HIV ile Yaşayan Bireylerde Kardiyovasküler Hastalıklar

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UNAIDS

1.3 MILLION

people were newly infected with HIV in 2023

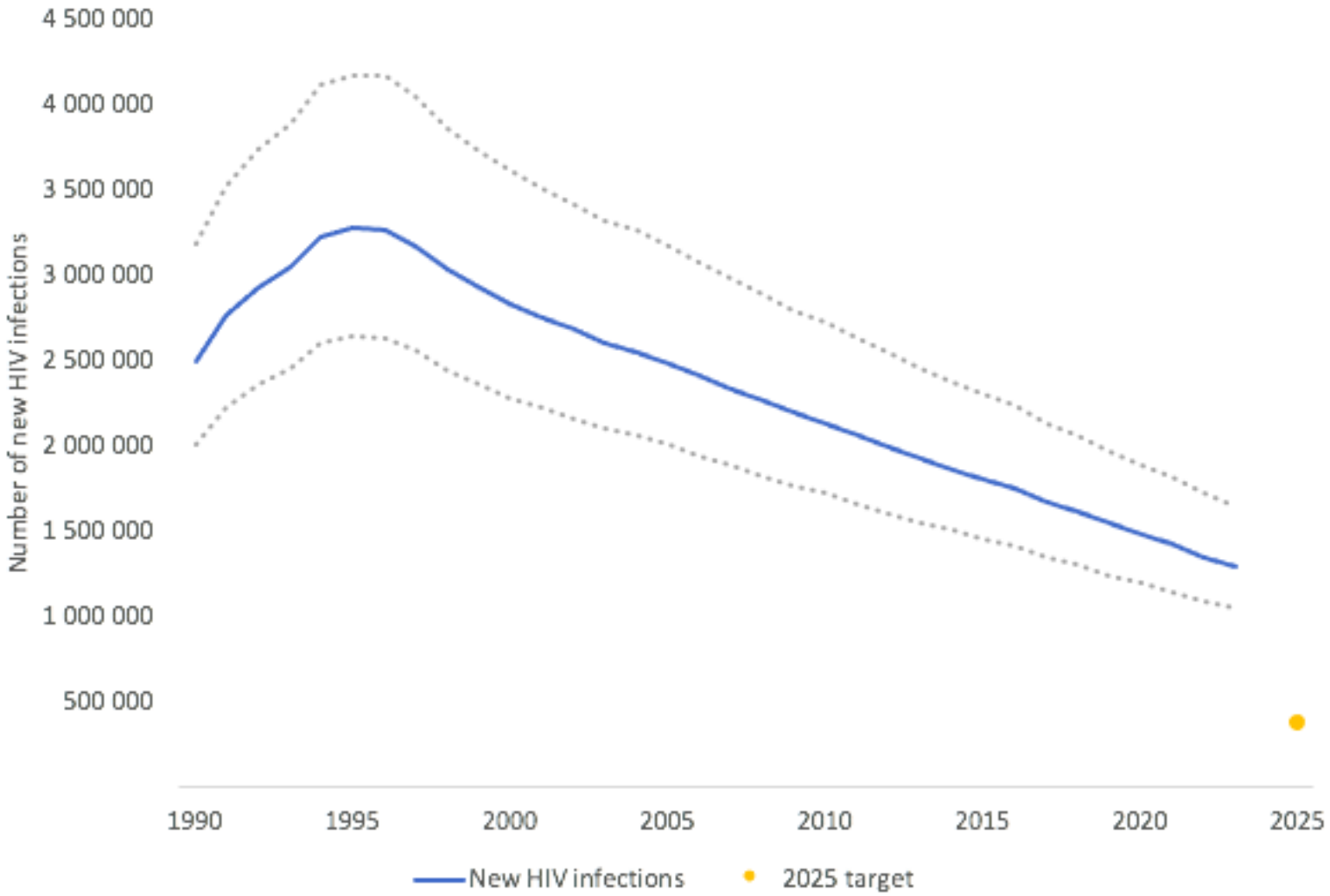
39.9 MILLION

people were living with HIV in 2023

630 THOUSAND

people died of AIDS-related illnesses in 2023

Number of new HIV infections, global, 1990–2023, and 2025 target



Source: UNAIDS 2024 epidemiological estimates

HIV / AIDS İSTATİSTİKLERİ

HIV / AIDS TOPLAM VAKA VE ÖLÜM SAYILARININ SON 5 YIL DAĞILIMI*

YILLAR	HIV	AIDS	TOPLAM	ÖLÜM
2020	3137	76	3213	38
2021	4202	103	4305	47
2022	5914	128	6042	67
2023	6185	144	6329	52
2024	1527	40	1567	9

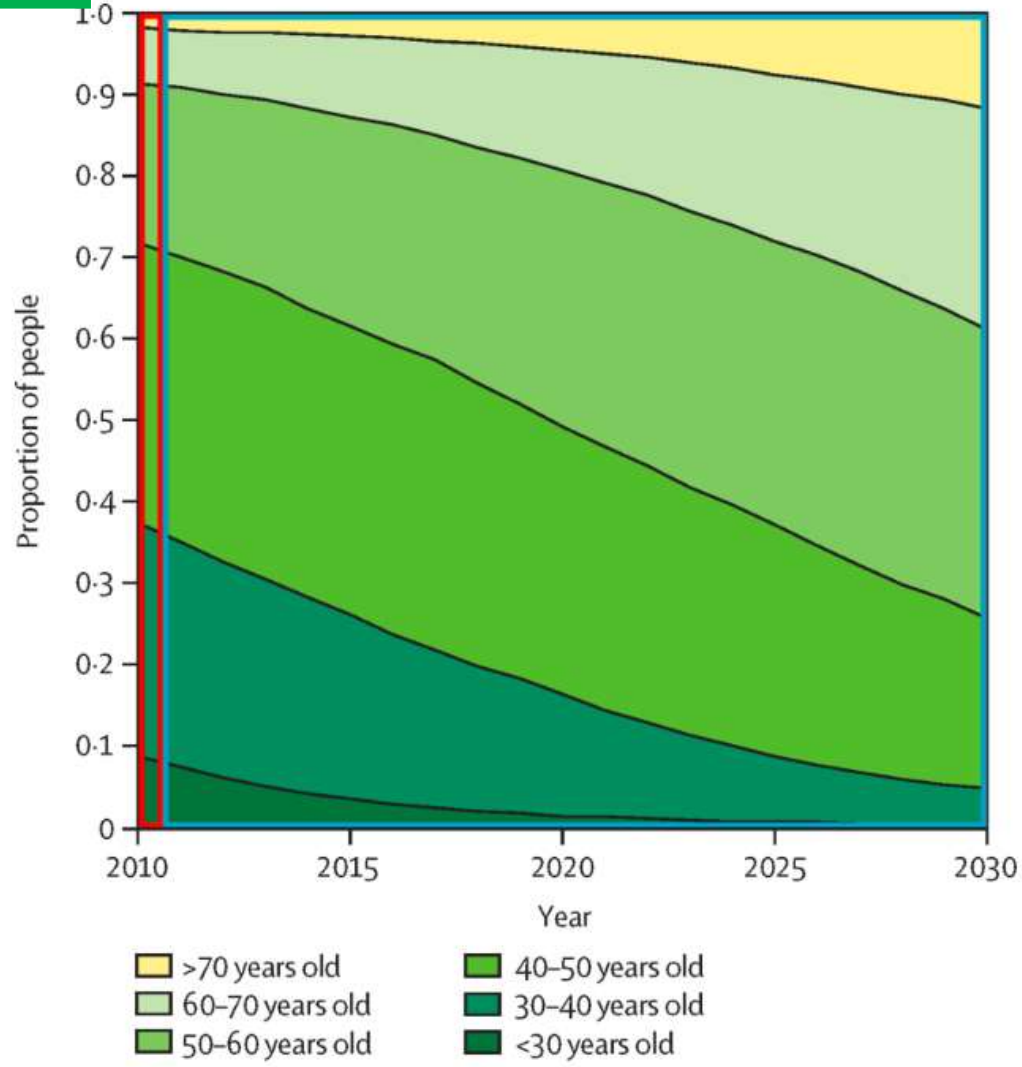
Future challenges for clinical care of an ageing population infected with HIV: a modelling study

Mikaela Smit, Kees Brinkman, Suzanne Geerlings, Colette Smit, Kalyani Thyagarajan, Ard van Sighem, Frank de Wolf, Timothy B Hallett, on behalf of the ATHENA observational cohort

- **>50 yaş HİYB**
  2010→ %28
  2030 →%73

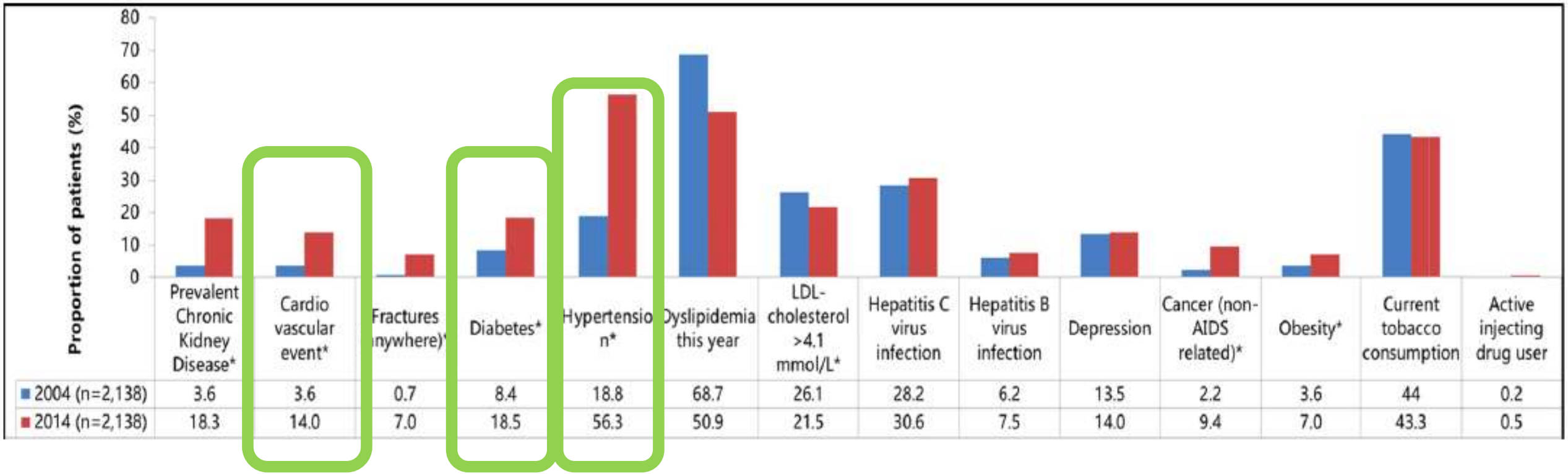
Modelleme çalışması→

2030→ HİYB ve KVH %78



Lancet Infect Dis. 2015 Jul; 15(7): 810–818.

