Cannabis: Global Patterns of Use, Harms and Changing Regulation of Medical and Recreational Use

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Aims

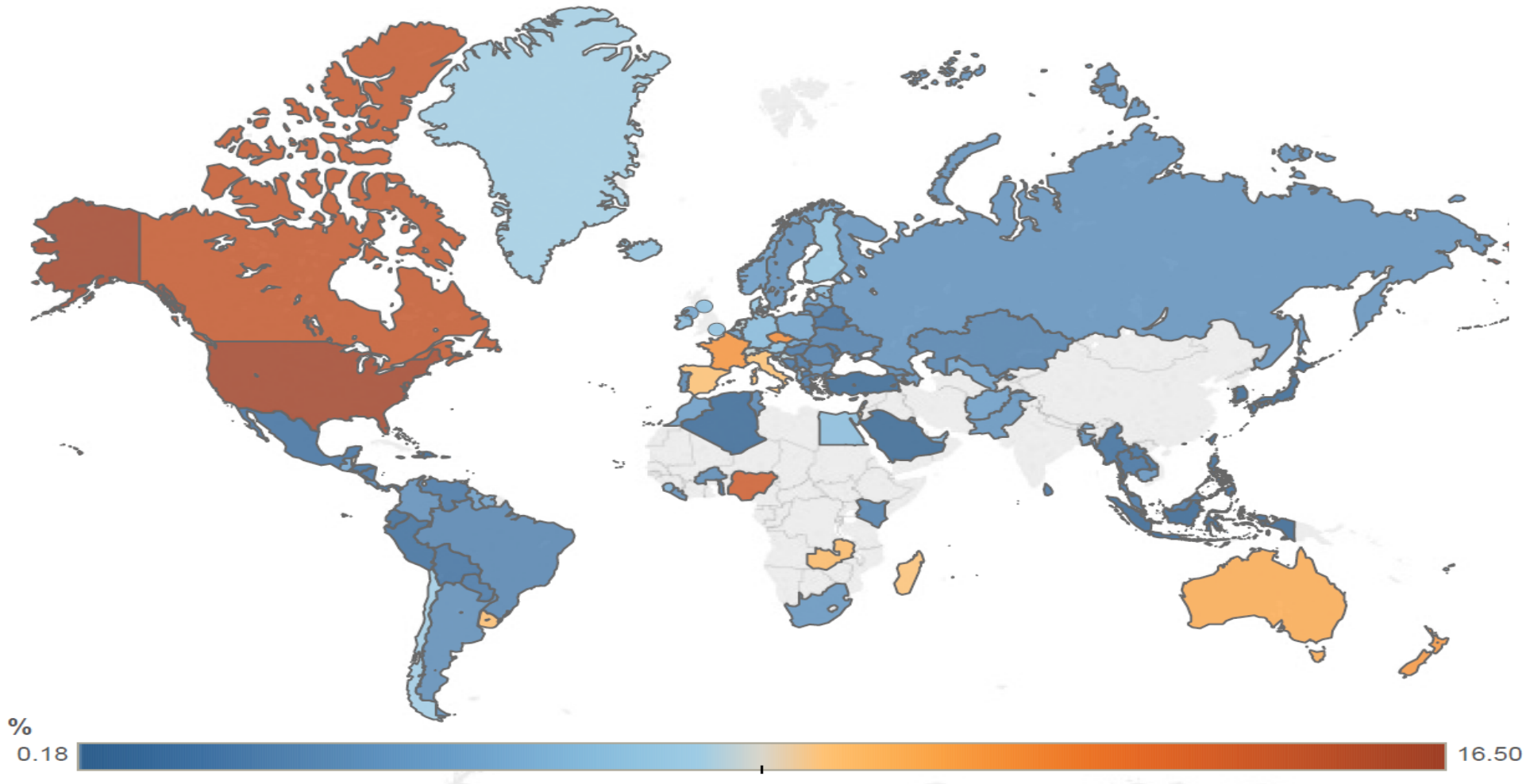
- Summarise
  - patterns of recreational cannabis use
  - evidence on harms of recreational cannabis use
- Emerging regulatory responses to cannabis use
  - Medical cannabis use
    - safety and effectiveness of cannabis and cannabinoids for medical use
  - Approaches to regulating medical cannabis use
- Legalisation of recreational cannabis use:
  - the USA, Uruguay and Canada
  - Evidence on the impacts of legalisation so far
- Looking ahead
  - Future risks and benefits of cannabis legalisation
  - Evaluating cannabis policy experiments

