

The Economic Cost of Methamphetamine Use in the United States, 2005

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Preface

This monograph presents the first national estimate of the economic cost of methamphetamine (meth) use in the United States. Our analysis suggests that the economic cost of meth use in the United States reached \$23.4 billion in 2005. Given the uncertainty in estimating the costs of meth use, this study provides both a lower-bound estimate of \$16.2 billion and an upper-bound estimate of \$48.3 billion.

The analysis undertaken to generate these estimates considers a wide range of consequences due to meth use, including the burden of addiction, premature death, drug treatment, and aspects of lost productivity, crime and criminal justice, health care, production and environmental hazards, and even child endangerment. There are other potential harms due to meth, however, that could not be included either due to a lack of scientific evidence or due to data issues. Although meth causes some unique harms, the study finds that many of the primary cost drivers are similar to those identified in economic assessments of other illicit drugs. Among the most costly elements are the intangible burden of addiction and premature death, which account for nearly two-thirds of the economic costs. The intangible burden of addiction measures the lower quality of life (QoL) experienced by those addicted to the drug. Crime and criminal justice costs also account for a significant share of economic costs. These costs include the burden of processing and incarcerating drug offenders as well as the costs of additional nondrug crimes generated by meth use. Other costs that significantly contribute include lost productivity, the costs of removing a child from his or her parents' home due to meth, and the cost of drug treatment. One unusual cost captured in the analysis is the cost associated with the production of meth. Producing meth requires toxic chemicals that can result in fire, explosions, and other events.

The study was sponsored by the Meth Project Foundation, a nonprofit group dedicated to reducing first-time meth use. Additional research support was provided by the National Institute on Drug Abuse.

The RAND Drug Policy Research Center

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Questions or comments about this monograph should be sent to the project leader, Rosalie Liccardo Pacula (Rosalie_Pacula@rand.org). Information about the Drug Policy Research Center is available online (<http://www.rand.org/multi/dprc/>). Inquiries about research projects should be made to the center's co-directors, Rosalie Liccardo Pacula (Rosalie_Pacula@rand.org) and Beau Kilmer (Beau_Kilmer@rand.org).

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Summary

After marijuana, amphetamines are the most widely used illicit drug worldwide (UNODC, 2008). The United Nations estimates that amphetamine users nearly equal the number of cocaine and heroin users combined (25 million versus 28 million). In the United States, the recent increase in the prevalence of amphetamines, particularly methamphetamine (meth), is cause for concern. The meth situation in the United States is a complicated story of conflicting indicators, however. On the one hand, national reporting systems monitoring drug use among household- and school-based populations suggest that meth is a relatively minor drug of concern (NSDUH, 2006; Johnston and O'Malley, 2007). According to the National Survey on Drug Use and Health (NSDUH), only 0.5 percent of the household population reported use in 2005, far below prevalence rates for marijuana and cocaine and slightly lower than those for heroin (NSDUH, 2006). Similarly, reports from high-school seniors suggest that meth abuse is relatively minor, with annual prevalence rates in 2005 of just 2.5 percent as compared with rates of 5.1 percent for cocaine, 9.7 percent for hydrocodone (e.g., Vicodin®), and 33.6 percent for marijuana (Johnston and O'Malley, 2007).

On the other hand, regional data systems, law-enforcement agencies, and county hospitals indicate that meth is the most significant problem facing the populations they serve (NDIC, 2007b; NACO, 2005, 2006; NIDA CEWG, 2005). According to information reported by the National Institute on Drug Abuse Community Epidemiology Work Group, in 2004, meth was the primary drug of abuse in 59 percent of treatment admissions in Hawaii, 51 percent of treatment admissions in San Diego, and 38 percent of treatment admissions for the entire state of Arizona. (These percentages all exclude treatment for alcohol abuse.) In 2005, 39.2 percent of reporting state and local law-enforcement agencies cited meth as their greatest drug threat, exceeding the percentage reporting cocaine and crack to be the greatest threat (35.3 percent) (NDIC, 2007a).

