

# Substance use and HIV

## Scope of the problem

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## What is the definition of substance use?



- **Substance use:**

Ingestion of psychoactive substance in moderate amounts that does not significantly interfere with functioning

## **Main categories of psychoactive substances**

### **Depressants:**

- Result in behavioral sedation (alcohol, anxiolytics or hypnotic drugs)

### **Stimulants:**

- Increase alertness and elevate mood (cocaine, amphetamines, nicotine)

### **Opiates:**

- Primarily produces analgesia and euphoria (heroin, morphine, codeine)

### **Hallucinogens:**

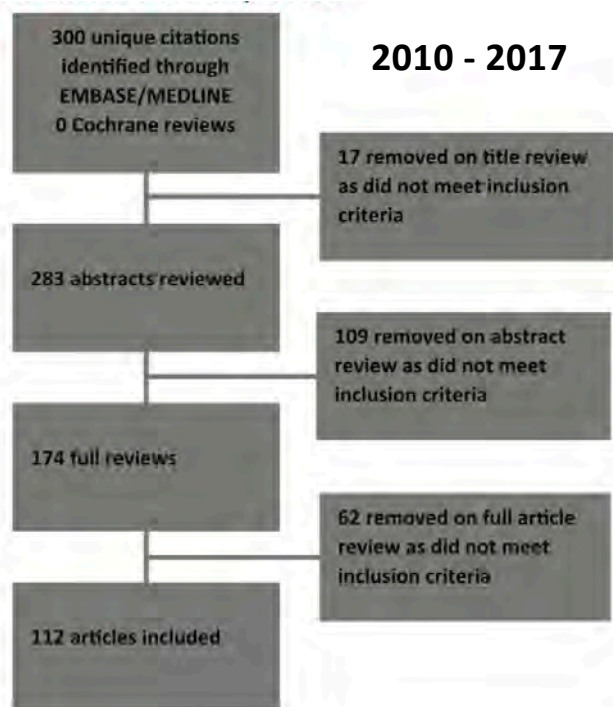
- Alters sensory perception (marijuana, LSD)

**Is it possible to scope the problem of substance use and HIV  
or are we in front of an impossible mission?**



# Sexualised drug taking among men who have sex with men: a systematic review

## Just a brief example to understand the difficulty of the task



Frequency of citations reporting recreational substance use and range of reported prevalence of use

Recreational drug	Number of citations reporting usage	Range of reported prevalence of drug use in general MSM community	Range of reported prevalence of drug use in MSM in sexual health setting
Methamphetamine	44 <sup>11,12,14-54</sup>	4.0%–100%	1.2%–100%
Poppers/nitrates	42 <sup>5,10,12,14-17,20,24,26,30,32,34-40,44,46,49-52,55-71</sup>	3%–37.3%	2%–88.7%
GHB/GBL	41 <sup>1,2,5,11,13,17,18,20,26,28,32,34,38,39,43-46,49,51,58,62,63,65-67,69,70,72-84</sup>	<1%–100%	1.4%–67.4%
Crystal methamphetamine	38 <sup>1,2,5,10,13,24,30,44,56,58,60,61,63,65,66,68-70,75-92</sup>	<1%–100%	0.6%–100%
Cocaine	34 <sup>2,5,11,12,15,27,32,34-39,41,43,49,51,59,61-66,70,72,74,75,85,87,90,93</sup>	5.0%–63.6%	1%–100%
Erectile dysfunction medications	18 <sup>5,10,12,18,34,36,37,39,44,49,55,57,59,64,66,77,85,93</sup>	3.0%–33.1%	0.3%–56%
Ketamine	25 <sup>2,5,14,17,24,26,34,39,40,44,46,49,51,55,57,61,62,65-67,70,72,75,77,84</sup>	0.8%–5.2%	1.3%–48.3%
Ecstasy	33 <sup>10-12,24,30-34,37-40,46,51,52,57,61-70,74,75,77,83,93,94</sup>	1.0%–38.3%	2.0%–68.3%
Amphetamine	14 <sup>13,24,27,33,40,46,49,55,59,63,66,70,77,95</sup>	0.7%–25%	0.2%–11%
Mephedrone	26 <sup>1,2,5,15,28,39,45,46,49,58,62,66,67,70,72,75-84,93</sup>	1.3%–100%	3.0%–83.7%
Cannabis/marijuana	19 <sup>15,31,34,36,39,42,44,52,56,60-63,66,69,70,77,79,96</sup>	7%–54.8%	1.0%–56%
Other drugs	26 <sup>a</sup>	0.6%–40.5%	0.2%–82.4%

**Why are these wide differences?**

## First limitation: The different perceptions of what is a substance



- **Substance use:**  
Ingestion of psychoactive substance in moderate amounts that does not significantly interfere with functioning
- **Do you all have the same concept of substance?**
  - **Cocaine, heroin, crystal, mephedrone**

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- **What about poppers or viagra?**



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- **Do you all have the same concept of substance?**

- Cocaine, heroin, crystal, mephedrone
- Poppers or viagra
- **What about tobacco or alcohol?**

## First limitation: The different perceptions of what is a substance



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- **Do you all have the same concept of substance?**

- Cocaine, heroin, crystal, mephedrone
- Poppers or viagra
- Tobacco or alcohol
- **And what about coffee?**

## **Second limitation: Substance use, abuse and dependence**



**Different concepts that overlap  
in the literature**

## Substance use vs. substance abuse

- **Substance use:**

Intentional ingestion of psychoactive substance in moderate amounts that does not significantly interfere with functioning

