An estimation of the social cost of illicit drug consumption in Catalonia

Estimación del coste social del consumo de drogas ilegales en Catalunya

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Abstract

Worldwide, as well as in Spain, the use of illegal drugs is among the major contributors to the global burden of disease. Quantifying the costs that illegal drugs impose on society is key in terms of decision-making. The objective of this paper is to estimate the social cost of illicit drug consumption in Catalonia for a specific year, and to establish a methodology to be able to replicate such estimations regularly and monitor properly the impact of national plans. To do that, a cost of illness study was performed. For the estimation of mortality and morbidity costs, we relied on the Attributable Fraction approach. Only public sector costs were included: healthcare and non-healthcare costs. The cost of illegal drug consumption in Catalonia in 2011 was estimated at €326.39 million (0.16% of the Catalan GDP in 2011; 0.15% in 2018). Of the total cost, 82% corresponded to direct costs. Among direct costs, 30.32% corresponded to the penal system, 15.99% to hospitalizations, 13.48% to the police force, 17.19% to pharmacy, 8.34% to treatment in specialized centres, and 5.74% to therapeutic communities, among others. Indirect costs represented 18% of total costs, mostly lost income due to drug-related death. This study has been an opportunity to systematically collect data and think about the potential economic returns that could be achieved from effective policies and programs aimed at reducing the consumption of illegal drugs.

Key Words: Illegal drugs; Cost of illness; Social cost; Policy; National plans.

Resumen

Mundialmente, así como en España, el consumo de drogas ilegales es uno los principales contribuyentes a la carga mundial de morbilidad. Cuantificar los costes que las drogas ilegales imponen a la sociedad es clave para la toma de decisiones. El objetivo de este trabajo es estimar el coste social del consumo de drogas ilegales en Cataluña para un año específico y establecer una metodología para poder replicar dichas estimaciones regularmente y monitorear el impacto de los planes nacionales. Se ha realizado un estudio de coste de la enfermedad. Para la estimación de los costes de mortalidad y morbilidad se ha utilizado el enfoque de la fracción atribuible. Solo se incluyeron los costes del sector público, sanitarios y no sanitarios. El coste del consumo de drogas ilegales en Cataluña en 2011 se estimó en € 326,39 millones (0,16 % del PIB catalán en 2011; 0,15 % en 2018). El 82 % del coste total correspondió a costes directos; de estos, el 30,32 % correspondió al sistema penal, 15,99 % a hospitalizaciones, 13,48 % a la policía, 17,19 % a farmacia, 8,34 % a tratamiento en centros especializados y 5,74 % a comunidades terapéuticas, entre otros. Los costes indirectos representaron el 18 % de los costes totales, principalmente pérdidas de productividad debidas a muertes por el consumo de drogas. Este estudio ha sido una oportunidad para recopilar datos de forma sistemática y pensar en los posibles rendimientos económicos que podrían obtenerse de políticas y programas efectivos destinados a reducir el consumo de drogas ilegales.

Palabras clave: Drogas ilegales; Coste de la enfermedad; Costes sociales; Política; Planes nacionales.

Worldwide, substance use disorders are among the major contributors to the global burden of disease. Actually, in 2015, they contributed to 111 million of global disability-adjusted life years (DALY). Global risk exposure to drugs for both sexes combined has increased significantly over the past 25 years. As the fifth-leading risk for men, substance use disorders were associated with 6.6% of disease burden; for women, they were the 12th leading risk factor with 2% (IHME, 2016).

Global estimated annual prevalence of illicit drug use was highest for cannabis (3.8% of adults aged 15-64 years), followed by amphetamines (0.77%), opioids (including prescription opioids and opiates; 0.37%) and cocaine (0.35%) (UNODC, 2017). It was also estimated that 0.25% of the adult population aged 15-64 years reported injecting drug use in 2015, equating to 11.8 million people. Cannabis and opioid dependence were the most common types of illicit drug dependence, with 19.8 and 16.8 million cases, respectively. Amphetamine and cocaine dependence were less prevalent, with 6.6 million and 3.9 million cases, respectively (Peacock et al., 2018). Globally, the age-standardized rates of mortality were 6.9 deaths per 100,000 people in 2015 for illicit drugs (Peacock et al., 2018). Illicit drug attributable burden was concentrated in drug use disorders (16.9 million), of which 12.9 were opioid use disorders-attributable, cirrhosis (4.7 million), HIV infection (3.0 million) and liver cancer (1.8 million) (IHME, 2016). Harm to others caused by the use of illegal drugs, as families, communities and the society as a whole, is also large and wide, ranging from violence to production losses (Nutt, King & Phillips, 2010).

