NDARC
National Drug &
Alcohol Research Centre

The Difference is Research

UNSW
AUSTRALIA

Studying substance use among young people: Mapping global trends, generating local insights

Louisa Degenhardt

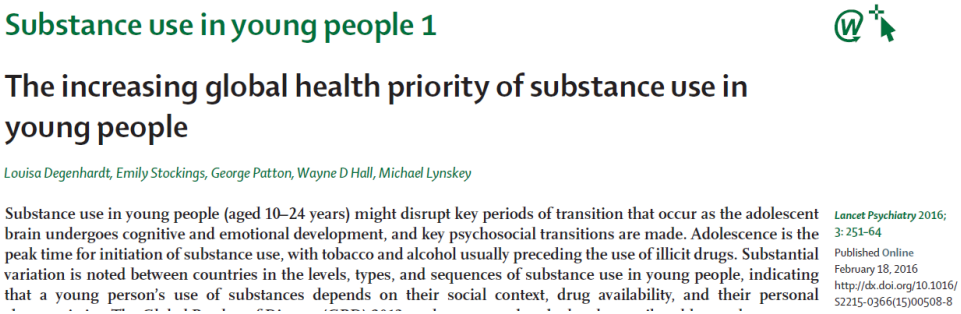
Medicine
National Drug and Alcohol Research Centre

Acknowledgements and disclosures

- *Disclosures: I have previously received untied educational grants from Reckitt Benckiser, Indivior, Mundipharma and Seqirus*
- UNSW: Sarah Larney, Amy Peacock, Samantha Colledge, Jason Grebely, Emily Stockings, Harriet Townsend, Laura Sergeant, Evan Cunningham, Erin Yong, Julia Stadum, Gabrielle Gibson, Griselda Buckland, Greg Dore, Richard Mattick, Michael Farrell
- University of Bristol: Matthew Hickman, Peter Vickerman, Adam Trickey, Jack Stone
- King's College London: Michael Lynskey, Lindsey Hines, John Strang, John Marsden
- University of Queensland: Janni Leung, Wayne Hall
- Ukrainian Institute on Public Health Policy: Kostyantyn Dumchev, Tetiana Kiriazova
- EMCDDA: Paul Griffiths, Eleni Kalamara, Andre Noor
- Staff from Open Society Foundations, Harm Reduction International, Global Fund, UNAIDS, WHO, UNODC
- Many other people who were helpful in assisting us with locating data…

Overview

- Provide an overview of global data on substance use with a focus on young people
  - Discuss UN global reporting systems
    - UN Office on Drugs and Crime
    - World Health Organization
  - IHME's Global Burden of Disease
- The role of specialist and expert groups in improving and expanding global reporting
  - Epidemiology
  - Harms
  - Interventions
- Provide an overview of recent work that has played such a role



Substance use in young people 1

The increasing global health priority of substance use in young people

Louisa Degenhardt, Emily Stockings, George Patton, Wayne D Hall, Michael Lynskey

Substance use in young people (aged 10–24 years) might disrupt key periods of transition that occur as the adolescent brain undergoes cognitive and emotional development, and key psychosocial transitions are made. Adolescence is the peak time for initiation of substance use, with tobacco and alcohol usually preceding the use of illicit drugs. Substantial variation is noted between countries in the levels, types, and sequences of substance use in young people, indicating that a young person's use of substances depends on their social context, drug availability, and their personal

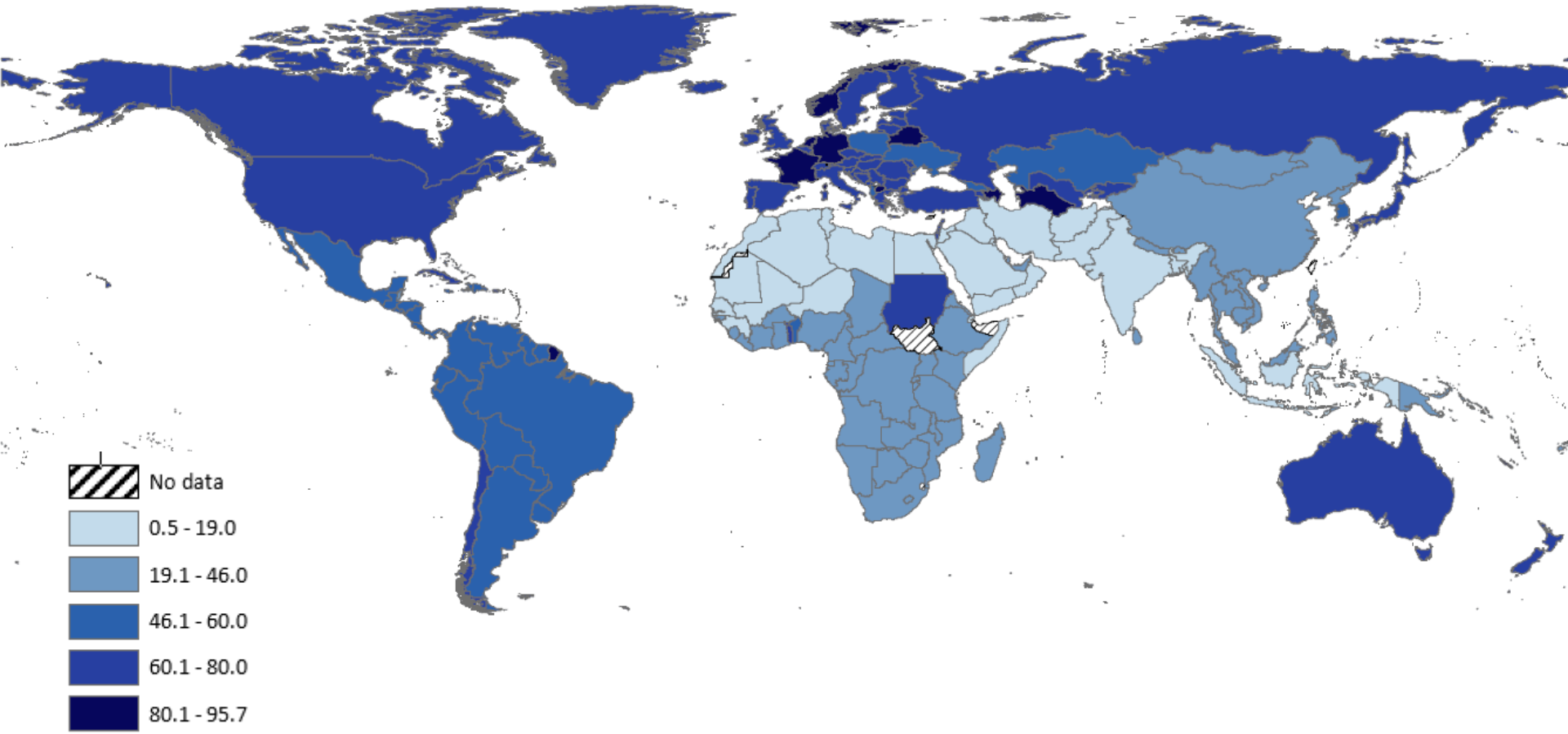
Lancet Psychiatry 2016; 3: 251–64
Published Online February 18, 2016
http://dx.doi.org/10.1016/S2215-0366(15)00508-8

1. Global reporting of substance use in young people

Global reporting of substance use - UN

- UNODC's World Drug Report
  - Includes country ARQ reports to UNODC
  - UNAIDS progress reports
  - Mathers et al (2008); peer-reviewed articles; government reports
  - Single estimates used
  - Included if method unknown or expert judgment estimates
- WHO's global status on alcohol report and WHO's tobacco atlas report
  - Greater collaboration with academics and triangulation of data in generation of estimates

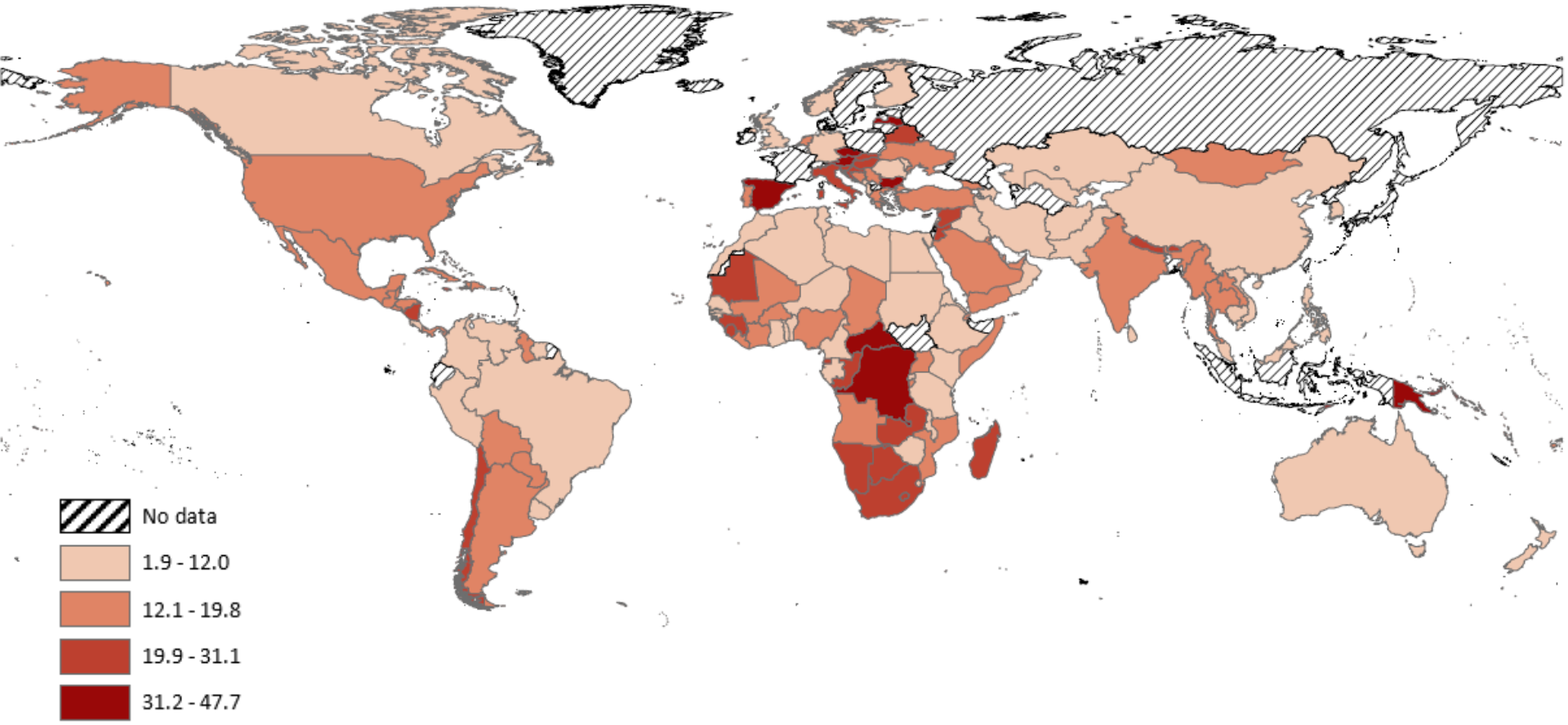
Past year alcohol use among young people



