Massachusetts Safe and Successful Youth Initiative

Benefit-to-Cost Analysis of Springfield and Boston Sites

November 26, 2014

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Acknowledgements

Principal Investigators

Patricia E. Campie, AIR
Anthony Petrosino, WestEd

Report Authors

Douglas D. Bradham, DrPH, AIR
Patricia E. Campie, Ph.D., AIR
Anthony Petrosino, Ph.D., WestEd

Suggested citation

Bradham, D.D., Campie, P.E., & Petrosino, A. (2014). *Massachusetts Safe and Successful Youth Initiative. Benefit-to-Cost Analysis of Springfield and Boston Sites*. Massachusetts Executive Office of Health and Human Services. Boston, MA.

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Executive Summary

Background

This Benefit to Cost Analysis was conducted as a preliminary investigation into the value of the Safe and Successful Youth Initiative (SSYI) implemented in Massachusetts (MA) as an effort to curb violent crime in eleven cities across the State. The American Institutes for Research (AIR) and WestEd are conducting a series of studies on the effectiveness of the SSYI program on behalf of the MA Executive Office of Health and Human Services. In this study we use the results of an Interrupted Time Series (ITS) study examining SSYI's impact on community violence victimizations (Petrosino, et al., 2014), to derive an estimate of SSYI's prevention benefits over the 2012 to 2013 funding period. Boston and Springfield, as the state's two largest cities involved in SSYI, were chosen for the analysis, pending receipt of additional cost data from the other nine SSYI cites; as such, the findings in this report should be considered preliminary in terms of placing a total benefit to cost estimate on the entire SSYI initiative.

Research Objectives

Three descriptive objectives were investigated: (1) to estimate the site-specific costs to society of implementing the SSYI interventions in Boston and Springfield, from January 2012 through December 2013; (2) to estimate the potential economic benefits of the crime victimization reductions documented in the ITS study by applying reliable estimates of the economic losses incurred when violent crimes are committed; and (3) to estimate the average annual ratio of society's benefit-to-cost ratios (BCR), after all amounts have been adjusted to 2013 values.

Methodology

This study utilized methods consistent with recommendations for program evaluation in public health prevention, and conservative estimates from a 2010 study that estimated the costs of violent crimes in Boston, adjusted to dollar values for 2013 (Drummond, et al, 2005; Brownson, et al, 2010; Gold et al, 1996; Haddix, et al, 2003). We proportionally adjusted Springfield's costs-savings estimate based on SSYI wage rate comparison to Boston's SSYI wages. Boston's 2013 value of 99.7 million in potential cost savings per 10% reduction in crime rate was used as the "benefit of prevention" for each city. This annual cost savings ("benefit of prevention") of violent crimes for each city was then placed over the city's estimated, annual societal intervention costs, and Benefit-to-Cost Ratios (BCR) calculated.