In Spain, illegal drug use is, together with alcohol use, in the 6th position among the risk factors in terms of burden of disease – DALYs- (IHME, 2016). Spain is ranked among the countries with higher illegal drugs consumption (European Monitoring Centre for Drugs and Drug Addiction, 2016). Drugs are far less prevalent, but up to 2% of Spaniards refers daily cannabis consumption, and 7%, daily use of sedatives (Observatorio Español de la Droga y las Toxicomanías, 2016). Policonsumption is usual and in 95% of the occasions associated with alcohol and in 60% with cannabis, being "tobacco-daily tobacco-cannabis-cocaine" the most frequent pathway (Sánchez-Niubò, 2020). Particularly, Catalonia is the region of Spain with the highest prevalence (up 50%) of Hepatitis C, related to the consumption of intravenous drugs (Saludes et al., 2019). Spain is also one of the leading countries in drug seizures in Europe, mainly in cannabis and heroine (Observatorio Europeo de las Drogas y las Toxicomanías, 2016).

However, to undertake these studies, the available information on public expenditure on social cost of illegal drug abuse in Europe remains scarce and heterogeneous, both at local and national level. Several contributions suggest that these costs are high, but there is still a lot of controversy and there is not yet consensus on how to calculate the costs of such complex phenomenon (Barrio, Reynolds & García-Altés, 2017). Recent review of guidelines undertaken in the context of the LEADER project has resulted in a proposal of two frameworks (minimum and ideal) to guide estimation of social costs for future research (Vella, García-Altés, Segura García, Ibáñez Martínez & Colom Farran, 2018), together with and a guidance document on methods for their estimation (LEADER, 2017). Having a standardized social estimation approach can also facilitate analysing the economic impact of introducing national drug strategies, as Portugal did recently, where social costs of drugs decreased by 18% in the eleven-year period following the approval of Portuguese Strategy for the fight against drugs (Gonçalves, Lourenço & Nogueira da Silva, 2015).

The drug-related public spending among the 18 countries that have developed estimates over the past 10 years is estimated at between 0.01 and 0.5 per cent of gross domestic product, with health interventions between 15% and 53% of that figure, differing considerably from one country to another (Observatorio Europeo de las Drogas y las Toxicomanías, 2016).

In Spain, major efforts have been made over the last decades to counteract the effects of drug consumption in individuals and society at large. In this sense, various policies at national and regional level have been implemented, coordinated and monitored. Among these efforts there were the attempts to estimate the social cost of illegal drug use abuse (García-Altés, Ollé, Antoñanzas & Colom, 2002; Rivera, Casal & Currais, 2017). The authors estimated that in 1997 minimum costs of illegal drug consumption in Spain reached about in 0.07% of GDP, while for Galicia it amounted to 0.12% of GDP in 2008 (Portella et al., 2003).

As part of an effort to improve the planning tools in the context of the evaluation of the Catalan Plan on Drugs, the objective of this research is to estimate the social cost of illicit drug consumption in Catalonia in 2011.

Methods

Healthcare in Catalonia (a region in Spain) is organized as a National Health System, funded by taxes. All residents (7,348,275 as of 2017) are granted universal public healthcare coverage by law. Public healthcare spending represents 5.4% of Catalan GDP.

We performed a cost of illness (COI) study, which has been extensively implemented for the calculation of social costs of substance abuse (García-Altés et al., 2002; Godgrey, Eaton, McDougall & Culyer, 2002; Kopp, 2001; Rehm et al., 2006; Rivera et al., 2017). As in any cost-of-illness study, the counterpoint of the analysis is that the costs are being calculated against the hypothetical alternative of the absence

of the condition of interest, in our case the non-existence of illegal drug use.

For the estimation of mortality and morbidity costs, we relied on the Attributable Fraction approach (AF) (Rehm et al., 2006). AF represents the share of a disease that are consequent to the exposure of a specific risk factor, in our case illicit drug consumption. AFs are calculated according to the following formula (Rehm et al., 2006):

$$AF = \frac{\left[\sum_{i=1}^{k} P_i \left(RR_i - 1\right)\right]}{\left[\sum_{i=1}^{k} P_i \left(RR_i - 1\right) + 1\right]}$$

Where:
− i is the exposure category. The baseline (no exposure) is i=0;
− RR(i) indicates the relative risk at exposure level i compared with no consumption of drugs;
− P(i) indicates the prevalence of the ith category of exposure.

Direct costs from the public sector perspective were included, as well as indirect costs, while private and intangible costs were excluded (Kopp, 2001). The matrix of cost of reference that was adopted is comparable to two of the most recent studies in the field focusing on European countries (Gonçalves et al., 2015; Rivera et al., 2017). These contributions are consistent with classical references (Kopp, 2001; Single et al., 2003) in terms of the definition of social cost and the categorisation of the items. Estimated categories are presented in Table 1.

