

# The International Cannabis Toolkit (iCannToolkit): a first necessary step to integrate global multidisciplinary evidence on cannabis related risks and benefits

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Lisbon Addictions, Lisbon, 23 June 2022



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Disclosure: no conflict of interest to declare



# THC units as gold standard, but many labs cannot currently measure standard THC units

- lack of resources e.g., funding, technical facilities
- feasibility e.g., legal status
- type of research, e.g., epidemiological surveys with limited time and access to products

How do we currently measure cannabis exposure?



where we should be



where we are at

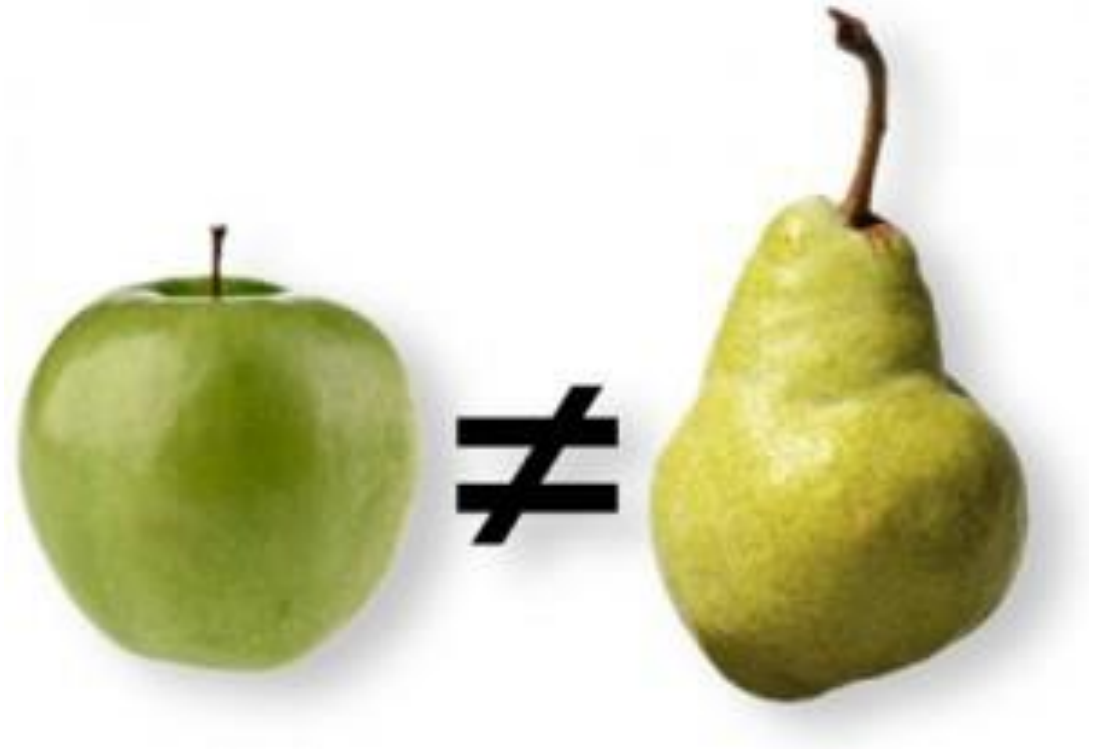


# A key issue: researchers use inconsistent cannabis metrics

There is no agreed-upon international approach for standardized metrics of cannabis consumption.

Measuring cannabis use is complex.

Research is lagging behind reality.

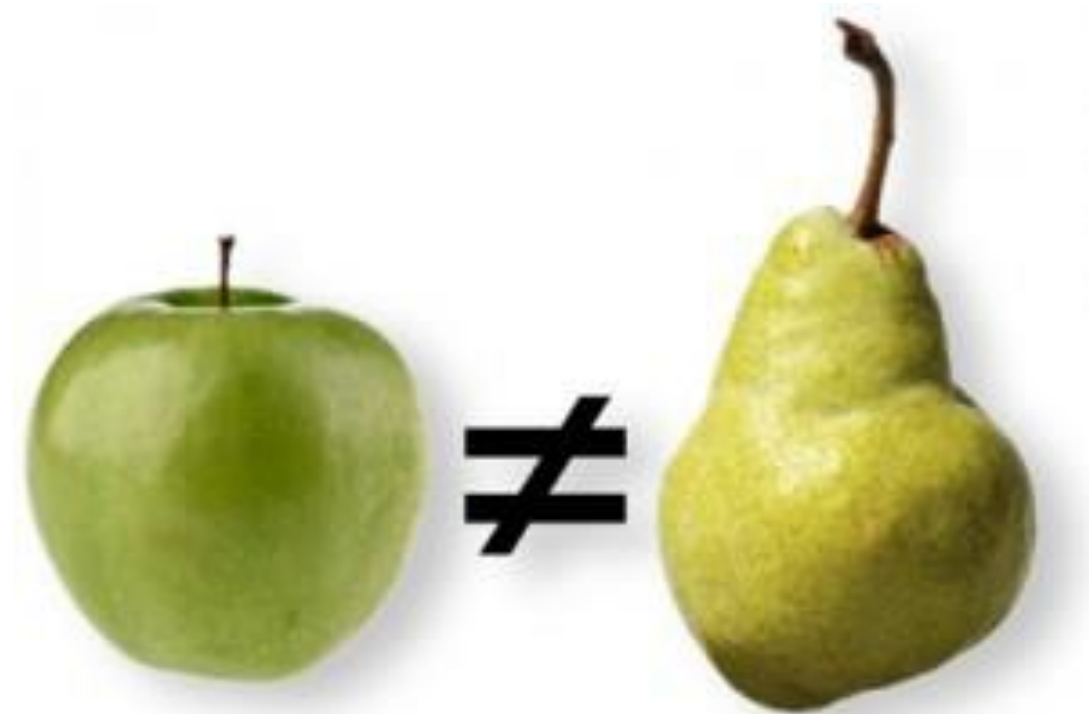
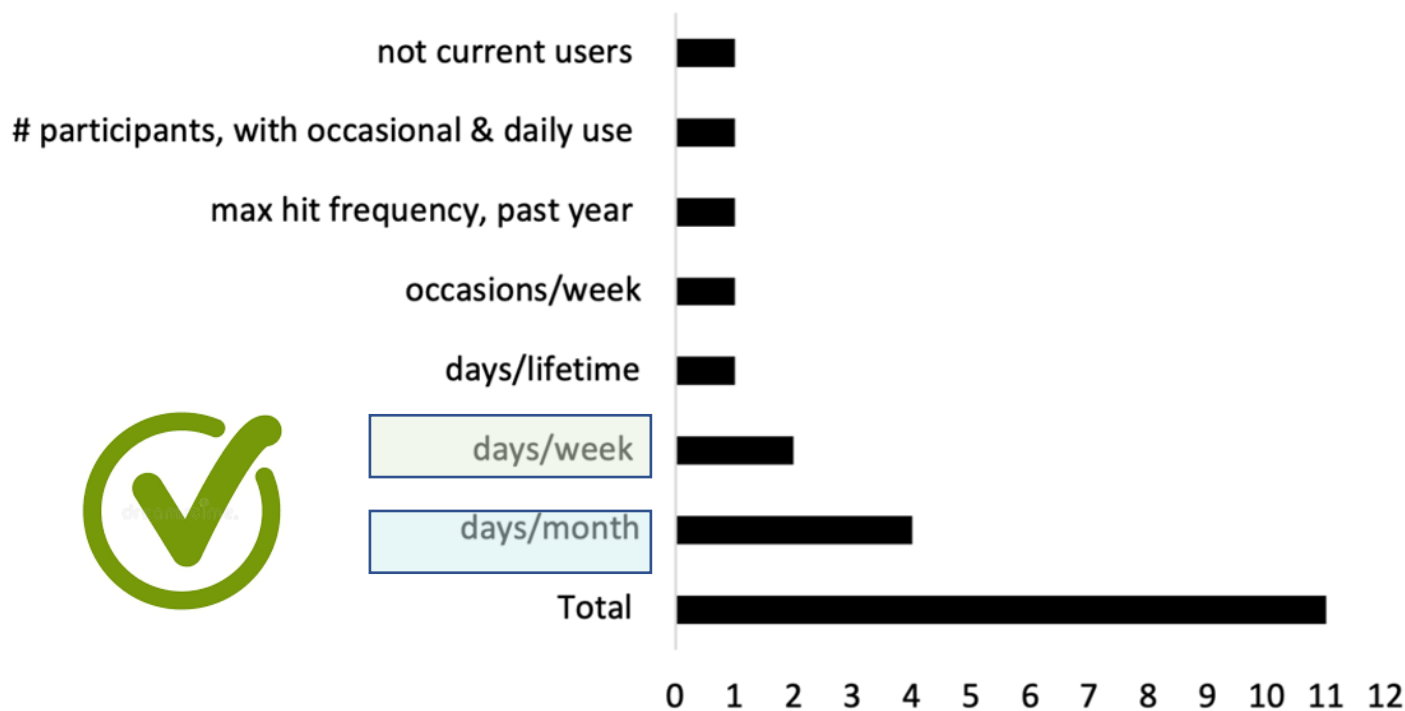