Findings

      Examination of the Boston and Springfield SSYI programs suggests that each dollar invested in these SSYI sites may be associated with societal cost-savings of as much as $7.35, in 2013 dollars. Our analysis found that in Boston the benefits could be as much as an estimated $8.9 million with just a 0.9% reduction in the violent crime rate. The 2013 adjusted annual average costs of the SSYI program in Boston of $1.2 million, not augmented by donated time, space or materials, would then generate a very positive Benefit-to- Cost Ratio of 7.37. This ratio would suggest that typically a dollar invested in Boston's SSYI program could be expected to gain a savings of nearly $7.40 in crime-related cost savings. In Springfield, where donated time, materials and space accounted for nearly 20% of the total annual societal costs, the SSYI program's adjusted annual average costs of $851,941 would be associated with an estimated costs savings of $5.91 million. These amounts would generate a Benefit-to-Cost Ratio of 6.9 or a suggested 1 dollar in investment in the Springfield SSYI program would be associated with a likely cost-savings of just over $6.95.
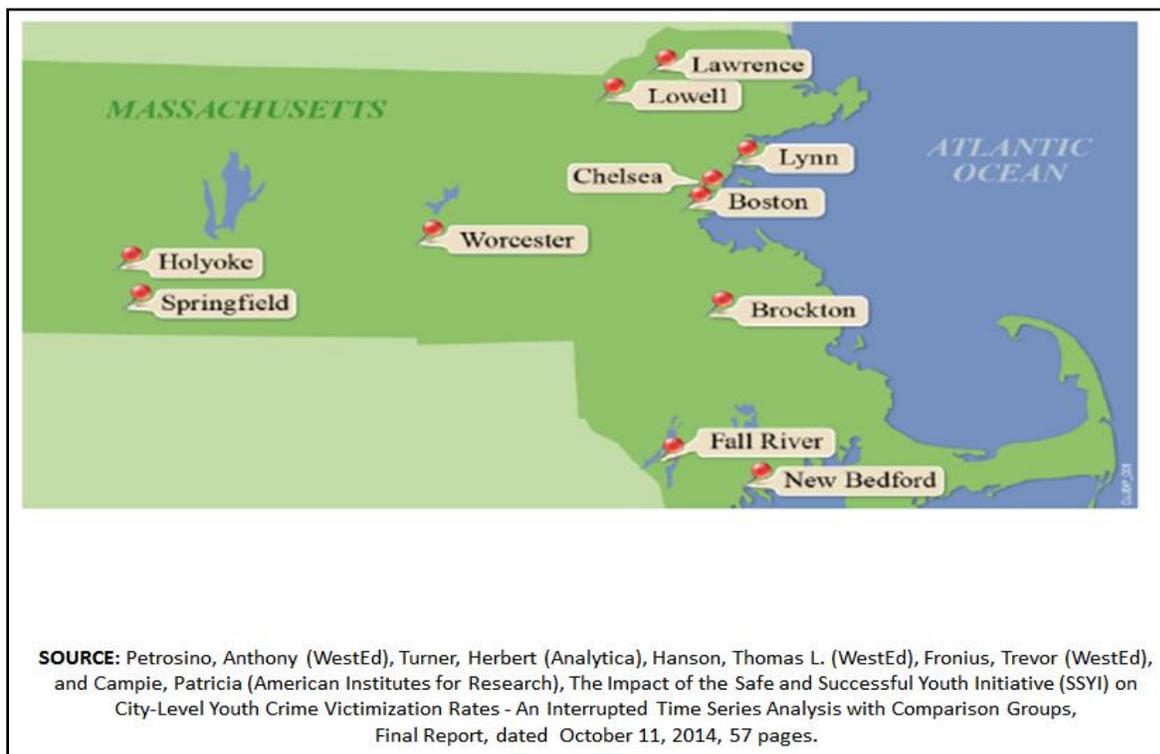
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Background

This study was conducted as a preliminary investigation into the value of the Safe and Successful Youth Initiative (SSYI) implemented in Massachusetts as an effort to curb violent crime in key cities across the State. The intervention targets male youth, ages 14-24, who have demonstrated a propensity to engage in gun, gang, or knife violence, and provides these youth with access to a street outreach worker who connects youth with services to meet their needs (e.g., employment training, educational remediation, trauma-informed counseling).

The AIR and WestEd research team conducted an Interrupted Time Series (ITS) study that documented a statistically significant decrease in the crime victimization rates was associated with the implementation of the SSYI program. Specifically, when compared with other cities throughout the state using monthly police data on victimizations from violent crime over a five year period, that study found an average reduction of 5.0-5.7 victimizations per 100,000 persons aged 14-24 in each of the eleven SSYI sites from 2011 through 2013, the first two years of program operation (Petrosino et al, 2014). For all eleven SSYI sites, based on population estimates during this time frame, this amounts a decrease of more than 900 victimizations from violent crime.

A Propensity Score Matching (PSM) study was then completed to examine youth-level differences in recidivism between those involved in SSYI and non-SSYI youth with similar propensities for violence (Campie, Vriniotis, Read, Fronius, & Petrosino, 2014). Findings from the PSM study indicated that non-SSYI youth were more likely to be incarcerated than SSYI youth who had received or were actively engaged in SSYI services. The optimistic findings from these two studies prompted EOHHS to commission the current study, a Benefit-to-Cost Ratio (BCR) Analysis to help determine the actual return on investment from SSYI, which could then guide future decisions on sustaining and expanding the program in the Commonwealth.