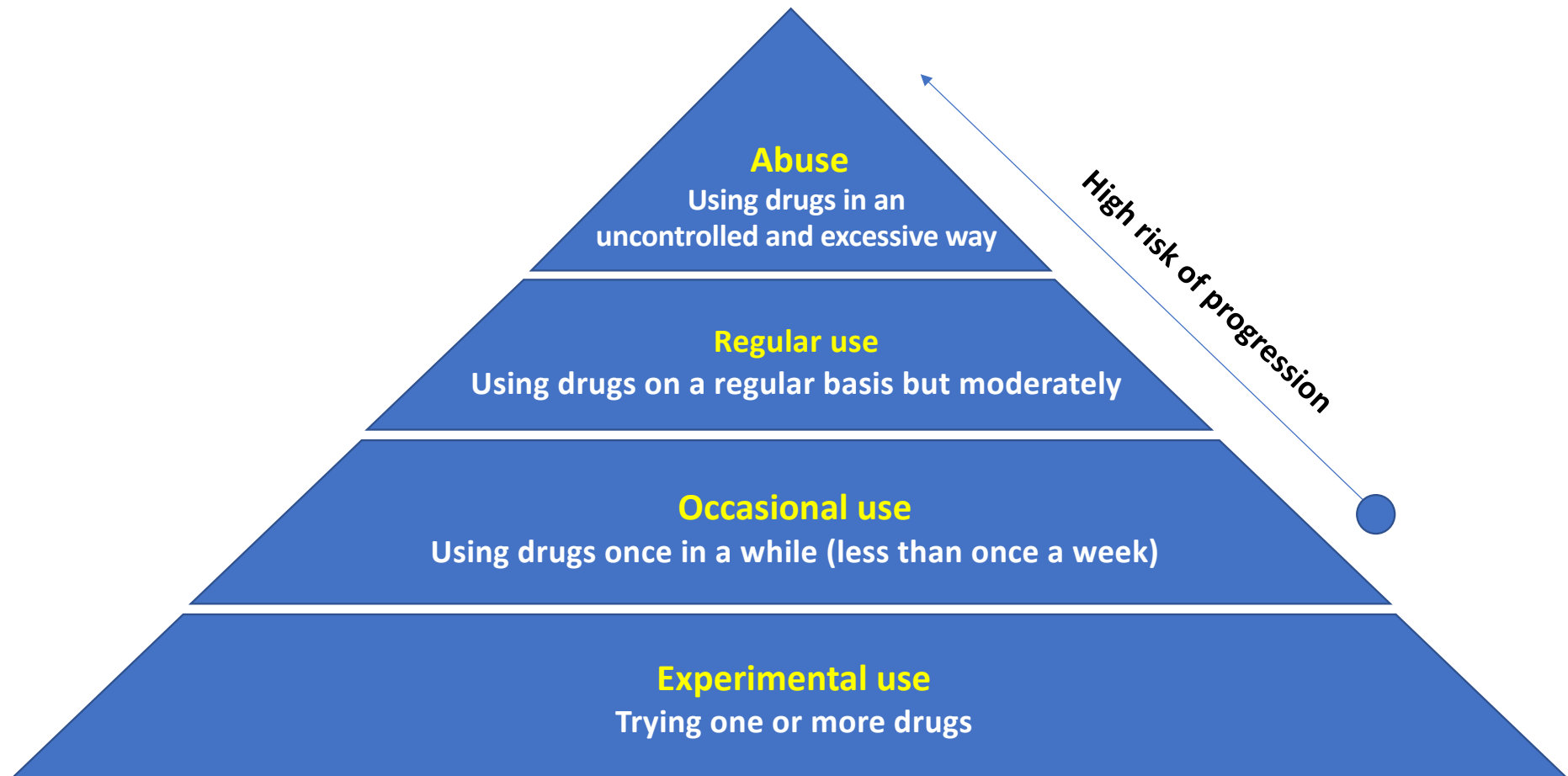
- **Substance abuse:**

Compulsive (uncontrolled) use of one or more psychoactive substance that interfere with functioning

**Definition:** Maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by:

- Recurrent substance use resulting in failure to fulfill role obligations at work, school or home
- Recurrent use in physically hazardous situations
- Recurrent substance-related legal problems
- Continued use despite social or interpersonal problems caused by the substance
- **Does not meet criteria for substance dependence**

## Steps leading from substance use to substance abuse



# Substance addiction

- **Substance addiction**

Chronic medical disorder with or without physiological dependence that includes multifactorial genetic components, biologic changes due to exposure to addictive substances and behavioral components.

**Definition:** Three of more of the following in the same 12 month period:

- Tolerance: Need for use of increasing amounts of the substance in order to achieve intoxication
- Withdrawal symptoms typical for the substance
- Substance taken in larger amounts or over a larger period of time than intended
- Desire to cut down or control use
- Great deal of time spent on using, obtaining, or recovering from the substance
- Reduced social, occupational or recreational activities because of substance use
- Continued use despite adverse physical or psychological consequences

## Substance abuse vs. addiction

**#1**

SUBSTANCE ABUSE CAN APPEAR CASUAL, WHILE ADDICTION USUALLY EXHIBITS MORE SERIOUS SYMPTOMS



**#2**

ADDICTION IS NEARLY ALWAYS ASSOCIATED WITH WITHDRAWAL SYMPTOMS

**#3**


ADDICTION IS CONSIDERED A MENTAL DISORDER OR DISEASE, WHILE SUBSTANCE ABUSE IS NOT NECESSARILY A DIAGNOSIS



**#4**

SUBSTANCE ABUSE ALTERS THE BRAIN BRIEFLY, WHILE SUBSTANCE ADDICTION ALTERS THE BRAIN PERMANENTLY

## Substance abuse vs. addiction



**ABUSE ALTERS THE BRAIN BRIEFLY**  
**ADDICTION ALTERS THE BRAIN PERMANENTLY**

SUBSTANCE ADDICTION CHANGES THE MAKEUP AND FUNCTION OF THE BRAIN DRAMATICALLY

“ For the brain, the difference between normal rewards and drug rewards can be described as the difference between someone whispering into your ear and someone shouting into a microphone ”

*National Institute on Drug Abuse*

**SUBSTANCE ADDICTION RESULTS FROM ONE PRIMARY FACTOR: THE ADAPTATION OF THE BRAIN AND BODY TO DEPEND ON THE EFFECTS OF THE SUBSTANCE**



**What is the connection between  
substance use and HIV?**

## Causes of substance use are common in HIV+ individuals

- Environment of drug use
- Inability to resist peer pressure
- Availability of drugs
- Desire to look “cool”, macho or grown-up
- Positive attitudes toward drug use
- Curiosity
- Belief that drugs will help overcome feeling of sadness, loneliness, boredom, anxiety
- Advertisements, media, apps

## **Substance use increase the risk of HIV acquisition**

- Substance abuse is a primary vector for spread of HIV
- Substance abusers are more likely to engage in high risk behaviours
- Patients with substance use disorders may not seek health care
- Addiction and high-risk sexual behaviours have been linked across a wide range of settings

## **Substance use increase the risk of HIV acquisition: Epidemiology**

- Outside the sub-Saharan Africa, 10% of all new HIV infections are attributed to IDU despite significant regional variations
- According to the WHO-HIV/AIDS program, IDU is responsible of more than 80% of all HIV infections in eastern Europe and central Asia
- The epidemic in countries in the middle East and North Africa have been largely attributed to IDU, and it is currently linked to the growing epidemic in Indonesia, Vietnam and Malaysia.
- **In the US drug abuse is a significant risk factor for HIV**
  - 1 million people in the US are living with HIV and about 1/3 of these cases are linked directly or indirectly to IDU
  - Up to 25% of all new diagnoses in US are reported in IDU

