Incorporation of Nested Multidisciplinary Clinics into an HIV Primary Care Clinic for Emerging Co-Morbidities

Yussef Bennani, MD, MPH

Lauren Richey, MD, MPH, FIDSA

LSU Health Sciences Center – New Orleans

2022

NATIONAL RYAN WHITE CONFERENCE ON HIV CARE & TREATMENT

Disclosures

Yussef Bennani has no relevant financial interests to disclose.

Disclosure will be made when a product is discussed for an unapproved use.

This continuing education activity is managed and accredited by AffinityCE, in collaboration with the Health Resources and Services Administration (HRSA), LRG, and AffinityCE. AffinityCE, LRG and HRSA staff, as well as planners and reviewers, have no relevant financial interests to disclose. AffinityCE adheres to the ACCME's Standards for Integrity and Independence in Accredited Continuing Education. Any individuals in a position to control the content of a CME activity, including faculty, planners, reviewers, or others, are required to disclose all relevant financial relationships with ineligible entities (commercial interests). All relevant conflicts of interest have been mitigated prior to the commencement of the activity.

There was no commercial support for this activity.

Learning Objectives

At the conclusion of this activity, participants will be able to:

1. Identify relevant co-morbidities among PWH in a Ryan White clinic population and use literature review to guide approaches for more targeted management.
2. Identify resources, both medical and with ancillary clinical staff available for aggressive co-management of pertinent co-morbidities.
3. Discuss methodologies for collecting longitudinal patient outcome data and analyzing ways in which multidisciplinary care of co-morbidities in PWH can be further improved.

Background

- Widespread use of cART has had a dramatic effect on life expectancy among people with HIV.

Background

- The nature of HIV primary care continues to fundamentally change
- cART has been successful with virologic suppression – current goals for >90% suppression are realistic and for many clinics, already attained
- Today, less clinical decision making about treating HIV than in past; more time devoted to co-morbidities

How did we get here?

Background

- Marcus et al (2016) reported data from cohort study of Kaiser-Permanente patients during 1996-2011
  - Life expectancy gap between 20-year-olds with HIV and without was 44.3 y
  - By 2008-2011, gap had been narrowed to 11.8 y
    - 7.9-year gap if started cART with CD4 >=500
    - 5.7-year gap if no hepatitis B or C, smoking, drug/alcohol misuse

Improved survival with cART

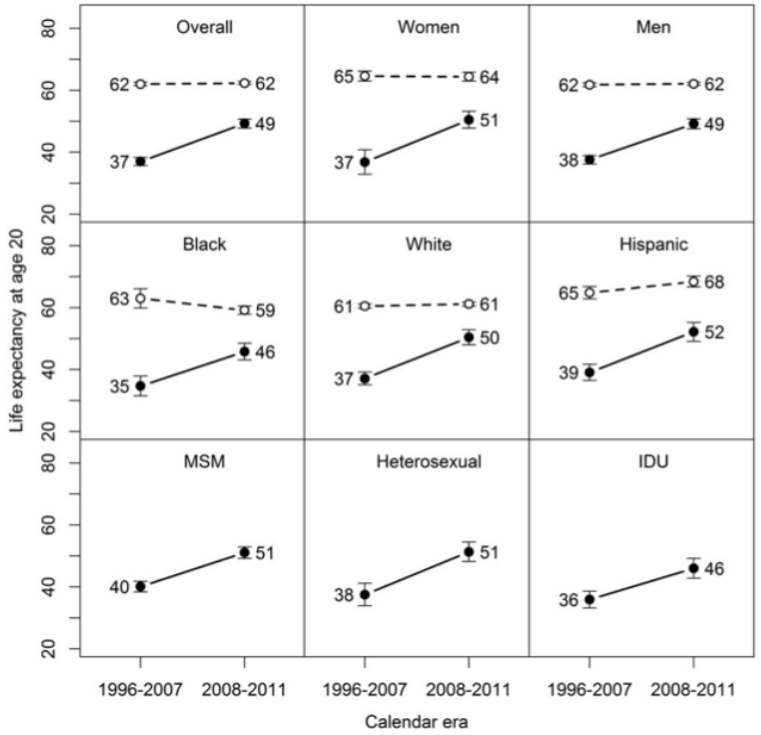


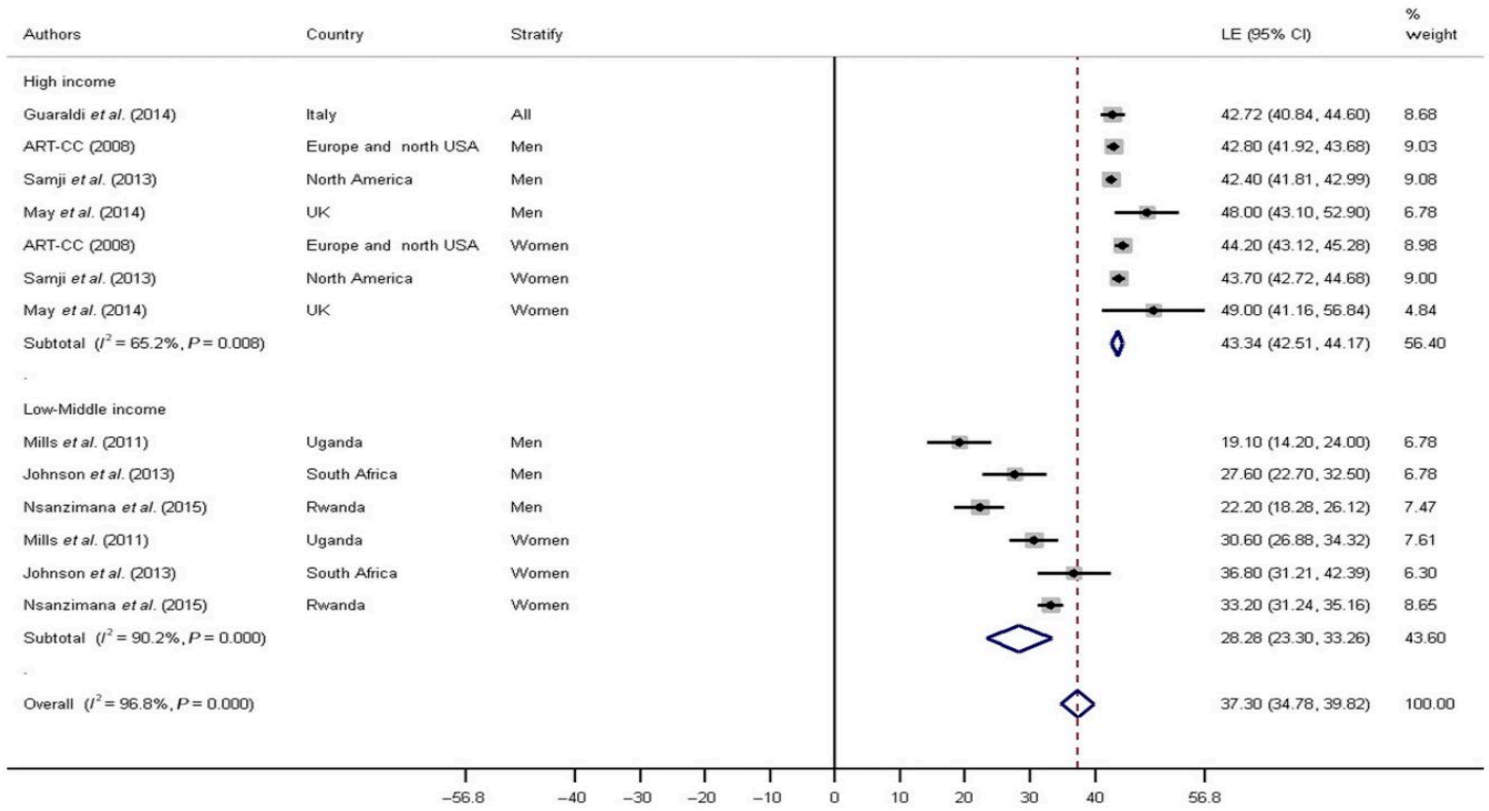
Figure 2. Life expectancy at age 20 for HIV-infected and HIV-uninfected individuals by demographic characteristics and HIV-transmission risk group, Kaiser Permanente, California, 1996-2011. Solid lines represent changes for HIV-infected individuals, with dotted lines for HIV-uninfected individuals. All changes were statistically significant at P < 0.001 for HIV-infected individuals, but only for blacks (*P* = 0.014) and Hispanics (*P* = 0.004) for HIV-uninfected individuals.

Source: Marcus JL, et al. *J Acquir Immune Defic Syndr* 2016;73:39–46

Improved survival with cART

- 2016 meta-analysis (Teeraananchai et al) estimated:
  - 43.3 additional years life expectancy among 20-year-olds in high-income countries if on cART
  - 28.3 additional years among 35-year-olds
  - Similar increases among both sexes
  - Lower if in low-middle income countries.

Improved survival with cART



Source: Teeraananchai et al. *HIV Medicine* (2017), 18, 256—266.

Fig. 2: Expected additional years of life for a person living with HIV starting combination antiretroviral therapy (cART) at 20 years of age. CI, confidence interval; LE, life expectancy. *Guaraldi *et al.* [14] provided life expectancy for age 25 years.

Improved survival with cART

- Antiretroviral Therapy Cohort Collaboration looked at 18 cohorts in North America and Europe of patients:
  - Aged at least 16 y.o. starting cART with at least 3 drugs between 1996-2010
  - At least 3 years follow up time available
  - Total of 88,504 patients included in analysis
- Calculated adjusted hazard ratios for mortality in 1st year, 2nd/3rd years after starting meds
  - Adjusted for age, sex, baseline VL, CD4, AIDS present yes/no, risk group
  - Calculated for all-cause mortality and for specific causes
- Compared 3-year periods in total observation period

Mortality Hazard Ratios

Year 1 after starting cART

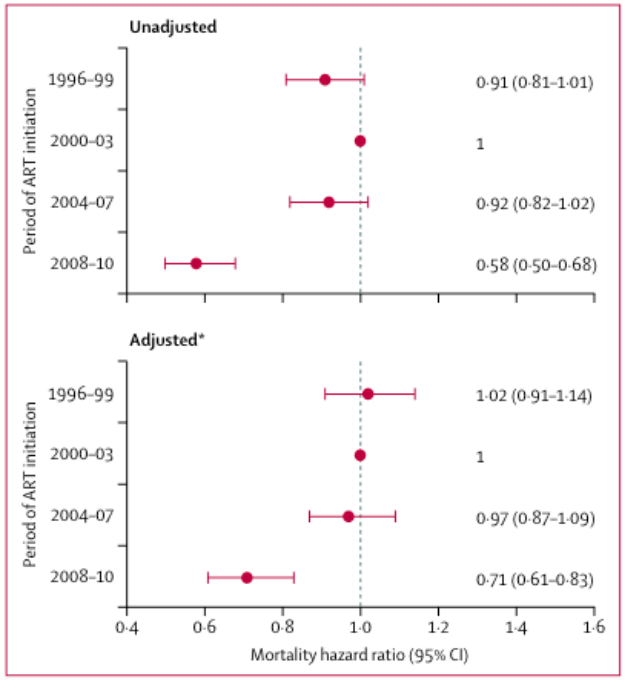


***Figure 1*: Unadjusted and adjusted all-cause mortality hazard ratios for the first year after starting antiretroviral therapy (ART), by period of initiation**
*Adjusted for age, sex, AIDS, risk group, CD4 cell count, and HIV-1 RNA at the time of starting ART.