One of the frequent uses of Benefit-to-Cost Ratios is to assess whether society's expenditures in prevention are associated with societal savings that are equal or greater than those collective expenses. If the BCR is greater than 1.0, then the program is deemed as "beneficial", and is considered a good investment of societal resources. While the original study did not intentionally collect these data, estimation of this program's average expected BCR is feasible using literature values and program expense data, with all values brought up to 2013 dollars. Figure 1 displays the eleven cities involved in the SSYI intervention. This current report deals only with Boston and Springfield.

Figure 1: Massachusetts Cities Implementing SSYI in 2012 and 2013

SOURCE: Petrosino, Anthony (WestEd), Turner, Herbert (Analytica), Hanson, Thomas L. (WestEd), Fronius, Trevor (WestEd), and Campie, Patricia (American Institutes for Research), The Impact of the Safe and Successful Youth Initiative (SSYI) on City-Level Youth Crime Victimization Rates - An Interrupted Time Series Analysis with Comparison Groups, Final Report, dated October 11, 2014, 57 pages.

Research Objectives

Three descriptive objectives were investigated.

(1) To estimate the site-specific costs to society of implementing the SSYI interventions in Boston and Springfield, MA from January 2012 through December 2013;

(2) To estimate the potential economic benefits of the crime victimization reductions documented in the ITS study by applying reliable estimates of the economic losses incurred when violent crimes are committed; and

(3) To estimate the average annual ratio of society's benefit-to-cost ratios, after all amounts have been adjusted to 2013 dollars. Figure 2 describes the approach taken to estimate the BCRs for Springfield and Boston.

Figure 2: Estimating Societal Benefit-to-Cost Ratios for SSYI
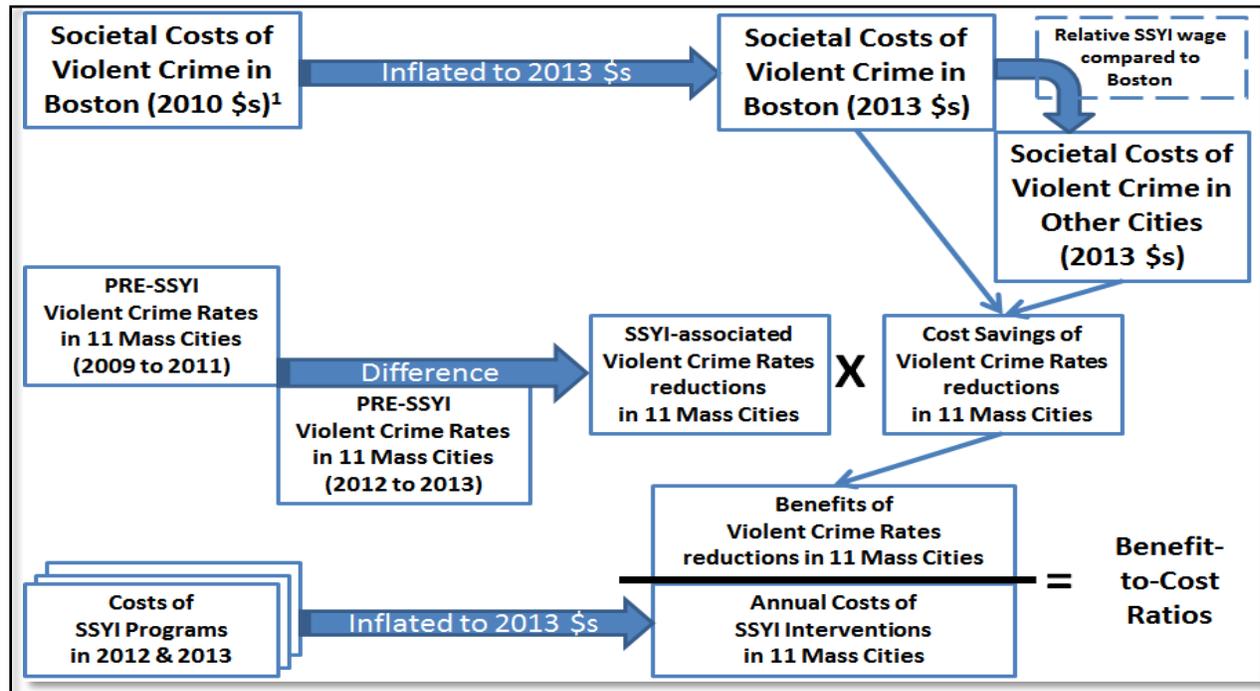
Methods