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

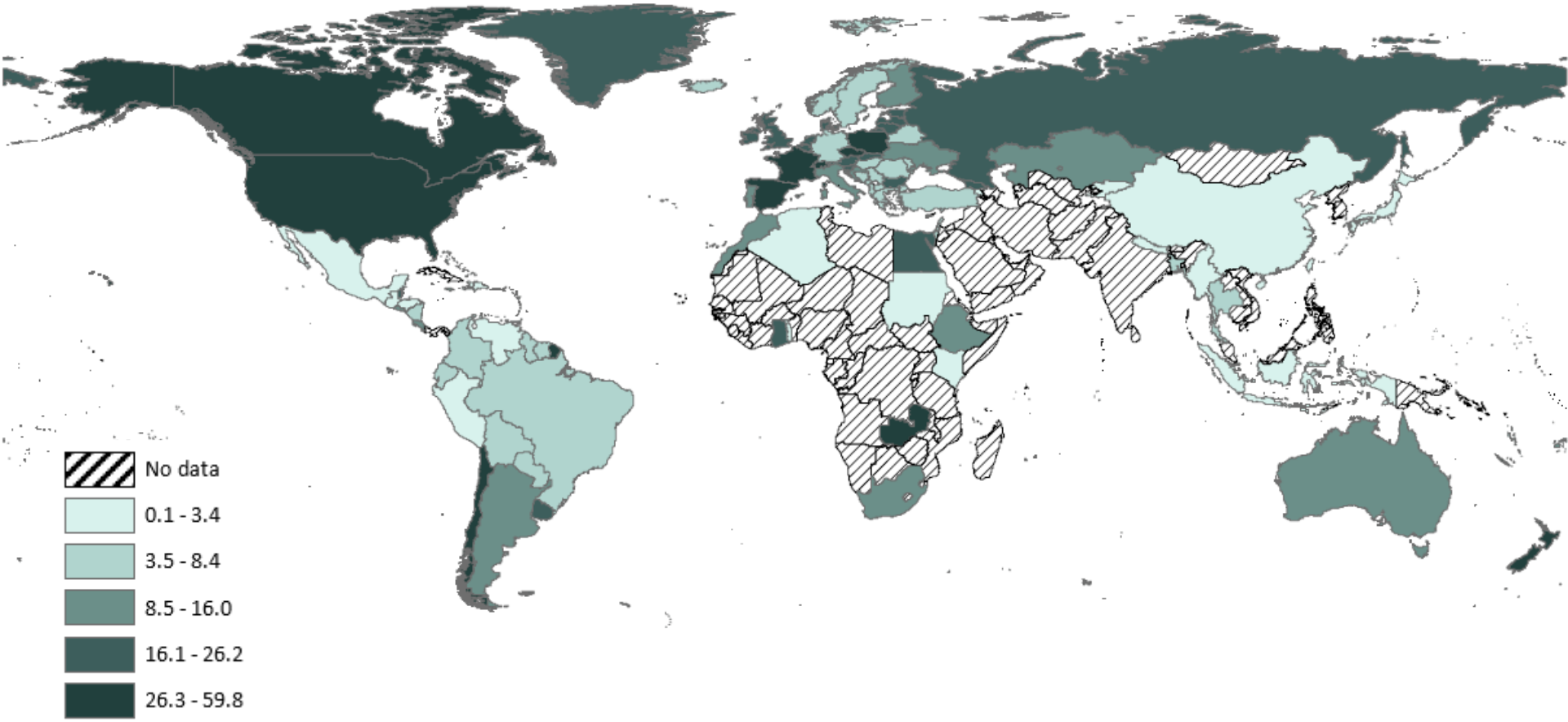
Current tobacco use among young people



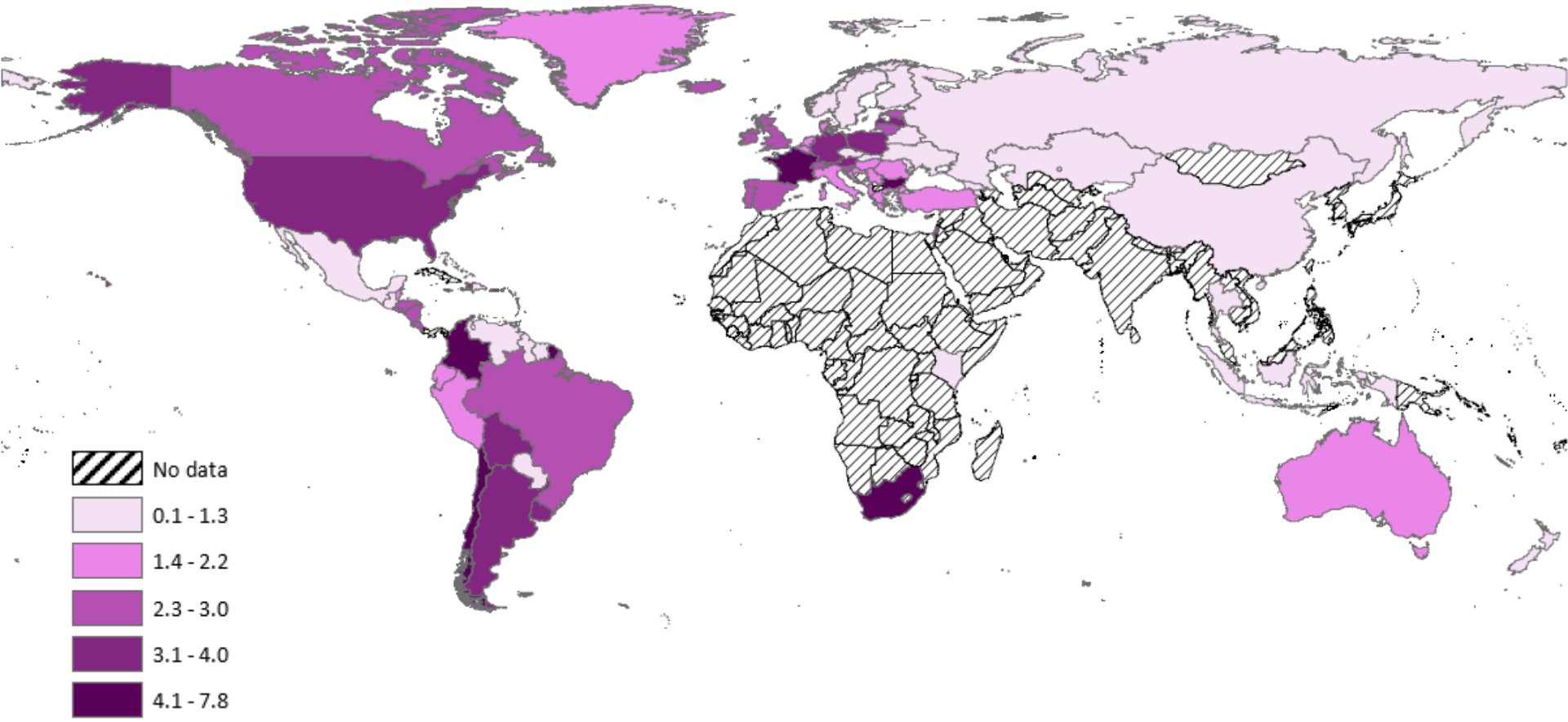
NDARC
National Drug & Alcohol Research Centre

The Difference is Research

Past year cannabis use among young people



Lifetime cocaine use among young people



Substance use in young people 2

Why young people's substance use matters for global health

Wayne D Hall, George Patton, Emily Stockings, Megan Weier, Michael Lynskey, Katherine I Morley, Louisa Degenhardt

During puberty, when young people are completing their education, transitioning into employment, and forming longer-term intimate relationships, a shift in emotional regulation and an increase in risky behaviour, including substance use, is seen. This Series paper considers the potential effects of alcohol, tobacco, and illicit drug use during this period on: social, psychological, and health outcomes in adolescence and young adulthood; role transitions, and later health and social outcomes of regular substance use initiated in adolescence; and the offspring of young people who use substances. We sourced consistent support for causal relations between substance use and outcomes and evidence of biological plausibility from different but complementary research designs. Many adverse health and social outcomes have been associated with different types of substance use. The major challenge lies in deciding which are causal. Furthermore, qualitatively different harms are associated with different substances, differences in life stage when these harms occur, and the quality of evidence for different substances and health outcomes varies substantially. The preponderance of evidence comes from a few high-income countries, thus whether the same social

Lancet Psychiatry 2016

Published Online
February 18, 2016
http://dx.doi.org/10.1016/S2215-0366(16)00013-4

This is the second in a Series of three papers on substance use in young people

Centre for Youth Substance Abuse Research, University of Queensland, Brisbane, QLD, Australia (Prof W D Hall PhD, M Weier BPsycSci); National

2. Potential harms of substance use in young people

Potential harms of substance use

- Major changes, transitions, and position of young people affect the potential outcomes of substance use
- Three ways (triple risks) in which this might occur:
  - acute intoxication and the short-term effects of regular heavy use
  - substance use initiated during this period can have longer-term effects by disrupting social transitions to adulthood and entrenching sustained, heavy, or dependent substance use
  - substance use may have adverse effects on the offspring of young adults

Potential harms of substance use

	Tobacco			Alcohol			Cannabis			Other illicit drugs*		
	Associated?	Likely causal?	Source	Associated?	Likely causal?	Source	Associated?	Likely causal?	Source	Associated?	Likely causal?	Source
Risks in adolescence and young adulthood												
Mental and behavioural												
Polysubstance use	✓	B	49	✓	B	47	✓	B	49–54	✓	D	54
Substance dependence	✓	A	55–57	✓	A	58–61	✓	A	53,62,63	✓	A	63
Depression	✓	B	64	✓	B	65–68	✓	B	69,70	✓	C	71
Anxiety	✓	B	64,72	✓	B	66	✓	B	62,73	✓	C	71
Psychotic symptoms or induced psychosis	✓	B	74–76	✓	B	77	✓	A	64,73,78	✓	A	71,79–82
Violence	X	..	..	✓	B	58,83,84	✓	D	55	✓	C	55
Risky sexual activity	X	..	..	✓	B	59,85,86	✓	D	87	✓	C	87
Intentional self-harm	X	..	..	✓	B	88,89	✓	?B	62,90–94	✓	C	95
Suicide	✓	B	96–99	✓	B	58–60,88,89,94,100	✓	?B	62,90–94	✓	C	101–103
Physical												
Fatal overdose	X	..	..	✓	A	104	X	..	..	✓	A	105
Road traffic accidents	X	..	..	✓	A	58–60	✓	A	62,107–111	✓	C	108,110
Other accidental injuries	✓	D	112,113	✓	A	114	✓	D	115	✓	C	95
Sexually transmitted infections	X	..	..	✓	?C	116,117	X	..	118	✓	B	87,95
HIV, HCV, and HBV infection	X	..	..	✓	?B	117	X	..	118	✓	A	87,119,120
Cognitive impairment	✓	E	121,122	✓	A	123	✓	B	15,62,124,125	✓	C	95
Social and other												
Lower educational attainment	✓	B	56,126,127	✓	B	56,59	✓	B	54,128–131	✓	C	54,56,129
Criminal activity	X	..	..	✓	?C	59	✓	?C	132,133	✓	?C	132,133

Potential harms of substance use

Risks for social role transitions and across the life course												
Mental and behavioural												
Substance dependence	✓	A	55–57	✓	A	134	✓	A	53,62,63	✓	A	134
Depression	✓	B	64	✓	B	65–68	✓	B	69,70	✓	C	71
Anxiety	✓	B	64,72	✓	B	66	✓	C	62,73,135	✓	C	71
Psychotic symptoms or induced psychosis	✓	B	74–76	✓	B	77	✓	A	53,73,78	✓	A†	71,79–82
Intentional self-harm or suicide	X	..	..	✓	B	88,89	✓	?B	62	✓	B	101–103
Physical												
Cardiovascular diseases	✓	A	136	✓	B	137	✓	C	62,124	✓	C	95
Cancers	✓	A	136	✓	B	137	✓	C	62,124	✓	C (injecting)	105
Chronic respiratory diseases	✓	A	136,138	X	..	..	✓	C	62,124	✓	?C	139
Cirrhosis	X	..	..	✓	B	140	X	..	..	✓	B (injecting)	105
Diabetes and endocrine diseases	X	..	..	✓	B	137	X	..	..	X	..	..
Other non-communicable diseases	✓	A	136	✓	B	137	X	..	..	?	..	..
Skin and subcutaneous diseases	X	..	..	X	..	..	X	..	..	✓	C (injecting)	141
Social and other												
Employment	X	..	..	X	..	..	✓	B	53,91	✓	C	138,142
Financial independence	✓	C	143	✓	C	143	✓	B	91,144,145	✓	C	138,142
Family formation	✓	C	143	✓	C	60,143	✓	D	144,145	✓	?C	143
Risks to the next generation												
Maternal reproductive health	✓	A	146	✓	B	146	✓	C	146	✓	C	146
Neonatal outcomes	✓	A	147	✓	B	148	✓	B	62	✓	C‡	149
Child outcomes	✓	A	147,150	?	B	148	✓	C	62	✓	C‡	151

Using cohort studies to examine trajectories of substance use and links with harm

- Adolescent cohorts
  - 2000 stories – the Victorian Adolescent Health Cohort study (VAHCS)
    - What are the outcomes of adolescent cannabis use?
    - Does parental supply of alcohol use increase risks of later binge drinking?
- Cohorts of vulnerable populations
  - What are the predictors of elevated mortality among young people involved with the criminal justice system?
  - People who inject drugs and tamper with opioids (NOMAD) – how did they change when tamper-resistant oxycodone was introduced?
  - People prescribed opioids for chronic non-cancer pain (POINT) – do opioids help?

3. IHME's Global Burden of Disease studies (2010-2027)

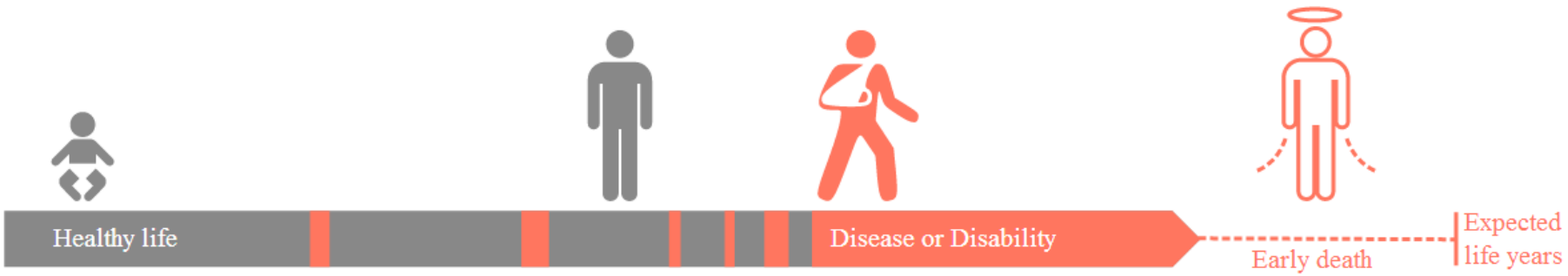
What is "global burden of disease"?

- The global burden of disease (GBD) framework was initiated by the World Bank World Development Report of 1993
- GBD quantifies what **disables** and **kills** people across countries, time, ages, and sex.

DALY

Disability Adjusted Life Years is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death

= **YLD** Years Lived with Disability + **YLL** Years of Life Lost



Summary of major components

- The major steps of GBD:
  - Reviews of epidemiological data
  - Modelling of epidemiology
  - Burden estimated in YLDs, deaths, YLLs and DALYs
- Modelling
  - Combines data from reviews with the knowledge of domain experts
  - Uses Bayesian methods
    - produces internally consistent estimates of disease incidence, prevalence, remission, and excess mortality
    - comparable between conditions, ages, locations, times, and sexes

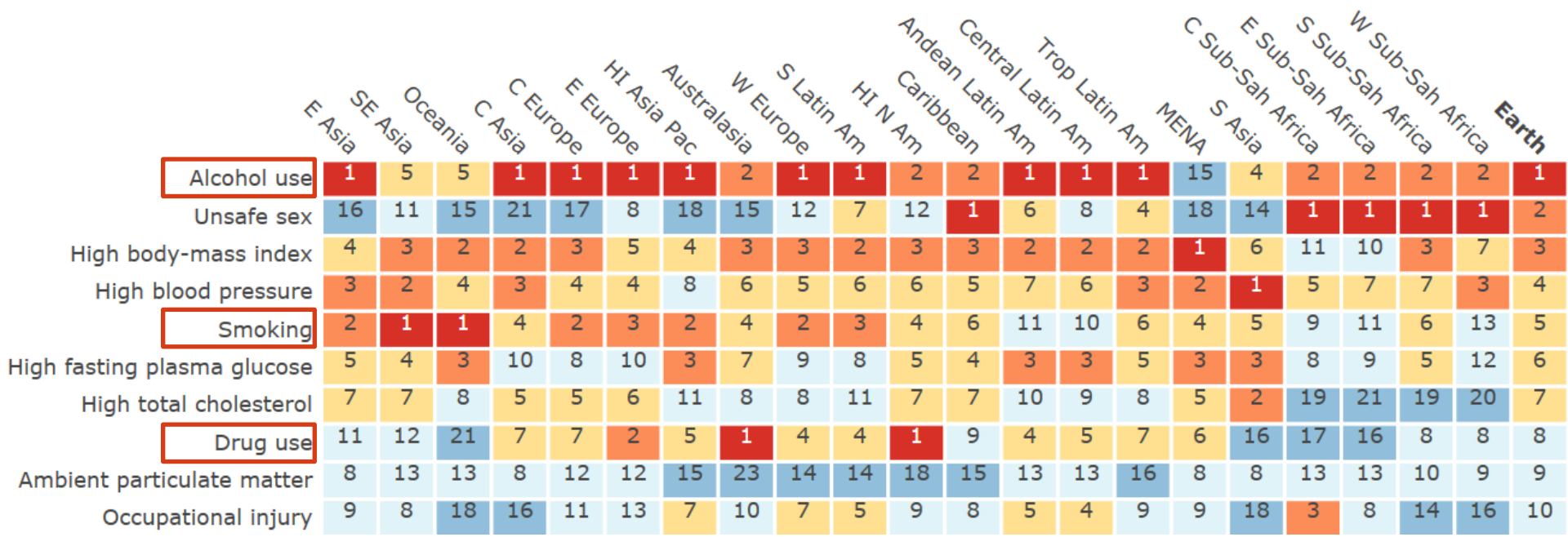
Illicit drugs and global burden of disease studies