Source: Drug abuse and HIV/AIDS, a research update from the NIDA

# **Some data of substance use from the US**

# The alcohol use problem among US general population

- **More than 50% of adult US population drank alcohol in the past 30 days.**
- **17.3 million Americans (5% of US population) are heavily drinkers.**
  - 29.4% of them are also current illicit drug users
- **Costs of alcoholism and illicit drug abuse to the US economy**
  - Productivity, health and crime costs of alcoholism and drug addiction: \$235 billion
  - US business cost of alcoholism and drug addiction: \$120 billion
  - Excessive alcohol use is the 3rd leading life-style cause of death

Source: National Institute of Drug Abuse

# The substance use problem among US general population

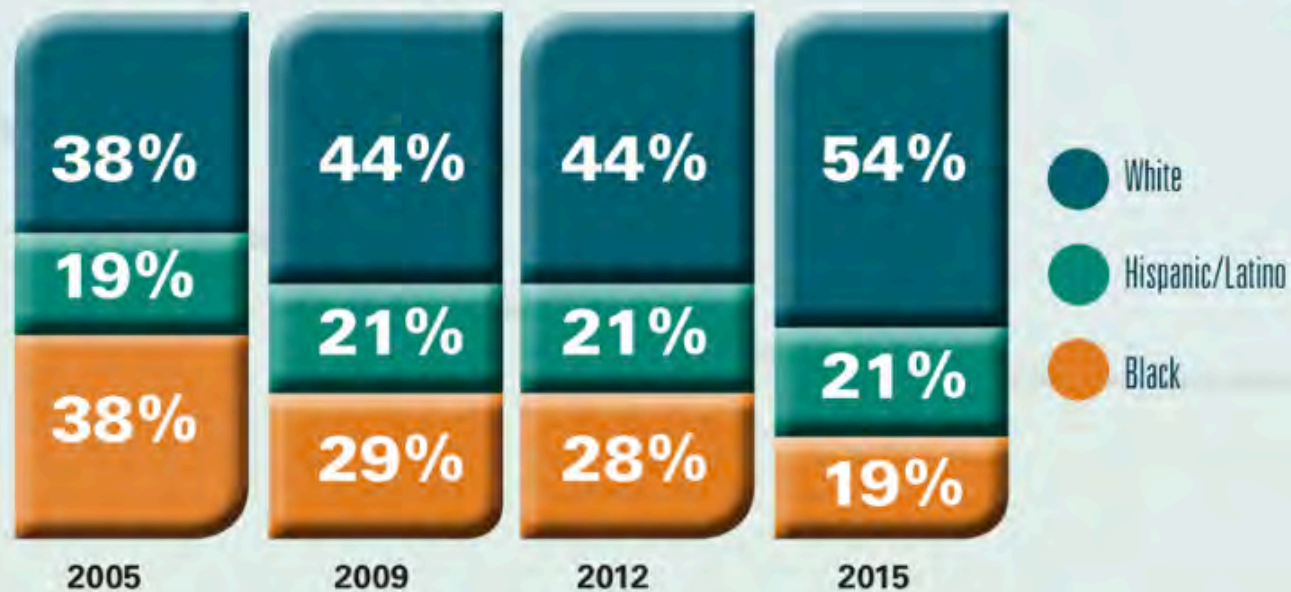
- **20.1 million Americans aged 12+ are current users of illicit drugs (8% of all the population)**
  - This prevalence remains stable since 2002
- **15.2 million Americans aged 12+ consume cannabis**
  - 57.3% of them only consume cannabis
- **8.6 million Americans aged 12+ consume other illicit drugs**
- **6.2 million Americans aged 12+ consume non-prescribed psychotherapeutic drugs**
  - 4.7 million consume non-prescribed pain-relievers
  - 1.8 million consume non-prescribed tranquilizers
  - 0.9 million consume non-prescribed stimulants
  - 0,2 million million consume non-prescribed sedatives

Source: National Institute of Drug Abuse

## IV heroin epidemic in the US, a growing problem

### Changes in who is starting to inject drugs

Percent of new PWID by race suggests fewer blacks, and more whites, are starting to inject drugs