Our methods are consistent with recommendations for program evaluation in public health prevention (Drummond, et al, 2005; Brownson, et al, 2010; Gold et al, 1996; Haddix, et al, 2003). To fairly estimate the benefit gained (society's cost savings) through SSYI interventions, we converted the objective outcome measure (e.g., significant change in crime victimization rates per 100,000 residents) to a reasonable dollar value (2013 $s).

First, for each city, the monthly documented crime victimization rates from January 2009 to December 2013 were acquired from the local and state authorities and analyzed for trends at quarterly levels; but, comparing before and following the SSYI program between cities with and without SSYI funding. We accepted these findings, and the raw crime victimization data for the intervened cities were acquired from the Petrosino, et al 2014 study. These rates estimate the expected percentage of reduction in crime rates in each SSYI city. Secondly, a separate study (Shapiro and Hassett, 2012) estimated the economic costs of violent crimes in 2010 dollar values across ten American cities – one of which was Boston. Those 2010 Boston-specific costs of violent crime included both tangible and intangible annual costs per 10,000 residents,

including: (1) victim costs, (2) local, State and Federal law enforcement and criminal justice system costs, and (3) criminal's lost productivity have been inflated to 2013 dollars in Table 1.

TABLE 1:	The cost of violent crime per resident in eight U.S. cities (in Millions of 2013 $s)						
City	Intangible costs ($ millions)	Intangible costs per resident	Direct Costs ($ millions)	Direct Costs, per resident	Total Costs ($ millions)	Total Costs per resident	Savings in Millions $s with 10 % Crime Rate Reduction
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Boston	$786	$1,222	$212	$330	$997	$1,549	$99.7
Chicago	$4,501	$1,590	$1,182	$417	$5,683	$2,006	$568
Dallas	$1,545	$1,184	$388	$298	$1,934	$1,480	$193
Houston	$2,841	$1,247	$805	$353	$3,646	$1,599	$365
Jacksonville	$858	$1,046	$216	$263	$1,075	$1,307	$107
Milwaukee	$963	$1,590	$252	$415	$1,215	$2,005	$121
Philadelphia	$3,179	$2,039	$788	$505	$3,966	$2,545	$397
Seattle	$231	$375	$95	$154	$326	$527	$33
Total or Average	$3,937	$1,286	$14,905	$342	$18,842	$1,627	$1,884.7

Source: Original 2010 dollar values from TABLE 11, page 33. and column (c , f and g) from TABLE 12, page 34.
Shapiro, Robert J. and Hassett, Kevin A., The Economic Benefits of Reducing Violent Crime - A Case Study of 8 American Cities, Final Report June 2012, 67 pages.

Note: $93.2 million in cost savings per 1% reduction[1] in violent crimes in 2010 dollars for Boston is inflated to $99.7 million in 2013 values, (column g of Table 1).

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[1] The Shapiro and Hassett 2010 value ($s saved per % reduction in crime rate) is a **relative change ratio**. These ratios are used to detect the change measured between two points in time (e.g., Crime Rate change from 2012 to 2013), relative to the base year's rate (Crime Rate in 2012). The resulting ratio is a **unitless** measure that can be applied to crime rates calculated at any population level.

Estimated costs from 2010 and 2012 are inflated to 2013 values, using Consumer Price Index (CPI) multipliers (Table 2). Because these "cost-savings" include only a portion of healthcare expenses, the amount is considered very conservative from our perspective.