# Example, lit review on use of inconsistent cannabis metrics



Emily Robinson,  
PhD candidate

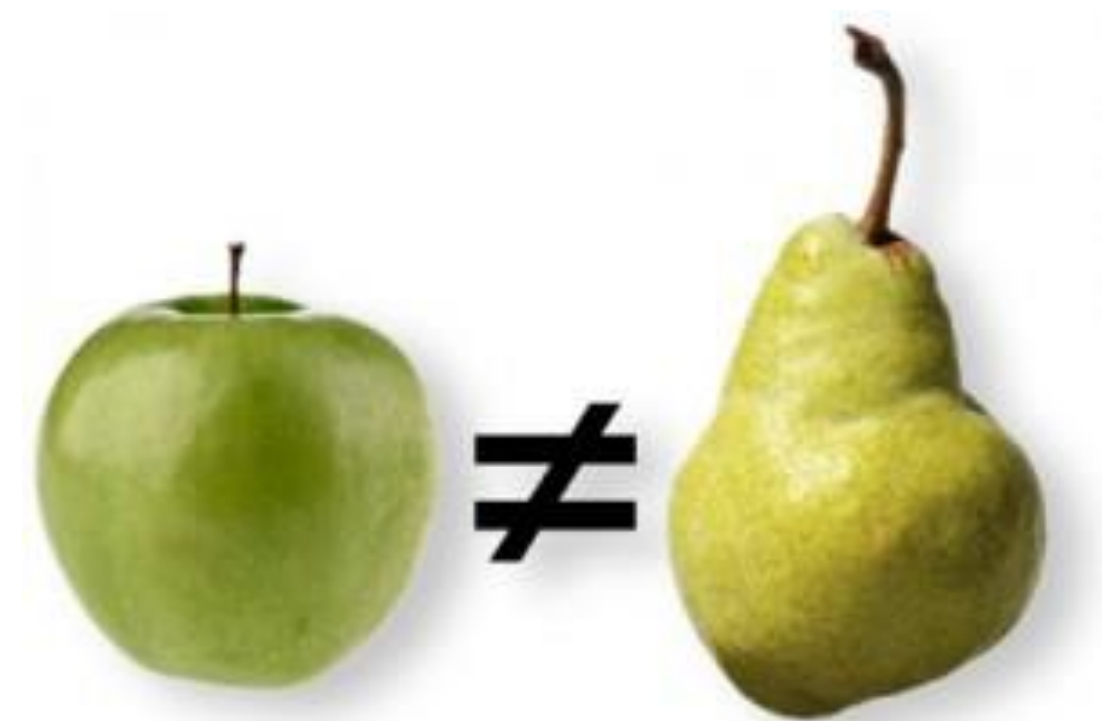
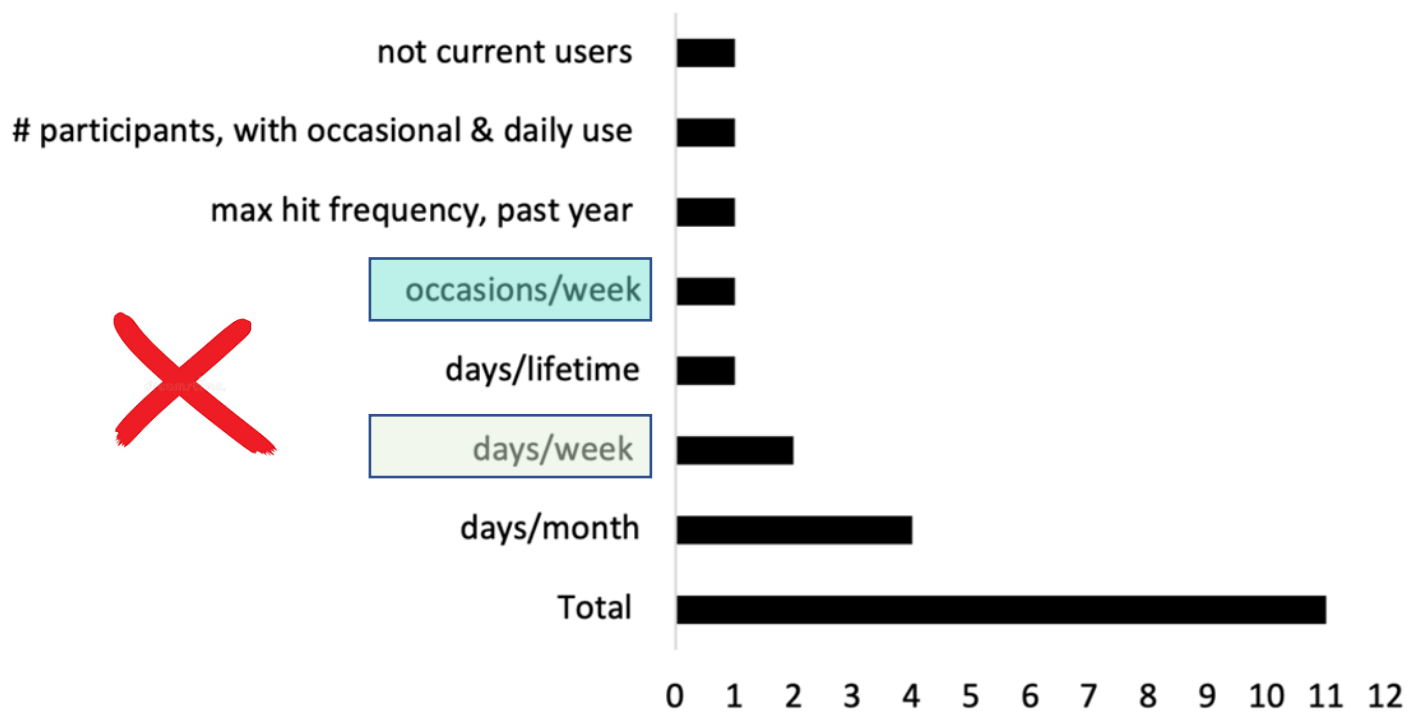
## Overview, cannabis frequency metrics, n studies





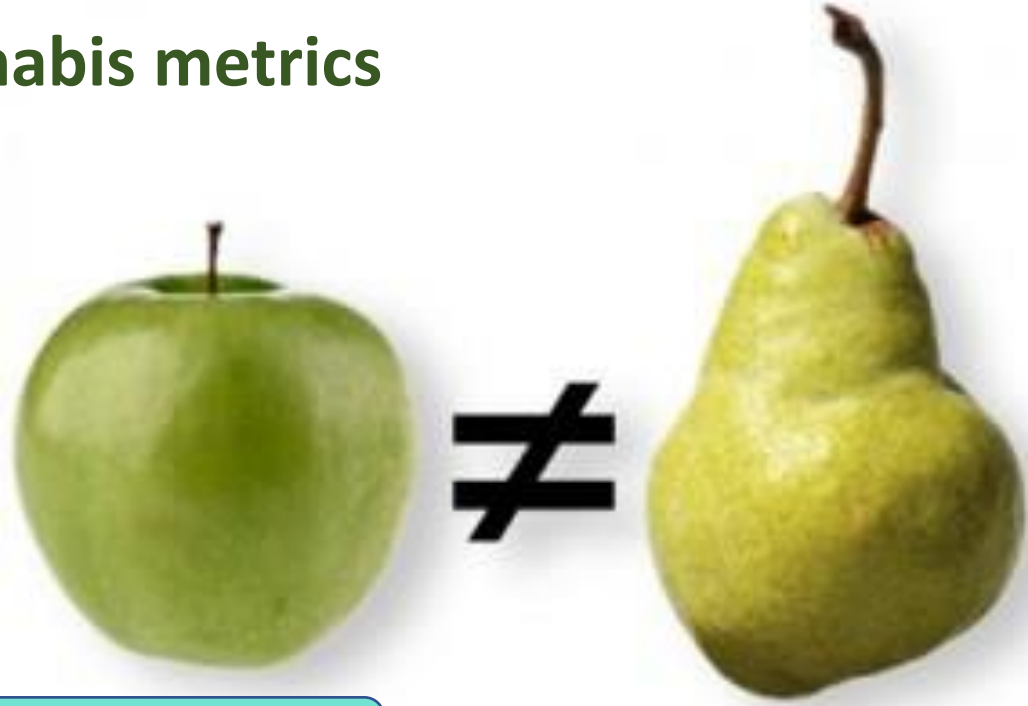
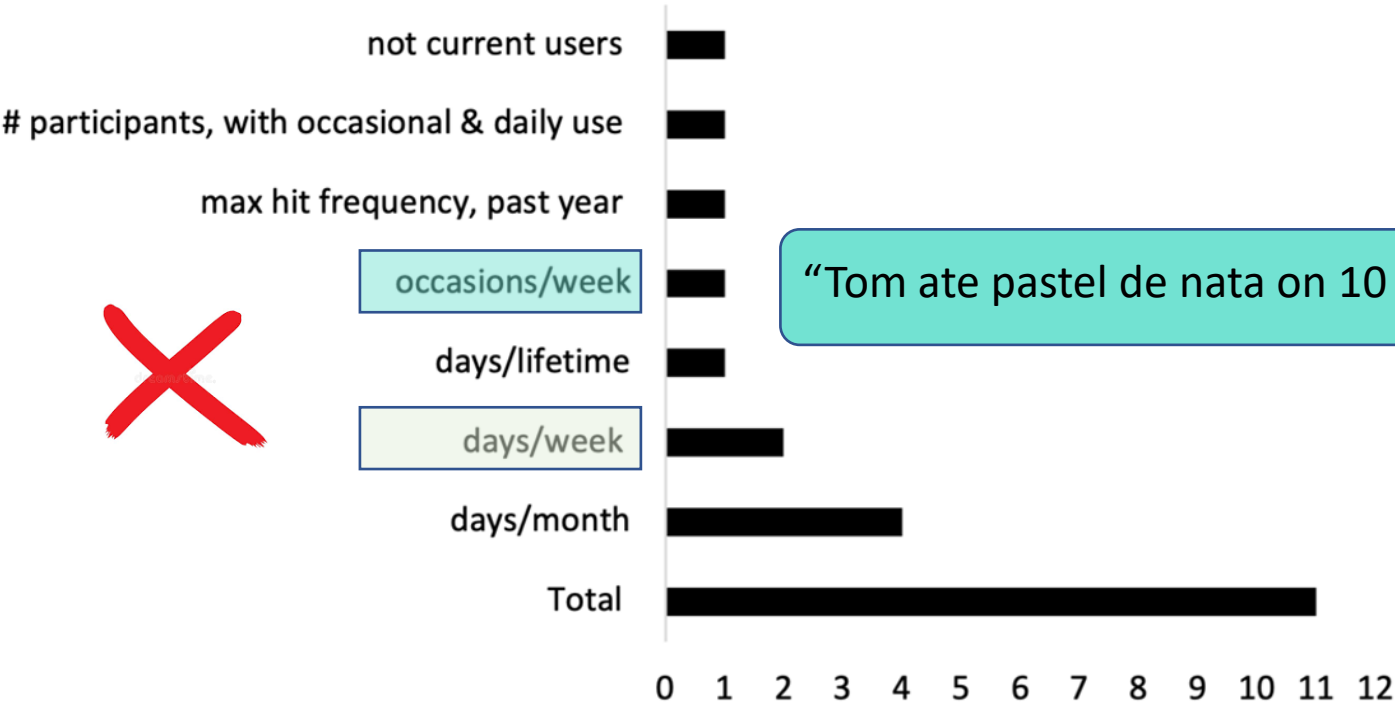
# Example, lit review on use of inconsistent cannabis metrics

