



EU project JUST/2010/DPIP/AG/1410: New methodological tools for policy and programme evaluation

The harm score index and incidence indicators applied to the School population data for cross countries comparisons

Francesco Fabi, Alessia Mammone, & Carla Rossi
Centre for Biostatistics and Bioinformatics,
University of Rome “Tor Vergata”, Italy

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Summary

- Segmentation of the consumer population, based on the intensity of use (Ricci R., 2010; Fabi F. et al., 2011);
- harm of poly-use, described by a score based on the ranking proposed by van Amsterdam and others (2010);
- application of these indicators to data from School Population Surveys (SPS) conducted in Italy in 2010 and in 2011 and comparison with PDUs;
- Incidence indicators for assessing dynamic aspects and application to Italy and Portugal.

Challenges from recent trends

- New trends in drug consumption show higher and higher proportions of poly-use.
- Epidemiological indicators used to monitor and evaluate drug policies are mostly based on the prevalence of users of the “main” substances
- The ranking of the harm of the substances is based on a single substance analysis.

The proposed approach

- A system of indicators is proposed to better evaluate drug policies on the basis of the data from School Population Surveys.
- The indicators can be applied to other population where the needed information is available, e.g. the General Population Survey or the surveys among particular groups.

Segmentation of the user population by frequency of use

- 3 sub-groups are defined on the basis of the frequency of use in the last 30 days.
 - Six classes of frequency are considered in the questionnaire in the last 30 days: **Never**, **1-2**, **3-5**, **6-9**, **10-19**, **>19**.
1. The **first** class corresponds to **non users**
 2. the **second and third** to **occasional users**,
 3. the **fifth and sixth** to **regular users**
 4. the last one to **intensive users**.

