Community Preventive Services Task Force

# Social Determinants of Health: Full-Day Kindergarten Programs

## Task Force Finding and Rationale Statement

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## Context

Children in low-income families often experience delays in language and other development by the age of three. Compensating for these delays before children begin regular schooling can be critical to providing them with equal opportunities for lifelong employment, income, and health.

## Intervention Definition

Full-day kindergarten is a formal program offered for children aged 4 to 6 years in a school or school-like setting, during the school year prior to entering first grade. Activities are organized, developed, and supervised by at least one adult. Full-day kindergarten programs run 5 days a week and last 5 to 6 hours per day. The goals of kindergarten are to prepare children academically, socially, and emotionally for effective participation in the educational system.

## Task Force Finding (December 2011)

The Community Preventive Services Task Force recommends full-day kindergarten programs to improve the health prospects of low-income and racial and ethnic minority children, based on strong evidence that full-day programs substantially improve reading and mathematics achievement—determinants of long-term academic and health-related outcomes (e.g., reduced teen pregnancy and risk behaviors)—when compared with half-day kindergarten or full-day kindergarten on alternating days.

The achievement gains apparent at the beginning of first grade do not, themselves, guarantee academic achievement in later years. Ongoing school environments that support learning and development are essential.

Because academic achievement is linked with long-term health, and because full-day kindergarten programs are commonly implemented in racial and 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.

## Rationale

### Basis of Finding

The Task Force finding is based on evidence from a meta-analysis published in 2010 (Cooper et al., 55 studies, search period through 2009) that met Community Guide systematic review standards in terms of intervention definition, search procedures, outcome assessment, study design and execution evaluation, and synthesis of effect estimates. An updated search for evidence (search period through March 2011) did not identify additional studies that met review inclusion criteria. The systematic review team also reviewed studies of the long term effects of early childhood education to draw inferences about the possible long term effects of full-day kindergarten.

The meta-analysis focused on full-day kindergarten programs and their association with improved kindergarten academic achievement as compared separately to half-day kindergarten and full-day kindergarten on alternating days (the temporal equivalent of half-day kindergarten). Effectiveness was measured by standardized achievement tests or assigned grades by the end of kindergarten or the beginning of first grade. Thirty reports contained 43 samples that compared full-day kindergarten with half-day kindergarten; these studies indicated that full-day kindergarten improved academic achievement by an average of 0.35 standard deviations (Cohen's d; 95% CI= 0.23, 0.46). Using the Binomial Effect Size Display, this result implies that if a group of children were evenly divided between full-day kindergarten and

half-day kindergarten, 59% of those in full-day kindergarten would have test scores above the population median, compared to 41% of those in half-day kindergarten. Seven studies compared full-day kindergarten with full-day kindergarten on alternating days and found that full-day kindergarten improved achievement by an average of 0.43 standard deviations (Cohen's d; 95% CI= 0.07, 0.79).

Education, intended to increase acquired knowledge, improve the ability to reason and solve problems, and improve social-emotional skills that allow healthy social interaction, is a major determinant of health. Educational attainment leads to health through three interrelated pathways (RWJF, 2009; Ross & Wu, 1996): (1) development of psychological strengths promoting healthy interaction, problem-solving ability, and a consequent sense of control; (2) ability to pursue and maintain productive work and income; and (3) knowledge of health and the ability to negotiate the health care system. In addition there is extensive evidence from early childhood experiments, such as the Perry Preschool Study (Schweinhart et al., 2005), the Carolina Abecedarian Project (Ramey et al., 2000), and the Chicago Child-Parent Centers (Reynolds, 2000), as well as systematic reviews (Camilli et al., 2010), that academic achievement in early childhood programs has long-term educational, economic, and health consequences. For these reasons, the Task Force considers measures such as standardized tests of academic achievement reasonable recommendation outcomes.

