

Can Education Policy Be Health Policy? Implications of Research on the Social Determinants of Health

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Abstract Research on the social determinants of health has demonstrated robust correlations between several social factors, health status, and life expectancy. Some of these factors could be modified through policy intervention. National-level public policies explicitly based on population health research are in various stages of development in many Western countries, but in spite of evident need, seemingly not at all in the United States. Because research shows such a strong association between education and good health, we offer evidence to show that at least two pressing problems in American society, namely the uneven distribution of educational attainment and health disparities linked to socioeconomic position, may be ameliorated through policy initiatives that link quality early childhood care, child development programs, and parental training in a seamless continuum with strengthened K–12 education.

The central tenet of research on the social determinants of health holds that, in all populations studied to date, health is distributed unevenly, following a gradient that is a function of social and economic advantage (Evans and Stoddart 1994). The gradient does not just represent differences between people at the top and the bottom of the socioeconomic scale, but is continuous across even relatively small differences in social advantage. The gradient is steepest in countries such as the United States where there are large differences between people on measures of early childhood experiences, education, income, and housing quality. It is much less steep in countries such as Sweden, where income differences are smaller and policies that promote social integration and support have been normative for decades.

The gradient in health does receive a great deal of attention from researchers in the United States, but at the policy level attention has focused less on social factors than on those diseases and conditions that are disproportionately prevalent among minorities and the economically disadvantaged and on ways to improve access to health care services for those individuals.

But according to Sir Michael Marmot, a British epidemiologist and one of the pioneers in the field of social determinants of health, the most solid of the “solid facts” emerging from his research and the work of other colleagues is that people’s social and economic circumstances affect their health throughout life. It follows, he says, that effective health policy must therefore affect peoples’ social and economic circumstances (Marmot 2002a). He and many others, notably Sir Donald Acheson (1998) and the Canadian Institute for Advanced Research (Evans, Barer, and Marmor 1994), argue that the best answers to the related problems of improving population health and minimizing health disparities do not lie in greater access to medical care for individuals, but in greater investments in the social and economic well-being of whole populations.

National and State-Level Policy Development

Policies derived from evidence about social determinants of health have begun to emerge on the national level in several countries including Sweden (Ägren and Hedin 2000) and the United Kingdom (Harrison 1998; La Parra and Alvarez-Dardet 2001; Scottish Policy Council 1998), where Marmot has done most of his work; Canada, where the Canadian Institute for Advanced Research (CIAR) Population Health group has labored successfully for nearly two decades as a policy entrepreneur (Hayes and Dunn 1998; Huynh 2002; Legowski and McKay 2000); and the Netherlands, where the Ministry of Health has undertaken a systematic, research-based strategy for reducing socioeconomic inequalities in health (Machenbach and Stronks 2002). In the United States, where the traditional health policy community is still struggling with the serious problems posed by major inequalities of access to health care on one hand and with problems created by the increasing commercialization of medical and hospital services on the other, there is almost no emergent policy of the sort envisioned by Marmot at the national level. The National Policy Association has reviewed the evidence for social determinants of health in the United States and summarized its views on desirable policy direc-

tions (Auerbach, Krimgold, and Lefkowitz 2000). Although they do not identify any particular option as the highest priority for the nation, James Auerbach and colleagues (*ibid.*: 21) conclude that “work on the social determinants of health provides a rich array of policy options and areas for further exploration, [and] contributes to an urgency that has not previously been felt, as the United States faces continuing economic divides, increasing residential segregation, major demographic changes, and the need to compete in global markets.”

Two state-level organizations, the Kansas Health Foundation and the Minnesota Health Improvement Partnership (2001), have both called for programs to advance population health through social and economic change, but this and other interesting publications notwithstanding (Tarlov and St. Peter 2000), there is little or no evidence of resultant new policies. Over the past decade, the state of Georgia has adopted and successfully maintained policies that closely approximate the direction we advocate here, and they will be described in more detail below. There have been some successful efforts in other states, notably in Wisconsin, to provide public support for early childhood education beginning at age four. Yet even when established, with few exceptions these programs have experienced periodic lapses in funding at times of financial exigency, and none except Georgia has linked early child care with the state-supported educational system.