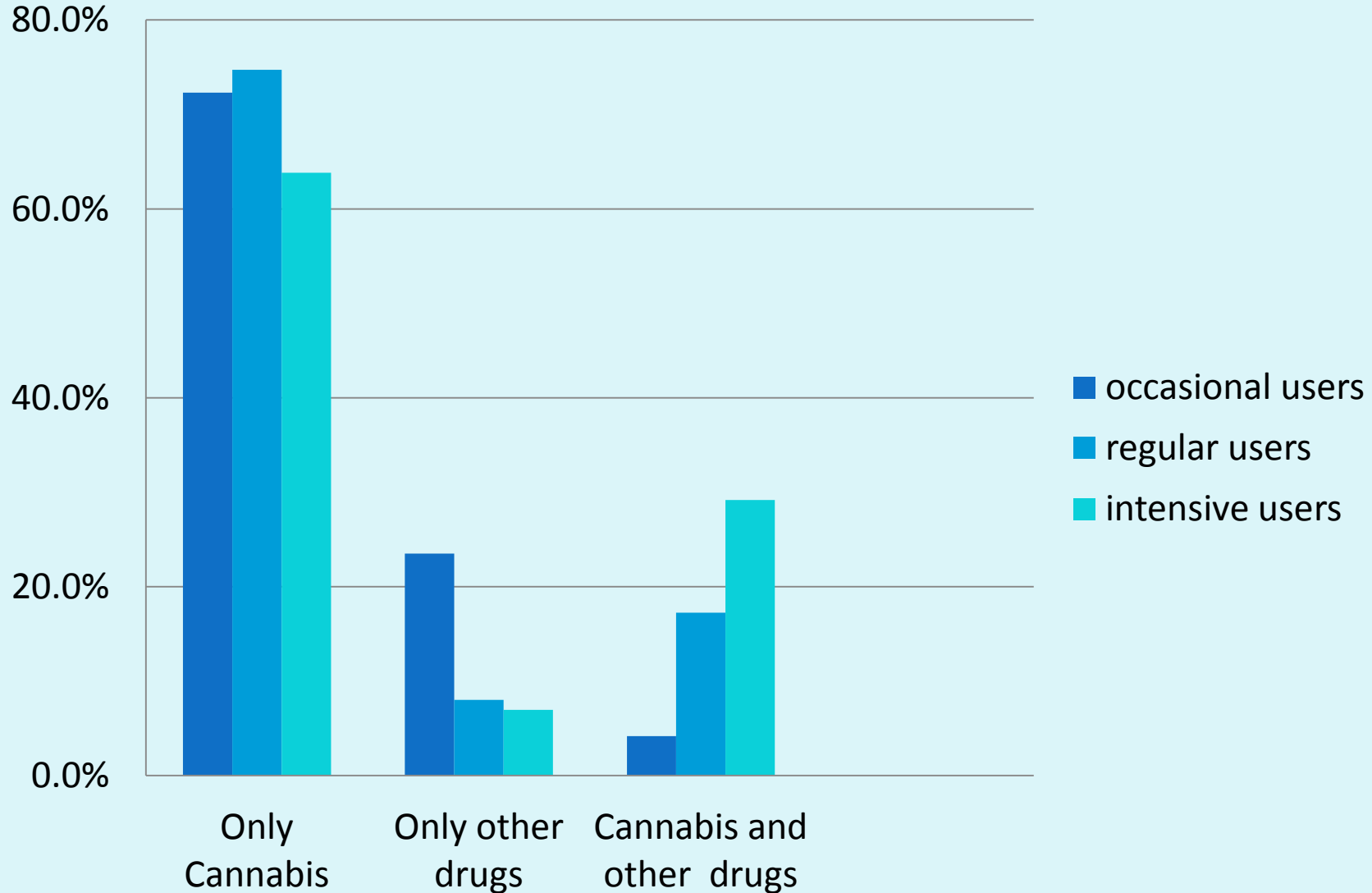
Poly-use evaluation

- Most consumers (with the exception of occasional users) report the use of various substances;
- It is necessary to include the frequency of use and the substance in a table to classify and weight poly-users.