While it is clear that the prevalence of meth problems is greater in western and rural states, there is evidence of a national problem. Data from the Treatment Episode Data Set (TEDS) show that treatment admissions for meth more than doubled nationally between 2000 and 2005 (NDIC, 2007b). Growth in amphetamine-related treatment admissions, which are dominated by meth, increased in every region between 1992 and 2005. Furthermore, information from the 2005 Drug Abuse Warning Network (DAWN), which monitors drug-related emergency-department (ED) episodes, reveals that stimulant-related admissions, including those due to meth, are just as likely as heroin admissions nationally once the margin of statistical error is taken into account. Yet, meth remains far less part of national discussions than are cocaine, heroin, marijuana, and prescription-drug abuse. Meth has not been the focus of media campaigns like the Marijuana Prevention Initiative. And only with the 2006 reautho-

rization did the National Youth Anti-Drug Media Campaign require that at least 10 percent of the fiscal year 2007 appropriation focus on reducing meth use.

Meth is a highly addictive substance that can be taken orally, injected, snorted, or smoked. When smoked or injected, the user immediately experiences an intense sensation followed by a high that may last 12 hours or more. Concerns about meth use arise from its highly addictive nature and its association with a number of adverse physical effects, including hypertension and other cardiovascular effects, seizures and convulsions, pulmonary impacts, and dental damage. Users also suffer psychological effects, such as anxiety, irritability, and loss of inhibition, which can lead to risky sexual and other types of behavior. Meth users who inject the drug expose themselves to additional risks related to injection-drug use, including contracting human immunodeficiency virus (HIV), hepatitis B and C, and other bloodborne viruses. Meth production imposes additional health risks on users and nonusers alike. The process for producing meth, a synthetic substance, is hazardous and susceptible to fire and explosion. Moreover, the production of each pound of meth results in 5–6 pounds of toxic by-product. As a result, health and environmental effects may also follow from the production process. Despite the documented harms associated with use, research to date has not attempted to quantify the social cost or burden this drug places on society today.

In this monograph, we attempt to fill the void by building the first national estimate of the economic burden of meth use, based on information available for 2005. We chose to focus on estimating the burden in 2005 because it is the most recent year for which we were able to obtain the data necessary to construct our estimate. Unlike data for other substances of abuse, the data necessary to build such an estimate nationally are far from complete or comprehensive. Furthermore, the scientific literature has yet to develop consistent evidence of causal associations for many of the harms that meth is believed to cause. Thus, calculation of the cost of consequences must be necessarily imprecise, as it can only reflect the state of the knowledge available today, which will change as more research is done in particular areas. To capture the relative imprecision of what is actually known today, we produce lower and upper bounds of all our point estimates. The variation represented in these lower- and upper-bound estimates reflects, in some instances, sampling variability in data sets that are available and, in other instances, the lack of data from which to obtain a precise point estimate. Despite this variability, we attempt to generate a best estimate of these costs based on what we understand of the science today. But we also point out that there are many cost areas that contribute to the economic burden that we are unable to measure and hence have to exclude from our calculations.

Our results are surprising for a substance that has received limited national attention. Even before monetizing the consequences associated with meth use, we see in Table S.1 that the toll in terms of premature death and lost well-being, as measured in quality-adjusted life-years (QALYs), is substantial. We estimate that meth use was responsible for nearly 900 deaths in 2005 and resulted in a total loss of more than 44,000 QALYs. According to data from the DAWN mortality publications, there were far more meth-related deaths than marijuana-related deaths in any given year (SAMHSA, 2007b). Yet, marijuana has remained the focus of the national antidrug campaign (ONDCP, 2008).

Following previous cost-of-illness (COI) studies estimating the burden of other substances of abuse, we consider in this monograph the cost of numerous consequences associated with use, including the cost of meth treatment, the excess health care service utilization

Table S.1
The Burden of Methamphetamine in 2005 in Terms of Premature Death and Lost Quality of Life

Burden	Lower Bound	Best Estimate	Upper Bound
Premature mortality	723	895	1,669
Lost QALYs	32,574	44,313	74,004

associated with meth use and dependence, productivity losses due to the drug, and the cost of meth-associated crime. In contrast to previous COI studies, however, this monograph also considers the cost to society associated with the production of meth, the intangible burden borne by those addicted, and child endangerment.

