

**The Economic Burden of Crime and Substance Abuse for Massachusetts and the City of
Boston***

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Annual Spending on Crime and Substance Abuse: Boston and Massachusetts (2008)

	Substance Abuse	Crime
Total state spending	\$5.87 billion	\$1.68 billion
State spending in the City of Boston	\$0.51 billion	\$0.34 billion
City of Boston spending	\$0.17 billion	\$0.25 billion
Total spending in the City of Boston	\$0.68 billion	\$0.59 billion

Deviant behavior by Boston’s juvenile and adult population is a significant social problem.

Substance abuse is highly prevalent: among Boston youth, approximately one-in-five will have taken an illicit drug within the last month and these youth are one-in-six of all hospital discharges for opioid dependence. Juveniles commit one-in-six violent crimes and over one-in-five of all property crimes across the state. Across all age groups, one-in-five crimes within the City of Boston is committed by juveniles.

The fiscal burden to the City of Boston from substance abuse and crime is substantial.

The fiscal burden is the amount taxpayers pay to address the public consequences of substance abuse. It is calculated using City, state, and federal government data.

- Each moderate substance abuser will impose a lifetime fiscal burden on the City of Boston taxpayers of \$40,500 in city government expenditures.
- For each chronic substance abuser the City of Boston taxpayer faces a fiscal burden of \$76,000 in city government expenditures alone.

The economic burden to the City of Boston from juvenile and adult crime is also significant.

The economic burden is the amount taxpayers and citizens pay to address the social consequences of juvenile crime (committed during the ages 12-17).

- Each moderate male juvenile offender imposes direct costs on the City of Boston taxpayers of \$9,600.
- Each chronic male offender imposes a direct fiscal burden of \$57,700.

Adult criminal activity is strongly correlated with juvenile crime so the full burden of crime should be measured over the life-course. The economic burden of a life of crime is extrapolated from rates of juvenile/adult crime and is expressed in terms of an individual currently aged 15.

- Each moderate adult offender imposes direct costs on the City of Boston taxpayers of \$46,100.
- Each chronic adult offender imposes a direct fiscal burden of \$275,000 and a total fiscal burden of \$1,250,200 on the City of Boston.

Only a very small fraction of government spending on substance abuse is for prevention, treatment and research; most of the spending is to address the consequences of abuse.

For Massachusetts, state spending on prevention is less than 1% of the total expenditures on substance abuse.

1. Introduction

The negative social and economic burden from youth violence, adult crime, and substance addiction is substantial. Juvenile crime is a large proportion of total crime. Juveniles are arrested for one-in-six violent crimes and over one-quarter of all property crimes (NCJJ [2008]). They also commit crimes in school: 25% of students and 8% of teachers report some form of victimization over a school year (Dinkes et al. [2007]). Also, juvenile offenses are often the precursor to more frequent adult criminal activity: the peak offending ages are 18-22, with many criminals' first offenses during their teenage years. Such crime and violence imposes heavy burdens on victims, as well as on citizens who pay for government prevention programs and the criminal justice system. In similar fashion, substance abuse and addiction is highly prevalent, imposing significant costs on both the health care system and the justice system, as well as adversely affecting families (ONDCP [2004]). The chronic nature of substance abuse and addiction magnifies these burdens as well (Califano [2009]).

In this paper we calculate the economic burden of juvenile and adult crime and substance abuse and addiction in Boston, Massachusetts. Placing economic values on these activities is the first step in assessing what public policies are appropriate and what amounts might be justifiably spent on prevention. We begin by describing the extent of juvenile and adult crime and substance abuse. No single statistic fully captures the scale of deviant behavior because it takes many inter-related forms: substance abuse often leads to crime and vice versa (NCASA [2004]). However, we emphasize deviant behavior by youth because of the strong association between youth and adult behaviors. Next, we calculate the total fiscal burden imposed on taxpayers as an annual amount. We also document the economic burden imposed on society (victims). Finally, we calculate the per youth fiscal burden. Estimates are reported as annual figures and as present values over the lifetime for youth with varying characteristics.

These present value figures may be interpreted as the expected burden that a deviant youth would impose over their lifetime and so the amount that would be saved should that behavior be prevented. In conclusion, we place these calculations in the context of current public investments.

2. Violence and Addiction in Boston

Each juvenile cohort (ages 10-17) in Boston [Massachusetts] is approximately 53,000 [611,000] persons (Census data). Most of these youth will prosper. But approximately one-quarter will not complete high school and so will have significantly impaired lifetime opportunities; around 1-2% will be serial criminals, with a much higher proportion having some involvement in the criminal justice system; and very high proportions will be exposed to illegal drugs (Belfield and Levin [2007]; Pew Center on the States [2009]; Califano [2009]). Critically, criminal activity and substance abuse often begin in the teenage years, such that deviance during youth often leads to deviance over the life-course (Delisi and Gatling [2003]; Ramchand et al. [2009]). Hence, it is appropriate to focus on juvenile behaviors, from which it is then possible to extrapolate over the life-course.

Table 1 shows the extent of juvenile crime across Massachusetts based on FBI arrest data (city-level data are not available for juveniles). In 2008, there were 18,000 arrests of juveniles out of a population of 0.6 million; this represents 12% of all arrests. There were almost 2,000 arrests for violent crime, such that one-in-six violent crimes was committed by a juvenile, and 3,400 property crime arrests (almost one-in-five of the total). Table 1 also shows significant numbers of arrests for drug abuse violations (2,115 or 11% of all such arrests) and liquor law crimes (775), as well as arrests for drunkenness and driving under the influence. However, these figures are likely to be underestimates. Juvenile delinquencies often include drug use, gun violence, gang activity, and alcohol abuse (see respectively Russell et al. [2008]; Watkins et al.

