¿Están obsoletas las adicciones?
Nuevas concepciones para el rediseño de las políticas de drogas

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Ex-presidente de Socidrogalcohol
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Alice Rap is a 5 year €10 million endeavour to study the place of addictions in contemporary European society, involving:

- more than 120 scientists
- more than 40 institutions
- over 30 scientific disciplines ranging from anthropology to toxicology.
The harm from addictions

Jürgen Rehm & Kevin Shield

TU Dresden, Germany
Proportion of substance-attributable deaths of all deaths EU 2013 (GBD 2015; own calculations)

Deaths
(overall more than 1 million deaths*)

* Assuming no overlap between risk factors
Proportion of substance-attributable burden of all burden EU 2013 (GBD 2015; own calculations)

Years of life lost

<table>
<thead>
<tr>
<th>M</th>
<th>W</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illicit Drugs</td>
<td>0,0%</td>
<td>0,0%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>5,0%</td>
<td>10,0%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>20,0%</td>
<td>25,0%</td>
</tr>
</tbody>
</table>
Proportion of substance-attributable burden of all burden EU 2013 (GBD 2015; own calculations)

- Illicit Drugs
- Alcohol
- Tobacco

DALYs
Qué podemos hacer?

Encontrar formas objetivas para medir

- la peligrosidad de las drogas
- los riesgos de los consumos
- el impacto de las actuaciones sobre las drogas
- el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos
Qué podemos hacer?

Encontrar formas objetivas para medir

- la peligrosidad de las drogas: MoE
- los riesgos de los consumos
- el impacto de las actuaciones sobre las drogas
- el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos
Toxicology and ranking of addictive drugs

Dirk Lachenmeier, Jürgen Rehm
TU Dresden, Germany
Previous approaches: Expert-based drug ranking

Harm Caused by Drugs

- Alcohol
- Heroin
- Crack Cocaine
- Methamphetamine
- Cocaine
- Tobacco
- Amphetamine
- Cannabis
- GHB
- Benzodiazepenes
- Ketamine
- Methadone
- Mephedrone
- Butane
- Qat/Khat
- Anabolic Steroids
- Ecstasy
- LSD
- Buprenorphine
- Mushrooms

Margin of Exposure (MOE) = \frac{\text{Benchmark Dose}}{\text{Estimated Human Exposure}}

WHO-IPCS (2009): “The MOE can be used by the risk manager for priority setting.”
Low Dose of drug

Margin of Exposure (MoE)

Exposure

Benchmark dose for 10% Response

Toxic effect

Low Dose of drug

Low

High

Low

High
Margin of Exposure

Exposure

Toxic effect

(MoE)

Benchmark dose for 10% Response
Interpretation of MoE

MOE < 1 Extreme Risk
MOE < 10 High Risk
MOE < 100 Risk

MOE > 100 Low Risk for Non-Carcinogens
MOE > 10,000 Low Risk for Carcinogens
MOE ranking of drug risks
MOE: Individual consumption

MOE: Whole Population

- ATS excl. Ecstasy
- Cannabis
- Ecstasy
- Benzodiazepines
- Opiates
- Cocaine
- Cigarettes (based on nicotine)
- Alcohol

Margin of Exposure

Values: 1 10 100 1000 10000 100000

Note: Margin of Exposure based on nicotine.
Compounds in Alcoholic Beverages

- Acetaldehyde
- Acrylamide
- Aflatoxin B1
- Arsenic
- Benzene
- Cadmium
- Ethanol
- Ethyl carbamate (urethane)
- Formaldehyde
- Furan
- Lead
- 4-Methylimidazole
- N-Nitrosodimethylamine
- Ochratoxin A
- Safrole
- 1
- 10
- 100
- 1000
- 10000
- 100000

