High School Completion Programs: A Community Guide Systematic Economic Review

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Context: On-time high school graduation rate is among the 26 leading health indicators for *Healthy People 2020*. High school completion (HSC) programs aim to increase the likelihood that students finish high school and receive a high school diploma or complete a GED (General Educational Development) program. This systematic review was conducted to determine the economic impact of HSC interventions, assess variability in cost-effectiveness of different types of programs, and compare the lifetime benefit of completing high school with the cost of intervention. **Evidence Acquisition** : Forty-seven included studies were identified from 5303 articles published in English from January 1985 to December 2012. The economic evidence was summarized by type of HSC program. All monetary values were expressed in 2012 US dollars. The data were analyzed in 2013. **Evidence Synthesis:** Thirty-seven studies provided estimates of incremental cost per additional high school graduate, with a median cost for HSC programs of $69 800 (interquartile interval = $35 900-$130 300). Cost-effectiveness ratios varied depending on intervention type, study settings, student populations, and costing methodologies. Ten studies estimated the lifetime difference of economic benefits between high school nongraduates and graduates; 4 used a governmental perspective and reported benefit per additional high school to range from $187 000 to $240 000; 6 used a societal perspective and reported a range of $347 000 to $718 000. Benefits exceeded costs in most studies from a governmental perspective and in all studies from a societal perspective. **Conclusion:** Interventions to increase HSC rates produce substantial economic benefits to government and society including averted health care costs. From a societal perspective, the benefits also exceed costs, implying a positive rate of return from investment in HSC programs.

KEY WORDS: cost-benefit, cost-effectiveness, GED, high school completion programs, systematic economic review, The Community Guide

● Context

A person's education level is strongly associated with his or her employment status, income, and health.[1-3] It is also associated with broader societal benefits including reduced crime and lower welfare dependency.[4] Although the level of education can be influenced by family background and personal characteristics, it can also be affected by appropriate health, education, or policy interventions.[5-7] Completing high school is usually seen as a minimum level of education required to develop knowledge and skills essential for success later in adulthood.[8]

Educational attainment is linked with health through 3 major interrelated pathways: health knowledge and behaviors; employment and income; and social and psychological factors, including a sense of control and social support.[9] Education increases knowledge and cognitive skills of people that enable them to make better health choices, including those related to timely receipt of medical care. It is also associated with health-promoting behaviors such as engaging in regular exercise, eating a healthy diet, and refraining from smoking and excessive alcohol consumption.[10] Second, more education improves the prospects for both employment and higher-paying jobs leading to improved living conditions and better access to health insurance. Finally, education fosters sense of control, social standing, and social support that have been linked to better physical and mental health outcomes.[9]

High school completion (HSC) is widely recognized as a minimum entry requirement for higher education and well-paid jobs.[11] On-time high school graduation rate is among the 26 leading health indicators for *Healthy People 2020* that provides a comprehensive set of 10-year national goals and objectives for improving the health of all Americans.[12] HSC programs aim to increase the likelihood that students finish high school and receive a high school diploma or complete a GED (General Educational Development) program. HSC programs take many forms and may be delivered in schools or community settings outside of school. They may target at-risk students as individuals or as groups (eg, pregnant students, students who have children, low-socioeconomic status students, racial/ethnic minorities) or they may include all students in a school that has low rates of HSC. Programs may have a single focus, such as mentoring, or they may be multiservice programs that change several features of the school environment to promote HSC.

The United States lags behind other developed countries in high school graduation rates, and rates differ nationally depending on race, ethnicity, and family income.[13] Increasing high school graduation rates among children with different racial and ethnic backgrounds and family incomes is a persistent challenge for the United States. Because academic achievement is linked with long-term health, and because HSC programs are commonly implemented in minority or low-income communities, these programs may also improve health equity.[13]

The Community Preventive Services Task Force found strong evidence of effectiveness of HSC programs in increasing HSC rates.[14] Although several economic evaluations of HSC programs have been published, there has been no systematic review of those evaluations. This systematic review of these economic evaluations was conducted to fill that gap by determining the economic impact of HSC interventions, assessing variability in cost-effectiveness of different types of programs, and comparing the lifetime benefit of completing high school to the cost of intervention.