Frequency of use score

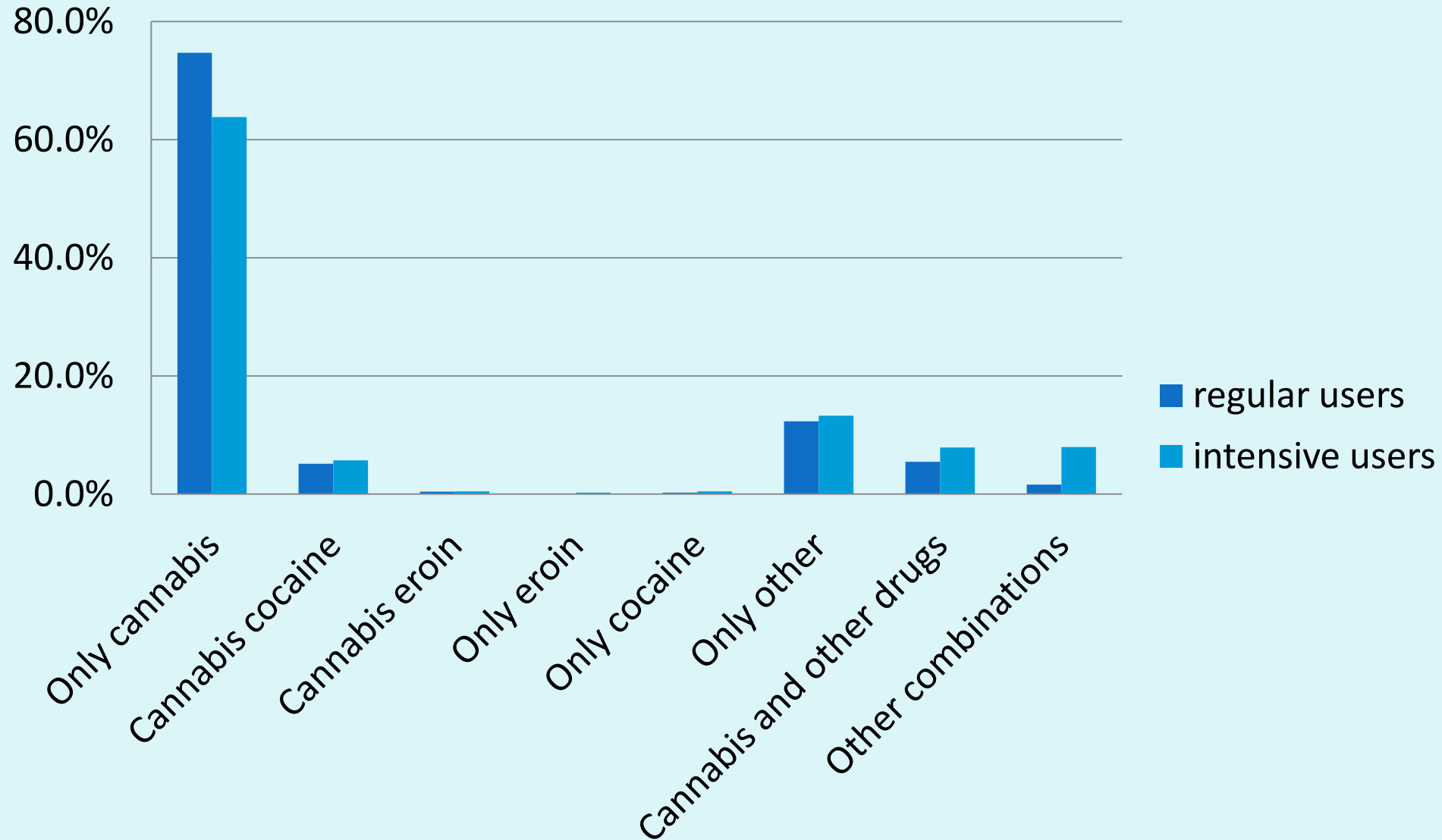
Substance	Frequency of use (median of the class)					
	0	1.5	4	7.5	14.5	25
cannabis			X			
cocaine	X					
heroin						
other				X		
Total score						13