Margin of Exposure (MOE) for 4 drinks per day
Compounds in Tobacco smoke

<table>
<thead>
<tr>
<th>Compound</th>
<th>Margin of Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNN</td>
<td>100000</td>
</tr>
<tr>
<td>Cresol</td>
<td>10000</td>
</tr>
<tr>
<td>NNK</td>
<td>1000</td>
</tr>
<tr>
<td>Styrene</td>
<td>100</td>
</tr>
<tr>
<td>Pyridine</td>
<td>10</td>
</tr>
<tr>
<td>Quinoline</td>
<td>1</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.1</td>
</tr>
<tr>
<td>Ammonia</td>
<td>0.01</td>
</tr>
<tr>
<td>Chromium</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td></td>
</tr>
<tr>
<td>Catechol</td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td></td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td></td>
</tr>
<tr>
<td>Isoprene</td>
<td></td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td></td>
</tr>
<tr>
<td>Acrolein</td>
<td></td>
</tr>
<tr>
<td>Butadiene</td>
<td></td>
</tr>
<tr>
<td>HCN</td>
<td></td>
</tr>
<tr>
<td>Nicotine</td>
<td></td>
</tr>
</tbody>
</table>

Yellow bars: data from Xie et al. 2012 (Reynolds Tobacco)

Rats (mortality)
Rats (liver changes)
Heart rate acceleration (humans)

Margin of Exposure for daily smokers (16 cigs per day)
What does this mean?

- Prioritize measures on drugs with MOE < 100
- Most efforts should go to alcohol, tobacco, cocaine and heroin, albeit for different reasons:
  - Alcohol and tobacco, because human use of current forms is not following the considerations of risk, i.e., it is way too high.
  - For cocaine and heroin, the potential risk per use is too high.
Research Needs

- Relevant toxicological endpoints for all drugs needed (especially for cannabis)
- Better exposure data needed (daily dosages rather than prevalences)
- Nicotine has been overlooked in the risk assessment of tobacco products and needs urgent re-evaluation (e.g. IARC has it on the high priority list for evaluation)
- Research into drug forms with reduced amount of intoxicants (such as alcohol-reduced spirits, nicotine-reduced tobacco)
Qué podemos hacer?

Encontrar formas objetivas para medir

- la peligrosidad de las drogas
- los riesgos de los consumos: CER (HUOT)
- el impacto de las actuaciones sobre las drogas
- el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos
Heavy Use Over Time (HUOT)

Peter Anderson

Professor, Substance Use, Policy and Practice, Institute of Health and Society, Newcastle University, England
Professor, Alcohol and Health, Faculty of Health, Medicine and Life Sciences, Maastricht University, Netherlands
Affiliate Scientist, Centre for Addiction and Mental Health, Toronto, Canada
The two facets of binaryism

Binaryism is a common ‘disorder’ of health care practitioners and researchers who, in its worse presentation, can only count up to two, (presence or absence of a disorder or disease) but not beyond.

The main symptom of the ‘disorder’ binaryism is that it confuses disease entities with treatment decisions.

Thus, a psychiatrist identify certain individuals as ‘cases of alcohol use disorder’, but what is really meant is ‘cases for alcohol use disorder treatment’, for ‘alcohol use disorder’ itself occurs in all grades of severity.
The idea of a sharp distinction between health and disease is a medical artefact for which nature, if consulted, provides no support.

Disease is nearly always a quantitative rather than a categorical or qualitative phenomenon, and hence it has no natural definitions.
Blood pressure, fasting plasma glucose (sugar), alcohol:

- major causes of disability adjusted life years
- major risk factors for:
  - cardiovascular disease
  - liver disease
  - Diabetes
  - cognitive decline
**Blood pressure:** Disease risk is a continuous (exponential) relationship
Blood glucose: Disease risk (above 5mmol/L) is a continuous (exponential) relationship

Ischaemic heart disease risk

- No known history of diabetes at baseline survey
- Known history of diabetes at baseline survey

HR (95% CI)

Mean fasting blood glucose concentration (mmol/L)
Alcohol: Disease risk is a continuous (often exponential) relationship

Female liver cirrhosis
Blood pressure:

Untreated high blood pressure is sometimes associated with a further progressive rise in blood pressure, often culminating in a treatment resistant state due to associated vascular and renal damage.

The vascular and renal damage, though, are a consequence of the high blood pressure.
Sugar:

Untreated high blood sugar levels are associated with hippocampal damage, often culminating in increased sugar intake, the hippocampus being a primary brain substrate for control of food and sugar intake.