● Evidence Acquisition

Search for evidence

The economic database search used search terms from the effectiveness review.[15,16] The search covered the period January 1985 to December 2012 and used the following sources: PubMed, ERIC, JSTOR, Center for Reviews and Dissemination at the University of York, MEDLINE, EconLit, PsycINFO, and Google Scholar.

Inclusion criteria

This economic review examined all the economic related outcomes from the included studies of an existing meta-analysis published in 2011[15] and an updated search for newer studies.[16] Studies were included if they met the inclusion criteria for the effectiveness review and satisfied additional requirements for the economic review. In particular, to qualify for inclusion, a study had to

- evaluate an intervention meeting the definition of an HSC program;
- evaluate a study population of K-12 students at risk for high school noncompletion (low income, racial or ethnic minority, pregnant or teen parent, or otherwise noted by author as at risk for noncompletion);
- measure and report HSC outcomes, including receipt of GED, and evaluate the relative effectiveness of HSC programs among a group of students compared with students not receiving the intervention;
- report economic related outcomes;
- be published in English; and
- be conducted in a high-income country.

The search terms and database information are available at www.thecommunityguide.org/healthequity/education/supportingmaterials/SS-highschoolcompletion.html.

Classification of HSC programs

The effectiveness review[16] described 11 major types of HSC programs with definitions and examples: vocational training, alternative schooling, social-emotional skills training, college-oriented programming, mentoring and counseling, supplemental academic services, school and class restructuring, multiservice packages, attendance monitoring, community service, and case

management. The same classification system was used in this economic review.

Economic methods

Economic review methods developed for the Guide to Community Preventive Services[17] (The Community Guide) were used to screen and abstract included studies. The economic evidence was summarized by economic content including cost, benefit, cost-effectiveness, and cost-benefit information and by type of HSC programs. All monetary values were expressed in 2012 US dollars using Consumer Price Index from the US Bureau of Labor Statistics[18] and Purchasing Power Parity from the World Bank[19] for converting international currencies.

Conceptual approach

For the analysis, conducted in 2013, the intervention costs per student were collected first. *Intervention costs* of HSC programs are the incremental costs of the intervention group over those of the control group and include development as well as operation costs. *Development costs* refer to the 1-time cost of program planning and program evaluation. *Operation costs* refer to ongoing costs of personnel, facilities and utilities, staff training, classroom supplies and materials, transportation, recreational activities, and financial incentives from the program to encourage students' school attendance.

> Incremental cost-effectiveness ratio (ICER) is the ratio of the change in costs between the intervention and control groups divided by the change in the number of high school graduates between the 2 groups. The number of additional high school graduates from an HSC program reflects its incremental benefit. The intervention with a higher ICER is less cost-effective.

The incremental cost per student was divided by the percentage point gain in the HSC rate to compute the ICER as cost per additional high school graduate. When an intervention was estimated to have no effect on graduation rates, the ICER was infinitely high.

Next, lifetime benefit per additional high school graduate was calculated and compared with cost per additional high school graduate. When evaluating the benefits, economists typically distinguish between governmental or societal perspectives. Benefits from a governmental perspective are those gained only by the government, such as additional tax revenues or reduced Medicare and Medicaid expenditures. A societal perspective, on the contrary, assesses all benefits associated with an intervention that can be expressed in monetary terms, including components from the governmental perspective and nongovernmental components such as increased gross earnings of individuals with a high school degree and reduced private health care out-of-pocket spending. The economic benefits of HSC programs primarily included the monetary value of productivity loss averted and averted health care, crime, and welfare costs. Some studies also considered indirect educational cost. These components are as follows:

- *Productivity loss averted*: Because education provides skills that can increase a person's productivity, people who do not complete high school are less likely to be employed or to be selected for high-paying employment, leading to substantially lower annual earnings.[20,21] The discounted value of the earning difference between a high school graduate and a nongraduate was calculated as productivity loss averted, using the assumption that a person now aged 20 years would continue a lifetime of productive work for 35 to 45 years. In the governmental perspective, only lost tax revenues from the loss of high-paying jobs were calculated.