- Prior to GBD, mortality was the only indicator used to compare burden across diseases and injuries
  - for disorders with low mortality, they would have been considered comparatively unimportant – even if they impact upon well-being
- Early GBD studies: WHO's GBD 1990, updates between 2000 and 2005
  - Small team in Geneva
    - some lack of clarity in reporting of methods
  - Illicit drugs
    - GBD 1990: 'dysfunctional and harmful drug use'
    - Cannabis not included; injecting drug use not separately examined
    - Tracking back, substantial use of English and Holman's (1995) report

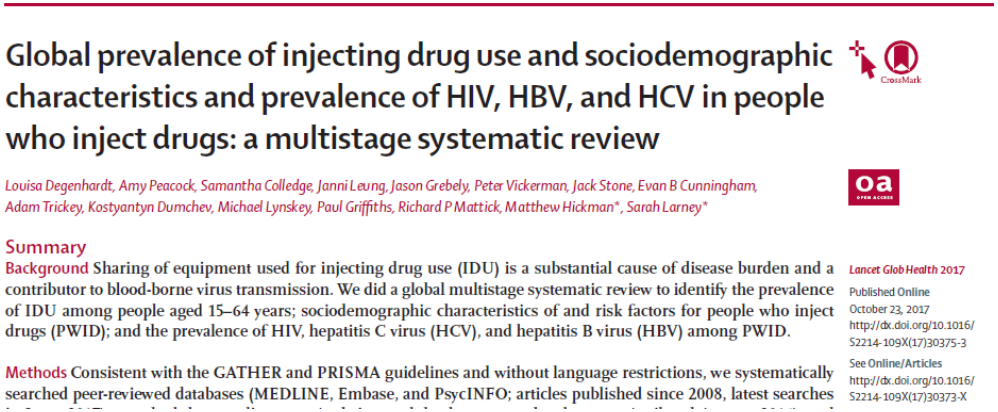
Illicit drugs and global burden of disease studies

- 2007: Gates Foundation funding
  - established the Institute of Health Metrics and Evaluation (IHME), which led a consortium including WHO to conduct GBD 2010
  - Published in 2012/2013
  - Ongoing iterations of the GBD studies (2013, 2015 is underway)
  - Changes overall:
    - Systematic review focus
    - Expansion in expert involvement cf. earlier studies
    - Causal relationships must be justified with evidence
    - Increased emphasis upon transparency of input data
    - Modelling of uncertainty
  - Changes for illicit drugs:
    - Cannabis included; hepatitis C and B as outcomes of injecting

Ranking of substance use as risk factors among 15-49 year olds



	E Asia	SE Asia	Oceania	C Asia	C Europe	E Europe	HI Asia Pac	Australasia	W Europe	S Latin Am	HI N Am	Caribbean	Andean Latin Am	Central Latin Am	Trop Latin Am	MENA	C Sub-Sah Africa	S Asia	E Sub-Sah Africa	S Sub-Sah Africa	W Sub-Sah Africa	Earth
Alcohol use	1	5	5	1	1	1	1	2	1	1	2	2	1	1	1	15	4	2	2	2	2	1
Unsafe sex	16	11	15	21	17	8	18	15	12	7	12	1	6	8	4	18	14	1	1	1	1	2
High body-mass index	4	3	2	2	3	5	4	3	3	2	3	3	2	2	2	1	6	11	10	3	7	3
High blood pressure	3	2	4	3	4	4	8	6	5	6	6	5	7	6	3	2	1	5	7	7	3	4
Smoking	2	1	1	4	2	3	2	4	2	3	4	6	11	10	6	4	5	9	11	6	13	5
High fasting plasma glucose	5	4	3	10	8	10	3	7	9	8	5	4	3	3	5	3	3	8	9	5	12	6
High total cholesterol	7	7	8	5	5	6	11	8	8	11	7	7	10	9	8	5	2	19	21	19	20	7
Drug use	11	12	21	7	7	2	5	1	4	4	1	9	4	5	7	6	16	17	16	8	8	8
Ambient particulate matter	8	13	13	8	12	12	15	23	14	14	18	15	13	13	16	8	8	13	13	10	9	9
Occupational injury	9	8	18	16	11	13	7	10	7	5	9	8	5	4	9	9	18	3	8	14	16	10



Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review

Louisa Degenhardt, Amy Peacock, Samantha Colledge, Janni Leung, Jason Grebely, Peter Vickerman, Jack Stone, Evan B Cunningham, Adam Trickey, Kostyantyn Dumchev, Michael Lynskey, Paul Griffiths, Richard P Mattick, Matthew Hickman*, Sarah Larney*

Summary

Background Sharing of equipment used for injecting drug use (IDU) is a substantial cause of disease burden and a contributor to blood-borne virus transmission. We did a global multistage systematic review to identify the prevalence of IDU among people aged 15–64 years; sociodemographic characteristics of and risk factors for people who inject drugs (PWID); and the prevalence of HIV, hepatitis C virus (HCV), and hepatitis B virus (HBV) among PWID.

Methods Consistent with the GATHER and PRISMA guidelines and without language restrictions, we systematically searched peer-reviewed databases (MEDLINE, Embase, and PsycINFO; articles published since 2008, latest searches

Lancet Glob Health 2017

Published Online October 23, 2017 http://dx.doi.org/10.1016/S2214-109X(17)30375-3

See Online/Articles http://dx.doi.org/10.1016/S2214-109X(17)30373-X

4. Extending global syntheses – the example of injecting drug use

Degenhardt et al (2017). Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review. *The Lancet Global Health.*

Global reviews of injecting drug use and characteristics of people who inject drugs

- Injecting drug use is an important driver of burden of disease due to illicit drug use
  - Reviews of injecting drug use and BBVs (2008, 2011)
    - Since these, annual updated reports in UNODC's World Drug Report
- There are effective interventions to prevent BBV, including:
  - Needle and syringe programs (NSP)
  - Opioid substitution therapy (OST)
  - HIV counselling and testing
  - HIV antiretroviral therapy
  - Condom distribution programs
  - Intervention coverage very low (2010)
    - Since then, biannual update of service availability and site numbers by HRI

Methods

- **Peer-reviewed literature:** Medline, EMBASE, PsycInfo
- **International organisations**: UNODC, WHO, UNAIDS, Global Fund, EMCDDA, HRI
- **Grey literature search**
- **Expert requests, additional consultation**
- All these stages and approach were consistent with previous review (Mathers et al, 2008)

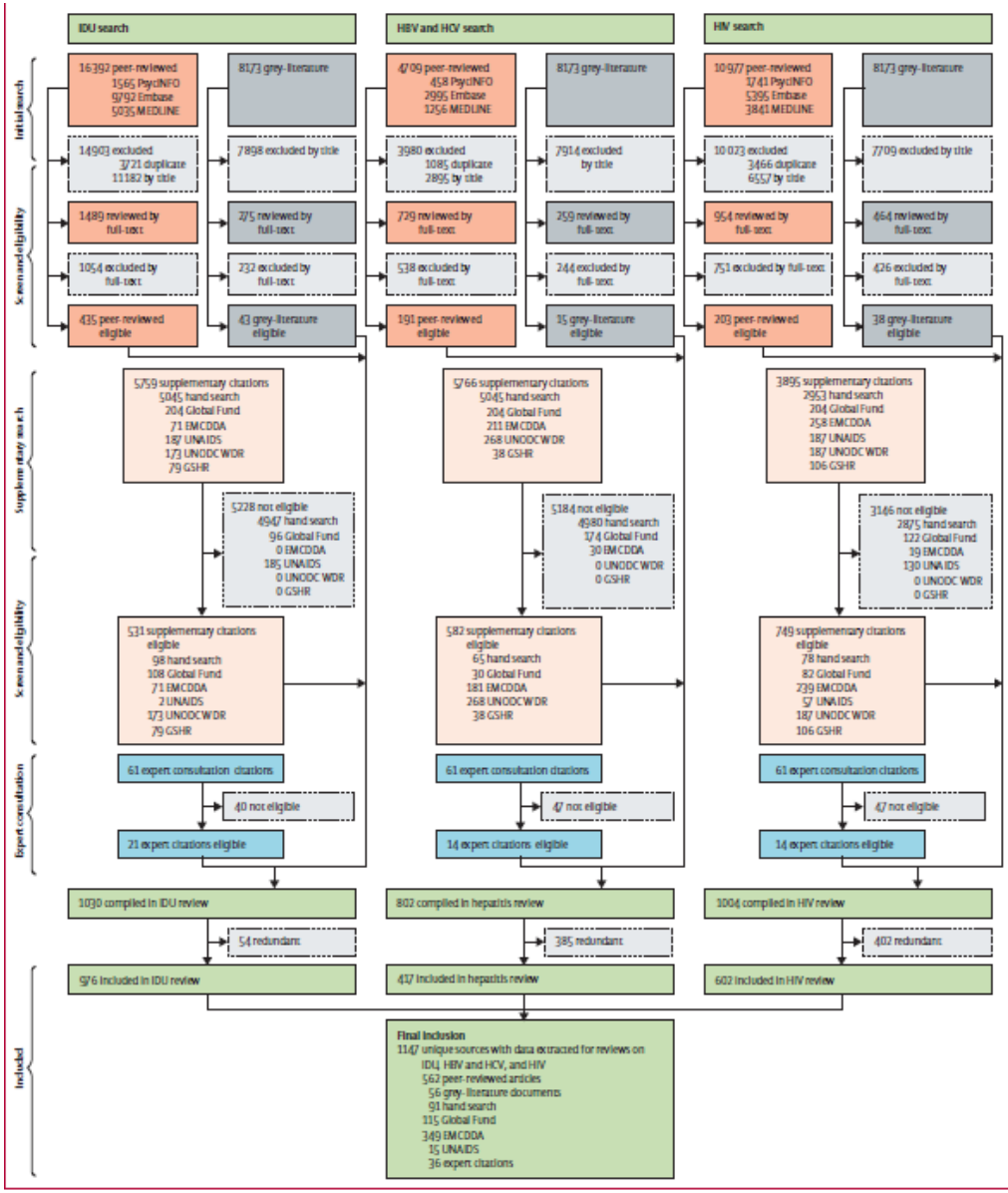
Methods

- We extracted data from all eligible studies on:
  - % women, young (<25 years)
  - % recently homeless, recent sex work
  - % incarceration history, arrest
  - Drugs injected, risk behaviours
- A note about our decision rules
  - Used all eligible estimates
  - If multiple estimates available – pooled via meta-analysis (generating 95%CI)
- regional estimates generated in the same manner as for BBV regional estimates

Flowchart

Screened 55,671 papers or reports

Ultimately 1,147 papers or reports extracted for at least one aspect of our review

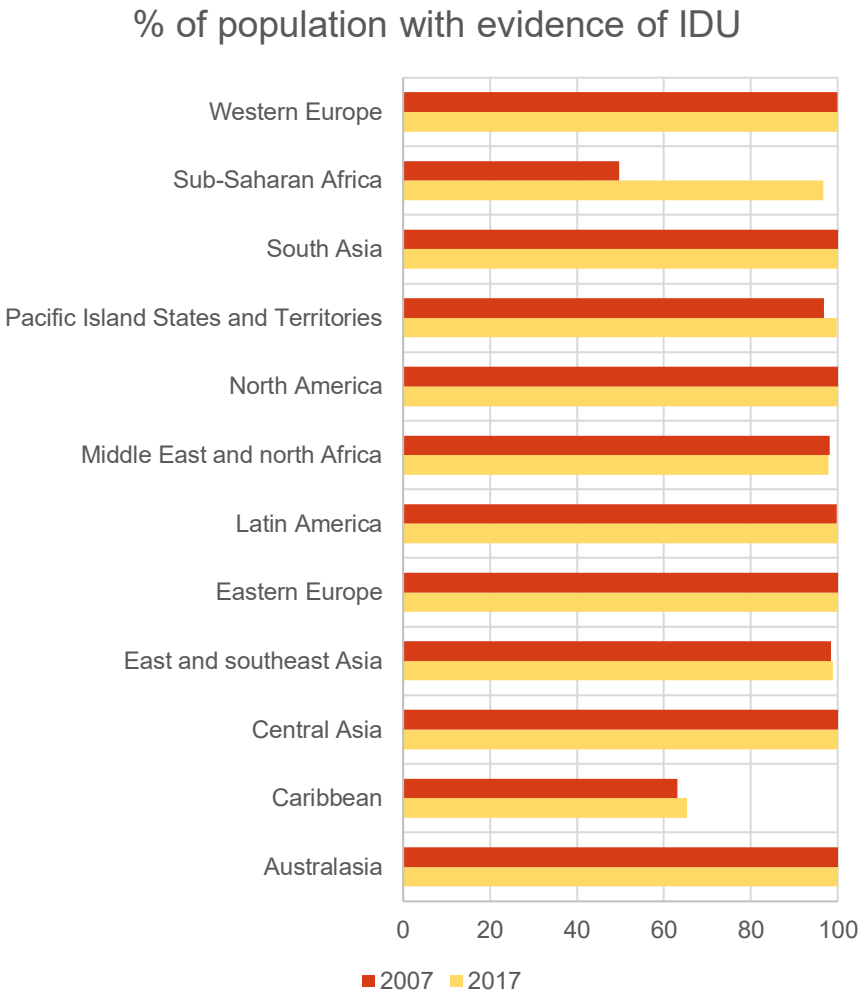


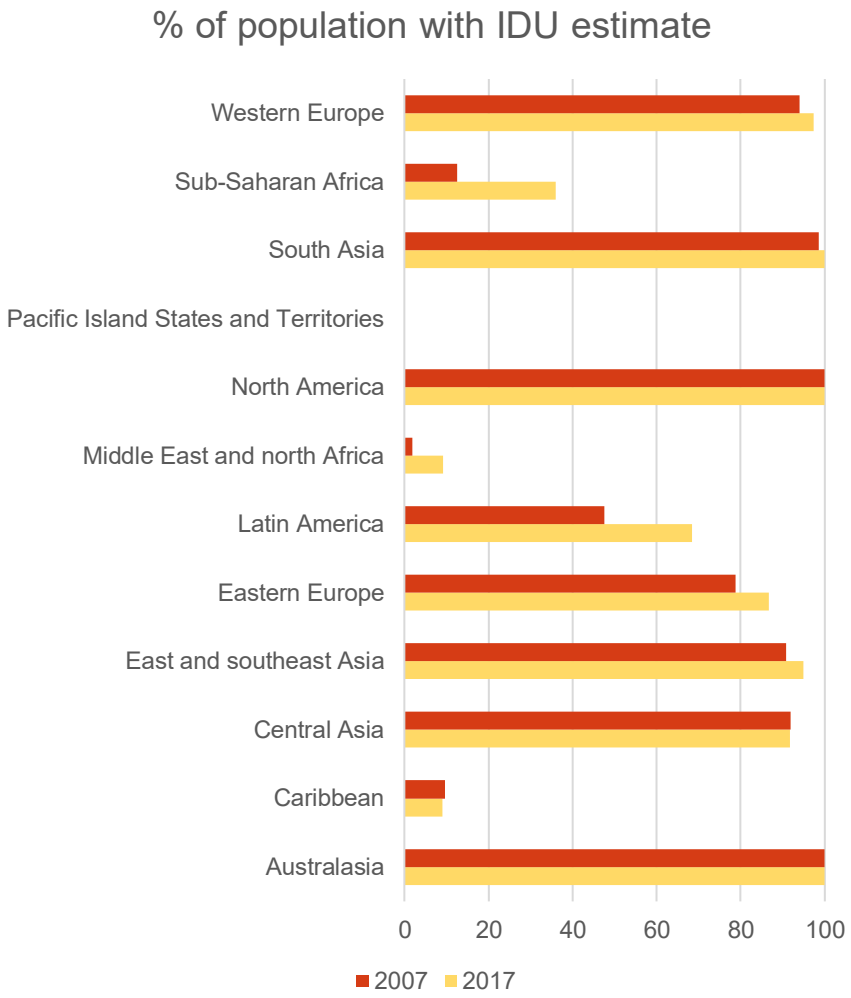
NDARC
National Drug & Alcohol Research Centre