[2008]; Decker et al. [2008]; Ford [2005]). Only some of these behaviors may be classified as violent crime. Also, juvenile crime is processed differently from adult crime: some minor offenses are not processed formally through the criminal justice system. But most importantly, these figures only count crimes that lead to an arrest and not the number of offenses committed. To calculate total criminal activity arrests need to be weighted by an 'offense multiple' (the ratio of crimes relative to arrests). Typically, substance abuse crimes – where the victim is often the abuser – have relatively high offense multiples.¹

Table 2 shows the extent of crime – both adult and juvenile – in the City of Boston in 2008. These city data are for offenses known to law enforcement (not arrests). The data show that residents of the City of Boston are disproportionately at risk of being the victims of crime: the population of Boston is 10% of the state population but the location of 25% of all violent crimes and 38% of all robberies.²

Finally, incarceration rates are high. Massachusetts has 26,400 persons in prison and 180,000 on probation or parole (Pew Center on the States [2009]; 2007 data). This translates into 1 in 24 adults under correctional control, which is the fifth highest ranking across all states. Many of these persons likely began their criminal careers as juveniles. Across Suffolk County, the state juvenile court heard 5,300 delinquency petitions, 1,300 status petitions, and 400 dependency petitions in 2004. Notably, Suffolk County has one of the highest petition rates across the 14 counties in Massachusetts.³

¹ There are also significant violations in schools in Boston. Annually, inner city public schools in Boston will experience approximately: 115 serious violent incidents; 2,015 violent incidents; and 1,090 other incidents (from national data, Neiman and DeVoe [2009]). In addition, many schools report delinquent behavior such as: student racial/ethnic tensions; bullying; sexual harassment; abuse of teachers; class disorder; and gang activities. Often, these activities too are not prosecuted through the formal criminal justice system.

² This count excludes the link between crime and suicide. Both victims of crime and perpetrators of crimes (especially drugs and gun-related crimes) are more likely to commit suicide (Cutler et al. [2001]). But adequate data are not available.

³ <http://ojjdp.ncjrs.gov/ojstatbb/njcda/asp/products.asp>.

Substance abuse is also an important social issue, not least because it is highly correlated with violent behavior. In 2007, there were 18,800 admissions to substance abuse treatment programs in the City of Boston; this represents 18% of all admissions across the state. Disproportionately, these City admissions were for hard drugs, such as heroin and crack (over alcohol). Based on hospital discharge data for opioid abuse, dependence, and poisoning, there were 1,900 persons aged under 24 who discharged from hospital in the City of Boston over the period 2004-06; this represents 14% of all the cases in the City.⁴ National data from the National Institute on Drug Abuse [2010] estimates that 18% of 10th graders and 23% of 12th graders have used some form of illicit drug over the previous month. This proportions include tobacco and alcohol, but the correlation across substances is high: for marijuana alone, the rates are 16%/21% of 10th/12th graders over the previous month, for example.⁵ Substance abuse and violent crime are strongly correlated: national data from CASA [2004] indicates that 78% of youth in the juvenile justice (arrested or incarcerated) are either under the influence of an illegal substance or admit having substance abuse problems.

Given these high rates of deviant behavior and their interactions, the economic consequences are likely to be significant.

3. Defining the Economic Burden of Violence and Addiction

3.1 The Fiscal Burden

The fiscal burden of violence and substance abuse is that which falls on government and taxpayers. Based on Anderson [1999], we identify the following main components of the burden of crime:

(F1) costs of operating the criminal justice system for policing, trials and sentencing

⁴ Bureau of Substance Abuse Services, Department of Public Health, Massachusetts.

⁵ Monitoring the Future Study: Trends in Prevalence of Various Drugs 2006-09, www.drugabuse.gov.

(F2) costs for incarceration, including parole and probation

(F3) costs of government crime prevention programs and treatment programs (e.g. HHS)

(F4) costs to the state from restitution for victims and from medical care

(F5) costs to the productivity of the school system⁶

(F6) losses in tax revenue due to lost productivity by criminals, substance abusers, and the victims

A similar list may be compiled for addiction, with particular emphasis on policing (F1) and government health care costs from substance abuse (F3).

There are two methods for calculating these economic burdens: the bottom-up approach and the ‘cost-of-illness’ approach. The former is preferable because it more closely relates resource use to the specific behaviors associated with violence and substance abuse. However, in this case the ‘cost-of-illness’ method is used. There is more independent evidence available that uses this method, including government surveys; and there is very little data which is sufficiently disaggregated to allow for a bottom-up approach.⁷

In calculating the fiscal burden we use Boston-specific data; otherwise national estimates are weighted for the Boston population, demographic characteristics, and crime rate. We draw on both the published research and government data to generate our estimates. Data from each source is adjusted to account for Massachusetts prices with a factor accounting for the relatively high rate of inflation of criminal justice services. (We also assume that all crimes

⁶ These school costs are composed of two parts. First, there are costs of directly policing violent behavior and treating substance abusers. Second, there are costs in disrupted learning to the school and the added costs of compensation to attract teachers to dangerous school environments. Many studies have identified adverse academic effects on the victims of school violence, and that the effects are compounded as the level of violence rises (Graham et al., [2006]). Very few studies include the second set of cost items.