SOURCE: CDC's National HIV Behavioral Surveillance data, 2005-2015

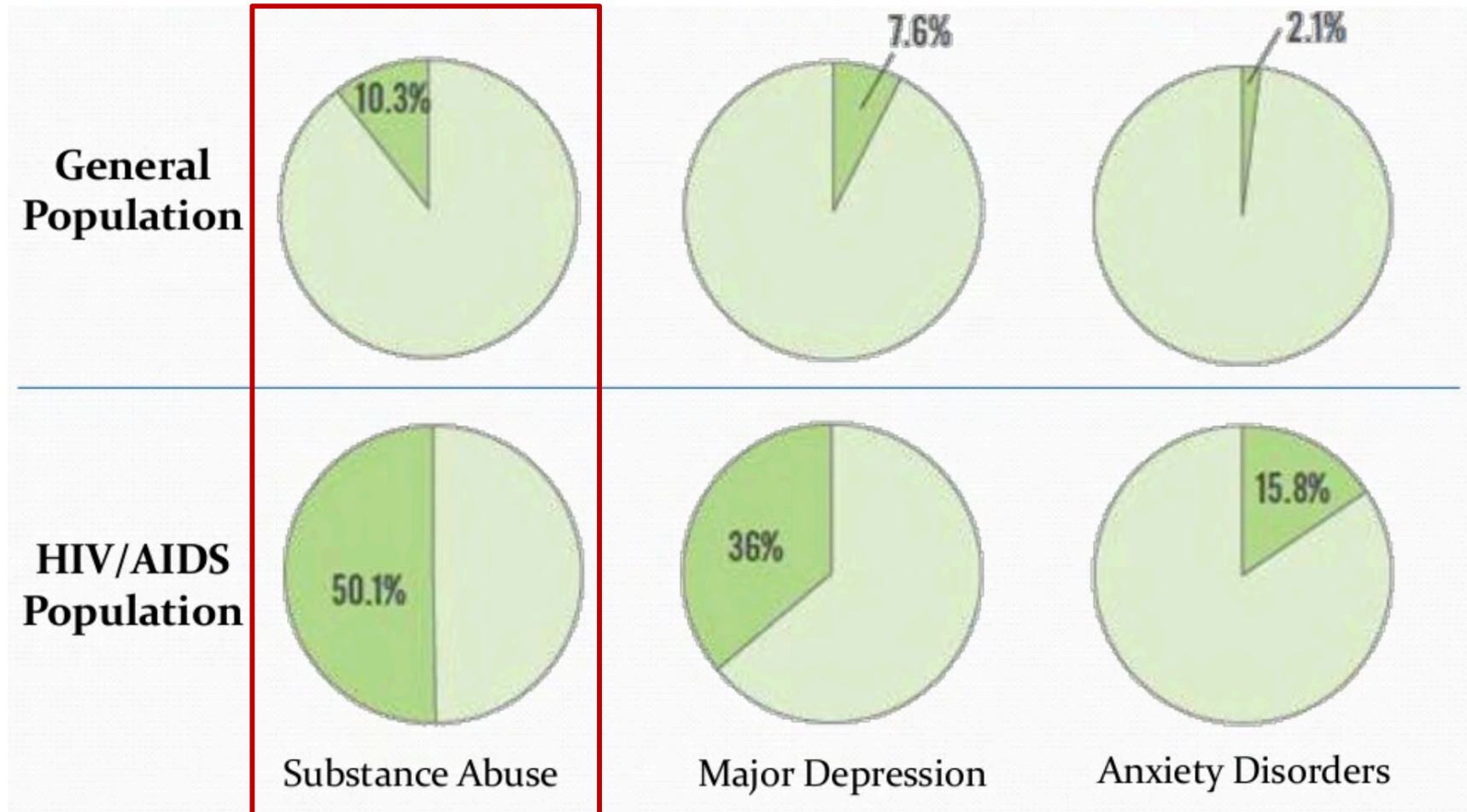
**60%**

Heroin use has increased more than **60%** (114% in whites) in recent years. The heroin and prescription opioid epidemics could lead to new HIV outbreaks.

SOURCE: National Survey on Drug Use and Health, 2002-2013

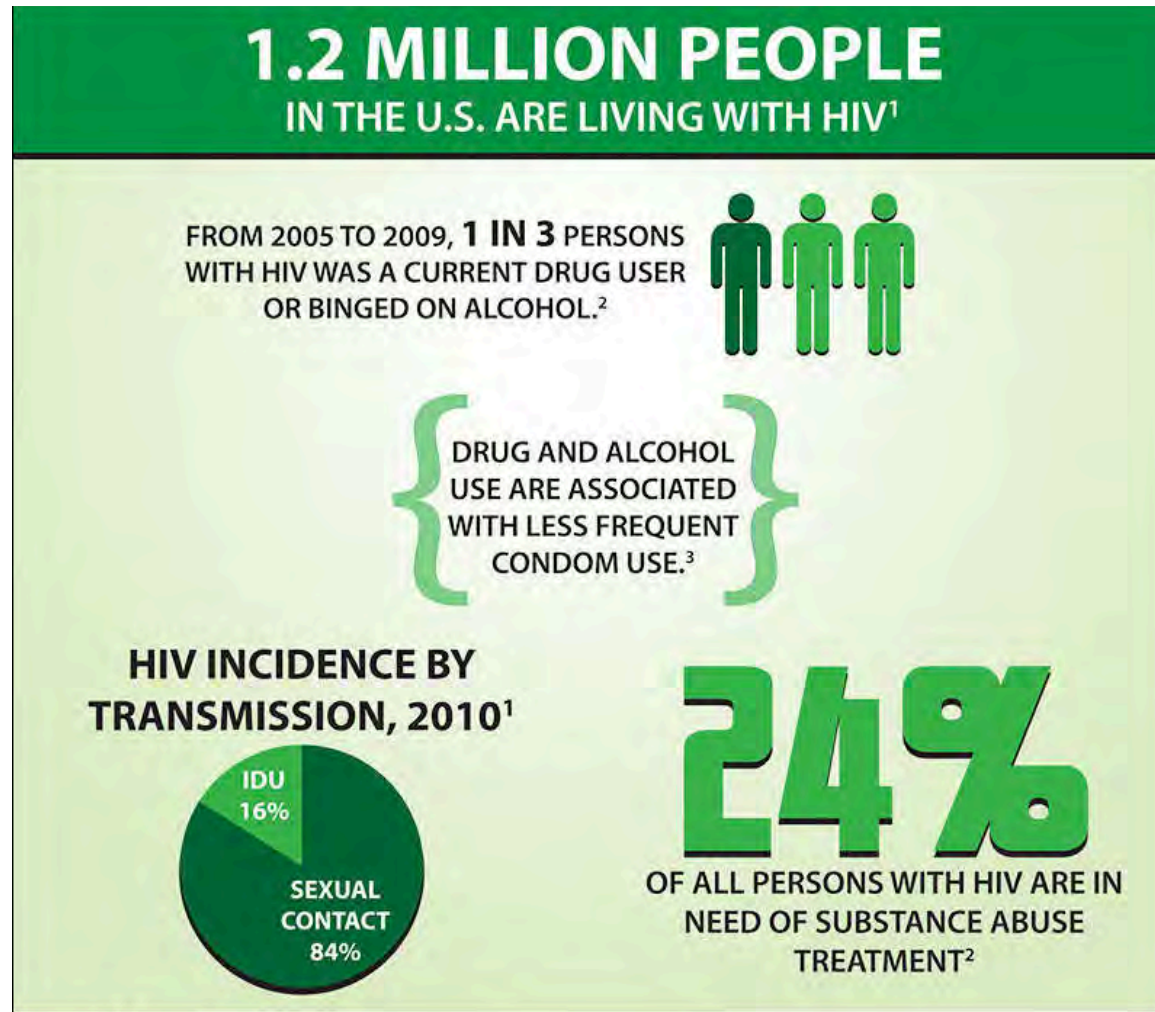


## Prevalence of substance use and psychiatric problems is higher among HIV+



Source: BW Hospital, Harvard Medical School, 2012

## Substance use and HIV in the US



# National (US) HIV Behavioral Surveillance (2014-2016) Survey – non-MSM subset

**Type of study:** CDC Survey

**Target population:** Low income non-MSM from 17 US cities

**Timeline:** 2016

**N = 7,560**



## Substance use:

- Crystal meth use HIV-: 4% (injectable: <1%)
- Crystal meth use HIV+: 4% (injectable: <1%)