Key terms

- Cannabis: any product of *cannabis sativa*
    - Marijuana: flowering tops
    - Hash: compressed resin
    - Cannabis infused edibles and drinks
    - Cannabis concentrates and extracts

- Cannabinoids for medical use:
    - Medicinal quality cannabis extracts e.g. Sativex
    - Pure cannabinoid drugs derived from the cannabis plant (THC/CBD)
    - Synthetic cannabinoid drugs that act on CB1 receptors

Global prevalence of cannabis use



Limitations of data on cannabis use

- Best data from high income countries: USA, EU and Oceania
- Based on large household and school surveys
  - Declining response rates and substantial costs
- Limited data on use in low and middle income countries
  - Less frequent survey data; cultural differences in acceptability of surveys
  - More often only indicators are problem use in health care or CJ systems
- Frequently need to impute data in countries where it is missing
  - Using data from culturally similar or geographically adjacent countries

Challenges in assessing cannabis-related harms

- Rely on observational epidemiological studies
  - Few longitudinal studies from a small number of HICs
- Issues:
  - Self-report measures of use: ever use; past year and daily
  - Follow up of cohorts now into mid 30s
  - Best studied outcomes: mental health and substance use in adulthood
  - Less known about any longer term adverse health effects
- Challenges in making causal inferences
  - Temporal sequencing
  - Selection effects and sample attrition
  - Uncontrolled confounding: personal characteristics and other drug use

