Pulling back the lens to contextualize HIV care: Examples from the Global IeDEA Network

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IeDEA
International epidemiologic Databases to Evaluate AIDS

CUNY The City University of New York

HIV care programs exist in a larger context

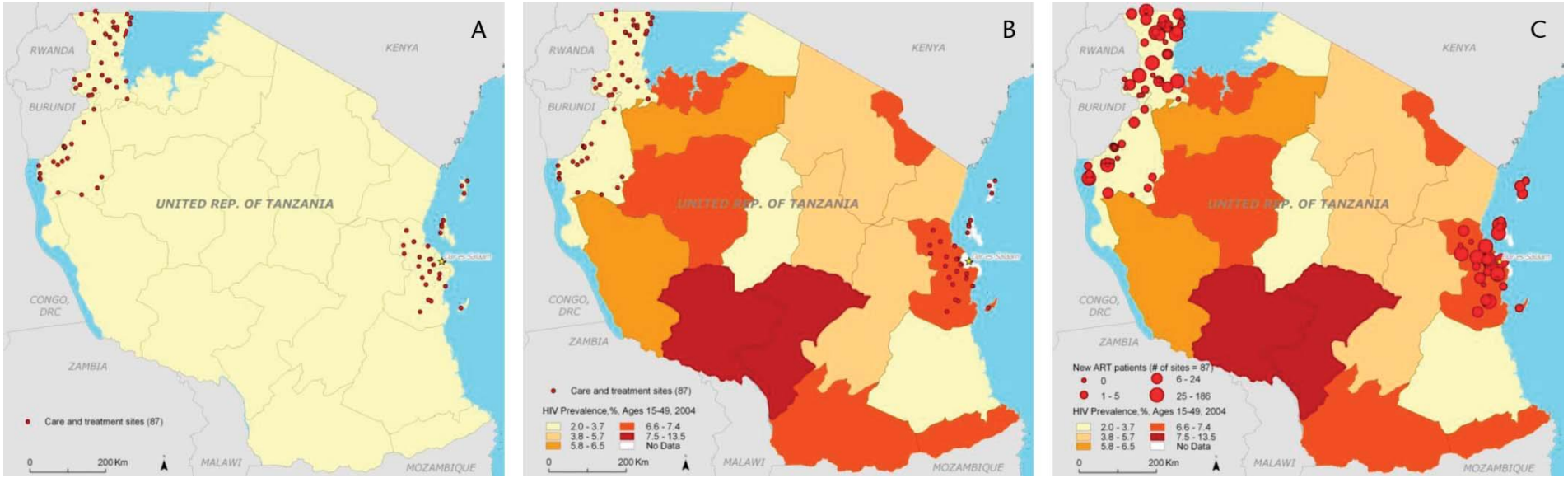


FIGURE 2. HIV care and treatment facilities directly supported by ICAP in Tanzania (A). The map of Tanzania showing HIV care and treatment facilities directly supported by ICAP from is overlaid with HIV prevalence data from the Demographic and Health Survey (B), and with circles for each site sized according to an M&E indicator value—in this case, persons newly initiated on ART over a 3-month period (C).

Source: Nash et al. JAIDS 2009

Outline

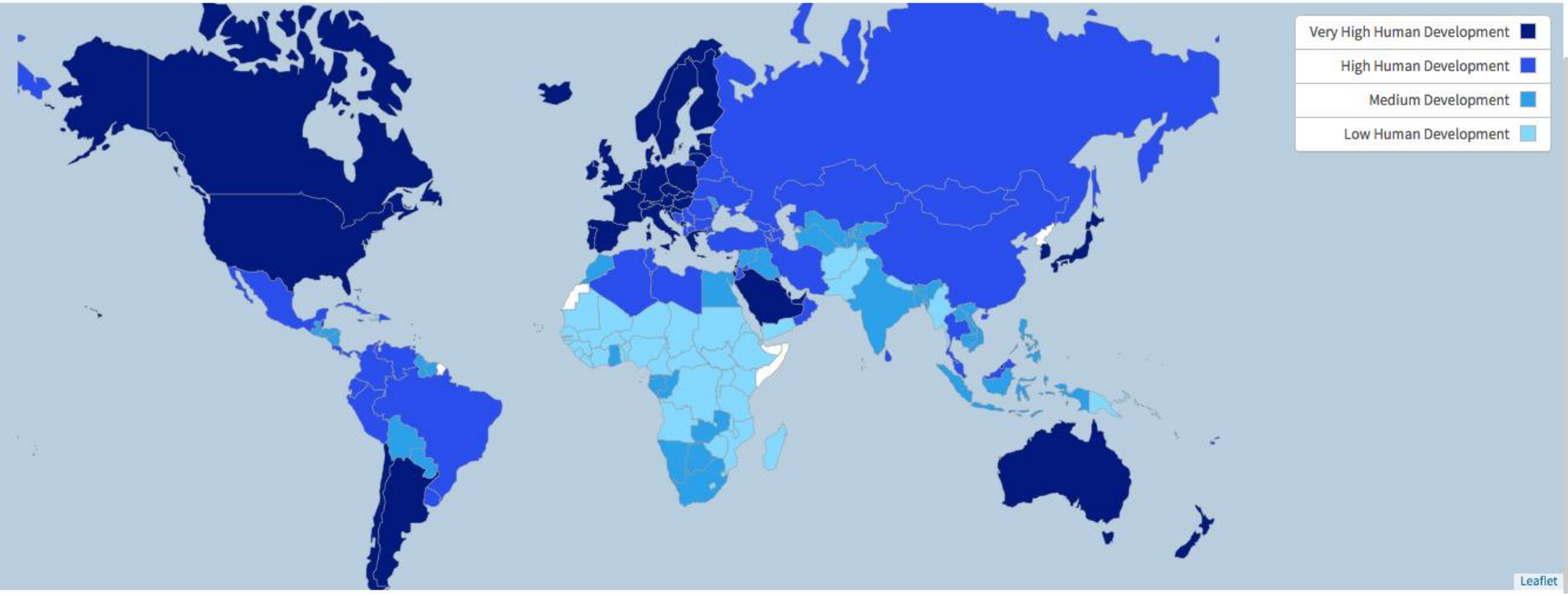
- Characteristics of the context in which HIV care is delivered that are potentially influential determinants of HIV care outcomes and ART program effectiveness
- Characteristics of HIV care sites that are potentially influential determinants of HIV care outcomes and ART program effectiveness
- An overview of the content in the upcoming IeDEA site assessment focusing on non-communicable diseases

HIV care context

Examples of contextual factors that could influence HIV care outcomes and program effectiveness