A summary of data – 2007 vs. 2017

	2007	2017
Countries with IDU	148	179
Countries with IDU %	61	83
Countries with HIV %	82	108
Countries with anti-HCV %	77	98
Population with IDU	94%	99%
Population with IDU %	76%	82%
PWID population with HIV %	83%	90%
PWID population with anti-HCV %	84%	88%

Evidence of injecting drug use – 2007 vs. 2017

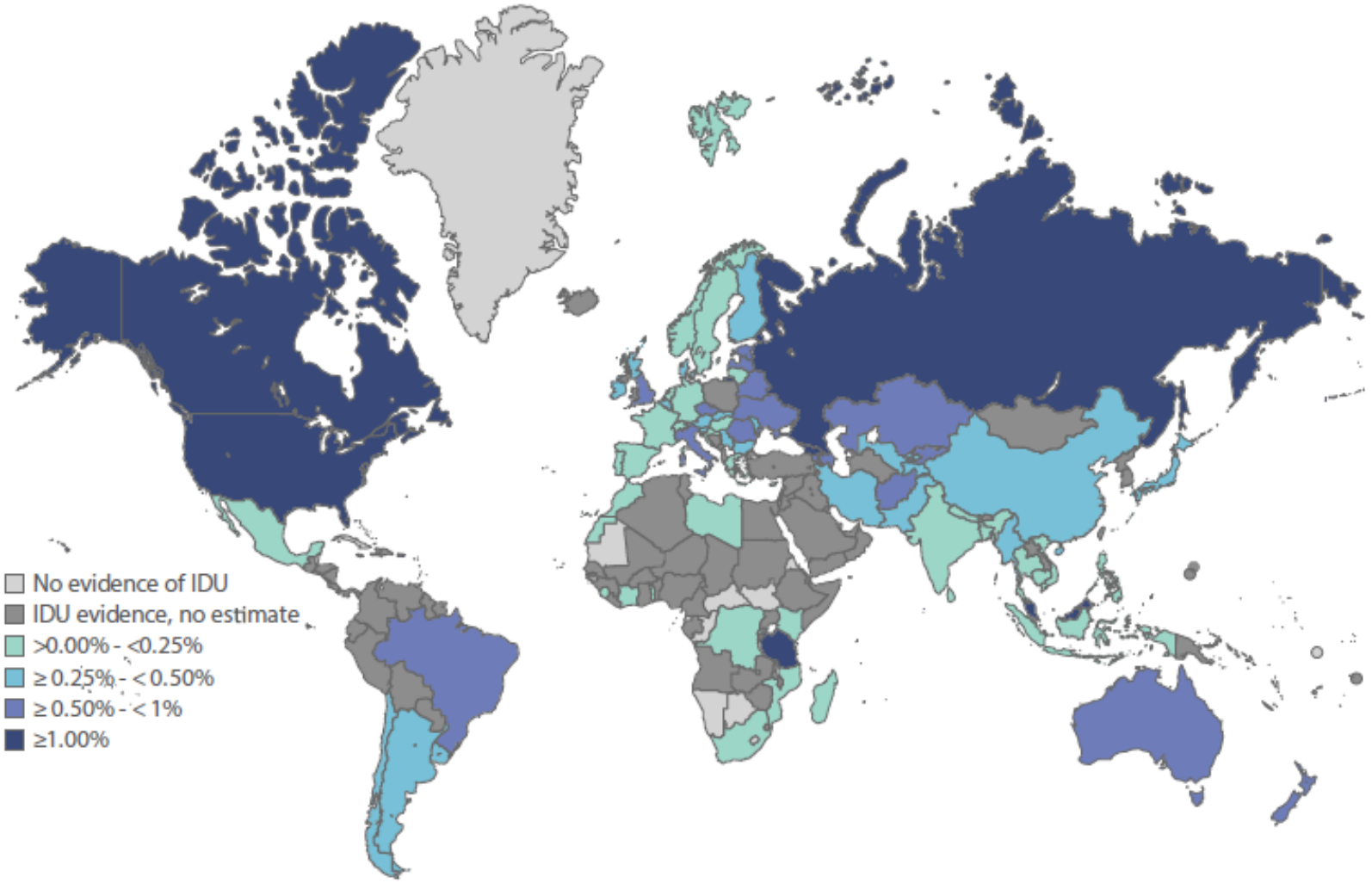




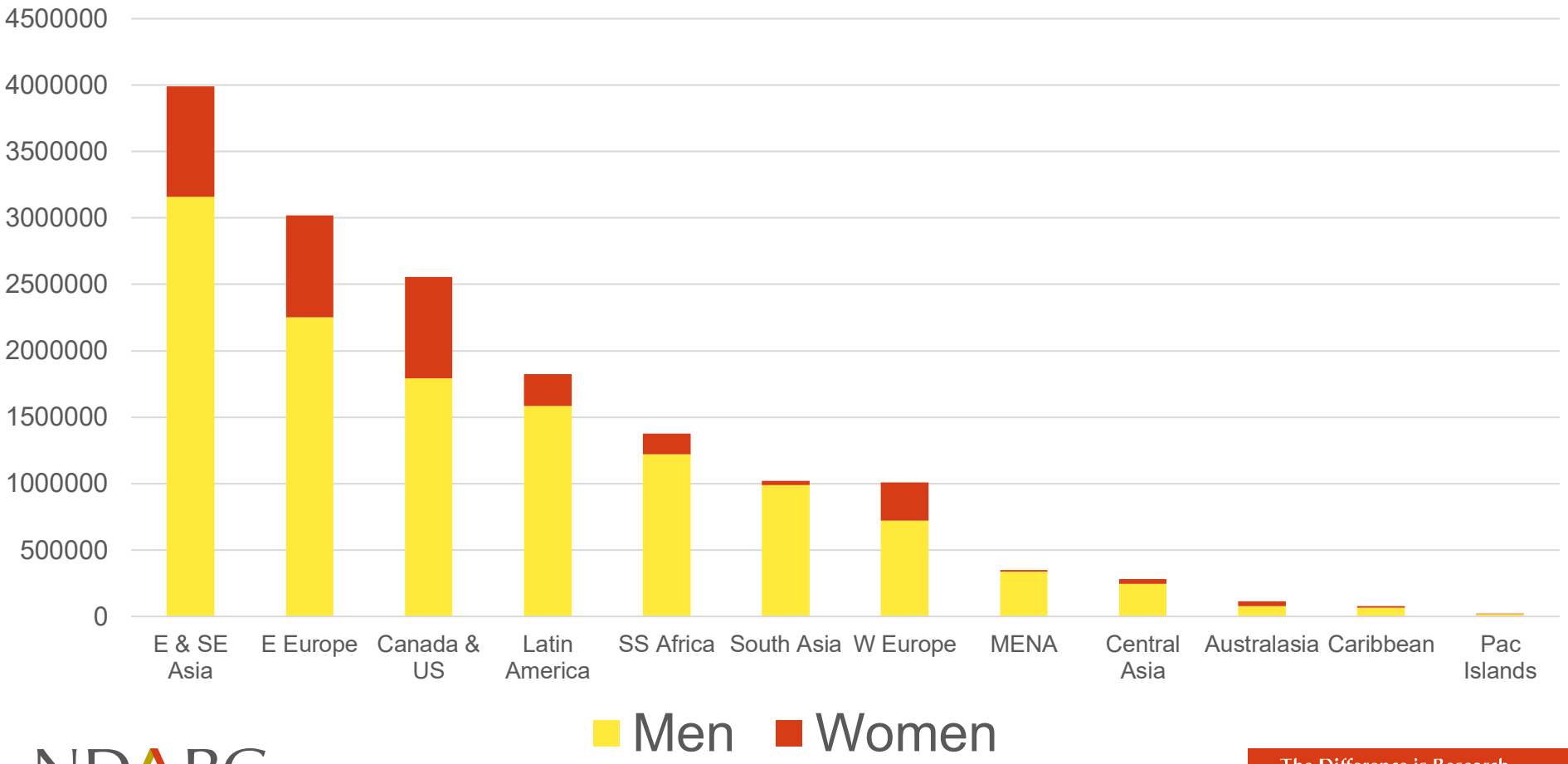
NDARC
National Drug & Alcohol Research Centre

The Difference is Research

Prevalence of injecting drug use



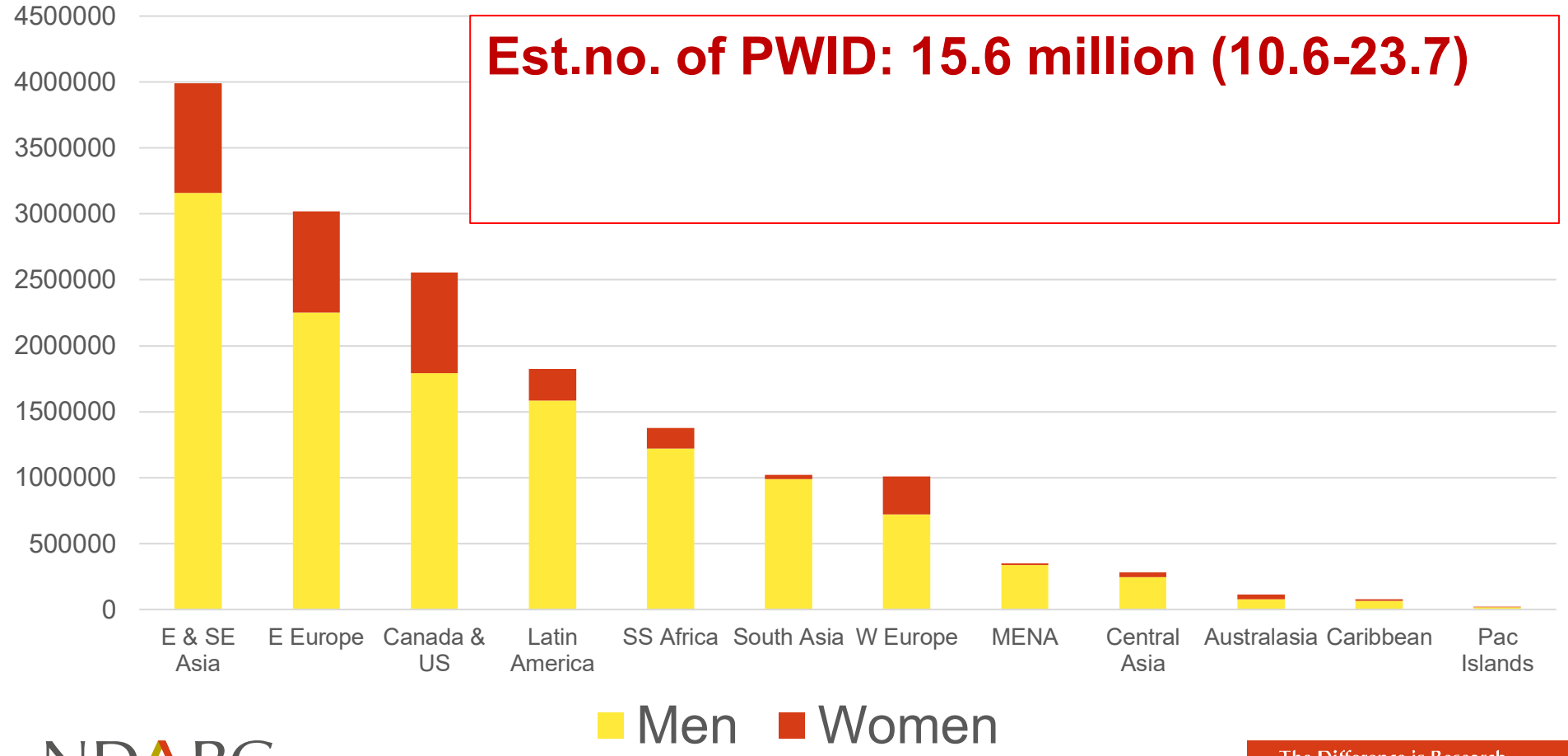
Estimates of the number of people who inject drugs