Using the national data available on each of these cost consequences, our best estimate of the economic burden of meth use in the United States in 2005 is roughly \$23.4 billion (Table S.2). This figure includes the estimable costs associated with drug treatment, other health costs, the intangible burden of addiction and premature death, lost productivity, crime and criminal justice costs, child endangerment, and harms resulting from production.

Many of our estimates are subject to substantial uncertainty, however, so for all of our estimates, we provide lower- and upper-bound estimates that help us better understand where paucity of data or scientific research might influence the credibility of our single point estimate. The degree of uncertainty, as indicated by these lower and upper bounds, varies considerably across cost components, with some categories showing much greater uncertainty than others (see Table S.2). When considered together, the uncertainty about each component contributes to the uncertainty about the total. Taking this aggregation of uncertainties into account, we estimate that the true economic burden is likely to be in the range of \$16.2 billion to \$48.3 billion.

In reviewing the key contributors to the total estimated costs, we found that most of meth's costs are due to the intangible burden that addiction places on dependent users and to premature mortality. We estimate the cost associated with these losses at \$16.6 billion, representing nearly two-thirds of our total cost estimate. The majority of these costs are due to the intangible cost of addiction (\$12.6 billion). That number is the product of the number

Table S.2
Social Costs of Methamphetamine in the United States in 2005 (\$ millions)

Cost	Lower Bound	Best Estimate	Upper Bound
Drug treatment	299.4	545.5	1,070.9
Health care	116.3	351.3	611.2
Intangibles/premature death	12,513.7	16,624.9	28,548.6
Productivity	379.4	687.0	1,054.9
Crime and criminal justice	2,578.0	4,209.8	15,740.9
Child endangerment	311.9	904.6	1,165.7
Production/environment	38.6	61.4	88.7
Total	16,237.3	23,384.4	48,280.9

NOTE: Due to rounding, numbers may not sum precisely.

of people dependent on the drug and the monetary value of the lost quality of life (QoL), measured by a reduction in QALYs. The estimate is subject to great uncertainty, because of assumptions underlying our upper- and lower-bound estimates of the number of people dependent and the valuation of their lost QALYs. The remaining cost (\$4.0 billion) is due to premature mortality among users. The uncertainty in this estimate is also significant, reflecting the variation in assumptions as to which deaths are attributable to meth. Moreover, we caution that both of these estimates depend on the value placed on a lost life, which, based on the literature, we take to be \$4.5 million. We use \$4.5 million as the value of a life rather than ascribe a range of estimates, but we provide our estimates of the number of events so that the reader may recalculate the associated costs with alternative valuations.

Crime and criminal justice costs represent the second-largest category of costs at \$2.5 billion to \$15.8 billion and a best estimate of \$4.2 billion. Meth-specific offenses represent more than half of these costs, totaling \$2.4 billion. These are the costs associated with processing offenders for the possession and sale of meth. Meth-induced violent and property crimes that are generally attributable to actions of people under the influence of meth or in need of meth represent an additional \$1.8 billion in costs. Finally, an additional \$70 million is due to parole and probation violations for meth offenses. It is possible that these costs are significantly underestimated, however, as the scientific literature regarding the causal association between meth and property and violent crime is inconclusive. We conducted our own analyses to explore the causality and association and, in our best estimate, find sufficient support to include an estimate of meth-induced property crime, but not violent crime. The very large bounds on this element are due to alternative assumptions of causality that warrant additional research.

Costs associated with productivity losses represent another substantial category of costs. The best estimate for total productivity losses is \$687 million. Most of the productivity losses are due to absenteeism (\$275 million) and incarceration (\$305 million). Smaller contributors are the costs due to a lower probability of working among meth users (\$63 million) and the cost of employer drug testing (\$44 million). We do not attempt to estimate any losses embodied in the potential changes in wages paid to meth users *vis-à-vis* nonusers. Nor can we include any estimates of the higher health care and workers' compensation costs paid by employers because of employees' meth use.