Kronik Komorbiditeler 2004-2014
ANRS CO3 Aquitaine Kohort



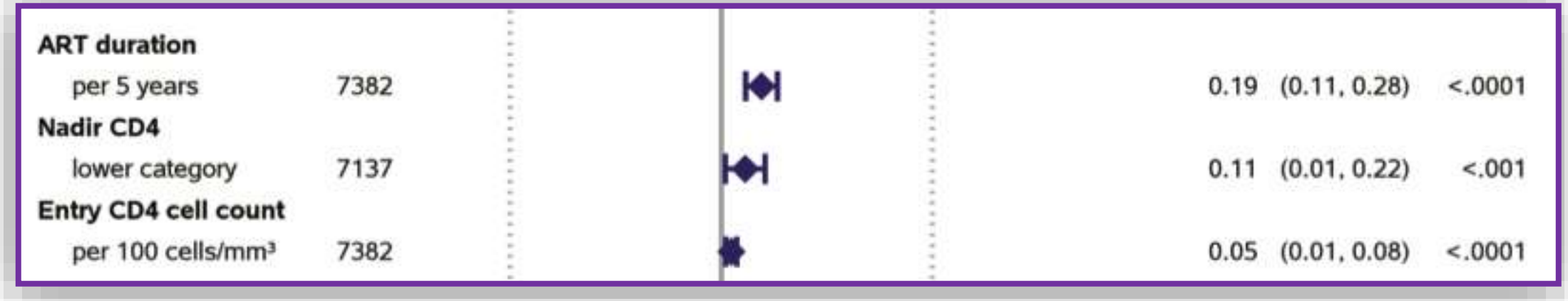
	Prevalent Chronic Kidney Disease*	Cardio vascular event*	Fractures (anywhere)*	Diabetes*	Hypertension*	Dyslipidemia this year	LDL-cholesterol >4.1 mmol/L*	Hepatitis C virus infection	Hepatitis B virus infection	Depression	Cancer (non-AIDS related)*	Obesity*	Current tobacco consumption	Active injecting drug user
2004 (n=2,138)	3.6	3.6	0.7	8.4	18.8	68.7	26.1	28.2	6.2	13.5	2.2	3.6	44	0.2
2014 (n=2,138)	18.3	14.0	7.0	18.5	56.3	50.9	21.5	30.6	7.5	14.0	9.4	7.0	43.3	0.5

Bonnet et al. BMC Infectious Diseases 2020; 20:850

Cardiovascular Risk and Health Among People With Human Immunodeficiency Virus (HIV) Eligible for Primary Prevention: Insights From the REPRIEVE Trial

Clinical Infectious Diseases

MAJOR ARTICLE



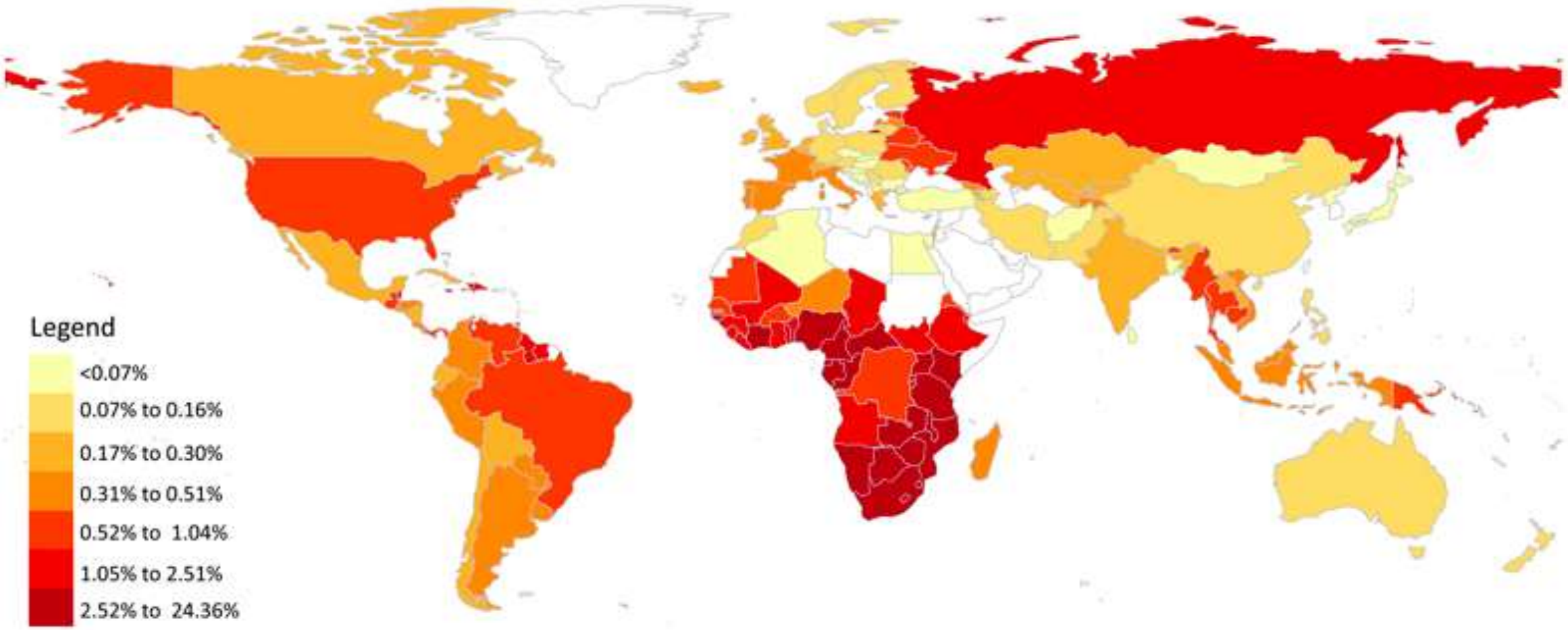
ART duration				
per 5 years	7382	0.19	(0.11, 0.28)	<.0001
Nadir CD4				
lower category	7137	0.11	(0.01, 0.22)	<.001
Entry CD4 cell count				
per 100 cells/mm³	7382	0.05	(0.01, 0.08)	<.0001

Global Burden of Atherosclerotic Cardiovascular Disease in People Living with the Human Immunodeficiency Virus: A Systematic Review and Meta-Analysis

- KVH geliştirme olasılığı→X2
- HIV ile ilişkili KVH küresel yükü son yirmi yılda→X3

Circulation. 2018 September 11; 138(11): 1100–1112. doi:10.1161/CIRCULATIONAHA.117.033369.

HIV ile ilişkili kardiyovasküler hastalık

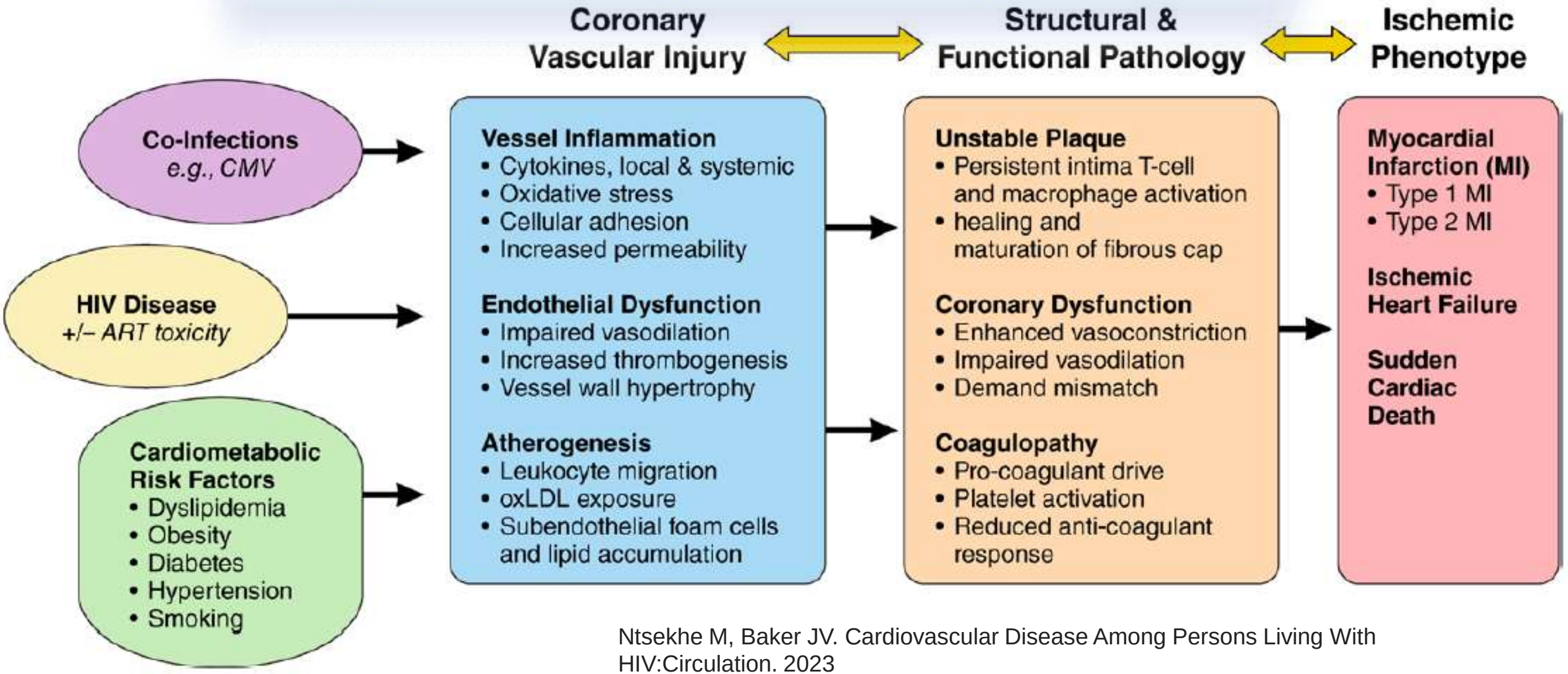


HIV ile Yaşayan Bireylerde Kardiyovasküler Hastalıklar (KVH)

- Koroner Kalp Hastalığı
- Kalp Yetmezliği
- Ani Kardiyak Ölüm

Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023

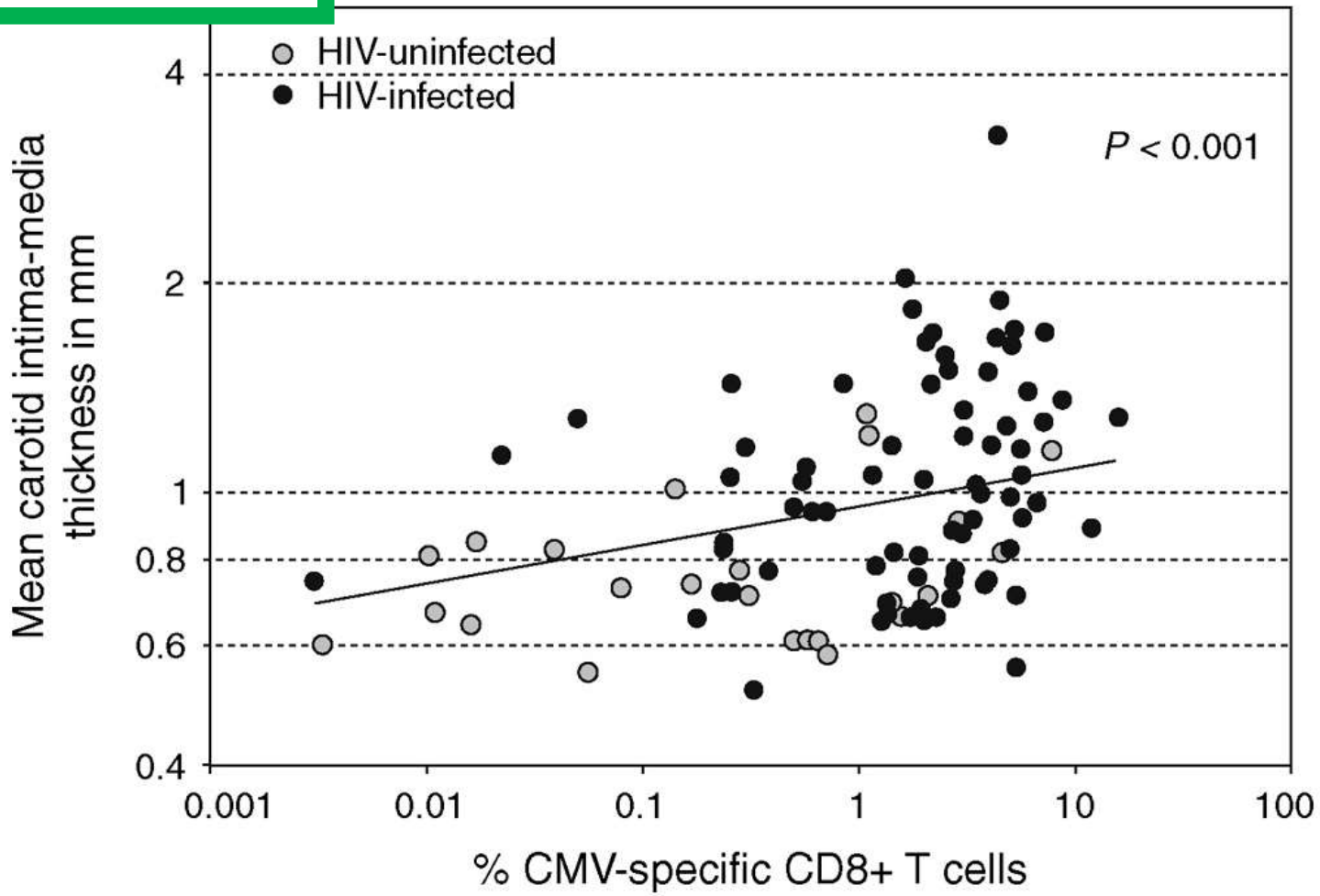
HIV İlişkili KVH'nin Olası Mekanizmaları