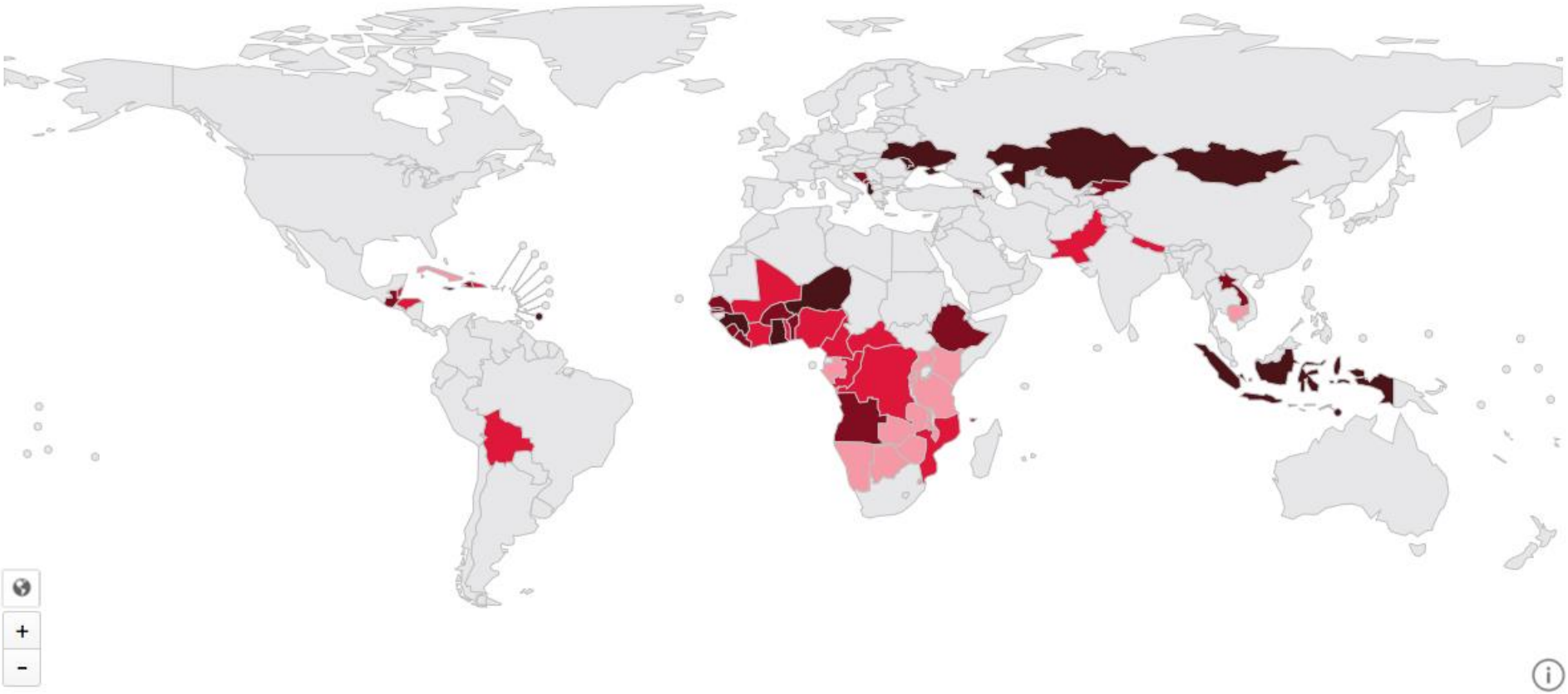
- Setting and population
  - Urban/semi-urban/rural
  - Human development indices (GDP per capita, education, life expectancy)
  - Health care system infrastructure
  - HIV-related stigma
  - Knowledge of HIV/AIDS
  - Cultural factors
- HIV burden, health care system capacity, policy environment
  - HIV prevalence
  - HIV testing coverage
    - Types of HIV testing available
    - Convenience of HIV testing
  - Health care workforce per capita
  - ART coverage vs. need
  - TB incidence
  - Funding for HIV service delivery
  - National ART guidelines
  - Laws that discriminate
  - Other non-HIV health burden

Human Development Index



Source: UNDP

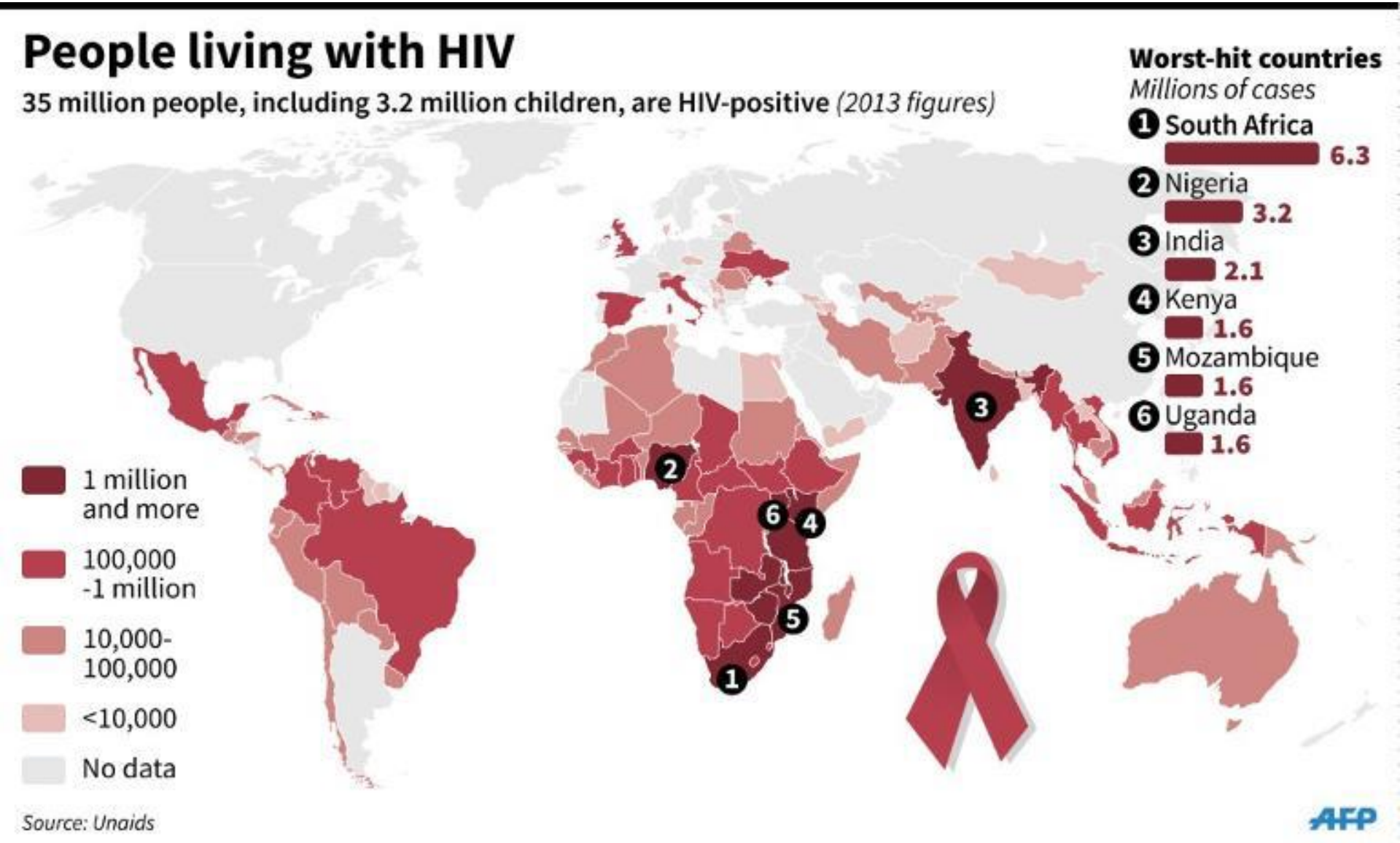
Stigma metric: Proportion of adults with discriminatory attitudes towards PLWH