All the not publicly available data was provided by entities of the Catalan Health or Justice systems. Each source of data is identified throughout the document when presented, together with the assumption adopted for the estimation.

Health-related direct costs

Treatment costs were broken up in the following components: pharmacy, which includes all cost of drugs provided to treat health consequences of illicit drug consump-
tion, visits to primary care centres, treatment in specialized centres, and treatment of addiction in prisons (Gerència d'Atenció Farmacèutica i Prestacions Complementàries. Àrea Sanitària. Servei Català de la Salut). Five main prescription drugs were identified as relevant in the treatment of illegal drug users: methadone (8,055 people were in opioid substitution therapy), buprenorphine (4,189 people), naltrexone (2,263 people), benzodiazepines, and retroviral therapy for HIV (4,484 people). The first three were considered as 100% dedicated to the treatment of illicit drug users. For benzodiazepines, only 1% for male and 0.5% for female was attributed to the treatment of drug users. These were applied to the population of users aged between 18 and 65, in order to exclude cases of consumption not related to illicit drugs. To estimate antiretroviral cost for HIV, the total 2011 cost on these drugs in Catalonia was identified, totalling €152,092,275. To this budget, we applied the corresponding AF (Rehm et al., 2006) (21%) to obtain the part of the budget related to the treatment of illicit drug users (€32,851,931.40). Despite that, between 60% and 80% of drug users are estimated to be infected with hepatitis C, antiviral cost was excluded, because back in 2011 very few drug addicts were treated given the adverse effects and poor effectiveness of the treatment with interferon and ribavirin.

Visits to primary care centres related to illicit drug consumption treatment were identified on the primary care minimum data set (Servei Català de la Salut), using the ICD 10 codes of addiction to cocaine and opioids. Then, it was possible to identify the number of doctors, nurses or social services' visits, and apply them the cost of each type of visit (Vela, Clèries, Vella, Adroher & García-Altés, 2019).

To calculate treatment costs in specialized centres, we applied the proportion of patients consulting due to drug addiction (49.4% of the total) to the total budget expended on that services (CatSalut, 2012) (€20,510,803.39). The cost of detoxication units (€1,746,359.13) was added on top.

Cost of treatment for addiction to illicit drugs provided in correctional facilities was estimated from data provided by the Catalan Department of Health and other non-gov-

Table 1. *Cost matrix*

Type of cost	Direct cost	Indirect cost
Health-related	Treatment costs	Lost income due to drug-related death
	Hospitalisation	Lost productivity due to treatment and/or hospitalisation
	Research and prevention	
	Support programs against addiction	
Non-health-related	Justice	
	Police	
	Penal system	

ernmental organizations. The cost of treating 3,980 addicted inmates in Catalan prisons amounted a total of €5,062,116.66.

Hospitalisation cost was furthermore divided in the following categories: morbidity cost for in-patient treatment costs; emergency costs, and ambulance service costs.

Registries of hospitalisations due to illicit drug consumption were retrieved from the hospital discharge database (Registro de Actividad de Atención Especializada. RAE-CMBD). Each DRG-related cost was multiplied by the corresponding AF (Rehm et al., 2006).

The basis for the calculation on "emergency" were data on emergency visits provided by three hospitals in Barcelona. The mean number of visits of emergency visits was calculated for these hospitals, taking into consideration their total population of reference. The result of this calculation was then applied to the total 2011 Catalan population. Unit cost for emergency visits was calculated as the weighted mean between the reimbursement tariff of two categories of hospitals, general and specialized, using relative frequencies of use in 2011 as weights.

Number of ambulance services specific for illicit drug related-emergencies was obtained from the Catalan emergency medical system (Sistema d'Emergències Mèdiques), and a unit cost was applied through a weighted average of the price of a basic service and an advance service ambulance (Orden de 17/11/2014, 2014).

Expenditure on research related to illicit drug consumption was calculated as the sum of total funding from the three main research calls on the topic: The National Plan on Drugs (Plan Nacional sobre Drogas, 2011), the Network of Addictive Disorders (Red de Trastornos Adictivos - RETOX) and the Agency for Management of University and Research Grants (Agència de Gestió d'Ajuts Universitaris i de Recerca - AGAUR).

Prevention expenditures were calculated accounting for total governmental resources dedicated to prevention coming from the budget of the Catalan Department of Health, and specific funding coming from the National Plan on Drugs from the Spanish government. Only those directed toward Catalonia and its population, or only the share of national programs focusing on Catalonia were included.

Regarding rehabilitation and social inclusion costs, estimation of cost associated with therapeutic communities and similar rehabilitation services was performed taking into account the number of individuals benefiting from them (Catalan Department of Health and Catalan Department of Welfare and Family). We also included the cost of the addiction hotline "Linea Verda" as reported by the service itself.