Years 2-3 after starting cART

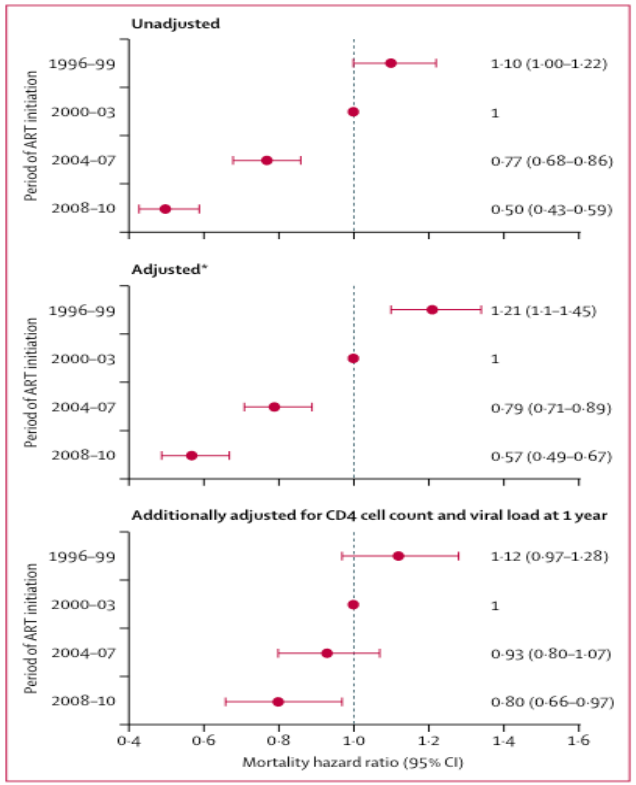


***Figure 2*: All-cause mortality hazard ratios for the second and third years after starting antiretroviral therapy (ART), by period of initiation**
*Adjusted for age, sex, AIDS, risk group, CD4 cell count, and HIV-1 RNA at the time of starting ART.

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Mortality Hazard Ratios 2

Year 1 after starting cART

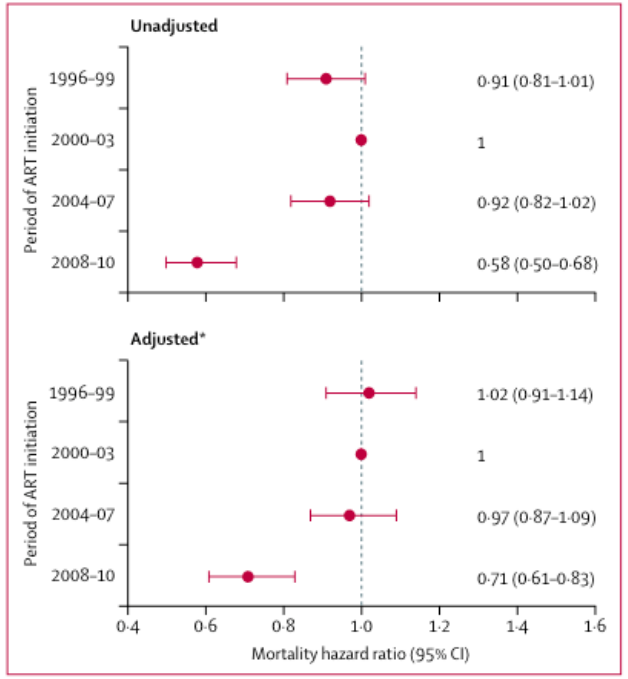


***Figure 1*: Unadjusted and adjusted all-cause mortality hazard ratios for the first year after starting antiretroviral therapy (ART), by period of initiation**
*Adjusted for age, sex, AIDS, risk group, CD4 cell count, and HIV-1 RNA at the time of starting ART.

Years 2-3 after starting cART

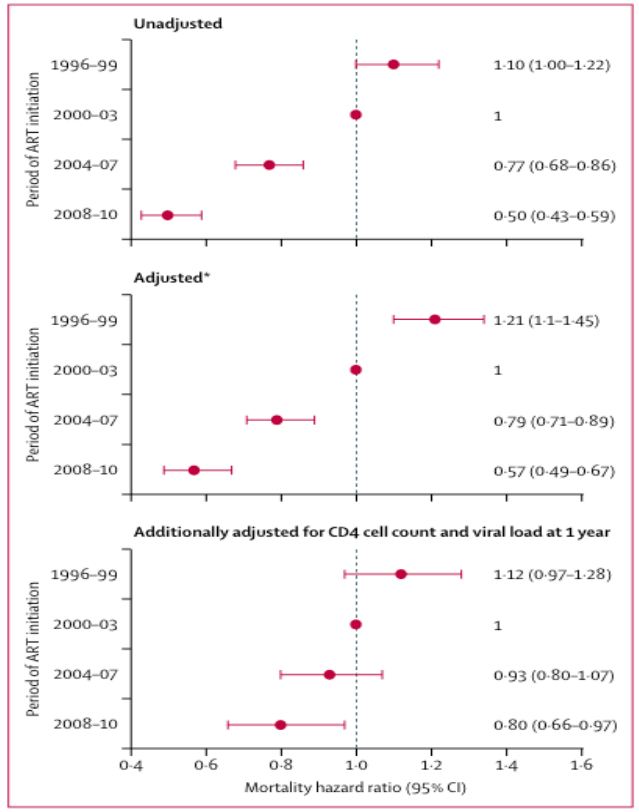


***Figure 2*: All-cause mortality hazard ratios for the second and third years after starting antiretroviral therapy (ART), by period of initiation**
*Adjusted for age, sex, AIDS, risk group, CD4 cell count, and HIV-1 RNA at the time of starting ART.

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Expected Age at Death

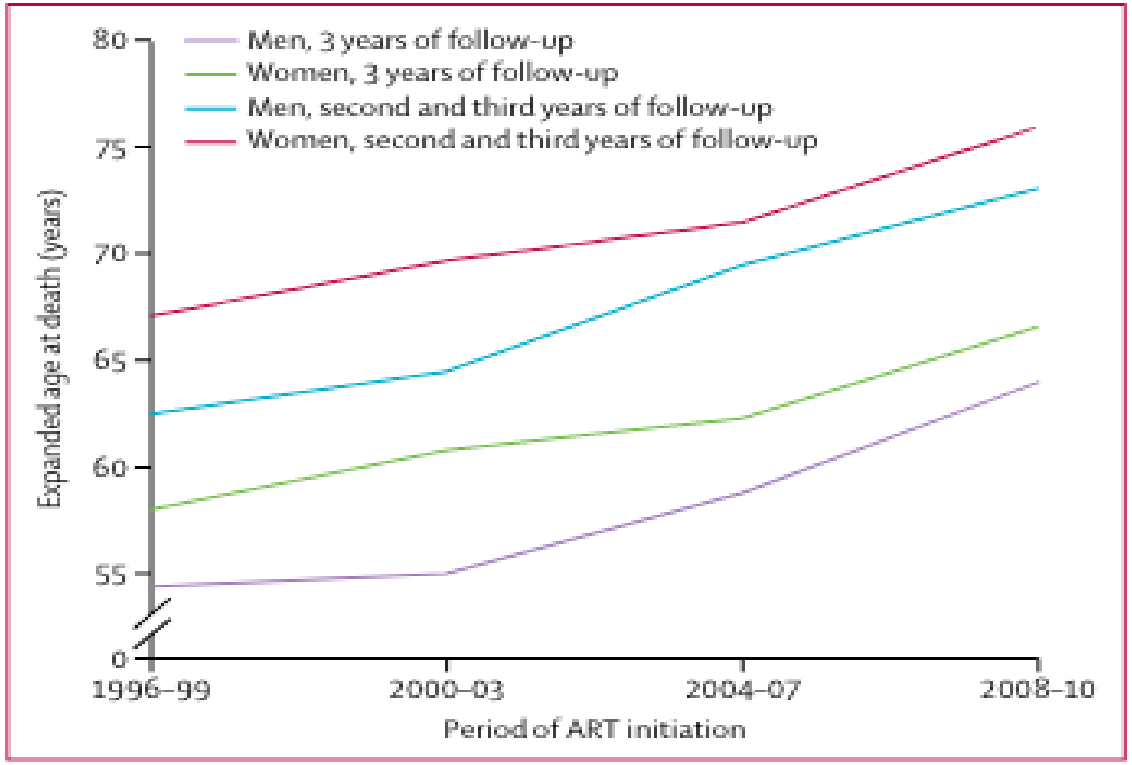


Figure 3. Expected age at death of men and women living with HIV starting antiretroviral therapy (ART) aged 20 years, by period of initiation. Estimates of life expectancy were based on mortality during the first 3 years of follow-up and the second and third years of follow-up. Data are for all regions.