- *Health care cost averted*: People with more education typically live longer and healthier lives and are less likely to suffer from illnesses.[22] Better health condition can reduce the fiscal pressure on government-supported programs and care such as Medicare and Medicaid. Also, compared with high school dropouts, graduates are also more likely to be employed in jobs with health insurance. These benefits can be monetized by estimating the savings in private and public health care expenditures.

- *Crime cost averted*: High school graduates are less likely to commit crimes than high school dropouts.[23] Savings from reduced crime can be realized in terms of reduced direct losses due to crime; reduced costs of the criminal justice system, including policing and court costs; costs associated with imprisonment of offenders and parole and probation; and other crime prevention costs.[23,24]

- *Public assistance cost averted*: People with more education are less likely to need public assistance.[25] Cost of such assistance can be cash assistance (eg, receipt of Temporary Assistance for Needy Families), housing assistance, food stamps (the Supplemental Nutrition Assistance Program), or other supportive services.[25]

- *Indirect education cost*: If students are newly motivated to continue their education, the extra costs of additional time in secondary education will be borne by both schools and families. Some studies considered this indirect education cost related to HSC programs, which reduced the net benefits obtained from such programs.

Finally, costs were compared with benefits per additional high school graduate from both governmental and societal perspectives, and the cost-benefit

estimates, measured as benefit-to-cost ratios (BCRs), were calculated to derive the returns from investment in these programs.

A BCR is the ratio of the benefits of the intervention, expressed in monetary terms, relative to its costs, also expressed in monetary terms.

A BCR greater than 1 means positive rate of return from investment. The higher the BCR, the better is the investment.

● Evidence Synthesis

Characteristics of included studies

The economic database search yielded a total of 5303 articles. After screening, 47 eligible studies in 27 articles were identified (Figure 1), most of which focused on local programs, were designed for the at-risk general population and for students still in school, and were conducted in the United States.

Intervention cost

Thirty-seven studies in 21 articles[26-46] reported intervention cost. The ranges of annual and total costs per student are listed in Table 1. Case management, supplemental academic services, and multiservice programs were relatively resource-intensive and thus more expensive. The community service program[46] had the lowest estimated cost of only $300 per student for 2 years. This program was designed for secondary stu-