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

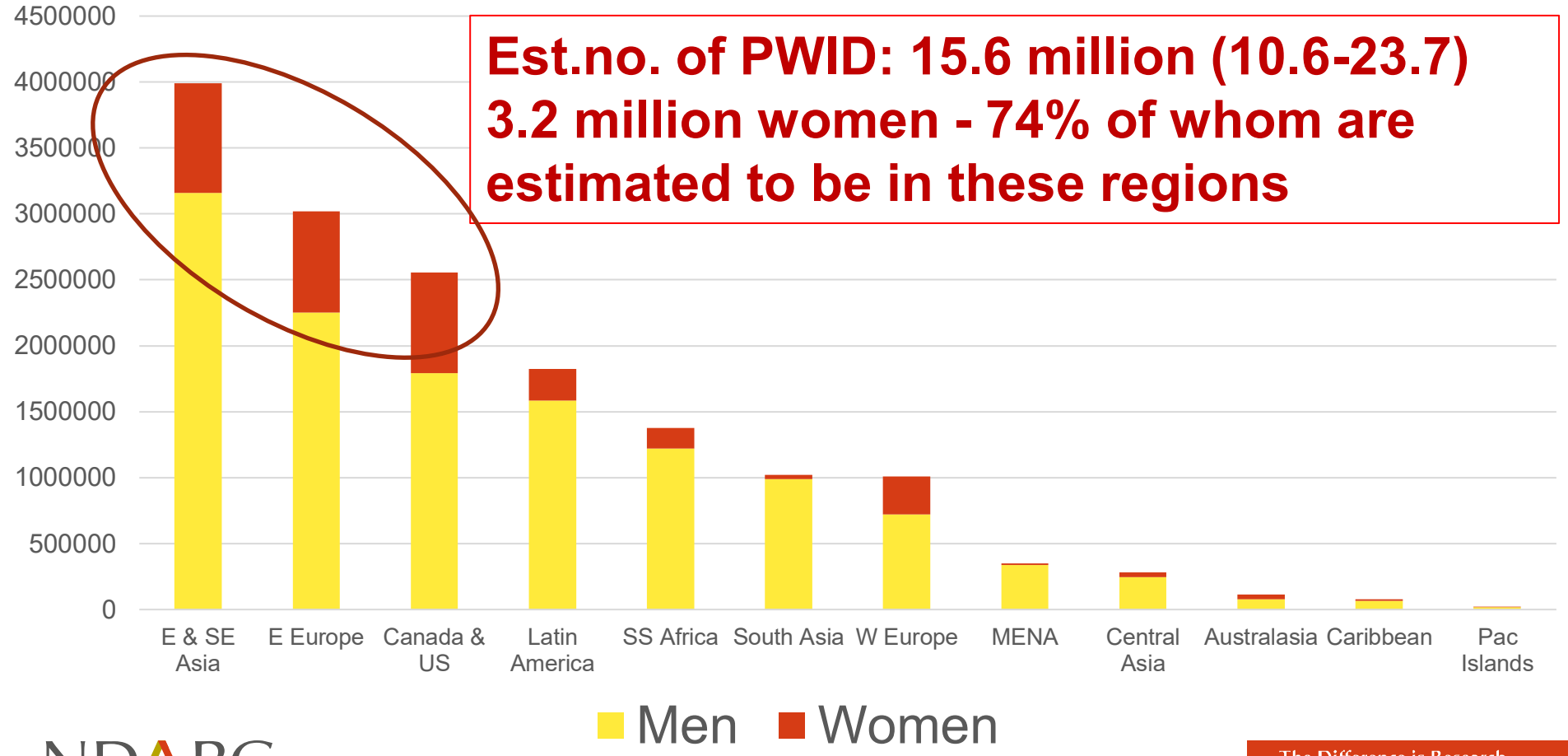
Estimates of the number of people who inject drugs



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

Estimates of the number of people who inject drugs

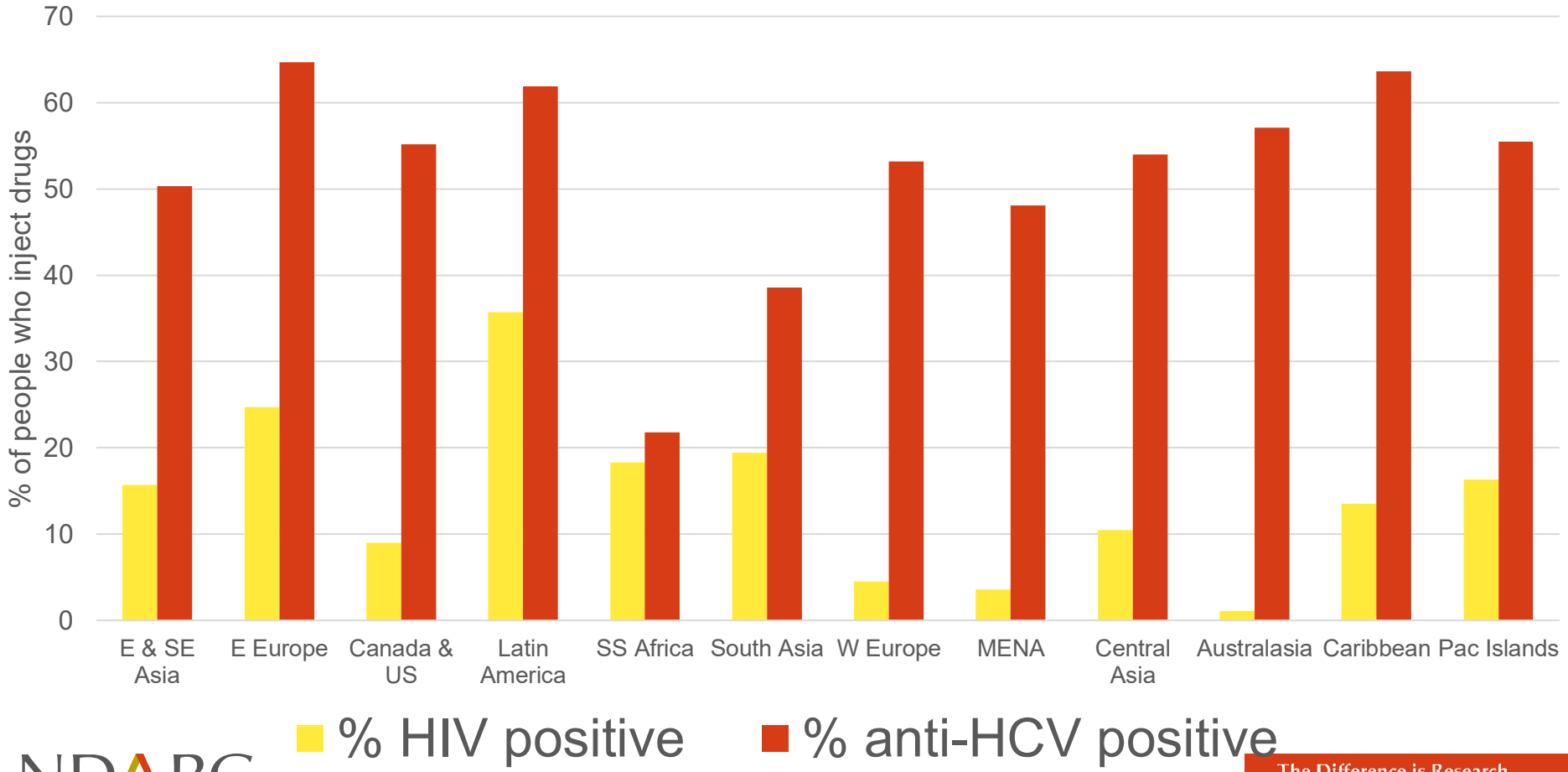


Est.no. of PWID: 15.6 million (10.6-23.7)
3.2 million women - 74% of whom are estimated to be in these regions

NDARC
National Drug & Alcohol Research Centre

The Difference is Research

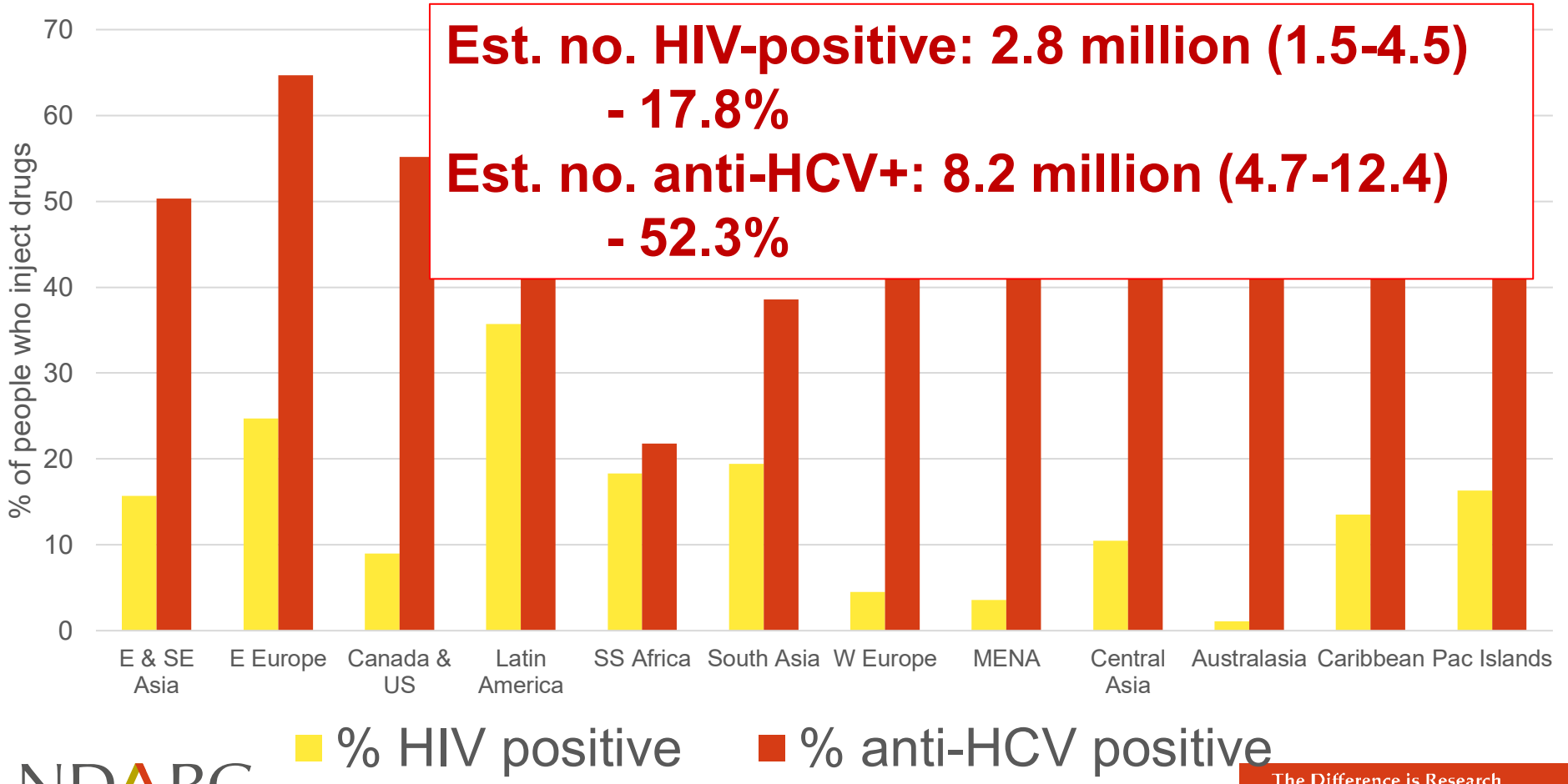
HIV and anti-HCV prevalence among people who inject drugs



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

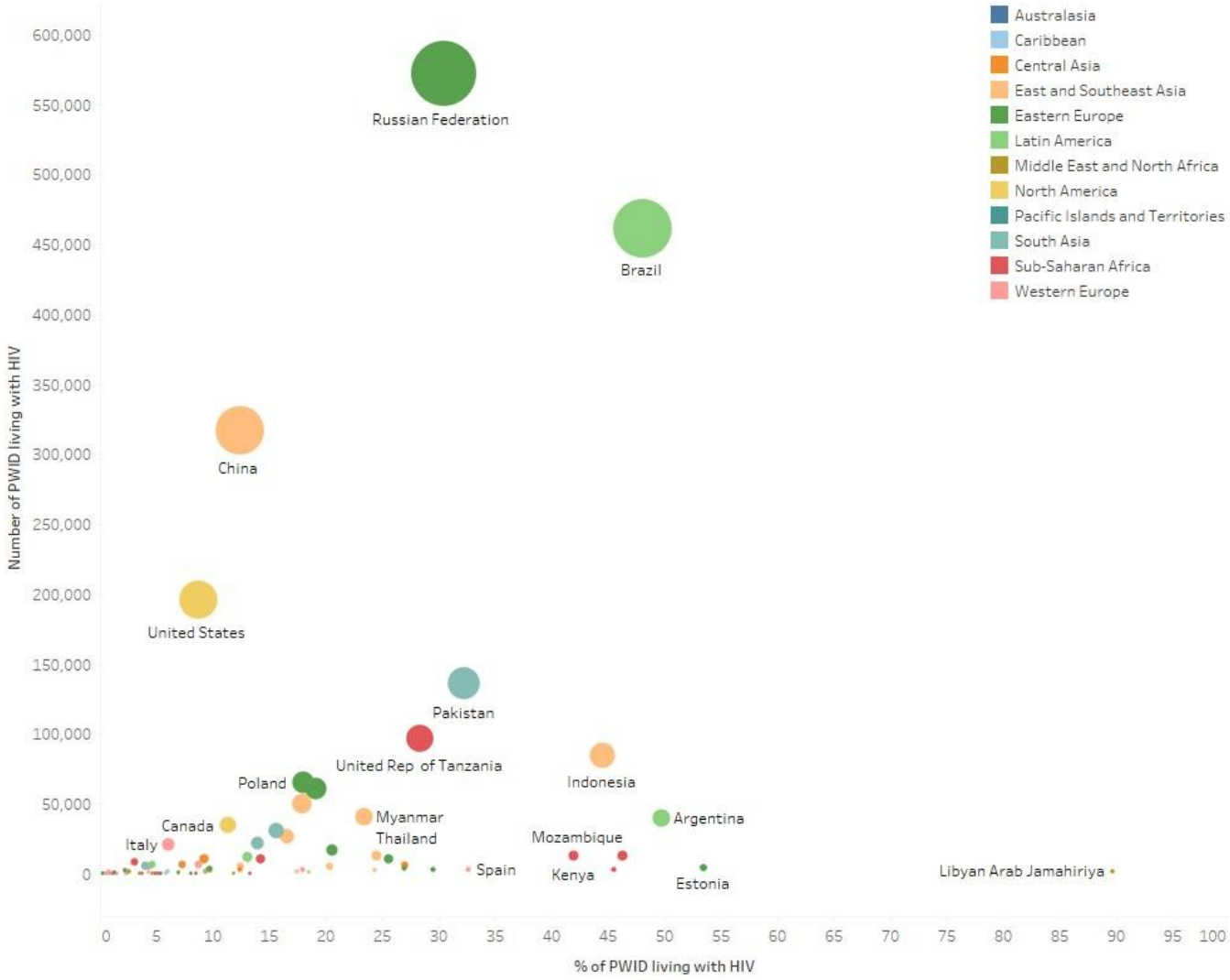
HIV and anti-HCV prevalence among people who inject drugs