Substances used by occasional, regular and intensive users SPS 2011

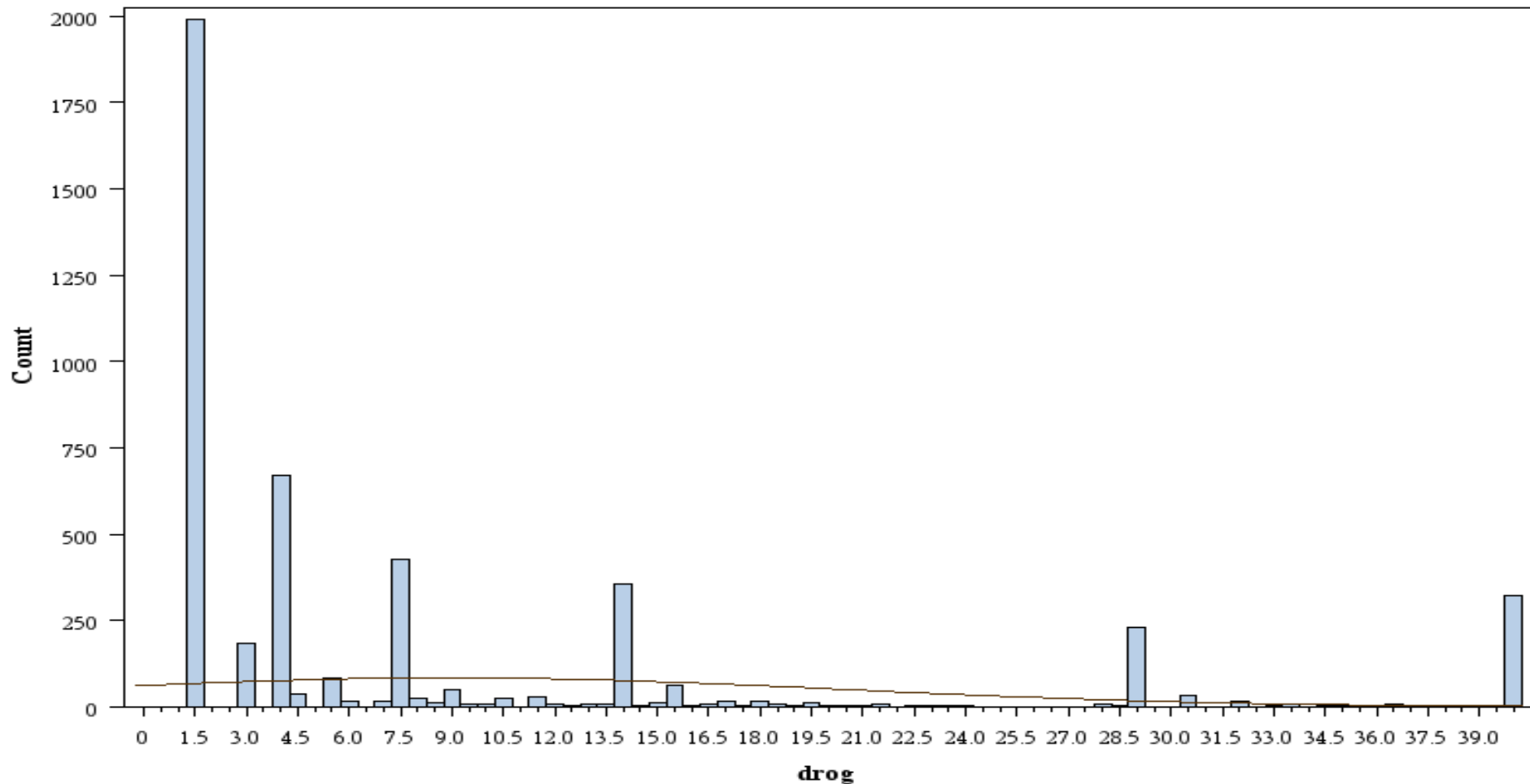


Substances used by regular and intensive users

SPS 2011



Distribution of the frequency of use score (SPS 2010)



Typical frequencies of use

- The stability the distributions observed for 2010 and 2011 allows to propose some general conclusions:
- Most consumers are occasional consumers (about 60%).
- Regular consumers mostly consume two or four doses a week as average (about 20%).
- Intensive users mostly consume daily and half of them more than one single dose (about 20%).

The global score of the harm of the substances

- The proposed global score is based on the physical scores of van Amsterdam and others.
- The 3 indicators are weighted according to the first principal component.
- Tobacco is not included in the principal component analysis (PCA).
- Alcohol is included in the PCA but its weight is not used in the scoring system at the moment.

The global score of the harm of the substances

Substance	Acute toxicity (X)	Chronic toxicity (Y)	Dependence (Z)	Substance	Overall physical harm score (W)
Crack Cocaine	2.39	2.63	2.82	Crack Cocaine	2.67
Heroin	2.37	2.03	2.89	Heroin	2.51
Alcohol	1.89	2.47	2.13	Alcohol	2.18
Methamphetamine	2.03	2.18	2.24	Methamphetamine	2.18
Cocaine	1.95	2.05	2.13	Methadone	2.12
Amphetamine	1.71	1.89	1.95	Cocaine	2.07
Methadone	1.95	1.42	2.68	Amphetamine	1.88
Ecstasy	1.34	1.34	0.61	GHB	1.47
GHB	1,84	0.79	1.71	Benzodiazepines	1.31
Ketamine	1.55	0.92	0.84	Buprenorphine	1.30
Cannabis	0.84	1.53	1.13	Cannabis	1.18
LSD	1.47	0.68	0.03	Ketamine	1.05
Buprenorphine	1.21	0.76	1.71	Ecstasy	1.03
Methylphenidate	0.92	0.83	0.86	Methylphenidate	0.87
Benzodiazepines	0.97	0.76	1.89	Anabolic steroids	0.81
Anabolic steroids	0.45	1.24	0.71	Khat	0.73
Khat	0.39	0.95	0.76	LSD	0.61
Magic mushrooms	0.89	0.13	0.03	Magic mushrooms	0.28

The poly-use score

- for any user i the poly-use score, measuring the global degree of physical harm H_i , is obtained by adding up the score w_j of the substance used j multiplied by the frequency f_{ij} of use:

$$H_i = \sum w_j f_{ij}$$

- any user is characterized by the two scores **frequency of use score** and **poly-use score**. This system of scores allows for cross country analyses.