Overview, cannabis frequency metrics, n studies



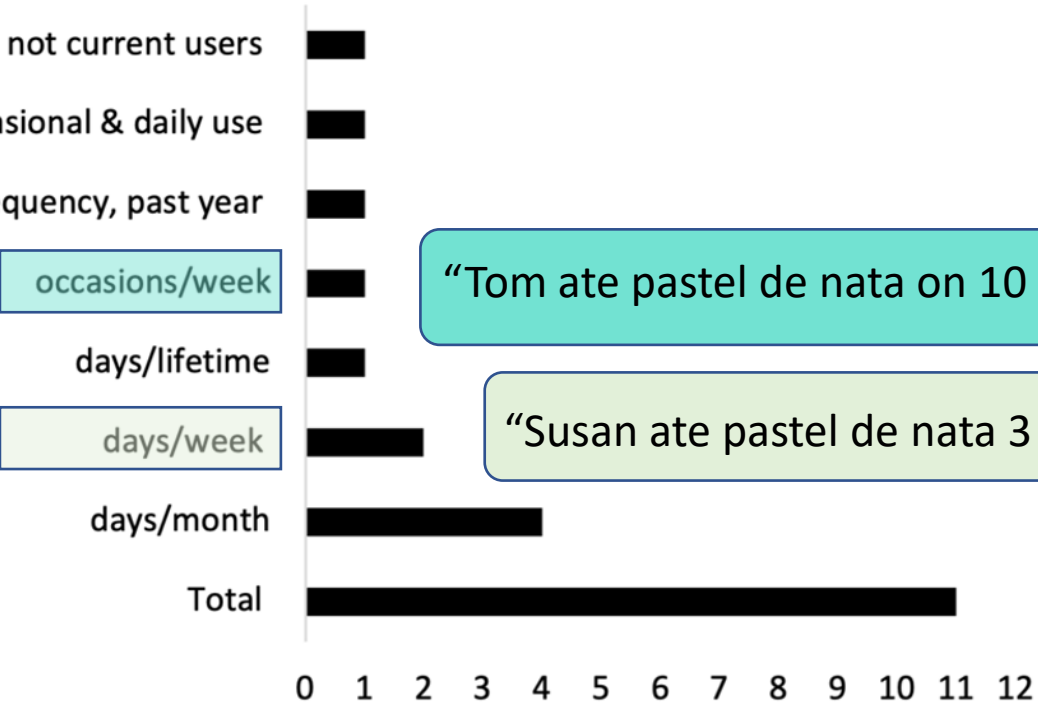
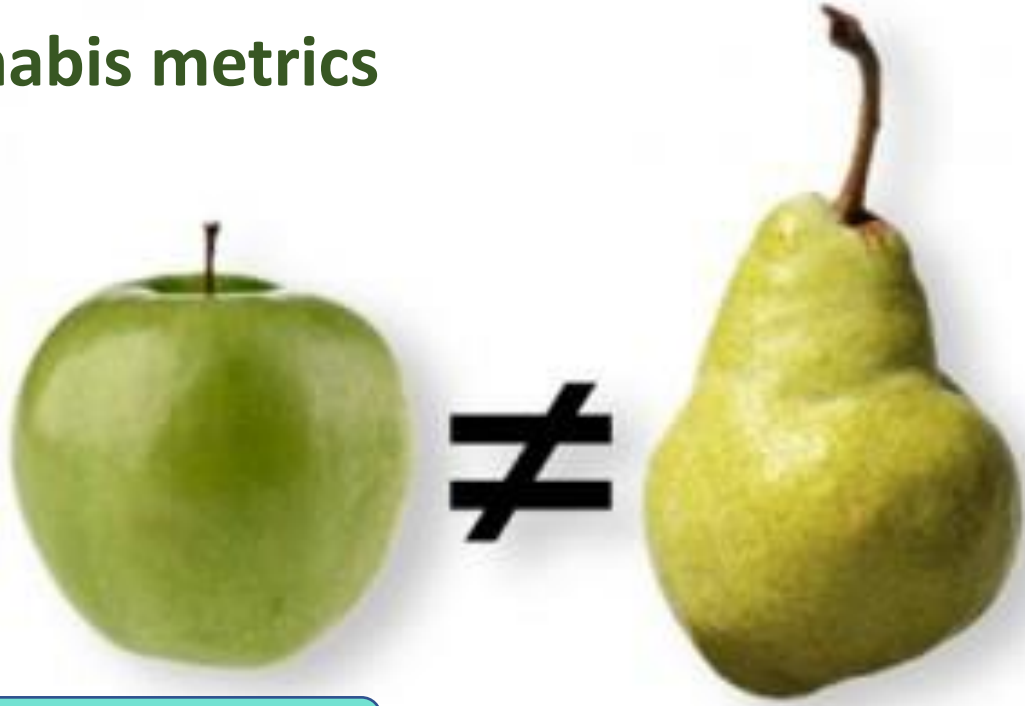
# Example, lit review on use of inconsistent cannabis metrics

## Overview, cannabis frequency metrics, n studies



# Example, lit review on use of inconsistent cannabis metrics

## Overview, cannabis frequency metrics, n studies



“Tom ate pastel de nata on 10 occasions this week”

“Susan ate pastel de nata 3 days this week”

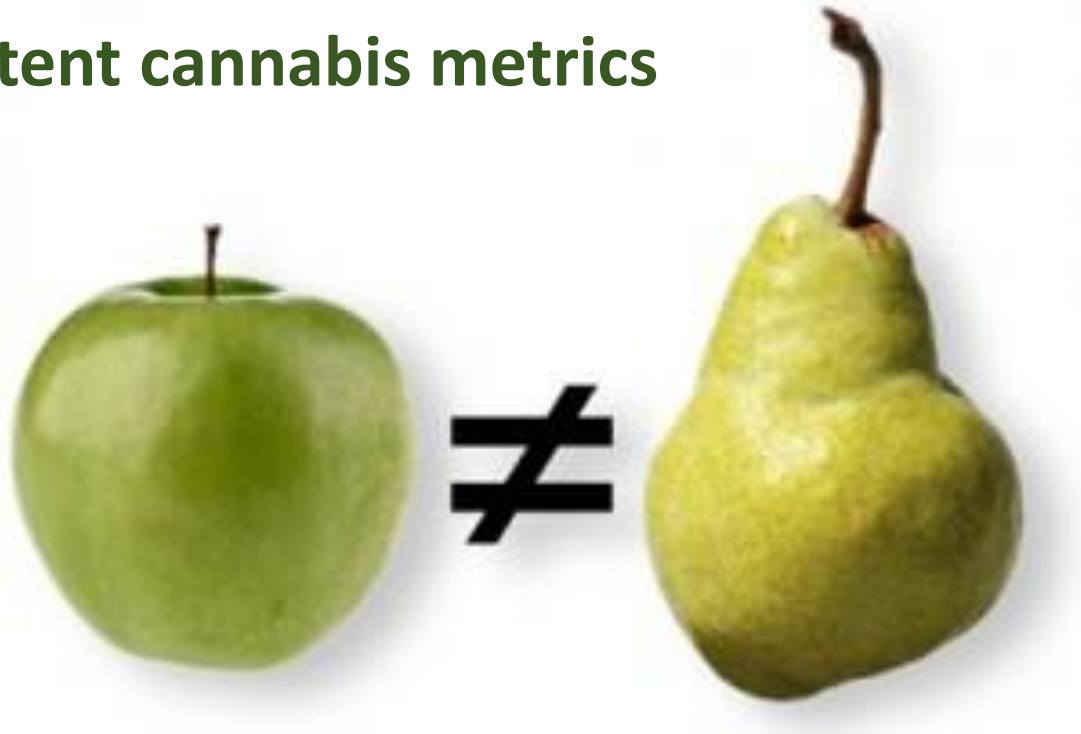
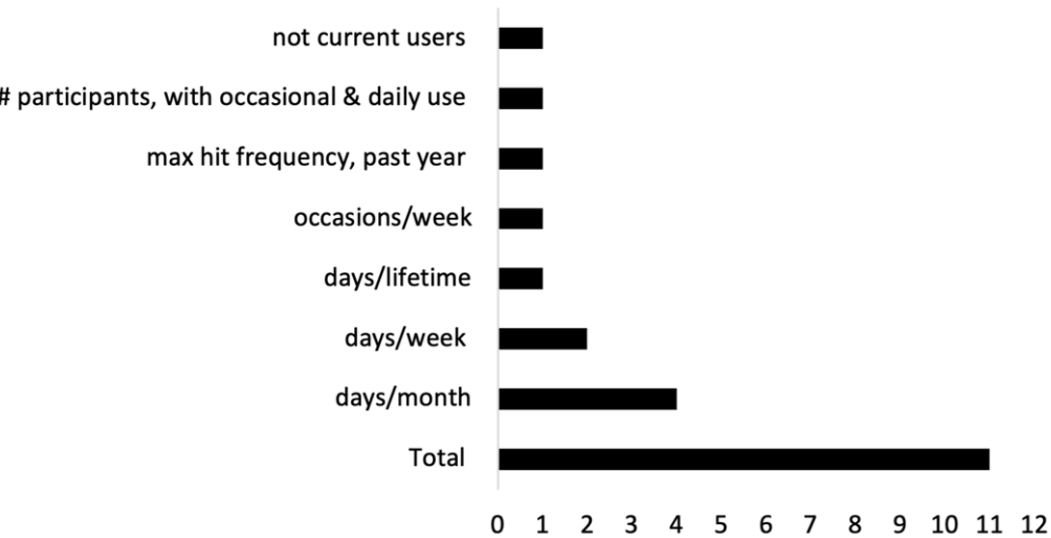