FIGURE 1 ● **Economic Evidence Search Yield**
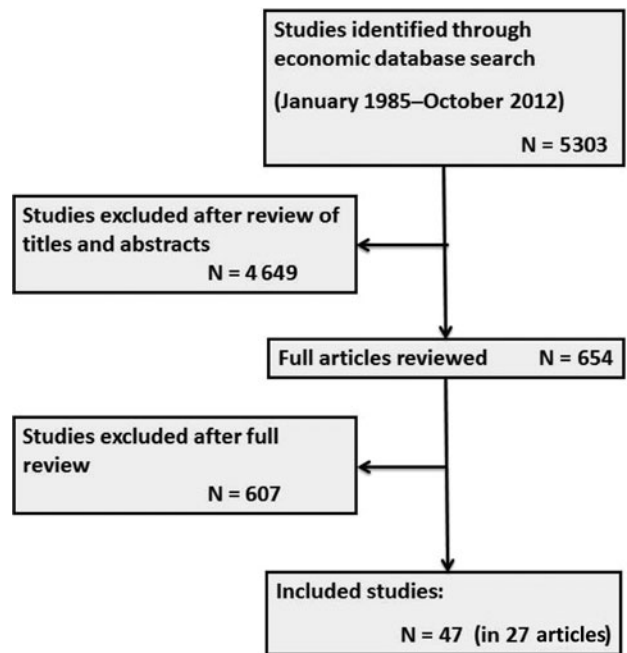
dents to serve as tutors of elementary students and save the salaries for teachers who served as coordinators/mentors, a major cost driver.
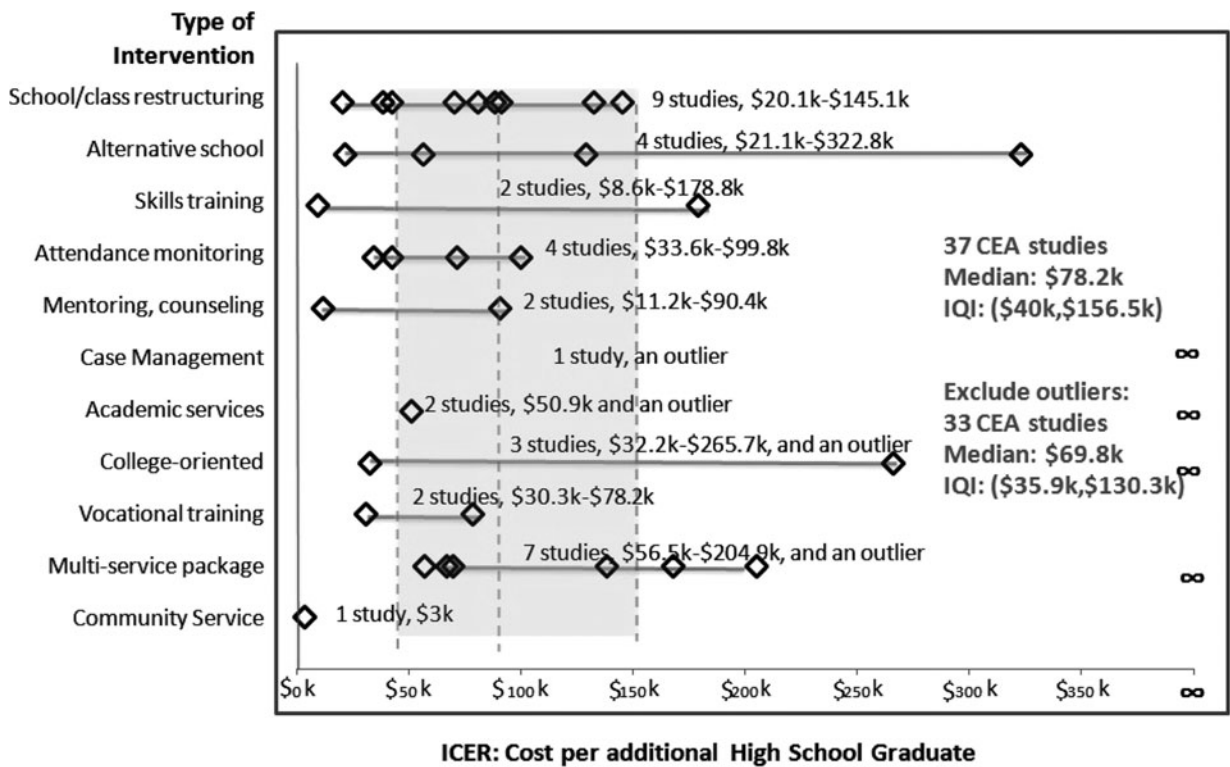
Cost-effectiveness analyses

Thirty-seven studies in 21 articles[26-46] provided enough information for the authors to calculate

TABLE 1 ● **Intervention Cost of High School Completion Programs**

Program Category and Type	No. of Studies[a]	Range of Annual Cost per Student ($000s)	Range of Total Cost per Student ($000s)
Environmental change			
School or class restructuring	9[26,27,30-32,45]	$0.7-$5.5	$2.2-$16
Alternative schools	4[33,34]	$0.9-$6.5	$1.7-$12.9
Learning skills, monitoring, and development			
Social-emotional skills training	2[33,35]	$2.4-$2.9	$1.1-$7.2
Attendance monitoring	4[26,28,32,36]	$0.7-$1.4	$2.1-$5.7
Mentoring, counseling	2[26,33]	$0.6-$1.5	$0.6-$4.5
Case management	1[37]	$4.6	$22.8
Academic and professional development			
Supplemental academic services	2[38,39]	$3.1-$35.0	$0.8-$14.9
College-oriented programming	3[38,40,41]	$0.7-$5.8	$3.6-$5.8
Vocational training	2[29,38]	$0.8-$5.9	$2.1-$11.1
Miscellaneous			
Multiservice package	7[26,33,38,42-44]	$0.7-$11.8	$4.1-$23.5
Community service	1[46]	$0.15	$0.3

[a]Some articles reported on more than 1 study, so number of studies does not always equal number of articles.