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Hazard Ratios for Specific COD 1

	Number of deaths	Period of ART initiation				Per period
		1996–99	2000–03	2004–07	2008–10	
First year of follow-up						
AIDS	902	0·98 (0·83–1·16)	1	0·94 (0·79–1·11)	0·71 (0·56–0·90)	0·93 (0·86–0·99)
Non-AIDs	525	1·04 (0·83–1·30)	1	1·09 (0·88–1·35)	0·48 (0·34–0·67)	0·87 (0·80–0·95)
Non-AIDS infection	117	0·89 (0·55–1·43)	1	1·11 (0·71–1·74)	0·45 (0·22–0·94)	0·91 (0·76–1·10)
Non-AIDS, non-hepatitis malignancies	122	1·01 (0·61–1·68)	1	1·53 (0·97–2·39)	0·65 (0·34–1·24)	0·99 (0·83–1·18)
Liver-related	76	1·07 (0·60–1·88)	1	0·93 (0·52–1·67)	0·36 (0·14–0·96)	0·80 (0·63–1·01)
Cardiovascular	64	0·95 (0·52–1·73)	1	0·72 (0·39–1·35)	0·19 (0·06–0·62)	0·71 (0·55–0·92)
Other	146	1·18 (0·78–1·78)	1	1·03 (0·67–1·59)	0·64 (0·34–1·19)	0·87 (0·73–1·02)
Unnatural*	107	1·37 (0·82–2·29)	1	1·49 (0·90–2·48)	0·62 (0·29–1·34)	0·89 (0·73–1·08)
Missing/unknown	572	1·00 (0·81–1·24)	1	0·86 (0·69–1·08)	0·98 (0·76–1·23)	0·97 (0·89–1·05)
Second and third years of follow-up						
AIDS	646	1·34 (1·12–1·60)	1	0·74 (0·59–0·92)	0·35 (0·24–0·51)	0·69 (0·64–0·76)
Non-AIDS	770	1·12 (0·94–1·34)	1	0·86 (0·71–1·03)	0·29 (0·21–0·40)	0·75 (0·69–0·81)
Non-AIDS infection	132	0·79 (0·52–1·19)	1	0·66 (0·43–1·04)	0·27 (0·12–0·59)	0·79 (0·66–0·95)
Non-AIDS, non-hepatitis malignancies	206	1·48 (1·03–2·13)	1	1·40 (0·97–2·00)	0·50 (0·28–0·87)	0·82 (0·71–0·94)
Liver-related	127	0·94 (0·63–1·40)	1	0·49 (0·30–0·79)	0·15 (0·05–0·42)	0·66 (0·54–0·80)
Cardiovascular	100	0·82 (0·50–1·34)	1	0·79 (0·49–1·29)	0·21 (0·08–0·53)	0·78 (0·64–0·95)
Other	205	1·47 (1·05–2·05)	1	0·93 (0·64–1·34)	0·29 (0·14–0·59)	0·69 (0·60–0·80)
Unnatural*	176	1·06 (0·74–1·53)	1	0·91 (0·62–1·35)	0·32 (0·16–0·63)	0·79 (0·68–0·92)
Missing/unknown	710	1·23 (1·02–1·48)	1	0·73 (0·58–0·91)	1·19 (0·96–1·49)	0·93 (0·87–1·00)

Data are hazard ratio (95% CI), mutually adjusted for age, sex, AIDS, risk group, CD4 cell count, HIV-1 RNA, and stratified by cohort, with 2000–03 as comparator. *Unnatural deaths include suicide, accident or other violent death, euthanasia, and substance abuse.

***Table 3*: Adjusted hazard ratios for specific causes of death by period of antiretroviral therapy (ART) initiation for first year of ART and second and third years of ART**

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Hazard Ratios for Specific COD 2

	Number of deaths	Period of ART initiation				Per period
		1996–99	2000–03	2004–07	2008–10	
First year of follow-up						
AIDS	902	0·98 (0·83–1·16)	1	0·94 (0·79–1·11)	0·71 (0·56–0·90)	0·93 (0·86–0·99)
Non-AIDs	525	1·04 (0·83–1·30)	1	1·09 (0·88–1·35)	0·48 (0·34–0·67)	0·87 (0·80–0·95)
Non-AIDS infection	117	0·89 (0·55–1·43)	1	1·11 (0·71–1·74)	0·45 (0·22–0·94)	0·91 (0·76–1·10)
Non-AIDS, non-hepatitis malignancies	122	1·01 (0·61–1·68)	1	1·53 (0·97–2·39)	0·65 (0·34–1·24)	0·99 (0·83–1·18)
Liver-related	76	1·07 (0·60–1·88)	1	0·93 (0·52–1·67)	0·36 (0·14–0·96)	0·80 (0·63–1·01)
Cardiovascular	64	0·95 (0·52–1·73)	1	0·72 (0·39–1·35)	0·19 (0·06–0·62)	0·71 (0·55–0·92)
Other	146	1·18 (0·78–1·78)	1	1·03 (0·67–1·59)	0·64 (0·34–1·19)	0·87 (0·73–1·02)
Unnatural*	107	1·37 (0·82–2·29)	1	1·49 (0·90–2·48)	0·62 (0·29–1·34)	0·89 (0·73–1·08)
Missing/unknown	572	1·00 (0·81–1·24)	1	0·86 (0·69–1·08)	0·98 (0·76–1·23)	0·97 (0·89–1·05)
Second and third years of follow-up						
AIDS	646	1·34 (1·12–1·60)	1	0·74 (0·59–0·92)	0·35 (0·24–0·51)	0·69 (0·64–0·76)
Non-AIDS	770	1·12 (0·94–1·34)	1	0·86 (0·71–1·03)	0·29 (0·21–0·40)	0·75 (0·69–0·81)
Non-AIDS infection	132	0·79 (0·52–1·19)	1	0·66 (0·43–1·04)	0·27 (0·12–0·59)	0·79 (0·66–0·95)
Non-AIDS, non-hepatitis malignancies	206	1·48 (1·03–2·13)	1	1·40 (0·97–2·00)	0·50 (0·28–0·87)	0·82 (0·71–0·94)
Liver-related	127	0·94 (0·63–1·40)	1	0·49 (0·30–0·79)	0·15 (0·05–0·42)	0·66 (0·54–0·80)
Cardiovascular	100	0·82 (0·50–1·34)	1	0·79 (0·49–1·29)	0·21 (0·08–0·53)	0·78 (0·64–0·95)
Other	205	1·47 (1·05–2·05)	1	0·93 (0·64–1·34)	0·29 (0·14–0·59)	0·69 (0·60–0·80)
Unnatural*	176	1·06 (0·74–1·53)	1	0·91 (0·62–1·35)	0·32 (0·16–0·63)	0·79 (0·68–0·92)
Missing/unknown	710	1·23 (1·02–1·48)	1	0·73 (0·58–0·91)	1·19 (0·96–1·49)	0·93 (0·87–1·00)

Data are hazard ratio (95% CI), mutually adjusted for age, sex, AIDS, risk group, CD4 cell count, HIV-1 RNA, and stratified by cohort, with 2000–03 as comparator. *Unnatural deaths include suicide, accident or other violent death, euthanasia, and substance abuse.

Table 3: **Adjusted hazard ratios for specific causes of death by period of antiretroviral therapy (ART) initiation for first year of ART and second and third years of ART**

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Hazard Ratios for Specific COD 3

	Number of deaths	Period of ART initiation				Per period
		1996–99	2000–03	2004–07	2008–10	
First year of follow-up						
AIDS	902	0·98 (0·83–1·16)	1	0·94 (0·79–1·11)	0·71 (0·56–0·90)	0·93 (0·86–0·99)
Non-AIDs	525	1·04 (0·83–1·30)	1	1·09 (0·88–1·35)	0·48 (0·34–0·67)	0·87 (0·80–0·95)
Non-AIDS infection	117	0·89 (0·55–1·43)	1	1·11 (0·71–1·74)	0·45 (0·22–0·94)	0·91 (0·76–1·10)
Non-AIDS, non-hepatitis malignancies	122	1·01 (0·61–1·68)	1	1·53 (0·97–2·39)	0·65 (0·34–1·24)	0·99 (0·83–1·18)
Liver-related	76	1·07 (0·60–1·88)	1	0·93 (0·52–1·67)	0·36 (0·14–0·96)	0·80 (0·63–1·01)
Cardiovascular	64	0·95 (0·52–1·73)	1	0·72 (0·39–1·35)	0·19 (0·06–0·62)	0·71 (0·55–0·92)
Other	146	1·18 (0·78–1·78)	1	1·03 (0·67–1·59)	0·64 (0·34–1·19)	0·87 (0·73–1·02)
Unnatural*	107	1·37 (0·82–2·29)	1	1·49 (0·90–2·48)	0·62 (0·29–1·34)	0·89 (0·73–1·08)
Missing/unknown	572	1·00 (0·81–1·24)	1	0·86 (0·69–1·08)	0·98 (0·76–1·23)	0·97 (0·89–1·05)
Second and third years of follow-up						
AIDS	646	1·34 (1·12–1·60)	1	0·74 (0·59–0·92)	0·35 (0·24–0·51)	0·69 (0·64–0·76)
Non-AIDS	770	1·12 (0·94–1·34)	1	0·86 (0·71–1·03)	0·29 (0·21–0·40)	0·75 (0·69–0·81)
Non-AIDS infection	132	0·79 (0·52–1·19)	1	0·66 (0·43–1·04)	0·27 (0·12–0·59)	0·79 (0·66–0·95)
Non-AIDS, non-hepatitis malignancies	206	1·48 (1·03–2·13)	1	1·40 (0·97–2·00)	0·50 (0·28–0·87)	0·82 (0·71–0·94)
Liver-related	127	0·94 (0·63–1·40)	1	0·49 (0·30–0·79)	0·15 (0·05–0·42)	0·66 (0·54–0·80)
Cardiovascular	100	0·82 (0·50–1·34)	1	0·79 (0·49–1·29)	0·21 (0·08–0·53)	0·78 (0·64–0·95)
Other	205	1·47 (1·05–2·05)	1	0·93 (0·64–1·34)	0·29 (0·14–0·59)	0·69 (0·60–0·80)
Unnatural*	176	1·06 (0·74–1·53)	1	0·91 (0·62–1·35)	0·32 (0·16–0·63)	0·79 (0·68–0·92)
Missing/unknown	710	1·23 (1·02–1·48)	1	0·73 (0·58–0·91)	1·19 (0·96–1·49)	0·93 (0·87–1·00)

Data are hazard ratio (95% CI), mutually adjusted for age, sex, AIDS, risk group, CD4 cell count, HIV-1 RNA, and stratified by cohort, with 2000–03 as comparator. *Unnatural deaths include suicide, accident or other violent death, euthanasia, and substance abuse.

Table 3: **Adjusted hazard ratios for specific causes of death by period of antiretroviral therapy (ART) initiation for first year of ART and second and third years of ART**

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Ergo…

"Since modern ART is highly effective and has low toxicity, the excess mortality in people living with HIV is unlikely to be addressed by further development of antiretroviral drugs. Instead, lifestyle issues that affect adherence to ART and non-AIDS mortality, and diagnosis and treatment of comorbidities in people living with HIV will need to be addressed."