Policy Adoption in the United States

There are several possible reasons for the slow uptake of population health ideas by American legislators and the broader policy community. Much of the literature on the social determinants of health has focused on individual income, income differences, and community living conditions as key factors. Even if it were perfectly clear that changes in U.S. fiscal policy would improve overall health, the current political climate is more favorable to tax cuts and less government spending on domestic programs than to more equitable distribution of incomes and living conditions through overtly redistributive public policy. Even on the side of the political aisle where domestic and social programs have traditionally been favored, the publicly stated attitudes about redistribution have not been positive. On March 11, 2001, the *Washington Post* published an article quoting several prominent Democratic politicians' positions on income redistribution (Pearlstein 2001). Their views were summed up by Mark Penn, former pollster for Bill Clinton, who said, “People don't want to see

policies whose primary purpose is to redistribute income. . . . The more government tries to monkey with income distribution, the more people dislike it,” and by Democratic Senator Evan Bayh, who said, “We’re for distributing opportunities, not incomes” (ibid.: H1).

Legislative climates do change, however, and there is a long history of legislation resulting in beneficial redistribution of material resources in the United States, including the progressive income tax in 1913; Social Security and various welfare policies through the 1930s; Medicare and Medicaid in the 1960s; and unemployment insurance, child tax credits, and the earned income tax credit in recent times. Population health experts such as Michael Marmot (2002b), Angus Deaton (2002), and Nancy Adler and Katherine Newman (2002) have suggested recently that in dealing with health disparities in the United States, it is time for policy makers to look beyond specific disease burdens and begin to consider the potential positive health effects of income redistribution. Although there is good evidence to support more and appropriately crafted policies of this kind as a way to improve overall health, in the give and take of the legislative process at this historical juncture the political battle lines would be very hard to move. Even when faced with a clear opportunity and little apparent political risk, Congress seems to find it easier to respond to pressures from the well-to-do than to give benefits to the poor and near-poor. The tax bill signed into law by the president on May 28, 2003, provided handsomely for citizens with substantial investment income, but to meet the politically dictated tax cut ceiling of \$350 billion, the budget conference committee jettisoned previously agreed-upon child tax credits for the working poor (U.S. Department of the Treasury 2003).

Besides the current aversion to overt redistribution of income from the rich to the poor, there may also be some built-in resistance to the idea that factors outside the health care system constitute the most important determinants of health. Policy makers and administrators tend to look at evidence from their own domains of expertise and to think in traditional terms about how to approach policy problems, even when the best solution may be evident in knowledge from a different domain entirely.

Another reason for America’s apparent slowness to respond to the mounting evidence about the social determinants of health could be the length of the list of putative determinants. In his seventh annual Office of Health Economics (OHE) lecture, Robert Evans (2002: 64) observes that, in evaluating social determinants of health, it would appear that “everything counts, all the time,” and Marmot (2002a) argues that there are at least seven or eight “solid facts” about social factors and health upon

which to base policy recommendations. To our knowledge, other than the referenced articles by Marmot, Deaton, and Adler making the case for income redistribution, no one else in the United States has published an argument, based on the evidence, that might help policy makers to set priorities for action and arrive at a confident starting point.

Our intent in writing this article therefore is to make the case for a policy approach, based on research on the social determinants of health, that would help the United States deal more effectively with disparities in health by first reducing the gradient of educational attainment across the population. The evidence reviewed here shows that they are very closely related issues and that the anticipated benefit could be substantial.

The Gradient in Educational Attainment in the United States

Although there are wide variations in educational attainment across student populations within individual schools, school districts, and states, the education gradient is most dramatically illustrated in the differences in student standardized test scores from northern to southern states. On average, children in many northern tier states do as well as their age peers anywhere in the world in reading and math; Maine, North Dakota, Minnesota, and Iowa are consistently among the best. Children in the South do much more poorly; in some states such as Mississippi and Arkansas, math and reading scores are consistently on par with the worst performing countries in the Organisation for Economic Co-operation and Development (OECD; U.S. Department of Education 1997). Children growing up in states closer to the Mason-Dixon Line perform somewhere in the middle. Interesting exceptions to the otherwise neatly aligned gradient are Texas and North Carolina, and both states have adopted standardized K–12 curricula.

The black-white achievement gap is one of the most vexing challenges to educators in the United States, and it persists despite enormous good-faith efforts made within schools and school districts to reduce it. The latest Program for International Student Assessment survey of fifteen-year-olds in all twenty-nine OECD countries (Lemke et al. 2004) showed that American students on average ranked twenty-fourth on measures of mathematics literacy and problem solving, below countries such as Poland and Slovakia. Disaggregated statistics show that among American children, white and Asian students performed at or above the OECD average, while Hispanic and black students' scores were significantly lower,

with blacks' scores the lowest of all. The fact that these relative standings have not changed in at least a decade underscores our contention that the problem lies primarily outside the schools themselves and that the remedy must begin before the child ever reaches kindergarten.