The hippocampal damage, though, is a consequence of the high blood sugar level.
Sugar: Relationship between blood glucose levels and human hippocampal volume from New York study
Alcohol:

Unmanaged heavy drinking can be associated with even further heavy drinking, often culminating in a more difficult to manage state due to associated brain atrophy.

The brain atrophy, though, is a consequence of the heavy drinking.
Alcohol: Relationship between drinking levels and brain volume from Framingham study
There is no natural cut-point !!!

Figure 1. Smoothed weighted frequency distribution, median, and 90th percentile of systolic blood pressure for ages 60–74 years: United States, 1960–1991

Blood Pressure

Alcohol

Glucose
Alcohol dependence/alcohol use disorder: simply defined as a score on a checklist of symptoms.

<table>
<thead>
<tr>
<th>DSM-IV</th>
<th>DSM-5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In the past year, have you:</strong></td>
<td><strong>In the past year, have you:</strong></td>
</tr>
<tr>
<td>Found that drinking—or being sick from drinking—often interfered with taking care of your home or family? Or caused job troubles? Or school problems?</td>
<td>Had times when you ended up drinking more, or longer, than you intended?</td>
</tr>
<tr>
<td>More than once gotten into situations while or after drinking that increased your chances of getting hurt (such as driving, swimming, using machinery, walking in a dangerous area, or having unsafe sex)?</td>
<td>More than once wanted to cut down or stop drinking, or tried to, but couldn’t?</td>
</tr>
<tr>
<td>More than once gotten arrested, been held at a police station, or had other legal problems because of your drinking? <strong>“This is not included in DSM-5”</strong></td>
<td>Spent a lot of time drinking? Or being sick or getting over other aftereffects?</td>
</tr>
<tr>
<td>Continued to drink even though it was causing trouble with your family or friends?</td>
<td>Wanted a drink so badly you couldn’t think of anything else? <strong>“This is new to DSM-5”</strong></td>
</tr>
<tr>
<td>Had to drink much more than you once did to get the effect you want? Or found that your usual number of drinks had much less effect than before?</td>
<td>Found that drinking—or being sick from drinking—often interfered with taking care of your home or family? Or caused job troubles? Or school problems?</td>
</tr>
<tr>
<td>Found that when the effects of alcohol were wearing off, you had withdrawal symptoms, such as trouble sleeping, shakiness, restlessness, nausea, sweating, a racing heart, or a seizure? Or sensed things that were not there?</td>
<td>Continued to drink even though it was causing trouble with your family or friends?</td>
</tr>
<tr>
<td>Had times when you ended up drinking more, or longer, than you intended?</td>
<td>Given up or cut back on activities that were important or interesting to you, or gave you pleasure, in order to drink?</td>
</tr>
<tr>
<td>More than once wanted to cut down or stop drinking, or tried to, but couldn’t?</td>
<td>More than once gotten into situations while or after drinking that increased your chances of getting hurt (such as driving, swimming, using machinery, walking in a dangerous area, or having unsafe sex)?</td>
</tr>
<tr>
<td>Spent a lot of time drinking? Or being sick or getting over other aftereffects?</td>
<td>Continued to drink even though it was making you feel depressed or anxious or adding to another health problem? Or after having had a memory blackout?</td>
</tr>
<tr>
<td>Given up or cut back on activities that were important or interesting to you, or gave you pleasure, in order to drink?</td>
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<tr>
<td>Continued to drink even though it was making you feel depressed or anxious or adding to another health problem? Or after having had a memory blackout?</td>
<td>Found that when the effects of alcohol were wearing off, you had withdrawal symptoms, such as trouble sleeping, shakiness, restlessness, nausea, sweating, a racing heart, or a seizure? Or sensed things that were not there?</td>
</tr>
</tbody>
</table>

The presence of at least 2 of these symptoms indicates an Alcohol Use Disorder (AUD).