Most recent data as of 2015

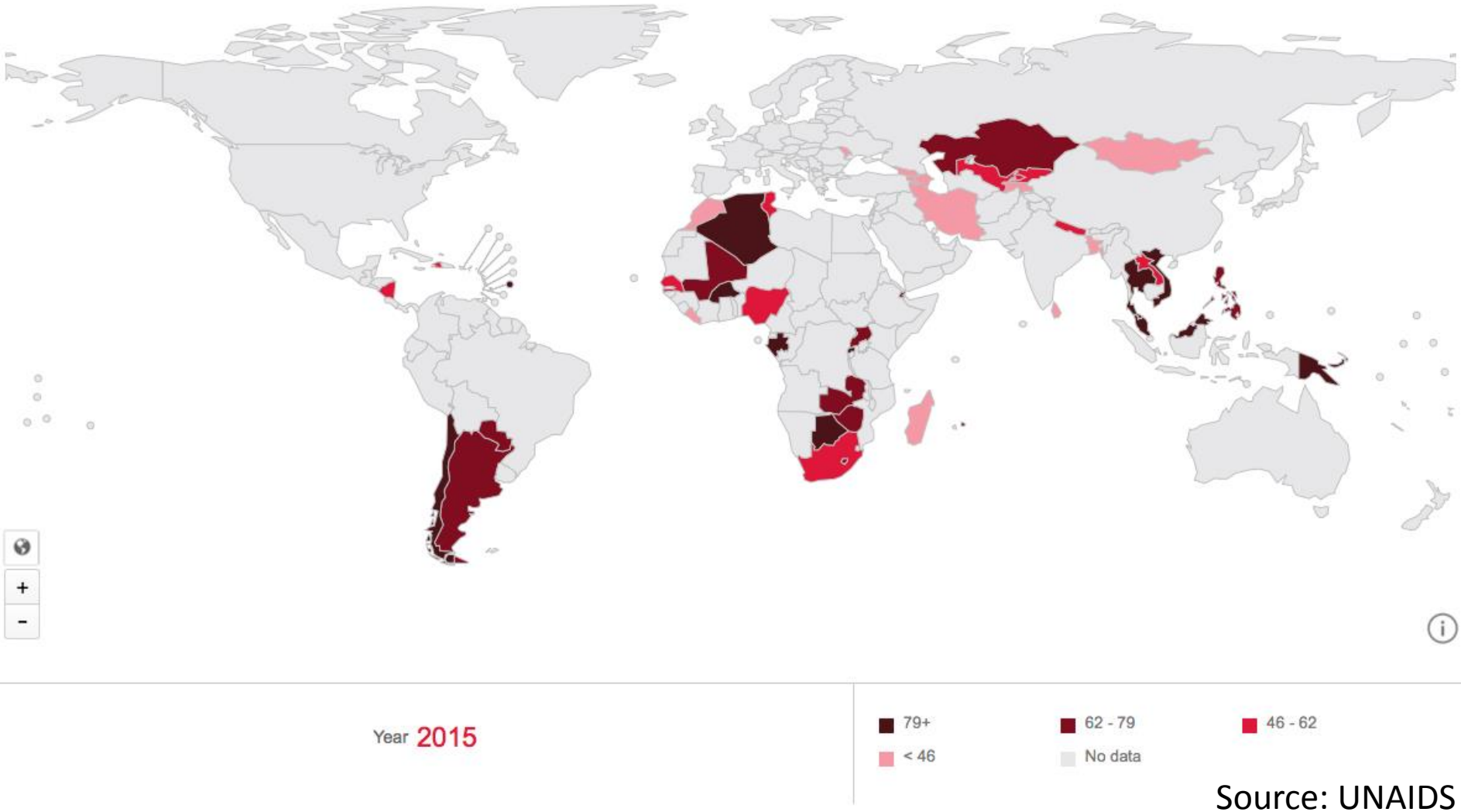
62.3+ %
49.3 - 62.3 %
26.8 - 49.3 %
< 26.8 %
No data