⁷ Put simply, the City of Boston budget documents do not adequately distinguish between policing programs specifically for substance abuse versus those for related conditions. Many ‘cost-of-illness’ studies draw on research by Harwood et al. [1998], e.g. Horgan [2001]. For a full discussion of methodology mainly related to substance abuse treatment, see Cartwright [2008ab].

are committed in-state). All figures are expressed in 2010 dollars. Present values are calculated using a discount rate of 5% (Moore et al. [2004]).

Importantly, this fiscal burden is spread across many levels of government: city, county, state and federal governments. The primary aim is to calculate the costs to Boston taxpayers, such that the expenditures of the city government are most relevant. However, Boston residents pay state and federal taxes and so expenditures by these agencies are also relevant. The legitimacy of including these levels of government depends on the extent to which state/federal spending in Boston relates to state/federal receipts from Boston taxpayers. If there is a perfect correspondence and broad-based taxation, taxpayers would be indifferent as to the level of government and would value reduced expenditures from any source. Based on analysis by the Tax Foundation (2007) of the Census Bureau's 2005 data on Consolidated Federal Funds, Massachusetts is a relatively heavy subsidizer of the federal government: for every \$1 paid in federal taxes the state receives only \$0.82 in federal spending. Therefore, the federal savings should be valued by Massachusetts citizens, but weighted by a factor of 0.82. Estimating the extent to which the state government 'subsidizes' or 'taxes' Boston residents is difficult; therefore we assume that there is no net transfer such that Boston taxpayers value state government dollars at their face value.

3.2 Social Costs

A full accounting of the social costs of crime and substance abuse should include all the impacts, not just those on the taxpayer. The social burden associated with crime and substance abuse includes several important components beyond the fiscal ones (Cohen, 2005):

(S1) costs directly imposed on victims (missed work, private medical expenses, and lower quality of life)

(S2) avoidance costs by potential victims (including insurance claims)

(S3) losses to businesses in high-crime areas from low customer base (Fisher, 1991)

(S4) transfers of assets from victims to criminals

(S5) productivity losses from participating in criminal activity or from being under the influence of illicit substances rather than working

(S6) burden on families when one member is involved in criminal activity or abusing substances

(S7) the marginal excess tax burden from collecting tax revenues to pay for the criminal justice system and public health treatment⁸

These social costs are likely to far exceed the fiscal costs. (According to estimates by Anderson [1999], the social cost of crime might be between 2.5 and 4 times as large as the fiscal burden.)

However, estimating these social burdens is beyond the scope of this paper. Some of these burdens can only be imperfectly estimated because of a lack of directly available data. For example, there is no study of the economic implications from having a father who is incarcerated or an addict. There is also no consensus on valuations where the substance abuser imposes costs on himself/herself. Nevertheless, we emphasize that public policy decisions should take these social costs very much into account.

3.3 Research Literature on the Economic Burden of Juvenile Crime

Several research studies have calculated the costs of all forms of juvenile crime on a per youth basis. All show very high economic burdens.

Three academic studies focus on at-risk youth to calculate the lifetime burden of career criminals or chronic offenders. Cohen and Piquero [2009] calculate these burdens using

⁸ Standard economic theory assumes that any tax will impose a deadweight loss, i.e. a reduction in economic activity. Strictly, the marginal excess tax burden (METB) will depend on the level of government at which taxes are collected and the price elasticity of demand of the taxed good and it is partly a fiscal cost. However, there is no precise value for the METB. Fullerton (1991) estimates the marginal excess burden from labor taxes at 7-25 cents per dollar; Allgood and Snow (1998) estimate 13-28 cents as the marginal welfare cost per dollar of a lump-sum grant.

willingness-to-pay measures for avoiding crime. Assuming that juvenile crime leads to adult crime, the lifetime present value crime burden imposed by a high-risk 14-year-old is \$0.93 million in juvenile crime costs (and an additional \$1.7-\$4.4 million in other social costs). Based on records of serial offenders in Texas, Delisi and Gatling [2003] estimate that the average career criminal imposes \$0.36 million in criminal justice system costs and \$1.11 million in victim costs over the life course. Finally, based on a sample of 503 boys in Philadelphia, Welsh et al. [2008] calculate the social costs of a juvenile cohort (using victim costs derived from Miller et al. [1996] but excluding expenditures of the criminal justice system). Each at-risk juvenile imposes present value costs of \$0.21 million during the juvenile years, with early onset offenders imposing much higher victim costs (2% discount rate).

Only one study has looked at juvenile violent crime separately. Miller et al. [2001] estimated the costs of 93,900 violent crimes by juveniles, leading to 5,133 referrals, in Pennsylvania in 1993. Adjusted for the context in Boston, this estimate of juvenile violence would translate into a fiscal cost of \$18 million annually, but this figure does not count costs to the criminal justice system and so is far from complete. Miller et al. [2001] also estimated the social costs to victims of juvenile crime in terms of medical care, public programs, lost future earnings, property losses, and quality of life. These social costs are magnitudes higher than the fiscal costs. Approximately, these estimates suggest that juvenile violence alone might impose fiscal and social costs for the city of Boston of at least half a billion dollars.

In summary, these studies are suggestive of a large economic burden, particularly in light of the absolute level of crime in Boston. However, the studies vary in context and in perspective (fiscal/social); they are also not consistent or omit some of the fiscal consequences

listed above; and they do not relate to the demographic and economic conditions in Boston.⁹

Therefore, it is appropriate to calculate new estimates.