FIGURE 2 ● **Summary of the 37 Included CEAs**

Abbreviations: CEA, cost-effectiveness analysis; ICER, incremental cost-effectiveness ratio; IQI, interquartile interval.

cost-effectiveness ratios in terms of incremental cost per additional high school graduate. Median cost per additional high school graduate for HSC programs was $78 200 with an interquartile interval (IQI) of $40 000 to $156 500. Figure 2 provides a summary of the 37 included cost-effectiveness analyses stratified by 11 major types of intervention. Attendance monitoring, mentoring and counseling, vocational training, and community service programs had the lowest estimated costs per additional graduate and were most cost-effective. However, it is unreliable to rank the economic efficiency of these programs based on cost-effectiveness ratios because costs varied by type of programs, services offered, intervention setting, targeted student population, and use of local prices to value resources. The pooled cost from multiple sites may also mask significant variations in site-specific costs. Also, there are only a few studies for many programs that were found to be relatively more cost-effective.

Of the 37 cost-effectiveness studies, 4 studies[33,37,39,40] were considered outliers because the interventions showed no change in the HSC rate, resulting in an infinitely high ICER. Excluding these outliers, the overall median ICER was $69 800 per additional graduate (IQI = $35 900-$130 300). Details of the 4 outliers are considered in the "Discussion" section.

Cost-effectiveness measures for the general at-risk population were compared with those for students who were pregnant or had children. Samples were derived from attendance monitoring programs[26,28,32,36] and multiservice package programs.[26,38,42-44] Results reported in Table 2 indicated that, for attendance monitoring programs, cost per additional high school graduate for the high-risk population was higher than that in the general population. For multiservice package programs, ICERs varied substantially by program for both general and high-risk student populations.

Cost-effectiveness measures for students still in school were compared with those for students who had already dropped out. Samples also were derived from attendance monitoring programs[26,28,32,36] and multiservice package programs.[26,38,42-44] Results indicated that cost per additional high school graduate was lower for students still in school than those who had already dropped out (Table 3).

Benefit analyses

The economic review identified 10 benefit analyses—4 from the governmental perspective[27,47,48,49] and 6 from the societal perspective.[47-52] Lifetime benefits per additional high school graduate from the governmental

TABLE 2 ● **Incremental Cost-effectiveness Ratios for General Population Versus SPC**

Program Type	Population	Program	$/Additional High School Graduate ($000s)
Attendance monitoring and contingencies	General population	Check & Connect[26]	$33.6
		Conditional Cash Transfer[32]	$41.8
		ALAS[26]	$70.9
	SPC	LEAP[28,36]	$99.8
Multiservice package	General population	Social Development Project[42]	$56.5
		I Have a Dream[26]	$66.3
		Job Corps[38]	$138
	SPC	Family Support Center[44]	$67.2
		Project Redirection[43]	$167.8
		New Chance[38]	$204.9

Abbreviation: SPC, students who are pregnant or have children.

perspective ranged from $187 000 to $240 000, and those from the societal perspective ranged from $347 000 to $718 000 (Table 4). The highest estimates from both perspectives come from the Belfield et al[48] study, which had a more restricted population sample than other studies (ie, the averted costs were based on a sample of individuals who had already dropped out of high school, were currently unemployed, might be involved in the criminal justice system, or might have mental or physical health conditions).

Cost-benefit analyses

Because most interventions were funded by either federal or state/local governments, the BCR from a governmental perspective was also calculated. Benefit and cost data were from studies of programs in California,[49] New York State,[47] and nationwide.[27] The overall median of BCRs from 22 studies was 2.2 (IQI =

1.5-4.7; Table 5), demonstrating positive returns from investment for HSC programs. For 2 studies,[33,41] the BCR was less than 1 while it was very high for one study.[46] As the economic benefits for specific state or national programs were held constant, this variation in the BCRs was driven by the variation in costs per additional high school graduate. Despite the range of variation in the BCRs, the economic benefits of all HSC programs exceeded the costs of intervention from a societal perspective.