Application to data from School Population Surveys (SPS 2010, SPS 2011)

- The most popular substances used by school-going teenagers in Italy in 2010 are cannabis, cocaine and tranquillizers. Similar percentages are obtained for 2011. Heroin, GHB, ketamine, ecstasy, LSD and magic mushrooms are also used albeit with lower percentages.

Poly-use scores for the three segments of users in the School Population aged 15-19 (SPS 2011).

SPS 2011		Poly use score							
Frequency class	Sample size	Mean	Median	First quartile	Third quartile	Min	Max	Standard Dev.	CV
Occasional	2783	2.77	1.70	1.7	4.7	0.42	12.65	1.67	60.36
Regular	1000	13.42	12.86	8.85	17.05	5.84	38.17	4.78	35.62
Intensive	945	59.55	58.9	34.5	59	14	467.5	38.68	64.95

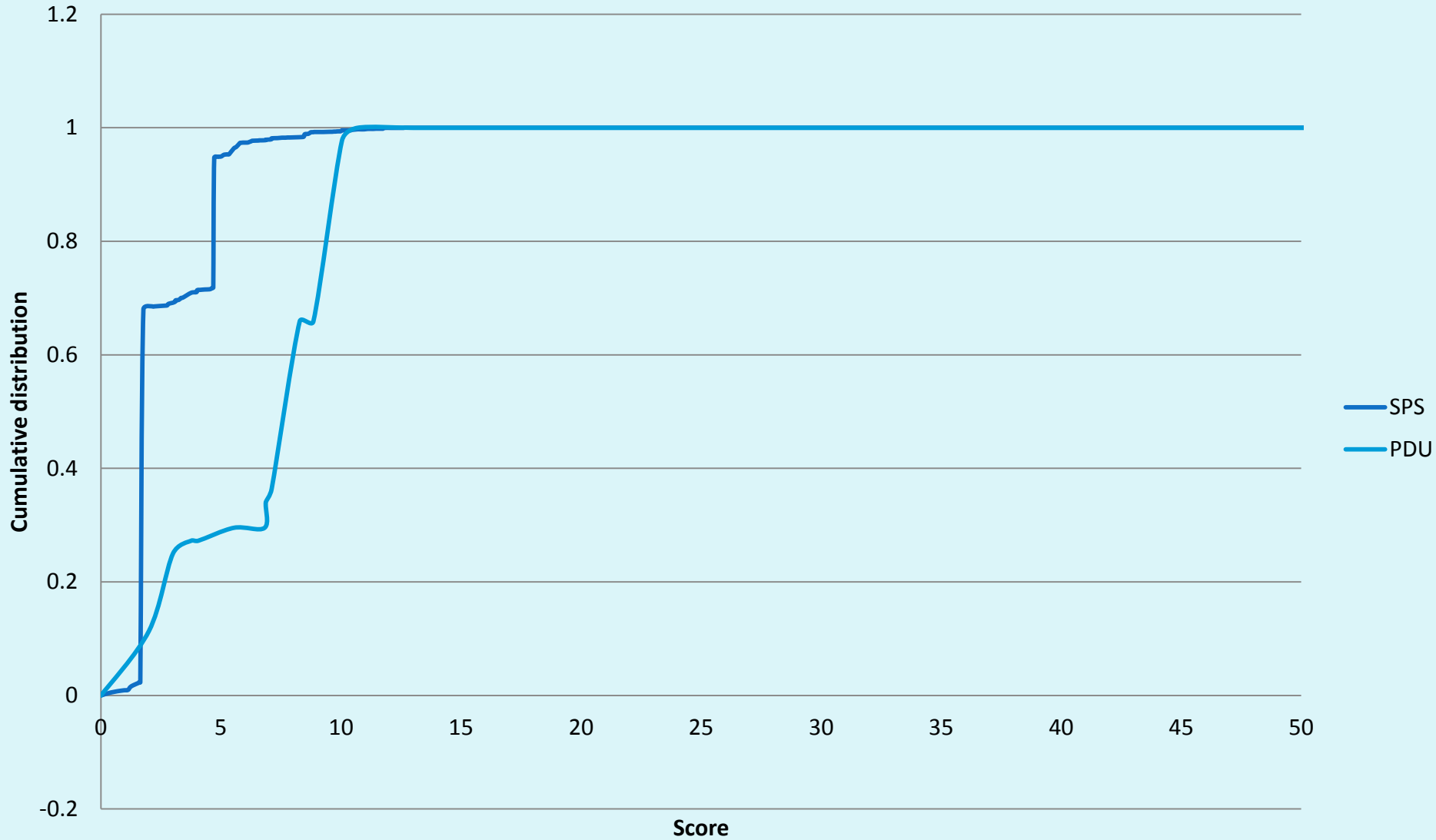
Comparison between two populations

- In order to better understand the potentialities of the poly use score, it is useful to compare the scores of different user populations. Statistics of the scores of a sample of quasi-problem drug users and SPS Survey are reported for comparison.
- It is clear that scores are continuously increasing from school students, in any segment, to quasi-PDUs. This is the area where secondary prevention should be applied.

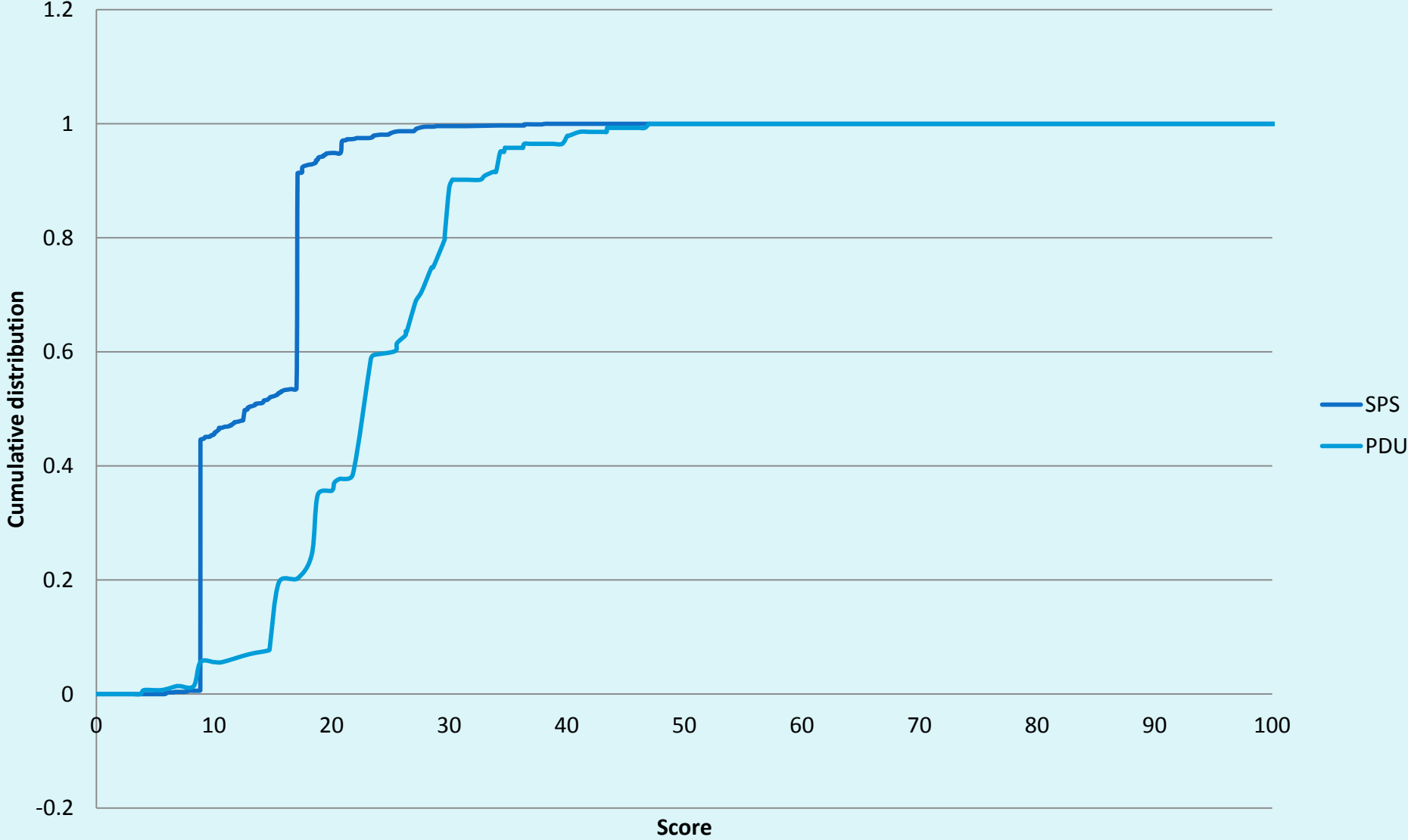
Poly-use scores for the three segments of the quasi-problem drug users in Italy (Survey 2012)

