Research Report

The New Zealand Illicit Drug Harm Index 2020

Version 1.1

Acknowledgements

Many thanks to Peter Kennerley and all members of the National Drug Intelligence Bureau (NDIB) for their support and guidance, and to Richard Arnold, Chris Lewis, Jarrod O'Brien, and Andrew Chappell for their insights and technical assistance.

Authors

Michael McFadden
Lauren Bellamore
Blair MacDonald

Please note: The New Zealand Illicit Drug Harm Index 2020 has been corrected and republished following the identification of an error in the way some totals were calculated.

Citation: McFadden M, Bellamore L & MacDonald B. 2022. *The New Zealand Illicit Drug Harm Index 2020: Version 1.1*. Wellington: Ministry of Health.

Published in February 2022
by the Ministry of Health
PO Box 5013, Wellington 6140, New Zealand

ISBN 978-1-99-110022-1 (online)
HP 7936

This document is available at **health.govt.nz**

Contents

Abbreviations

MDMA 3,4-methylenedioxy-methamphetamine

List of Tables

Project summary

<table>
<tr><td>Aim</td><td>The 2020 Illicit Drug Harm Index (DHI 2020) provides a comprehensive evaluation of the costs of harmful illicit drug use. Estimates of total harm and harm per kilogram of drug consumed are included. Illicit drugs potentially include legal drugs (such as medication) diverted to the illicit drug market and/or the misuse of medications and excludes alcohol and tobacco.</td></tr>
<tr><td>Method</td><td>The primary sources of data for the calculation of harm associated with illicit drugs were coronial findings, hospital admissions, willingness to pay estimates from research findings in New Zealand and elsewhere, crime statistics, and estimates of the street value of illicit drugs. There were two categories of harm: personal harm and community harm. Consumption of illicit drugs was measured primarily through wastewater analysis, supplemented by self-reported survey data.</td></tr>
<tr><td>Results[1]</td><td>Summary of social harms ($) per kilogram by drug type
<table>
<tr><th>Drug type</th><th>Personal harm
$ per kilogram</th><th>Community harm
$ per kilogram</th><th>Total harm
$ per kilogram</th></tr>
<tr><td>Methamphetamine</td><td>544,451.68</td><td>563,910.03</td><td>1,108,361.71</td></tr>
<tr><td>Cocaine</td><td>125,917.23</td><td>173,755.03</td><td>299,672.26</td></tr>
<tr><td>MDMA</td><td>62,283.36</td><td>76,455.46</td><td>138,738.82</td></tr>
<tr><td>Cannabis</td><td>4,847.90</td><td>10,876.13</td><td>15,724.02</td></tr>
</table>
Summary of social harms by drug type ($ million)
<table>
<tr><th>Drug type</th><th>Personal harm
$ million</th><th>Community harm
$ million</th><th>Total harm
$ million</th></tr>
<tr><td>Methamphetamine</td><td>404.52</td><td>418.98</td><td>823.50</td></tr>
<tr><td>Cocaine</td><td>6.44</td><td>8.89</td><td>15.33</td></tr>
<tr><td>MDMA</td><td>23.53</td><td>28.88</td><td>52.42</td></tr>
<tr><td>Heroin</td><td>18.16</td><td>*</td><td>18.16</td></tr>
<tr><td>GHB/GBL</td><td>1.13</td><td>1.93</td><td>3.06</td></tr>
<tr><td>Cannabis</td><td>280.97</td><td>630.34</td><td>911.31</td></tr>
<tr><td>Synthetic cannabinoids</td><td>78.35</td><td>2.13</td><td>80.47</td></tr>
<tr><td>Total</td><td>813.09</td><td>1091.15</td><td>1,904.25</td></tr>
</table></td></tr>
<tr><td>Discussion</td><td>The DHI 2020 is a conservative measure of the harms associated with the use of illicit drugs in New Zealand. It can be extended to accommodate new and emerging drugs in the future. There were several changes incorporated in DHI 2020. The three most significant initiatives were the use of coronial data and hospital admission data in estimating harm, and the use of recently developed wastewater analysis to estimate consumption for methamphetamine, cocaine and MDMA. Cannabis consumption was estimated using New Zealand Health Survey (Health Survey) data due to technical issues interpreting the wastewater analysis. Reliable estimates of the consumption of GHB/GBL and synthetic cannabinoids were not available from any source. Due to these changes any comparison with the results of DHI 2016 should be treated with caution.</td></tr>
<tr><td>Looking forward</td><td>The National Drug Intelligence Bureau (NDIB) now owns the DHI. It is intended for the DHI to be updated biennially, including a year-to-year comparison.</td></tr>
</table>

[1] All figures in the *Summary of social harms ($) per kilogram by drug type* have been corrected. All figures in the *Summary of social harms by drug type ($ million)* tables have been corrected, apart from Personal Harm $ million figures for GHB/GBL and Synthetic cannabinoids. See **Appendix Two** for incorrect numbers.