4. Calculating the Fiscal Burden of Violence and Addiction

4.1 The Fiscal Burden of Substance Abuse and Addiction: Annual Spending

One way to calculate the fiscal burden is to add up all the government expenditures associated with substance abuse. Expenditures on substance abuse and addiction are made by all levels of government: federal, state, and local. The most thorough estimates of these government expenditures are reported in CASA [2009].¹⁰ This Report distinguishes between substances, estimating that 32% of spending is on tobacco, 60% on alcohol, and 8% on other drugs.

Through its state government, Massachusetts is one of the biggest spenders on substance abuse and addiction (CASA [2009, Table 4.3]). Across government departments for education, health, the criminal justice system, and child/family assistance, state spending on substance abuse and addiction programs was \$4.5 billion in 2005. This amount represents 22% of the state budget (compared to 15% as the average across the 50 states). Expressed as a function of the 2009 state budget of \$26.93 billion, therefore, the total annual state spending on substance abuse and addiction is estimated at \$5.87 billion.¹¹

The City of Boston also commits significant resources toward substance abuse and addiction. The City budget for FY2009 was \$2.38 billion; the majority of the budget is funded through property taxes, with \$0.46 billion coming from state aid. Expenditures from the City budget are primarily allocated for education (44%); public safety (24%); administration and

⁹ Many of these sources (as well as the studies by Aos et al [2006] and Fass and Pi [2002]) rely on primary evidence from Miller et al. [1996] for victim costs. Notable omissions are deadweight loss burdens (\$7) and costs to the school system from juvenile violence (F5).

¹⁰ The CASA [2009] report uses evidence from the Census, Bureau of Justice, Department of Education, and direct surveys of state agencies. The data is from fiscal year 2005. Only a very small component of funding is allocated to prevention: well over 90% of expenditures are on treatments for substance abuse.

¹¹ http://www.mass.gov/bb/gaa/fy2010/app_10/ga_10/hdefault.htm. This figure is for spending across the state, not just in Boston.

finance (14%); and public works (7%).¹² Based on the method and estimates from CASA [2009, Appendix B], a conservative estimate of the amount of this direct City budget that is devoted to substance abuse and addiction is 9%, or \$0.17 billion annually. Most of this spending is devoted to the education system, the criminal justice system, and the health system, with some spending on child/family assistance and public safety.¹³

From these numbers, it is possible to calculate the total fiscal expenditures for the City of Boston annually from substance abuse.¹⁴ The figures are reported in Table 3. The amount is \$0.68 billion annually, with 25% from the City treasury (\$0.17bn) and 75% from the state treasury (\$0.51bn). Critically, this estimate does not include the burden of violent crime or any losses in tax revenue associated with lost productivity.¹⁵ However, this amount includes all age groups, not just juveniles, and so cannot be directly compared to a single age group.¹⁶

In addition to City and state spending, the federal government also expends resources on substance abuse. Federal spending on substance abuse and addiction was \$230 billion in 2005, with almost three-quarters of that amount being spent through the health system (CASA [2009, Table 2.2]).¹⁷ This amount should be adjusted for the proportional contributions from Massachusetts to the federal government and adjusted up to 2010 spending levels. Overall, annual spending on substance abuse and addiction by the federal government in Boston

¹² More disaggregated data is not publicly available.

¹³ http://www.cityofboston.gov/TridionImages/04%20Public%20Safety%20Cabinet_tcm1-3891.pdf.

¹⁴ The City of Boston population is estimated at 0.574 million and the Massachusetts population is 6.594 million (Census data). Therefore, the City population is 8.7% of the state population. These figures are therefore significantly underestimates because they assume substance abuse is spread evenly across the state. As noted, above state expenditures are counted proportionately.

¹⁵ This is listed as item (F4) above. Given that these losses in tax revenue are mainly federal income taxes, the direct consequences for the City of Boston treasury revenues are likely to be minimal.

¹⁶ If a zero discount rate is assumed, the amount may be interpreted as the lifetime spending for a single age cohort.

¹⁷ This amount does not include the costs for prevention/treatment, interdiction, or taxation and regulation.

(Massachusetts) is estimated at \$0.64 billion (\$7.4bn). For the annual totals reported in Table 3, however, these federal expenditures are not included.

4.2 The Fiscal Burden of Substance Abuse and Addiction: Spending per Lifetime Abuser

As many individuals are neither substance abusers or criminals it is useful to present the economic burden per offender rather than as an aggregate across the entire population.

Approximately, for each age group (e.g. 15-year olds) in Boston there will be 500-700 individuals (14%) who are either substance abusers or involved in the criminal justice system.

To translate the total government expenditure into individualized present values, it is necessary to apply a discount rate (and make assumptions about the age distribution of the caseload).¹⁸ See Table 4. Approximately, for the cohort of youth who are now aged 15, the present value of total government expenditures on substance abuse and addiction will be \$131,600 per individual over the life course or \$503 million for each age cohort (unadjusted for age of onset or duration of abuse).¹⁹ If only the direct City of Boston expenditures are counted, the lifetime present value burden of substance abuse and addiction for each 15-year old is \$18,400.²⁰

Of course, these figures are an average for all individuals: many individuals will impose a very low fiscal burden; a small subset of chronic users will impose a much larger burden. An approximate calculation can be made based on the prevalence rates for chronic users (4%), mild users (15%), and non-users (81%) from Cohen and Piquero [2009] and Merlo and Wolpin [2009]. Specifically, 81% of persons will impose almost zero lifetime burden. However, moderate users

¹⁸ The present value amount is the value of the sum in the current time period, where future expenditures are given a lower weight (discounted). It is the equivalent of a lump sum at age 15. A discount rate of 5% is applied, with substance abuse restricted to ages 15 to 51.