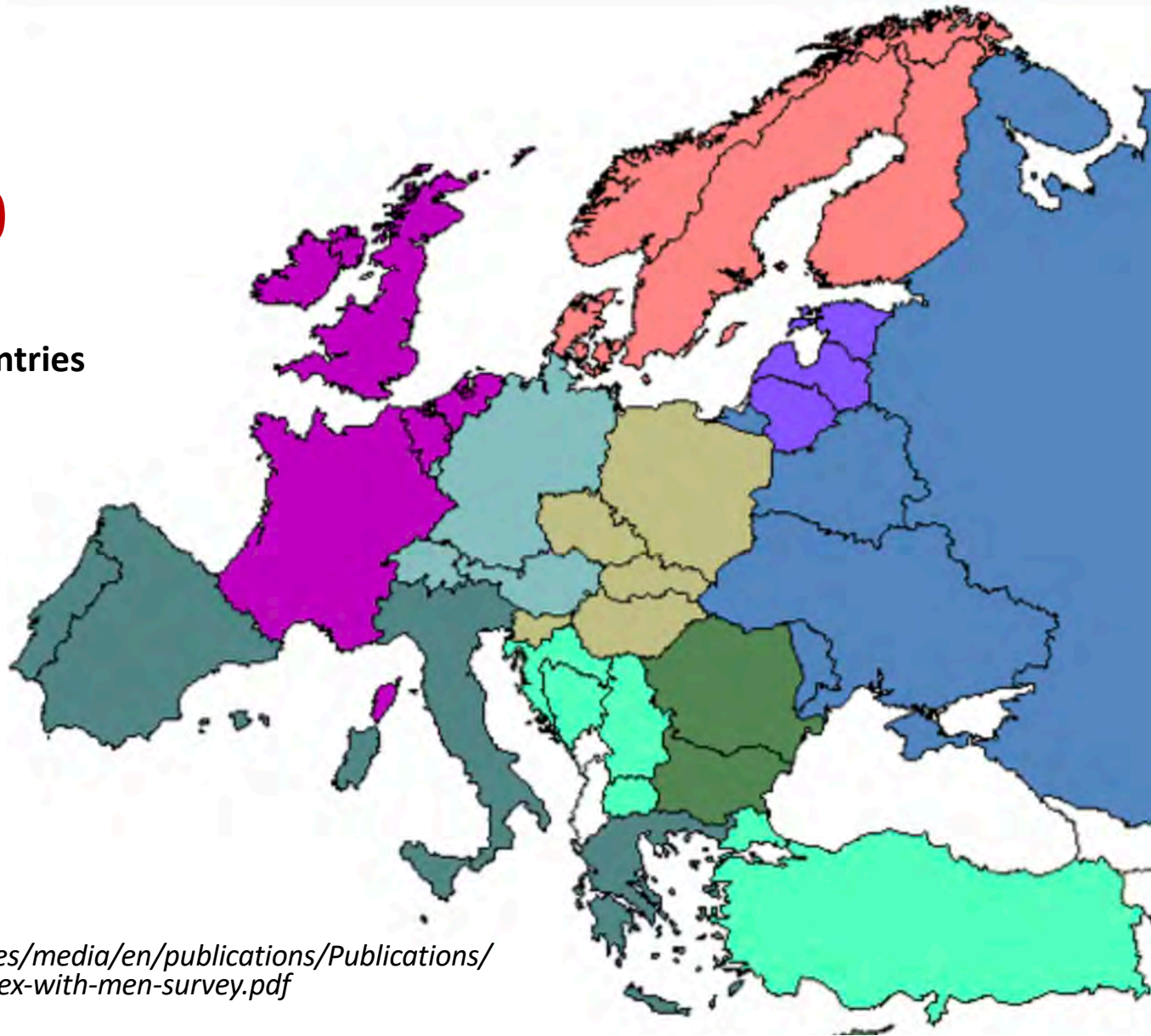
## Risk factors / behaviors (last year):

- Any STI (last year): 6.9% (HIV+ 10.3%)
  - Female: 8.2% (vs. male: 5.4%)
- HIV testing (last year): 40.5%
- PrEP use: 0.2%
- Condomless sex (last year):
  - Men: 45%
  - Female: 40%

**Some data of substance use from EU**

# EMIS Survey 2010

N = 181,495 people from 38 EU countries

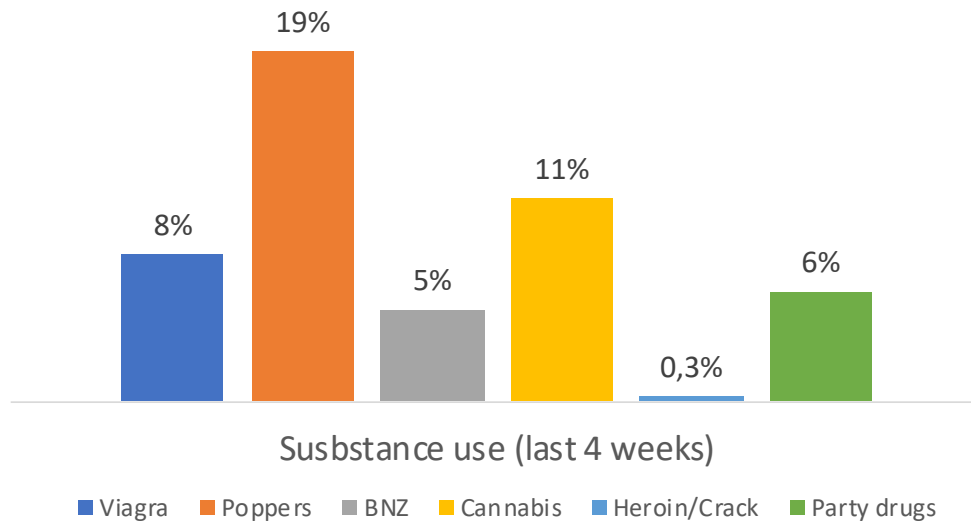


Available at: <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/EMIS-2010-european-men-who-have-sex-with-men-survey.pdf>