Non-health related direct costs

For justice costs, the number of judicial procedures related to illegal drug trafficking in Catalonia for the year 2011 was obtained (Observatorio Español de la Droga y las Toxicomanías, 2013), and an estimated cost of €415 for each procedure was applied (Rivera et al., 2017).

Police cost data was provided by the Catalan autonomic police force, including drug driving controls, scientific police, and public security, data provided by Plan Nacional de Drogas regarding drug trafficking control, and by the Dirección General de Tráfico regarding police drug test among drivers in cars with and without road traffic collisions.

Penal system cost was calculated applying a mean cost of €20,340, corresponding to the maintenance cost of inmates in prison (Rivera et al., 2017), to the 3,980 addicted inmates treated in Catalan penitentiaries.

Health-related indirect costs

Productivity losses. To estimate the cost generated by deaths related to illicit drugs consumption, we applied AF (Rehm et al., 2006). Potential annual income generated was identified using Catalonia's 2011 per capita average annual salary (assumed equal for both men and women) (Idescat, 2017). Future yearly income was updated using a typical net present value approach, using a 3% discount rate. The formula used for calculating lost income is presented below:

$$Lost\ income = N_t^{DRD} \cdot \left[\frac{R_t(1 - (1+r)^{-m_t})}{r}\right]$$

where N_t^{DRD} is the number of illicit drugs-related deaths; represent average annual salary; R_t is the difference in years between the retirement age (which was set at 65 for both males and females) and the age at the time of death. In other words, lost income is the actualized value of drug-related deaths' forgone salary. Deaths are calculated by grouping individuals by age group. This was consistent with the main contributions in the literature (Rehm et al., 2006). Only individuals who are still in their working life were considered, therefore those deaths incurred in the 70-79 and 80+ age groups were excluded.

Income losses were estimated with an approach based on the gross value added (GVA) net of salaries method (Gonçalves et al., 2015). GVA per day (Idescat, 2018) was applied to the number of days of hospitalisation associated with morbidity data used for estimating hospitalisation costs (see the previous sections). As for productivity losses, AF were applied to data on hospitalisation days. GVA per day was estimated as equal to €95.93.

Results

As can be seen in Table 2, the cost of illegal drug consumption in Catalonia in 2011 was estimated at €326.39 million. 82% of the total cost corresponded to direct costs,

distributed quite evenly between health and non-health related. Among direct costs, 44.37% corresponded to the non-health related costs (justice, police and penal system), 15.99% to hospitalizations, 17.19% to pharmacy, 8.34% to treatment in specialized centers, and 5.74% to therapeutic communities and other aid programs, among others. Indirect costs represented 18% of total costs, mostly lost income due to drug-related death (Figure 1).

Health-related direct costs

Pharmacy costs' estimations account to €45,886,505.83. Of these, the vast majority was generated by HIV treatment (71.59%). Treatment in specialized centres, including detoxification units and outpatient drug treatment centres, accounts to €22,257,162.52; primary care centres visits, €3,515,452.00, and treatment in correctional facilities, €5,062,116.66 (Table I Online annex).

A total of 8,385 cases of hospitalisation related to illicit use were identified, that represented €42,696,460.35 hospitalization costs. Male patients generated the 86.56% of total costs, of which HIV and hepatitis C represented 16% and 24%, respectively. Illnesses that generated the higher use of resources for women were pregnancy complications and hepatitis C, 37% and 25% respectively. The contribution provided by each illness is provided in Table II Online annex.

Emergency visits accounted for a total of estimation of €5,352,194.97, generated by 31,858 visits associated to illicit drugs consumption. A total number of ambulance service cases of 12,283 (men: 54%; women: 44%; sex not reported: 2%) was estimated, with total cost accounting to €5,968,429.79.

Research represented 0.36% of direct costs. The contribution of each research centre is presented in Table III Online annex.

Prevention costs amounted to a total of €1,952,888.55. Among support programs against addiction, rehabilitation and social inclusion stand-off, accounting to €15,332,085.96€. The existing addiction hotline had a cost of €45,399.84.

Non-health related direct costs

In 2011, 3,980 trials were identified as related to illicit drugs, representing a cost of €1,509,355.00 (0.56% of direct costs).