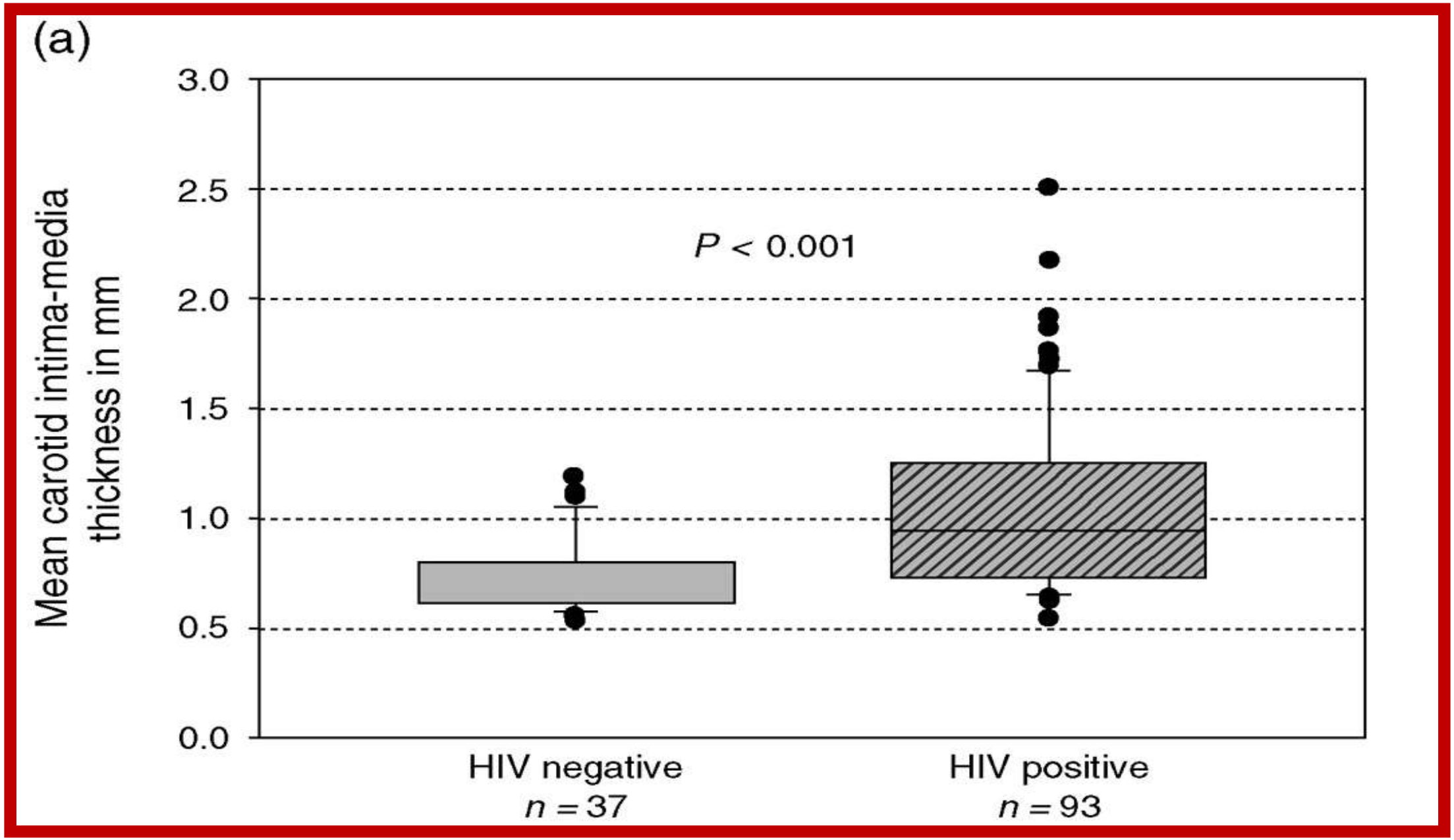
Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023

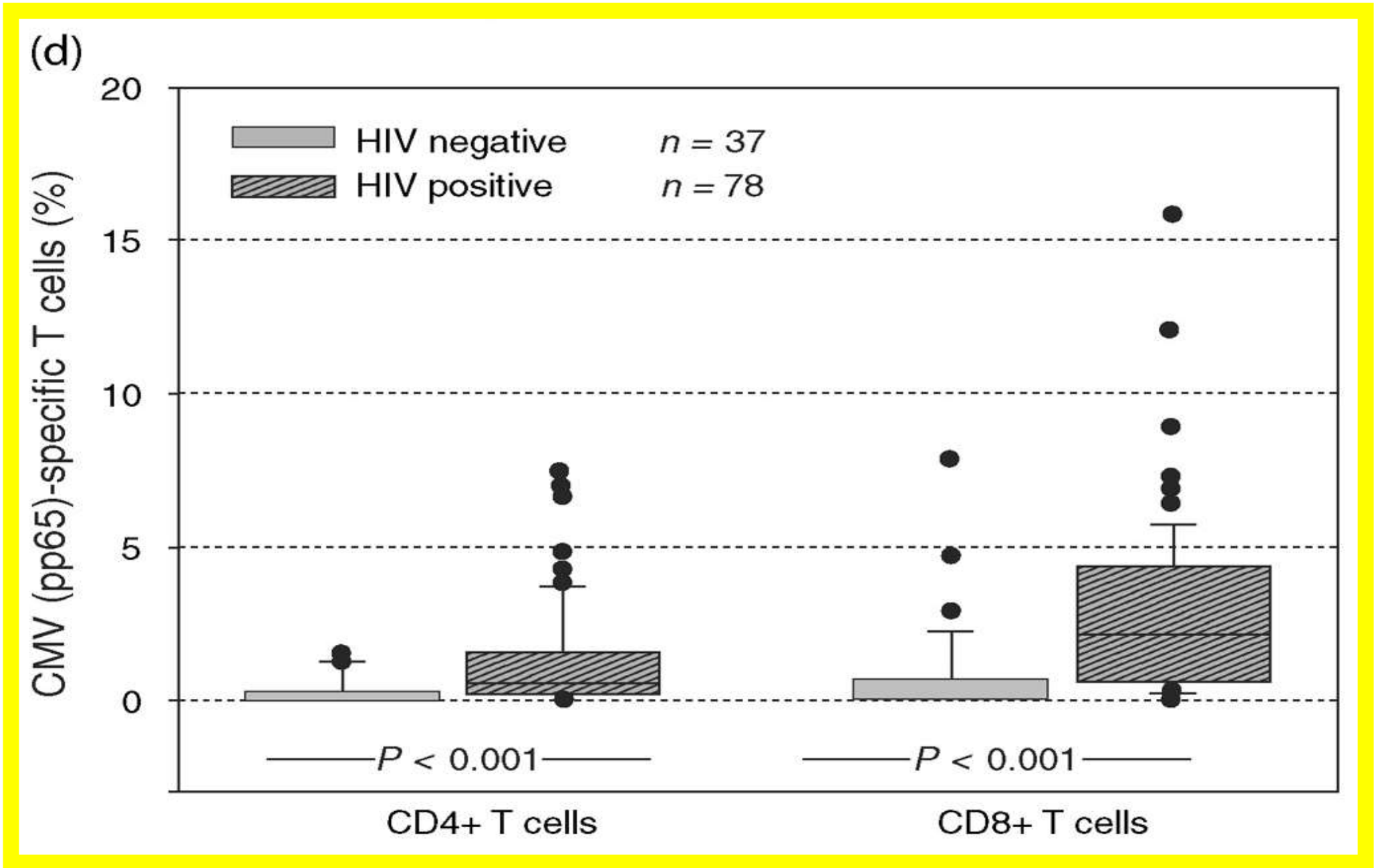
Increased carotid intima-media thickness in HIV patients is associated with increased cytomegalovirus-specific T-cell responses

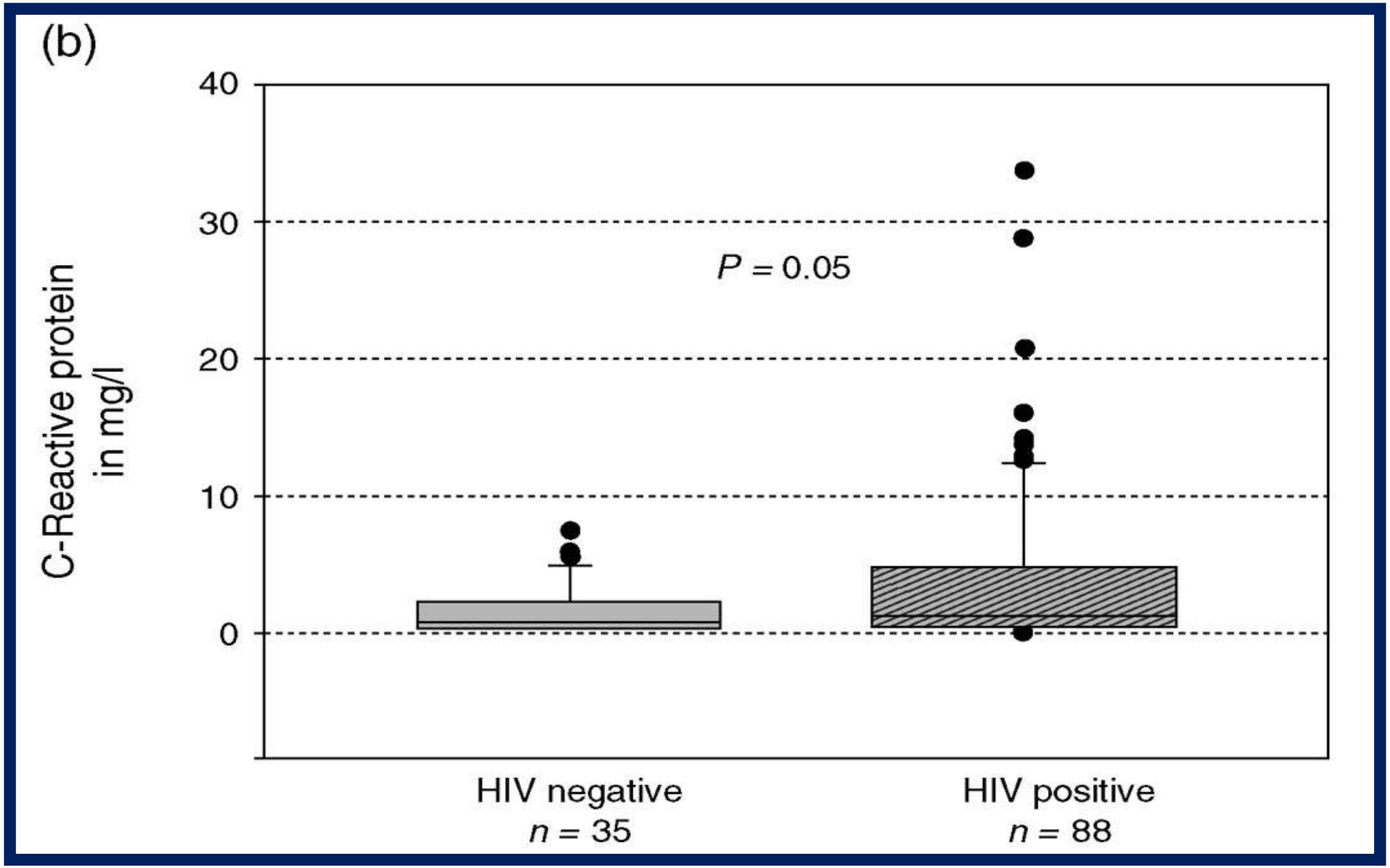
- HIV(+)/(-) karşılaştırmada, CMV'ye özgü T hücrelerinin yüzdesindeki her 10 katlık artış için karotis IMT'de %14'lük artış (P < 0,001).