		Italy							
Drug users	n	Mean	Median	First quartile	Third quartile	min	max	Dev. standard	CV
Occasional	44	7.21	8	3	9.5	2	10.68	3.03	42.12
Regular	143	23.48	22	18.5	28.65	4.06	47	7.51	32.00
Intensive	461	149.17	125.45	75	199.35	26.41	653.84	98.89	66.29

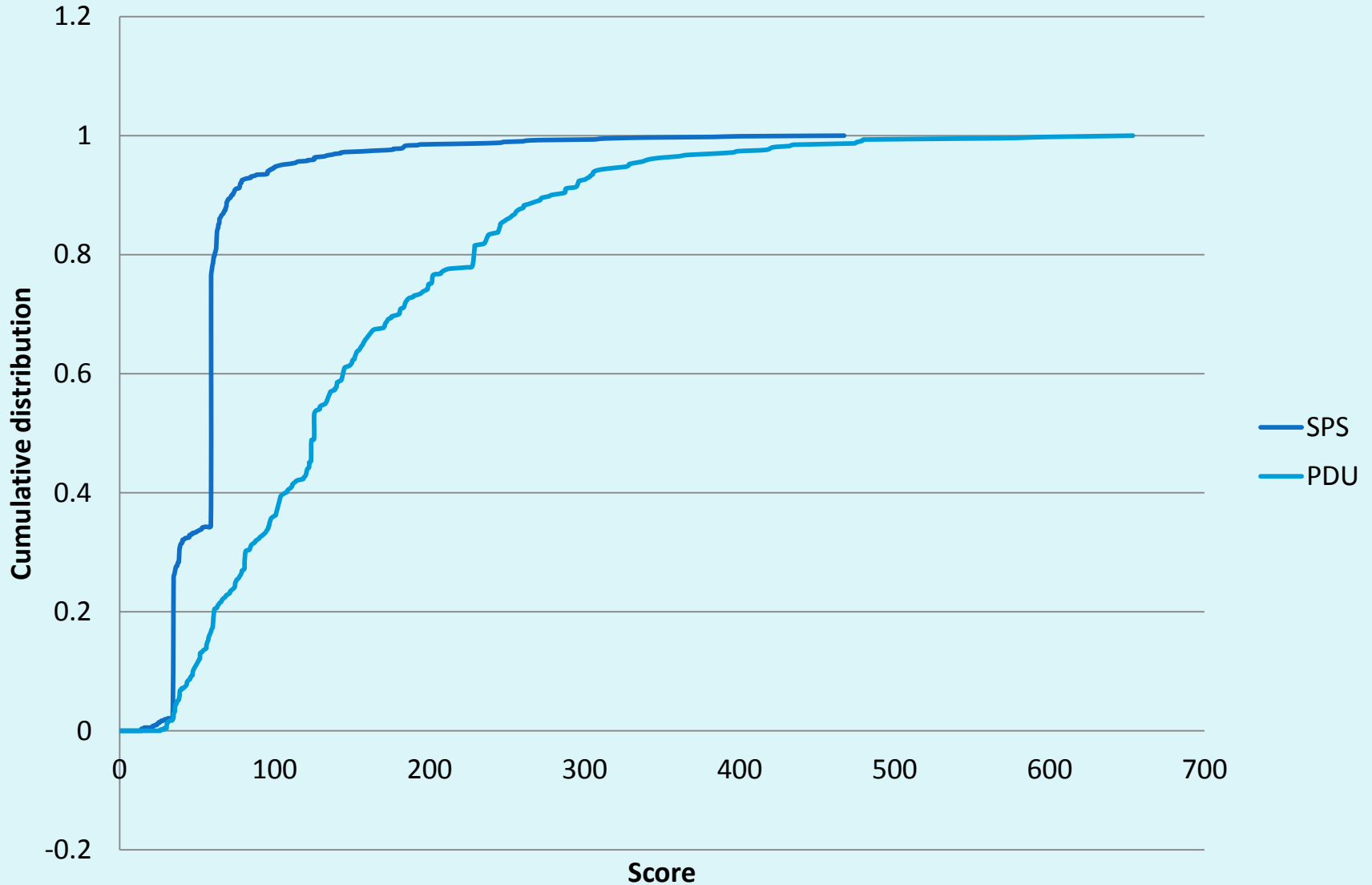
Cumulative distributions of occasional users