Other results from the meta-analysis were each based on a single study. Outcomes included self-confidence, ability to work or play with others, independence, and school attendance by the end of kindergarten or the beginning of first grade. The outcome most relevant for this review is ability to work and play with others, which can be regarded as a social-emotional health outcome. The study that reported on this outcome showed a significant effect favoring full-day kindergarten (d=1.06, 95% CI= 0.63, 1.49; Anderson, 1984).

Cooper et al. (2010) analyzed data derived from the Early Childhood Longitudinal Studies (ECLS) separately. ECLS began in 1998 and included approximately 21,000 kindergarteners. Results from the ECLS studies supported their meta-analysis, revealing a greater positive gain in reading and math at the end of kindergarten or beginning of first grade for children in full-day kindergarten programs than for those in half-day kindergarten programs. Data also indicated the possible loss of effect by the end of third grade.

Cooper et al. also analyzed studies included in the meta-analysis to assess effects of full-day kindergarten by the end of third and fourth grade. Findings were inconsistent. Some studies showed an increased benefit over time, and others showed a decreased benefit. Studies of the long-term effects of early childhood education are challenging because of potential confounding and other issues. Children in low-income families are more likely to participate in full-day kindergarten than are children in families with higher income; they are also more likely subsequently to attend poorer quality schools (an independent cause of low achievement and other poor outcomes). In addition, children whose academic performance has improved because of full-day kindergarten programs may receive less attention in elementary school if their teachers give more attention to classmates with achievement problems. If children with achievement problems improve from increased attention, the early benefits attained by children who attended full-day kindergarten programs appear to be diminished in comparison. Systematic reviews of long-term effects of early childhood education, conceptually comparable to kindergarten, indicate that better-designed studies show greater long-term academic and health effects than do studies not controlling for conditions following the early childhood program (Barnett, 2011).

### Other Benefits and Harms

In addition to improved educational and social-emotional outcomes, full-day kindergarten may be responsible for other benefits as well as potential harms. Some researchers postulate that full-day kindergarten allows more individualized

instruction, easier identification of and referral for problems, and improved nutrition (Walston & West, 2004). In contrast, other researchers propose that full-day kindergarten may put pressure on children to achieve before they are developmentally ready; increase fatigue and irritability for both students and teachers; and reduce planning time for teachers (Gullo, 1990).

### Economic Evidence

Six studies qualified for the economic review. These studies provided information about program costs (5 studies), cost-benefit analyses (1 study), change in cost-effectiveness as program availability increased (1 study), and economic benefit from reduced grade retention (1 study).

Identified studies do not give a clear picture about costs beyond the broad finding that full-day kindergarten is relatively more expensive than half-day kindergarten. Estimates of incremental costs of full-day kindergarten ranged from 20% to more than 70%.

A model-based cost-benefit analysis of full-day kindergarten expansion in the state of Washington indicated a cost of $2,778 more per child and the present value of benefits up to age 65 years to be $5,958. The analysis did not, however, take into account the costs of additional programs to ensure maintenance of the short term academic gains from full-day kindergarten or the benefits from reductions in grade retention and assignment to special education.

One study estimated that the benefits from lower grade retention rates associated with full-day kindergarten would equal approximately 19% of full-day kindergarten costs. Another study measured cost-effectiveness using program costs per percentage of students scoring proficient on the end-of-year Developmental Reading Assessment. Results showed that the cost-effectiveness of full-day kindergarten relative to half-day kindergarten programs improved as the county increased its full-day kindergarten availability over a 3-year period.

Future research on the economic benefits of full-day kindergarten should incorporate savings in transportation costs to the school system, child care cost savings for parents, and increased employment opportunities for parents during the kindergarten years associated with children's FDK attendance. There could also be additional costs of full-day kindergarten programs to consider, such as adopting new curricula and training teachers and staff.

### Considerations for Implementation

Barriers to establishing full-day kindergarten may include concerns about a lack of play time; lack of qualified teachers; and rapid turnover among teachers.

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