Another way in which the uneven outcomes of our current education policies are manifested is in the high levels of illiteracy among both adults and children in the United States. Ninety million American adults have marginal or substandard literacy skills: most of them are white and native-born (Kirsch et al. 2001). More than 60 percent of poor children in the fourth grade cannot read, and only 31 percent of all fourth graders read at or above the basic standard (Donahue et al. 2001).

The Policy Problem

For our present purposes, we will assume that the primary policy problem is the improvement of the health of the American people. Evidence of the need lies both in the statistics published by the World Health Organization (WHO) showing how, in spite of our dominant economic position in the world, America compares unfavorably with peer nations on measures of disability-free life expectancy (WHO 2000) and in numerous National Institutes of Health reports about health discrepancies across the population (National Institutes of Health 2002; U.S. Department of Health and Human Services 2002).

Given the breadth of the challenge posed, we will also assume that, while efforts must be increased to reduce poverty through asset redistribution and other means, more than one policy approach will be required to achieve optimal results, and first preference will be given to politically acceptable policies that are likely to have the greatest impact on overall health status.

Key Determinants of Health Can Guide Policy Direction

The observations of Michael Marmot, Richard Wilkinson, Donald Acheson, and many others suggest that beyond genetics, which cannot be influenced at a population level, social position and its attendant assets are arguably the most powerful determinants of health. This knowledge has been available for centuries, if not millennia (Hippocrates 400 BCE; Villerme 1826).

As in every other country, there is a de facto social hierarchy in Amer-

ica, and according to American sociologist Catherine Ross and her colleagues, education is the key to a person's position in that hierarchy (Ross and Wu 1995; Ross and Van Willigen 1997). In assessing the relative importance of education, work, and income to health, Ross and Wu (1995: 720) stated,

Some researchers pit various aspects of socio-economic status against each other, asking . . . whether education, occupation or income is the better predictor of risk factors for . . . disease? This ignores causal relationships among the three aspects of SES [socioeconomic status]: Not only is education a strong predictor of health when occupation and income are adjusted, but a calculation of a direct effect of education (net of occupation and income) underestimates the total effect of education that (also) works indirectly by way of jobs and income.

Because education is generally valued in the United States, both by the electorate and by political leaders, Ross's observations may provide a basis for policy initiatives that can garner bipartisan support. Based on their reading of the concerns of the voters, former President Clinton, President George W. Bush, and former presidential candidate Al Gore have all made education a key part of their election strategies. President George W. Bush staked his record as governor of Texas—"Do one thing and do it well"—on his claims for improving the state's education standards and performance. His administration's No Child Left Behind (2001) initiative is a continuation of that focus.

Education and Health

The literature providing evidence for a connection between health and education is large, consistent, and persuasive. According to Ross and her colleagues, better-educated people are healthier, enjoy higher levels of self-reported health, and have lower levels of morbidity, mortality, and disability (Ross and Van Willigen 1997). Working with data from the National Longitudinal Mortality Study, Irma Elo and Samuel Preston (1996) demonstrated a strong inverse relationship between all-cause mortality and years of education for American men and women. Catherine Ross and John Mirowsky (1999) have shown the same exposure effect, and they have also provided evidence that the quality of both the education received and the educational environment adds to the health protective effects of education. Angus Deaton and Christina Paxton (1999), Michael Grossman and Robert Kaestner (1997), George Kaplan and Julian Keil

(1993), and many others have also demonstrated a very close correlation between education and health. It seems clear that the longer you stay in school, the longer you are likely to live.

More education is clearly associated with better health. Lack of education, at least as manifest by illiteracy, is just as clearly associated with worse health. In 1999 the American Medical Association's Council of Scientific Affairs published a special report on health literacy. The council noted that literacy, one of the key products of education, is related to multiple aspects of health including knowledge about health, personal health status, and the use of health services. Patients with adequate health literacy can read, understand, and act on health care information. Among patients with hypertension, diabetes, and asthma (Williams, Baker, Honig et al. 1998; Williams, Baker, Parker et al. 1998), for example, studies show a strong correlation between literacy level, health knowledge, and skills for managing their own or a family member's disease. In one study, literacy was a better predictor of metastases than age or race when men first presented with prostate cancer (Bennett et al. 1998).