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

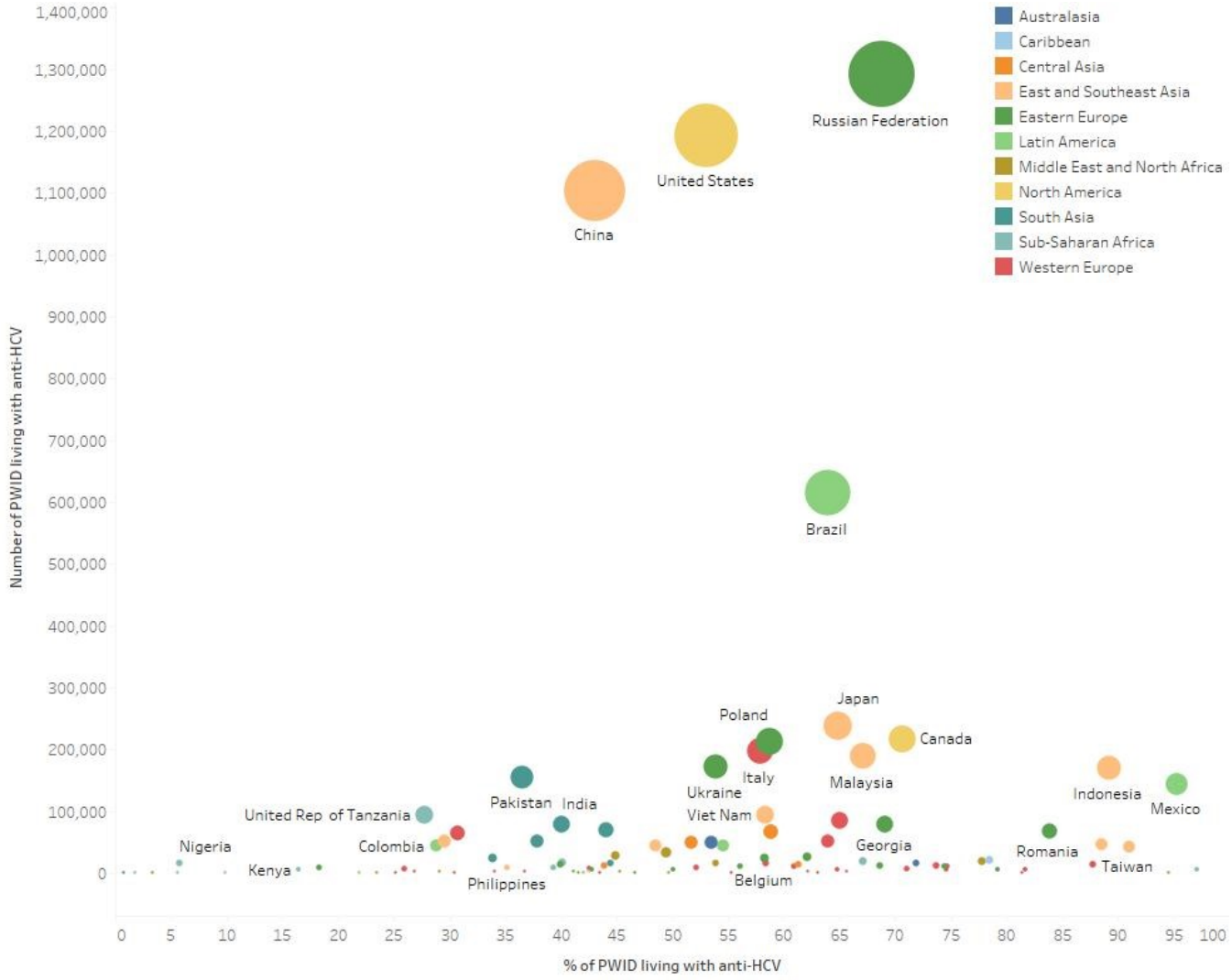
HIV among PWID



NDARC
National Drug & Alcohol Research Centre

The Difference is Research

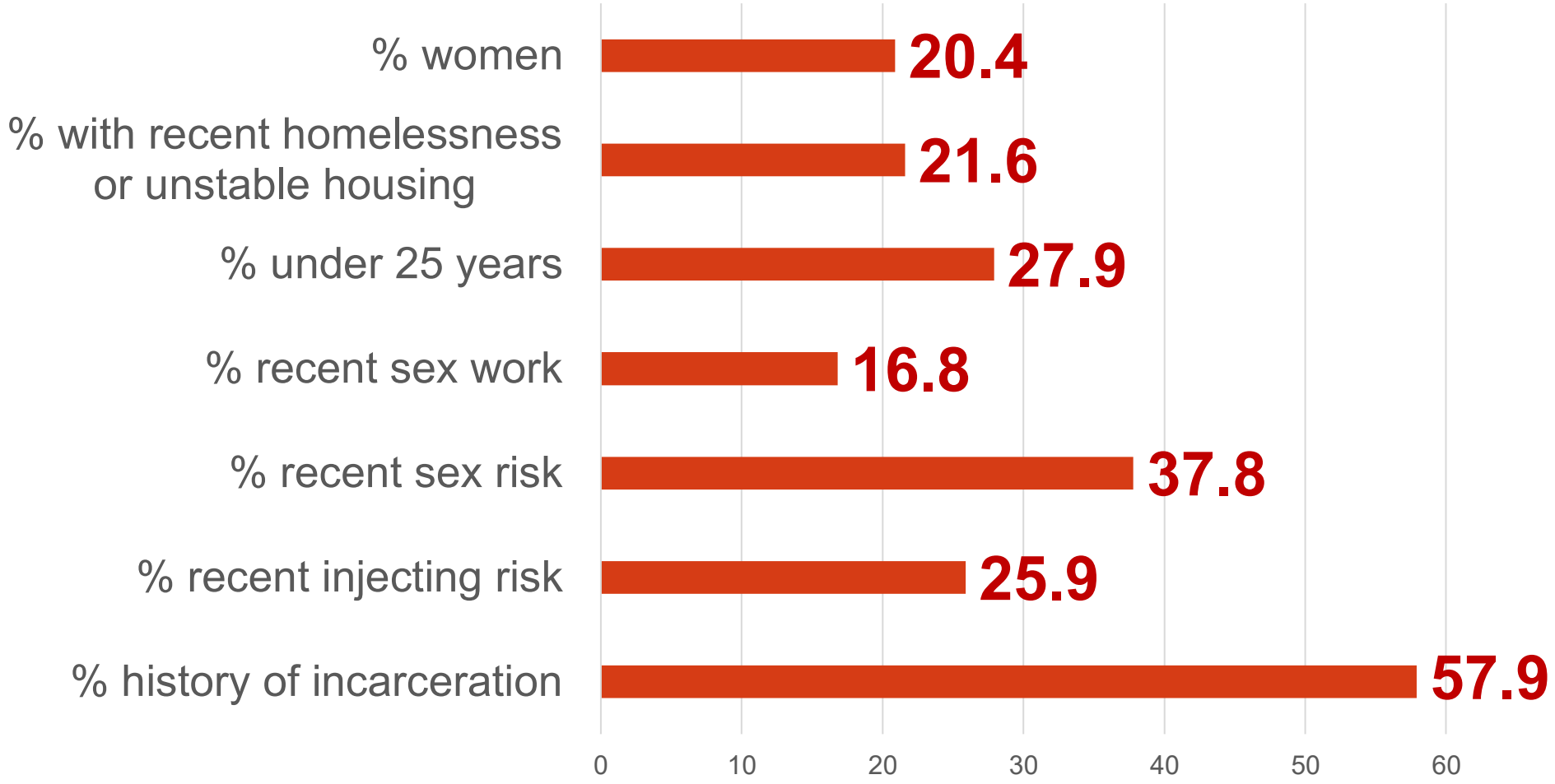
Anti-HCV among PWID



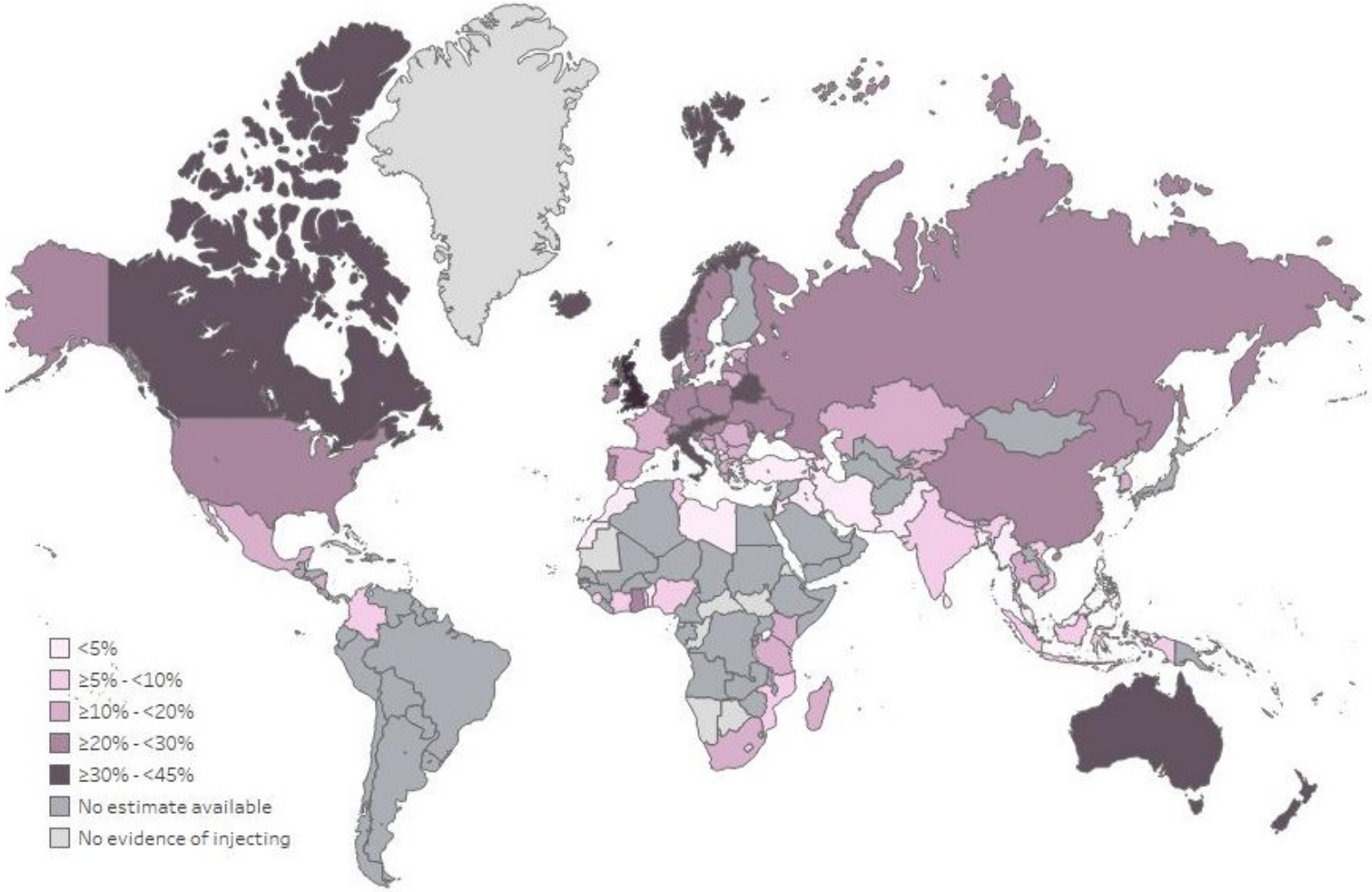
NDARC
National Drug & Alcohol Research Centre

The Difference is Research

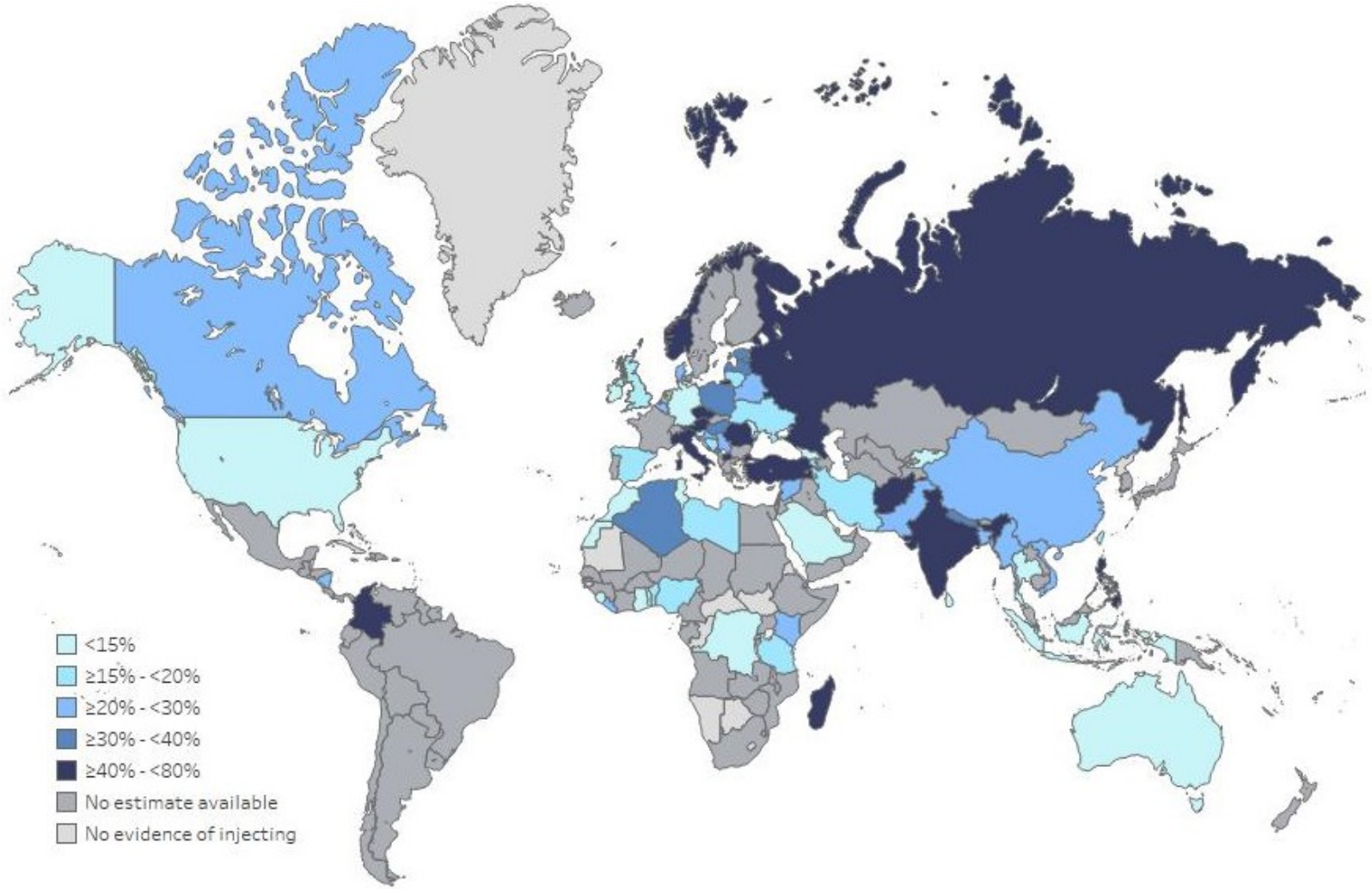
Some characteristics of PWID globally…



…with substantial regional variation
(% women)