We don't know if Tom and Susan ate the same amount of pastel de nata

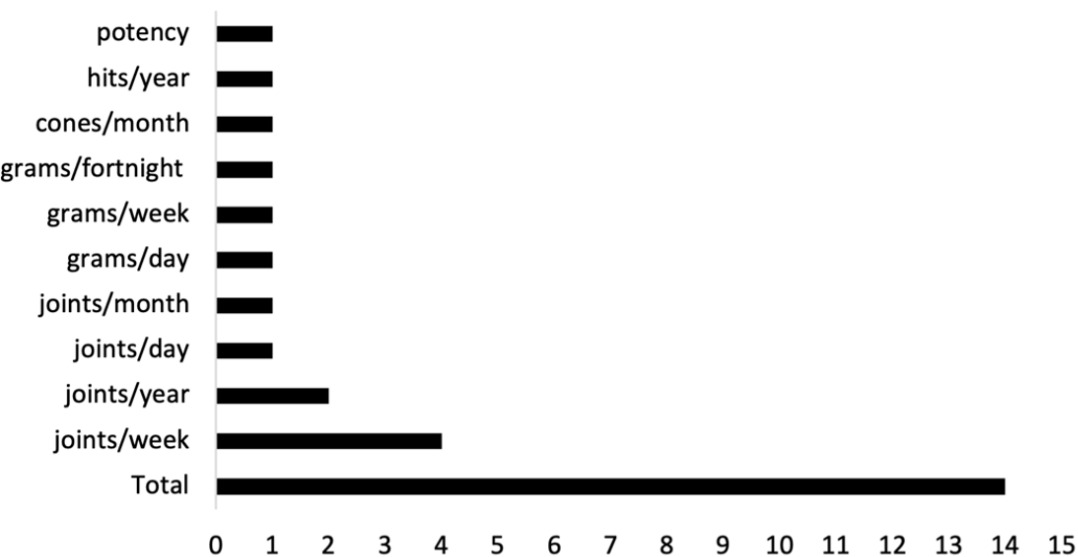


# Example, lit review on use of inconsistent cannabis metrics

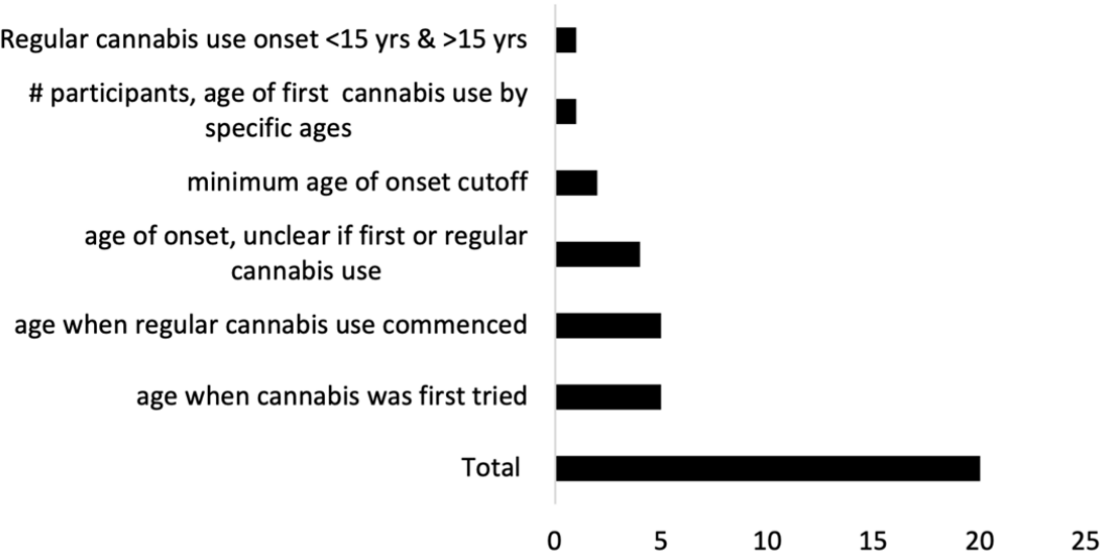
Overview, cannabis frequency metrics, n studies



Overview, cannabis dosage metrics, n studies



Overview, age of onset metrics, n studies



## **The problem with lacking agreed upon cannabis use metrics**

- Interpreting and synthesizing multidisciplinary evidence on the health consequences of cannabis use, across world regions, over time & changing cannabis markets and products
- Evidence to develop guidelines that can inform consumers on health risks of different levels of cannabis exposure

## The International Cannabis Toolkit (iCannToolkit): a multidisciplinary expert consensus on minimum standards for measuring cannabis use

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Amir Englund<sup>9,10</sup>  | Mahmoud A. ElSohly<sup>11,12</sup>  | Suzanne H. Gage<sup>13</sup>  |  
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 | Tom P. Freeman<sup>3</sup> 



## International Cannabis Toolkit Workshop 2019

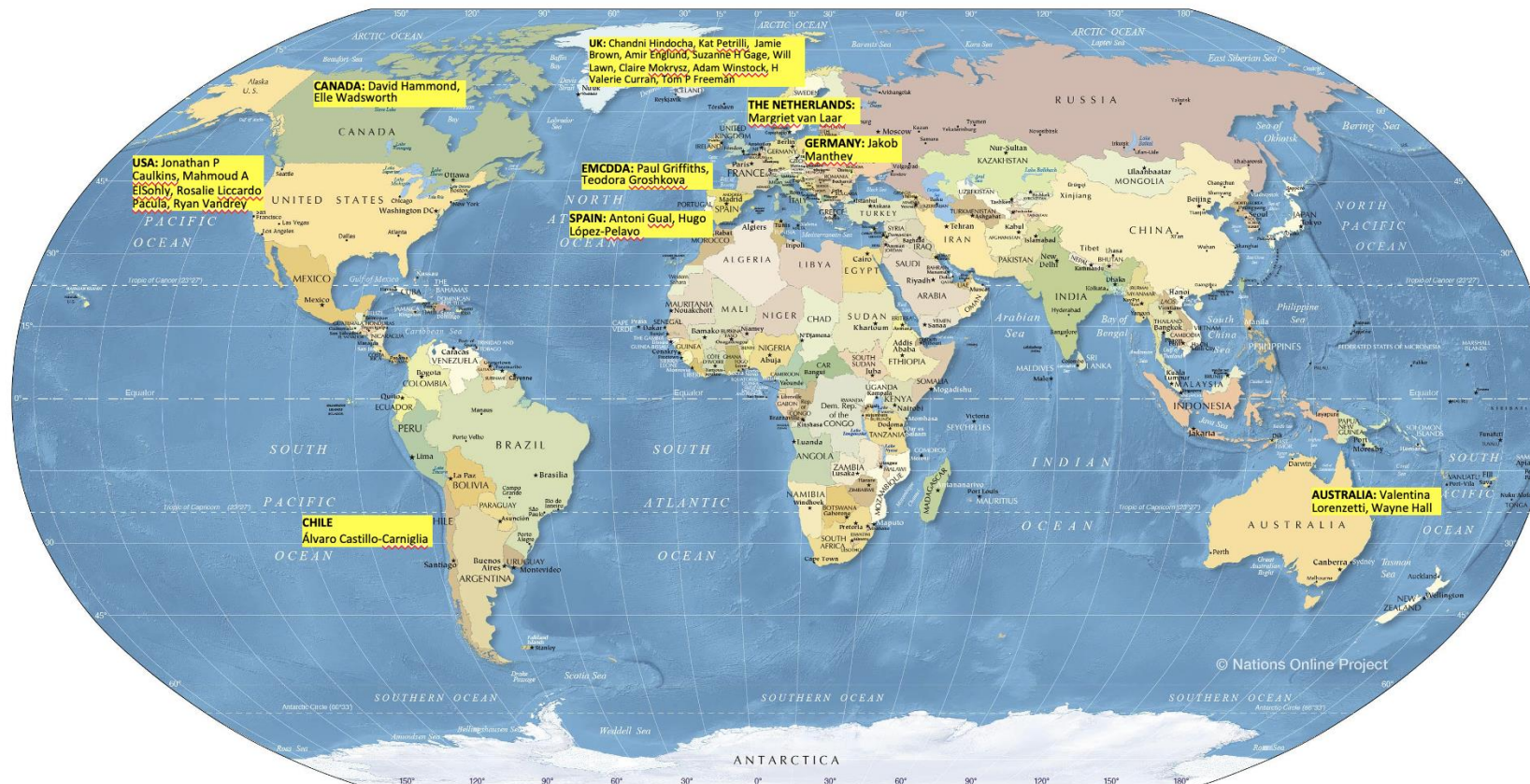
- 22nd October 2019, Lisbon -





# Joining forces, to address complex global issue on cannabis measurement

**Aim 1:** Identify / disseminate key challenges in measuring cannabis use from an international multidisciplinary perspective



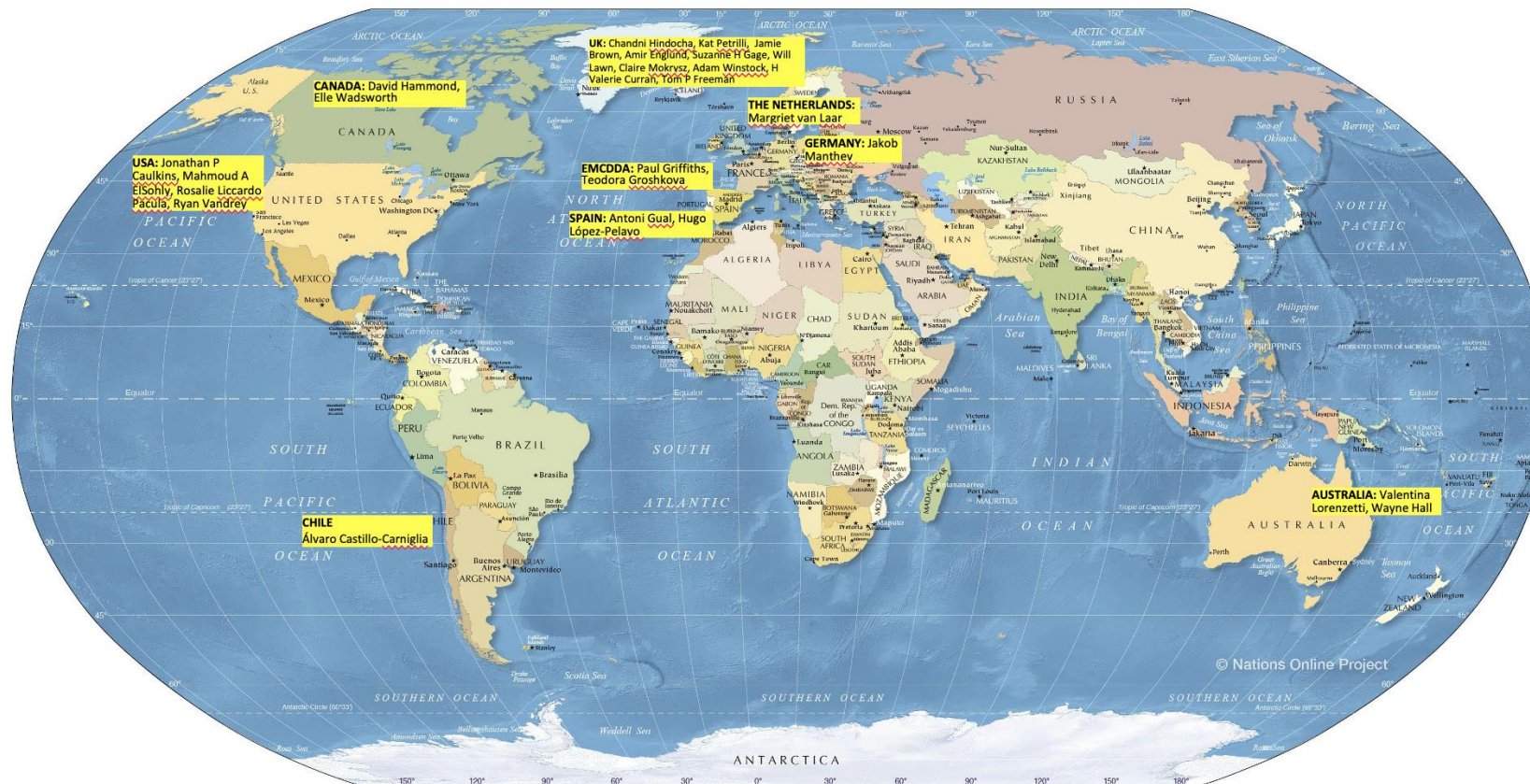


# Joining forces, to address complex global issue on cannabis measurement



**Aim 1:** Identify / disseminate key challenges in measuring cannabis use from an international multidisciplinary perspective