Introduction

The first published drug harm index was developed by the Australian Federal Police during 2001 in response to the Australian Government's interest in the social impact of its policies to curb the abuse of illicit drugs (McFadden et al, 2002) and subsequently revised in 2003, 2006 and 2008 (Attewell & McFadden, 2008). It was followed by other drug harm indices, including Great Britain in 2005, the United Nations Office on Drugs and Crime (UNODC) in 2005 and New Zealand in 2008 (MacDonald et al, 2006; UNODC, 2005; Slack et al, 2008). The New Zealand Drug Harm Index was significantly revised in 2016 (McFadden, 2016). The DHI 2020 retains the basic underpinning of the 2016 version while introducing new data sources which will improve the accuracy of the estimation of personal and community harm (see Table 1).

Table 1. Significant changes in data sources from DHI 2016

Change	Background
Wastewater analysis	Wastewater analysis is used to estimate consumption of major illicit drugs. This is timelier and more accurate than the previous method based on the Health Survey.
Hospital admissions	Hospital admissions data are again timelier and more accurate than the Health Survey for our purpose. Estimates of serious and minor harm related to illicit drug use can now be estimated. These effectively replace the previous classification of people who are dependent and people who use drugs casually used in DHI 2016, although related the two classificatory systems are not equivalent.
Coronial reports	Deaths attributable to illicit drugs are now based on coronial reports rather than estimates provided through a UNODC report.

Following this introduction, the report reviews existing knowledge and its implications for the project, before outlining the method. This is followed by an overview of drug use in New Zealand. Next comes a section on drug harm calculation. The conclusion describes the output of the calculation and their implications.

The DHI 2020 retains the classification system of personal and community harms and their components, that were first introduced in 2016. It omits estimates for higher level government interventions in relation to illicit drugs. The measurement of the cost of interventions at any level is crucial to return-on-investment (ROI) studies that are often used in assessing the impact of specific interventions and programs. The intervention costs provided in 2016 were at a high level, e.g. health, and law enforcement. In fact, these higher-level functions encompass a variety of specific interventions and are the appropriate level for any ROI study. The costs associated with specific interventions need to be estimated separately. As noted in DHI 2016, the cost of interventions should not be construed as a form of harm. Another change is the use of expert opinion to estimate harm associated with specific drugs has been discontinued. In essence, both wastewater analysis and hospital admissions provide the necessary information on a range of illicit drugs. None of this should be taken as a criticism of the health surveys or expert opinion. Both are obviously critical to the development of sound policy in relation to illicit drug use. In terms of constructing a drug harm index, the new data sources were both adequate and parsimonious. Please see Appendix One for further details on the *conceptual framework* used for the DHI 2020.

Background

Of the various drug harm indices developed between 2001 and 2008, only two remain in use, the New Zealand DHI and the Australian DHI. It should be noted the Victorian Police version was always an internal measure and not subject to public scrutiny.

In general, most commentators were sympathetic to the aims of developing a DHI while noting the complexities involved (Greenfield & Paoli, 2010; Nutt et al, 2010; Ritter, 2009; Ritter & Moxham-Hall V, 2016). In this they were consistent with a 2006 review conducted by the Beckley Foundation (Roberts et al, 2006). The notion of a single measure of drug harm that can be used to measure the benefits of illicit drug policy and practice is highly appealing. Most realised the problems that beset the measurement of any behaviour that is illegal. Reuter (2009) was more sceptical, suggesting that any single measure of drug-associated harms was unlikely to capture the complexity of the environment within which drug markets operate.

The first published DHI was developed for the Australian Federal Police in 2001. At that time, the development of an index was in response to two quite separate issues.

- Law enforcement had long struggled with the reporting and interpretation of illicit drug seizures. There are, two options for most agencies:
    1. Reporting the number and weight of seizures by drug type provides an accurate picture of what has occurred, but it is difficult to interpret in terms of general trends. A decrease in seizures of one drug type might be counterbalanced by an increase for another drug type.
    2. Reporting the aggregate number and weight for all seizures across all drug types. This has the benefit of being a single number, but it is remarkably coarse.
- The Australian Government had introduced an output–outcome reporting regime for Commonwealth departments to increase departmental accountability and shift agencies' perspective from an emphasis on properly acquitting the funds provided to an emphasis on the social impacts of government programmes.

The original DHI provided law enforcement with a way of reporting its drug seizure activity in a single meaningful number that also represented the dollar value of its social impact to the community. In 2007, the Victorian Police began developing a DHI, and one year later the New Zealand Police introduced its own version (Slack et al, 2008).

Although the DHI was originally developed in a law enforcement context, its wider applicability was soon recognised in that a single index would be of value in tracking the total harm caused by illicit drugs. This approach involves a weighted aggregate of key harm measures such as mortality, morbidity and drug-related crime. It was this latter application that led to the development of the Home Office Drug Harm Index in the United Kingdom in 2004 (MacDonald et al, 2006). A similar approach was adopted by the UNODC in developing its Illicit Drug Index in 2005 to provide a single measure of harm across regions and countries, and across time (UNODC, 2005, 2006). An excerpt from Attewell and McFadden (2008) provides a summary of the similarities and differences between the various measures:

> All are used as summary measurements to compare policy outcomes either internally or externally. However, there are differences in approach and method. The United Kingdom index concentrates on a set of measurable indicators that are related to the social harms caused by drugs. The index for the base year (1988) was set at 100, and subsequent levels of harm were plotted against that point. Thus, it is a relative rather than an absolute measure of harm. The AFP and New Zealand indices share the same methodology, the only difference being that AFP had an independent estimate of the economic cost of drug use in the community, whereas the New Zealand study developed its own measurements. Both forms of measurement provide absolute estimates of the level of harm in economic terms, and both are used by their respective law enforcement agencies to report performance. There are differences: the bottom-up approach used in New Zealand resolved the issue of double-counting harm by counting polydrug users in each of the relevant drug categories. The top-down approach used in Australia avoided this problem by segmenting harm at the aggregate level. The issue remains important if harm at the drug-user level is of interest (p 42).