We calculate the costs associated with drug treatment at approximately \$545 million, almost all of it in the community-based specialty treatment sector (\$491 million). The total also includes \$39 million of federally provided specialty treatment, almost entirely through the Indian Health Service (IHS) and the U.S. Department of Veterans Affairs (VA), and \$15 million for treatment received in general short-stay hospitals. We did not have access to data on the cost of treatment received in the general, non-hospital-based medical sector, so these costs are omitted.

We estimate approximately \$351 million for additional health care costs among meth users. These include \$27 million for hospital admissions induced by the use of meth, \$14 million for the incremental costs of caring for patients admitted for another cause but whose conditions are exacerbated by meth use, \$46 million for ED care of meth patients not admitted to the hospital, and \$14 million for hospital inpatient care of suicide attempts to which meth use is a likely contributor. The largest contribution is an additional \$250 million for health administration and support. The health care total is likely an underestimate because it includes only the incremental costs for other conditions even though a share of those conditions may have been caused by meth and meth-induced behaviors.

Child-endangerment costs are estimated at \$905 million. Our estimates are limited to children who are removed from their homes by the foster-care system, so these costs are likely an underestimate of the full burden of meth abuse. Substance abuse is a key contributing factor in two-thirds of those removals, though we must make some assumptions about the specific role of meth. The largest contributor to these costs is the medical, mental, and QoL losses suffered by children (\$502 million), though the burden on the foster-care system is similar in size (\$403 million). The substantial uncertainty derives from the uncertainty regarding how many of those substance-associated removals are related to meth and our inability to measure accurately the cost of these episodes.

Potentially unique costs of meth are the harms associated with production. We estimate the social costs associated with the meth-production process at \$61 million. About half of those costs are due to injuries and deaths from hazardous-substance events, such as explosions and fires (\$32 million). About half the casualties are suffered by responding emergency personnel, but the more serious and costly events are not suffered by first responders. The other half of the production costs are due to cleanup of hazardous wastes at discovered laboratory facilities (\$29 million). The substantial range—from \$39 million to \$89 million—results largely from uncertainty in estimating the number of deaths attributable to meth production.

While our methods are not completely comparable to those of other prevalence-based COI studies for the abuse of other drugs or drugs in general (e.g., Mark, Woody, et al., 2001; ONDCP, 2004b), our results are similar in a few key ways. The major cost drivers for meth, if we ignore the intangible burden of addiction (which is omitted from other estimates of the cost of drug use), are similar to those for other illicit drugs, with losses associated with premature death and crime being major components. Importantly, if we take out the intangible cost of addiction from our estimate (representing \$12.6 billion), our revised estimate of the total economic burden of meth use (\$10.8 billion) represents 5.5 percent of the total cost of illicit drug use in the United States reported by the ONDCP (2004b). While this might seem like a small fraction, it represents a greater share of the economic burden than simple consumption rates would suggest. According to annual prevalence data from the NSDUH, meth users represent only 3.7 percent of all illicit-drug users (NSDUH, 2006). If we use our upper-bound estimate of the cost of meth use (still excluding intangibles), we find that meth users represent 7.2 percent of the total cost of illicit drug use, approximately twice the burden suggested by consumption alone.

If we consider the cost per meth user, our best estimate translates into \$26,872 for each person who used meth in the past year or \$74,408 for each dependent user. The per capita cost, like our overall estimate, is sensitive to the inclusion of the intangible burden of addiction. If we ignore this intangible cost, the costs in the past year for each user and meth-dependent user are appreciably smaller at \$12,395 and \$34,322, respectively. This suggests that the average cost per heavy meth user (ignoring intangible cost of addiction) is at least 75 percent of the estimated average cost per heroin addict in 2005 dollars (Mark, Woody, et al., 2001).

While this monograph highlights key components of the costs of meth that we were able to quantify, further research is needed in a number of areas before a true accounting of the full economic burden can take place. Throughout this monograph, we identify and (whenever possible) provide evidence on the potential magnitude of various cost components that we are unable to include explicitly in our estimate because of data issues and inconclusive science regarding causality. These are obvious areas in which more research would be fruitful. Specific areas that are likely to translate into substantial costs in terms of the overall burden

include meth-associated crime, child endangerment in non-foster-care settings, employer costs of hiring meth workers, and health care costs associated with treating meth-induced health problems. Estimates of the total cost and its components do not provide adequate information to inform policymakers regarding the most effective policies to reduce the harms associated with meth use. More research should be conducted to identify cost-effective strategies for dealing with the problem and reducing particular harms associated with use.