¹⁹ Each age cohort of individuals in the City of Boston is 3,900 (www.bps.org).

²⁰ These figures may seem high, but they are comparable to the estimate of Spoth et al. [2002] who only estimate the lifetime economic burden from alcohol abuse. In fact, the CASA [2009] method most likely undercounts the full fiscal costs because it does not fully measure items (F4) through (F6) above.

will impose a burden of \$40,500 and chronic substance abusers will impose a lifetime fiscal burden of \$76,000 to the City of Boston. If the federal and state disbursements are included, moderate and chronic users will impose significantly larger burdens at \$289,500 and \$542,800 respectively. Based on prevalence rates for moderate and chronic users (and the duration of use), the total present value burden in terms of all government spending in Boston is estimated at \$249 million.

4.3 The Fiscal Burden of Juvenile Crime and Lifetime Crime: Annual Amounts

As for substance abuse, expenditures on crime are spread across levels of government and departments within each level. To conservatively estimate government expenditures on crime, we focus on: costs of operating the criminal justice system for policing, trials and sentencing; and costs for incarceration, including parole and probation (only F1 and F2, above). Federal spending is also excluded. Even as the majority of the burden for crime prevention falls on state and local government, the federal government role is not trivial.

As shown in Table 3, total state spending on public safety, corrections, and the justice system is at least \$1.68 billion annually (see Table Notes for calculations). Weighting this amount proportionately to the amount of crime in Boston, this translates into state spending within the City at \$0.34 billion annually. In addition, the City of Boston government spends on \$0.25 billion on public safety. Therefore, counting only these burdens, the total amount being spent in the City of Boston is \$0.59 billion annually.

4.4 The Fiscal Burden of Juvenile Crime and Lifetime Crime: Lifetime Amounts per Offender

A recent estimate of the full fiscal and economic burden of juvenile crime in California has been calculated by Belfield and Levin [2009]. This estimate focuses on all types of juvenile crime and includes calculations of items (F1), (F2), (F3), and (F5) for the juvenile years (ages 12-17) and

extrapolations for lifetime crime costs. It includes separate calculations for males and females.²¹ It also includes some bottom-up calculations in its costing exercise, as well as a sensitivity analysis. Therefore, for comparability purposes it is useful to adapt these results in light of the differences in crime rates, populations and prices in Boston to derive burdens per lifetime offender.

The summary of the burden associated with juvenile crime over the years 12 to 17 is given in Table 5. It should be noted that, for all estimates, the costs imposed by males significantly exceed those imposed by females.

The direct City expenditure per youth on juvenile crime alone is \$1,400; if the juvenile is a moderate offender, the City will spend \$5,800 per youth; and if the juvenile is a chronic offender, the fiscal burden to the City is \$34,600.

The full fiscal burden includes state and federal spending, as well as City government expenditures. In total, the state of Massachusetts spends approximately \$26 million in the City of Boston annually on law and public safety to combat juvenile crime (not counting state spending in the city on education and school-related programs to combat crime). Adding in these state expenditures and the (weighted) federal dollars, the full fiscal burden to the City of Boston per youth is \$6,300. For a moderate juvenile offender the amount is \$26,200 and for a chronic juvenile offender it is \$157,300.

Finally, as shown in the final panel of Table 5, juvenile crime imposes a social burden on City residents of at least \$63,900 per moderate offender and \$383,600 per chronic offender.

Of course juvenile crime is only a fraction of total crime (see Table 1). Yet many adult criminals begin as juvenile criminals (as noted above, the peak offending years are 18-22) and so

²¹ From a review of evidence it is likely that 90% of the burden of violent crime is attributable to males (Tracy et al. [2009]).

these youth costs can be extrapolated into adulthood. The result will be even greater fiscal burdens associated with youth crime.

Annual state spending on law and public safety to address adult crime in Boston is \$188 million. But this figure does not include all of the items (F1)-(F7) above and so is a significant understatement. Adult crime costs can be extrapolated based on the juvenile crime costs, accounting for the severity of adult crime, the longer period of incarceration, probation and parole, and the discount rate. These adult crime costs are reported in Table 6.

Approximately, the City of Boston will incur government expenditures of \$46,100 per moderate offender and \$275,000 per chronic offender. These are present values over the life course. Adding in city, state and federal expenditures, moderate and chronic offenders impose fiscal burdens of \$0.2 million and \$1.25 million respectively.

4.5 The Full Fiscal Burden per Deviant Youth

As noted above, substance abuse and criminal activity are strongly correlated. Therefore it is not appropriate to simply add up the respective costs to calculate the full cost of juvenile crime and addiction ('deviant youth') combined.

As an approximation, we assume that crime driven by substance abuse is 78% of all juvenile crime (NCASA [2004]). Therefore, there is an additional 28% of the crime burden to be added to the substance abuse costs reported above.²² Thus, the direct fiscal burden to the City of Boston is approximately \$42,100 per moderate 'deviant youth' and \$85,700 per chronic 'deviant youth'. The full fiscal burdens are \$296,800 and \$586,800 respectively. These are conservative estimates, because they do not count the associated adult deviant behavior.

4.6 Sensitivity Analysis

²² In effect, the substance abuse costs already include 78% of the crime costs.