**Aim 2:** Launch the development of an International Cannabis Toolkit: a standardized, internationally relevant tool to measure cannabis use in research and clinical settings





# Joining forces, to address complex global issue on cannabis measurement



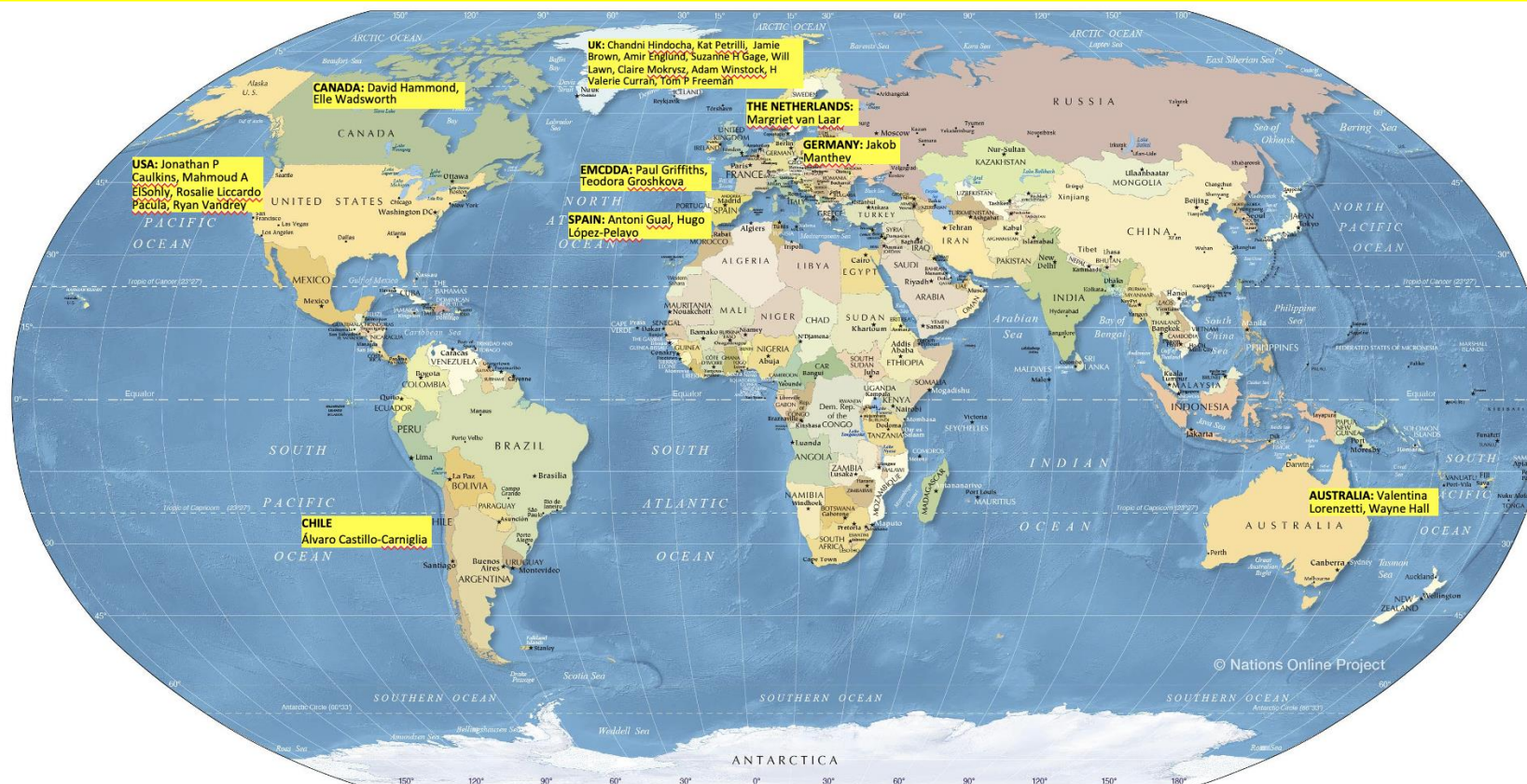
**Aim 1:** Identify / disseminate key challenges in measuring cannabis use from an international multidisciplinary perspective

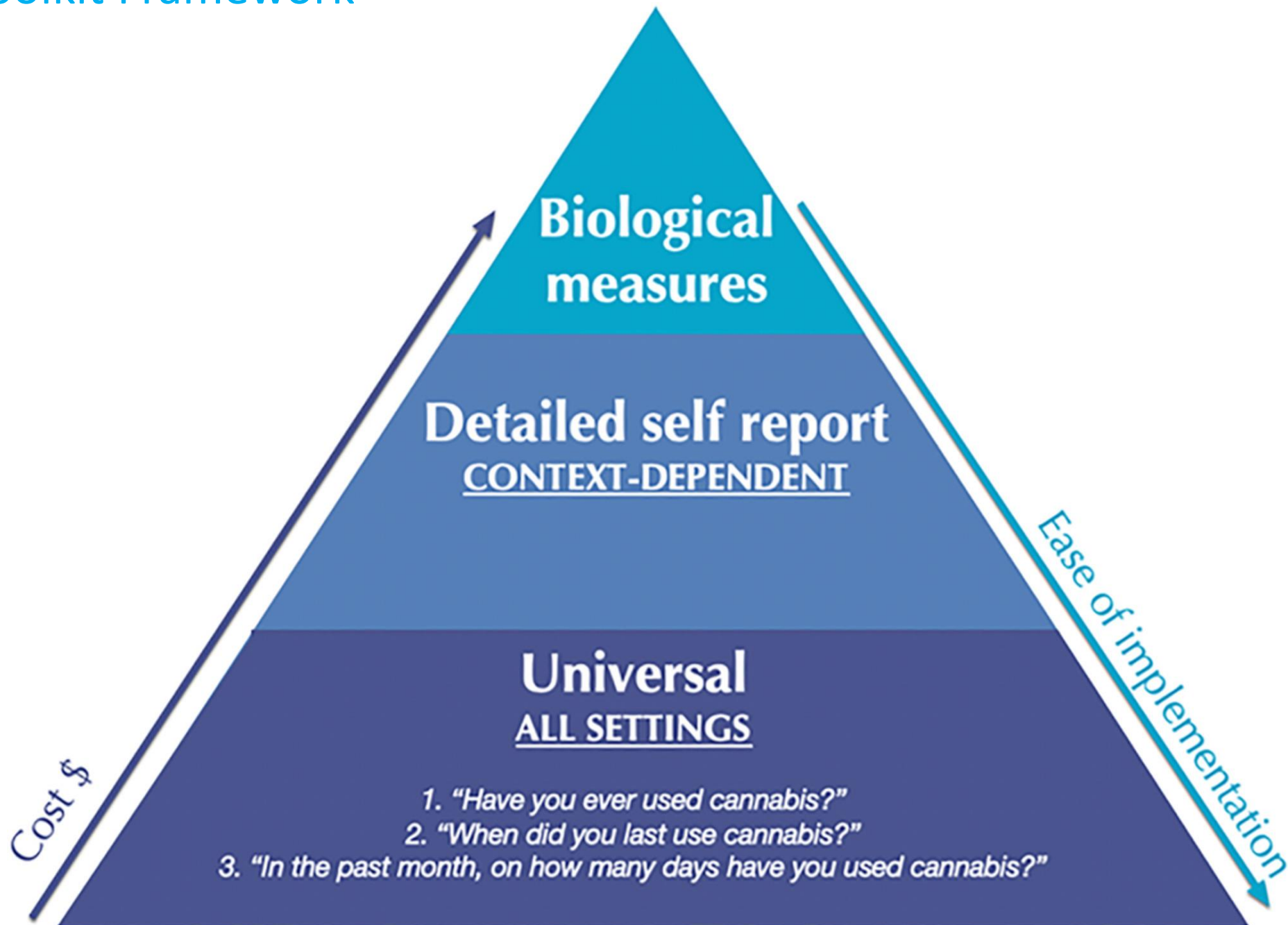
**Aim 2:** Launch the development of an International Cannabis Toolkit: a standardized, internationally relevant tool to measure cannabis use in research and clinical settings

Experts from countries and states that vary with respect to legal status of cannabis

**multi-disciplinary:** epidemiology, academia, clinical psychology, psychiatry, psychopharmacology, pharmacology, neuroscience, economy)