Police force is involved in the fight against illicit drug consumption and trafficking in different ways. The most relevant activities are included in Table IV Online annex, which estimates the contribution of each components to the total €35,977,463.81, where drug trafficking control activities and Intelligence Centre Against Organized Crime (CICO) represented 41.64% of it. A total of 3,980 inmates were incarcerated for felonies related to illicit drugs that generated a total of €80,953,200.00 (30.32% of direct costs).
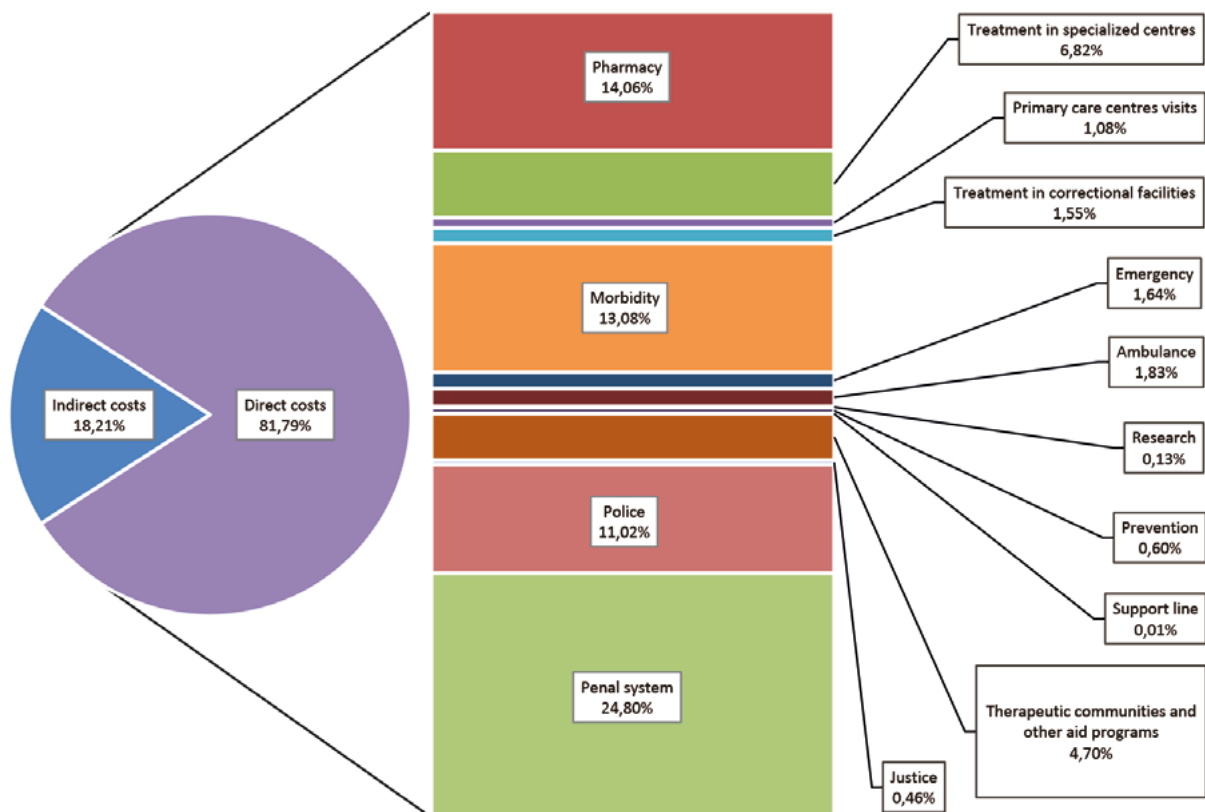

Figure 1. Distribution of direct and indirect costs. Catalonia, 2011.

Table 2. *Cost of illegal drug consumption by type of cost. Catalonia, 2011*

Type of cost		Item	Amount
Direct costs			
Health-related	Treatment costs	Pharmacy	€ 45,886,505.83
		Treatment in specialized centres	€ 22,257,162.52
		Primary care centers visits	€ 3,515,452.00
		Treatment in correctional facilities	€ 5,062,116.66
	Hospitalization	Morbidity	€ 42,696,460.35
		Emergency	€ 5,352,194.97
		Ambulance	€ 5,968,429.79
	Research and prevention	Research	€ 436,568.75
		Prevention	€ 1,952,888.55
	Support programs against addiction	Addiction hotline	€ 45,399.84
		Therapeutic communities and other rehabilitation and social inclusion programs	€ 15,332,085.96
Non-health-related	Justice		€ 1,509,355.00
	Police		€ 35,977,463.81
	Penal system		€ 80,953,200.00
Indirect costs			
Health-related	Lost income due to drug-related death		€ 57,405,516.65
	Lost productivity due to treatment and/or hospitalisation		€ 2,039,622.66
Total direct costs	Health-related		€ 148,505,265.22
	Non-health-related		€ 118,440,018.81
Total			€ 266,945,284.03
Total indirect costs			€ 59,445,139.30
Total social cost			€ 326,390,423.33

Health-related indirect costs

A total of 151.85 deaths associated with illegal drugs occurred in 2011, representing a loss of future income equal to €57,405,516.65 (94.45% of indirect costs) (Table V Online annex). Men accounted for 71.20% of the total. The illness inducing the highest number of deaths was HIV (indicated as B20-B24 in the table), followed by suicide (X60-X84, Y87.0).