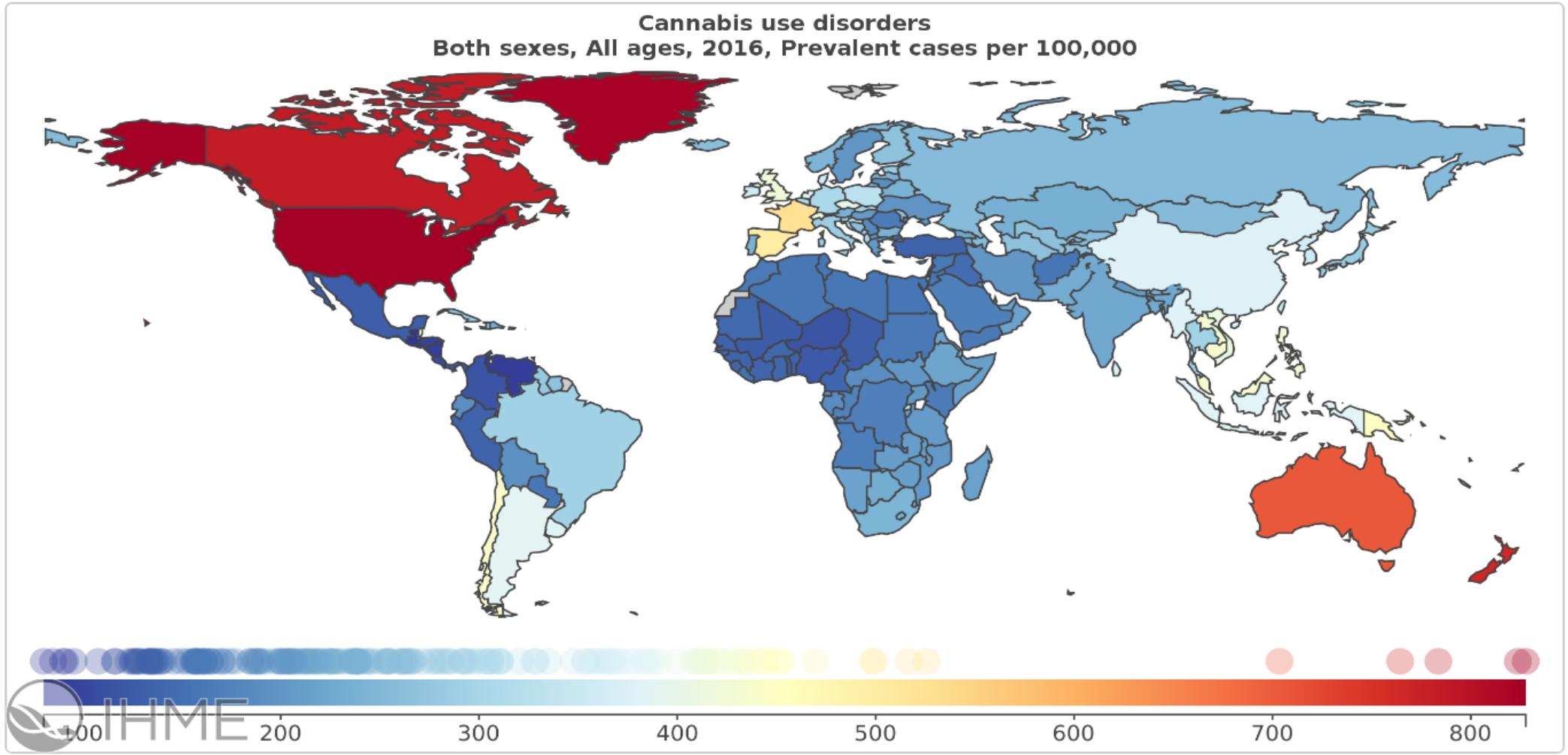
Acute effects

- Cognitive and psychomotor impairment
- Anxiety, dysphoria, psychotic symptoms
  - Most often in naïve users;
  - May increase with higher potency: increased ERs visits in USA
- Motor vehicle crashes if users drive while impaired:
  - Debates about magnitude of association: 1.3-2.0
  - Policy challenge: identifying cannabis-impaired drivers
- Birth outcomes:
  - low birth weight most consistently observed
  - birth defects and
  - behavioural disorders in offspring understudied

Harms of regular cannabis use

- Cannabis dependence
- Correlates of cannabis dependence
  - Psychosis
  - Depression and suicide
  - Other illicit drug use
  - Educational under-achievement
  - Physical health
    - Cardiovascular effects
    - Respiratory disease
    - Hyperemesis syndrome
- Debate about which of these are:
    - Causes and consequences e.g. depression?
    - Explained by common causes e.g. school leaving & other drug use?

Global Prevalence of Cannabis Dependence



Long term adverse health effects

- Not well studied because
  - Fewer decades of cannabis use
  - Fewer users who have used daily for decades
  - Few prospective studies; more case-control studies
- Lung and upper respiratory tract cancer
  - Mixed results in case-control studies
  - Confounded by past or current tobacco smoking
  - Lower rates of daily cannabis smoking than tobacco smoking
- Testicular cancer
  - Three case control studies show moderate increase in risk
  - Not wholly implausible but causal mechanism unclear

Other long term adverse health effects

- Respiratory diseases:
    - chronic bronchitis most consistently found in studies
    - COPD: found in some but not all studies including the largest

- Cardiovascular disease:
    - THC acutely stimulates cardiovascular system
    - Tolerance develops rapidly in healthy young users
    - Case series and small case-control of myocardial infarctions and strokes
    - Use by older medical & recreational users with higher baseline CVD risk

Cannabis impaired driving

- Tempting to look to alcohol-impaired driving for a model
  - Roadside breath test; blood testing to confirm if BAC > per se level
  - Per se definition of impairment: 0.05% for all drivers
  - Penalties: Fines and loss of licence for statutory period for low level offences
- Saliva test detects recent cannabis use
- Setting per se blood THC levels a major challenge
  - No relationship to impairment
  - Delays in blood tests: under-estimate use at time of accident or testing
  - Expert recommendations in range: 5 to 7 ng/ml
  - Most common levels in Australia and EU: 1-2 ng/ml
- Low levels do not detect impairment
  - Can also detect past use in regular users who were not impaired at time
  - No scientific rationale for any per se level (Compton, 2017)
  - Zero tolerance being used to punish drug use rather than protect public safety

Medical uses of cannabinoids

- Primarily for symptom relief as an
    - adjunct (in combination with other drugs) or
    - second + line (only after failing other treatments)

- Proposed benefits in treating symptoms of:
    - nausea and vomiting in cancer patients
    - appetite stimulation in AIDS patients
    - chronic pain in cancer and non cancer patients
    - muscle spasticity & pain in multiple sclerosis patients
    - childhood epilepsies resistant to treatment

Pharmaceutical policy by plebiscite

- Pioneered in some states in the USA:
  - No clinical trial evidence of efficacy required
  - Patient testimonials sufficient to warrant use
- Put the issue to the popular vote in a referendum
  - If the proposal is passed the legislature must enact it
  - An option in around half of US states
- Patients can access cannabis without a prescription
  - Doctors “recommend” rather than prescribe
  - Using open-ended criteria for “medical use”
  - Cannabis products supplied by commercial dispensaries