Source: UNAIDS and DHS



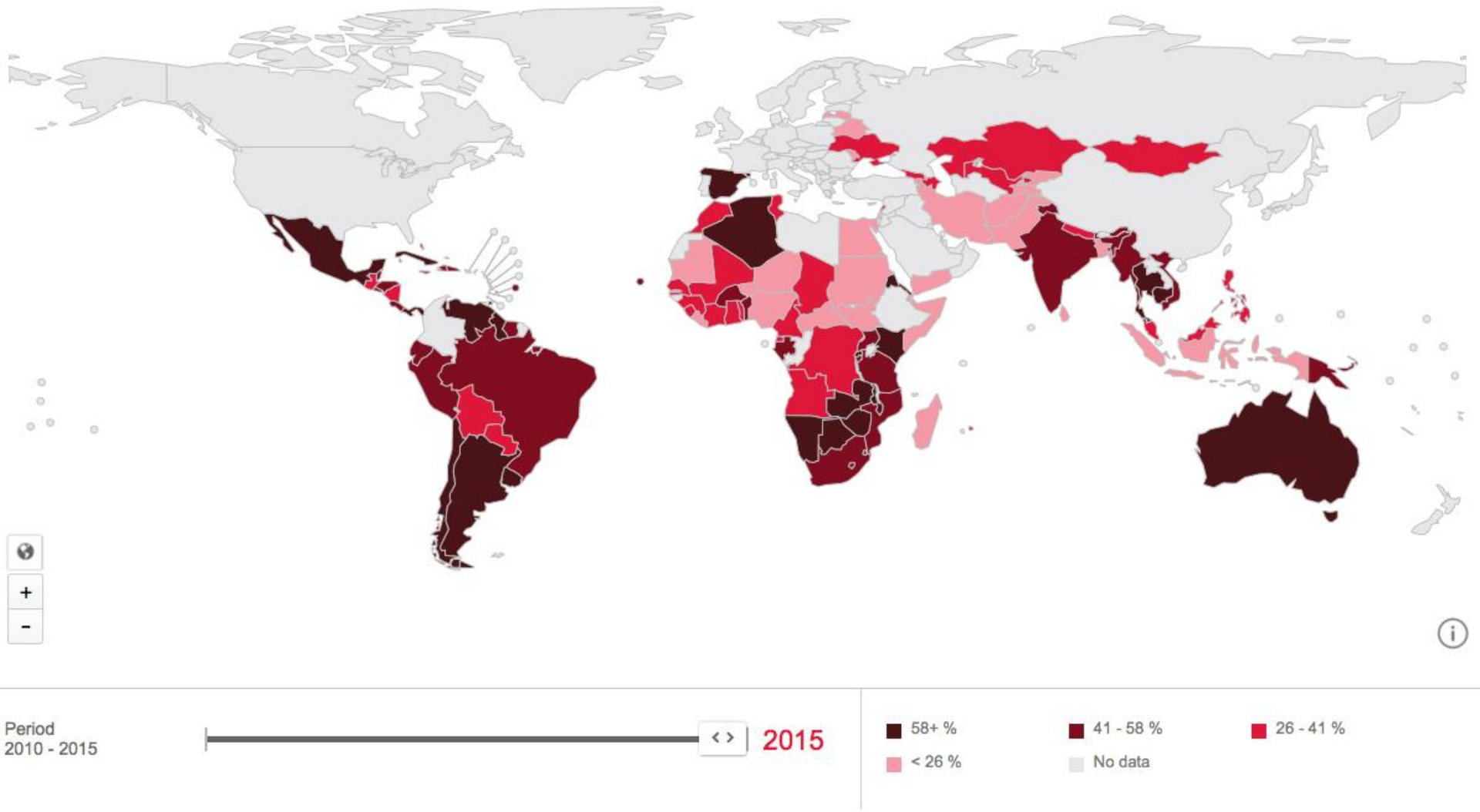
Source: UNAIDS

HIV testing coverage: Proportion of PLWH who know their status



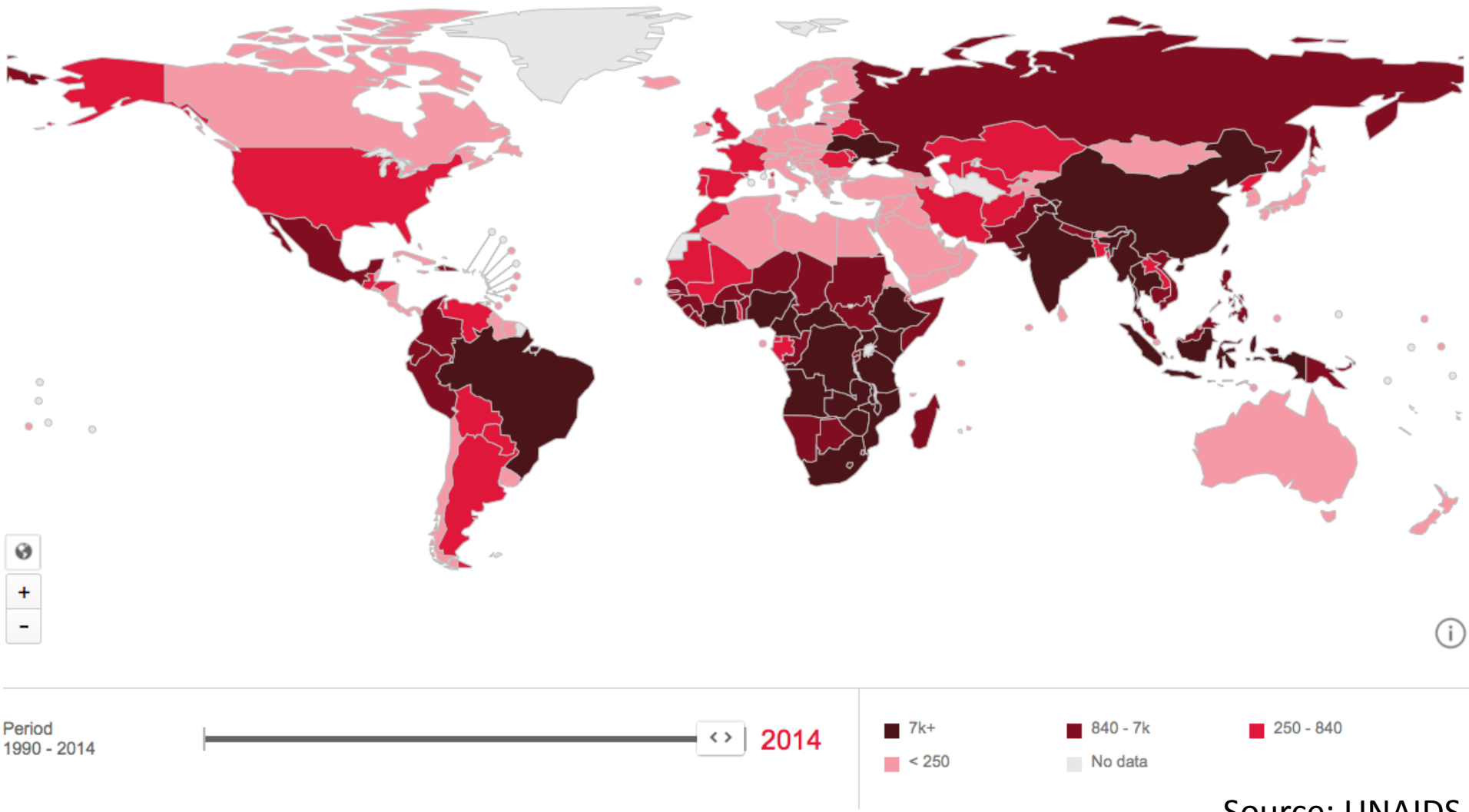
Source: UNAIDS

HIV treatment coverage, 2015



Source: UNAIDS

TB incidence among people living with HIV/AIDS, 2014



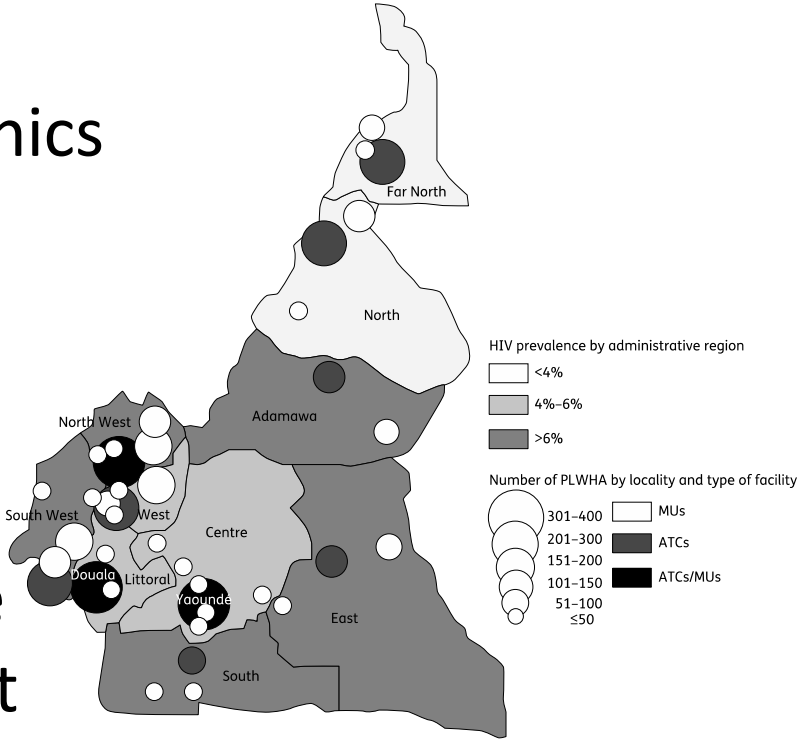
Source: UNAIDS

Factors associated with late antiretroviral therapy initiation in Cameroon: a representative multilevel analysis

Journal of Antimicrobial Chemotherapy
2013

Jacques D.A. Ndawinz[1,2]*, Basile Chaix[3,4], Sinata Koulla-Shiro[5], Eric Delaporte[6,7], Barnabe Okouda[8], Ambroise Abanda[8], Severin Tchomthe[8], Etienne Mboui[9], Dominique Costagliola[1,2,10] and Virginie Supervie[1,2]

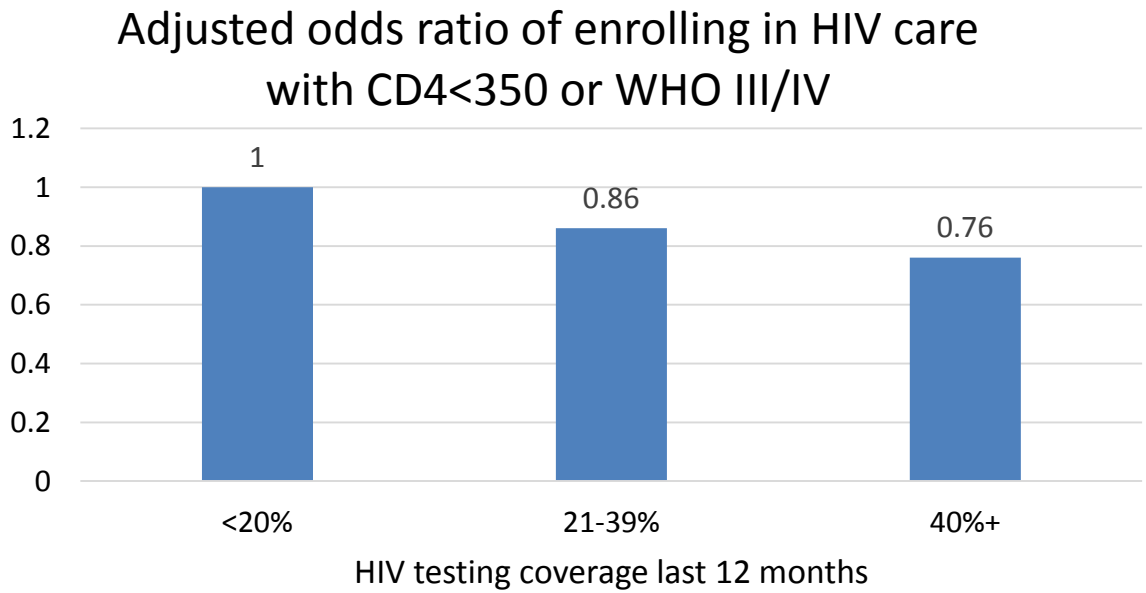
- Representative sample of HIV clinics and patients initiating ART in Cameroon (55 clinics; 4,935 patients)
- After controlling for individual factors, living a region with more comprehensive knowledge about HIV was associated with a lower likelihood of late ART initiation (CD4<100 cells/uL).



Advanced disease at enrollment in HIV care in four sub-Saharan African countries: change from 2006 to 2011 and multilevel predictors in 2011

Susie Hoffman[a,b], Yingfeng Wu[c], Maria Lahuerta[b,c], Sarah Gorrell Kulkarni[d], Harriet Nuwagaba-Biribonwoha[c], Wafaa El Sadr[b,c], Robert H. Remien[a], Veronicah Mugisha[c], Mark Hawken[c], Ema Chuva[e], Denis Nash[a,b,d], Batya Elul[b,c],

- 46,201 patients enrolling in HIV care at 195 clinics in in Kenya, Mozambique, Rwanda and Tanzania
- After controlling for potential confounding factors, more extensive HIV testing coverage* in the region of a facility was significantly associated with lower risk of late enrollment.