In an important extension of classical economic evaluation techniques, Melberg et al (2011) included a willingness-to-pay question in a survey of drug harm. Willingness-to-pay, as the phrase implies, is a technique to measure how much a community is willing to pay to achieve a given outcome. Melberg et al found that one in fourteen members of the public knew socially or were related to a person who uses drugs (i.e. family and friends). Family and friends of people who use drugs indicated they would be willing to spend between 500 and 13,000 euros to treat the person.

The reasons for the survival of the New Zealand DHI and the Australian DHI is not altogether clear. Possibly the ability of the respective DHIs to provide feedback in an organisational environment that is conducive to feedback may be one factor. It should also be noted these DHIs report results in dollar values, which assists interpretation by the general public and professional community alike. In short, they have a clear message.

Calculating the cost of illicit drug-related social harm

Illicit drug consumption in New Zealand

The extent of drug use in society is always difficult to ascertain. The most widely used technique is the nationally representative survey, participation in which is voluntary, and anonymity is guaranteed. Nevertheless, the sample survey may fail to reach a portion of the population of people who use drugs, such as the homeless and those in prison. The sample survey technique was used in DHI 2016 but is limited at measuring total volume of drug consumption as it relies on assumptions of average volume of use per person. Specialised surveys of subsets are also used, including those in treatment, in prison or recently arrested. Some indication of the variability in estimating the number of people who use drugs can be found in Hall et al (2000), who used three separate methods to estimate the number of people who use heroin in Australia. The result for Australia ranged from 67,000 to 92,000; the median was 74,000 and the mean 77,000. In the calculation of overall harm or cost to the community, one of the most influential factors is the estimated number of people who use drugs, and this may be subject to some variation. A supplementary approach is the analysis of wastewater. This is a volumetric measure of consumption and avoids having to calculate the number of people who use drugs and their average consumption.

The original New Zealand study to estimate illicit drug consumption was undertaken in Auckland in 2014 (Lai et al, 2017); it measures the metabolites of some illicit drugs in wastewater samples giving a volume of drug use within a specific catchment area, Following further development, the New Zealand Police has published quarterly estimates of the consumption of methamphetamine, cocaine and MDMA covering wastewater catchment areas of up to 75% of the population. Currently, methamphetamine, cocaine, MDMA, heroin, fentanyl, cannabis, and methamphetamine precursors (ephedrine, pseudoephedrine) can be tested for in New Zealand. Table 2 has estimates of the consumption of methamphetamine, cocaine, MDMA and cannabis. All estimates, apart from cannabis, are based on New Zealand Police wastewater consumption data. The cannabis estimates derive from the 2018/19 Health Survey due to the challenges of testing for cannabis in wastewater, compared to other drugs.

The most significant challenge is that THC and THC-COOH (the psychoactive ingredients tested for) do not dissolve in wastewater as well as other drugs do and are known to adhere to surfaces, including sewer infrastructure, creating significant inconsistencies. In addition, the effect of wastewater on the extraction of cannabis compounds is far greater than for other drugs.[2]

Table 2. Estimated annual consumption of illicit drugs in New Zealand 2019[3]

Drug type	Total consumption (kg)
Methamphetamine	743
Cocaine	51
MDMA	378
Cannabis	58,000

[2] National Drug Intelligence Bureau. (May 2020). *Wastewater Testing: Cannabis Update.* IN CONFIDENCE.

[3] Total consumption (kg) for Methamphetamine, Cocaine and MDMA have been corrected. See **Appendix Two** for incorrect numbers.

The above consumption figures are as they are currently reported by NZ Police. This does not include adjustments for the percentage of the population covered by wastewater testing and does not adjust for purity. While the above figures provide accurate volumes for the pure substance detected at wastewater sites, they are almost certainly an underestimation of total consumption. Opportunities exist for further analysis of wastewater data which would provide a more accurate picture of illicit drug consumption in New Zealand.

Drug types included are those where sufficient traces were detected to allow a reasonable estimate of consumption to be made. Existing evidence for fentanyl and heroin suggests low levels of consumption and they have therefore been omitted from consumption estimates. Consumption of synthetic cannabinoids and GHB/GBL (both included in the overall estimated social cost of drug-related harm table) is unable to be estimated as these substances are not included in wastewater testing and were not included in the 2018/19 Health Survey.

Personal harms

Personal harms resulting from illicit drug use included in the report include harms related to premature death and harms related to a reduction in the quality of life. Harm calculations were made in relation to the illicit drug types described in Table 3. As noted previously, harms were categorised as *personal* where they related to the people who use drugs themselves, and as *community* where they related to the wider New Zealand community.

Premature death

In a change from the approach in DHI 2016 when deaths were sourced from the Ministry of Health, the Coronial Services Unit (Ministry of Justice) were requested to provide details on drug-related deaths in 2019. A keyword search[4] was performed, with the data counting instances where keywords were recorded in *Medical Cause of Death 1*, *Medical Cause of Death 2*, *Medical Cause of Death 3*, *Provisional Cause of Death* and *Final Cause of Death*. There were 107 deaths reported. This included active cases.