Source: The Antiretroviral Therapy Cohort Collaboration, *Lancet HIV* 2017; 4: e349–356.

Non-infectious co-morbidities

- With improved survival, age-related risk of chronic diseases has increased…but the risk is even more than we would expect.
- These increases appear to happen sooner and more frequently than in similar non-PWH.
- Schouten et al (2014)
  - Cross-sectional analysis of age-associated non-communicable co-morbidity prevalence (AANCC) in Amsterdam.
  - Recruited HIV patients >=45 years old (N=540) with non-HIV controls (N=524)
    - Recruitment monitored to ensure similar age, sex, ethnicity between the groups
  - Screened at baseline and every 2 years for AANCC's

Non-infectious co-morbidities

- Overall, PWH had higher mean # of AANCC's (1.3 vs 1.0, p<0.01)
- Also a higher proportion of PWH had more than 1 AANCC
  - 69.4% vs 61.8% (p=0.009)
- Every AANCC was more prevalent among PWH
  - Significantly more so: MI, PAD, impaired renal function
- In multivariate analysis, HIV was independent risk factor for higher # AANCC's
- Among PWH only, odds ratio for age bordered on significantly higher than non-PWH

Age-Associated Noncommunicable Comorbidities

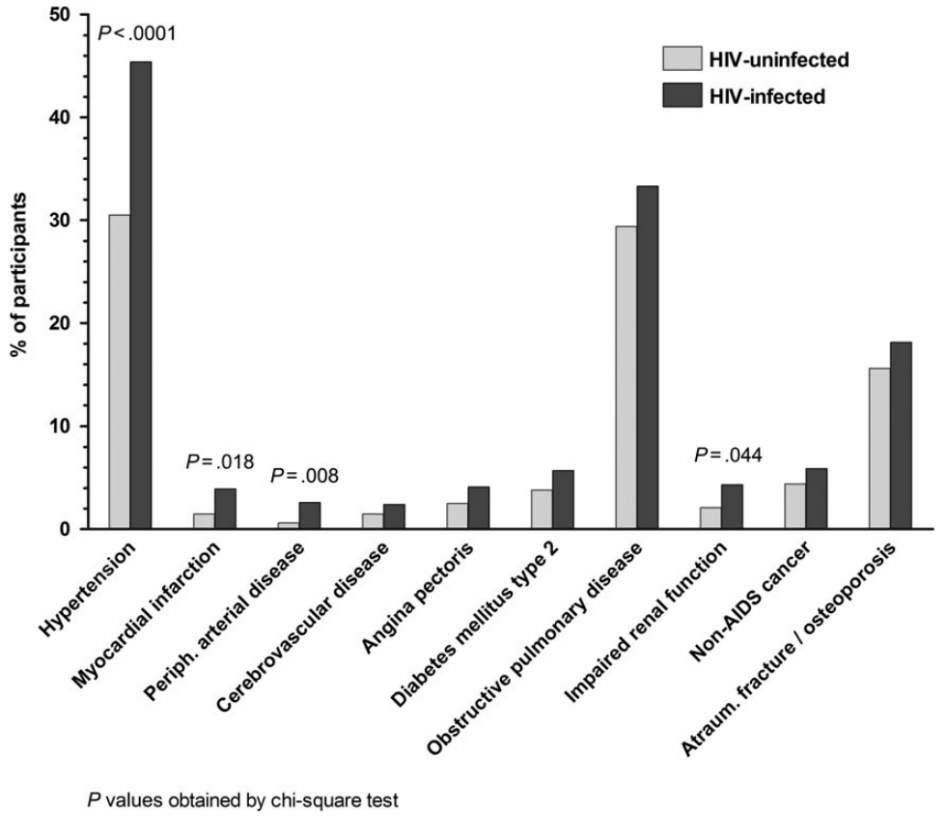


Figure 2. Prevalences of each of the different age-associated noncommunicable comorbidities over the 2 study groups.
Abbreviation: HIV, human immunodeficiency virus.

Source: Schouten, et al. *Clinical Infectious Diseases*, 2014;59(12):1787–97

Prevalence of Comorbidity Risk Factors

Characteristic	HIV-Uninfected Participants (n = 524)	HIV-Infected Participants (n = 540)	*P* Value
Smoking status			
Never smoked	36.5%	33.0%	.028*
Ever smoked	38.9%	35.0%	
Currently smoking[a]	24.6%	32.0%	
Pack-years of smoking among ever-smokers	15.0 (4.5–28.8)	22.2 (7.8–36.8)	.001**
Severe alcohol use[b]	7.3%	4.8%	.098***
Daily to monthly use of cannabis	11.6%	13.5%	.356***
Daily to monthly use of cocaine	2.9%	3.7%	.442***
Daily to monthly use of ecstasy	8.6%	4.3%	.004***
BMI, kg/m^2	24.5 (22.8–27.0)	24.2 (22.3–26.6)	.019**
BMI categories, kg/m^2			
<20	3.3%	8.2%	.121*
20 to <25	54.1%	50.7%	
25 to <30	32.7%	33.2%	
≥30	9.9%	8.0%	
Waist-to-hip ratio higher than normal[c]	62.4%	84.0%	<.001***
Blood pressure, systolic, mm Hg	133 (125–143)	135 (126–147)	.006****
Blood pressure, diastolic, mm Hg	79 (72–85)	81 (75–89)	<.001****
Positive family history for myocardial infarction, hypertension, diabetes mellitus type 2, or hypercholesterolemia[d]	66.5%	70.8	.139***
Physical activity[e]	53.0%	44.3%	.005***
25-hydroxy vitamin D2 + D3, nmol/L	54 (39–72)	47 (29–71)	<.001**

Data are presented as median (interquartile range) or percentage.

Abbreviations: BMI, body mass index; HIV, human immunodeficiency virus.

[a] Smoked during the last month before completing the questionnaire.

[b] Alcohol intake >4 units (for men) or >2 units (for women) daily or almost daily.

[c] If ≥0.9 in males and ≥0.85 in females.

[d] Participants were considered to have a positive family history for myocardial infarction/hypertension/diabetes mellitus type 2/hypercholesterolemia when they stated in the questionnaire to have a first-degree family member who experienced a myocardial infarction before the age of 60, or to have a first-degree family member suffering from hypertension, diabetes mellitus type 2, or hypercholesterolemia.

[e] Physical activity was defined following the Dutch guidelines for healthy physical activity ("Combinorm"): at least 5 days per week at least 30 minutes of moderate physical activity or at least twice per week at least 20 minutes of heavy physical activity [26].

* Nonparametric test for trend.

** Wilcoxon rank-sum test.

*** χ^2 test.

**** Student *t* test.

Source: Schouten, et al. *Clinical Infectious Diseases*, 2014;59(12):1787–97

Prevalence of Comorbidity Risk Factors 2

Characteristic	HIV-Uninfected Participants (n = 524)	HIV-Infected Participants (n = 540)	*P* Value
Smoking status			
Never smoked	36.5%	33.0%	.028*
Ever smoked	38.9%	35.0%	
Currently smoking[a]	24.6%	32.0%	
Pack-years of smoking among ever-smokers	15.0 (4.5–28.8)	22.2 (7.8–36.8)	.001**
Severe alcohol use[b]	7.3%	4.8%	.098***
Daily to monthly use of cannabis	11.6%	13.5%	.356***
Daily to monthly use of cocaine	2.9%	3.7%	.442***
Daily to monthly use of ecstasy	8.6%	4.3%	.004***
BMI, kg/m^2	24.5 (22.8–27.0)	24.2 (22.3–26.6)	.019**
BMI categories, kg/m^2			
<20	3.3%	8.2%	.121*
20 to <25	54.1%	50.7%	
25 to <30	32.7%	33.2%	
≥30	9.9%	8.0%	
Waist-to-hip ratio higher than normal[c]	62.4%	84.0%	<.001***
Blood pressure, systolic, mm Hg	133 (125–143)	135 (126–147)	.006****
Blood pressure, diastolic, mm Hg	79 (72–85)	81 (75–89)	<.001****
Positive family history for myocardial infarction, hypertension, diabetes mellitus type 2, or hypercholesterolemia[d]	66.5%	70.8	.139***
Physical activity[e]	53.0%	44.3%	.005***
25-hydroxy vitamin D2 + D3, nmol/L	54 (39–72)	47 (29–71)	<.001**

Data are presented as median (interquartile range) or percentage.

Abbreviations: BMI, body mass index; HIV, human immunodeficiency virus.

[a] Smoked during the last month before completing the questionnaire.

[b] Alcohol intake >4 units (for men) or >2 units (for women) daily or almost daily.

[c] If ≥0.9 in males and ≥0.85 in females.

[d] Participants were considered to have a positive family history for myocardial infarction/hypertension/diabetes mellitus type 2/hypercholesterolemia when they stated in the questionnaire to have a first-degree family member who experienced a myocardial infarction before the age of 60, or to have a first-degree family member suffering from hypertension, diabetes mellitus type 2, or hypercholesterolemia.

[e] Physical activity was defined following the Dutch guidelines for healthy physical activity ("Combinorm"): at least 5 days per week at least 30 minutes of moderate physical activity or at least twice per week at least 20 minutes of heavy physical activity [26].

* Nonparametric test for trend.