Patients with low literacy levels also have higher health care costs. Among Medicaid recipients in one study (Weiss 1999), those reading at the lowest level of literacy had annual health care costs of \$12,974, versus \$2,969 for the overall Medicaid population studied. Those patients with inadequate literacy were twice as likely as literate patients to have been hospitalized during the previous year. The National Academy on an Aging Society estimates that low literacy levels account for over \$73 billion annually in avoidable health care costs.

As Ross points out, even at the same income levels, poorly educated people experience greater hardship than the well educated (Ross and Wu 1995). The effects of poverty and lack of education are synergistic in economic terms; each makes the other worse. The evidence therefore suggests that lack of education in the United States can be seriously detrimental to health.

Pathways between Education and Health

While the relationship of education to health has been well established, the precise pathways between them have not. There are a number of possible explanations, and while they are considered separately here, they are almost certainly not mutually exclusive; one pathway may predominate at one stage of the life course while another is more important at a different stage. They may also interact and influence each other.

Ross and Wu argue that education exerts its positive effects on health through four broad channels: by influencing work and economic conditions; by enhancing social and psychological resources; by enabling lifestyle and health behaviors; and directly, with no known mediators (*ibid.*). The work and income pathway has received a great deal of attention from researchers both in this country and elsewhere. As noted above, the relationship between personal or household income and life expectancy appears to be a very robust one (Lynch et al. 1998; Ross et al. 2000; Wolfson et al. 1999). Well-educated people are more likely to work full time, have higher incomes, and be in more satisfying jobs. Better-educated people are less likely to experience financial hardship or to be unemployed.

Marmot's now classic Whitehall study has shown a gradient in health status and mortality across job classifications in the British civil service, leading Evans and his colleagues to surmise that somehow one's position in the workplace hierarchy becomes embedded in one's biology (Evans 2002). Marmot emphasizes the importance to health of a personal sense of control over one's working conditions and job demands (Marmot 2002a).

In one study examining the relative contributions of education, work, and income to health, Marilyn Winkleby and colleagues (1992) have shown that while income, education, and occupation all contribute to cardiovascular disease risk factors, the relationship is strongest for education.

There is also evidence supporting Ross's proposed second pathway between education and health. The most critical factors included in her "social and psychological resources" are not yet identified, but there are a great many promising candidates. Education is not just for inculcation of marketable skills. It is also critical for acquiring those "spiritual resources" and capacities described by Robert Fogel (1999) that are necessary for making moral choices, making informed judgments, increasing personal sense of control, enabling mastery, and facilitating self-direction. There is a large literature on character development, self-control, self-efficacy, and resilience. Factors such as supportive parental guidance and modeling (Cohen, Richardson, and LaBree 1994; Duncan, Duncan, and Hops 1996; Wickrama et al. 1999); stable social bond to a competent, caring adult (Egeland, Carlson, and Sroufe 1993); positive and consistent experience with goal setting and achievement (Bandura 1986b; Earley and Lituchy 1991; Finn and Rock 1997); monitoring and limit setting by parents (Chilcoat and Anthony 1996; Dishion and McMahon 1998); peer modeling and support (Bandura 1986a; Fagan and Wilkinson 1998; Schunk 1987); reinforcement by significant others (Edmundson et al.

1996; Rosenfield, Folger, and Adelman 1980); clear and positive community values (Flay, Allred, and Ordway 2001; McAlister et al. 1982); and committed, capable, experienced teachers who can inspire with positive expectations (Langer 2000; Teven 2001) are included in our concept of education and all have important influences on the development of children. Many of these learned capacities have also been shown to have a positive effect on health.

Better-educated people tend to have more numerous, supportive, and informative associations with family, friends, and others in their community, and there is a large literature on the positive health effects of social support (Berkman and Syme 1979; Eckenrode 1983; Gore 1978; House, Landis, and Umberson 1988).

The third proposed pathway is also well supported in research. Well-educated people are more likely to engage in positive health behaviors such as exercising, not smoking, not drinking heavily, and using the health care system appropriately (Ross and Wu 1995; Ross and Mirowsky 1999). This relationship appears very early in the educational stream, potentially at least by the eighth grade for some students (Low 2001), and like education's effect on mortality, it is dose dependent. The more years of education a person receives, the less likely he or she is to engage in negative health behaviors (Flay et al. 1994; Greenlund et al. 1996; Kandel and Wu 1995).