The severity of the AUD is defined as:

- **Mild:** The presence of 2 to 3 symptoms
- **Moderate:** The presence of 4 to 5 symptoms
- **Severe:** The presence of 6 or more symptoms
Alcohol: There is a smooth line relationship between levels of alcohol consumption and the score on the checklist.
Alcohol:

The signs and symptoms that have been attributed to alcohol dependence are actually the consequences of heavy drinking.

Thus, the term “alcohol dependence” is redundant and the term “heavy use over time” is all that is needed.

The redefinition to HUOT is likely to reduce the stigma associated with dichotomous labelling, enhancing the scope for more heavy drinking patients to receive advice and treatment.
Other drugs:

Although this presentation has focussed on alcohol, the same arguments apply to all other substances.
Qué podemos hacer?

Encontrar formas objetivas para medir

- la peligrosidad de las drogas
- los riesgos de los consumos
- el impacto de las actuaciones sobre las drogas: Addiction footprint
- el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos
Health Footprint as accountability tool to manage change

Peter Anderson

Professor, Substance Use, Policy and Practice, Institute of Health and Society, Newcastle University, England
Professor, Alcohol and Health, Faculty of Health, Medicine and Life Sciences, Maastricht University, Netherlands
Disability-adjusted life years (DALYs)

We are all used to DALYs to:

1. Rank risk factors and conditions
2. Rank countries (more contentious)
3. Rank impact of policy approaches (from impact and cost-effectiveness perspectives)
Rank impact of policy approaches (from impact perspective): DALYs (blue) and life years (grey) averted in one year due to policy measures

Panel C. Germany

- Brief interventions
- Tax increase
- Advertising regulation
- Opening hours regulation
- Drink-drive restrictions
- Treatment of dependence
- Minimum price
- Worksite interventions
- School-based programmes

** Indicates significant impact
Disability-adjusted life years (DALYs)

But, this is a missed opportunity, because DALYs can also be used to:

1. Apportion responsibility for DALYs by drivers of harm
2. Apportion responsibility for DALYs by public and private sectors
3. Use DALYs as a metric for accountability that drives change and reduces harm
Disability-adjusted life years (DALYs)

We call this additional use (reframing) of DALYs a health footprint, and we propose it as part of a redesign of health governance.

It is similar to a carbon footprint.
A tool for climate change management

A carbon footprint is a measure of greenhouse gas emissions, [specifically carbon dioxide and methane, calibrated for CO₂ equivalent], produced by actions of an entity.

The central reason for measuring a carbon footprint is to reduce world temperature increases through apportioning responsibility for emissions across drivers and enabling targeted and effective reductions of emissions of greenhouse gases.
Identifying drivers of carbon footprint
Apportioning carbon footprint by sector
A tool for health change management

A health footprint is proposed as a measure of risk-factor related disability adjusted life years (DALYs) produced by actions of an entity.
A tool for health change management

The central reason for measuring a health footprint is to improve health through apportioning responsibility for DALYs across drivers and enabling targeted and effective reductions of DALYs, and thus health improvement.
Identifying drivers of health footprint

- Structural drivers
- Core drivers
- Policy drivers
A tool for health change management

Health Footprints:

- Nations, regions and cities
- Sectors and organizations
- Products and services
- Individuals
## Health footprint of a global brewer

<table>
<thead>
<tr>
<th>Regions</th>
<th>Production in 2012 in thousand hectolitres</th>
<th>attributable DALYs</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>125,129</td>
<td>749,338</td>
</tr>
<tr>
<td>Latin America North</td>
<td>126,189</td>
<td>1,645,115</td>
</tr>
<tr>
<td>Latin America South</td>
<td>34,292</td>
<td>428,060</td>
</tr>
<tr>
<td>Western Europe</td>
<td>2,931</td>
<td>15,113</td>
</tr>
<tr>
<td>Central and Eastern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>2,278</td>
<td>48,776</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>57,667</td>
<td>411,601</td>
</tr>
<tr>
<td>Global export and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>holding</td>
<td>7,030</td>
<td>41,869</td>
</tr>
<tr>
<td>Global beer company</td>
<td>402,631</td>
<td>3,339,873</td>
</tr>
</tbody>
</table>

0.13 % of all DALYs
3.4% of all alcohol-attributable DALYs
In Conclusion:

1. Whilst we have been quite good at using DALYs to identify risk factors, rank countries (at per capita level) and model potential impact of government policies, as has also been done with carbon footprint,

2. We have not gone to the next step to apportion DALYS across actors and actions as a tool of accountability for public and private sectors, or drive DALYs down to municipal or individual level, as has been done with the carbon footprint;

3. We call the next step a re-framing of DALYs a health footprint, and we propose it as part of a redesign of health governance.
 Qué podemos hacer?