** Wilcoxon rank-sum test.

*** χ^2 test.

**** Student *t* test.

Source: Schouten, et al. *Clinical Infectious Diseases*, 2014;59(12):1787–97

Noncommunicable Comorbidities

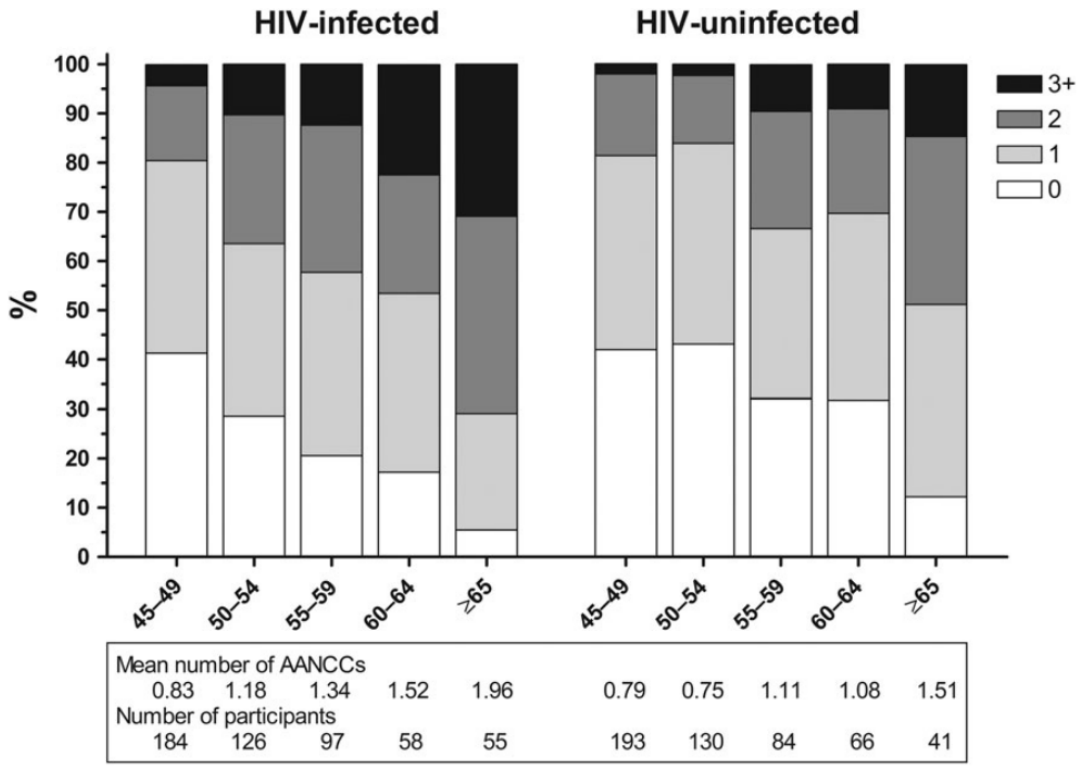


Figure 1. Distribution of the number of age-associated noncommunicable comorbidities stratified by age across both study groups. Abbreviations, AANCC, age-associated noncommunicable comorbidities; HIV, human immunodeficiency virus.

Source: Schouten, et al. *Clinical Infectious Diseases*, 2014;59(12):1787–97

Non-infectious co-morbidities

- Guaraldi et al (2011)
  - case control of PWH on ART (N=2,854) with matched controls by age/sex/race from general population (N=8,562)
  - Sampled from Modena, Italy in 2002-2009.
  - Assessed prevalence, risk factors for non-infectious co-morbidities (NICM's)
  - Also assess prevalence of "polypathology" (Pp) in each group
- Prevalence of NICM's higher in study group than controls in every age group
- Independent predictors of Pp from multivariate model:
  - Age, nadir CD4<200, male sex, ART exposure
- Pp prevalence in PWH age groups similar to gen pop groups 10 years older

Comparative Prevalence

NICM, by age	HIV-infected patients (n = 2854)	HIV-uninfected controls (n = 8562)	*P* value
CVD			
≤40 years	5 (0.91%)	4 (0.24%)	.049
41–50 years	39 (2.26%)	33 (0.64%)	<.001
51–60 years	27 (5.97%)	36 (2.65%)	.002
>60 years	22 (16.18%)	24 (5.88%)	.076
Htn			
≤40 years			
41–50 years	37 (6.75%)	140 (8.52%)	.206
51–60 years	340 (19.72%)	888 (17.17%)	.018
>60 years	176 (38.94%)	433 (31.93%)	.007
	81 (59.56%)	226 (55.39%)	.425
Renal failure			
≤40 years	18 (3.28%)	1 (0.06%)	<.001
41–50 years	90 (5.22%)	8 (0.15%)	<.001
51–60 years	41 (9.07%)	4 (0.29%)	<.001
>60 years	33 (24.26%)	2 (0.49%)	<.001
Bone fracture			
≤40 years	59 (10.77%)	12 (0.73%)	<.001
41–50 years	262 (15.20%)	48 (0.93%)	<.001
51–60 years	67 (14.82%)	18 (1.33%)	<.001
>60 years	17 (12.50%)	10 (2.45%)	<.001
DM			
≤40 years	18 (3.28%)	23 (1.40%)	.009
41–50 years	158 (9.16%)	151 (2.92%)	<.001
51–60 years	89 (19.69%)	92 (6.78%)	<.001
>60 years	53 (38.97%)	65 (15.93%)	<.001

Abbreviations: CVD, cardiovascular disease; DM, diabetes mellitus; HIV, human immunodeficiency virus; Htn, hypertension; NICMs, noninfectious comorbidities.

Table 1. Comparative Prevalence of Selected Noninfectious Comorbidities Among Patients Versus Control Subjects, Stratified by Age

- Prevalence among PWH higher for nearly every comorbidity, in every age group

Source: Guaraldi, et al. *Clinical Infectious Diseases*, 2011;53(11):1120–6

Comparative Risk

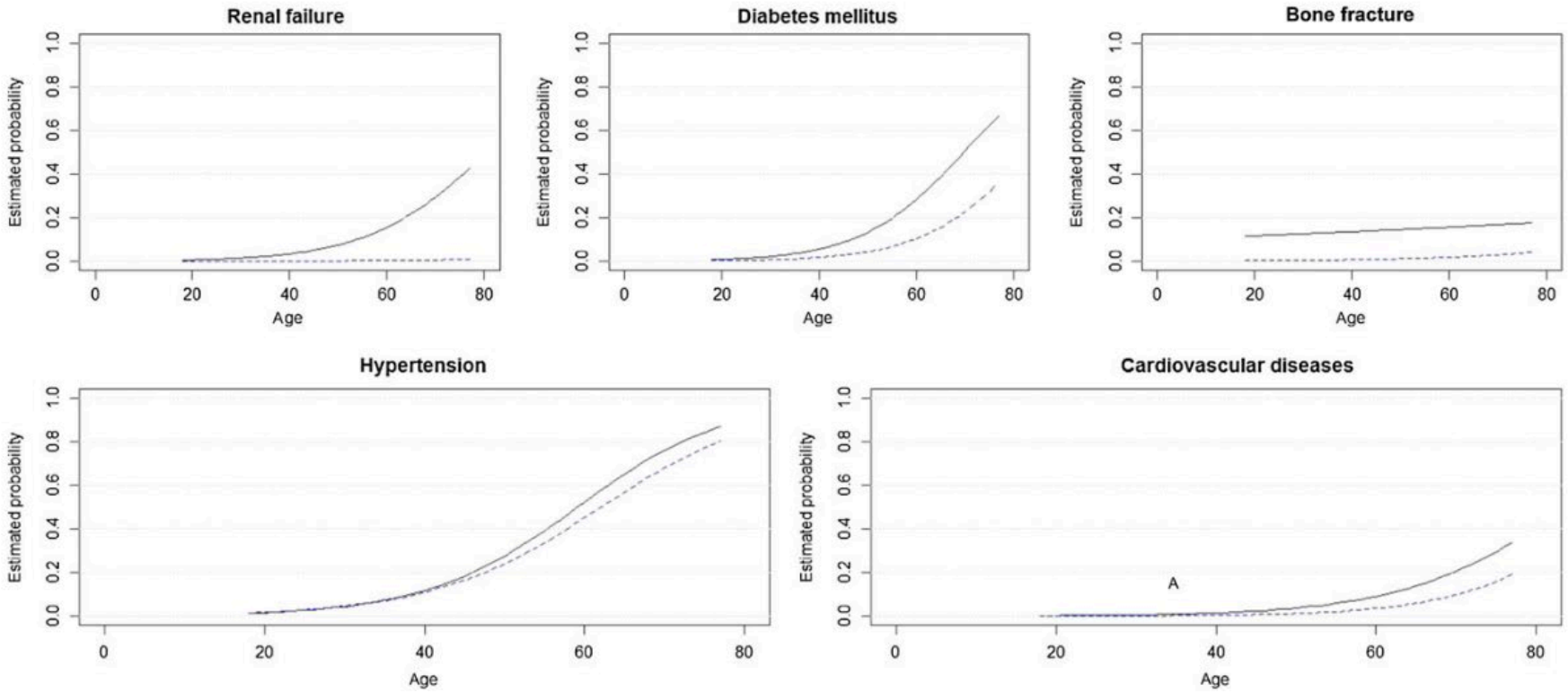


Figure 1. Comparative risk of hypertension, diabetes mellitus, renal failure, cardiovascular disease, and facture, by age, among patients versus control subjects.