Child health is not conceptually equivalent to adult health. It is difficult to measure at a population level because young people have not lived long enough to develop well-defined chronic illness associated with aging. Instead, child and adolescent health encompasses an added dimension of developmental changes that must occur for continued health during the life course. Good health, adoption of positive health behaviors, and avoidance of negative ones in childhood and adolescence form the foundation for an individual's health for the rest of his or her lifetime (Low et al. 2005).

One of the most important child developmental markers is academic success, since this influences future life choices. Its lack is strongly associated with youth problem or health-risk behaviors such as dropping out of school, tobacco cigarette smoking, using alcohol and other substances, violence, delinquency, risky sexual behavior, suicide ideation and behavior, unhealthy nutrition practices, and inadequate physical activity (Ary et al. 1999; Anderson 2002; Chung and Pardeck 1997; Ellickson et al. 1996; Grunbaum et al. 2002; Rosenberg, O'Carroll, and Powell 1992; Tressider et al. 1997). Among adolescents, these health-risk behaviors determine

more than 70 percent of the morbidity and mortality experienced during youth and almost 66 percent during adulthood (Grunbaum et al. 2002; Kulbok and Cox 2002).

Possible Reverse Causation

While education may promote or even cause health, another possible explanation of the correlation between them is the reverse: better health may lead to more and better education. While it is obvious in some cases that poor health may interfere with education, over the life course the relationship is very likely bidirectional, and the preponderance of the evidence supports the concept that the initial relationship is strongly in the direction from education to health and not the other way around (Koivusilta, Rimpelä, and Rimpelä 1999; Ross and Wu 1996; Shakotko, Edwards, and Grossman 1980).

Predisposition to Both Education and Health: Third Factor Hypothesis

Both education and health may depend on some as yet unidentified third factor. There are at least two good candidates here: *endowment*, or that cluster of genetically inherited factors that predisposes to achievement and good health, and the inclination to postpone gratification in the expectation of future benefit (*rate of time preference* or *discount utility* in economic theory). Genetic factors are rarely included for study per se in social determinants research, but there is evidence both for some heritability of general intelligence (Dickens and Flynn 2001; Kaprio, Pulkkinen, and Rose 2002; Miller, Mulvey, and Martin 2001; Neiss and Rowe 2000) and for a relationship between IQ, success in education, and health (Eaves et al. 1990; Hicks, Langham, and Takenaka 1982; Jimerson et al. 2000; Lassiter 1995; Lavin 1996; Morris 1999). Given the probable range of IQs included in studies of the correlation between years of education and mortality, and also that there is good evidence that environmental factors play a significant role in shaping IQ (Dickens and Flynn 2001), it seems unlikely that inherited IQ alone accounts for the observed relationship between education and health. Of course other inherited traits such as personality, stature, longevity, proneness to specific diseases, and so on may play a role in both health and education, but as yet there is no credible evidence of their effects on the health of populations. There is good

evidence, adduced below, that education plays a role in promoting health that is independent of such personal endowments, including genetics.

Time preference is an important factor that some authors (Fuchs 1982) believe may help explain some of the observed education-health connection. According to this hypothesis, those of us who are able to put off earning income will stay in school longer than those who cannot, and the same traits will lead us to avoid the immediate gratifications of smoking and overeating in expectation of a longer and healthier life.

That this trait does play a role, albeit a relatively small one, in both education and health has been demonstrated by Victor Fuchs (1982) and Steven Kennedy (2003), among others. The key question here is whether it is innate or learned. The evidence from sociological research supports the view that time preference is significantly influenced by social and cultural factors (Lawrence 1991).

Direct Effects of Education on Health

Ross has concluded that education has a positive effect on health that is independent of the three pathways of influence considered above, and three other authors have offered evidence that education actually causes health. Based on an artificial longitudinal cohort study, and using census data from the decades before, during, and after different states enacted compulsory education laws, Adrianna Lleras-Muney (2002) has demonstrated a strong positive effect of education on life expectancy (mortality). Her conclusion is that education does cause health, but her data could not illuminate the pathways through which the effect is transmitted. Kennedy (2003) examined the hypothesis that education causes health, testing an econometric model that included technical efficiency, allocative efficiency, and time preference as possible pathways.¹ His analysis found support for an effect of all three. Ross's self-efficacy, self control, and self-direction would play important roles in these processes (Ross and Wu 1995), as would health literacy.