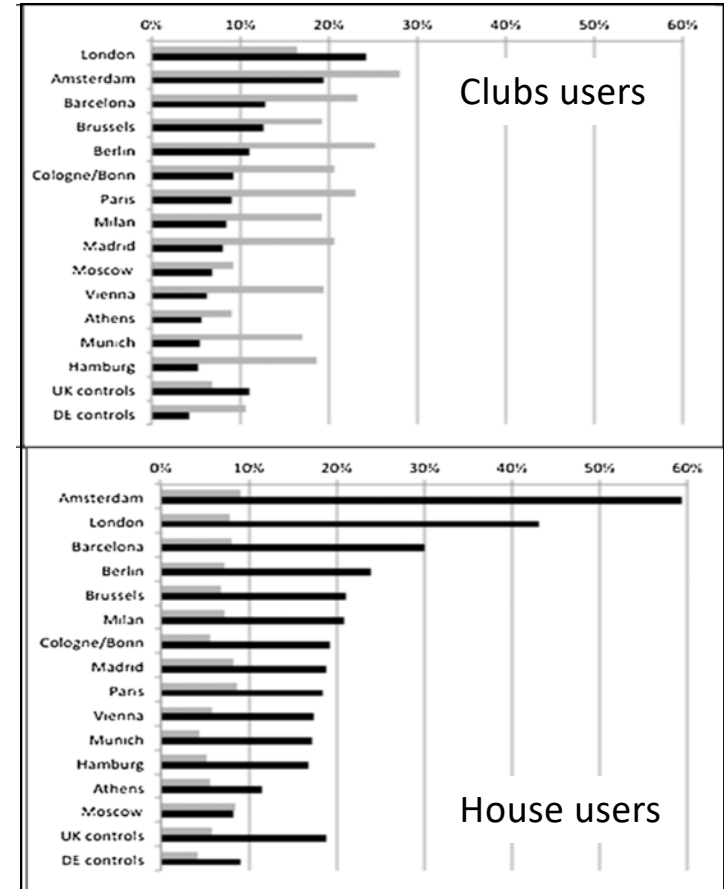
## EMIS Survey 2010 – Demographics

- Men: >99% (<1% trans). Age <30 years: >50%
- Lived in medium/small cities (<500,000 people) or in the countryside: 54%
- Highly educated men: 60% (30% - 83%)
- Unemployed: 6% (0.8% - 11%)
- MSM: 76% (+15% bisexual)
- Steady relationship with a man: 39% (54% were single)
- Living alone: 30% (13% - 50%)
- Apps use in last 7 weeks: 94%
- Sexual unhappiness among MSM: 46.7% (27.8% - 61.3%)
  - Mean reason: “I want a steady relationship”: 25.4%

# EMIS Survey 2010 – Substance use



N = 181,495 people



N = 55,446 people from urban centers

Available at: <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/EMIS-2010-european-men-who-have-sex-with-men-survey.pdf>

Schmidt AJ et al. *Int J Drug Policy* 2016;38:4-12.

## EMIS 2010 Substudy: Spain

**Type of study:** EMIS survey subanalysis

**Target population:** MSM app users

**Timeline:** June – August 2010

**N = 13,111**



### Chemsex use (last year):

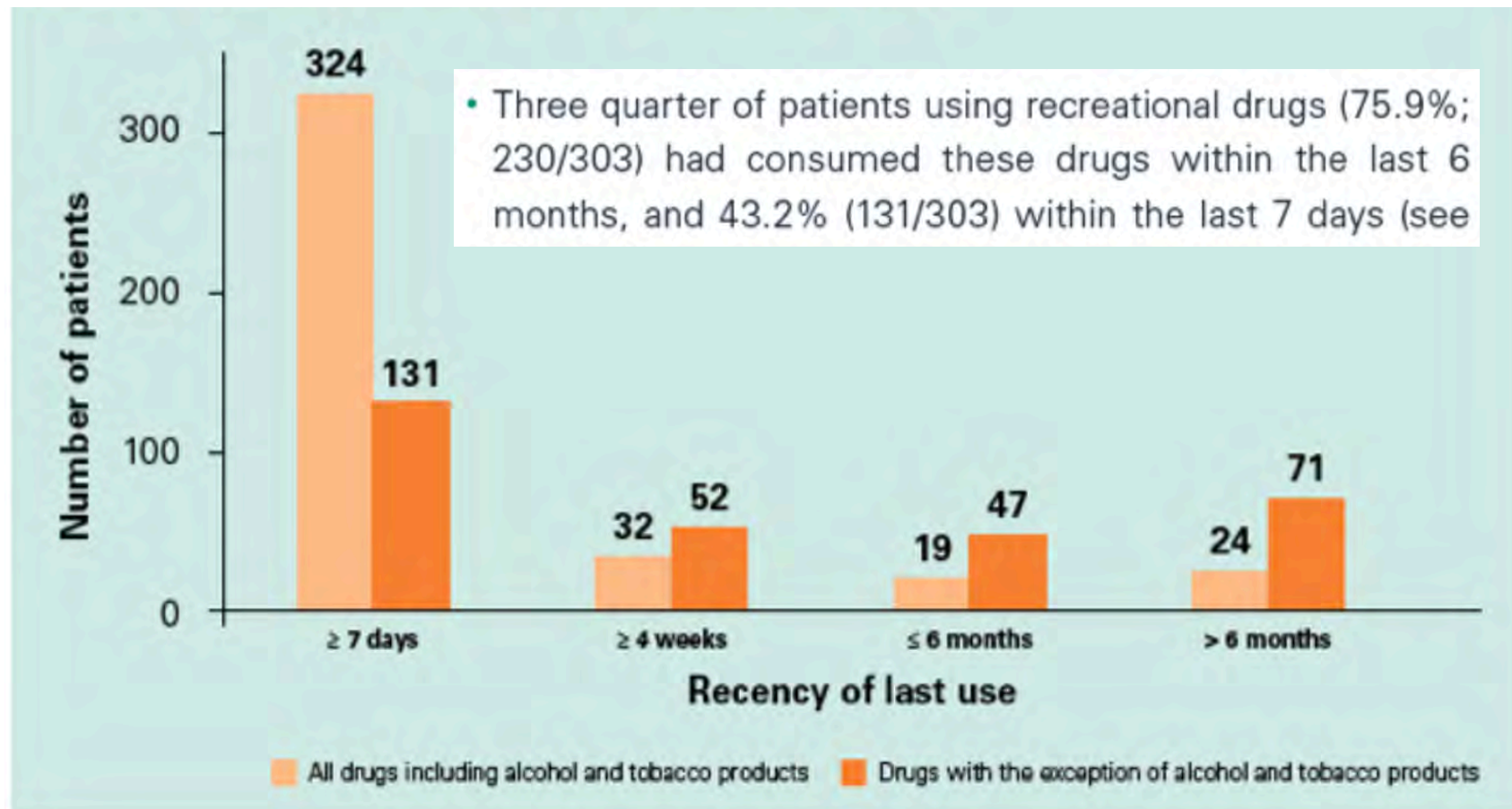
- Chemsex use (last year): 21.9% (included other drugs)
- Sex enhancers (last year): 33.6%