* Percent testing for HIV and received results in last 12 months

HIV care site characteristics

Neogloves
STERILE

LYKASTER
STERILE
NON TOXIC &
PYROGEN FREE
DISPOSABLE SYRINGE

BP

Examples of site level factors that both vary and potentially drive HIV care outcomes and program effectiveness

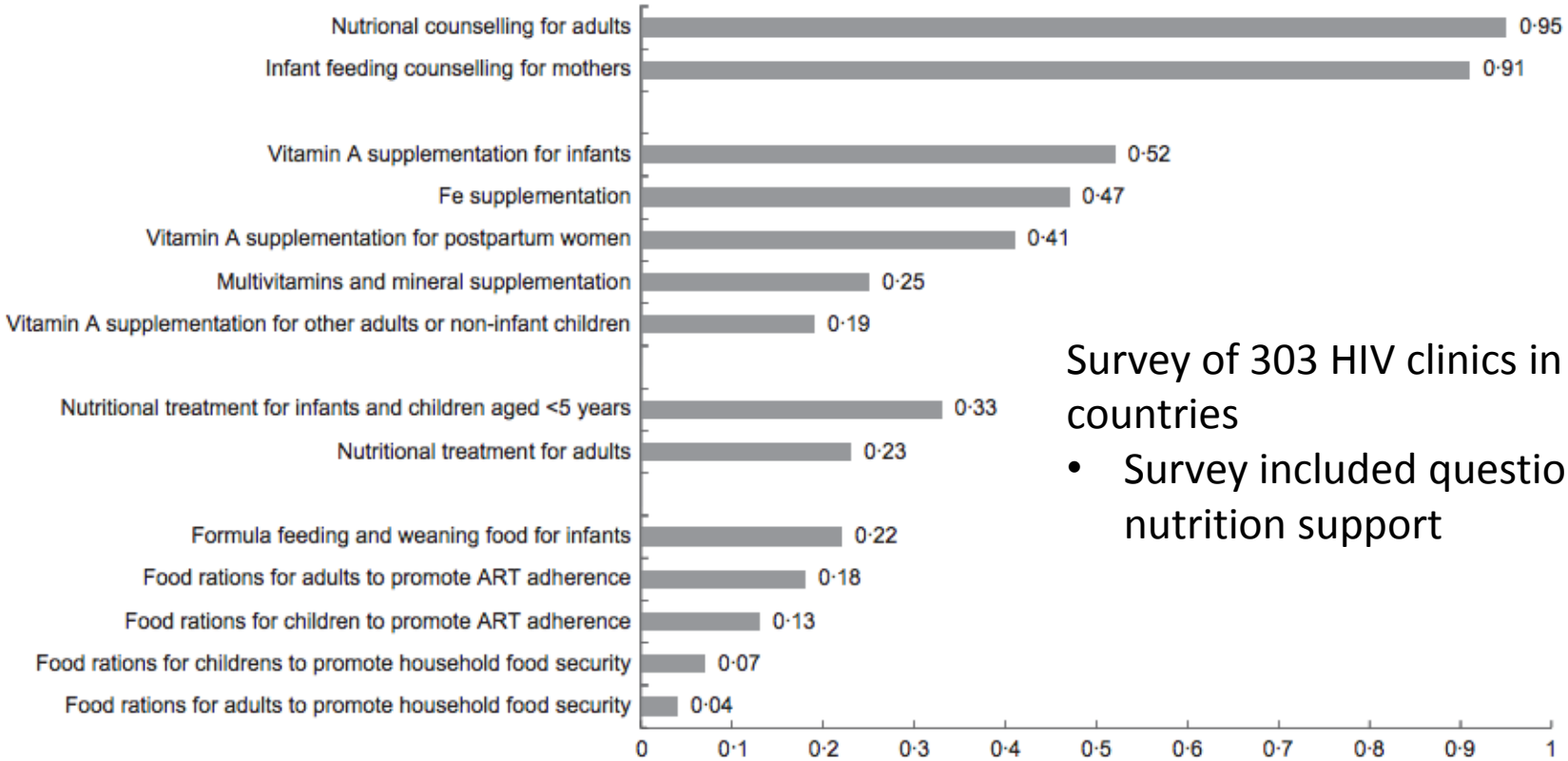
- Physical characteristics of the HIV care clinic
  - e.g., number of exam rooms, square footage, etc.
- Health care system tier
  - i.e., primary, secondary, tertiary care facility
- Patient load
  - E.g., number and type of patients (i.e., adults and peds), provider to patient ratio
- Available services and programmatic characteristics
  - e.g., TB treatment, VCT, PMTCT, point of care CD4, on-site pharmacy, availability of adherence support services, nutritional support, patient support groups, peer educator program, outreach for missed visits, appointment reminders, quality management activities, etc.
- Staffing characteristics
  - e.g., number of staff by cadre (e.g., physicians, nurses, health officers, pediatricians, pharmacists), etc.

Public Health Nutrition: page 1 of 10 doi:10.1017/S136898001100125X

Availability of nutritional support services in HIV care and treatment sites in sub-Saharan African countries

Aranka Anema[1,2,*], Wendy Zhang[1], Yingfeng Wu[3], Batya Elul[3,4], Sheri D Weiser[5], Robert S Hogg[1,6], Julio SG Montaner[1,2], Wafaa El Sadr[3,4] and Denis Nash[3,4] for the International Center for AIDS Care and Treatment Programs

Nutritional services in HIV care sites in Africa



Survey of 303 HIV clinics in 9 SSA countries

- Survey included questions on nutrition support

Fig. 1 Prevalence of nutritional support services available in 303 HIV care and treatment sites in nine sub-Saharan African countries, July 2008 (ART, antiretroviral therapy)

TB Diagnostic Capacity in Sub-Saharan African HIV Care Settings

Suzue Saito, MA, MIA,† Andrea A. Howard, MD, MS,*† Michael J. A. Reid, MD, MA, MRCP,‡ Batya Elul, PhD, MSc,*† Anna Scardigli, MD, DHA,* Sabine Verkuijl, MD, DTM&H, MMed,* Alaine U. Nyaruhirira, PhD, MPH,* and Denis Nash, PhD, MPH*†§*

J Acquir Immune Defic Syndr 2012

- Site survey of 663 HIV clinics in 9 sub-Saharan African countries, serving 908,000 HIV patients
- 87% of facilities serving 97% of patients had access to sputum smear microscopy
  - Primary health facilities << likely to have access
- Conclusions: Decentralization of HIV care to primary health facilities should plan for availability of adequate TB diagnostics

TABLE 2. Bivariate Analysis of Factors Associated With Availability of Sputum Smear, Sputum Culture, DST, CXR, and TST Diagnostic Services at HIV Care and Treatment Programs in 9 SSA Countries, September 2010 (N = 663)*

	Sputum Smear Microscopy (n = 660)		AFB (n = 663)		DST (n = 352)†		CXR (n = 653)		TST (n = 663)	
	n (%)	*P*	n (%)	*P*	n (%)	*P*	n (%)	*P*	n (%)	*P*
Overall (% facilities)	574 (87)		352 (53)		123 (35)		170 (26)		81 (12)	
Overall (% patients)	881,972 (97)		699,968 (77)		242,640 (35)		508,757 (56)		301,117 (33)	

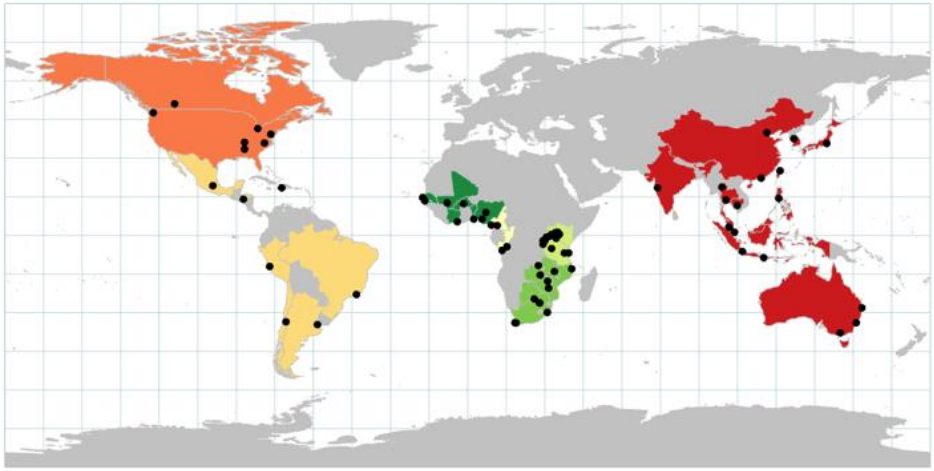
Research article

Characteristics and comprehensiveness of adult HIV care and treatment programmes in Asia-Pacific, sub-Saharan Africa and the Americas: results of a site assessment conducted by the International epidemiologic Databases to Evaluate AIDS (IeDEA) Collaboration

JIAS Journal of the International AIDS Society

Stephany N Duda[§,1], Amanda M Farr[2,3], Mary Lou Lindegren[4,5], Meridith Blevins[6,7], C William Wester[7,8], Kara Wools-Kaloustian[9], Didier K Ekouevi[10,11,12], Matthias Egger[13], Jennifer Hemingway-Foday[14], David A Cooper[15], Richard D Moore[16,17], Catherine C McGowan[8], Denis Nash[18,19] and the International Epidemiologic Databases to Evaluate AIDS (IeDEA) Collaboration