& greater diversity  
in future





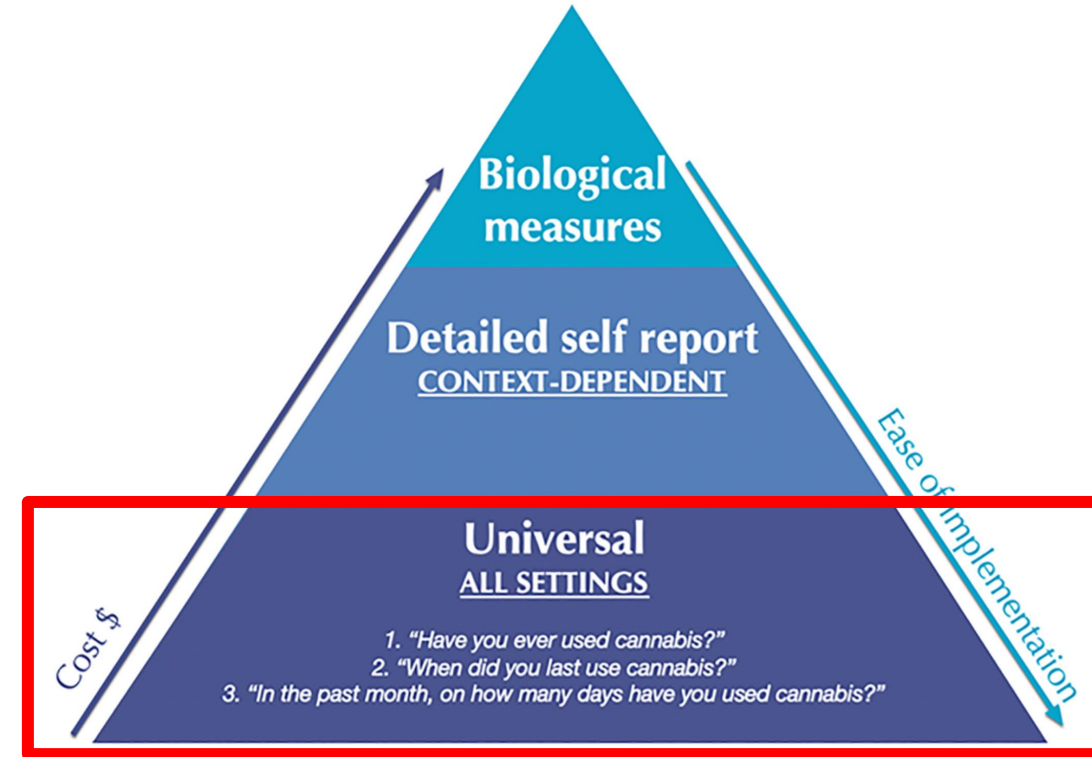
## UNIVERSAL LAYER: All settings

AIM: to quantify frequency and recency of use.

1. 'Have you ever used cannabis?' (Record: yes, no)

2. 'When did you last use cannabis?'

3. 'In the past month, on how many days have you used cannabis?'



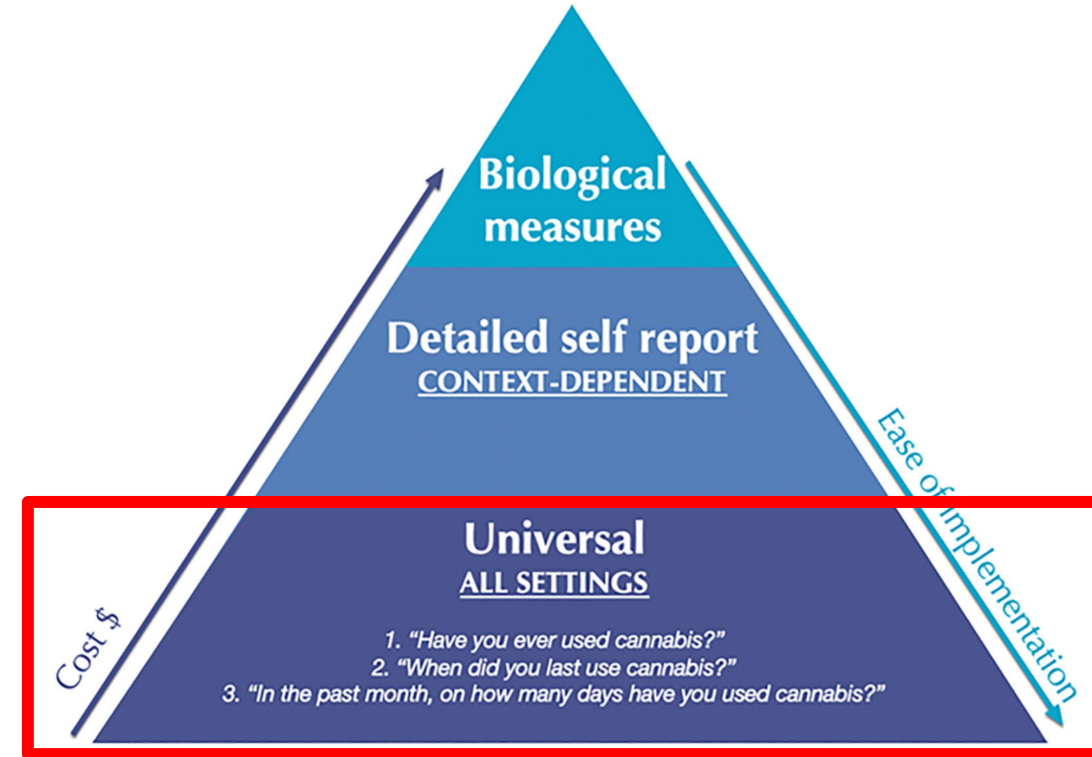
IF ALL CANNABIS STUDIES IMPLEMENTED JUST THE 3 ITEMS, THIS WOULD SIGNIFICANTLY ADVANCE THE FIELD & INCREASE EVIDENCE INTEGRATION



## UNIVERSAL LAYER: All settings

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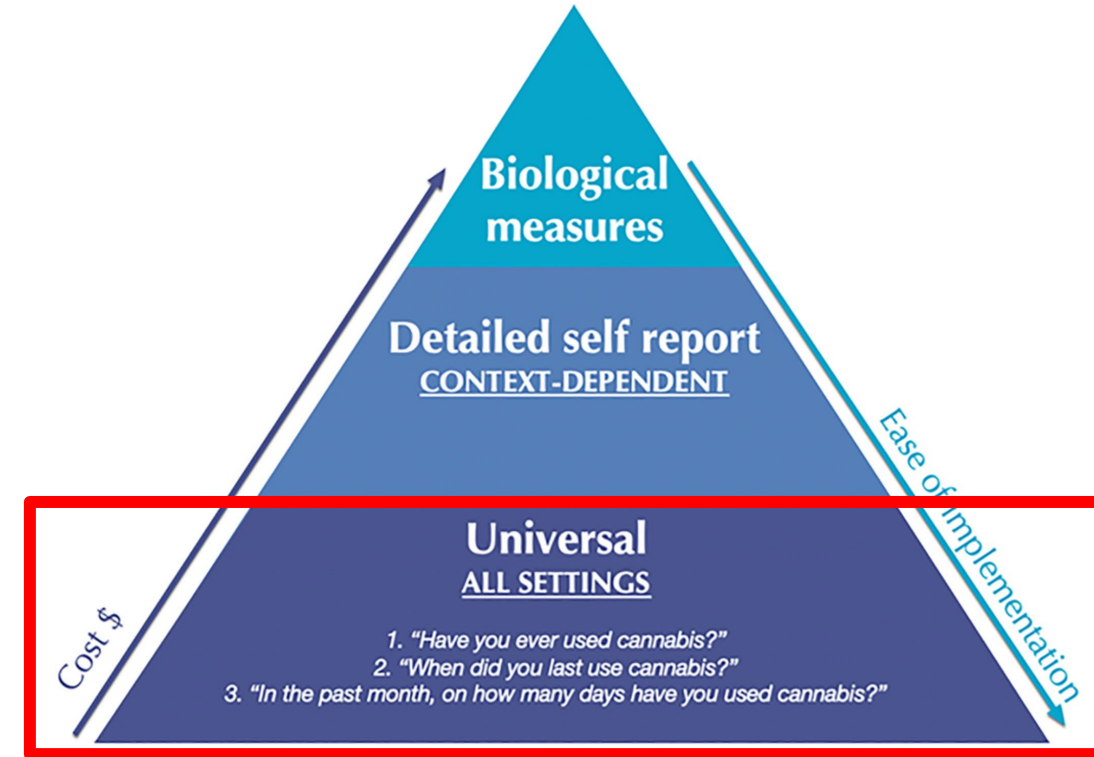
1. **'Have you ever used cannabis?'** (Record: yes, no)  
brief screening of lifetime cannabis use
2. **'When did you last use cannabis?'**  
(Record hours, days, months or years as appropriate)  
can use item alone in hospital emergency settings to determine cannabis-related intoxication
3. **'In the past month, on how many days have you used cannabis?'**  
(Record n days/month from: never, 0 to 30)  
risky cannabis use



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(Record n days/month from: never, 0 to 30)  
risky cannabis use



Combined, can help distinguish relapse vs continued abstinence in a frequent user.

ALL SETTINGS: surveys, epidemiological, clinical, cognitive and neuroimaging studies and clinical practice.

**Superficial** - additional layers required to measure additional cannabis exposure facets.



## SECOND LAYER: Detailed self report for CONTEXT-DEPENDENT/setting-specific MEASURES

AIM: to quantify additional aspects of cannabis use in addition to universal items.

### RECOMMENDED: TIMELINE FOLLOW-BACK METHODOLOGY

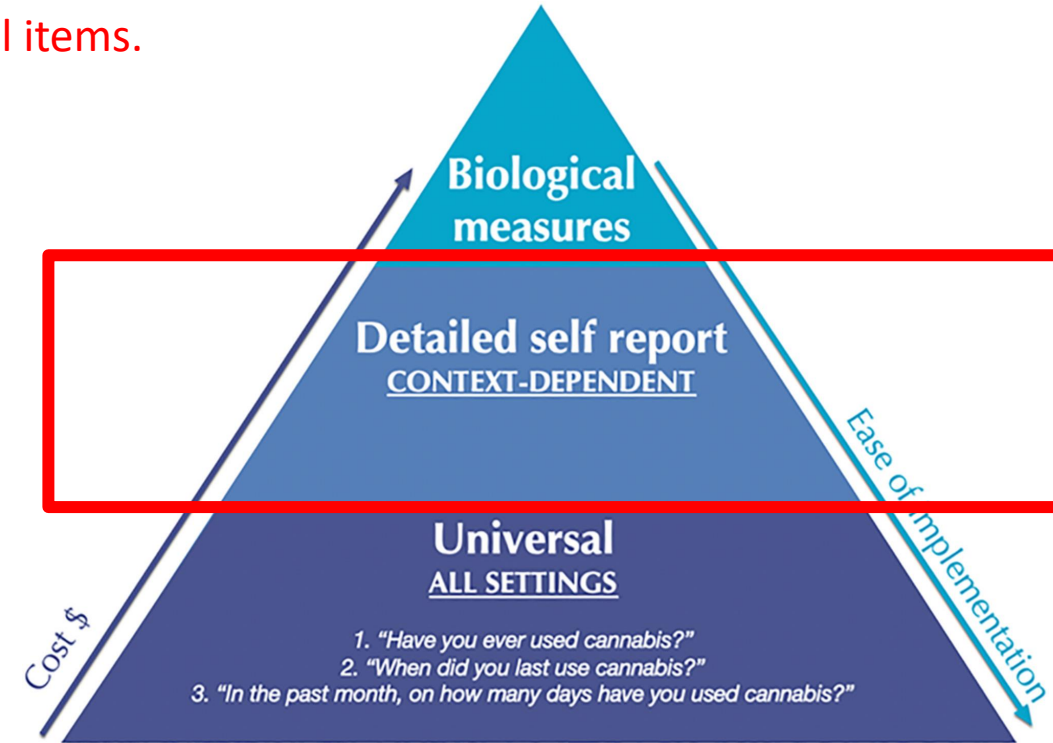
(Sobell & Sobell, 1992)

КВ - Крепленое вино  
ВОД - Водка или крепкие напитки  
П - Пиво/Коктейли с низким содержанием алкоголя  
ВИН - Вино/Коктейли с высоким содержанием алкоголя

Понедельник	Вторник	Среда	Четверг	Пятница	Суббота	Воскресенье
1					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
Июнь 2013	Июль 2013	Июль 2013	Июль 2013	Июль 2013	Июль 2013	Июль 2013

1. "Have you ever used cannabis?"  
2. "When did you last use cannabis?"  
3. "In the past month, on how many days have you used cannabis?"