Using a Danish cohort data set, Jacob Arendt (2001) also examined the hypothesis that education and health are related through some third variable. His candidate variables were endowment or genetic factors and the ability to postpone gratification. His work, like Kennedy's, showed

1. Time preference has already been discussed here, *vide supra*, but for those readers not familiar with the terms *allocative* and *technical efficiency*, they are very roughly equivalent to the processes of choosing and using the most appropriate resources for maintenance and enhancement of health.

that education does have positive effects on health that are independent of either endowment or time preference.

Requirements for Optimal Education

If education does contribute as much to health as the literature clearly suggests, then a policy initiative aimed at broad improvements in education across the United States could produce a benefit to American society in at least two areas of clearly demonstrated need. But the challenge of optimizing educational opportunity and outcomes should be approached from the right starting point, and kindergarten is too late to begin thinking about publicly supported education. There is a substantial amount of evidence pointing to the fact that children do not reach kindergarten with the same capacities for learning, and rather than reducing these differences, the traditional K–12 education system in place in many school districts, particularly those in urban poor and some southern communities, perpetuates and even magnifies them (Lee and Burkam 2002).

One extensive analysis (Jimerson et al. 2000) has shown that a child's home environment and early caregiving are powerful predictors of whether the child remained in a traditional program or dropped out of high school, leading the authors to state, "Moreover, quality of early care likely gains its predictive power from its effect on the ability to make use of later opportunities and supports in the environment (Sroufe and Egeland 1991). The context from which the child emerges when entering elementary school provides a critical foundation for subsequent academic success" (544). Victor Fuchs and Diane Reklis (1997) have reported a striking relationship between mathematics achievement in the eighth grade and readiness to learn as children entered kindergarten in each of the states. The relationship is essentially linear; math scores are higher in states in which more children come to kindergarten ready to learn.

The Capacity for Learning

Research in developmental neuroscience shows that learning starts at birth and that brain development in the first years of life is both rapid and extensive. Early sensory and emotional experience directly affects both the absolute number of brain cells and the connections between them. The more numerous the connections, the greater will be the child's capacity for learning. Genes can and do specify the brain's basic wiring, the common neural architecture, but there are not nearly enough genes to specify the

trillions of connections that characterize the optimally functioning human brain. Most of those grow and become established as a direct consequence of sensory and emotional experience. Without the experience, the connections either will not develop or will not be maintained (Huttenlocher 1984; Rakic, Bourgeois, and Goldman-Rakic 1994; Shore 1997).

Not only is brain development before age three more rapid and important than we have previously thought, but early brain development is vulnerable to environmental influences such as stress and lack of nurturing. The effects of the early environment, both negative and positive, are long lasting (Carnegie Corporation of New York 1994). There is now a great deal of evidence in the literature for a close relationship between early life conditions, later performance in school, adult literacy, health status, and mortality (Keating and Hertzman 1999).

Positive Effects of Early Intervention

While parental SES is often viewed as a significant, predictive factor in a child's educational success (Smith, Brooks-Gunn, and Klebanov 1997), there is also good evidence that many countries have found ways to mitigate the negative effects of growing up in a low-income household. In all countries studied so far, there is a relationship between education level of the parents, income relative to their needs, and the subsequent literacy and math skills of their children. The slope of the curve describing this relationship is steepest in the United States as compared to countries such as the Netherlands, Sweden, Germany, Canada, and Switzerland and is very like that of Poland (Brooks-Gunn, Duncan, and Britto 1999; Willms 1999). If these countries can find ways of protecting their children from the negative effects of low SES and low levels of parental education, the United States should be able to do the same. Some of these countries have more hierarchically structured education systems and generally more social welfare programs in place than in the United States, but they also have measurably better average literacy levels, better health status, and far lower health care costs. The United States cannot become France or Switzerland and it should not try, but it can learn from their experience and adapt key policies to its own very evident needs.