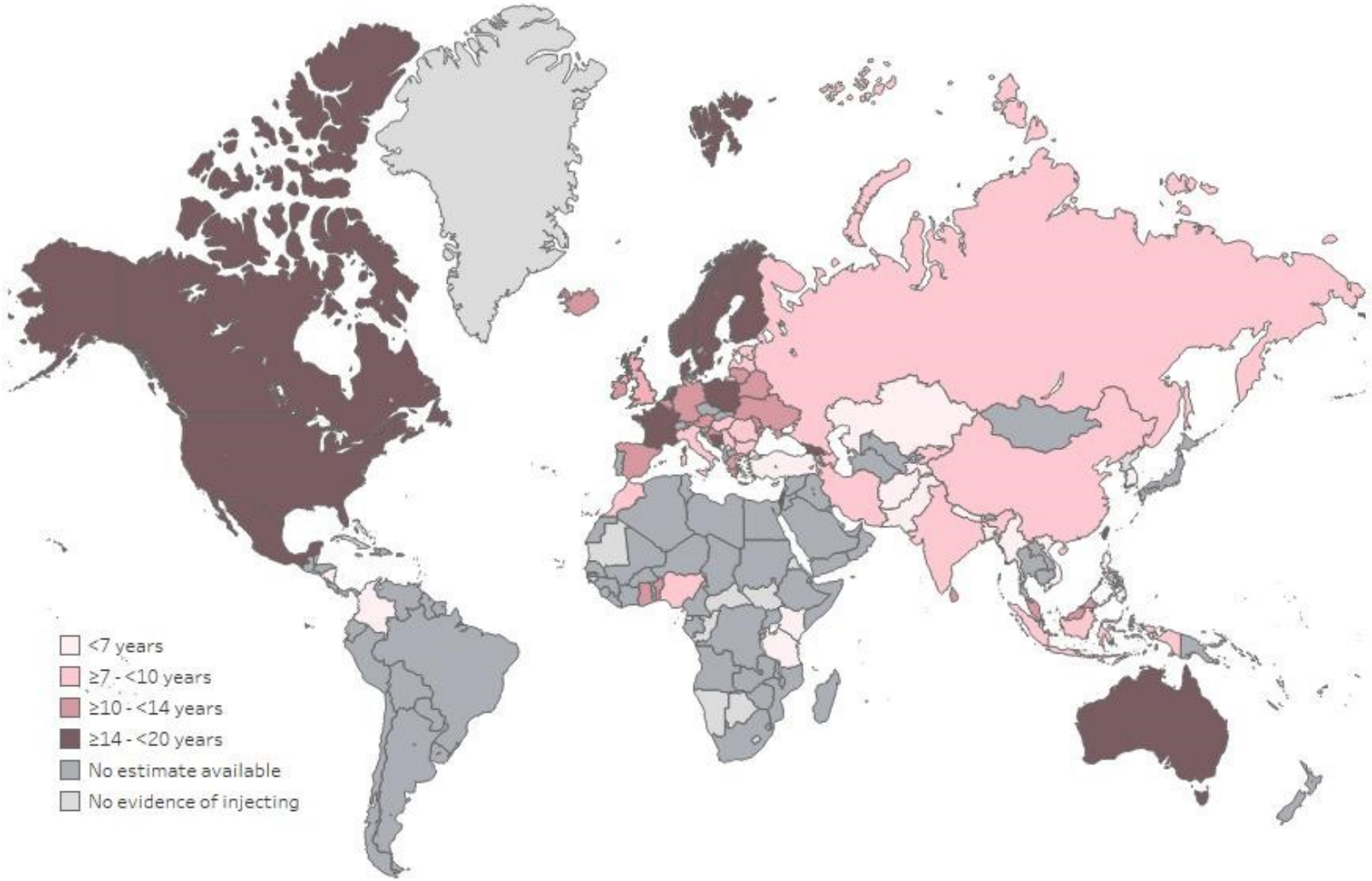
…with substantial regional variation
(% under 25 years)

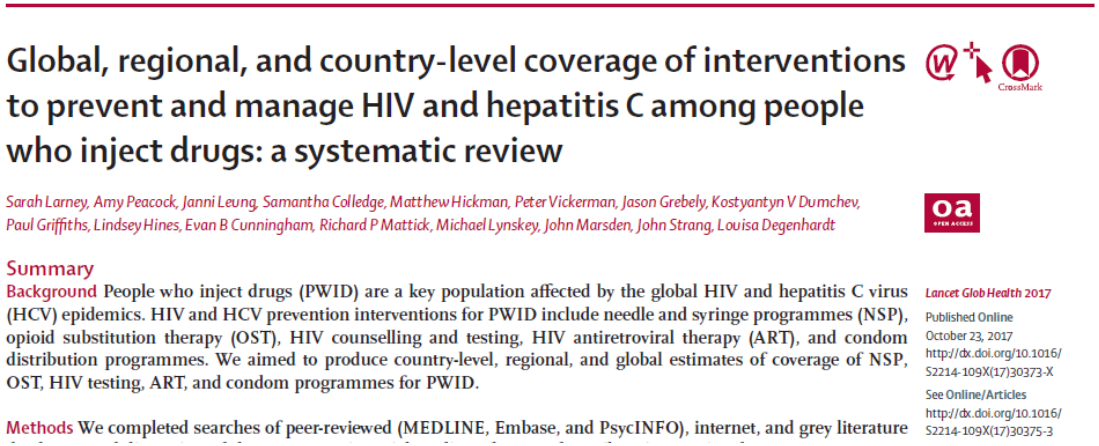


NDARC
National Drug & Alcohol Research Centre

The Difference is Research

…with substantial regional variation
(Median years of injecting)





Global, regional, and country-level coverage of interventions to prevent and manage HIV and hepatitis C among people who inject drugs: a systematic review

Sarah Larney, Amy Peacock, Janni Leung, Samantha Colledge, Matthew Hickman, Peter Vickerman, Jason Grebely, Kostyantyn V Dumchev, Paul Griffiths, Lindsey Hines, Evan B Cunningham, Richard P Mattick, Michael Lynskey, John Marsden, John Strang, Louisa Degenhardt

Summary

Background People who inject drugs (PWID) are a key population affected by the global HIV and hepatitis C virus (HCV) epidemics. HIV and HCV prevention interventions for PWID include needle and syringe programmes (NSP), opioid substitution therapy (OST), HIV counselling and testing, HIV antiretroviral therapy (ART), and condom distribution programmes. We aimed to produce country-level, regional, and global estimates of coverage of NSP, OST, HIV testing, ART, and condom programmes for PWID.

Methods We completed searches of peer-reviewed (MEDLINE, Embase, and PsycINFO), internet, and grey literature

Lancet Glob Health 2017

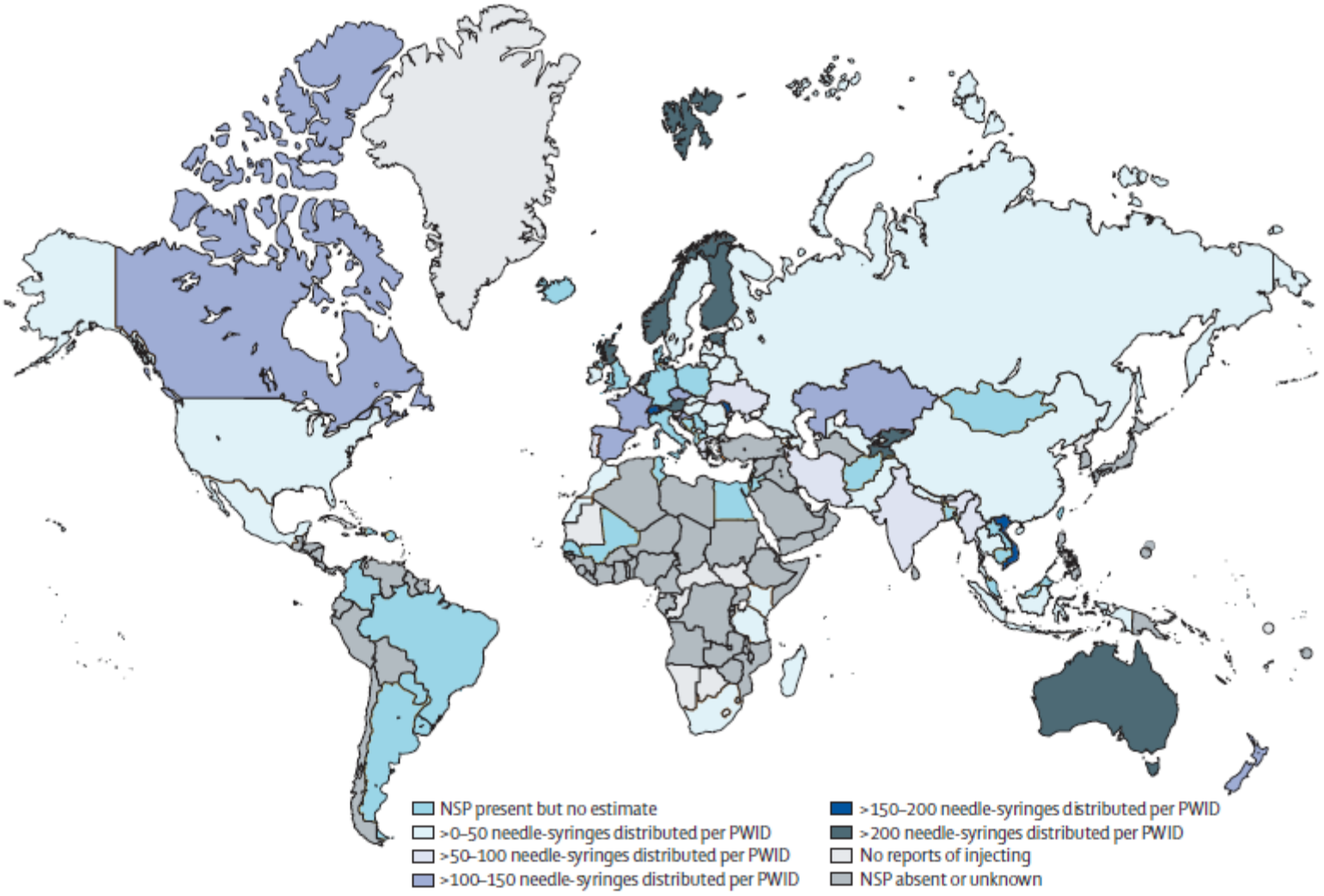
Published Online October 23, 2017 http://dx.doi.org/10.1016/S2214-109X(17)30373-X

See Online/Articles http://dx.doi.org/10.1016/S2214-109X(17)30375-3

5. Intervention coverage for people who inject drugs

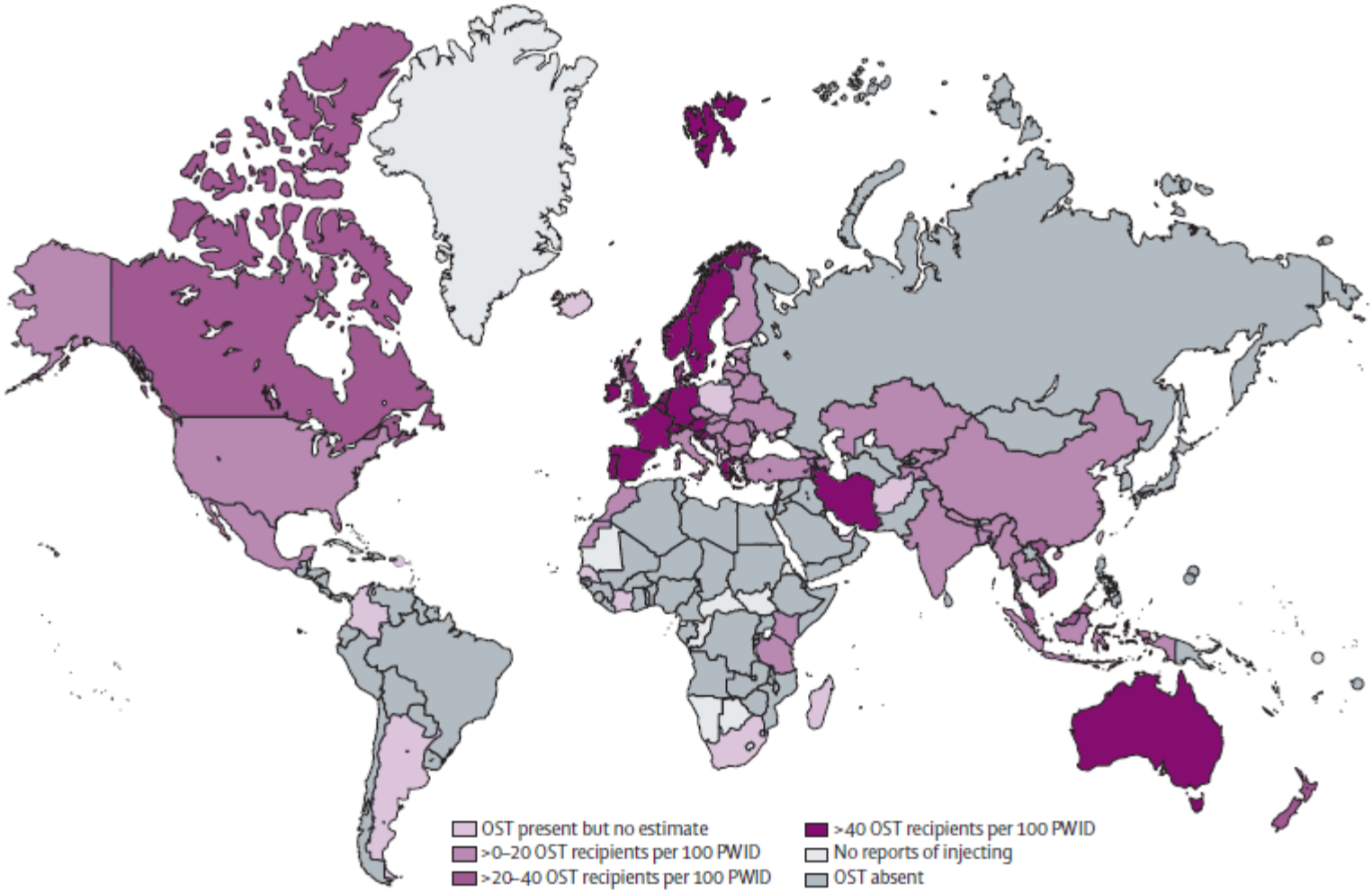
Larney et al (2017). Systematic review of global, regional, and country-level coverage of interventions to prevent and manage HIV and hepatitis C among people who inject drugs. *The Lancet Global Health.*