Source: Guaraldi, et al. *Clinical Infectious Diseases*, 2011;53(11):1120–6

Polypathology Prevalence

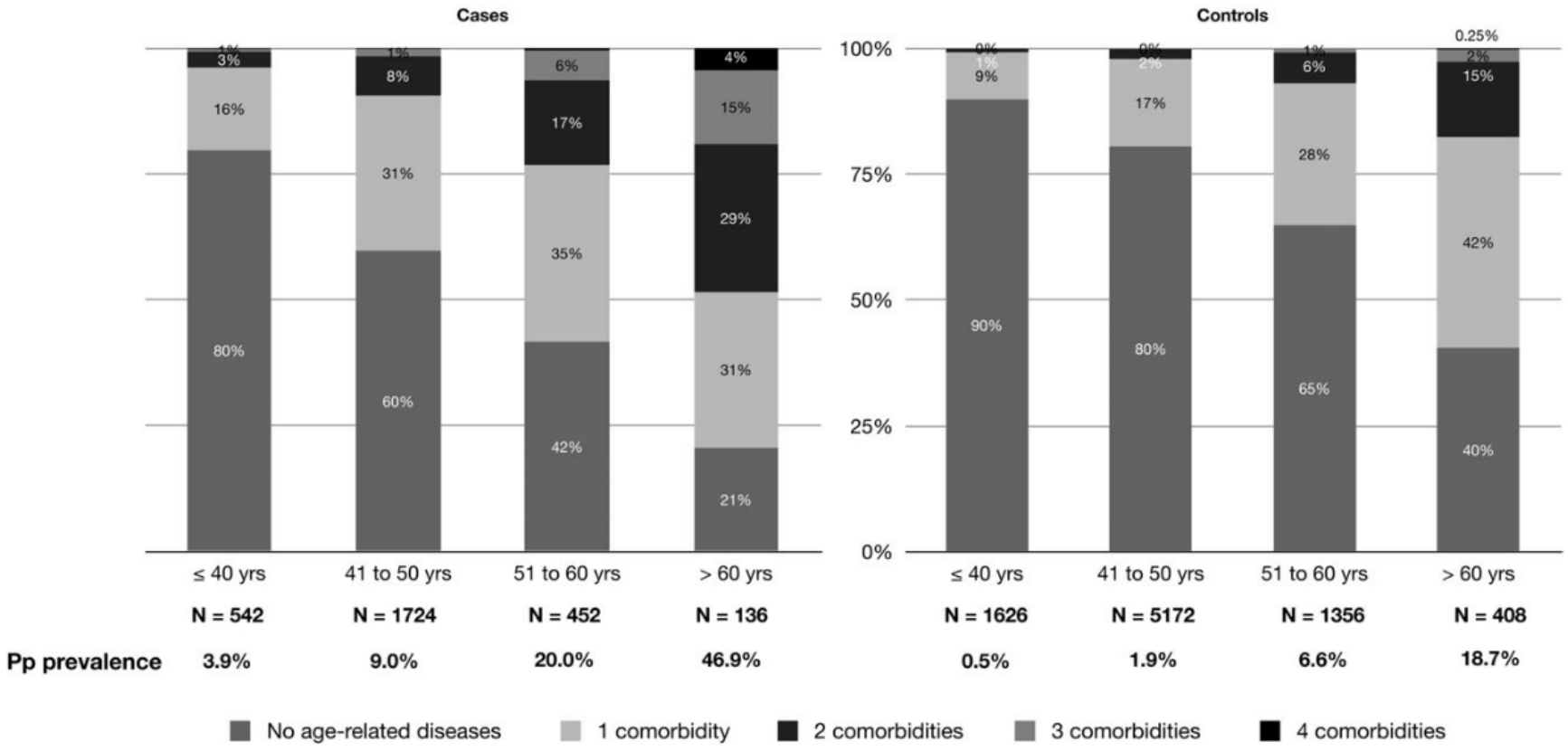


Figure 2. Polypathology (Pp) prevalence among patients and control subjects, by age categories. The following comorbidities were included: hypertension, diabetes mellitus, hypothyroidism, cardiovascular disease, and bone fractures.

Source: Guaraldi, et al. *Clinical Infectious Diseases*, 2011;53(11):1120–6

Non-infectious co-morbidities

- Swiss HIV Cohort Study – prospective observational cohort established in 1988 with continuous enrollment
  - Determined incidence of clinical events from 2008 through 2010
  - Data from 8,844 patients included in the analysis

Clinical Baseline

Variable	Total	Age group			*P* value[a]
		<50 years	50–64 years	≥65 years	
Patients, no. (%)	8444 (100)	5761 (68.2)	2233 (26.4)	450 (5.3)	
Female, no. (%)	2464 (29.2)	1932 (33.5)	453 (20.3)	79 (17.6)	<.001
HIV transmission groups, no. (%)					.322
MSM	3627 (42.9)	2401 (41.6)	1017 (45.5)	209 (46.4)	
Heterosexual	3393 (40.2)	2328 (40.4)	827 (37.0)	238 (52.9)	
IDU	1424 (16.8)	1032 (17.9)	389 (17.4)	3 (0.70)	
Prior clinical AIDS, no. (%)	1963 (23.2)	1160 (20.1)	660 (29.5)	143 (31.8)	<.001
Age at HIV diagnosis, median years (IQR)	29 (23–36)	26 (21–31)	37 (30–43)	54 (48–60)	<.001
Years HIV-infected, median (IQR)	15.4 (9.59–22.0)	14.0 (8.58–21.1)	18.2 (12.8–23.5)	15.7 (11.8–21.5)	<.001
First CD4 cells/μL, median (IQR)	350 (180–542)	367 (200–554)	310 (147–527)	285 (127–480)	<.001
Nadir CD4 cells/μL, median (IQR)	190 (84–288)	206 (102–306)	149 (62–245)	161 (67–254)	<.001
Years CD4 <200 cells/μL, median (IQR)	0.916 (0–12.5)	0 (0–10.1)	3.19 (0–18.3)	1.98 (0–14.5)	<.001
CD4 cells/μL at last visit, median (IQR)	528 (377–711)	532 (383–717)	523 (370–710)	471 (329–627)	<.001
BMI, kg/m[b], median (IQR)	23.5 (21.2–26.1)	23.3 (21.1–25.9)	23.8 (21.3–26.5)	24.2 (22.1–26.7)	<.001
Smoking, no. (%)					<.001
Never	2688 (31.8)	1828 (31.7)	657 (29.4)	203 (45.1)	
Ever	2009 (23.8)	1185 (20.6)	654 (29.3)	170 (37.8)	
Current	3735 (44.2)	2740 (47.5)	919 (41.2)	76 (16.9)	
Hypertension, no. (%)[b]	4753 (56.3)	2839 (49.3)	1559 (69.8)	355 (78.9)	<.001
Diabetes mellitus, no. (%)	350 (4.1)	121 (2.1)	156 (7.0)	73 (16.2)	<.001
Fat loss, no. (%)[c]	1425 (16.9)	682 (11.8)	611 (27.4)	132 (29.3)	<.001
Fat accumulation, no. (%)[d]	1514 (17.9)	822 (14.3)	568 (25.4)	124 (27.6)	<.001
Hepatitis B virus coinfection, no. (%)	339 (4.0)	255 (4.4)	67 (3.0)	17 (3.8)	<.001
Hepatitis C virus coinfection, no. (%)	1915 (22.7)	1332 (23.1)	555 (24.9)	28 (6.2)	<.001
Depression, no. (%)	1282 (15.2)	852 (14.8)	382 (17.1)	48 (10.7)	.911
MDRD, mL/min, median (IQR)	101 (86.5–111)	106 (92.4–115)	93.8 (79.5–102)	75.2 (62.1–87.0)	<.001
Drug use, no. (%)					
Illicit injectables in the past 6 months	217 (2.6)	176 (3.1)	41 (1.8)	0 (0)	<.001
Illicit noninjectables in the past 6 months	1522 (18.0)	1202 (20.8)	315 (14.1)	5 (1.1)	<.001
Opiate substitution treatment program	771 (9.1)	576 (10.0)	195 (8.7)	0 (0)	<.001
Alcohol use, no. (%)[e]					.001
Moderate	411 (4.9)	261 (4.5)	120 (5.4)	30 (6.7)	
Severe	217 (2.6)	151 (2.6)	56 (2.5)	10 (2.2)	

Table 1. Clinical Baseline Characteristics of 8444 HIV-Seropositive Cohort Participants, Stratified by Age

Source: Hasse, et al. *Clinical Infectious Diseases*, 2011;53(11):1130–9

Clinical Baseline 2

Variable	Total	Age group			P value[a]
		<50 years	50–64 years	≥65 years	
Patients, no. (%)	8444 (100)	5761 (68.2)	2233 (26.4)	450 (5.3)	
Female, no. (%)	2464 (29.2)	1932 (33.5)	453 (20.3)	79 (17.6)	<.001
HIV transmission groups, no. (%)					.322
MSM	3627 (42.9)	2401 (41.6)	1017 (45.5)	209 (46.4)	
Heterosexual	3393 (40.2)	2328 (40.4)	827 (37.0)	238 (52.9)	
IDU	1424 (16.8)	1032 (17.9)	389 (17.4)	3 (0.70)	
Prior clinical AIDS, no. (%)	1963 (23.2)	1160 (20.1)	660 (29.5)	143 (31.8)	<.001
Age at HIV diagnosis, median years (IQR)	29 (23–36)	26 (21–31)	37 (30–43)	54 (48–60)	<.001
Years HIV-infected, median (IQR)	15.4 (9.59–22.0)	14.0 (8.58–21.1)	18.2 (12.8–23.5)	15.7 (11.8–21.5)	<.001
First CD4 cells/μL, median (IQR)	350 (180–542)	367 (200–554)	310 (147–527)	285 (127–480)	<.001
Nadir CD4 cells/μL, median (IQR)	190 (84–288)	206 (102–306)	149 (62–245)	161 (67–254)	<.001
Years CD4 <200 cells/μL, median (IQR)	0.916 (0–12.5)	0 (0–10.1)	3.19 (0–18.3)	1.98 (0–14.5)	<.001
CD4 cells/μL at last visit, median (IQR)	528 (377–711)	532 (383–717)	523 (370–710)	471 (329–627)	<.001
BMI, kg/m^b, median (IQR)	23.5 (21.2–26.1)	23.3 (21.1–25.9)	23.8 (21.3–26.5)	24.2 (22.1–26.7)	<.001
Smoking, no. (%)					<.001
Never	2688 (31.8)	1828 (31.7)	657 (29.4)	203 (45.1)	
Ever	2009 (23.8)	1185 (20.6)	654 (29.3)	170 (37.8)	
Current	3735 (44.2)	2740 (47.5)	919 (41.2)	76 (16.9)	
Hypertension, no. (%)[b]	4753 (56.3)	2839 (49.3)	1559 (69.8)	355 (78.9)	<.001
Diabetes mellitus, no. (%)	350 (4.1)	121 (2.1)	156 (7.0)	73 (16.2)	<.001
Fat loss, no. (%)[c]	1425 (16.9)	682 (11.8)	611 (27.4)	132 (29.3)	<.001
Fat accumulation, no. (%)[d]	1514 (17.9)	822 (14.3)	568 (25.4)	124 (27.6)	<.001
Hepatitis B virus coinfection, no. (%)	339 (4.0)	255 (4.4)	67 (3.0)	17 (3.8)	<.001
Hepatitis C virus coinfection, no. (%)	1915 (22.7)	1332 (23.1)	555 (24.9)	28 (6.2)	<.001
Depression, no. (%)	1282 (15.2)	852 (14.8)	382 (17.1)	48 (10.7)	.911
MDRD, mL/min, median (IQR)	101 (86.5–111)	106 (92.4–115)	93.8 (79.5–102)	75.2 (62.1–87.0)	<.001
Drug use, no. (%)					
Illicit injectables in the past 6 months	217 (2.6)	176 (3.1)	41 (1.8)	0 (0)	<.001
Illicit noninjectables in the past 6 months	1522 (18.0)	1202 (20.8)	315 (14.1)	5 (1.1)	<.001
Opiate substitution treatment program	771 (9.1)	576 (10.0)	195 (8.7)	0 (0)	<.001
Alcohol use, no. (%)[e]					.001
Moderate	411 (4.9)	261 (4.5)	120 (5.4)	30 (6.7)	
Severe	217 (2.6)	151 (2.6)	56 (2.5)	10 (2.2)	

Table 1. Clinical Baseline Characteristics of 8444 HIV-Seropositive Cohort Participants, Stratified by Age