### Risk factors / behaviors (last year):

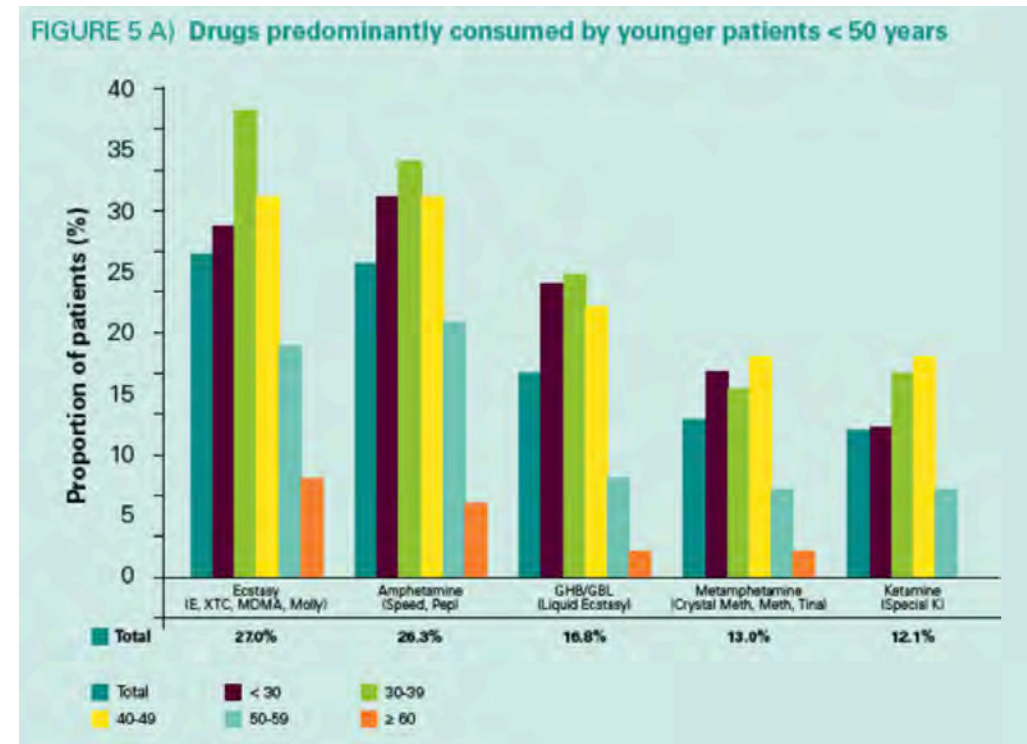
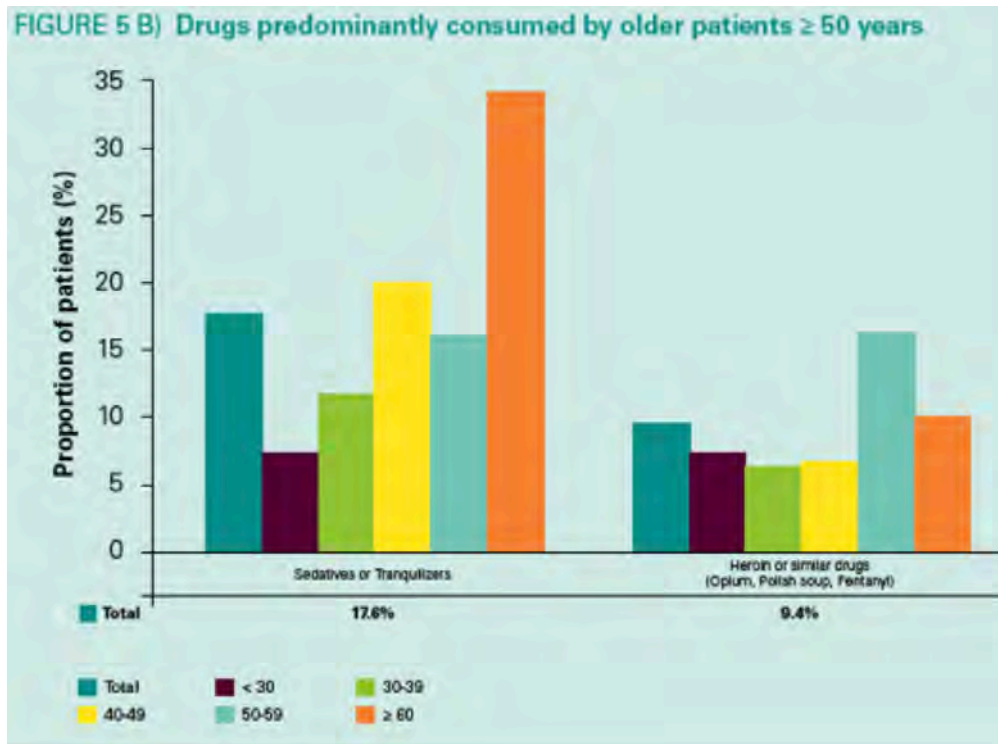
- UAI (last year): 29.4%
  - HIV+ with VL > 50 cop/ml or unknown: 27.8%
- STIs: not reported
- HIV+: 12%
- Never HIV tested: 26.2%