Regarding productivity losses, the total of 21,274.11 days of work lost generated a total of €2,039,622.66 of costs (Table VI Online annex).

Discussion

This study estimated that the minimum social cost of illegal drug consumption in Catalonia in 2011 was €326.39 million (€349.56 million in 2018). Just to put these figures into context, the social cost of illegal drug consumption represented 0.16% of the Catalan GDP in 2011 (0.15% in 2018). Also, this gross figure could be compared with €1.27 million invested in prevention programmes during the same year. Previous estimations referred to Spain: 1,436 million euros in 2012 (0.14% of Spanish GDP) (Rivera et al., 2017), and 88,800 million PTA in 1997 (around €836.30 million nowadays) (García-Altés et al., 2002).

We adopted the COI framework, which have been extensively implemented for the calculation of social cost of substance abuse (Godgrey et al., 2002; Kopp, 2001; Rehm et al., 2006), also for the case of Spain (García-Altés et al., 2002; Rivera et al., 2017). Advantages and limitations of COI have been thoroughly analysed, both from a general point of view and in relation to our area of interest (Collins & Lapsley, 2002; Single et al., 2003). This has encouraged the development of a variety of alternative approaches and specific solutions to COI's limits when applied to illicit drugs (Portella et al., 2003; Rehm et al., 2006; Single et al., 2003). Additionally, alternative methods for the estimation of indirect costs have been suggested (Koopmanschap, Rutten, van Ineveld, y van Roijen, 1995). The adopted framework in our study relies on COI and takes into account posterior improvements (Gonçalves et al., 2015; Kopp, 2001; Rehm et al., 2006).

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However, the estimates generated through this study are higher than those coming from similar studies. We hypothesise that the higher estimation is determined by 1) the innovative approach used and the effort to include as much local level data as possible; 2) the inclusion of the majority of the categories from Rehm et al. (Rehm et al., 2006) in the framework including those with higher impact on social costs, as productivity losses; 3) the inclusion of all categories of illnesses in the analysis of the mortality and morbidity costs.

One of the main issues related to the estimation of drugs' social cost during a specific time period consists in defining the analysis' counterfactual. The most common option in the literature is to assume no past, present and future substance use as counterfactual (Gonçalves et al., 2015; Kopp, 2001; Rivera et al., 2017). Though commonly adopted, this approach received criticism (Collins et al., 2002; Single et al., 2003). Critics advocate for considering only part of total costs in the estimation, i.e., the one that it is amenable by public policies. These are defined as avoidable costs. Total costs, instead, include expenditures which can't be influenced by today's policies, for example, those related to either past use of drugs or those generated by cases of past consumption which will continue in the future (Collins et al., 2002; Single et al., 2003). By adopting the case of zero-consumption as counterfactual, these costs are automatically included in the estimation of social costs. Hence the criticism to this approach. Therefore, they should be considered as unavoidable and not included in the calculation of social costs (Single et al., 2003). Despite of these criticism, currently there is no alternative available that can allow for a precise calculation of those unavoidable costs (Collins et al., 2002). The approach adopted for this paper relies on the zero-consumption case as counterfactual.

The matrix of cost of reference that was adopted is comparable to previous ones (Gonçalves et al., 2015; Rivera et al., 2017), which represent two of the most recent studies in the field focusing on European countries, that are consistent with classical texts, in terms of the definition of social cost and the categorisation of the items (Kopp, 2001; Single et al., 2003). Due to absence of data regarding some items of the matrix of cost, it was possible to estimate only a subset of categories included in the matrix of reference. Moreover, intangible costs were not estimated, due to the limitations inherent in the available methodologies. Specific costs that could not be included are prevention costs by local administrations, and social inclusion costs paid by the Labour Department. Similarly, some estimations are based on means and extrapolations, as is the case of emergency visits, average salary for men and women or judicial procedures.

Data used for the estimation were both public and private, mainly not-for-profit organizations. The decision of using both types of source has two main reasons. First, it allowed us to rely on the authors' vast network of contacts in the Catalan system of entities that provide different types of service related to illicit drug consumption. This includes, among others, costs for drugs used in treating addiction, programs in scientific research, and support programs (as hotlines) for addicts. Second, by presenting data from entities that generally do not appear in official calculation of social cost of illicit drug consumption, it allowed for all these entities to emerge as a network of providers. Anyway, the study presented here is easily replicable, so estimations can be regularly redone, allowing for properly monitoring the impact of national plans. At the same time, it has been extremely valuable to stablish relationships with other Governmental departments, and to raise awareness on drug addiction problem, a public health problem where "health in all policies" is totally relevant.