- Surveyed 128 clinical sites in 41 countries in 2009/10
- Assessed the presence of seven essential services reflecting the comprehensiveness of HIV care
  - CD4 count: 100%
  - TB screening: 80%
  - Community outreach: 72%
  - Nutritional support: 82%
  - ART adherence support: 88%
  - PMTCT: 94%
  - Prevention services: 97%
- All 7 services: 46%
  - Higher comprehensiveness in newer sites and sites in LIC, especially PEPFAR-supported countries



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High attrition before and after ART initiation among youth (15–24 years of age) enrolled in HIV care

Matthew R. Lamb[a,b], Ruby Fayorsey[a], Harriet Nuwagaba-Biribonwoha[a], Violante Viola[a], Vincent Mutabazi[c], Teresa Alwar[a], Caterina Casalini[a] and Batya Elul[a,b] *AIDS* 2014, **28**:559–568

- Among 14,844 youth initiating ART in Kenya, Mozambique, Rwanda, and Tanzania:
  - Those attending clinics providing sexual and reproductive health services, including condoms, had significantly lower attrition after ART initiation
    - AHR =0.47, 95% CI: 0.32 – 0.70
  - Those attending clinics offering adolescent support groups had significantly lower attrition after ART initiation
    - AHR=0.73, 95% CI: 0.52 – 1.0

Site assessments in IeDEA

- Routine general site assessment of all IeDEA sites is conducted every other year
  - Targets all 300+ IeDEA sites in the 7 regions
  - Goal: To describe IeDEA sites and their evolution over time; and to facilitate multi-level analyses of site-level factors in relation to HIV care outcomes
  - Next general site assessment will occur in the Fall 2016
- Ad hoc site assessments conducted as part of targeted research studies
  - May target specific sites or a representative sample of sites
  - Examples include:
    - Completed: Tuberculosis, hepatitis, ART adherence, HIV disclosure,
    - Planned 2016: non-communicable diseases

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Research article

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Stephany N Duda[§,1], Amanda M Farr[2,3], Mary Lou Lindegren[4,5], Meridith Blevins[6,7], C William Wester[7,8], Kara Wools-Kaloustian[9], Didier K Ekouevi[10,11,12], Matthias Egger[13], Jennifer Hemingway-Foday[14], David A Cooper[15], Richard D Moore[16,17], Catherine C McGowan[8], Denis Nash[18,19] and the International Epidemiologic Databases to Evaluate AIDS (IeDEA) Collaboration

A survey of paediatric HIV programmatic and clinical management practices in Asia and sub-Saharan Africa—the International epidemiologic Databases to Evaluate AIDS (IeDEA)

IeDEA Pediatric Working Group

Tuberculosis in Antiretroviral Treatment Programs in Lower Income Countries: Availability and Use of Diagnostics and Screening

Lukas Fenner[1,2,3]*, Marie Ballif[1], Claire Graber[1], Venerandah Nhandu[4], Jean Claude Dusingize[5], Claudia P. Cortes[6], Gabriela Carriquiry[7], Kathryn Anastos[8], Daniela Garone[9], Eefje Jong[10], Joachim Charles Gnokoro[11], Omar Sued[12], Samuel Ajayi[13], Lameck Diero[14], Kara Wools-Kaloustian[14,15], Sasisopin Kiertiburanakul[16], Barbara Castelnuovo[17], Charlotte Lewden[18], Nicolas Durier[19], Timothy R. Sterling[20], Matthias Egger[1], for the International epidemiological Databases to Evaluate AIDS (IeDEA)[¶]

Targeted Spontaneous Reporting: Assessing Opportunities to Conduct Routine Pharmacovigilance for Antiretroviral Treatment on an International Scale

Beth Rachlis[1] · Rakhi Karwa[2,3] · Celia Chema[3] · Sonak Pastakia[2,3] · Sten Olsson[4] · Kara Wools-Kaloustian[3,5] · Beatrice Jakait[3,6] · Mercy Maina[3,6] · Marcel Yotebieng[7,8] · Nagalingeswaran Kumarasamy[9] · Aimee Freeman[10] · Nathalie de Rekeneire[11] · Stephany N. Duda[12] · Mary-Ann Davies[13] · Paula Braitstein[3,14,15]

Comprehensiveness of Care Provided at Global HIV Treatment Sites in the IeDEA Consortium: 2009 and 2014

Cristin Q. Fritz[1§], Meridith Blevins[2, 3], Mary Lou Lindegren[1,3,4*], Kara Wools-Kaloutsian[5], Beverly S. Musick[6], Morna Cornell[7], Kelly Goodwin[8], Dianne Addison[9], Jean Claude Dusingize[10], Eugène Messou[11], Armel Poda[12], Stephany N. Duda[13], Catherine C. McGowan[14], Matthew G. Law[15], Richard D. Moore[16], Aimee Freeman[17], Denis Nash[9], C. William Wester[3, 14]*

IeDEA Site Assessment papers: Fenner L et al. PLoS One 2013; Sohn et al. JIAS 2013; Duda S et al. JIAS 2014; Rachclis B et al. Drug Saf 2016; Quinn et al. JIAS (in press)

IeDEA NCD site survey

IeDEA site survey on non-communicable diseases (NCDs)

- What: Site assessments of IeDEA sites in LMICs
  - Goal: Assess capacity for the screening, diagnosis, and management of NCDs and their risk factors.
- How: Cross sectional web-based survey of a representative sample of IeDEA sites in LMICs (n~165) REDCap
- When: Summer 2016

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IeDEA NCD site survey content (1)

- Staffing (specialist services, training, availability)
  - Nephrology, endocrinology, neurology, cardiology, gastroenterology/hepatology, oncology, psychology/psychiatry, pulmonology, pathology
- Staffing (task shifting)
  - Nursing assistants, patient navigators, adherence counselors, outreach workers, peer educators, nutritionists, other non-clinical staff
- NCD risk factor assessment using a written protocol
  - Tobacco use, alcohol consumption, other substance use, physical inactivity, overweight/obesity, family history of chronic disease, intimate partner violence
  - Method of risk factor assessment and availability for inclusion in the IeDEA database
- Health education and promotion around NCDs
  - Tobacco cessation or harm reduction, alcohol cessation or harm reduction, other substance use cessation or harm reduction, physical activity promotion, nutritional education, health relationships/violence prevention.

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IeDEA NCD site survey content (2)

- Screening and management of non-communicable diseases
  - Hypertension, diabetes, kidney disease, impaired lung function, depression, PTSD, substance use disorders (alcohol or drug dependence), other mental health disorders (bipolar disease or schizophrenia)
  - Written protocol for screening
  - Method for screening
  - Which patients are targeted for screening
  - Number of patients screened per month
  - Frequency of screening (e.g., at each visit, annual)
  - Written protocol for managing screen positives
  - Location of management (at HIV clinic or out referral)
  - Staff responsible for management of NCD
  - Recent training of staff on NCD management

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IeDEA NCD site survey content (3)

- Pediatric and adolescent health care and service provision
  - Does clinic have protocol and capacity for screening, diagnosis, and management of:
    - Developmental delays
    - Vision problems
    - Hearing impairment
    - Schooling and education adherence
    - Abuse
    - Vaccination (hepatitis B, HPV)

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IeDEA NCD site survey content (4)

- Imaging
  - Abdominal ultrasound, ultrasound of kidney, conventional chest radiography, conventional other radiography, CT scan with contrast, CT without contrast, MRI of head, DEXA

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IeDEA NCD site survey content (5)