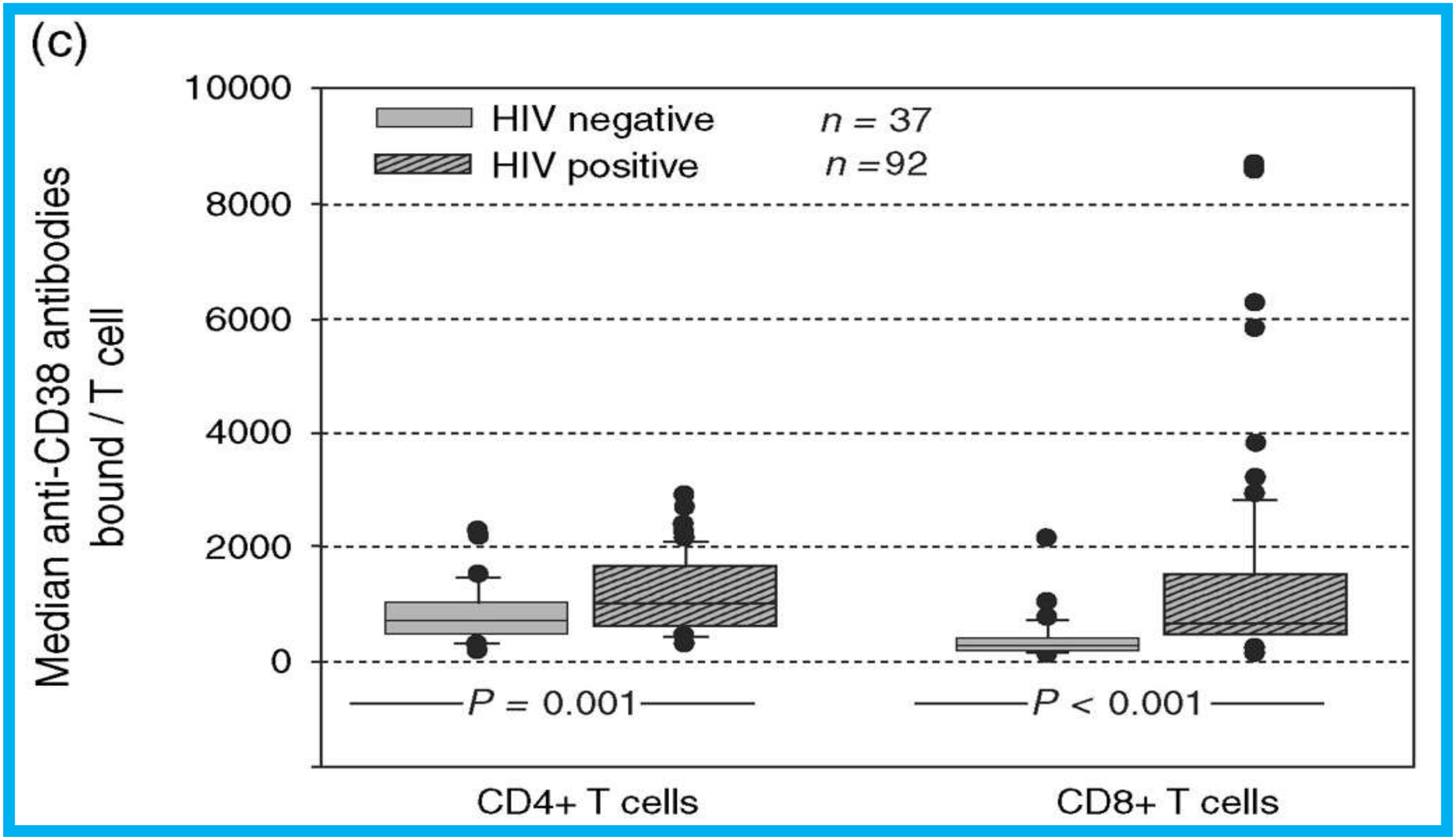


AIDS. 2006 Nov 28;20(18):2275-83.


(a)
Mean carotid intima-media thickness in mm
3.0
2.5
2.0
1.5
1.0
0.5
0.0
P < 0.001
HIV negative
n = 37
HIV positive
n = 93


(d)
20
15
10
5
0
CMV (pp65)-specific T cells (%)
HIV negative
n = 37
HIV positive
n = 78
P < 0.001
P < 0.001
CD4+ T cells
CD8+ T cells


(b)
40
30
20
10
0
C-Reactive protein
in mg/l
P = 0.05
HIV negative
n = 35
HIV positive
n = 88

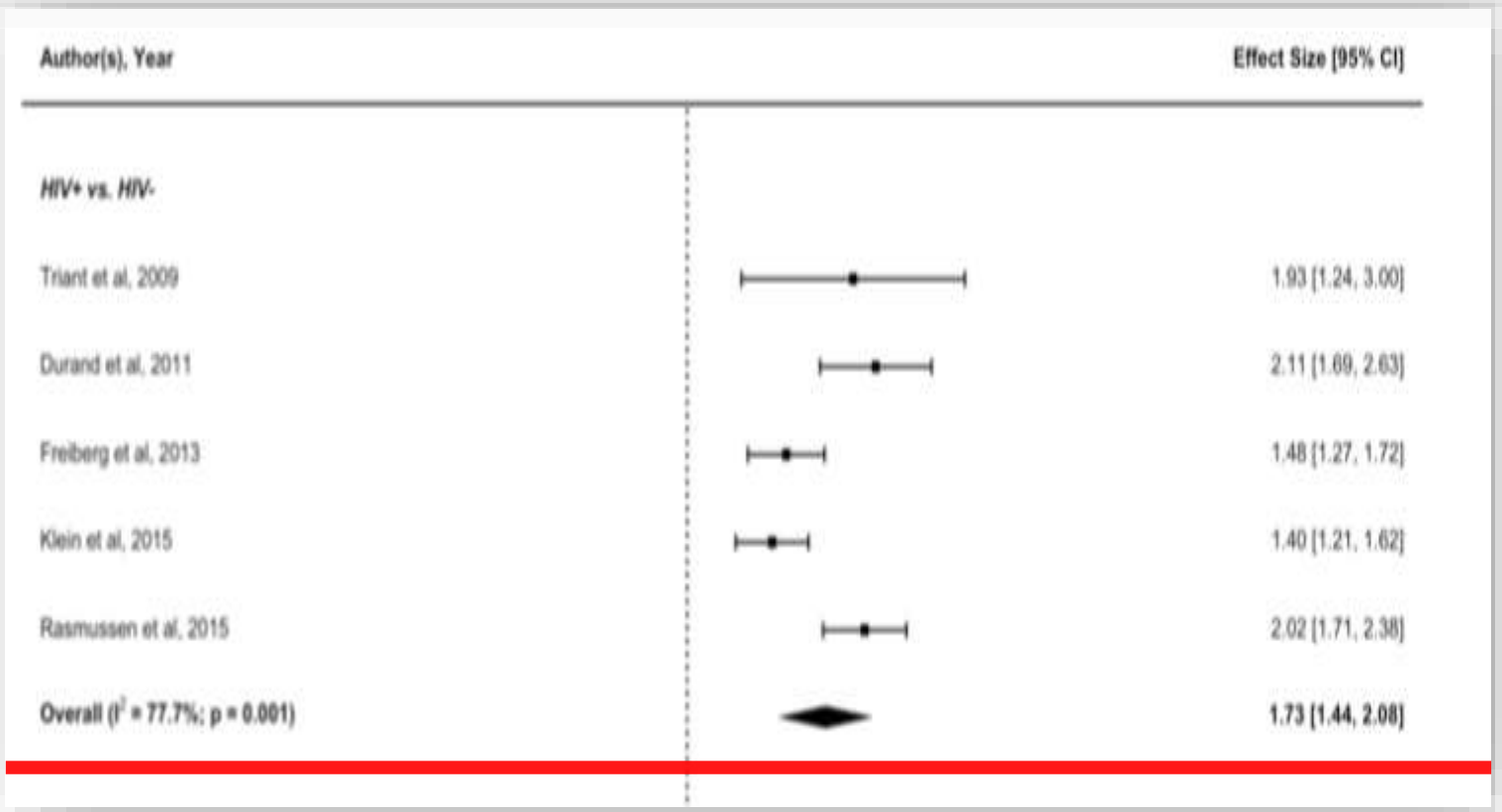

(c)
Median anti-CD38 antibodies bound / T cell
10000
8000
6000
4000
2000
0
HIV negative
HIV positive
n = 37
n = 92
P = 0.001
P < 0.001
CD4+ T cells
CD8+ T cells

HIV ve Tip 1 ve Tip 2 MI Farkı

- Tip 1 MI→ Plak rüptürü ve aterotrombozla karakterize %50 HIV risk
- Tip 2 MI→ Altta yatan ateroskleroz Ø
  - Uyuşturucu kullanımı vs nonkardiyojenik nedenler
  - Koroner mikrovasküler disfonksiyon
    - Kronik inflamasyon
    - Endotel aktivasyonu ve disfonksiyonu

Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023

Risk of myocardial infarction among people living with HIV: an updated systematic review and meta-analysis