Source: Hasse, et al. *Clinical Infectious Diseases*, 2011;53(11):1130–9

Clinical Events

End points	Total[a] no. (%)	Rate (95% CI) per 1000 person-years	Rate (95% CI) per 1000 person-years, by age group			*P* value[b]
			<50	50–64	≥65	
Non-AIDS Comorbidities	994 (100)					
Bacterial pneumonia	201 (20.1)	9.03 (7.87–10.4)	7.54 (6.27–9.05)	12.8 (10.2–16.0)	9.41 (5.21–17.0)	.005
Cerebral infarction	39 (3.9)	1.73 (1.26–2.37)	0.784 (0.445–1.38)	2.81 (1.75–4.52)	8.53 (4.59–15.9)	<.001
Coronary angioplasty	76 (7.6)	3.38 (2.70–4.23)	1.31 (0.843–2.02)	7.32 (5.35–9.84)	10.3 (5.84–18.1)	<.001
Myocardial infarction	55 (5.5)	2.44 (1.88–3.18)	0.849 (0.493–1.46)	5.98 (4.31–8.29)	5.08 (2.28–11.3)	<.001
Procedure on other arteries	31 (3.1)	1.37 (0.967–1.95)	0.718 (0.398–1.30)	2.81 (1.75–4.52)	2.54 (0.819–7.87)	.001
Pulmonary embolism	16 (1.6)	0.709 (0.434–1.16)	0.522 (0.261–1.04)	0.989 (0.444–2.20)	1.69 (0.423–6.77)	.089
Deep vein thrombosis	32 (3.2)	1.42 (1.00–2.00)	1.31 (0.843–2.03)	1.65 (0.888–3.07)	1.69 (0.422–6.74)	.539
Fracture, adequate trauma	123 (12.4)	5.48 (4.60–6.54)	3.67 (2.82–4.77)	8.67 (6.61–11.4)	12.8 (7.73–21.3)	<.001
Fracture, inadequate trauma	37 (3.7)	1.64 (1.19–2.26)	0.783 (0.445–1.38)	3.14 (2.00–4.93)	5.08 (2.28–11.3)	<.001
Osteoporosis	61 (6.1)	2.71 (2.11–3.48)	1.50 (0.998–2.26)	4.64 (3.21–6.72)	8.49 (4.57–15.8)	<.001
Avascular necrosis of bone	22 (2.2)	0.974 (0.642–1.48)	0.979 (0.590–1.62)	0.824 (0.342–1.98)	1.69 (0.442–6.75)	.783
Diabetes mellitus	70 (7.0)	3.12 (2.46–3.94)	2.09 (1.48–2.96)	4.65 (3.21–6.74)	8.56 (4.61–15.9)	<.001
Pancreatitis	28 (2.8)	1.24 (0.857–1.80)	0.783 (0.445–1.38)	2.31 (1.37–3.90)	1.69 (0.422–6.75)	.017
Liver-associated event[c]	57 (5.7)	2.53 (1.95–3.28)	2.22 (1.59–3.11)	3.64 (2.40–5.53)	0.843 (0.119–5.9)	.538
Kidney-associated event[d]	31 (3.1)	1.37 (0.967–1.95)	1.18 (0.741–1.87)	1.65 (0.888–3.07)	2.53 (0.818–7.86)	.176
Non–AIDS-defining malignancy	115 (11.6)	5.12 (4.27–6.15)	2.42 (1.75–3.34)	9.66 (7.47–12.5)	17.2 (11.1–26.7)	<.001
HIV-related events	195 (100)					
CDC stage B event	100 (51.3)	4.52 (3.72–5.51)	4.95 (3.94–6.22)	3.52 (2.29–5.39)	4.25 (1.77–10.2)	.257
CDC stage C event	95 (48.7)	4.32 (3.53–5.28)	3.88 (3.00–5.02)	5.08 (3.55–7.27)	6.05 (2.89–12.7)	.134
Hospitalizations	1812 (100)					
Somatic disease	1484 (79.9)	74.4 (70.7–78.3)	63.1 (59.0–67.4)	91.5 (83.7–100)	142 (121–168)	<.001
Injury	119 (6.6)	5.30 (4.43–6.35)	4.39 (3.46–5.58)	5.65 (4.04–7.91)	15.4 (9.71–24.4)	<.001
Psychiatric disease	245 (13.5)	11.0 (9.73–12.5)	11.8 (10.3–13.8)	10.0 (7.77–12.9)	5.07 (2.28–11.3)	.028
Deaths	177 (100)	7.81 (6.74–9.05)	5.92 (4.82–7.28)	9.68 (7.50–12.5)	22.5 (15.4–33.8)	<.001

Table 3. Overall and Age-Related Incidence Rates of Clinical Events, Hospitalizations, and Deaths, from 1 January 2008 through 31 December 2010

Source: Hasse, et al. *Clinical Infectious Diseases*, 2011;53(11):1130–9

Clinical Events 2

End points	Total[a] no. (%)	Rate (95% CI) per 1000 person-years	Rate (95% CI) per 1000 person-years, by age group			*P* value[b]
			<50	50–64	≥65	
Non-AIDS Comorbidities	994 (100)					
Bacterial pneumonia	201 (20.1)	9.03 (7.87–10.4)	7.54 (6.27–9.05)	12.8 (10.2–16.0)	9.41 (5.21–17.0)	.005
Cerebral infarction	39 (3.9)	1.73 (1.26–2.37)	0.784 (0.445–1.38)	2.81 (1.75–4.52)	8.53 (4.59–15.9)	<.001
Coronary angioplasty	76 (7.6)	3.38 (2.70–4.23)	1.31 (0.843–2.02)	7.32 (5.35–9.84)	10.3 (5.84–18.1)	<.001
Myocardial infarction	55 (5.5)	2.44 (1.88–3.18)	0.849 (0.493–1.46)	5.98 (4.31–8.29)	5.08 (2.28–11.3)	<.001
Procedure on other arteries	31 (3.1)	1.37 (0.967–1.95)	0.718 (0.398–1.30)	2.81 (1.75–4.52)	2.54 (0.819–7.87)	.001
Pulmonary embolism	16 (1.6)	0.709 (0.434–1.16)	0.522 (0.261–1.04)	0.989 (0.444–2.20)	1.69 (0.423–6.77)	.089
Deep vein thrombosis	32 (3.2)	1.42 (1.00–2.00)	1.31 (0.843–2.03)	1.65 (0.888–3.07)	1.69 (0.422–6.74)	.539
Fracture, adequate trauma	123 (12.4)	5.48 (4.60–6.54)	3.67 (2.82–4.77)	8.67 (6.61–11.4)	12.8 (7.73–21.3)	<.001
Fracture, inadequate trauma	37 (3.7)	1.64 (1.19–2.26)	0.783 (0.445–1.38)	3.14 (2.00–4.93)	5.08 (2.28–11.3)	<.001
Osteoporosis	61 (6.1)	2.71 (2.11–3.48)	1.50 (0.998–2.26)	4.64 (3.21–6.72)	8.49 (4.57–15.8)	<.001
Avascular necrosis of bone	22 (2.2)	0.974 (0.642–1.48)	0.979 (0.590–1.62)	0.824 (0.342–1.98)	1.69 (0.442–6.75)	.783
Diabetes mellitus	70 (7.0)	3.12 (2.46–3.94)	2.09 (1.48–2.96)	4.65 (3.21–6.74)	8.56 (4.61–15.9)	<.001
Pancreatitis	28 (2.8)	1.24 (0.857–1.80)	0.783 (0.445–1.38)	2.31 (1.37–3.90)	1.69 (0.422–6.75)	.017
Liver-associated event[c]	57 (5.7)	2.53 (1.95–3.28)	2.22 (1.59–3.11)	3.64 (2.40–5.53)	0.843 (0.119–5.9)	.538
Kidney-associated event[d]	31 (3.1)	1.37 (0.967–1.95)	1.18 (0.741–1.87)	1.65 (0.888–3.07)	2.53 (0.818–7.86)	.176
Non–AIDS-defining malignancy	115 (11.6)	5.12 (4.27–6.15)	2.42 (1.75–3.34)	9.66 (7.47–12.5)	17.2 (11.1–26.7)	<.001
HIV-related events	195 (100)					
CDC stage B event	100 (51.3)	4.52 (3.72–5.51)	4.95 (3.94–6.22)	3.52 (2.29–5.39)	4.25 (1.77–10.2)	.257
CDC stage C event	95 (48.7)	4.32 (3.53–5.28)	3.88 (3.00–5.02)	5.08 (3.55–7.27)	6.05 (2.89–12.7)	.134
Hospitalizations	1812 (100)					
Somatic disease	1484 (79.9)	74.4 (70.7–78.3)	63.1 (59.0–67.4)	91.5 (83.7–100)	142 (121–168)	<.001
Injury	119 (6.6)	5.30 (4.43–6.35)	4.39 (3.46–5.58)	5.65 (4.04–7.91)	15.4 (9.71–24.4)	<.001
Psychiatric disease	245 (13.5)	11.0 (9.73–12.5)	11.8 (10.3–13.8)	10.0 (7.77–12.9)	5.07 (2.28–11.3)	.028
Deaths	177 (100)	7.81 (6.74–9.05)	5.92 (4.82–7.28)	9.68 (7.50–12.5)	22.5 (15.4–33.8)	<.001

Table 3. Overall and Age-Related Incidence Rates of Clinical Events, Hospitalizations, and Deaths, from 1 January 2008 through 31 December 2010

Source: Hasse, et al. *Clinical Infectious Diseases*, 2011;53(11):1130–9

Our experiences

Earliest experiences with subspecialty care

- At our HIV primary care clinic, we have in place:
  - Behavioral health
  - Nutrition
  - Pulmonary
  - Chronic pain
  - Ophthalmology (arrangement with their clinic; not nested)
- In the past, have had other subspecialists collaborating:
  - GI – specifically for colorectal cancer screening
  - Endocrine
  - Oncology – nested in cancer center

Subspecialists in HIV clinic

- Model for these subspecialty clinics has been essentially free-standing clinics physically located in our clinic space
  - Designated specifically for our patients with HIV
  - Functionally, similar to sending to subspecialty clinic
  - No additional staff, resources generally involved

Subspecialists in HIV clinic

- Pros
  - Proximity to our providers for theoretical ease of communication
  - Familiar location and clinic staff for our patients
  - Rapid referrals – patients scheduled on the spot by our clinic staff
  - Familiarity/exposure to HIV-specific issues
  - Relationships with colleagues in other specialties
- Cons
  - Theoretical ease of communication often just theoretical
  - Service essentially standalone
  - Services provided represent historical needs, not necessarily current needs
  - Usually heavily dependent on a single subspecialist – vacation, absence, change jobs, etc.