It should be noted that this includes all deaths where drugs have been found to be a contributing factor, not just acute overdoses. This takes a wide view of drug-related harm and caution should be taken when using the below statistics to describe drug-related deaths.

To avoid double counting, where only one substance was recorded against a death this substances was counted as 1, where two or more substances were recorded against a death the substances are counted as an equal proportion of 1 (i.e. if four substances were recorded against a death these substances were counted as 0.25 each). The total number of deaths related to a specific substance was then multiplied by the estimated value of a life: $4,527,300 (Ministry of Transport, 2020, p.13). The total cost of premature death calculated as an estimated $484.8 million,[5] with the main contributor methamphetamine at $244.9 million.[6] Details are provided in Table 3.

[4] Keywords searched: heroin (heroin, opium), fentanyl, cocaine, methamphetamine, GHB (GHB, fantasy, liquid ecstasy), MDMA (MDMA, ecstasy), Synthetic cannabinoid (synthetic cannibi, FUBINACA, Kronic), Drug toxicity (drug overdose, drug toxicity), Multi-drug (multi-drug, multi drug).

[5] Figure corrected from $484.4 million.

[6] Figure corrected from $244.5 million.

Loss of quality of life

In DHI 2016, loss of quality of life was calculated using a conversion factor relating this form of harm to that of premature death. In DHI 2020 this has been replaced by hospital admission (NMDS) data, namely hospital admissions that resulted in a drug-related primary diagnosis. Hospital admissions of more than one day were considered a serious loss of quality of life and those of one day or less as a minor loss. This is consistent with the basis used by the Ministry of Transport to identify minor and serious injury in road crashes. Costs associated with a serious loss of quality of life were estimated at $454,100 per person (admissions = 681) and for a minor loss at $18,400 per person (admissions = 1,037). These dollar figures include loss of output due to temporary incapacitation, calculated using average hourly earnings as a proxy. Table 3 has details with the total cost of loss of quality of life at $328.3 million[7] with $309.2 million[8] relating to serious cases and $19.1 million[9] relating to minor cases.

Note that minor rounding errors will occur, largely because hospital admissions could be attributed to multiple factors, including alcohol and other illicit drugs. Multiple cause admissions were distributed equally over known factors to avoid double-counting. It should also be noted that in some cases cannabis ('cannabinoid' in the data) related hospital admissions are unable to be differentiated from synthetic cannabinoid related admissions, skewing the cost figures somewhat.

Using hospital admissions to measure loss of quality of life almost certainly underestimates the cost of drug harm. This data is unlikely to include people with life-long drug issues never visit hospital, some long-term and chronic impacts, as well as wider harms experienced such as job loss, accommodation loss and mental health issues.

Table 3. Personal harms by drug type ($ million)[10]

Drug type	Premature death	Quality of life		Total harm
		Serious injury	Minor injury	
Methamphetamine	244.85	151.57	8.10	404.52
Cocaine	4.53	1.58	0.33	6.44
MDMA	15.85	5.37	2.32	23.53
Heroin	18.11	0.00	0.05	18.16
GHB/GBL	0.00	0.83	0.30	1.13
Cannabis	124.50	148.96	7.51	280.97
Synthetic cannabinoids	76.96	0.91	0.48	78.35
Total	484.80	309.21	19.08	813.09

[7] Figure corrected from $328.6 million.

[8] Figure corrected from $309.4 million.

[9] Figure corrected from $19.2 million.

[10] The following figures in *Table 3* have been corrected: Premature death – Methamphetamine; Serious injury – Methamphetamine, Cocaine, Cannabis; Minor injury – Methamphetamine, Heroin; Total harm – Methamphetamine, Cocaine, MDMA, Heroin, Cannabis. See **Appendix Two** for incorrect numbers.

Summary and comment

The total cost of personal harm to people who use drugs in New Zealand is now estimated at $813.1 million,[11] with most of that cost relating to premature death at $484.8 million.[12] Of the illicit drugs included, methamphetamine caused the most harm at $404.5 million.[13] These estimates are generally higher than those reported in the 2016 report, due primarily to an increase in reported deaths from 75 to 107 deaths.

Community harms

Community harms occur in different domains. First, there are specific harms that affect the family and friends of people who use drugs. Second, there are a variety of harms that follow drug-related crime, including acquisitive crime to fund drug purchases, and the reinvestment of the profits of drug trafficking. Normally, this investment is undertaken to diversify the income base of criminal enterprises. Third, there are harms caused by a reduced revenue base to the government. The sale of illicit drugs is not subject to GST, and organised crime does not pay company tax on its profits. The reduced tax base means fewer funds are available for services such as health, education and infrastructure spending.