Already 8 years have passed since 2011, when we collected all these drug-related costs. Interestingly, in 2012, due to the severe economic crisis, the prevention budget was dramatically reduced in approximately 1 million euros and evenly-matched again in 2014 and sustained ever since. A brief review of the changes occurred between 2011 and the most recent data available in the majority of the indicators tells us, regardless of some fluctuation in the data, that drug-related costs might not have increased significantly except for the costs on pharmacological treatment. The advent of the new antivirals of direct action in 2015 have resulted in a significant increase in the number of PWID that are treated for their infection for hepatitis C. Bearing in mind that the average treatment cost is €6,500 per person and that at least 50% of the PWID have been treated (7,482 people in 2017), the increase amounts to approximately €24,316,500 (7,7% of the drug-related costs back in 2011).

Nowadays several typologies of governance of addiction coexist in Europe. There are countries that introduced innovative harm reduction strategies; others still rely on a more traditional approach (Anderson et al., 2017). Regardless of the governance approach, quantifying prevalence use and associated burden of disease and mortality at country level and accompanying this with the analysis of the economic direct and indirect costs that illegal drugs impose on society is key and should inform policy planning and evaluation and service provision (Degenhardt et al., 2012).

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Conflict of interest

References

Anderson, P., Berridge, V., Conrod, P., Dudley, R., Hellman, M., Lachenmeier, D.,... Gual, A. (2017). Reframing the science and policy of nicotine, illegal drugs and alcohol - conclusions of the ALICE RAP Project. *F1000Research, 6*, 289. doi:10.12688/f1000research.10860.1.

Barrio, P., Reynolds, J. & García-Altés, A. (2017). Social costs of illegal drugs, alcohol and tobacco in the European Union: a systematic review of existing publications. *Drug and Alcohol Review, 36*, 578-588. doi:10.1111/dar.12504.

CatSalut. (2012). *Memòria CatSalut. El sistema de salut i la xarxa sanitària pública de Catalunya 2011*. Barcelona, Espanya: Departament de Salut. Generalitat de Catalunya. Retrieved at https://catsalut.gencat.cat/ca/coneix-catsalut/presentacio/informes-memories-activitat/anual-catsalut/.

Collins, D. J. & Lapsley, H. M. (2002). *Counting the cost: estimates of the social costs of drug abuse in Australia in 1998-9*. Canberra, Australia: Commonwealth Department of Health and Ageing. Commonwealth of Australia. Retrieved at https://catalogue.nla.gov.au/Record/814639.

Degenhardt, L. & Hall, W. (2012). Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *Lancet, 379*, 55-70. doi:10.1016/S0140-6736(11)61138-0.

European Monitoring Centre for Drugs and Drug Addiction. (2016). *European Drug Report 2016: Trends and Developments*. Luxembourg: Publications Office of the European Union. Retrieved at http://www.emcdda.europa.eu/publications/edr/trends-developments/2016_en.

García-Altés, A., Ollé, J. M., Antoñanzas, F. & Colom, J. (2002). The social costs of illegal drugs in Spain. *Addiction, 9*, 1145-1153. doi:10.1046/j.1360-0443.2002.00170.x.

Godgrey, C., Eaton, G., McDougall, C. & Culyer, A. (2002). *The economic and social costs of Class A drug use in England and Wales, 2000*. London, United Kingdom: Home Office Research, Development and Statistics Directorate. Retrieved at https://www.drugsandalcohol.ie/5441/1/Home_Office_Research_Study_249_Economic_and_social_costs.pdf.

Gonçalves, R., Lourenço, A. & Nogueira da Silva, S. (2015). A social cost perspective in the wake of the Portuguese strategy for the fight against drugs. *The International Journal on Drug Policy, 26*, 199-209. doi:10.1016/j.drugpo.2014.08.017.

Idescat. (2017). *Enquesta anual d'estructura salarial*. Barcelona, Espanya: Institut d'Estadística de Catalunya (Idescat). Generalitat de Catalunya. Retrieved at https://www.idescat.cat.

Idescat. (2018). *Valor afegit brut*. Barcelona, Espanya: Institut d'Estadística de Catalunya (Idescat). Generalitat de Catalunya. Retrieved at https://www.idescat.cat.

IHME (2016). *GBD Results Tool*. Seattle, WA: Institute for Health Metrics and Evaluation (IHME). University of Washington. Retrieved at http://ghdx.healthdata.org/gbd-results-tool.

Kopp, P. (2001). *Calculating the social cost of illicit drugs. Methods and tools for estimating the social cost of the use of psychotropic substances*. Strasbourg, France: Council of Europe Publishing. Retrieved at https://book.coe.int/en/root/2147-calculating-the-social-cost-of-illicit-drugs-methods-and-tools-for-estimating-the-social-cost-of-the-use-of-psychotropic-substances.html.