HIV/oncology multi-disciplinary clinic

- Per previous, nested in UMCNO Cancer Center from 2013-2019
- Patients evaluated by both ID specialist familiar with cancer care, oncologist familiar with HIV care at same visit
- Employed designated patient navigators to assist patients with attending visits, take advantage of additional resources available to both HIV patients, cancer patients

HIV/oncology multi-disciplinary clinic

- Pros
  - Treatment plans involved input from both ID and oncology
  - Treatment plans immediately available to the other specialty
  - Ease of communication
  - Familiarity with additional clinic resources – e.g. cancer center SW, nutrition, chemotherapy nurses
  - Effective use of ancillary staff to assist with treatment plans
  - Addressed an area of clear, current clinical need
- Cons
  - Expensive
  - Unambiguously not part of HIV primary care, needed separate resources (and funding)
  - Patients referred from outside clinics often with unavailable clinical data
  - At times, disjointed from HIV clinic where most of their care took place

Assessing burden of co-morbidities

- With this is in mind, we considered co-morbidities frequently encountered that might benefit from more intensive management
- Attempted to more systematically assess burden in our patient population
- Possible sources
  - Billing data – not always easy to access
  - Discrete medical history in an EMR – needs to be entered (and need an EMR)
  - Chart review of provider notes – presumably most complete; very time-consuming to collect

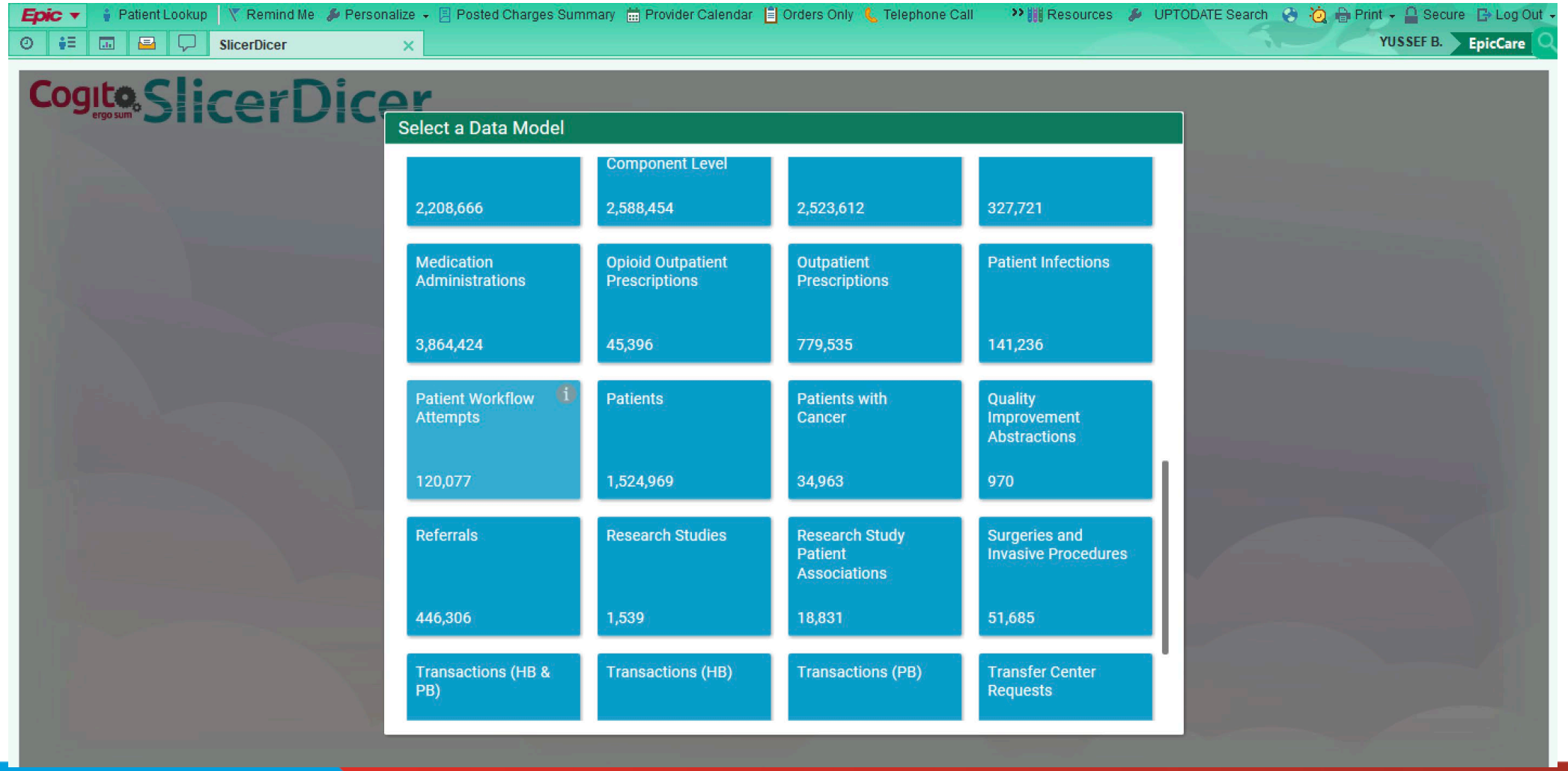
Assessing burden of co-morbidities

- EMR in our clinic is Epic
  - Vast number of discrete data fields available
  - Many, however, are redundant or inconsistently populated
  - Quality of data available for review dependent on commitment to systematically enter data by providers/staff
    - Competing priorities for time during a visit
    - Need providers and staff to have a consistent approach

Epic Slicer Dicer

- Very basic data extraction/query tool added to our Epic system
- Useful for imprecise frequencies of patients, visits, admissions, etc
- Generally, not appropriate for research
- Can be helpful for:
  - Research feasibility studies
  - Basic clinic demographics
  - Tracking encounter volume/productivity
- Can output patient level data within strata
- Again, data extraction only as good as data input

Epic Slicer Dicer



What we learned about our patient population

- Among 1,879 patients with HIV seen in prior 18 months
  - 1,034 (55%) had hypertension
  - 717 (38%) had hyperlipidemia
  - 420 (22%) had a history of any kind of cancer
  - 333 (18%) had diabetes mellitus
  - 256 (14%) had chronic kidney disease
  - 141 (8%) had COPD
  - 126 (7%) had coronary artery disease and/or history of MI

Where we started

- Identified comorbidities of greatest need for more intensive management:
  - CKD
  - Diabetes mellitus
  - Cardiovascular disease
- Hypertension with highest prevalence, however felt that this was adequately managed by ID clinic providers

Where we started

- Major benefit of Ryan White-funded clinic within major tertiary care academic medical center is diversity of other services available

HIV Renal Diseases Clinic

- Initial contact made with cardiology and nephrology, who both expressed interest in collaboration
- Renal diseases identified as initial priority for pilot
- Engaged nephrology regarding parameters for a multidisciplinary clinic within HIV clinic
  - Based on need, decided on once-monthly clinic
  - Referrals limited to CKD stage 3-5 or proteinuria; exclude ESRD
  - Patients to be evaluated by ID and nephrology together at first visit, co-formulate treatment plans
  - Designated nephrologist; 2 rotating HIV providers
    - opportunities for rotating ID and nephrology fellows
  - Follow-up to be with nephrology alone unless otherwise needed
  - Limited to patients with HIV within our clinic
  - Identified health educator within nephrology as resource to provide Kidney Smart classes to patient
  - Enlisted help from our own health educators re: patients who may benefit

HIV Renal Diseases Clinic

- Main goals of the clinic based on previous experiences
  - Rapid referrals to ensure timely evaluation
  - Timely communication between specialties to ensure treatment plan quickly implemented, consistent with highest quality HIV care
  - Comfort/familiarity with the setting on the part of our patients
  - Tight incorporation into HIV primary care
  - Availability of clinic patient navigators, health educators to incorporate HIV/nephrology plans into their activities
  - Building increased familiarity/expertise with managing PWH on part of nephrology
  - Building increased familiarity/expertise managing renal disease in our clinic
  - Development of relationships with other subspecialists to explore research in the field

Additional clinic support

- In addition to subspecialist MD's, we worked to integrate health educators in our HIV clinic and with nephrology
  - Nephrology – Kidney Smart classes
  - HIV clinic
    - Renal friendly diet
    - Assistance with medications/pillboxes
    - Follow up re: adherence to therapy for HTN, DM and HIV
- Designated nurse navigator for scheduling, contact with patients re: appointments

HIV Renal Diseases Clinic

- Logistic challenges
  - Building a unique template for the monthly clinic
  - Limiting access to the schedule to 1 scheduler with strict scheduling guidelines
  - Provider education – awareness of availability
    - Managing expectations about referrals outside scope of clinic
  - Balancing perceived need with actual need
  - Workflow for no-shows/lost to follow up
  - ID provider scheduling based on inpatient schedules
  - Agreeing on contract adjustment for nephrology compensation
  - Data management for QI

What worked

- Referral volume took about a month before providers consistently referred
  - Initially a trickle, then a tsunami, then steady
  - 62 patients referred in first 18 months.
- Added a second monthly clinic day for follow ups due to demand
- Patients tended to show up, even if they “felt fine”
  - Frequently did not happen with free-standing nephrology referrals
- Well received by providers and patients
- Assistance of health educators to get patients into clinic or rescheduled if missed
- Has operated mostly as embedded in HIV primary care activities

Challenges faced

- Mostly logistic!
  - Follow up visits began to fill up the schedule, delay initial evaluations
  - Access to scheduling not as limited as we liked to think
    - Unknown patients scheduled
    - Referred patients scheduled to ID, nephrologist on different days, often months apart
- Patients who canceled and came off the schedule did not reschedule
  - Referrals had to be kept track of to ensure rescheduled

Tracking our progress

- Obviously, an essential component of any intervention is evaluating effect
- EMR not able to output specific data; need to be manually tracked
  - Monthly updates of active patients
- Data tracking initially very basic due to limited volume
- RedCap database in development as volume has grown
  - Streamlined data input screens
  - Updated reports in real time
  - Can track clinical indicators as well as patient dispo

Next steps

- Expand this model for intensive multidisciplinary management of additional co-morbidities
- Evaluate long-term clinical benefit of this service
  - Evaluate patient and provider satisfaction
- Next priorities:
  - Diabetes mellitus
  - Cardiovascular disease

Questions?

How To Claim CE Credit

If you would like to receive continuing education credit for this activity, please visit:

ryanwhite.cds.pesgce.com