Family and friends of people who use drugs

DHI 2016 introduced harm suffered by family and friends as a new measure of community harm. Past research had largely been concentrated in Nordic countries and some of the estimates, especially willingness-to-pay are transferred from these studies. Melberg et al (2011) conducted a representative survey of 3,092 adults in Copenhagen, Helsinki, Oslo and Stockholm. Almost half of the respondents had at some time known and been concerned about the illicit drug use of a personal acquaintance (i.e. family or friend). In Oslo, 14% of respondents indicated they were willing to pay for the treatment of a friend. In fact, median responses across all respondents ranged from 500 euros for a friend to 13,000 euros for a child. It is argued the amount family and friends are willing to pay is closely related to the harm or distress that family and friends experience because of drug use. While a proportion of respondents willing to pay for treatment might be acting entirely from altruism, indications from the Melberg et al study indicate there are significant harms experienced by family and friends, with 6.5% reporting they had feared violence from the person using drugs and 22.5% acknowledging they had been worried in the past 12 months. From these figures, it appears that willingness to pay and incurred harm may be closely related.

The current measure assumed the proportion of the adult population willing to pay for treatment for friend or family was the same in New Zealand as in Norway. This assumption is conservative, as New Zealand's adult population has a higher proportion of current people who use drugs than Norway's. It was also assumed the average willingness-to-pay figure for family and friends was 500 euros. Again, this was a conservative figure given the range of 500 to 13,000 euros in the Melberg study. Thus, the number of family and friends in New Zealand willing to pay the equivalent of 500 euros each was calculated as 14% of the adult New Zealand population (aged 15–64 years) in 2018 (3,219,200 people). The number of affected people was estimated at 450,688. The total harm to the community as estimated by willingness-to-pay techniques is $518.7 million.

[11] Corrected from $813.0 million.

[12] Corrected from $484.4 million.

[13] Corrected from $404.2 million.

In DHI 2016, it was assumed that significant harm to family and friends would be from people with addiction. In DHI 2020, it was assumed the most likely to cause concern for family and friends would be when people who use drugs are admitted to hospital for more than one day, i.e. serious cases as previously defined. Total harm across drug types was distributed according to the number of serious hospital admissions for each drug type. The results are reported in Table 4.

Note this report did not consider one significant family relationship: children. There is insufficient information available to allow an estimate of the social cost borne by children of people who use drugs, and this was therefore excluded from this report.

Acquisitive crime

Acquisitive crime as a means of funding illicit drug purchases has long been assumed and debated. For example, based on figures for the UK DHI (Goodwin, 2007), acquisitive crime accounted for 61.9% of the 2005 index. In contrast, figures from Slack et al (2008) suggest that property losses accounted for 6.1% of the NZ DHI. There are obviously differences in method, but it is cautionary to observe that under two separate measures of drug harm the relative contribution of property crime can differ tenfold.

The evidence from the literature is quite different. Stevens (2008) traced the development of the political debate in the UK over drugs and crime and concluded that this link had been exaggerated. Bryan et al (2013) conducted a recent and detailed survey of the links between heroin use, cannabis only use and crime. They reported that while heroin use was related to the incidence of acquisitive crime, cannabis use was not. Furthermore, they noted that only 43% of acquisitive crime by people who use heroin was related to the need to buy drugs. Caulkins and Kleiman (2011) have covered the complexities of this area.

Acquisitive crime was separated into burglary (68,735[14] cases) and theft (138,818[15] cases), the average property cost per crime being $2,072 for burglary and $451 for theft (New Zealand Police 2019). The proportion of arrestees who used drugs in the past 12 months and claimed to be dependent during that time (30% of arrestees) was again used as an indicator of the extent of drug-related acquisitive crime (Wilkins et al 2016). Distinct from the DHI 2016, corrections were made for unreported crime. It is far more plausible that unreported crime represents a smaller proportion of the value of reported crime. In the absence of any other evidence, it was decided to exclude estimates of unreported crime.

The economic value of property lost due to acquisitive crime committed to fund drug use is $205.1 million.[16] See Table 4 for details.

[14] Corrected from 71,546 (source: https://www.police.govt.nz/about-us/publications-statistics/data-and-statistics/policedatanz/victimisation-time-and-place).

[15] Corrected from 106,916 (source: https://www.police.govt.nz/about-us/publications-statistics/data-and-statistics/policedatanz/victimisation-time-and-place).

[16] Corrected from $196.5 million.

Reinvestment into other crime

Organised crime plays a significant role in drug production, importation and distribution (excluding drug trafficking). This section is concerned with harms that extend beyond the harms traditionally associated with illicit drugs. In part, this is due to the evolution of organised crime structures and to the diversification of business. Organised crime acts like legitimate business in attempting to lower the risk associated with activities. One strategy to reduce risk is diversification into other crime types.

Drug crime is highly profitable but not all profits of crime are reinvested in crime. Recent work (McFadden, 2015) undertaken on behalf of the New Zealand Police suggests that 56% of the revenue from drug trafficking is reinvested in criminal activity, while the remainder is used to support a lifestyle. The majority reinvested will fund further drug trafficking; however, some will be invested in other activities such as extortion, fraud, pornography and weapons trafficking.

Hughes et al (2015) provided a network analysis of the links between major drug crimes and other types of crime in Australia. They found that 28.5% of cases in the linked network were not drug-related and that most cases were associated with economic crime. There is insufficient information available to calculate the actual proportion of profits from drug trafficking reinvested in other crime. Based on the Hughes et al figures it is unlikely to exceed 28.5%. A conservative estimate of 20% was used in the model. Thus, the proportion of drug-related revenue reinvested in other crime is 20% of 56%, or approximately 11%. The results are provided in Table 4.