TABLE 2:	Multipliers for each year from 2003 to 2013, using the CPI and the MCPI				
				Multiplier to 2013 values	
	YEAR	CPI % Change/yr	MCPI % Change/yr	CPI	MCPI
	2010	0.0164	0.0341	1.07	1.10
	2011	0.0316	0.0304	1.05	1.07
	2012	0.0207	0.0366	1.02	1.04
	2013	0.0146	0.0246	1.00	1.00
NOTES:		http://data.bls.gov/cgi-bin/surveymost?cuur0000sa0		**Data Series**	
	CPI =	Consumer Price Index - All Urban Consumers		CUUR0000SA0	
	MCPI =	Medical Consumer Price Index - All Urban Consumers		CUUR0000SAM2	
		Base Period: 1982-84=100			

Boston's 2013 value of 99.7 million in potential cost savings per 10% reduction in crime rate was used as the "benefit of prevention" for each city, after adjusting Boston's dollar value to other Massachusetts cities' local dollar values by wage rate ratios in each year (see Table 3). Those wage rates came from the expenditure data collected from each city.

TABLE 3:	2013 Relative Dollar Value Adjustment, Compared to Boston Wages in SSYI				
City	Year	Position Title	Similar Position's 2012 Hourly Effective Wage Rate	Local Average Post-SSYI Years	Percent of Boston's Effective Wage for Similar Position
column	(a)	(b)	(c)	(d)	(e)
Boston	2012	Operations Manager	34.62	34.62	100%
	2013		34.62		
Springfield	2012	Program Manager	24.04	24.04	69%
	2013		24.04		
NOTES:	1	columns (b) & (c)	from 2013 and 2013 detailed expenditure data collected from SSYI Cities		
	2	columns (d) & (e)	authors' calculation of relative effective wage rate for similar positions		
	3	columns (f)	authors' calculation of relative effective wage rate for similar positions		

Benefit-to-Cost Ratios: The annual cost savings ("benefit of prevention") of violent crimes for each city was then placed over the city's estimated, average annual societal costs of the SSYI Program, and the BCR calculated (see Table 4).   The annual costs to society for implementing the intervention were acquired from the SSYI site's program personnel, including any volunteer labor or contributed space, and in-kind support from other partnering programs, or government services. By including these in-kind and volunteered resources, the perspective of the analysis is a societal one. The average Benefit-to-Cost ratios were estimated. In this report only the Boston and Springfield SSYI site data have been examined and verified sufficiently for reporting.

Findings

Our analysis found that in Boston the benefits from SSYI could be as much as $8.9 million with just a 0.9% reduction in the violent crime rate (see Table 4, columns f and g).

TABLE 4:		Average Crime Rate Reductions Achieved in 2012 & 2013 and Estimated Savings					
City	Year	Total Violent Crime Rate per 10,000 Residents	Average Rate Pre-SSYI Years	Average Rate Post-SSYI Years	Reduction per 10,000	Percent Crime Rate Decrease with SSYI from Pre-SSYI	Annual Savings in Millions (2013$) with Recorded Reduction in Violent Crime[3,4,5]
column	(a)	(b)[1]	(c)	(d)	(e)[2]	(f)	(g)
Boston	2009	142.4					
	2010	139.3	138.4				
	2011	133.4			14.4	**0.90**	**$8.9**
	2012	125.3		124.0			
	2013	122.8					
Springfield	2009	199.0					
	2010	200.4	196.7				
	2011	190.7			28.6	**0.85**	**$5.9**
	2012	179.4		168.2			
	2013	156.9					
NOTES:	1	column (b)	from Petrosino, et al, 2014 (unadjusted rates calculated to 10,000 residents [2010 Census])				
	2	column (c)	authors' calculation				
	3	$93.2	million per 10% reduction in violent crime for Boston in 2010 $s (Shapiro & Hassett, 2012)				
	4	$99.7	million per 10% reduction in violent crime for Boston in 2013 $s (authors' calculation)				
	5	column (g)	non-Boston values are adjusted by relative effective wage rates (see Table 4)				

The 2013 adjusted annual average costs of the SSYI program in Boston of $1.2 million, not augmented by donated time, space or materials, would then generate a very positive BCR of 7.37 (see Table 5, columns d, e and f).