● Conclusion

Summary of findings

The economic evidence showed that interventions to increase HSC rates produce substantial economic benefits to government and society including averted health

TABLE 3 ● **Incremental Cost-effectiveness Ratios for Students Still in School Versus Dropouts**

Program Type	Population	Program	$/Additional High School Graduate ($000s)
Attendance monitoring and contingencies	Still in school	Check &Connect[26]	$33.6
		Conditional Cash Transfer[32]	$41.8
		ALAS[26]	$70.9
	Already dropped out	LEAP (mixed)[28,36]	$99.8
Multiservice package	Still in school	Social Development Project[42]	$56.5
		I Have a Dream[26]	$66.3
		Family Support Center[44]	$67.2
	Already dropped out	Job Corps[38]	$138
		Project Redirection[43]	$167.8
		New Chance[38]	$204.9

TABLE 4 ● Lifetime Benefit of Graduating From High School

Study	Population	Benefits ($000s)					Lifetime Benefits per Additional High School Graduate ($000s)
		Productivity Loss Averted	Health Care Cost Averted	Crime Cost Averted	Welfare Cost Averted	Indirect Educational Cost	
Governmental perspective (N = 4)							
Belfield and Levin, 2007 (California)[49]	High school/GED	$112	$65.2	$35.4	$8.4	$(34)	$187.0
Belfield, 2007 (New York)[47]	High school/GED	$115.6	$53.9	$27.7	$5.6	. . .	$202.8
Levin et al, 2007 (United States)[27]	High school/GED	$154.0	$44.9	$29.5	$3.3	$(27)	$204.7
Belfield et al, 2012 (United States)[48]	Opp Youth	$115.6	$54.1	$68.1	$13.6	$(11.1)	$240.3
Societal perspective (N = 6)							
Hankivsky, 2008 (Canada)[50]	High school	$121.1	$226.3	. . .	. . .	. . .	$347.4
Belfield and Levin, 2007 (California)[49]	HS/GED	$315.6	$32.8	$112.4	$4.1	$(29.8)	$435.1
Lewis et al, 2005 (Louisiana)[52]	High school	$374.9	. . .	$67.4	. . .	. . .	$442.3
Catterall, 1987 (United States)[51]	High school/GED	$436.4	. . .	. . .	$20.2	. . .	$456.6
Belfield, 2007 (New York)[47]	High School/GED	$433.0	$53.9	$124.7	$5.6	. . .	$617.2
Belfield et al, 2012 (United States)[48]	Opp Youth	$487.1	$54.1	$181.7	$16.8	$(21.6)	$718.1

Abbreviations: GED, General Educational Development; Opp, opportunity.

care costs. From a societal perspective, the benefits also exceeded costs, implying a positive rate of return from investment in HSC programs.

Discussion
Outliers

In the cost-effectiveness analyses, 4 studies were considered outliers because the interventions showed no change in HSC rate, resulting in an ICER that was infinitely high. The Upward Bound[40] and Up with Literacy[33] programs focused on helping students graduate from high school and enter college; they had very high baseline high school graduation rates, indicating that those programs do not target high-risk students. The author of the Quantum Opportunity Program[37] attributed the program's failure to implementation issues, including difficulty of implementing the full Quantum Opportunity Program model, low participation rate, and limited influence on students' classroom activities. For the computer-assisted GED program,[39] most students said they failed the test because they did not stay with the program long enough to be ready for testing.

Longevity issues

This review included 10 studies that simulated the lifetime benefit per additional high school graduate from the governmental and societal perspectives; however, some may argue that economic issues related to greater longevity should also be considered. Although living longer than currently expected could pose financial challenges to national entitlement programs such as Social Security and Medicare, the extension of healthy productive lives would transform these challenges into opportunities. For example, people who reach older ages with their health intact will require fewer resources from Medicare, and some may choose to work longer—lessening the impact of a shifting age structure on the Social Security Trust Fund.[53] Owing to this potentially counteracting impact, economic issues related to greater longevity were not considered in this review.