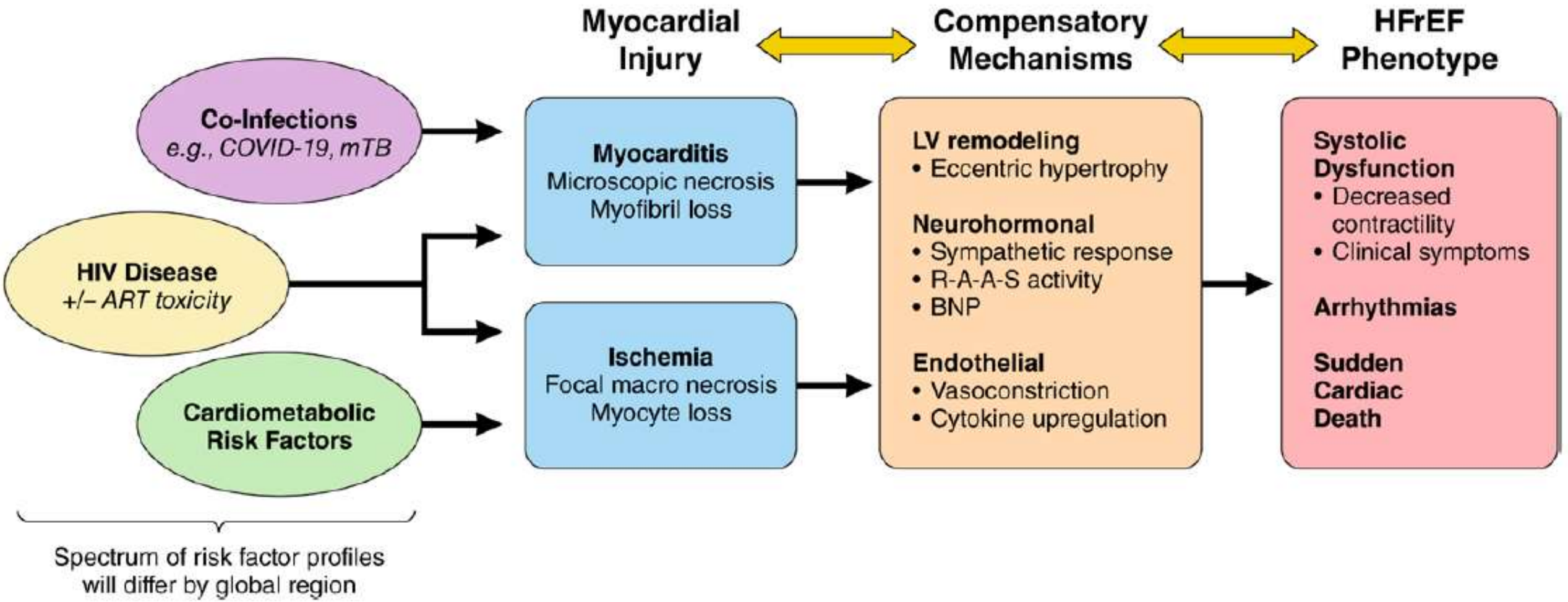
HIV (+)→1,4-2,1 MI riski

Eyawo O. BMJ Open. 2019 Sep 24

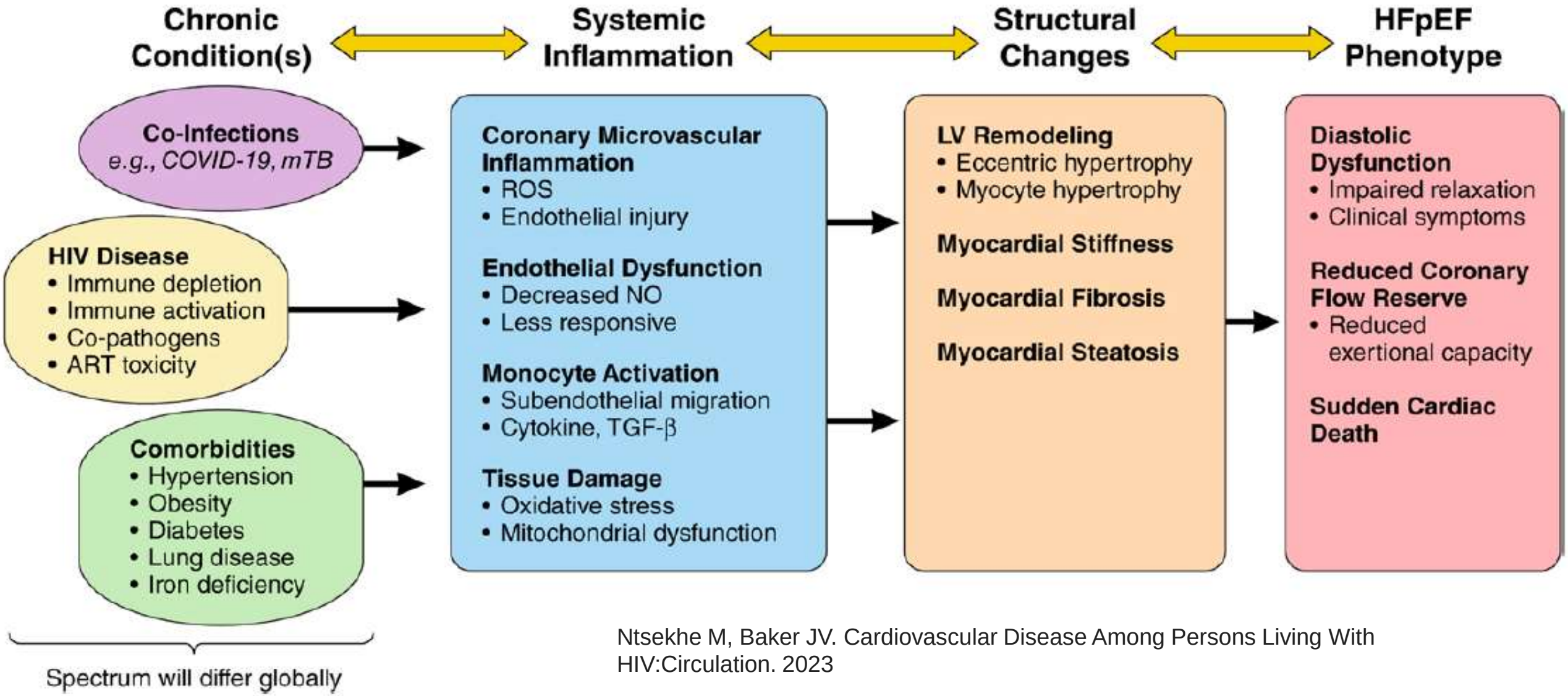
HIV ve Kalp Yetmezliği

- ART öncesi dönemde HIV ilişkili KY sist. disfonk.
- Düşük CD4 düzeyi
- ART sonrası HIV ilişkili diast. disfonk.

Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023



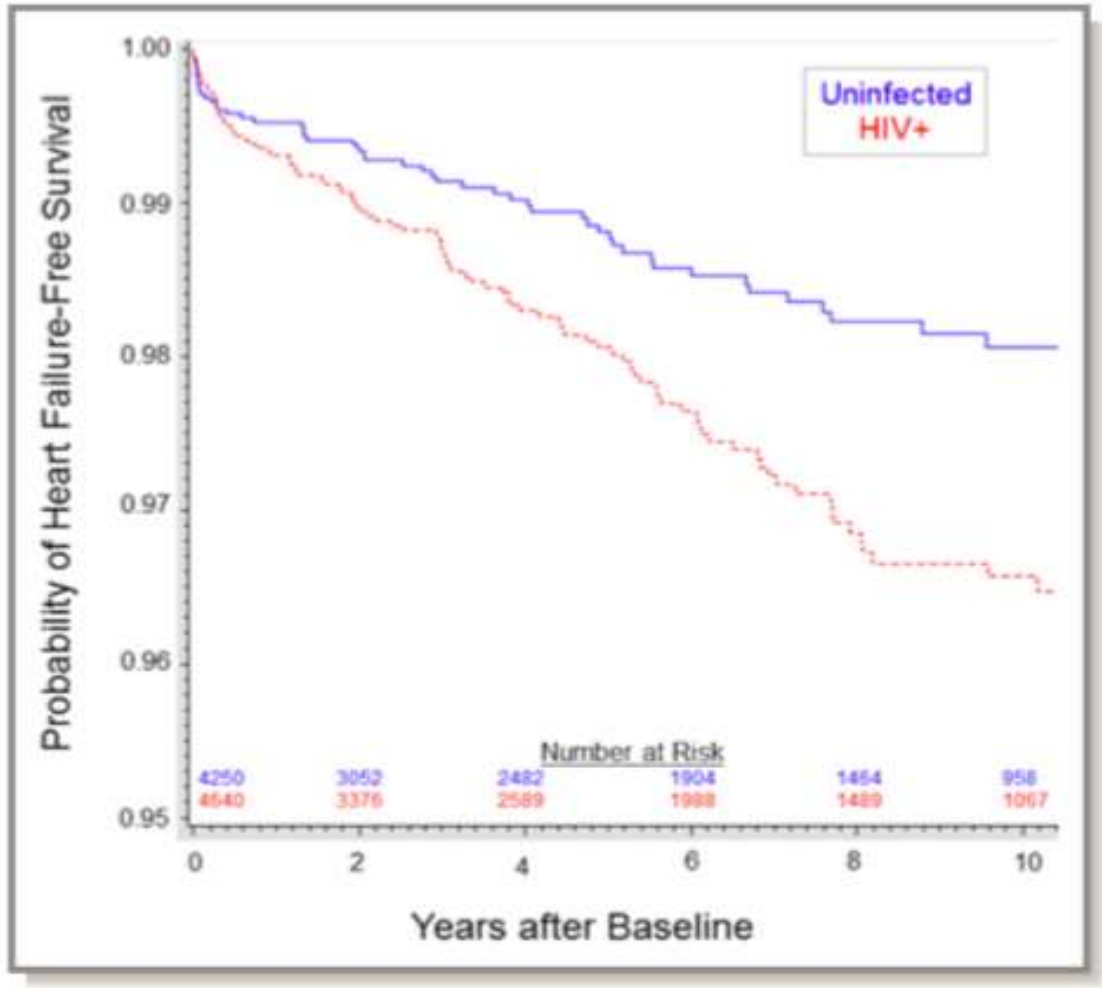
Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023



Ntsekhe M, Baker JV. Cardiovascular Disease Among Persons Living With HIV:Circulation. 2023

Adjudicated Heart Failure in HIV-Infected and Uninfected Men and Women

- HIV ilişkili KY ↑
- ↑HIV RNA ve ↓ CD4
- KY → 97/ 4640 HIV (%2.1)
- Kontrol→ 55/4250 (%1.3)
- HR→2.10 (CI %95-1.38–3.21)



Heart Assoc. 2018;7:e009985.

