

Out-of-School-Time Academic Programs Are Recommended to Improve Academic Achievement and Health Equity

Community Preventive Services Task Force

The Community Preventive Services Task Force makes several recommendations for academically at-risk students: reading-focused out-of-school-time academic programs are recommended on the basis of strong evidence of effectiveness in improving the reading achievement of students in grade levels K-3. Mathematics-focused out-of-school-time academic programs are recommended on the basis of sufficient evidence of effectiveness in improving mathematics achievement. General out-of-school-time academic programs that do not focus on one specific subject are recommended on the basis of sufficient evidence of effectiveness in improving the reading and mathematics achievement. Out-of-school-time academic programs with minimal academic content have insufficient evidence to determine the effectiveness of these programs. Because academic achievement is linked with long-term health, and because out-of-school-time academic programs are commonly implemented in racial and ethnic and minority or low-income communities, these programs are likely to improve health equity.

KEY WORDS: academic achievement, after-school, health equity, recommendation, summer school

● Task Force Finding

The Community Preventive Services Task Force issued separate findings for 4 types of out-of-school-time academic programs.

- Reading-focused out-of-school-time academic programs are recommended on the basis of strong

evidence of effectiveness in improving the reading achievement of academically at-risk students in grade levels K-3.

- Mathematics-focused out-of-school-time academic programs are recommended on the basis of sufficient evidence of effectiveness in improving the mathematics achievement of academically at-risk students. Effects appear greater for older students (grade levels 7-12) than for younger students (grade levels 2-5), although the number of studies is too small to draw a firm conclusion.
- General out-of-school-time academic programs that do not focus on one specific subject are recommended on the basis of sufficient evidence of effectiveness in improving the reading and mathematics achievement of academically at-risk students, although the magnitude of each effect is smaller than those from reading- and mathematics-focused programs.
- Out-of-school-time academic programs with minimal academic content have insufficient evidence to determine the effectiveness of these programs that typically only provide homework assistance or time to complete homework.

The achievement gains apparent after out-of-school-time academic programs do not, themselves, guarantee academic achievement in later years. Ongoing school and social environments that support learning and development are essential.

Because academic achievement is linked with long-term health, and because out-of-school-time academic programs are commonly implemented in racial and

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ethnic minority or low-income communities, these programs are likely to improve health equity. Equity in health is the widespread, achievable, equality in health and in the major social determinants of health in all the principal social divisions of a population.

● **Definition**

Out-of-school-time academic programs are programs provided outside of regular school hours to students in grades K-12 who are either low-achieving or at risk of low achievement. Out-of-school-time academic programs are offered during the school year—usually after school hours—or during summer recess.

These programs *must include* an academic component, which can range from minimal academic content, such as supervised time for students to complete their homework or receive homework assistance, to more intensive tutoring or remedial classes focused on specific subjects, such as reading or mathematics. To address other goals, programs also *may include* sports and recreation, snacks, or counseling. Attendance is most often voluntary, although students may be required to participate under certain circumstances (eg, to avoid retention in grade).

● **Basis of Findings**

Results from 55 studies were combined quantitatively for reading and mathematics achievement outcomes, as measured by standardized achievement tests. A meta-analysis published in 2006¹ (search period 1985-2003) met Community Guide standards in terms of intervention definition, outcomes assessed, and research methods. Of the 35 studies included in the meta-analysis, 4 studies were excluded from the review on which these recommendations are based.² An updated Community Guide search (2003-2011) identified 24 additional studies. The review on which these recommendations are based combined evidence from the published meta-analysis and studies identified in the update. One additional, independent systematic review³ of summer

school programs was reviewed and provided complementary evidence.

The included studies were stratified by program focus:

- Reading
- Mathematics
- General academic, including reading, mathematics, and other subjects
- Minimal academic programs in which academics were a small component

Analysis showed that reading-focused programs were more effective than general academic programs (Table). Mathematics-focused programs also outperformed general academic programs, although the number of mathematics-focused programs was small. Only one of the included studies (not shown in the Table) evaluated the effect of a minimal academic program on mathematics and reading achievement, providing insufficient evidence to determine effectiveness of these programs.

Stratification by temporal setting (ie, summer and after-school) showed increased effectiveness of summer school compared with after-school programs, especially for general academic programs. For reading achievement, general academic summer programs yielded a median of 0.20 SD (interquartile interval [IQI] = -0.02 to 0.38) compared with a median of 0.05 SD (IQI = 0.00-0.09) for after-school programs. For mathematics achievement in general academic programs, summer programs yielded a median of 0.22 SD (IQI = -0.05 to 0.29) compared with 0.04 SD (IQI = 0.00-0.24) for after-school programs.

Several studies from the update period also reported effects of out-of-school-time academic programs on high school completion, college participation, delinquency, and substance use. There was not enough evidence, however, to determine effectiveness of the intervention on these outcomes due to the small number of studies and inconsistent results.

Available evidence was used to assess several additional potential effect modifiers and dose-response relationships. Greater program effectiveness was found in studies that used untreated controls rather than treated

TABLE ● Program Effects on Reading and Mathematics Outcomes

Program Focus (No. of Studies)	Reading Effects	Mathematics Effects
Reading (23)	0.31 SD (IQI = 0.02-0.58)	NA ^a
Mathematics (5)	NA ^b	0.12 SD (range = -0.32 to 1.33)
General (21)	0.09 SD (IQI = 0.00-0.26)	0.06 SD (IQI = -0.01 to 0.24)

Abbreviations: IQI, interquartile interval; NA, not applicable.