In developing policies to address meth, it is also important to recognize the key differences between meth and other substances, such as the harms to persons and the environment that result from meth's unique production process, of which only a fraction are estimated here. Of course, this monograph can only highlight the key components of the costs of meth, in the hope that these will be more salient to policymakers and that their attention will be directed to the more important aspects of the problem. This research cannot directly support one policy or another. Further research is needed to inform policymakers on the most effective strategies to reduce these harms.

A final insight from this study is that, in the case of meth abuse, we should be cautious interpreting evidence from national household surveys and school-based studies as indicators of the problem. Clearly, the burden of meth abuse is substantial, far exceeding what would be implied by simple prevalence measures from either of these populations. Moreover, as is the case with other substances of abuse, it is probably not the recreational meth user who imposes the greatest burden on our society, but rather those who become addicted, engage in crime, need treatment or emergency assistance, cannot show up for work, lose their jobs, or die prematurely. These are the individuals who impose the greatest cost on society, yet they are also generally populations that are not adequately captured in household- or school-based surveys.

Introduction

Methamphetamine (meth), together with cocaine, heroin, and marijuana, is one of the four illegal drugs of most consequence in the United States today. Although lifetime and annual prevalence rates for meth use in the household population are 5 percent and 0.5 percent, respectively (NSDUH, 2006), meth use and abuse have risen substantially in the United States during the past 15 years. From 1992 to 2005, meth-related treatment admissions increased more than tenfold. This increase is due to both significant geographic expansion from west to east and demographic expansion of meth users.

Meth use remains a more significant problem in western states, though states in the Midwest and South contribute a large share of treatment admissions for meth. Western states comprise 65 percent of primary meth treatment admissions nationally, while the Midwest and South contribute 19 percent and 15 percent, respectively (SAMHSA, 2008b). Amphetamine-related treatment admissions also increased by 920 percent in the Midwest, 560 percent in the South, 455 percent in the West, and 45 percent in the Northeast between 1992 and 2002 (Dobkin and Nicosia, forthcoming). Although meth use was originally highly concentrated among white men, users are now increasingly female and Hispanic. The emergence of meth is also a significant concern for the criminal justice system. The majority of county law-enforcement agencies now report meth as their primary drug problem (NACO, 2005). Moreover, the share of meth-related treatment admissions referred by the criminal justice system is approximately 50 percent higher than for other substances (SAMHSA, 2008b).

Concerns about meth use arise from its association with a number of adverse physical and psychological effects. Meth users suffer from a wide variety of physical symptoms, including headaches and chest pain (Rawson, Huber, et al., 2002; Rawson, Anglin, and Ling, 2002). Use has also been associated with mental health events, such as hallucinations, paranoia, and violent behavior (Rawson, Huber, et al., 2002; Rawson, Anglin, and Ling, 2002; NIDA, 2002). There is also concern that meth-related reductions in inhibition can result in an increase in injuries and sexually transmitted diseases (Sheridan et al., 2006; Schepens et al., 1998; Winslow, Voorhees, and Pehl, 2007; Shoptaw et al., 2003; Lyons, Chandra, and Goldstein, 2006).

Furthermore, meth use is supplied by a production process unique among major drugs. Meth is a synthetic substance produced by numerous labs in a hazardous process susceptible to fire and explosion. Although many of the superlabs¹ have migrated to Mexico in response to tougher precursor-chemical laws, meth production continues in the United States. In addition, the production of each pound of meth results in 5–6 pounds of toxic by-product (DEA,

¹ *Superlabs* are defined as those capable of producing 10 pounds or more of meth per production cycle. See NDIC (2005).

undated). As a result, health and environmental effects may follow from meth production, which may affect users, nonusers, and the environment.