Human Immunodeficiency Virus and Heart Failure in Low- and Middle-Income Countries

JACC: HEART FAILURE VOL. 3, NO. 8, 2015

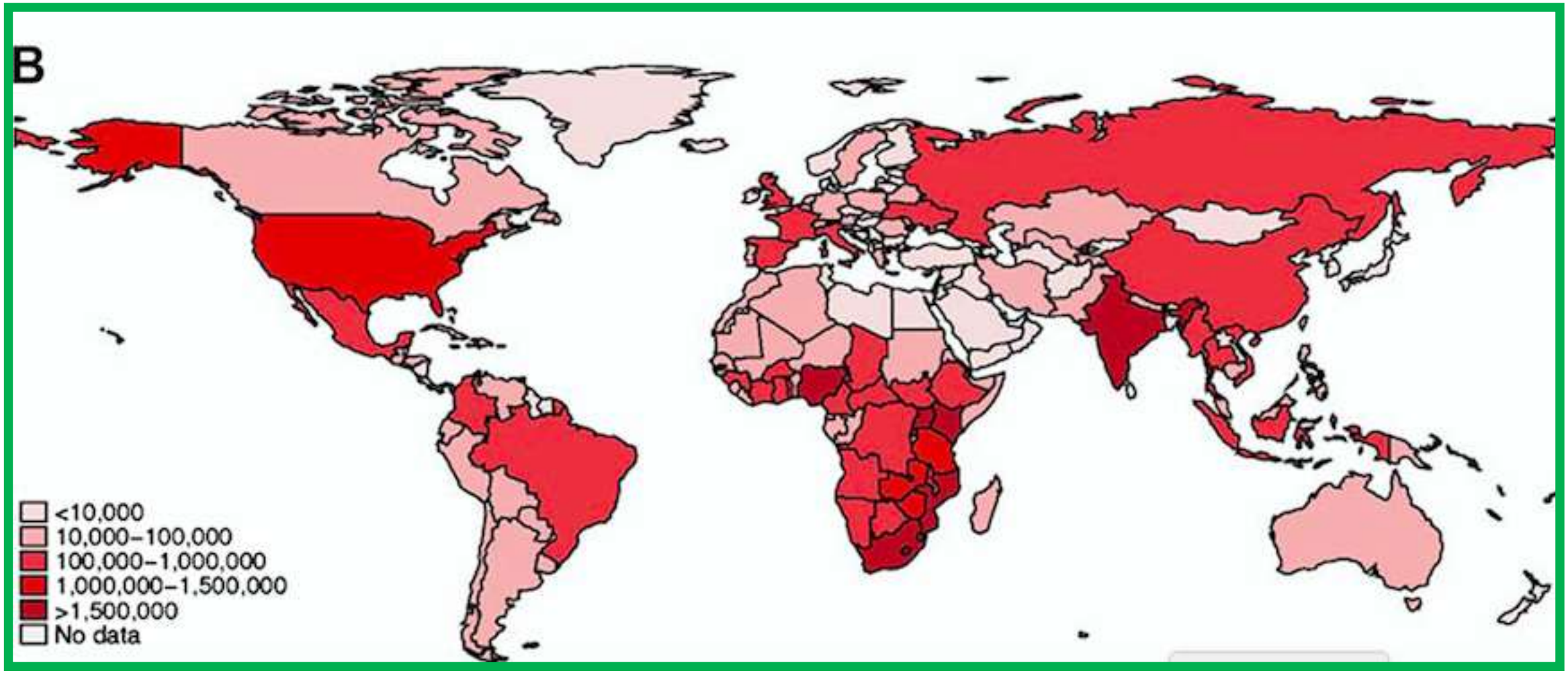
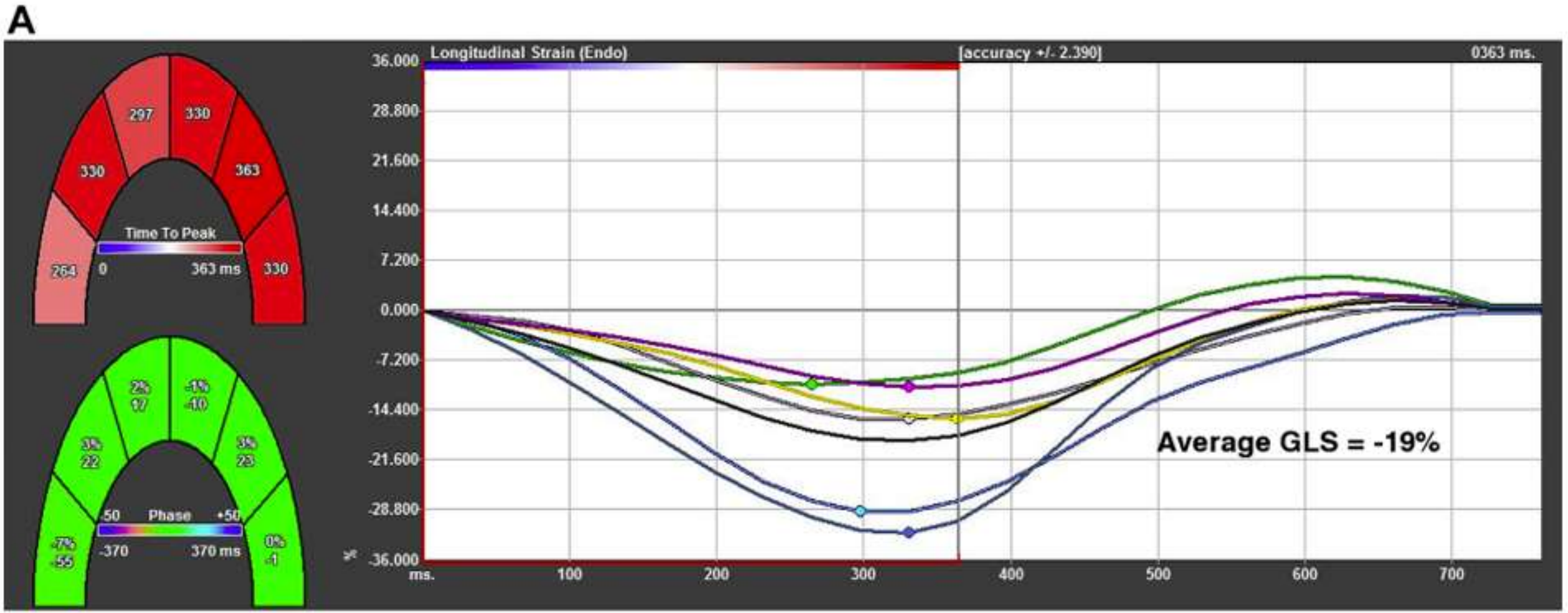


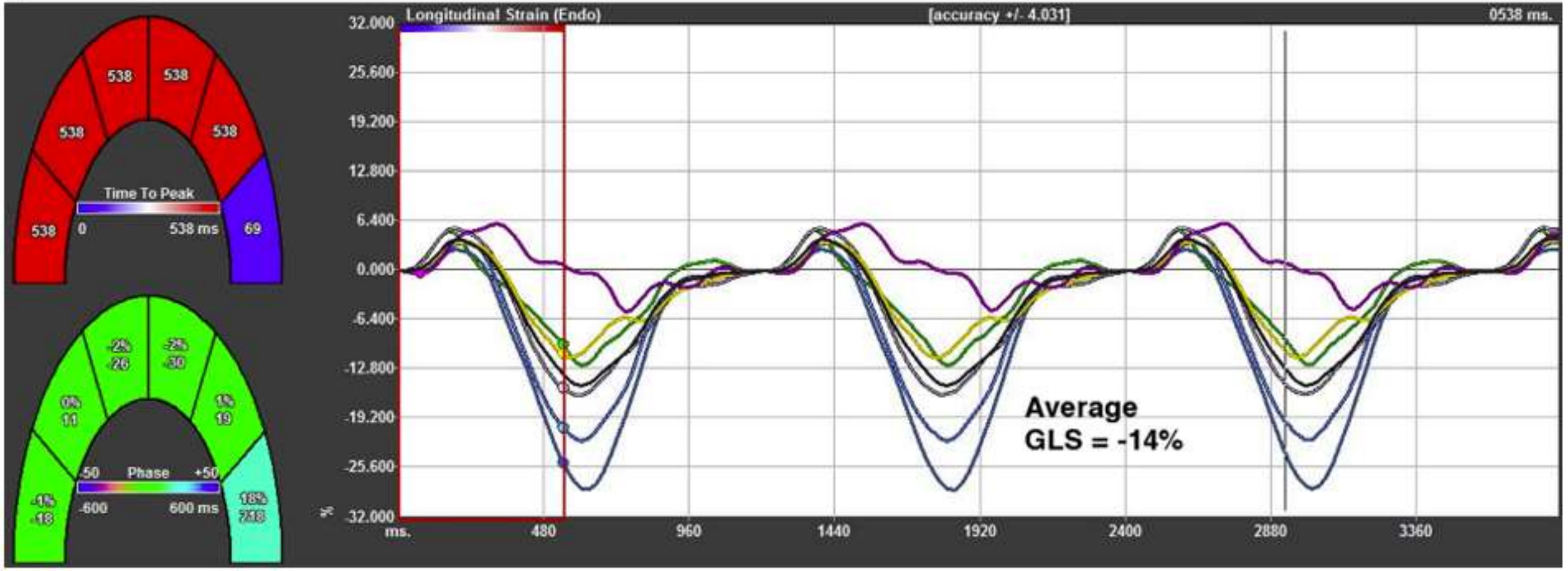
FIGURE 3 Myocardial Deformation Tracings in HIV-Infected Individuals With Normal LVEF



JACC Heart Fail. 2015 Aug;3(8):579-90

HIV→ Longitudinal sistolik kardiak strain ile miyokardial deformasyon
MR→ Subklinik miyokard fibrosis ve steatosis
Erken miyokard disfonksiyon tespiti→ ↑ risk vaka tanımı