- Availability and costs to patient for other procedures
  - **CVD**: Sphygmomanometers, cardiac stress test capacity, electrocardiography, holter/arrhythmia monitoring device, carotid duplex/ultrasound, 2-D echo, cardiac troponin, creatinine kinase MB isoenzyme, creatinine phosphokinase (CPK), cardiac catheterization capacity
  - **Diabetes**: HbA1c, fasting plasma glucose, oral glucose tolerance test, random plasma glucose testing for patients with symptoms of hyperglycemia, digital photography for remote diagnosis of diabetic retinopathy
  - **Kidney disease**: Creatinine measurement, urinalysis (dipstick), urine protein measurement, kidney biopsy
  - **Pulmonary disease**: peak flow measurement via spirometry, pulmonary extra function testing, pulse oximetry
  - **Liver disease**: LFTs, liver fibroscan, bilirubin
  - **Endocrinology**: BMI, central obesity (MUAC), waist-hip circumference, calf circumference
  - **Cervical cancer**: PAP smear, VIA
  - **Other malignancies**: Fecal occult blood test, fine needle/lymph node biopsy, skin biopsy, histopathology/special staining capacity, serum markers (e.g., PSA), endoscopy/colonoscopy, mammography

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IeDEA NCD site survey content (6)

- Availability and costs to patient for other procedures, cont'd
  - **Mental Health**: Individual counseling or psychotherapy for management of depression, support groups or group therapy for the management of depression, individual counseling or psychotherapy for management of PTSD, support groups or group therapy for the management of PTSD, individual counseling or psychotherapy for other mental health diagnoses, support groups or group therapy for other mental health diagnoses
  - **Treatment (medication)**: Insulin, aspirin, metformin, thiazide diuretics, ACE inhibitors, calcium channel blockers, statins, oral morphine, steroid inhalers, SSRIs, benzodiazepines
  - **Surgical procedures**: Retinal photocoagulation, renal replacement therapy by peritoneal dialysis, renal replacement therapy by hemodialysis, renal transplantation, radiotherapy, chemotherapy, coronary bypass or stenting

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IeDEA NCD Site Survey Pilot - Feedback

- Many procedures listed are not available at my clinic
- Survey raises awareness about many things not being done in my clinic
- We are an outpatient HIV facility, do not have some of the facilities required for the diagnosis of NCDs
- Major challenges regarding NCDs are qualified personnel and materials for the diagnosis

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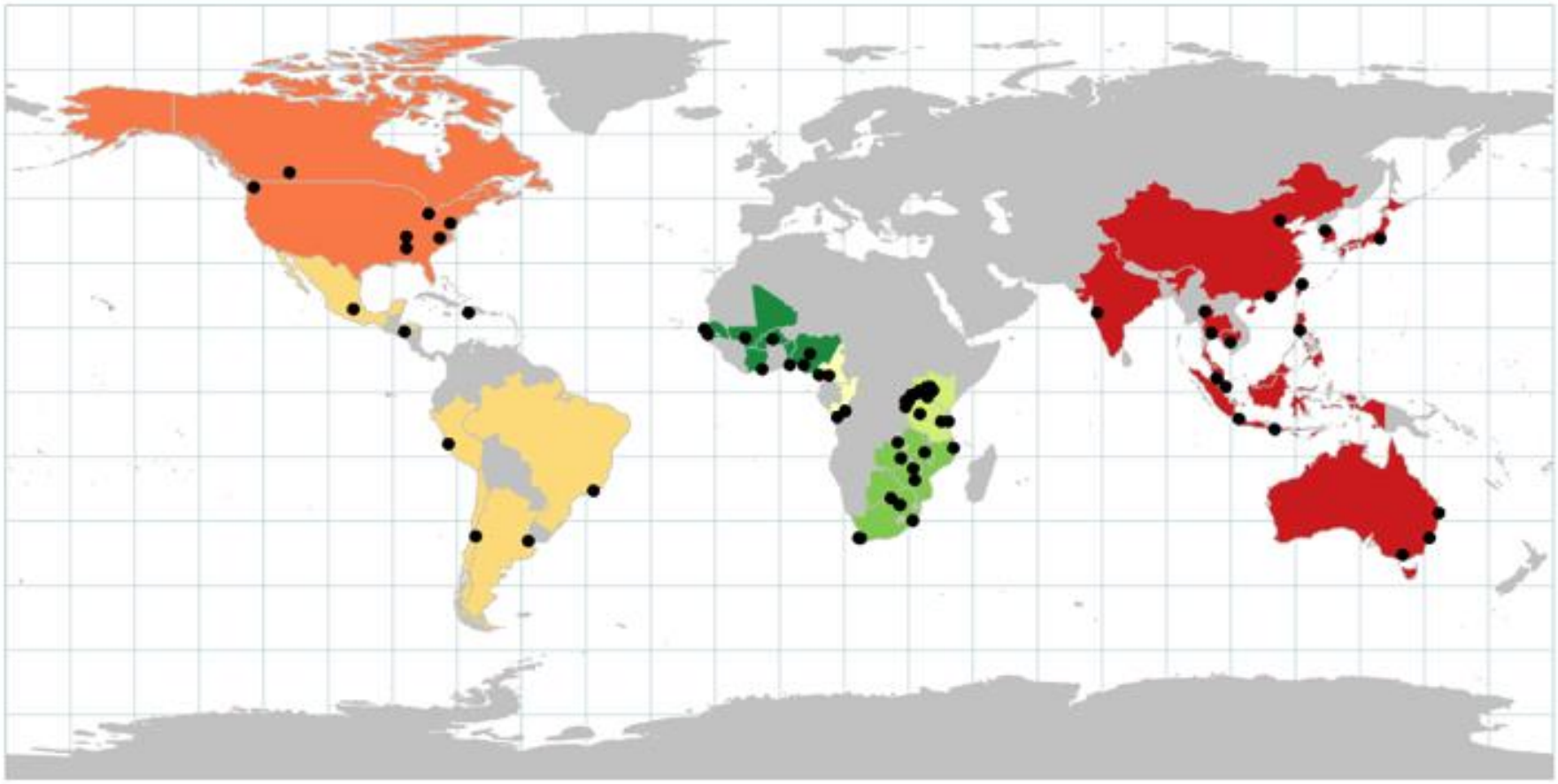
Conclusions

- Contextual and site level factors are important drivers of HIV care outcomes and program effectiveness
- IeDEA has ability and infrastructure to conduct general and targeted time updated site assessments, and to incorporate these data into descriptive and analytical research studies
- Ability to incorporate information on larger context needs further development, but will allow us to further leverage our strengths as a global network
- Forthcoming NCD survey should help lay the foundation for more focused NCD-related research within IeDEA

1.7M patients, 300+ clinics, 42 countries



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- **IeDEA PIs**: Francois Dabis, Valeriane Leroy, Richard Moore, Matthias Egger, Mary-Ann Davies, Denis Nash, Kathryn Anastos, Constantin Yiannoutsos, Kara Wools-Kaloustian, Annette Sohn, Matthew Law, Cathy McGowan
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- **PEPFAR NCD working group**

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Extra slides on NCD survey

What is the training of the staff providing services for: (check all that apply)

	Physician	Mid-level provider	Nurse	Nursing assistant	Other clinical staff	Non-clinical staff
a. Nephrology	☐	☐	☐	☐	☐	☐
b. Endocrinology	☐	☐	☐	☐	☐	☐
c. Neurology	☐	☐	☐	☐	☐	☐
d. Cardiology	☐	☐	☐	☐	☐	☐
e. Gastroenterology / Hepatology	☐	☐	☐	☐	☐	☐
f. Oncology	☐	☐	☐	☐	☐	☐
g. Psychiatry / Psychology	☐	☐	☐	☐	☐	☐
h. Pulmonology	☐	☐	☐	☐	☐	☐
i. Pathology	☐	☐	☐	☐	☐	☐

The following questions are about lifestyle factors that contribute to NCDs and whether they are assessed at your facility.

Does your site have a written protocol for assessing the following risk factors?

	Yes	No
a. Tobacco use	○	○
b. Alcohol Consumption	○	○
c. Other Substance Use	○	○
d. Physical inactivity	○	○
e. Overweight and obesity	○	○
f. Family History for chronic disease (heart disease, cardiovascular disease, lung disease, cancer, etc.)	○	○
g. Intimate partner violence	○	○

The following questions are about the diagnosis, management and treatment of Non-Communicable Disease (NCD). We will start with questions about disease screening.

Do you screen your patients for:

	Yes	No
a. Hypertension	○	○
b. Diabetes	○	○
c. Kidney disease	○	○
d. Impaired lung function	○	○
c. Depression	○	○
d. Posttraumatic stress disorder (PTSD)	○	○
e. Substance abuse disorders (including alcohol or drug dependance)	○	○
f. Other mental health disorders (including bipolar, schizophrenia, etc.)	○	○

HYPERTENSION

The following questions are about screening and management of hypertension at your facility.