^aNo reading-focused studies reported program effects on mathematics achievement.

^bNo mathematics-focused studies reported program effects on reading achievement.

controls or controls whose treatment conditions were not reported. Combined evidence from the Lauer et al¹ and Community Guide update review² suggested that programs providing only individualized instruction (ie, one-on-one tutoring, computer-assisted instruction, homework assistance) had smaller effects than programs providing only group instruction and that the greatest effects were found in programs that combined individualized and group instruction. However, this analysis did not account for academic focus.

Evidence was sparse on the effects of program duration and program participation (ie, proportion of the program attended). Lauer et al¹ found that programs had to provide a minimum of 45 hours of instruction to see substantial improvements in reading and mathematics achievement. Included studies showed little evidence on differential effects based on socioeconomic status of participants; however, Cooper et al³ found that summer-time academic programs had greater benefit among middle-class than lower-class participants.

● **Applicability and Generalizability**

On the basis of the settings and populations from included studies, results are applicable to urban K-12 US schools, low-income populations, and summer and after-school programs.

Analysis of program effects by grade level indicated that reading-focused programs show effects only at lower grade levels. The median standardized mean difference in programs for students in grades K-3 was 0.43 (IQI = 0.11-1.05) and for students in grades 4-12 was -0.02 (IQI = -0.06 to 0.06). The reverse appears to be the case for mathematics-focused programs, although the number of studies was too small to draw a conclusion. Study populations were mostly racial and ethnic minority students, with high proportions eligible for free or reduced-price lunch—an indicator of poverty. All studies evaluated programs in the United States.

● **Additional Benefits and Potential Harms**

An additional benefit of out-of-school-time academic programs reported in the literature is the possibility of extra work time, and thus income, for parents whose children attend programs.⁴ Other potential benefits include providing a safe environment for children during nonschool hours and improving nutrition for students who receive healthy food as part of the program.

Potential harms of the intervention include reductions in unstructured play time and family time.⁵ Although decreased opportunities for students to work part-time may be a benefit (part-time student work has

been associated with increased risk behavior⁶), part-time work also may provide an opportunity for students to increase self-confidence and responsibility and to supplement family income.

● **Economic Evidence**

The economic evidence is based on a systematic review of all available studies, conducted on behalf of the Task Force by a team of specialists in systematic review and economic methods (primarily from the Community Guide Branch at the Centers for Disease Control and Prevention) and in research, practice, and policy related to the use of educational interventions to promote health equity.

Fourteen studies were included in the economic review, all of which reported only program cost. Program costs varied largely according to hours of program operation. Eleven included studies provided enough information to calculate hourly costs per student, which ranged from \$3.06 to \$13.17 in 2012 US dollars as reported in the OSTA paper. Annual costs of out-of-school-time academic programs evaluated in the 14 studies ranged from \$623 to \$8705 in US 2012 dollars per student as reported in the OSTA paper. Major cost drivers of out-of-school-time academic programs include salaries for teachers and staff, costs for facilities and utilities, and costs for transportation, with salaries being the largest expense. On the basis of distribution of hourly costs per student, the most expensive programs are intensive ones that include case management or have more than 1 major cost driver.

● **Considerations for Implementation**

The following considerations are drawn from studies included in the evidence review,² from the broader literature, and from expert opinion:

- For many federal programs, oversight is the responsibility of the state and compliance with program requirements and enforcement are commonly incomplete.
- Some school districts fail to notify parents about the availability of free programs, such as Supplemental Educational Services, resulting in underuse of the programs.
- Most out-of-school-time academic programs are voluntary; attendance may be especially low for students most in need.
- Transportation to and from programs may be an issue for potential program participants.
- Inadequate staff training and staff turnover can make programs inefficient.

- Extended school days and school years are an alternative to out-of-school time academic programs, which may avoid some of the challenges faced by those programs.

● Evidence Gaps

A summary of areas needing further research is presented here. A more detailed discussion is in the accompanying article.²

Effectiveness review

- More high-quality research is needed to identify which features of out-of-school-time academic programs, such as curriculum, pedagogy, training, and exposure time, contribute to their effectiveness.⁷
- More evidence is needed to determine variability in effectiveness of interventions based on:
 - student characteristics (eg, race or ethnicity, socioeconomic status);
 - program focus; and
 - simultaneous examination of program duration and degree of student participation, as either without the other is unlikely to be effective.
- To understand program effects better, more details are needed about activities in the intervention and control groups.
- Research is needed to assess the long-term effects of out-of-school-time academic programs.
- Additional research is needed on ways to improve implementation of, and participation in, out-of-school-time academic programs.
- Transportation may be a challenge for children in low-income families and should be investigated as a barrier to participation.

Economic review

- A standard methodology should be used to collect information about the actual costs of out-of-school-time academic programs.
- More in-depth studies are needed to understand cost variations of different program types used in different locations.
- A complete and accurate economic assessment of the cost-benefit of out-of-school-time academic programs would better inform decision makers.

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