Номер участника \_\_\_\_\_ Дата интервью \_\_\_\_\_  
1. Проверка качества (ФИО) 2. Проверка качества (ФИО)



Requires more resources  
(e.g., time, funding, research personnel & training).

## SECOND LAYER: Detailed self report for CONTEXT-DEPENDENT/setting-specific MEASURES

### RECOMMENDED: TIMELINE FOLLOW-BACK METHODOLOGY

(Sobell & Sobell, 1992)

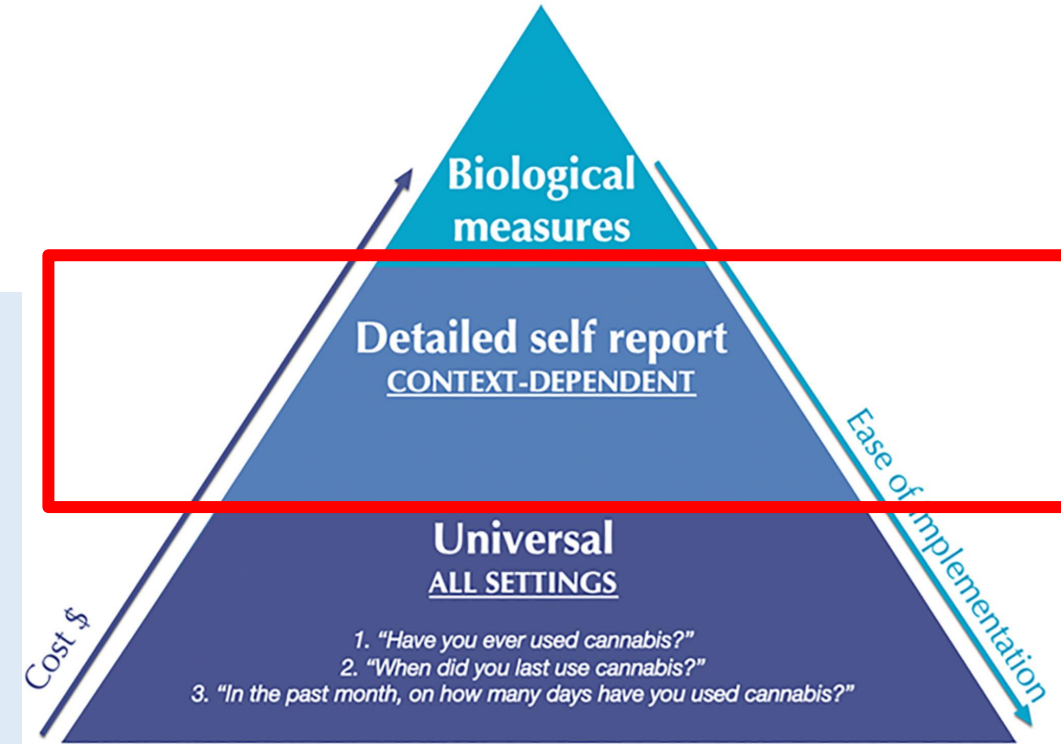
#### FLEXIBLE TIMEFRAMES

according to the context & question.

- **past 1-2 days:** recent use in intervention/epidemiological studies;
- **past week:** during CUD treatment/clinical trial with regular testing
- **past month:** detailed current levels of cannabis use
- **past 3 months-to-1 year:** longer history of use in longitudinal study

#### SETTINGS:

- surveys for small intervention studies/large-scale epidemiological studies
- longitudinal/cross-sectional observational studies on community samples.
- treatment/clinical, school counselling, judiciary - to decide if need to measure problems with use.

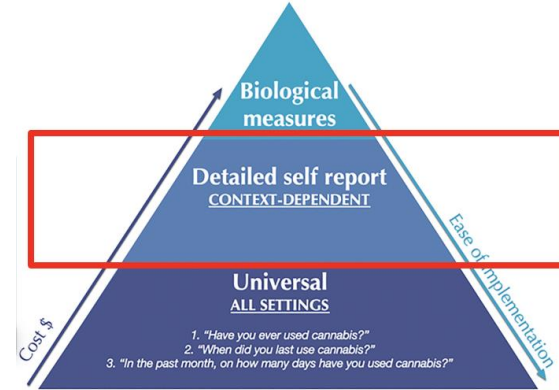


## SECOND LAYER: Detailed self report for CONTEXT-DEPENDENT/setting-specific MEASURES

### RECOMMENDED: TIMELINE FOLLOW-BACK METHODOLOGY

(Sobell & Sobell, 1992)

dosage in grams, or else as reported by participants



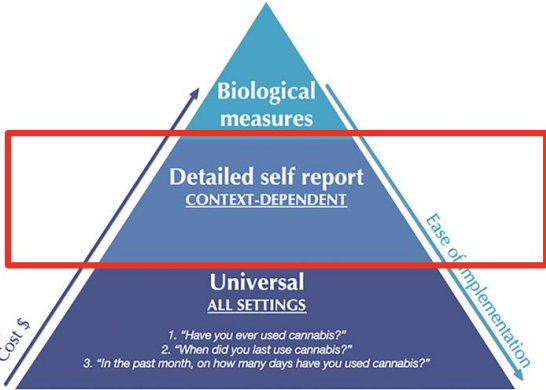


SECOND LAYER: Detailed self report for CONTEXT-DEPENDENT/setting-specific MEASURES

RECOMMENDED: TIMELINE FOLLOW-BACK METHODOLOGY  
(Sobell & Sobell, 1992)

dosage in grams, or else as reported by participants

NEW PRODUCTS, NEW CHALLENGES:  
quantifying vaping, gummy bears, drinks etc



Cannabis concentrates used for 'dabbing'