While estimates have been made of the overall social costs of drug abuse, with several studies examining the specific costs of heroin and cocaine, no estimate has yet been forthcoming for meth alone. Such a cost estimate would be useful for several reasons. First, the estimated cost burden of meth would provide policymakers with valuable information regarding the magnitude of the social burden that this particular drug, as compared with other drugs of abuse, imposes on society. This information will be useful for guiding resource-allocation decisions regarding where to spend limited drug-prevention and drug-enforcement dollars. Second, it could provide insight regarding the need for new policy approaches aimed at reducing the unique harms imposed by meth production and abuse that may not be common with other illicit drugs. Third, it could provide policy analysts with valuable information relevant for the construction of cost-effectiveness analyses evaluating alternative strategies to reduce the problem of meth abuse.

With these benefits in mind, RAND researchers embarked on an effort to calculate the annual economic burden of meth in the United States. Considering the potentially broad scope of this task and the availability of reliable data and literature, we focused on estimating the costs associated with the following:

- meth treatment that is delivered in general, short-stay hospitals and the specialty treatment sector
- health services used in the treatment of medical conditions attributed to or exacerbated by meth use, such as overdose, acute respiratory and cardiovascular problems, accidents and injuries, meth-exposed infants, and mental health conditions
- lost productivity due to absenteeism, unemployment, or premature death
- crimes attributable to meth use as well as criminal justice costs associated with enforcing meth laws
- environmental and personal harms resulting from meth-related production
- meth-related child endangerment, including the burden on the foster-care system, due to parental involvement with meth
- intangible cost of meth addiction.

While we recognize that these domains do not capture all the costs associated with meth use, they represent those components for which we believe that reasonably good data are available and for which a preliminary national estimate could be built. Although other domains are not included in the cost estimate, we make an effort to provide some evidence on their scope.

The calculations provided in this monograph represent an assessment of these costs based on measures of the problem and consequences in 2005. To the extent that use has changed since 2005, the scope of the corresponding costs will follow. But the costs associated with this use will not necessarily increase or decrease proportionally with the level reported in this monograph, as specific costs are tied to particular types of use (e.g., dependence versus regular use) as well as assumptions regarding how that use translates into harms (e.g., crime). For example, the cost of lab cleanup may be declining with a reduction in lab busts, but crime among meth users may be on the rise. Similarly, the fraction of the meth-using population that is represented by dependent or heavy users may change in proportion to light users, thereby affecting costs differentially.

General Approach to the Study

We take a prevalence-based, cost-of-illness (COI) approach to identifying and measuring the costs associated with meth use. This approach generates a monetary value of the economic burden to society in a given calendar year and considers the direct, indirect, and intangible costs associated with meth use and treatment of the problem in that calendar year (Rehm et al., 2007; Harwood, Fountain, and Livermore, 1998; Rice et al., 1990). The prevalence-based COI approach has been used to estimate the cost burden of various physical and mental health conditions, such as asthma, diabetes, and depression, as well as drug use.

COI studies have come under increasing criticism by academics for a variety of reasons. First, they tend to provide a single point estimate of the measure of the problem in a manner that suggests more precision than what is actually inherent in these calculations (Reuter, 1999; Moore and Caulkins, 2006). Rarely are estimates of the degree of a causal relationship, the cost of treating a medical condition, or the fraction of the population affected known with certainty. Second, because COI estimation is embedded in the medical literature, which has traditionally resisted placing a dollar value on pain and suffering, the calculations omit values for these intangible costs even though the research shows they exist. The resistance to assigning monetary values to these intangible costs places health problems at a distinct disadvantage when compared with programs that have other social or economic impacts, as traditions in these literatures are much more likely to include estimates of the intangible costs. For example, in the crime literature, it has been shown that the intangible costs of crime are frequently more than three times the estimated tangible costs (T. Miller, Cohen, and Wiersema, 1996). Third, COI studies applied to substance abuse in particular are inconsistent in their treatment of future costs associated with use of the drug today. While it is common practice to include the full net present value of future lost productivity associated with a premature death caused by drug use in the period in which it occurs, the future costs of incarcerating a person caught in possession or selling a drug today, for example, is not fully considered. Finally, while COI estimates may provide information on the total magnitude of a problem for society, they say little about who bears the brunt of those costs (government, families, or the user). Without knowledge of who bears the burden of these costs, it is difficult to make policy recommendations regarding appropriate places for government to step in.