Given the data limitations, the above estimates should be interpreted cautiously. However, it is very likely that these burdens are conservative, for several reasons. First, budget-based estimates are considerably below those based on ‘willingness to pay’, which is the economic standard for valuation (Cohen et al., 2004). (Opinion polls also show that the public would prefer to spend resources on treatments and prevention rather than on juvenile incarceration, Nagin et al. [2006]). Second, many of the components of the full fiscal costs of crime are not counted because of data limitations.²³ Specifically, items (F4)-(F6) above are undercounted because they do not correspond with any line-item expenditure in government budgets. Counting lost productivity – and so lost tax revenues – would substantially increase the totals. The deadweight loss from tax collection to pay for public services to combat crime is also not included. Third, as shown in Table 2, Boston is the locus of a substantial amount of adult crime, disproportionate to its population. Finally, it is worth noting that taxpayers may care about the social costs of violence and addiction, i.e. the repercussions for victims and substance abusers themselves. Counting these repercussions would significantly increase the size of the burden.²⁴

5. Conclusions

Substance abuse and juvenile crime are significant, both economically and socially. Moreover, because these behaviors are chronic, the lifetime consequences are very large. The above calculations show that the City of Boston – both directly from its own revenues and indirectly through state and federal expenditures – is expending considerable resources on combating youth substance abuse and crime. For substance abuse, the amount is conservatively estimated at \$0.68 billion. For crime, annual spending is \$0.59 billion.

²³ Even then, the victims’ costs in studies such as those by Miller et al. [1996] exclude avoidance costs, mental health costs (including referrals to clinics or psychological counseling), long-term disability costs, and hospital care paid by insurers, as well as omit any induced crime by victims of crime (Cohen [2005]).

²⁴ Alternative, significantly higher estimates are given in Cohen and Piquero [2009].

This spending is distributed across only a fraction of the population. The above calculations suggest that a 15-year old chronic substance abuser will 'cost' the City directly \$76,000 in present value expenditures; if the state and federal expenditures are included, the amount exceeds half a million dollars. Similarly large figures are estimated for juvenile criminals, particularly if they become adult criminals. These dollar amounts represent what the City should be willing to pay – at age 15 – to avert each case of chronic substance abuse or prevent a youth from becoming a chronic offender. In fact, only a very small fraction of government spending on substance abuse is for prevention, treatment and research. Most of the spending is to address the consequences of abuse in terms of health care and spending via the criminal justice system. Spending on prevention varies across levels of government. Data for the City of Boston are not available, but for Massachusetts, state spending on prevention is less than 1% of the total expenditures on substance abuse. Combining federal and state spending on prevention, it is estimated that less than 2% of the total government spending is on prevention, treatment, and research; the remaining 98% is to address the consequences of substance abuse. Thus, these significant burdens are likely to be perpetuated.

References

- Allgood, S and A Snow. 1998. The marginal cost of raising tax revenue and redistributing income. *Journal of Political Economy*, **106**, 1246-1273.
- Anderson, DA. 1999. The aggregate burden of crime. *Journal of Law and Economics*, **XLII**, 611-642.
- Aos, S, Miller, M and E Drake. 2006. Evidence-based public policy options to reduce future prison construction, criminal justice costs, and crime rates. Washington State Institute for Public Policy, www.wsipp.wa.gov/pub.asp?docid=06-10-1201.
- Belfield, CR and HM Levin. 2007 (Eds). *The Price We Pay: The Economic and Social Costs of Inadequate Education*. Brookings Institution: Washington, DC.
- Belfield, CR and HM Levin. 2009. *High School Dropouts and the Economic Losses from Juvenile Crime in California*. Monograph, California Dropout Research Center, University of California, Santa Barbara, http://cdrp.ucsb.edu/dropouts/pubs_reports.htm.
- Califano, JA. 2009. *How to Raise a Drug-Free Kid: The Straight Dope for Parents*. Simon & Schuster's Touchstone/Fireside Division; New York, NY.
- Cartwright, WS. 2008a. A critical review of accounting and economic methods for estimating the costs of addiction treatment. *Journal of Substance Abuse Treatment*, **34**, 302-310.
- Cartwright, WS. 2008b. Economic costs of drug abuse: Financial, cost of illness, and services. *Journal of Substance Abuse Treatment*, **34**, 224-233.
- CASA. 2009. *Shoveling Up II: The Impact of Substance Abuse on Federal, State and Local Budgets*. Center on Addiction and Substance Abuse, Columbia University, New York, NY.
- Cohen MA, Rust RT, Steen S, and ST Tidd. 2004. Willingness-to-pay for crime control programs. *Criminology*, **42**, 89-109.
- Cohen, M, and A Piquero. 2009. New evidence on the monetary value of saving a high risk youth. *Journal of Quantitative Criminology*, **25**, 1, 25-49.
- Cohen, MA. 2005. *The Costs of Crime and Justice*. Routledge: New York.
- Cutler, D, Glaeser, EL and KE Norberg. 2001. Explaining the rise in youth suicide. In J Gruber (Ed.) *Risky Behavior among Youths. An Economic Analysis*. University of Chicago Press: Chicago.
- Decker, SH, Katz, CM, Webb, V. 2008. Understanding the black box of gang organization - Implications for involvement in violent crime, drug sales, and violent victimization. *Crime & Delinquency*, **54**, 153-172.
- Delisi, M and JM Gatling. 2003. Who pays for a life of crime? An empirical assessment of the assorted victimization costs posed by career criminals. *Criminal Justice Studies: Critical Journal of the Criminal Law Society*, **16**, 283-293.