Koopmanschap, M. A., Rutten, F. F., van Ineveld, B. M. & van Roijen, L. (1995) The friction cost method for measuring indirect costs of disease. *Journal of Health Economics, 14*, 171-89. doi:10.1016/0167-6296(94)00044-5.

LEADER (2017). *Looking at Economic Analysis of Drugs and Economic Recession. LEADER European project. Drug Prevention and information (2007-2013)*. Brussels, Belgium: European Commission. Retrieved at https://www.alicerap.eu/home-leader.html.

Nutt, D. J., King, L. A. & Phillips, L. D. (2010). Drug harms in the UK: a multicriteria decision analysis. *Lancet, 376*, 1558-1565. doi:10.1016/S0140-6736(10)61462-6.

Observatorio Español de la Droga y las Toxicomanías. (2013). *Alcohol, tabaco y drogas ilegales en España. Informe 2013*. Madrid, España: Ministerio de Sanidad, Servicios Sociales e Igualdad. Retrieved at https://www.mscbs.gob.es.

Observatorio Español de la Droga y las Toxicomanías. (2016). *Alcohol, tabaco y drogas ilegales en España*. Informe 2016. Madrid, España: Ministerio de Sanidad, Servicios Sociales e Igualdad. Retrieved at https://www.mscbs.gob.es.

Orden de 17/11/2014, de la Consejería de Sanidad y Asuntos Sociales, por la que se establecen los precios públicos de la asistencia sanitaria y de los servicios prestados en la red de centros sanitarios dependientes del Servicio de Salud de Castilla-La Mancha (2014). Toledo, España: *Diario Oficial de Castilla-La Mancha (DOCM)*. Retrieved at https://docm.castillalamancha.es/portaldocm/.

Peacock, A., Leung, J., Larney, S., Colledge, S., Hickman, M., Rehm, J.,… Degenhardt, L. (2018). Global statistics on alcohol, tobacco and illicit drug use: 2017 status report. *Addiction, 113*, 1905-1926. doi:10.1111/add.14234.

Portella, G., Laezza, C., Laccetti, P., De Petrocellis, L., Di Marzo, V. & Bifulco, M. (2003). Inhibitory effects of cannabinoid CB1 receptor stimulation on tumor growth and metastatic spreading: actions on signals involved in angiogenesis and metastasis. *FASEB J, 17*, 1771-1773. doi:10.1096/fj.02-1129fje.

Rehm, J., Baliunas, D., Brochu, S., Fischer, B., Gnam, W., Patra, J.,… Taylor, B. (2006). T*he costs of substance abuse in Canada 2002*. Ottawa, Canada: Canadian Centre on Substance Abuse. Retrieved at https://www.ccsa.ca/sites/default/files/2019-05/ccsa-011332-2006.pdf.

Rivera, B., Casal, B. & Currais, L. (2017). The social cost of illicit drugs use in Spain. *The International Journal on Drug Policy, 44*, 92-104. doi:10.1016/j.drugpo.2017.03.012.

Saludes, V., Folch, C., Antuori, A., González, N., García, D., Anoro, M.,… HepCdetect II Study Group. (2019). Utility of a one-step screening and diagnosis strategy for viremic HCV infection among people who inject drugs in Catalonia. *The International Journal on Drug Policy,*74, 236-245. doi:10.1016/j.drugpo.2019.10.012.

Sánchez-Niubò, A., Sordo, L., Barrio, G., Indave, B. & Domingo-Salvany, A. (2020). Onset and progression of drug use in the general population of Catalonia, Spain. *Adicciones, 32*, 32-40. doi:10.20882/adicciones.1089.

Single, E., Collins, D., Easton, B, Harwood, H., Lapsley, H., Kopp, P.,... Wilson, E. (2003). *International guidelines for estimating the costs of substance abuse*. Geneva, Switzerland: World Health Organization (WHO). Retrieved at https://apps.who.int/iris/handle/10665/42603.

UNODC (2017). *World Drug Report 2017*. Vienna, Austria: United Nations Office on Drugs and Crime (UNODC). Retrieved at https://www.unodc.org/wdr2017/index.html.

Vela, E., Clèries, M., Vella, VA., Adroher, C. & García-Altés, A. (2019). Análisis poblacional del gasto en servicios sanitarios en Cataluña (España): ¿qué y quién consume más recursos? *Gaceta Sanitaria, 33*, 24-31. doi:10.1016/j.gaceta.2017.05.017.

Vella, V.A., García-Altés, A., Segura García, L., Ibáñez Martínez, N. & Colom Farran, J. (2018). Systematic review of guidelines in estimating social costs on drugs. *Gaceta Sanitaria, 32*, 481-487. doi:10.1016/j.gaceta.2017.10.009.