NSP coverage (needles-syringes per 100 PWID)



Globally: 33 needles per PWID per year

OST coverage (clients per 100 PWID)

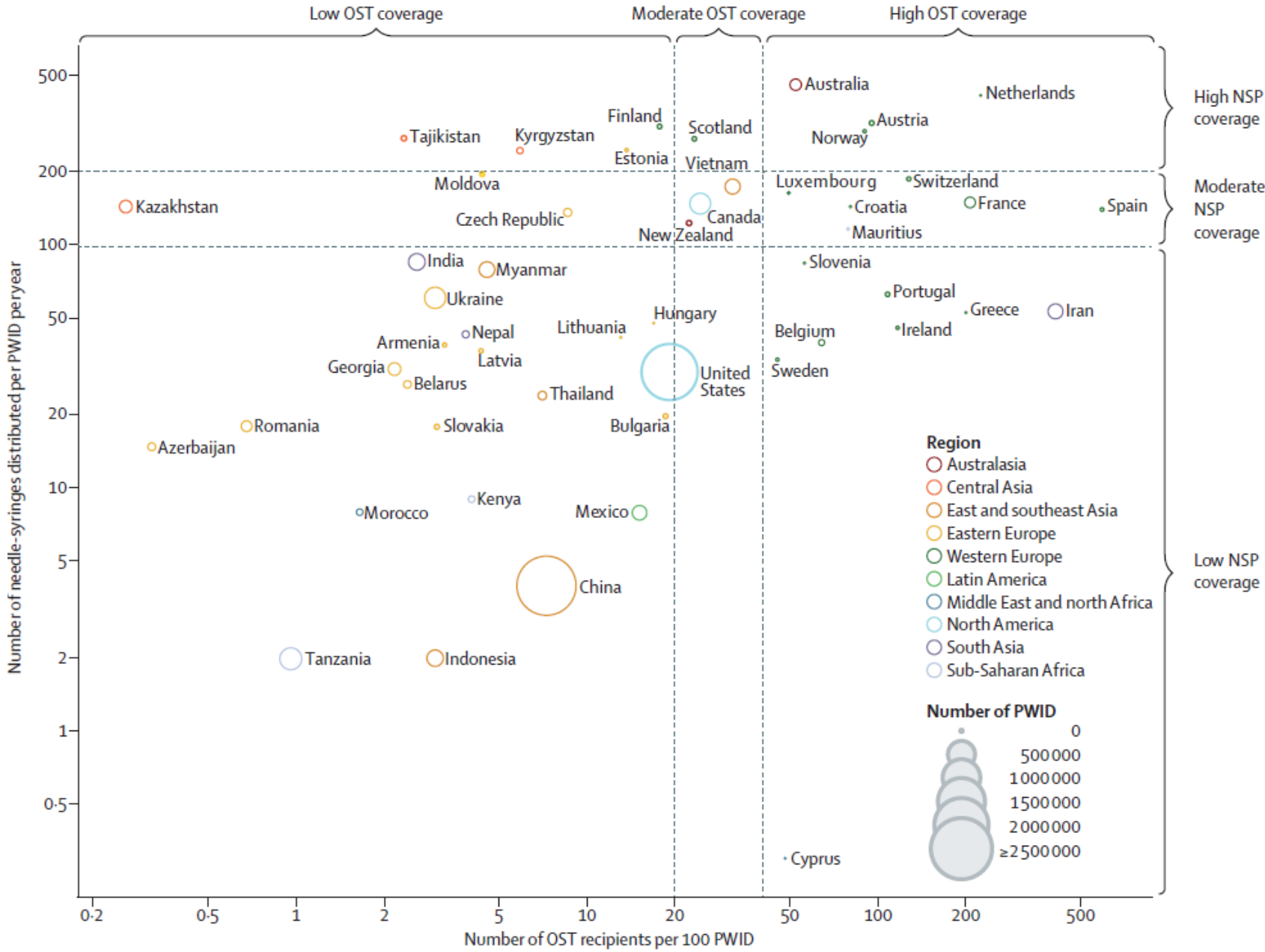


NDARC
National Drug & Alcohol Research Centre

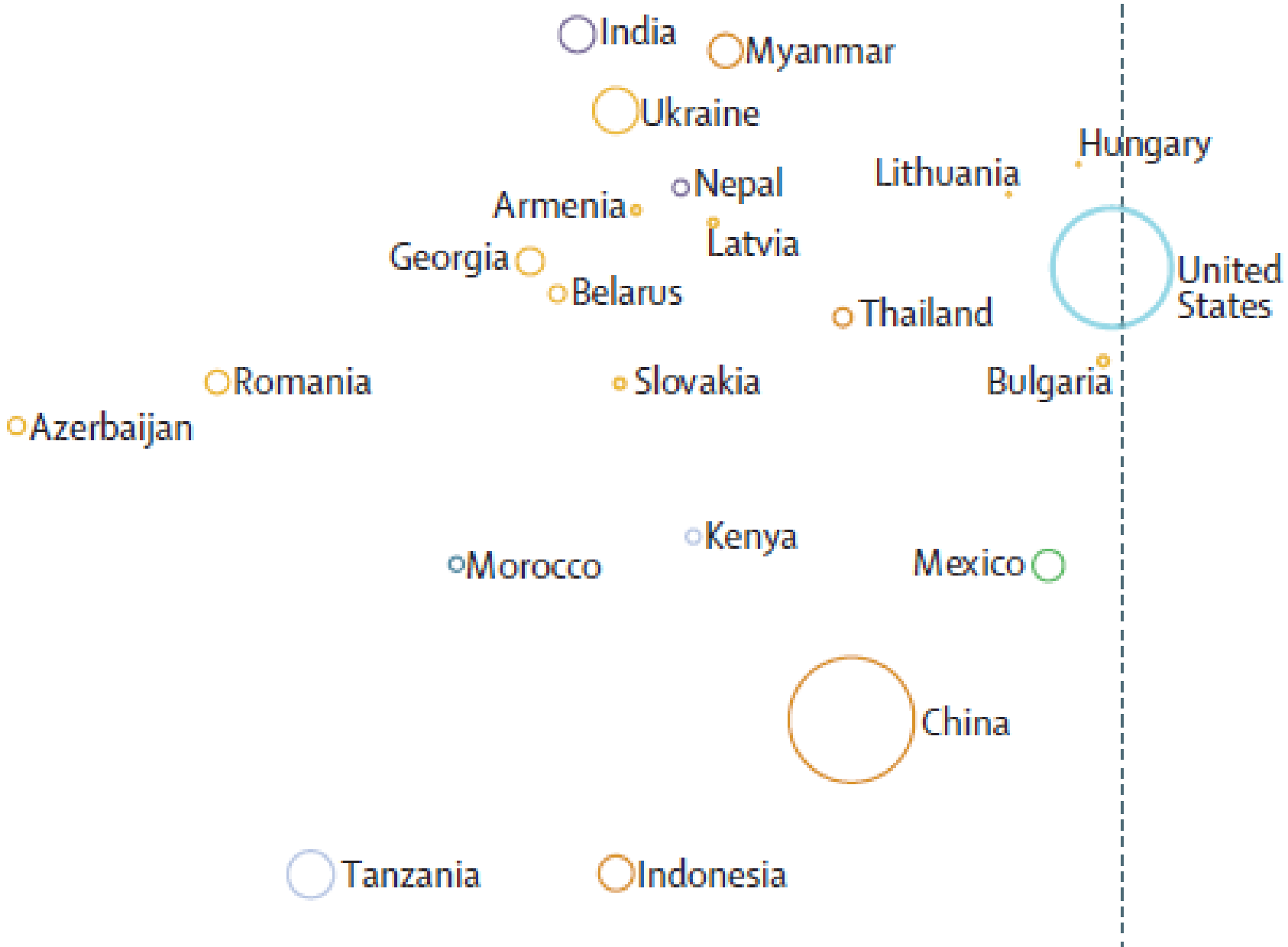
Globally: 16 people in OST per 100 PWID per year

The Difference is Research

Combination high coverage NSP and OST is rare

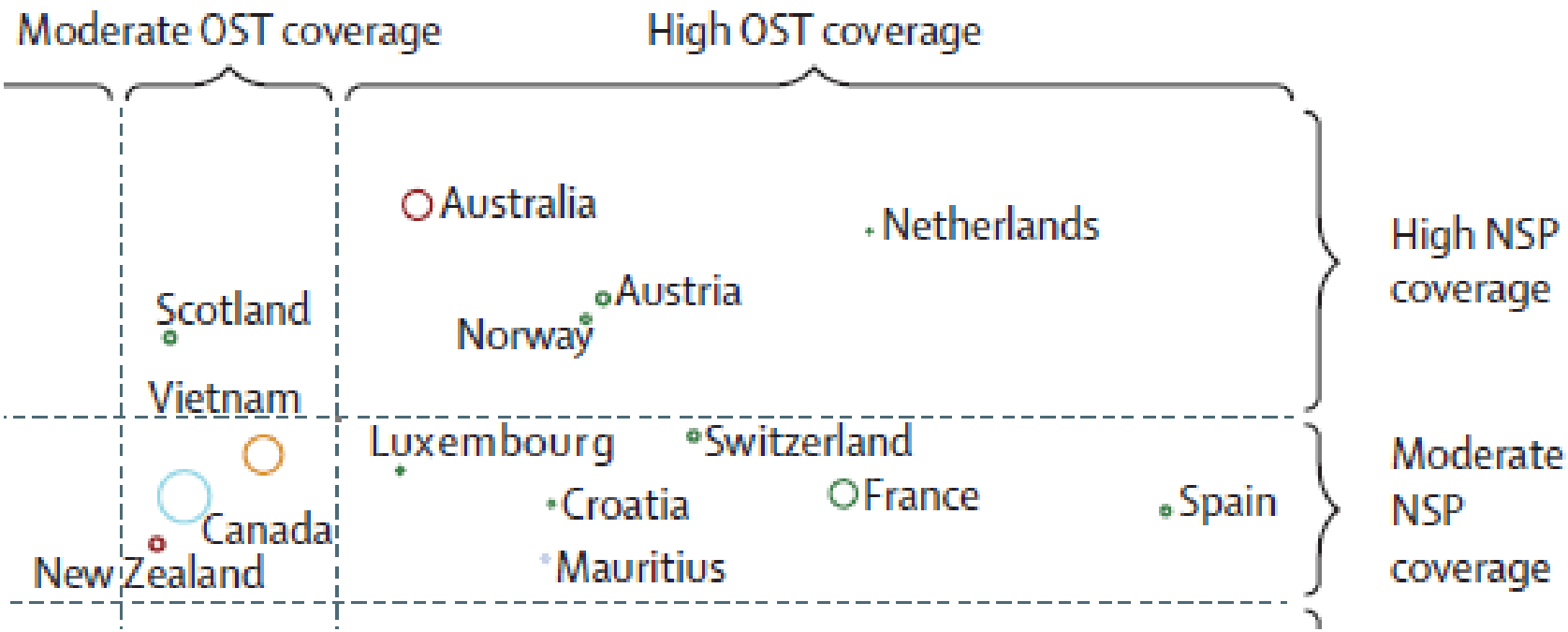


Low coverage of both is most frequent



<1% of PWID live in countries with high coverage of both NSP and OST

5% of PWID live in countries with either moderate or high coverage of NSP and OST



…are these correct?

- We searched systematically online, in peer-reviewed and grey literature, using UN and other organisation collaborators to assist with promoting call for data, asked many people if they had information, searched (and read) in many languages, but…
  - We may have missed things
  - Reviews should be updated regularly - resourcing
- There has been an expansion in data
  - However, considerable gaps remain - call to action for data collection and reporting

…how do these numbers compare?

- …to UNODC World Drug Report 2017?
  - Includes country ARQ reports to UNODC; UNAIDS progress reports; Mathers et al (2008); peer-reviewed articles; government reports
  - Single estimates used
  - Included if method unknown or expert judgment estimates
- …to Mathers et al (2008) and Nelson et al (2011)?
  - Consistent with current methodology – searching
  - Increased data coverage
  - Different method - pooling and estimating uncertainty
  - If new estimates – same or improved study quality
    - Sensitivity analyses - lower study quality had higher estimates

Comparing estimates

	People who inject drugs	HIV among PWID	Anti-HCV among PWID
Current review	15.6 million (10.2-23.7) (0.33%)	2.8 million (1.5-4.5) (17.8%)	8.2 million (4.7-12.4) (52.3%)
UNODC World Drug Report 2017	11.8 million (8.9-17.4) (0.25%)	1.6 million (0.9-3.2) (13.1%)	6.1 million (51.7%)
Mathers et al 2008 Nelson et al 2011	15.9 million (11.0-21.2) (0.36%)	3.0 Million (0.8-6.6) (18.9%)	10.0 million (6.0-15.2) (62.9%)

6. Implications and some thoughts

Implications

- Injecting drug use remains an issue
  - Now documented in many more countries – Africa
  - HCV and HIV remain prevalent
- Service needs of PWID will differ across countries – including because of differing demographic profiles
  - More certain of this with bettter reporting of key variables
- Coverage of core interventions is typically very low
- Several ways in which these data might be useful to drug policy discussions
  - Informing success of attempts at intervention scale-up
  - UN Sustainable Development Goals (2015-2030)

We have a contribution to make globally…

- Global reporting systems are important
  - May be limited in scope
    - Search for information
    - Parameters and indicators summarised
- We must continue to push the boundaries
  - What is “known”
  - What needs to be known and/or synthesised
  - Greater granularity
  - Greater transparency
  - More attention to problems of public health impact that may be overshadowed or stigmatised
    - E.g. other health outcomes; subpopulations

Thank you

Have questions or feedback? Let us know:
global.reviews@unsw.edu.au