- Dinkes, R, Cataldi, EF and W Lin-Kelly. 2007. *Indicators of School Crime and Safety: 2007*. NCES, Institute of Education Sciences, U.S. Department of Education: Washington, DC.
- Drake, E. 2007. Evidence-Based Juvenile Offender Programs: Program Description, Quality Assurance, and Cost. WSIPP Report, www.wsipp.wa.gov/rptfiles/07-06-1201.pdf
- Fass, SM, and CR Pi. 2002. Getting tough on juvenile crime: An analysis of costs and benefits. *Journal Of Research In Crime And Delinquency*, **39**, 363-399.
- Fisher, B. 1991. A neighborhood business area is hurting: Crime, fear of crime, and disorders take their toll. *Crime and Delinquency*, **37**, 363-373.
- Ford, JA. 2005. The connection between heavy drinking and juvenile delinquency during adolescence. *Sociological Spectrum*, **25**, 629-650.
- Fullerton, D. 1991. Reconciling recent estimates of the marginal welfare cost of taxation. *American Economic Review*, **81**, 302-308.
- Graham, S, Bellmore, A and J Mize. 2006. Peer victimization, aggression, and their co-occurrence in middle school: Pathways to adjustment problems. *Journal of Abnormal Child Psychology*, **34**, 363-378.
- Harwood, H, Fountain, D and G Livermore. 1998. The Economic Costs of Alcohol and Drug/Abuse in the United States, 1992. U.S. Department of Health and Human Services, Rockville, MD.
- Horgan, C. 2001. *Substance Abuse: The Nation's Number One Health Problem*. Monograph, Robert Wood Johnson Foundation, www.rwjf.org.
- Merlo, A and KI Wolpin. 2009. The transition from school to jail: Youth crime and high school completion among black males. Working Paper, University of Pennsylvania.
- Miller, TR, Cohen, MA, and B Wiersema. 1996. Victim Costs and Consequences: A New Look. National Institute of Justice Research Report, NCJ-155282.
- Miller, TR, Fisher, DA, and MA Cohen. 2001. Costs of juvenile violence: Policy implications. *Pediatrics*, **107**, 1, e3.
- Moore, MA, Boardman, AE, Vining AR, Weimer, DL and DH Greenberg. 2004. Just give me a number! Practical values for the social discount rate. *Journal of Policy Analysis and Management*, **23**, 789-812.
- Nagin, D., Piquero, A., Scott, E., and Steinberg, L. 2006. Public preferences for rehabilitation versus incarceration of juvenile offenders: Evidence from a contingent valuation survey. *Crime and Public Policy*, **5**, 301-326.
- National Center for Juvenile Justice (NCJJ). 2008. 'California'. State Juvenile Justice Profiles. Pittsburgh, PA: NCJJ.

- NCASA. 2004. *Criminal Neglect: Substance Abuse, Juvenile Justice and the Children Left Behind*. Monograph, www.casacolumbia.org.
- Neiman, S and JF DeVoe. 2009. Crime, Violence, Discipline and Safety in U.S. Public Schools: Findings from the School Survey on Crime and Safety 2007-08. National Center for Educational Statistics, U.S. Department of Education: Washington, DC.
- Office of National Drug Control Policy (ONDCP). 2004. *The Economic Costs of Drug Abuse in the United States, 1992-2002*. Washington, DC: Executive Office of the President (Publication No. 207303).
- Pew Center on the States. 2009. One in 31: The Long Reach of American Corrections. Washington, DC: The Pew Charitable Trusts.
- Ramchand, R, MacDonald, JM, Haviland, A, Morral, AR. 2009. A Developmental Approach for Measuring the Severity of Crimes. *Journal Of Quantitative Criminology*, **25**, 129-153.
- Russell, K, Dryden, DM, Liang, YY, Friesen, C, O'Gorman, K, Durec, T, Wild, TC, Klassen, TP. 2008. Risk factors for methamphetamine use in youth: a systematic review. *Pediatrics*, **8**, 48.
- Spoth, RL, Gyll, A and SX Day. 2002. Universal family-focused interventions in alcohol-use disorder prevention: cost-effectiveness and cost-benefit analysis of two interventions.
- Tracy, PE, Kempf-Leonard, K, and S Abramoske-James. 2009. Gender differences in delinquency and juvenile justice processing, evidence from national data. *Crime & Delinquency*, **55**, 171-215.
- Watkins, AM, Huebner, BM, and SH Decker. 2008. Patterns of gun acquisition, carrying, and use among juvenile and adult, arrestees: evidence from a high-crime city. *Justice Quarterly*, **25**, 674-700.
- Welsh, BC, Loeber, R, Stevens, B, Stouthamer-Loeber, M, Cohen, MA and DP Farrington. 2008. Costs of juvenile crime in urban areas: a longitudinal perspective. *Youth Violence and Juvenile Justice*, **6**, 3-27.

