fax
Centro Ararat, Inc.
8169 Concordia Ste. 412
Ponce, PR 00717-1567
References


References