$74.8 million[17] in funding for other criminal activities in New Zealand is provided each year from drug trafficking. The majority of this (over 75%)[18] is generated from the sale of illicit cannabis.

The preceding analysis and estimates relate to the reinvestment of drug trafficking profits into other illegal activities. There is a further threat posed by drug trafficking profits entering the legitimate economy as organised crime seeks to diversify further by investing in legitimate business. This is in addition to any money laundering activities, and it is not a new problem. McDowell and Novis (2001) describe the negative impacts of criminal profits being invested in the legitimate economy as:

- undermining the private sector by subsidising legitimate business with drug profits, thereby creating a competitive advantage over honest businesses
- undermining the integrity of financial markets by moving large sums of money through the international financial system
- loss of economic control that the previous point entails, especially to developing economies, and
- the economic damage that ensues from the perception that countries are corrupt and involved in the laundering of drug profits.

These threats are less likely to occur in countries with strong institutions, transparent government and appropriate checks and balances in place. They are nevertheless real and not accounted for in this report.

[17] Corrected from $61.4 million.

[18] Corrected from “over 90%”.

Reduced tax base

A further aspect of the economic harm associated with organised crime's involvement in drug trafficking is the loss to the tax base available to the government. Modern organised crime will seek to lower its risk through diversification and enhance its profitability by tax avoidance. Organised crime generally pays neither GST nor company tax. In doing so, it reduces the government's ability to provide services to the people of New Zealand.

The basis of this measure was the income derived from drug trafficking, as it was for the estimate of organised crime's reinvestment in other crime. An accurate assessment of GST would be based on revenue less any GST credits. With an illegal enterprise such as drug trafficking, it is difficult to estimate the extent of GST credits. As an alternative and conservative estimate, GST was calculated against estimated profit, as company tax properly is. Tax avoided was calculated by multiplying estimated profit by income by the GST rate of 15% and by the company tax rate of 28%. McFadden (2015), using New Zealand Police data, estimated that drug-related revenue included 83% profit, with the remaining 17% reimbursing the costs of running the business.

Overall, $292.5 million[19] is lost to the tax base through the failure to pay appropriate taxes in relation to revenues and profit generated by illegal drug trafficking. This additional revenue could only be realised either by the legalisation of illegal drugs or by the diversion of this investment into legal forms of investment. Nevertheless, it remains a genuine social harm associated with illegal drug trafficking. Table 4 has details of total cost.

Table 4. Community harms by drug type ($ million)[20]

Drug type	Harm to family and friends	Acquisitive crime	Reinvestment in other crime	Tax revenue foregone	Total harm
Methamphetamine	254.27	100.51	13.08	51.12	418.98
Cocaine	2.66	1.05	1.06	4.13	8.89
MDMA	9.00	3.56	3.32	13.00	28.88
Heroin	*	*	*	*	*
GHB/GBL	1.39	0.55	*	*	1.93
Cannabis	249.89	98.78	57.38	224.29	630.34
Synthetic cannabinoids	1.52	0.60	*	*	2.13
Total	518.74	205.05	74.83	292.53	1091.15

* Insufficient data for an estimate to be made.

In total, the cost to the community of harms associated with drug use was $1,091.2 million in 2019. Harm to family and friends of people who use drugs was the major contributing harm at $518.7 million and cannabis the major contributing drug type at $630.3 million.

[19] Corrected from $240.2 million.

[20] The following figures in *Table 4* have been corrected: Harm to family and friends – Methamphetamine, MDMA, Cannabis; Acquisitive crime – Methamphetamine, Cocaine, MDMA, GHB, Cannabis, Synthetic Cannabinoids; Reinvestment in other crime – Methamphetamine, Cocaine, MDMA, Cannabis; Tax revenue forgone – Methamphetamine, Cocaine, MDMA, Cannabis; All Total harm figures.

Conclusion

Estimates of harms per kilogram of illicit drug consumed are given in Table 5. These estimates underpin any attempt to calculate return-on-investment for interventions aimed at reducing or eliminating the consumption of illicit drugs in specific user populations.

Table 5. Summary of social harms ($) per kilogram by drug type[21]

Drug type	Personal harm $ per kilogram	Community harm $ per kilogram	Total harm $ per kilogram
Methamphetamine	544,451.68	563,910.03	1,108,361.71
Cocaine	125,917.23	173,755.03	299,672.26
MDMA	62,283.36	76,455.46	138,738.82
Cannabis	4,847.90	10,876.13	15,724.02

Overall, the estimated harm resulting from the use of Illicit drugs is $1,904.3 million (Table 6). This compares with the estimate of $1,493.7 million in 2016, noting that there are significant methodological improvements in the 2020 report so that these figures are not comparable.

Table 6. Summary of social harms by drug type ($ million)[22]

Drug type	Personal harm $ million	Community harm $ million	Total harm $ million
Methamphetamine	404.52	418.98	823.50
Cocaine	6.44	8.89	15.33
MDMA	23.53	28.88	52.42
Heroin	18.16	*	18.16
GHB/GBL	1.13	1.93	3.06
Cannabis	280.97	630.34	911.31
Synthetic cannabinoids	78.35	2.13	80.47
Total	813.09	1091.15	1,904.25

* Insufficient data for an estimate to be made.

^ Partial estimate due to insufficient data.

[21] All figures in *Table 5* been corrected.