Cumulative distributions of regular users



Cumulative distributions of intensive users



Incidence indicators

- Indicators based on incidence are the most appropriate for evaluation of policies and interventions.
- It is generally recognised that early use of cannabis is associated with higher risk of harmful use of other substances.
- Thus it is important to estimate incidence of cannabis use among teenagers. This can be obtained by combining various sources of information.

Estimating incidence from prevalence

- Denote by $g(a)$ the density function and $G(a)$ the (cumulative) distribution function of the age at first use of a specific substance.
- Denote by $P(a,t)$ the prevalence of users aged a at time t .
- The expected number of subjects of the population $P(a,t)$ who started using that substance at time t is denoted by $I(a,t)$.

Estimating incidence from prevalence

- $I(a,t)$ can be estimated by multiplying the prevalence $P(a,t)$ by the probability of onset at age a $g(a)$ given that the age at onset is not higher than a $G(a)$:

$$I(a,t) = P(a,t) \frac{g(a)}{G(a)}$$

P(a,t), G(a), g(a) and I(a,t) among teenagers in Italy (Cannabis-2012)

Age	g(a): source web-survey on cannabis use	G(a)	P(a,t): source SPS and demographic data	I(a,t)
15	0.22	0.438	25,983	13,133
16	0.21	0.652	59,023	19,415
17	0.14	0.793	84,435	15,020
18	0.10	0.890	101,725	11,109
19	0.04	0.931	110,712	4,873
Total			381,878	63,550

Remarks about incidence

- Overall the incident cases among teenagers aged 15-19 are about 17% of the prevalent cases.
- $I(15,t)/P(15,t) > 0.5$ is the highest value and corresponds to the mode of the onset age distribution.
- The minimum value of the ratio is for $a=19$:
- $I(19,t)/P(19,t) < 0.05$.

Remarks about the indicators

- It must be observed that the frequency of use and the poly-use indicators need to be calculated on the basis of individual data
- The incidence indicator, once age at onset distribution is known, can be evaluated on the basis of aggregated data available any study.

Cannabis incidence estimate for Portugal

Age	P(a,t): source estimates from ESPAD Study	g(a): source web-survey on cannabis use	G(a)	I(a,t)
15	4,800	0.11	0.29	1,821
16	9,200	0.27	0.56	4,436
17	11,600	0.16	0.72	2,578
18	15,700	0.14	0.86	2,556
Total	41,300			11,390

Comments

- In the case of Portugal the ratio incidence/prevalence for ages 15-18 is 0.28.
- If ages 15-18 are considered for Italy, the ratio is 0.22.
- The difference is due to the onset age distributions.
- In Italy the proportion of those who start before 15 is higher than in Portugal (22% versus 21% for males and 20% versus 13% for females).

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Comments, questions?

THANK YOU VERY MUCH