GED versus high school diploma

Although GED is a primary option available to individuals to complete high school outside of a regular high school curriculum, there is evidence in the literature to show that GED recipients tend to fare significantly

TABLE 5 ● **Estimated Benefit-to-Cost Ratios for High School Completion Programs**

Location	Program	Intervention	Benefits per Additional High School Graduate ($000s)	Costs per Additional High School Graduate ($000s)	Benefit-to-Cost Ratio[a]
California programs (N = 9)	Project STAR—California[26]	School/class restructuring	$187.0 (California data, governmental perspective)	$145.1	1.3
	Twelve Together[26]	Mentoring, counseling		$90.4	2.1
	Project STAR—California free lunch eligible[26]	School/class restructuring		$89.3	2.1
	California Peninsula Academies[45]	School/class restructuring		$80.4	2.3
	Achievement for Latinos through Academic Success[26]	Attendance monitoring		$70.9	2.6
	I Have a Dream[26]	Multiservice package		$66.3	2.8
	First Thing First—California[26]	School/class restructuring		$41.9	4.5
	Check & Connect[26]	Attendance monitoring		$33.6	5.6
	Career Academies[26]	School/class restructuring		$20.1	9.3
New York programs (N = 3)	Project ACCEL[33]	Alternative schools	$202.8 (New York data, governmental perspective)	$322.8	0.6
	Small Schools of Choice (SSCs),[31] 2005-2008	School/class restructuring		$88.2	1.6
	Small Schools of Choice (SSCs),[31] 2007-2010	School/class restructuring		$69.8	1.7
National programs (N = 10)	Upward Bound Math[41]	College-oriented programming	$204.7 (national data, governmental perspective)	$265.7	0.8
	New Chance[38]	Multiservice package		$204.9	1.1
	Project Redirection[43]	Multiservice package		$167.8	1.2
	Job Corps[38]	Multiservice package		$138	1.6
	High School Redirection[34]	Alternative schools		$128.8	1.6
	JOBSTART[38]	Vocational training		$78.2	2.9
	National Guard Youth Challenge[38]	Academic services		$50.9	4.2
	First Thing First[27]—Kansas, Texas, Missouri, Mississippi	School/class restructuring		$38.1	5.4
	JTPA Title II-A Programs[29]	Vocational training		$30.3	6.8
	The Coca-Cola Valued Youth[46]	Community service		$3	68.2

Abbreviation: JTPA, Job Training Partnership Act.
[a]Median benefit-to-cost ratio for all programs was 2.2 (interquartile interval = 1.5-4.7).

worse than those having regular high school diploma across a range of measures including hourly, annual, and lifetime earnings.[54-57] Economic benefits are overestimated by assuming that GED receipt turned recipients into average high school graduates.

Limitations and evidence gaps

The studies reporting intervention costs were heterogeneous in terms of program type, cost components included, duration and intensity of program,

staff-to-student ratio, and cost-of-living levels in different school areas. Ideally, both cost and effectiveness data for an intervention would be collected simultaneously at the time of evaluation, and the cost data would be collected using the same methods across studies. However, most cost data in this review were collected from program budgets, which usually did not provide adequate information on particular cost components and factors to analyze variations of cost. Moreover, some in-kind donations, such as volunteer time or a free facility provided by a local school, were not counted. For some types of programs—such as social-emotional skills training, mentoring and counseling, case management, supplemental academic services, vocational training, and community service programs—the number of cost-effectiveness studies was small, making it difficult to form a definitive conclusion about their cost-effectiveness. Potential variation in the precise benefits resulting from different HSC interventions was not examined, and some HSC programs may be more likely to produce high school graduates with higher future earnings than other programs. As regard overestimation of benefits by treating GED recipients as equivalent to high school graduates, the lack of knowledge about the differences in health, crime, and welfare dependency outcomes between GED recipients and high school graduates makes it difficult to estimate the magnitude of this overestimation. Also, although there were studies that discussed changes in quality-adjusted life years with each additional year of schooling, no studies explicitly considered the effect of HSC on quality-adjusted life years. Finally, cost savings from reduced childcare costs and reduced grade retention were not included in the reviewed studies, suggesting that benefits were underestimated.

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