TABLE 5:				Safe & Successful Youth Initiative 2012 & 2013 Expenditures & Donations		
City	Year	SSYI Expenditures (in 2013 $s)	SSYI Donations (in 2013 $s)	Total Annual Societal Costs of Implementing SSYI (in 2013 $s)	Total Annual Estimated Societal Benefits (in 2013 $s)	SSYI Benefit-to-Cost Ratios
column	(a)	(b)	(c)	(d)	(e)	(f)
Boston	2012	$119,566	$0	$1,211,832	$8,936,019	7.4
	2013	$2,304,098	$0			
Springfield	2012	$615,573	$247,398	$851,941	$5,918,346	6.9
	2013	$764,546	$76,364			
NOTES:	1	column (b)	from each SSYI Program, using authors' data collection tool			
	2	column (c)	from each SSYI Program, using programs' estimate of donated personnel, space and materials			
	3	column (d)	sum of columns b and c			
	4	column (e)	from column f in Table 4			
	5	column (f)	authors' calculations			

This ratio would suggest that typically a dollar invested in Boston's SSYI program could be expected to gain a savings of nearly $7.40 in crime-related cost savings (see Table 5, column f). In Springfield, (where donated time, materials and space accounted for nearly 20% of the total annual societal costs), the SSYI program's adjusted annual average costs of $851,941 would be associated with an estimated costs savings of $5.91 million (see column e of Table 5). These amounts would generate a Benefit-to-Cost Ratio of 6.9, or a suggested 1 dollar in investment in the SSYI program would be associated with a likely cost-savings of just over $6.95.

Limitations

The estimated reductions in violent crime victimizations were carefully analyzed by the Petrosino team, and were shown to be significantly different after the SSYI implementation; although these declines were in a series of declining contextual rates. The details of the ITS estimation were not part of our analysis. However, these effect measures are exogenous environmental observations aggregated at population levels, and may not be directly causally linked to the programs' impact of their targeted participants. While the association is strongly suggestive of a relationship, the evidence is not definitive. Our estimated economic benefits are

tied to these estimated reductions in aggregate violent crime rates. However, the PSM analysis that examined youth-level outcomes from participation in SSYI found reductions in future incarceration likelihood that are consistent with the reduction in violent crime victimizations reported in the ITS study.

The city-specific estimates used in the BCR analysis are reliant upon a 2010 study (Shapiro and Hassett) which included only one Massachusetts city – Boston. Since we find their estimation routine to be consistent with literature recommendations and believe it is reliable, we have used it and incremented by national Consumer Price Index inflators, lacking time and resources to replicate it across Massachusetts. However, we do feel that their approach has under-estimated the healthcare expense to society, thus providing a very conservative amount for the costs per percent reduction in violent crimes rates, which we use as the benefit weight for the reductions in crime rates found in each city.

The use of Boston's external cost-savings rate, adjusted with wage rate adjustments to the local level for non-Boston SSYI sites, is internally consistent with our collected data from the SSYI programs. Alternative strategies (e.g., state economic data) for making this within-state dollar adjustment would have required additional resources and time. Since the State's reported wage rates would be less sensitive to the non-profit wage rates set in these SSYI programs, we are more comfortable with our internally derived method.

Implications

This BCR study is considered preliminary because aside from Boston and Springfield, nine other cities in Massachusetts implemented the SSYI program but were unable to provide their data describing the implementation costs to society when this study was done. We expect these data to become available in the future and at that time we will update our analyses so we can generate a broader and more reliable picture of the potential economic value of SSYI overall. Moreover, considering the promising findings from the ITS and PSM studies, and the BCR estimates generated in this preliminary report, we recommend that an experimental impact evaluation, be considered as a next step for determining long-term outcomes from the SSYI.

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