## Proportion of drug users among German HIV+ individuals

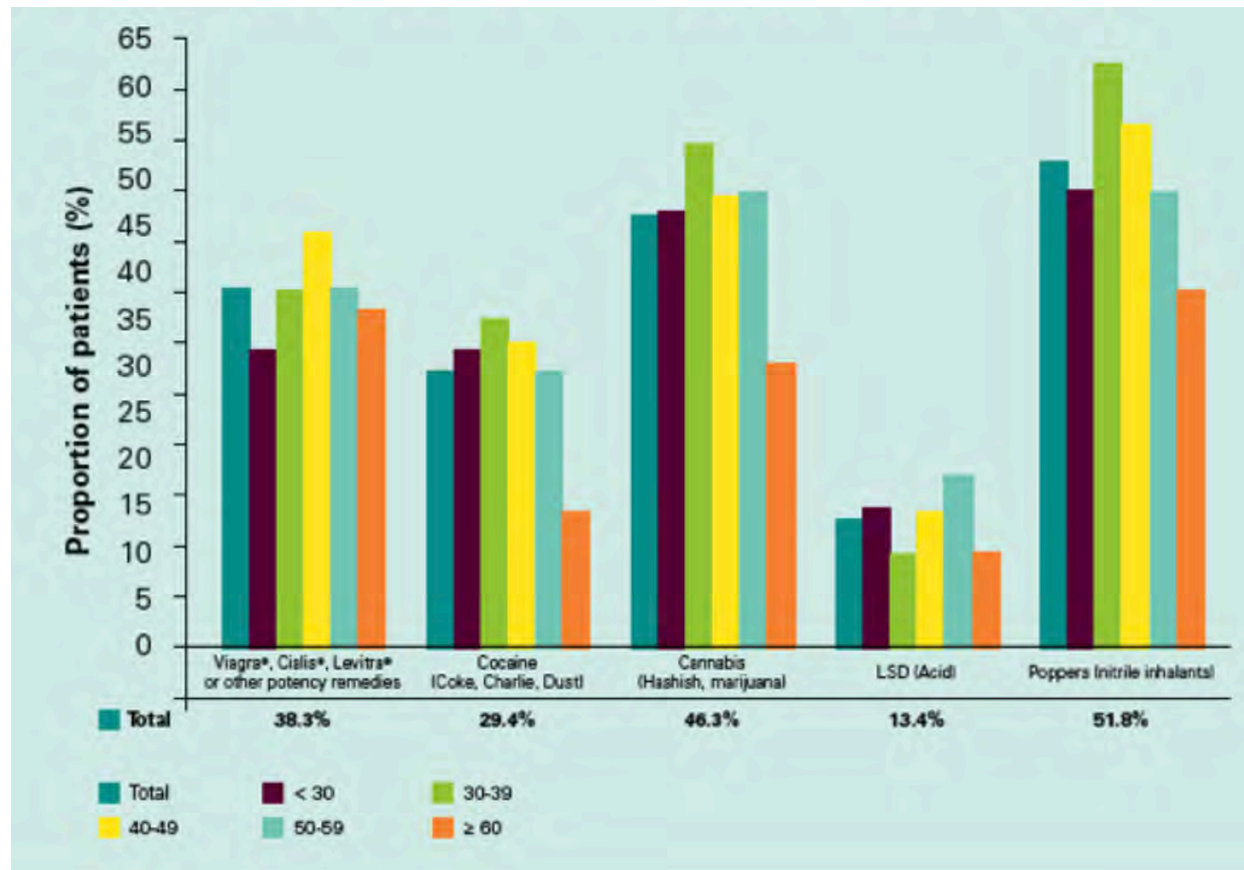


## Drugs consumed by German HIV+ individuals by age



- **Olders:** sedative drugs and Morphine-like drugs
- **Youngers:** Ecstasy, GHB, metamphetammine, ketamine, amphetamine.

## Drugs consumed by German HIV+ individuals without preference by age



- Viagra, cocaine, cannabis, LSD, Poppers

## USEX Study (Madrid, Spain) – MSM HIV+ Survey

**Type of study:** Self-reported survey

**Target population:** MSM HIV+ at 22 outpatient clinics

**Timeline:** June 2016 – March 2017

**N = 742**



**Chemsex use (last year): 29.1%**

- GHB/GBL: 21%
- Mephedrone: 20.1%
- Crystal Meth: 8.7%
- Slamsex: 4.6%

**Risk factors / behaviors:**

- VL >50 (last month): 34% (vs. 17% non-drug users)
- UAI (last 6 months): 87% (vs. 43% non-drug users)
- Fisting (last 6 months): 44% (vs. 6% non-drug users)
- >20 sexual partners (last 6 months): 44% (vs 8%)
- Any ITS (ever): 85% (vs. 53% non-drug users)
- **Depression: 33% (vs. 21% non-drug users)**

**Some data from other countries**

## Hanoi (Vietnam) HIV/AIDS prevention center study

**Type of study:** Peer to peer interview

**Target population:** MSM (hidden population)

**Timeline:** Sept – Dec 2014

**N = 622**



### Substance use (ever):

- Crystal Meth: 20.1%
- Other sexualized drugs (ever):
  - Poppers: 9.7%
  - Erectile dysfunction medication: 8.5%
- No Slamsex reported

### Risk factors / behaviors:

- Involved in selling sex (AOR: 2.43)
- Facilitate social MSM networking (AOR: 3.23)
- No ITS rates reported

## The FLUX Study (Australia)

**Type of study:** Online questionnaire

**Target population:** MSM apps users (Facebook 65%)

**Timeline:** Sept 2014 – July 2015

**N = 2,251 (1711 had 6-month follow-up)**



### **Substance use (last 6 months): 28%**

- Crystal Meth: 12%
- GHB/GBL: 6.9%
- Any drug users (last 6-months): 50.5%
  - Poppers: 32.1%
  - Erectile dysfunction medication: 21.8%
- Slamsex (last 6 months): 4.7% (ever 10.3%)

### **Risk factors / behaviors:**

- >10 sexual partners (OR: 3.21)
- UAI (OR: 1.81)
- HIV+ (46.2% vs. 5%)
- HCV (16.1% vs 1.2%)

# **Consequences of substance use (in HIV)**



## Consequences of substance abuse in HIV+ individuals: Comorbidities

- The accumulation of medical sequelae from chronic substance abuse can amplify the burdens of the HIV infection itself and conduct to an accelerated aging process
- HIV+ substance abusers become vulnerable to infections (hepatitis, ITS, sepsis, soft tissue infections, endocarditis...)
- Neurological symptoms may overlap between HIV infection and substance abuse
- Drug users have a higher risk of developing depression than non-drug users
- Drug use was associated with 4.1 times greater risk of being a poor adherer (<90%), specially among stimulant drug users
- Drug users have an strong stigma
- Lower rates of linkage to care

## Consequences of substance abuse in HIV+ individuals: DDI

**TABLE 1: Proportion of patients consuming recreational drugs with a potential of drug-drug interactions some any antiretroviral therapies**

Viagra®, Cialis®, Levitra® or other potency remedies	38.3%	Ecstasy (E, XTC, MDMA, Molly)	27.0%	Heroin or similar drugs (Opium, Polish soup, Fentanyl)	9.4%
Cocaine (Coke, Charlie, Dust)	29.4%	Amphetamine (Speed, Pep)	26.3%	Mephedrone or similar drugs (Bubbles, M-CAT, Meow, Meph)	5.8%
Sedatives or Tranquilizer	17.6%	GHB/GBL (Liquid Ecstasy)	16.9%	Alcohol	91.1%
Anabolic steroids	6.0%	LSD (Acid)	13.5%	Poppers (nitrite inhalants)	51.8%
Psychoactive substances (Legal Highs, Herbals)	5.1%	Metamphetamine (Crystal Meth, Meth, Tina)	13.0%	Tobacco products	74.5%
Cannabis (Hashish, marijuana)	46.3%	Ketamine (Special K)	12.1%		

## Consequences of substance abuse in HIV+ individuals: ART deferral

Percentage of providers likely to prescribe ART based on patient drug use