Canada's Medical Marijuana Program:
pharmaceutical policy by litigation

- Courts directed the federal government to let patients use medical cannabis
  - Series of decisions forced progressively more liberal policies
- Government successively tried
  - Using ministerial discretion to allow use by named individuals
  - Allowing patients/carers to grow cannabis for medical use
  - Creating a government cannabis supply for patients
  - Licensing commercial producers to directly supply approved patients
- Reluctance of physicians to prescribe
  - Medicolegal liability
  - Lack of evidence to justify medical use
- Patient complaints about
  - quality and cost of medical marijuana

Competing models of medical use

- Approved pharmaceutical cannabinoids only
  - Challenges in doing clinical trials
  - Mixed history of dronabinol, nabilone and sativex
  - Expensive for patients in absence of subsidy

- Herbal cannabis derivatives
  - Unknown effectiveness and safety for many uses
  - Weak medical oversight of medical use
  - Commercial interests in promoting use e.g. dispensaries

Legalisation of recreational cannabis use

- USA:
  - State level citizen-initiated referenda 2012, 2014, 2016
- Uruguay:
  - Presidential decision 2013
- Canada:
  - Election promise in 2017 and implemented in 2018

Regulation in US States that have legalised

- Alcohol the popular model
  - Use legal for adults over age of 21
  - 28.5 g purchase limit
  - Licenses for producers, processors and sellers
  - Taxed on sales price
  - Taxes earmarked for social goods
  - Impaired driving=5 nanograms/mL THC
- Legalisation without commercialisation:
  - Grow and gift only; no sales
  - Washington DC and Vermont

Effects of legalisation: increased potency and lower prices

- Prices have declined
    - 14-60% in early legalisation states (median 22%)
- Popularity of edibles:
    - Candies, cookies, infusions
    - More ED attendances by adults
    - Accidental childhood poisonings
- Cannabis concentrates
    - 70-90% THC content
    - Used in vaporisers and e-cigarettes: dabs

Cannabis legalisation in Uruguay

- Top down policy from the President
  - Announced Uruguay would legalise recreational use in 2013
- Aims of policy were to:
  - Protect public health
  - Remove organised crime from cannabis market
- Registered users can access cannabis in one of three ways
  - Grow your own for personal use
  - Growers' clubs (as in Spain) for members' use
  - Purchase cannabis produced by state from pharmacies
- Implementation has been gradual:
  - Grow your own legalised first then cannabis clubs
  - Pharmacy supply most recently: limited access
  - Too early to tell how well it is working

Cannabis legalisation in Canada

- Trudeau's election promise to legalise in 2018
  - Federal policy rather than a result of state initiatives
  - Promises a nationally consistent approach
- A more traditional legislative and deliberative process:
  - Expert committee recommendations
  - Public consultation
  - Legislation debated in parliament
- Public health-oriented language- legalise and regulate by:
  - Eliminating black market for cannabis
  - Removing criminal penalties for use and supply
  - Protecting public health and
  - Minimising youth uptake

The future of legal cannabis markets

- Causes for concern in USA
  - More potent cannabis more readily available
  - At a much lower price than under prohibition
  - Reductions in perceived risk of using cannabis
- Increased commercialisation of cannabis industry
  - National repeal of cannabis prohibition in the USA?
  - Interest from alcohol, tobacco, beverage and biotech industries
  - Alcohol and tobacco executives joining cannabis firms
  - Organised cannabis lobbyists: Congress Cannabis Caucus
  - Firms with an Interests in expanding use, especially heavy use

What may happen to cannabis use?

- Changes in cannabis use in youth:
  - Softening of perceived risks of use often precedes increased use
  - More heavy use among current users already occurring
  - More initiation at an earlier age? If so, how much, in whom and how soon?
- Harms that may be seen in young adults users:
  - More car crashes with cannabis (plus or minus alcohol)?
  - More ER attendances for adverse cannabis effects
  - Heavier cannabis use among persons with mental disorders
- Heavier use among current regular cannabis users?
  - Increased help seeking among older users?
  - Higher rates of dependence and psychoses among cannabis users?
  - Educational under-achievement and amplified social disadvantage?
  - More serious health effects of long term daily use?
- Better responses to cannabis use problems
  - Better treating of cannabis dependence
  - Reducing cannabis-impaired driving
  - Low risk guidelines and social norms against heavy use?

Time lines for evaluating effects

- Likely to take time to evaluate effects of legalisation on:
  - Rates of cannabis use among youth
  - Cannabis related harm among current and new users
  - Effects on alcohol and other drug-related harm e.g. opioids

- It will probably be easier to study adverse and beneficial effects
  - Cannabis use will no longer be illegal to disclose
  - Easier to measure exposure to THC and CBD
  - More regular users using cannabis for much longer
  - Easier to do clinical trials