There is also good evidence that differences in readiness to learn can be reduced substantially by appropriately timed and designed interventions, and many of the efforts that have been made so far to improve the cognitive and social capacity of at-risk children in the prekindergarten years have had encouraging results. The Center for Educational Research

at Stanford and the Institute for Child Study at the University of Toronto have reported that low SES children enrolled in compensatory education programs (Right Start) before going to kindergarten had significantly better developmental test scores at seven, eight, and nine years of age than their peers who did not receive the early enrichment (Case and Griffin 1991; Case, Griffin, and Kelly 1999). The Canadian federal government has provided substantial funding for the development of measures of readiness to learn and standards for child development and learning outcomes (Human Resources and Skills Development Canada 1998). The Canadian Centre for Studies of Children at Risk at McMaster University has done extensive research to define readiness to learn, to develop test instruments to measure it, and to guide interventions for improving it. The center's results to date are remarkable, showing that a feasible, population-level, acceptable, inexpensive, and psychometrically sound intervention could entirely eliminate the differences in readiness to learn among children from poor, near-poor, middle-income, and well-to-do Canadian families (Janus and Offord 2003; Offord and Janus 2002).

Similarly, the now classic High/Scope Perry study carried out decades ago in Ypsilanti, Michigan, has also shown that preschool enrichment programs for high-risk children can significantly improve social outcomes such as subsequent high school graduation, avoidance of legal and marriage problems, home ownership, and use of social services (Schweinhart 1993).

Head Start and Early Head Start

The largest targeted early childhood intervention programs in the United States are Head Start, for children four and five years old, created by the federal Department of Health and Human Services in 1965, and Early Head Start, for pregnant mothers, toddlers, and children up to three years of age, created in 1994. These needs-tested programs now serve just under 1 million American children, providing comprehensive child development, educational, health, nutritional, social, and family services. Services are offered in centers or in the child's home, or both, depending on family need and preference. The trained Head Start service providers are locally based grantees of the U.S. Department of Health and Human Services who have a significant degree of discretion over program content but who also are held accountable for meeting developmental standards set by the national program directors. Earlier published evaluations of the programs and their outcomes have shown mixed results (McGroder

1990), but a more recent, comprehensive, seven-year national examination of Early Head Start has shown this version of early, planned interventions for mothers-to-be and very young children to have modest but positive effects on learning and, depending on the age of the mother and the number of social risk factors involved, also on the parenting that supports the child's learning through the first three years of life (Love et al. 2002).

From its inception, Head Start has been funded in two streams: one for service provision and a second for development and testing of new approaches to care and development. This built-in feedback loop offers a real possibility of continuous improvement in a social program that can have profound effects on the children and families served by it (Kagan, personal communication, 2003). The Department of Health and Human Services recently published its own evaluation of Head Start and concluded that "children in Head Start are not getting what they need to succeed in school" (U.S. Department of Health and Human Services 2003: 2). Citing a serious lack of coordination of services and too little attention to development of cognitive skills, they support the proposals of the current administrative branch for more skilled caregivers and a greater emphasis on letter and number recognition, prereading, and language skills (*ibid.*). The proposed changes are consistent with an extensive literature on the observed lifetime benefits of early interventions, and if fully implemented they could significantly strengthen the program. At the time of writing, however, it appears that the administration's mandates for change will not be fully funded, and it remains to be seen what can be accomplished with less than optimal resources.

The available evidence therefore shows that being born at risk does not have to be a life sentence for our children. It also shows that the earlier family support and educational enrichment are provided, the better the outcomes. The point was made some time ago by the Civitas program that, from a public policy perspective, we have allowed a massive mismatch to develop between the opportunity for positively influencing children's development during the first three years of life when their brains are most malleable and the other public investments we make in human services including health and education (Perry 1996). This mismatch is nicely illustrated by comparing the per capita expenditures in one state, Connecticut, for support of K-12 education versus pre-K child care and development: the ratio is \$8,700/.083, or more than 10,000/1 (Kagan 2003).

Outline of Our Policy Recommendations

Strong evidence links early childhood development to literacy, social competence, and success in school. Even stronger evidence links educational attainment to personal health status and subsequent socioeconomic position. A better-educated population is likely to participate more fully and effectively in the processes of a democratic society, including the processes of innovation and sustainable economic development (Keating and Hertzman 1999). Improved health status will improve the quality of life for many and is an essential factor in gaining control of health care costs, particularly those covered by Medicaid, which is the largest and fastest-growing line item in the budgets of most states.