[22] All figures in the *Summary of social harms by drug type ($ million)* tables have been corrected, apart from Personal Harm $ million figures for GHB/GBL and Synthetic cannabinoids. See **Appendix Two** for incorrect numbers.

References

Attewell R & McFadden M (2008). Measuring the benefits of drug law enforcement: The development of the Australian Federal Police drug harm index, *Bulletin on Narcotics*, 60 1–2: 45–58.

Bryan M, Del Bono E & Pudney S (2013). *Drug-related crime*, ISER Working Paper Series, 2013–08, Institute for Social and Economic Research.

Caulkins J & Kleiman M (2011). Chapter 10 Drugs and crime in *The Oxford Handbook of Crime and Criminal Justice*, Oxford University Press, New York, 275–310.

Goodwin A (2007). *Measuring the harm from illegal drugs: The Drug Harm Index 2005*, Home Office Online Report 22/07 accessed at **http://webarchive.nationalarchives.gov.uk/20110220105210/rds.homeoffice.gov.uk/rds/pdfs07/rdsolr2207.pdf**.

Greenfield V & Paoli L (2010). *If supply-oriented drug policy is broken, can harm reduction help fix it? Melding disciplines and methods to advance international drug control policy*, United States Naval Academy, Department of Economics, Working Paper 2010–30.

Hall W, Ross J, Lynskey M, Law M & Degenhardt L (2000). *How many dependent heroin users are there in Australia*? Monograph 44. Sydney: National Drug and Alcohol Research Centre.

Hughes C, Chalmers J, Bright D & McFadden M (2015). *Trafficking in multiple commodities: Exposing Australia's polydrug and poly-crime networks*. Monograph Series No. 4, National Drug Law Enforcement Research Fund.

Lai FY, Wilkins C, Thai P, & Mueller J F (2017). An exploratory wastewater analysis study of drug use in Auckland, New Zealand, *Drug and Alcohol Review* (September 2017), 36, 597–601.

MacDonald Z, Collingwood J & Gordon L (2006). *Measuring the harm from illegal drugs using the Drug Harm Index – an update*, London, Home Office, Online Report 08/06.

McDowell J & Novis G (2001). *The Consequences of Money Laundering and Financial Crime*, Bureau of International Narcotics and Law Enforcement Affairs, US Department of State.

McFadden M (2015). *Development of a Proceeds of Crime Disruption Index*, New Zealand Police, Wellington.

McFadden M (2016). *The New Zealand Drug Harm Index 2016*, Ministry of Health, Wellington.

McFadden M, Mwesigye S & Williamson G (2002). Pricing outputs: A case study in law enforcement, *Australian Journal of Public Administration*, 61(4), 80–88.

Melberg H, Hakkarainen P, Houborg E, Jääskeläinen M, Skretting A, Ramstedt M & Rosenqvist P (2011). Measuring the harm of illicit drug use on friends and family, *Nordic Studies on Alcohol and Drugs*, 28, 2, 105–121.

Ministry of Transport (2019). *Social Cost of Road Crashes and Injuries 2018 update*, Wellington.

New Zealand Police (2019). *Crime in New Zealand at a glance.* Accessed at **https://www.police.govt.nz/sites/default/files/publications/crime-at-a-glance-nov2019.pdf**.

Murray C et al (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010, *The Lancet*, 380, 2213. (Full author list exceeds 400 names.)

Nutt D, King L & Phillips L (2010). Development of a rational scale to assess the harm of drugs of potential misuse, *The Lancet*, 369, 9566, 1047–1053.

Reuter P (2009). Ten years after the United Nations General Assembly Special Session (UNGASS): assessing drug problems, policies and reform proposals, *Addiction*, 104: 510–517.

Ritter A (2009), Methods for comparing drug policies—the utility of composite Drug Harm Indexes, *International Journal of Drug Policy*, 20, 6, 475–479.

Ritter Al & Moxham-Hall V (2016). Complexities and challenges - NZ's Drug Harm Index 2016. *Matters of Substance*, Vol. 27, No. 3, Aug 2016: 34–36.

Roberts M, Bewley-Taylor D & Trace M (2006). *Monitoring Drug Policy Outcomes: The Measurement of Drug-related Harm*, The Beckley Foundation, Report Nine.

Shanahan M, Seddon J & Ritter A (2015). Exploring the economic costs to family members affected by drug use: A discrete choice experiment, Drug Policy Modelling Program, UNSW, Accessed 30 December 2015 at **https://dpmp.unsw.edu.au/project/exploring-economic-costs-family-members-affected-drug-use-discrete-choice-experiment**.

Slack A, O'Dea D, Sheerin I, Norman D, Jiani Wu & Nana G (2008). *New Zealand Drug Harm Index,* BERL report for the New Zealand Police.

Stevens, A. (2008). Weighing up crime: The overestimation of drug-related crime, *Contemporary Drug Problems*, 35(2/3), 265.

United Nations Office on Drugs and Crime (2005). World Drug Report 2005, United Nations publication, E.05.XI.10.

United Nations Office on Drugs and Crime (2006). World Drug Report 2006, United Nations publication, E.06.XI.10.

Wilkins C, Prasad J, Moewaka Barnes H, Romeo J S & Rychert M (2016). *New Zealand Arrestee Drug Use Monitoring 2016*, SHORE & Whariki Research Centre, Massey University.