We attempt to address some of these limitations of prior COI studies. Specifically, when possible, we attempt to capture the uncertainty related to the causal attribution by providing high and low estimates of the causal association between meth and these specific outcomes when the literature or our own analyses support such an approach. In doing this, we produce a range of estimates that enable us to capture the uncertainty inherent in the construction of our estimate as well as in the data that underlie these estimates. Further, in our estimates, we include an estimate of the intangible health burden associated with living with addiction and the welfare loss associated with sending a child to foster care. In addition, we treat criminal justice costs in a manner consistent with the losses associated with premature death, by incorporating the full net present value of future expenditures associated with a current arrest or conviction today.² Finally, in the last chapter, we provide some context for our findings and draw a distinction between those costs that are borne by the individual and those that are borne by

² It is not possible, however, to include the full present costs for components that are less understood, such as long-term health problems of those convicted.

society, so as to facilitate policy recommendations and to guide policymakers regarding areas in which different policies might reduce the cost to society in general.

A key element of this study is identifying when or how much of each cost should be attributed to meth. Unlike research on other substances of abuse, established attribution factors for meth-specific diseases or other harms are not available.³ Therefore, we must infer attribution fractions from the scientific literature or from our own analysis of existing data.

When constructing estimates from our own examination of existing data, we discovered a number of methodological issues that are important to keep in mind. First, the data sources used in the analyses identify meth with varying levels of precision. Some identify only stimulants, others only general amphetamines, and still others identify meth use specifically. When meth is not identified separately from other stimulants and amphetamines, we make adjustments to the totals so that our estimates reflect only what we believe to be meth-specific cases. A second problem is the inconsistent measurement of meth use across the data sets. Some data sources capture any use of meth in the past month or year, while other data sources capture more involved measures of use, such as dependence or abuse within a one-year time frame. This creates problems in trying to identify the costs associated with a particular type of use consistently across data sets. Because this work focuses on the costs associated with any meth use, we do our best to use the most appropriate measure that is tied to a given outcome (e.g., meth dependence when looking at drug treatment, meth use when looking at productivity effects). A third and more difficult data problem is that often we are given only the total budget allocated to an issue (e.g., substance abuse treatment, law enforcement) and very little about how those funds are used, specifically those targeting meth users or meth harms. In these cases, we again attempt to use data from outside sources to help us ascertain a reasonable allocation of these total budgets, but our estimates are fundamentally based on assumptions that allocations are made consistently with the data we use.

Clearly, our attempts to deal with these challenges add some imprecision to the estimates we generate. We attempt to highlight this imprecision through the presentation of lower and upper bounds of our best point estimates. But the bounds are influenced by more than just the imprecision related to the issues mentioned here. There are two additional sources of uncertainty underlying the estimates presented in this monograph. The first is statistical uncertainty. Statistical uncertainty comes from sampling and model parameter variation that is natural whenever a probabilistic sample is used to infer information about an entire population. Statistical uncertainty is traditionally demonstrated in statistical analyses through the use of 95-percent confidence intervals, which specify—under the assumption of normality—that the actual population value should be within the range provided by the interval 95 percent of the time.

A second form of uncertainty influencing our estimates, to which we will refer as structural uncertainty, arises from factors influencing the reliability of estimates, regardless of the sample from which they are drawn. For example, when pulling estimates from the literature regarding the value of a crime or a lost life or the average cost for a given length of stay (LOS) for treatment, there are substantial ranges reported. Without having access to the original data from which these are constructed, we are left to infer ranges from those reported in the data.

³ For example, Popova et al. (2007) and Collins and Lapsley (2008) provide morbidity-attribution factors for other substances.

While we recognize that these adjustments do not address all the criticisms raised regarding the COI approach, they represent a significant improvement over prior analyses of the cost of illicit drugs in the United States.