B

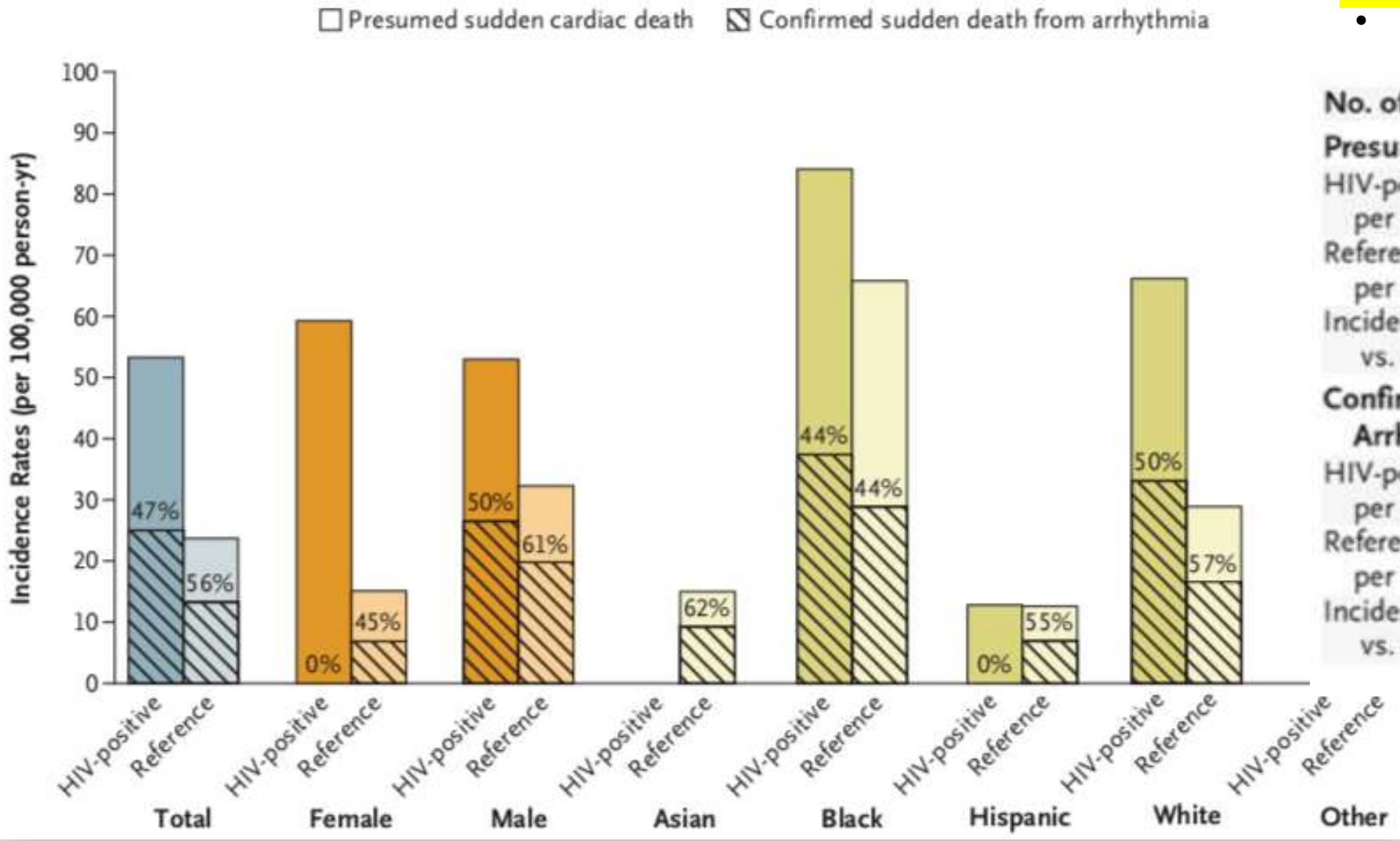


JACC Heart Fail. 2015 Aug;3(8):579-90

HIV ve Ani Kardiyak Ölüm

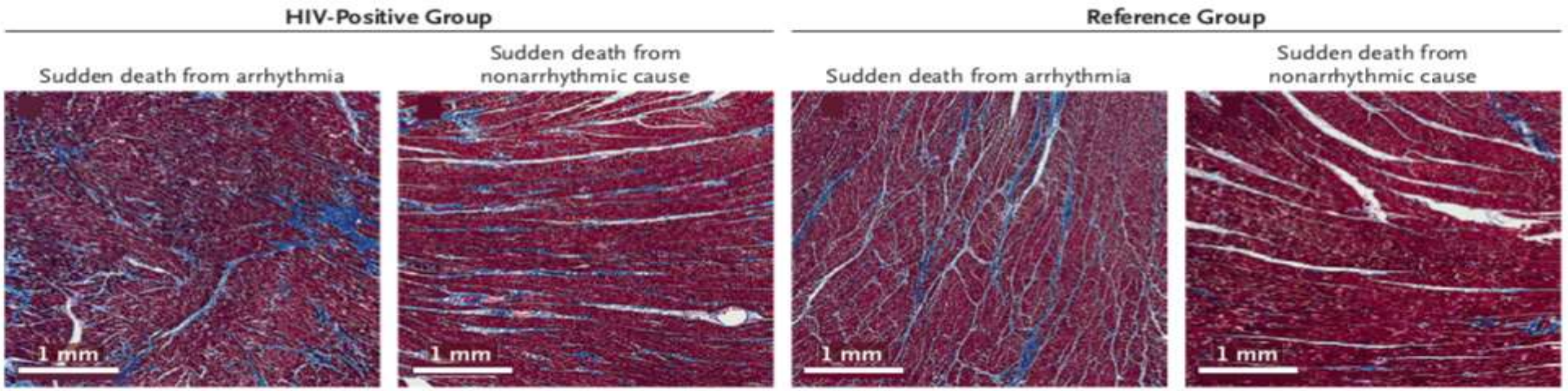
Sudden Cardiac Death and Myocardial Fibros
Determined by Autopsy, in Persons with H

- San Francisco 2011-2016 HIV
- 2011-2014 Kontrol
- 100.000 kişi/yılı
- Aritmi ve ani ölüm
- Irk, etnik grup, cinsiyet



No. of Patients	47	505
Presumed Sudden Cardiac Death		
HIV-positive incidence rates — per 100,000 person-yr	53.3	(39.2–70.1)
Reference incidence rates — per 100,000 person-yr	23.7	(21.7–25.9)
Incidence rate ratio for HIV-positive vs. reference	2.25	(1.37–3.70)
Confirmed Sudden Death from Arrhythmia		
HIV-positive incidence rates — per 100,000 person-yr	25	(15.6–37.8)
Reference incidence rates — per 100,000 person-yr	13.3	(11.8–15.0)
Incidence rate ratio for HIV-positive vs. reference	1.87	(0.93–3.78)

N Engl J Med 2021;384:2306-16.



	HIV-Positive Group, Presumed Sudden Cardiac Death (N=24)		Reference Group, Presumed Sudden Cardiac Death (N=164)		HIV-Positive Group vs. Reference Group, Presumed Sudden Cardiac Death	
	Sudden death from arrhythmia (N=12)	Sudden death from nonarrhythmic cause (N=12)	Sudden death from arrhythmia (N=100)	Sudden death from nonarrhythmic cause (N=64)	Sudden death from arrhythmia	Sudden death from nonarrhythmic cause
	mean percent fibrosis				*percent difference (95% CI)*	
Total Fibrosis	12.5±6.4		8.7±7.5		72 (23 to 142)	
	13.8±7.1					(7 to 198)
Interstitial and Perivascular Fibrosis	11.9±5.4					(8 to 185)
Replacement Fibrosis	1.9±3.4					(−20 to 75)

Presumed sudden cardiac deaths
HIV+/- → (34% vs. 13%).
HIV + → ↑ histolojik intertisyel miyokard fibrosis

Kardiyovasküler Risklerin Belirlenmesi

<40 yaş ise kardiyovasküler risklerin varlığını tespit et

≥40 yaş ise 5-10 yıllık kardiyovasküler hastalık riskini belirle

Risk modifikasyonu yap

Welcome to the Risk Assesment Tool System (RATS). Please select the desired values from the list below.

General

- [ ] EuroSida AIDS/Death risk score
- [ ] FENCE score
- [ ] CSRFENCE Score

Cardiovascular

- [ ] D:A:D (R) CVD 5 and 10 year risk score
- [ ] D:A:D (F) CVD 5 and 10 year risk score
- [ ] Framingham CVD 5 and 10 year risk score
- [ ] MI Number needed to harm

Build form

Rigshospitalet, University of Copenhagen
CHIP, Section 2100
Blegdamsvej 9, DK-2100 Copenhagen, Denmark

CVR no.: 29190623
VAT no.: DK29765790
Follow us on:

1. Age: yr
2. Gender: Male Female
3. Previous smoker? Yes No
4. Smoker? Yes No
5. Family CVD history? Yes No
6. Diabetes? Yes No
7. Abacavir treatment? Yes No
8. PI exposure: yr

AMERICAN COLLEGE of CARDIOLOGY

ASCVD Risk Estimator Plus

Estimate Risk

Current Age ℹ *

Age must be between 20-79

Sex *

Male | Female

Race *

White | African American | Other

Systolic Blood Pressure (mm Hg) *

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *

Value must be between 60-130

Total Cholesterol (mg/dL) *

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ℹ ○

Value must be between 30-300

History of Diabetes? *

Yes | No

Smoker? ℹ *

Current ℹ | Former ℹ | Never ℹ

On Hypertension Treatment? *

Yes | No

On a Statin? ℹ ○

Yes | No

On Aspirin Therapy? ℹ ○

Yes | No

Do you want to refine current risk estimation using data from a previous visit? ℹ ○

Yes | No

Risk of geographic region

Low risk | Moderate risk | High risk | Very high risk

Gender

Male | Female

Age

40 - 69 years

Current smoking

Systolic blood pressure

100 - 200 mmHg

mmol/L | mg/dL

Total cholesterol

3 - 9 mmol/L

HDL-cholesterol

0.7 - 2.5 mmol/L

LDL-cholesterol

0.1 - 9 mmol/L

Risk of geographic region

Low risk | Moderate risk | High risk | Very high risk

Gender

Male | Female

Age

70 - 90 years

Current smoking

Diabetes mellitus

Systolic blood pressure

100 - 200 mmHg

mmol/L | mg/dL

Total cholesterol

3 - 9 mmol/L

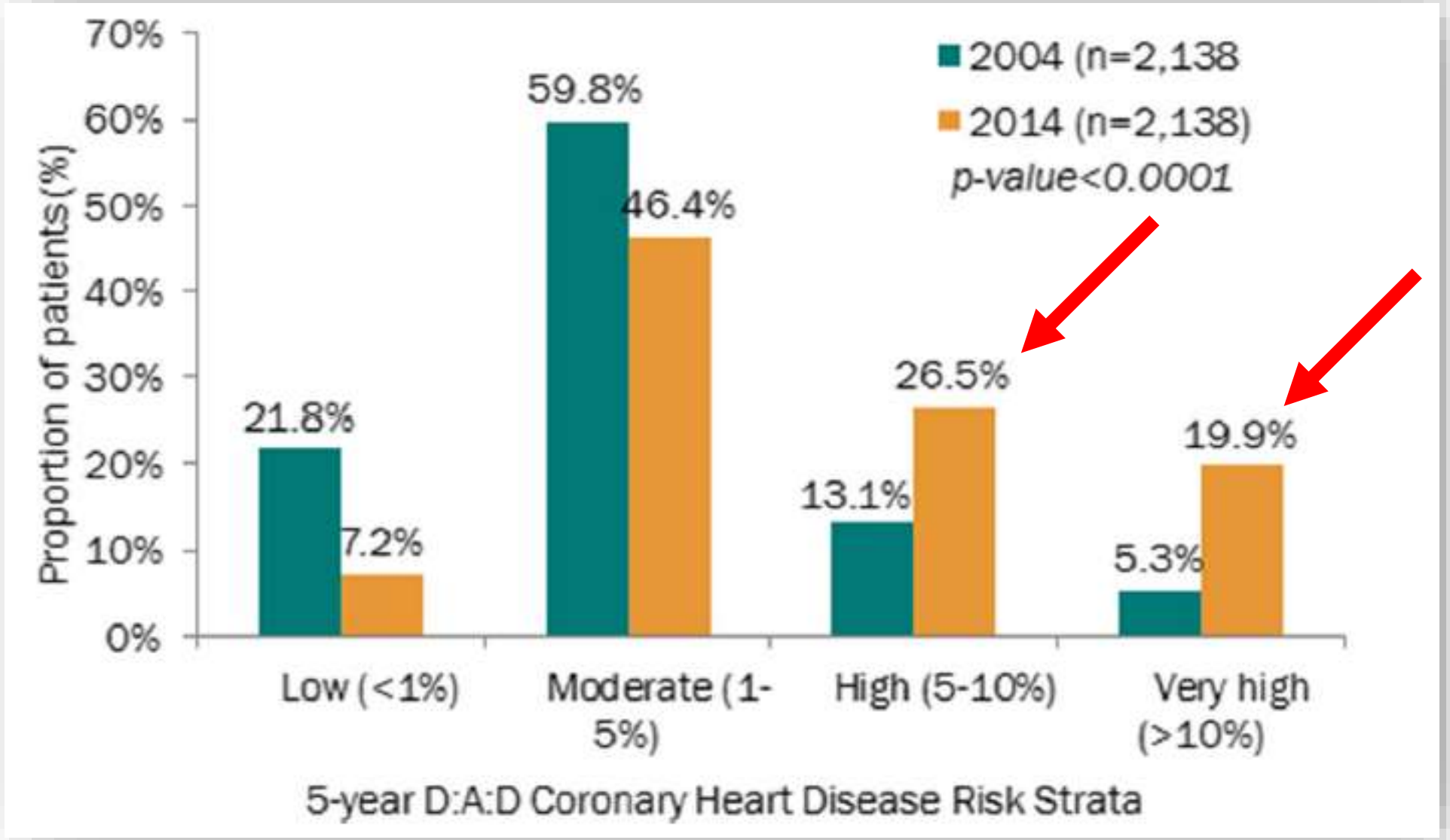
HDL-cholesterol

0.7 - 2.5 mmol/L

LDL-cholesterol

0.1 - 9 mmol/L

Bonnet et al. BMC Infectious Diseases 2020; 20:850



Comparison of Risk Category Predictions of Framingham Risk Score (FRS), Atherosclerotic Cardiovascular Disease Risk Score (ASCVD), Systematic Coronary Risk Evaluation (SCORE) and Data Collection on Adverse Events of Anti-HIV Drugs (D:A:D) Score in HIV-Infected Patients