Appendix One:
Conceptual framework

This section sets out the general framework used for the research. The current framework is heavily dependent on the DHI 2016 framework (pp 11–15). The framework identifies the burden of illicit drug use through the inclusion of estimates of harm to family and friends and a re-evaluation of crimes attributable to drug use.

Personal harms include poor health, injury, psychological trauma, poor interpersonal relationships, loss of income, loss of lifestyle, arrest and imprisonment. The fact these outcomes can be identified as separate harms does not necessarily mean they should be measured separately. Actual measures of personal harm used in this report included the cost of premature death and the cost of years of life lost through drug-related disability. Both these measures incorporate a range of personal harms (Ministry of Transport, 2019; Murray et al, 2012). As with Slack et al (2008), this report did not consider the potential personal benefits of illicit drug use due to the difficulties related to quantification.

The majority of DHIs have used a prevalence approach to calculating harms, as is common in burden of disease studies. The approach is explained by Slack et al (2008):

> The prevalence approach estimates resource diverted in a given year due to the impacts of past and present illicit drug use. The costs estimated using the prevalence approach are then compared to a counterfactual situation, in this case where no illicit drugs were ever used. That is, in order to determine the harm avoided by reducing drug consumption we compare the current situation with drug use to a hypothetical case where there is no harmful drug use. (…) The prevalence approach has the advantage of using currently available health data, such as mortality and morbidity figures related to illicit drug use, to define what a counterfactual population would have looked like today. This is likely to result in more robust estimates than under the major alternative approach based on incidence.

Here, incidence is the preferred and adopted approach for calculating harms. This approach uses data from a defined period (normally a year) to estimate harm and answers the question ‘How much harm is current drug use causing now and likely to cause in the near future?’. Making it of more interest to government, policy makers, practitioners and the community. The prevalence approach is primarily a historical one and calculates the harm that could have been avoided had illicit drugs never existed; answering the question ‘How much harm has historical illicit drug use caused?’.

In summary, the current method included many of the building blocks used in the previous version of the New Zealand Drug Harm Index. Changes were minimal and were mainly related to improved data sources to underpin the analysis.

Appendix Two:

Tables with incorrect numbers previously published in the DHI 2020

Please note this information is provided for transparency and should not be relied upon for analysis.

Table 7i. Estimated annual consumption of illicit drugs in New Zealand 2019

Drug type	Total consumption (kg)
Methamphetamine	171
Cocaine	12
MDMA	87
Cannabis	58,000

Table 8i. Personal harms by drug type ($ million)

Drug type	Premature death	Quality of life		Total harm
		Serious injury	Minor injury	
Methamphetamine	244.47	151.65	8.11	404.23
Cocaine	4.53	1.59	0.33	6.45
MDMA	15.85	5.37	2.32	23.54
Heroin	18.11	0.00	0.13	18.24
GHB/GBL	0.00	0.83	0.30	1.13
Cannabis	124.50	149.07	7.51	281.08
Synthetic cannabinoids	76.96	0.91	0.48	78.35
Total	484.42	309.42	19.17	813.01

Table 9i. Community harms by drug type ($ million)

Drug type	Harm to family and friends	Acquisitive crime	Reinvestment in other crime	Tax revenue foregone	Total harm
Methamphetamine	254.24	96.30	3.01	11.76	365.32
Cocaine	2.66	1.01	0.24	0.95	4.87
MDMA	9.01	3.41	0.77	2.99	16.17
Heroin	*	*	*	*	*
GHB/GBL	1.39	0.53	*	*	1.92
Cannabis	249.91	94.66	57.42	224.46	626.45
Synthetic cannabinoids	1.52	0.58	*	*	2.10
Total	518.74	196.48	61.44	240.16	1,016.83

* Insufficient data for an estimate to be made.

Table 10i. Summary of social harms ($) per kilogram by drug type

Drug type	Personal harm $ per kilogram	Community harm $ per kilogram	Total harm $ per kilogram
Methamphetamine	2,364,073.01	2,136,479.42	4,500,552.43
Cocaine	547,789.46	413,382.17	961,171.63
MDMA	270,685.88	186,011.15	456,697.02
Cannabis	4,846.18	10,800.87	15,647.06

Table 11i. Summary of social harms by drug type ($ million)

Drug type	Personal harm $ million	Community harm $ million	Total harm $ million
Methamphetamine	404.23	365.32	769.55
Cocaine	6.45	4.87	11.31
MDMA	23.54	16.17	39.71
Heroin	18.24	*	18.24
GHB/GBL	1.13	1.92	3.05
Cannabis	281.08	626.45	907.53
Synthetic cannabinoids	78.35	2.10	80.45
Total	813.01	1016.83	1,829.84

* Insufficient data for an estimate to be made.

^ Partial estimate due to insufficient data.

Summary of changes to the background modelling

The majority of corrections stem from the miscalculation of wastewater totals (Table 2i). In addition, theft and burglary figures are now taken from victimisation totals on the Police website[23] rather than internal Police occurrence totals, leading to minor changes in **Acquisitive crime** figures. Any other minor corrections are due to rounded numbers being replaced by exact numbers in the background modelling.

[23] Source: https://www.police.govt.nz/about-us/publications-statistics/data-and-statistics/policedatanz/victimisation-time-and-place