Encontrar formas objetivas para medir

- la peligrosidad de las drogas
- los riesgos de los consumos
- el impacto de las actuaciones sobre las drogas
- el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos: wellbeing framework.
Addiction Policy and Wellbeing

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Is the GDP enough?

- The reliance on GDP as measure of progress for societies is neither comprehensive or ethically valid.
- It places too much emphasis on the material wealth.
- It underestimates important aspects of the societal impact of drugs:
  - Intangible costs
  - Most of the harm to others
  - The damaging effects of inequalities
- Well-being has been proposed as an alternative indicator.
What is well-being

- Well-being has typically been defined with reference to more objective and measurable components:
  - disability-adjusted life years (DALYs)
  - quality-adjusted life years (QALYs)
- But this misses a critical dimension, relating to personal, non-medical experiences over those years.
Well-being exists in two dimensions, subjective and objective. It comprises an individual’s experience of their life as well as a comparison of life circumstances with social norms and values.
A well-being frame helps to change perspective

- Well-being analyses find that, whilst some policies may reduce health harms, they often come at the expense of:
  - criminalization
  - social stigma
  - social exclusion

- Those unwanted collateral effects detract from individual and societal well-being, and may outweigh the initial benefits
Per cent using cannabis in last year

White ethnicity: 8%
Black ethnicity: 4%

16-59 year olds, England & Wales

Source: Release 2013
Stopped and searched for drugs
(per 1,000)

White ethnicity  Black ethnicity

0  60

Adults, London

Source: Release 2013
Risk of being charged when cannabis found on stop and search (white ethnicity set to 1.0)

Adults, London

Source: Release 2013
A well-being frame

- Well-being has various dimensions, including
  - Quality of life (health, life balance, education, connectedness, safety, environment, etc)
  - Material conditions (income, job, housing)
  - Sustainability over time.

- Drugs and drug-related harms are affected by and affect all of these dimensions.

- A variety of well-being frames exist. At the international level, the OECD frame is a useful benchmark.
OECD well-being framework

The GDP includes items that do not boost well-being
A Well-being perspective

Societal and individual Well-being

Unregulated criminal market

Ultra prohibition

Prohibition with harm reduction/decriminalisation

Strict legal regulation

Light market regulation

Unregulated legal market

Commercial promotion

Drug policy spectrum
Optimizing well-being

• The position of the optimal point of maximum societal well-being depends on the relative value placed on different components of well-being.

• This balance will vary with cultural and historical factors that will differ between societies and vary over time.
Unanswered research questions

- What is the internal validity of the well-being construct?
- What should be the relative weight of its various components?
- Can the well-being framework be operationalized?
- This construct has mostly been applied to jurisdictions. Can it be adapted for its use at an individual level?
What does this mean for policy?

- Drug policies should be designed with a well-being perspective.
- Drug policies should balance decriminalization of illicit substances with innovative harm reduction policies.
- Drug policies should effectively regulate legal drugs, such as tobacco and alcohol.
- Fighting stigma and social exclusion should be priorities of all drug policies.
En resumen: Qué podemos hacer?

- Medir la peligrosidad de las drogas mediante las técnicas del **Margen de Exposición**
- Medir los riesgos de los consumos substituyendo el concepto adicción por el de **Consumo Excesivo Reiterado**
- Medir el impacto de las actuaciones sobre las drogas mediante la **Huella de Salud**
- Evaluar el impacto de las políticas y de los tratamientos en el bienestar de los ciudadanos mediante el **Marco del Bienestar**
Thanks for your attention !!
Muchas gracias !!

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