Included and Excluded Costs

In addition to explicitly addressing some of the criticisms raised about the COI methodology, this monograph differs from previous estimates of the cost of illicit drug use in that it includes costs that are specific to meth, such as production-related incidents that are never directly considered in general estimates of the cost of drug abuse. Similarly, we explicitly consider the issue of child endangerment, which is so clearly a potential cost of both meth production and meth use when the persons involved are parents. As is indicated in Chapter Two, these meth-specific costs are not trivial. Nevertheless, there are some categories of costs that should be captured in a full assessment of the cost of meth use that are not reflected in our estimate because data are not available on the prevalence or cost of these events. Table 1.1 provides an overview of the cost components that we are able to include and the specific components not included. There may well be additional cost components that are not included. The reasons for exclusion of specific elements are discussed in the chapters that follow. When suitable data sources were not available to generate cost estimates, we make an effort to provide evidence that speaks to the potential scope of the component whenever possible but do not provide direct estimates.

Finally, in some cases, we can include only the current costs associated with use. As is the case for many other COI studies, the longer-term implications are generally less understood and therefore difficult to quantify.

Table 1.1
Costs Included in and Excluded from the Study

Cost	Included	Not Included (NI)
Drug treatment		
Care received in specialty sector	x	
Care received in general hospitals	x	
Other care received in general medical setting		x
Other care received through the U.S. Department of Veterans Affairs (VA), Indian Health Service (IHS), Federal Bureau of Prisons, U.S. Department of Defense (DoD)	x	
Excess health service utilization		
Care received in hospital settings	x	
Care received in other medical settings		x
Dental		x
Health infrastructure	x	
Intangible costs associated with dependence	x	

Table 1.1—Continued

Cost	Included	Not Included (NI)
Productivity losses		
Associated with premature death	x	
Reduced income associated with meth use		
Due to increased unemployment	x	
Due to fewer hours worked	x	
Due to treatment-related absenteeism	x	
Due to other meth-involved absenteeism	x	
Due to lower wages		x
Lost productivity due to incarceration	x	
Employer costs		
Drug testing	x	
Work-related injury		x
Higher health care and benefit costs		x
Crime		
Arresting and adjudicating users and sellers	x	
Property and violent crime by meth users (includes intangible costs)	x	
Nonindex and nondrug crime (e.g., identity theft)		x
Incarceration for misdemeanor possession		x
Crime and violence related to meth market	x	
Harms related to meth production		
Environmental cleanup	x	
Physical injury and death	x	
Additional waste		x
Personal decontamination, shelter, and evacuation		x
Child endangerment		
Foster-care placement	x	
Child malnutrition and victimization	x	
Other costs (e.g., adoption)		x

Organization of This Monograph

Each chapter of this monograph attempts to quantify the identified meth-related costs in a particular area (e.g., health care, productivity, crime, child endangerment, production). The chapters begin with a summary of findings followed by a review of the peer-reviewed scientific

literature supporting an association between meth and particular outcomes captured within that chapter. In many places, although the science suggests a relationship between meth and particular outcomes, no cost estimates can be constructed, because the data are insufficient for doing so. It is important that the omission of these costs is not misinterpreted as an inference that the costs are small or zero. Indeed, we dedicate an entire chapter (Chapter Nine) to a discussion of some potentially plausible magnitudes of these costs under differing assumptions and whether their omission is likely to be a large or small factor in terms of the overall estimate. Within the specific chapters, however, we simply note their omission so that the estimates we produce are based on the strongest science available. The specific methods, data sets, and assumptions used to generate these estimates are all contained in the individual chapters, although technical regression results supporting parameters used in estimate construction within the chapter are placed in the appendixes. We conclude the monograph with a discussion of the magnitude of these costs vis-à-vis other substances of abuse and what we can infer regarding who bears the burden of these costs.

We add just a final word of caution regarding the information provided in this monograph. The information is based on the best available national data and the state of the science at the time we wrote this. Given the relatively early stages of the meth epidemic in some states, we anticipate that the knowledge base will change substantially in the next few years, warranting a reconsideration of these costs and updating of these estimates. These are costs based on incidences of meth-related problems in 2005, which will not be reflective of the problem in 2008 or 2010, given that this is an evolving social issue.