Table 1
Juvenile arrests and percent of all arrests in Massachusetts (2008)

	(1) Total arrests of persons aged under 18	(2) Aged under 18 % of all arrests
Total¹	17,974	12%
Violent crime²	1,964	16%
Property crime³	3,411	18%
Curfew and loitering law violations	13	100%
Runaways	293	100%
Arson (p)	50	38%
Robbery (v)	529	26%
Vandalism	906	26%
Burglary (p)	761	20%
Motor vehicle theft (p)	131	19%
Weapons; carrying, possessing, etc.	265	19%
Larceny-theft (p)	2,469	18%
Liquor laws	775	18%
Stolen property; buying, receiving, possessing	224	17%
Disorderly conduct	1,375	16%
Aggravated assault (v)	1,396	14%
Sex offenses except forcible rape	87	13%
Other assaults	2,517	12%
Drug abuse violations	2,115	11%
Murder and non-negligent manslaughter (v)	8	10%
Forcible rape (v)	31	10%
All other offenses (except traffic)	3,538	10%
Offenses against the family and children	103	8%
Forgery and counterfeiting	22	4%
Embezzlement	6	4%
Suspicion	1	4%
Fraud	48	3%
Drunkenness	204	3%
Driving under the influence	101	1%
Prostitution and commercialized vice	6	0%

Source: FBI, UCR 2008, Table 69. *Notes:* ¹ Does not include traffic arrests. ² Violent crimes (v) are offenses of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. ³ Property crimes (p) are offenses of burglary, larceny-theft, motor vehicle theft, and arson.

Table 2
Offenses Known to Law Enforcement in Boston (2008)

	(1) Total offenses in Boston	(2) Percentage of Massachusetts state total
Violent crime¹	6,676	25%
Property crime²	22,429	16%
Murder	62	40%
Forcible rape	237	16%
Robbery	2,398	38%
Aggravated assault	3,979	22%
Burglary	3,493	11%
Larceny-theft	16,531	17%
Motor vehicle theft	2,405	21%

Source: FBI, UCR 2008. *Notes:* ¹ Violent crimes (v) are offenses of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. ² Property crimes (p) are offenses of burglary, larceny-theft, motor vehicle theft, and arson.

Table 3
Annual Spending on Crime and Substance Abuse: Boston and Massachusetts (2008)

	Substance Abuse	Crime
Total state spending	\$5.87 billion	\$1.68 billion
State spending in the City of Boston	\$0.51 billion	\$0.34 billion
City of Boston spending	\$0.17 billion	\$0.25 billion
Total spending in the City of Boston	\$0.68 billion	\$0.59 billion

Sources: http://www.mass.gov/bb/gaa/fy2010/app_10/sect_10/h800.htm;
http://www.cityofboston.gov/TridionImages/04%20Public%20Safety%20Cabinet_tcm1-3891.pdf.
Notes: No federal spending is included. Spending amounts are annual amounts across all age groups. Spending amounts across columns should not be added; some expenditures are counted in both columns. City of Boston spending is for policing and fire department (adjusted for arson/non-arson fire rates) and transfers from federal government. State spending on crime is for: Department of Public Safety; Department of Judiciary (Trial Court and Public Counsel Services only). State spending weighted at mean rate of violent/property crime in Boston (see Table 2 above).

Table 4
Per Youth Fiscal Burden from Substance Abuse in Boston

	Present value at age 15 across lifetime		
	Average per youth	Average per moderate user	Average per chronic abuser
City of Boston fiscal burden	\$18,400	\$40,500	\$76,000
Full fiscal burden to Boston residents	\$131,600	\$289,500	\$542,800

Notes: City burden includes only spending by the City of Boston government. Full burden includes the city burden as well as the state and fiscal burden payable by the resident of the City of Boston. Present values are expressed at age 15 using a 5% discount rate. Figures in 2010 dollars rounded to nearest \$100.

Table 5
Per Youth Fiscal and Social Burden from Juvenile Crime in Boston

Present value at age 15 across all juvenile years (ages 12-17)			
	Average per youth	Average per moderate offender	Average per chronic offender
City of Boston Fiscal Burden			
Overall mean	\$1,400	\$5,800	\$34,600
Male	\$2,300	\$9,600	\$57,700
Female	\$400	\$1,800	\$10,600
Full Fiscal Burden to Boston residents			
Overall mean	\$6,300	\$26,200	\$157,300
Male	\$10,500	\$43,700	\$262,200
Female	\$1,900	\$8,000	\$48,200
Social Burden to Boston residents			
Overall mean	\$15,300	\$63,900	\$383,600
Male	\$25,600	\$106,600	\$639,400
Female	\$4,700	\$19,600	\$117,400

Notes: Total economic loss derived from Belfield and Levin [2009]. Assumes zero crime until age 12. Offenders assumed to be 12% of all juveniles and commit 50% of all crimes; chronic offenders 2% of all juveniles and commit 50% of all crimes. Males assumed to commit 85% of offenses. Juvenile span is ages 12 through 17. City burden based on estimated proportion of total criminal justice spending incurred locally. Present values are expressed at age 15 using a 5% discount rate. Figures in 2010 dollars rounded to nearest \$100.

Table 6
Per Youth Fiscal Burden from Adult Crime in Boston

	Present value at age 15 across all adult years (ages 18-40)		
	Average per youth	Average per moderate offender	Average per chronic offender
City of Boston Fiscal Burden			
Overall mean	\$11,100	\$46,100	\$275,000
Male	\$18,300	\$76,300	\$458,600
Female	\$3,200	\$14,300	\$84,200
Full Fiscal Burden to Boston residents			
Overall mean	\$50,100	\$208,200	\$1,250,200
Male	\$83,400	\$347,300	\$2,084,900
Female	\$15,100	\$63,600	\$383,100

Notes: Total economic loss derived from Belfield and Levin [2009] adjusted for Boston price index. Assumes zero crime until age 12. Offenders assumed to be 12% of all juveniles and commit 50% of all crimes; chronic offenders 2% of all juveniles and commit 50% of all crimes. Males assumed to commit 85% of offenses. City burden based on estimated proportion of total criminal justice spending incurred locally. Present values are expressed at age 15 using a 5% discount rate. Figures in 2010 dollars rounded to nearest \$100.