Is there a written protocol for how to screen for hypertension?

- ◯ Yes
- ◯ No

How do you screen (methods)?

- ☐ manual sphygmomanometer office-based blood pressure measurement
- ☐ automated oscillometric office BP
- ☐ ambulatory BP monitoring 24-hour, daytime, or nighttime
- ☐ Other

(Check all that apply)

Please specify if other: _____

Whom do you screen (patients)?

- ◯ All patients
- ◯ Patients presenting with symptoms
- ◯ Other selection of patients

Please specify if other: _____

How many patients are screened per month?

- ◯ 10-100
- ◯ 101-250
- ◯ 250-500
- ◯ >500
- ◯ Unknown

How often does this facility offer routine screening for hypertension?

- ◯ At enrollment
- ◯ At ART start
- ◯ Once a year
- ◯ Every visit
- ◯ Other

Please specify other: _____

If patients are screened positive, is there a written protocol for hypertension management?

- ◯ Yes
- ◯ No

Where is hypertension managed?

- ◯ In this Clinic
- ◯ In the same Health Facility (but not at this clinic)
- ◯ Only offsite (at distance)
- ◯ Not available

What type of staff is responsible for hypertension management?

- ◯ Physician
- ◯ Mid-level provider
- ◯ Nurse
- ◯ Nursing assistant
- ◯ Other clinical staff
- ◯ Non-clinical staff

Have you or any provider(s) of diabetes services received any training in the diagnosis and management of hypertension in the last two years?

- ◯ Yes
- ◯ No

Imaging

Does your site provide any of the following procedures and if yes who pays for it?

	Available free of charge	Patient contribution	Not available
Ultrasound abdominal	○	○	○
Ultrasound kidney	○	○	○
Conventional radiography chest	○	○	○
Conventional radiography other	○	○	○
Computed Tomography (CT) without contrast	○	○	○
Computed Tomography (CT) with contrast	○	○	○
Magnetic Resonance Imaging (MRI) head	○	○	○
Dual energy x-ray absorpiometry scans (DEXA; bone mineral density)	○	○	○

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Association of Adherence Support and Outreach Services with Total Attrition, Loss to Follow-Up, and Death among ART Patients in Sub-Saharan Africa

Matthew R. Lamb[1,2]*, Wafaa M. El-Sadr[1,2,3], Elvin Geng[4], Denis Nash[2,5]

- Combined program-level data with aggregate outcome data
  - 349 clinics in 10 countries
  - 232K ART patients
- Assessed whether certain programmatic services were associated with attrition
  - Counseling services (aRR=0.62, 95%CI: 0.42– 0.92)
  - Educational materials (aRR=0.73, 95%CI: 0.63–0.85)
  - Reminder tools (aRR=0.79, 95%CI: 0.64–0.97)
  - Food rations (aRR=0.72, 95%CI: 0.58–0.90)
- Conclusion: Certain adherence support services may improve retention following ART initiation

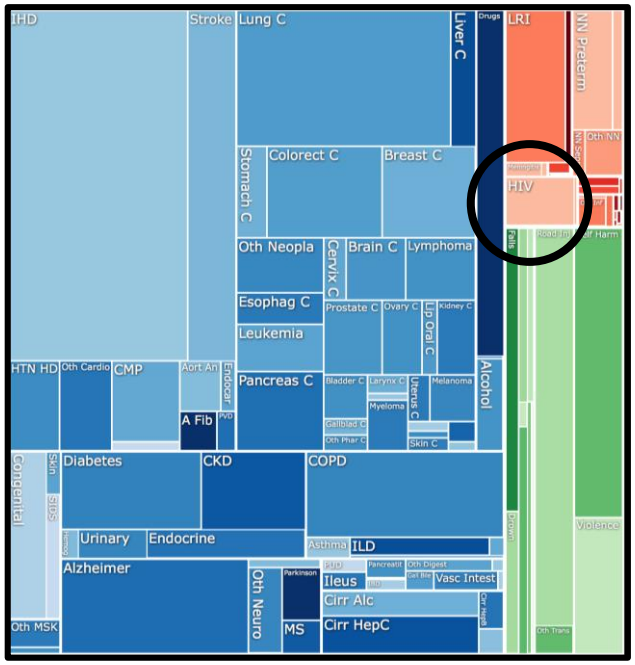
Program-level and contextual-level determinants of low-median CD4^{+} cell count in cohorts of persons initiating ART in eight sub-Saharan African countries

Denis Nash[a,b,c], Yingfeng Wu[a], Batya Elul[a,b], David Hoos[a,b], Wafaa El Sadr[a,b], for the International Center for AIDS Care and Treatment Programs *AIDS* 2011, **25**:1523–1533

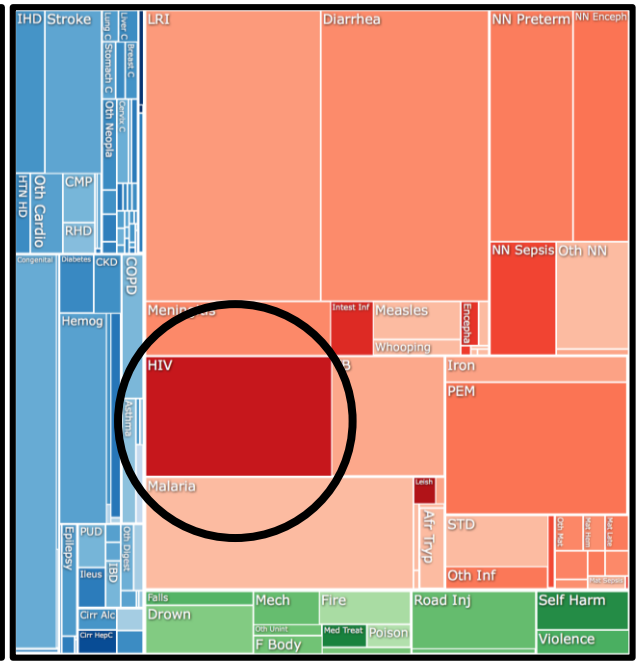
- 121K patients initiating ART at 267 clinics in 8 countries
  - Aggregate outcome data: Median CD4 count at ART initiation among cohorts initiating ART each quarter during 2004-8
- Examined determinants of low median CD4 count among populations of patients initiating ART:
  - Program-level factors
    - Low provider to patient ratio
    - No PMTCT program
    - No outreach for pre-ART patients who miss clinic visits
    - Fewer adherence support services
  - Contextual-level factors
    - Lower HIV/AIDS knowledge
    - Lower testing coverage
- Conclusions: Determinants of late ART initiation operate on multiple levels

Years of life lost by cause of death grouping, 2013

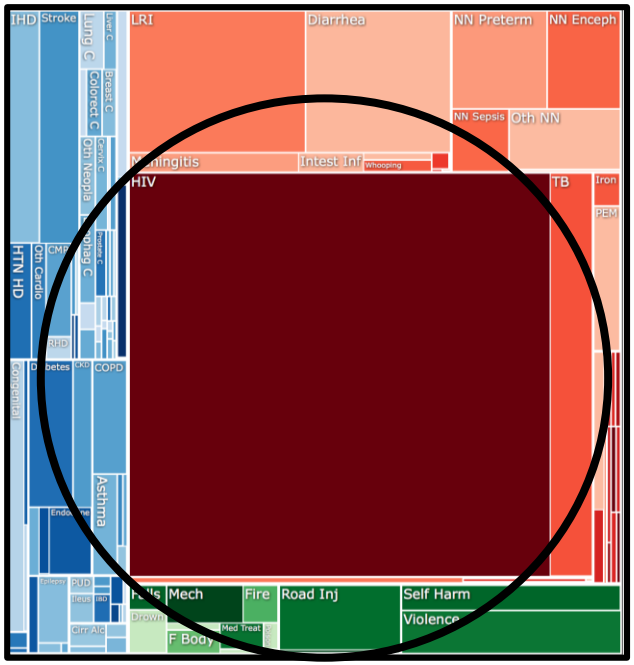
North America



Central Africa



Southern Africa



Blue=non-communicable diseases

Red=Communicable, maternal, nutritional

Green=Injuries

Source: IHME, GBD Project