Vape pen containing cannabinoids



cannabis products in a shop in Lisbon, November 2022

## TOP LAYER: Biological measures

- objective gold standard
- quantifies cannabinoids in biological matrices

### MEASURE

#### Presence vs absence:

- THC-COOH in urine
  - THC in saliva
- e.g., testing strips



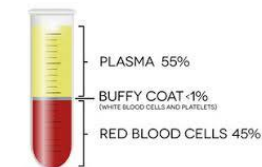
#### THC-COOH level in urine



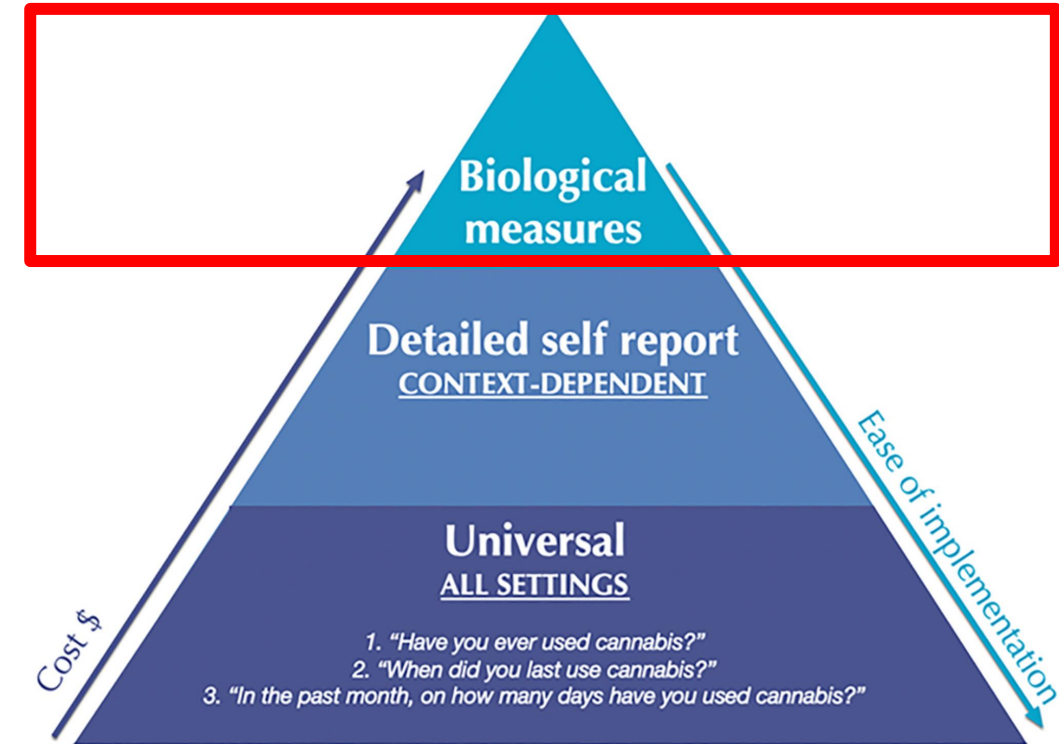
#### THC level in saliva



#### THC, THC-COOH or 11-OH-THC in plasma



#### THC level/presence/concentration in cannabis products





TOP LAYER: Biological measures

- objective gold standard
- quantifies cannabinoids in biological matrices

ADDITIONAL CONSIDERATIONS



feasibility

MEASURE	• PROXY FOR	RECOMMENDED FOR:	CONSIDERATIONS
<b>Presence vs absence:</b> <ul style="list-style-type: none"><li>• THC-COOH in urine</li><li>• THC in saliva</li></ul> e.g., testing strips	<ul style="list-style-type: none"><li>• consumption</li><li>• recent use</li></ul>	<ul style="list-style-type: none"><li>• clinical treatment services</li><li>• emergency services</li><li>• judicial system proxy of recent cannabis exposure</li></ul>	<ul style="list-style-type: none"><li>• Immediate result</li><li>• binary outcome based on cutoff</li><li>• <b>2-8 weeks for an initial negative test after quitting</b></li></ul>
<b>THC-COOH level in urine</b>	<ul style="list-style-type: none"><li>• self-reported continuous abstinence</li><li>• regular cannabis use status</li><li>• predicts: withdrawal, CUD severity, tolerance to intoxication, cognition.</li></ul>	<ul style="list-style-type: none"><li>• experimental, MRI and cognitive studies, clinical trials</li></ul>	<ul style="list-style-type: none"><li>• cannot measure abstinence duration</li><li>• access/costs of lab facilities/analyses</li><li>• multiple samples/creatinine normalisation for reliable testing</li><li>• no immediate result</li></ul>
<b>THC level in saliva</b>	<ul style="list-style-type: none"><li>• associated with: cognition, driving</li></ul>	<ul style="list-style-type: none"><li>• experimental, MRI and cognitive studies investigating recent use</li></ul>	<ul style="list-style-type: none"><li>• uncertainty of time of last exposure</li><li>• risk of contamination of buccal area (food)</li></ul>
<b>THC, THC-COOH or 11-OH-THC in plasma</b>	<p>precise / reliable measure of:</p> <ul style="list-style-type: none"><li>• THC consumption</li><li>• THC metabolism</li></ul>	<ul style="list-style-type: none"><li>• experimental studies with acute cannabinoid administration</li><li>• rigorous checking of THC level</li></ul>	<ul style="list-style-type: none"><li>• Invasive – compliance</li><li>• Complex results for sober chronic users / environmental cannabis smoke.</li></ul>
<b>THC level/presence/concentration in cannabis products</b>	<ul style="list-style-type: none"><li>• <b>Standard THC Unit</b></li><li>• correlate with: product abuse liability, risk for CUD or for specific adverse events, and broader public health-related outcomes</li></ul>	<ul style="list-style-type: none"><li>• precise assessment of products</li><li>• Exposure-response relationships in experimental studies</li></ul>	<ul style="list-style-type: none"><li>• jurisdiction</li></ul>

# endorsement & next steps

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DOI: 10.1111/add.15751

COMMENTARY

**ADDICTION** **SSA**

## We need convincing data to support a public health approach to cannabis regulation

**Coordinating cannabis data collection globally: Policy implications**  
Harmonizing global data collection on cannabis use is vital, as laws and policies are rapidly evolving. A similar need exists for measurement of **medical cannabis use** which, at least in the United States, occurs outside medical systems and medical record-keeping—ultimately putting patients at risk.

Susan R. B. Weiss   
Nora D. Volkow 

National Institute on Drug Abuse, National Institutes of Health,  
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Agreed measures of cannabis use and impacts are essential in **evaluating regulatory change and supporting policy decisions driven by public health evidence**. A shared understanding of measures also responds to the **call for greater collaboration and coordination** in cannabis research. The iCannToolkit provides a collaborative foundation that can be expanded to additional domains and to address **emerging and context-specific data needs**.

Rebecca Jesseman 

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## The need to calibrate standardized cannabis measurements across cultures

The iCann Toolkit is an important step towards standardized measurement of cannabis consumption in both clinical and research settings. However, there are still significant challenges caused by **regional differences in cannabis potency and cultural differences in methods of administration** that will need to be addressed.

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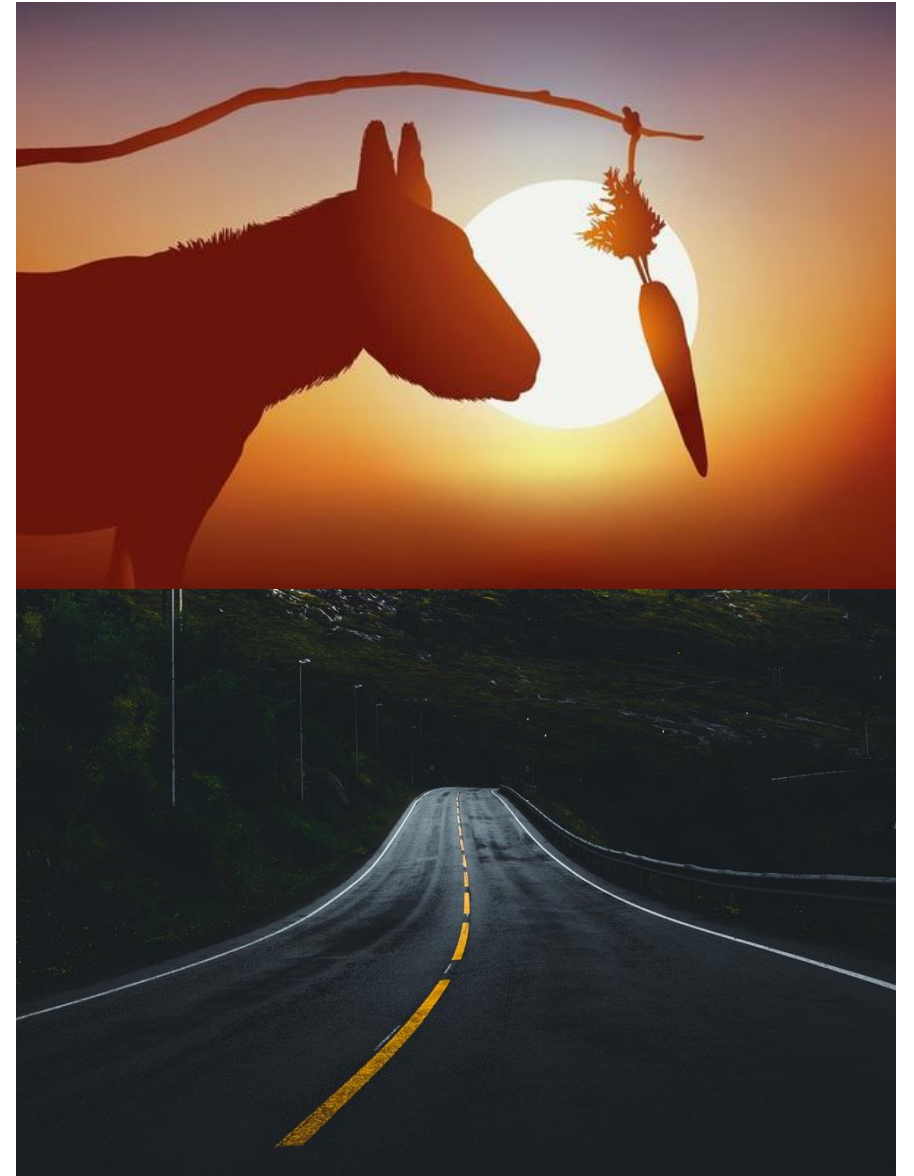
- **validation of timeline follow-back methodologies:**
  - across cultures & licit-illicit markets, over time
  - picture aids
  - new methods of medical & non-medical use (vaping, capsules, gummy bears, concentrates, drinks...)
- **more detailed population-level monitoring, e.g.:**
  - waste water testing
  - regulators' seed-to-sale market tracking data
  - cannabis loyalty-card data akin to monitoring eating habits by accessing grocery store loyalty card data sets

# Conclusions

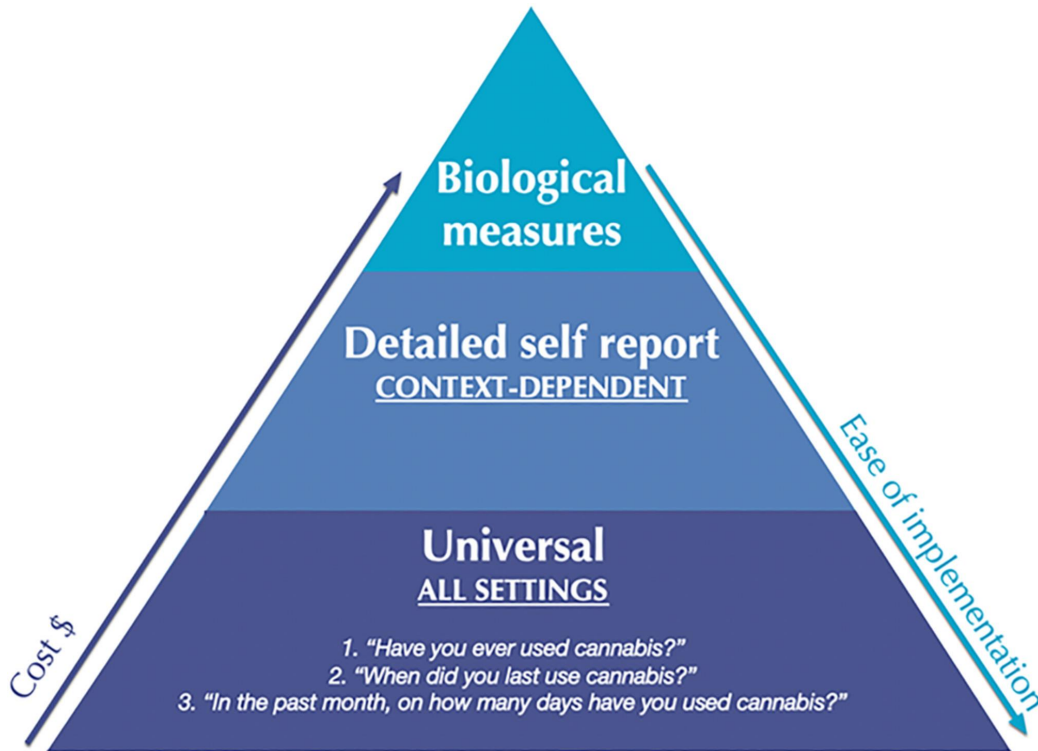
The consistent use of the standard THC unit and the iCannToolkit framework across research, public health, clinical practice and medical settings

is recommended to facilitate:

- harmonisation of international evidence on cannabis use,
- understanding of cannabis use related harms
- inform approaches for risk reduction/harm minimisation.



# Take home message



**IF you are measuring cannabis exposure, remember to use these items:**

- 1. 'Have you ever used cannabis?'**
- 2. 'When did you last use cannabis?'**
- 3. 'In the past month, on how many days have you used cannabis?'**

***more time... timeline follow-back***

***more resources... biological measures***



# Contributors to this work

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- Portuguese Monitoring Centre for Intervention on Addictive Behaviours and Dependencies (SICAD)



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Medical Research Foundation