576

Korten V[1], Gökengin D[2], Yildirmak T[3], Inkaya AC[4], Fincanci M[5], Yagci Caglayik D[1], Mermut G[2], Simsek F[3], Eren G[5], Unal S[4]

[1]Infectious Diseases, Marmara University Hospital, Istanbul, Turkey, [2]Infectious Diseases, Ege University Hospital, Izmir, Turkey, [3]Infectious Diseases and Clinical Microbiology, Okmeydani Training and Research Hospital, Istanbul, Turkey, [4]Infectious Diseases, Hacettepe University, Ankara, Turkey, [5]Infectious Diseases and Clinical Microbiology, Istanbul Education and Research Hospital, Istanbul, Turkey

FRAMINGHAM - CVD (N=527)	Low Risk (≤10%) n (%)	Moderate Risk (>10% - ≤20%) n (%)	High Risk (>20%) n (%)	
Framingham score	273 (51.8)	173 (32.8)	81 (15.4)	
Framingham score with ARF*	268 (50.9)	152 (28.8)	107 (20.3)	
SCORE (N=527)	Low Risk (<1%) n (%)	Moderate Risk (≥1% - <5%) n (%)	High Risk (≥5% - <10%) n (%)	Very High Risk (≥10%) n (%)
Score	88 (16.7)			
Score with ARF*	81 (15.4)			
ASCVD (N=527)	Low Risk (<7.5%) n (%)		n (%)	
ASCVD score	365 (69.3)		162 (30.7)	
ASCVD score with ARF*	335 (63.6)		192 (36.4)	
DAD-Full (N=527)	Low Risk (<5%) n (%)		High Risk (≥5%) n (%)	
DAD-F score	387 (73.4)		140 (26.6)	
DAD-Reduced (N=527)	(<5%) n (%)		(≥5%) n (%)	
DAD-R	381 (72.3)		146 (27.7)	

* ARF= Additional Risk Factors: Framingham (DM), ASCVD (LDL cholesterol ≥ 190 mg/dL or DM), Score (DM or GFR < 60 ml/m or total cholesterol > 310 mg/dL or blood pressure ≥ 180/110 mmHg)

Çok merkezli kesitsel çalışma

Temmuz 2016- Şubat 2017, 5 merkez, 40-74 yaş arasında KVH olmayan, statin almayan hastalar

Yüksek KVH skor prevelansı %20.3 ile %36.3

667 hastanın 527 si değerlendirilmiş

- %82'si erkek, ortanca yaş: 48
- %11 erken başlangıçlı KVH aile öyküsü
- %50 sigara içici
- %22 HT
- %8 DM

P146

Prevalence of cardiovascular disease (CVD) and Comparison of risk category predictions of Systemic Coronary Risk Evaluation Score-2 (SCORE2) and four other CVD risk calculators among people living with HIV(PLWH) in Türkiye

Tukenmez Tigen, E[1]; Gökengin, D[2]; Özkan Özdemir, H[3]; Akalın, H[4]; Kaya, B[5]; Deveci, A[6]; İnan, A[7]; İnan, D[8]; Altunsoy, A[9]; Özel, A.S[10]; Karaoğlan, İ[11]; Eraksoy, H[12]; Demirdal, T[13]; Yıldırmak, T[14]; Birengel, S[15]; İnci, A[16]; Nazlı, A[17]; Kayaaslan, B[9]; Sayın Kutlu, S[18]; Ataman Hatipoğlu, Ç[19]; Esen, Y[20]; Koç, T[20]; Korten, V[1]; and HIV-TR Study Group

- Çok merkezli kesitsel çalışma, 2019-2021
- **20 merkez**, **1425 hasta**, %82.7 erkek, >40 yaş, ortanca yaş 51
- **%10.6 tanılı KVH**
- Ortanca CD4 : 696 h/µl

HIV Drug Therapy GLASGOW 2022

Participant Characteristics	Median (IQR) or proportion (n=1425)
Age, y, median (IQR)	51 (45-58)
Male, Sex	1178 (82.7)
Smoking (current smoker)	651 (45.7)
Alcohol use (1-7 or >7 drinks/week)	411 (28.9)
IV non-prescription drug use	35 (2.5)
Exercise & physical activity	248 (17.4)
Body mass index	
Obese (≥30 kg/m²)	258 (18.3)
Diabetes mellitus	242 (17)
Hypertension	420 (29.5)
Hypercholesterolemia	498 (34.9)
Family history of premature cardiovascular disease	102 (7.2)
Family history of CAD (In parents)	310 (21.1)
Years since HIV diagnosis, median (IQR)	5.0 (2.0-9.0)
Cumulative months of ART use, median (IQR)	
Protease Inhibitor	218 (15.3)
Nucleoside Reverse Transcriptase Inhibitor	1390 (97.5)
Others	1325 (93)
Nadir CD4⁺ cell count, cells/µL, median (IQR)	318 (168-480)
Nadir CD4<200 cells/µL	424 (29.8)
Current CD4⁺ cell count, cells/µL, median (IQR)	696 (479-920)
Viral load, <200 copies/mL	1345 (94.4)

<u>Kardiyovasküler Risk Hesaplayıcıları:</u>

- Framingham Risk Skoru (**FRS**)
- Modifiye Framingham Risk Skoru (**Modified FRS**)
- Avrupa Kardiyovasküler Risk Değerlendirme Skoru 2 (**SCORE2***)
- Data Collection on Adverse Effects of Anti-HIV Drugs Cohort (**D:A:D**)
- Aterosklerotik kardiyovasküler risk skoru (**ASCVD**)

THE ANATOLIAN JOURNAL OF CARDIOLOGY

Official journal of the TURKISH SOCIETY OF CARDIOLOGY

Prevalence of Cardiovascular Disease and Comparison of Risk Category Predictions of Systemic Coronary Risk Evaluation Score-2 and 4 Other Cardiovascular Disease Risk Assessment Tools Among People Living with Human Immunodefficiency Virus in Türkiye

ORIGINAL INVESTIGATION

Elif Tükenmez Tigen[1]
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Hülya Özkan Özdemir[3]
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ABSTRACT

Background: Cardiovascular disease (CVD) is a major cause of mortality among people living with HIV (PLWH). We aimed to assess the prevalence of diagnosed CVD and the risk of CVD among PLWH using 5 different tools.

Methods: This retrospective, cross-sectional study was conducted in 20 tertiary centers in Türkiye between October 2021 and March 2022, among 1425 PLWH aged 40-75 years. About 82.7% were male, with a median age of 51. Web-based tools for each score were used for CVD risk calculations.

Results: Of 1425 PLWH enrolled, 10.8% had confirmed CVD, and 1132 had their risk scores evaluated. Of those participants, 42.8% had a higher risk of CVD (10-year risk of atherosclerotic CVD risk score (ASCVD) above 7.5%), and according to the European Society of Cardiology systemic coronary risk evaluation 2 (SCORE2), 71.7% had a high- to very high-risk rate. The agreement between various CVD risk tools varied, with Framingham heart study risk score (FRS), modified FRS, data collection on adverse effects of anti-HIV drugs (DAD), and SCORE2 for high-risk countries showing overall agreement rates of 82%, 94%, 91%, and 36%, respectively, compared to ASCVD. According to the 2021 European and 2019 American Cardiology guidelines, 75.3% and 47.1% of PLWH would be eligible for lipid-lowering agents, respectively.

Conclusion: The diagnosed CVD prevalence highlighted the importance of monitoring cardiovascular health and comorbidities in this population. SCORE2 identified a greater number of individuals at high/very high risk compared to other prediction tools. The implementation of CVD prevention through lipid-lowering therapy was far from desired levels in our cohort.

Keywords: Human immunodeficiency virus, cardiovascular disease, cardiovascular risk

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Comparison of Risk Category Predictions of Framingham Risk Score (FRS), Atherosclerotic Cardiovascular Disease Risk Score (ASCVD), Systematic Coronary Risk Evaluation (SCORE) and Data Collection on Adverse Events of Anti-HIV Drugs (D:A:D) Score in HIV-Infected Patients

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Prevalence of cardiovascular disease (CVD) and Comparison of risk category predictions of Systemic Coronary Risk Evaluation Score-2 (SCORE2) and four other CVD risk calculators among people living with HIV(PLWH) in Türkiye

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HIV Drug Therapy GLASGOW 2022

KVH risk faktör prevalansı:

- %50 sigara kullanımı
- %26 Hiperlipidemi,
- %22 Hipertansiyon,
- %16.5 obezite,
- %8 DM
- %11 ailesel KVH öyküsü

Korten et al 2017

KVH Risk faktör prevalansı:

- %45.7 sigara kullanımı
- %**34.9 Hiperlipidemi,**
- %**29.5 Hipertansiyon,**
- **%18.3 obezite**,
- %**17 DM**
- %7.2 ailesel KVH öyküsü

Tigen et al 2021

Lipid düşürücü ajan için uygun kişiler:

- ESC--> %21.8
- AHA--> %36.4

Lipid düşürücü ajan için uygun kişiler

- ESC--> %75.3
- AHA--> %47.1

HIV ile Yaşayan Bireyde Kardiyovasküler Risk yönetimi

10 yıllık kardiyovasküler hastalık riski hesapla

Tüm kişilere yaşam tarzı değişiklikleri öner,
10 yıllık KVH riski ≥10 olanlarda ART modifikasyonu

Modifiye edilebilecek risk faktörlerini belirle

Sigara	Kan basıncı	Koagülasyon	Kan şekeri	Lipidler
Sigarayı bırak Davranışçı tedavi Farmakoterapi	KB≥140/90 mmHg ise (öz. KVH riski>%10) ilaç tedavisi	Bilinen KVH varsa,DM+yüksek KVH riski varsa	DM tanısını doğrula ve tedavi et	KVH riski ≥ %10 veya Tip 2 DM veya bilinen KVH varsa ilaç tedavisi
	Hedef SKB<130, DKB<80 mmhg	75-150 mg ASA	Hedef AKŞ 80-130 mg/dL HbA1c <%6.5-7	Hedef : LDL-K<70, Non-HDL<100 Çok yüksek risk LDL-K<55, Non-HDL<85

DHHS Güncellemesi – *27 Şubat 2024*

Date: February 27, 2024

Source ClinicalInfo

The Department of Health and Human Services Guidelines Panel for the Use of Antiretroviral Agents in Adults and Adolescents with HIV (the Panel) has developed recommendations for the use of statin therapy in people with HIV, in collaboration with representatives from the American College of Cardiology (ACC), the American Heart Association (AHA), and the HIV Medicine Association.

With continuous antiretroviral therapy (ART) and viral suppression, most people with HIV achieve a life expectancy close to that of people without HIV. However, there remains a mortality gap primarily due to cardiovascular disease and cancer. REPRIEVE, a large randomized controlled trial among people with HIV aged 40 to 75 years who were receiving ART and had low-to-intermediate risk of atherosclerotic cardiovascular disease (ASCVD), showed that when compared to placebo, pitavastatin 4 mg daily was associated with a 35% reduction in major adverse cardiovascular events over a median follow-up duration of 5 years. The recommendations below are endorsed by the organizations listed above.

For people with HIV who have low-to-intermediate (<20%) 10-year ASCVD risk estimates:

- Age 40–75 years
  - When 10-year ASCVD risk estimates are 5 to <20%, the Panel recommends initiating at least moderate intensity statin therapy **(AI)**.
    - Recommended options for moderate intensity statin therapy include:
      - Pitavastatin 4mg once daily **(AI)**
      - Atorvastatin 20mg once daily **(AII)**
      - Rosuvastatin 10mg once daily **(AII)**

https://clinicalinfo.hiv.gov/en/news/updates-hiv-clinical-guidelines-adult-and-adolescent-arv