Research on the social determinants of health indicates that one of the best ways to improve the health of the whole population is to focus policies on optimizing both early childhood development and education. As has been argued here, in one critical sense, they are the same thing; adequate social and cognitive development in childhood is a necessary foundation for success in education, which in turn is closely and positively linked to health status. Because learning starts at birth, and the brain's capacity for future learning and emotional resilience depends on the quality of experience during the first three or four years of life, our collective responsibilities for universal education should start when a child is born, not just when he or she enters kindergarten. Since none of us is born knowing how to be a good parent, parental education should be included in the policy (Pfannenstiel and Seltzer 1989). This innovative public policy approach would explicitly link child care with what we in America have traditionally thought of as formal education and will require a departure from the usual compartmentalized thinking that characterizes most government policy making. All agencies, from education, health, and finance to social welfare will have to agree on common objectives and create integrated policies to promote and support the new programs. Most important, all must understand that education affects far more than an individual's employability and economic prospects and that promoting good health cannot be the sole purview of the health care system.

The essential elements of the right kind of policy for the United States would include at a minimum appropriate prenatal care and nutrition, provision for parent training and support, quality child care delivered by well-qualified child development specialists, progressive introduction of elemental education beginning at a few months of age, and regular assessment to ensure that developmental and cognitive milestones are being met

prior to entering kindergarten. Early Head Start already offers many of these things to some needy families and children, with some benefit, but as noted above, far too few children qualify and program quality is uneven and, by the Department of Health and Human Services's own assessment, does too little for the child's cognitive and emotional development. Like public K–12 education, versions of these programs should be universally available to all children and families who choose to take part. All of the social determinants literature and all of the public health literature points to the need for comprehensive, population-based interventions because, rich or poor, we are all affected (McCain and Mustard 1999). Funding sources, standard setting, and jurisdiction are subjects for debate, but we would argue for substantial federal participation and support in all three areas. All of the available evidence indicates that in childhood development and education programs, quality counts.

International Examples

We are not the first to advocate an approach like this. France, Italy, the Canadian province of Quebec, and the state of Georgia have all moved to provide universal free or low-cost developmentally oriented child care. Sweden, England, and Scotland have recently transferred national responsibility for early childhood education and care from welfare to education departments. Changes in practice as a result of these policy initiatives differ across the three countries, but their policy rationales are based on the same evidence about the critical importance of a child's early years to later success in school.

In Sweden, legislation on child care has been brought into the School Act, and the National Agency for Education has been given supervisory responsibility. The agency has developed a national curriculum for children from ages one to five years, making preschool the first step in life-long learning and a "strong and equal part of the school system" (Korpi 2000: 3). The Scottish Council Foundation (Jones 1999: Section III, 3) has examined the issues surrounding the integration of child care and education and has concluded that "all children should have access to an integrated system of early services, including a guaranteed pre-school place from age three to five that must be preceded by linked early-years care. Continuity and coherence must replace the several changes in setting and staff that children commonly experience between daycare, playgroup, nursery school and kindergarten."

The New Community Schools Initiative is now being extended to all schools in Scotland. Their stated aim is “a child-centered and integrated approach to education, health and family support” (Cohen et al. 2003: 1). In England, government funding is provided for children’s centers to bring care, education, and other child and family services together, but so far these have been created only in economically deprived areas, somewhat like Head Start centers in the United States. Perhaps most important, England has consolidated all authority for educational and children’s services under one national inspectorate (*ibid.*).

Feasibility in the United States

On the curricular side, the Head Start and Early Head Start programs, a consortium of educators and child development experts led by the National Center for Children and Families at Columbia University, and the Canadian Centre for Studies of Children at Risk at McMaster University, among others, have all developed standards and model curricula that can be adapted to any community, including ones in developing countries (Kagan and Rigby 2003; Consultative Group on Early Childhood Care and Development 1999, 2003; Janus and Offord 2003).

Although quality early childhood care and development programs have been created, tested, and validated so that existing models could be adapted and implemented anywhere, the same cannot be said quite yet for what follows after admission to kindergarten. The commitment to local control and funding of education in this country makes standardization of any aspect of education a challenge, but the evidence from studies of education policies and outcomes in other countries (*vide supra*), from comparisons of achievement scores in states with statewide standardized curricula and those without, and from the striking successes of the Department of Defense school system (Anderson, Bracken, and Bracken 2000; Smreker et al. 2001) indicates that a great deal is already known about how to promote excellent outcomes in schools. Appropriate curricular and assessment standards, family involvement, significant school-level autonomy over pedagogical methods, and well-qualified, experienced teachers who can convey and maintain high expectations to all students regardless of ethnicity or socioeconomic status are some of the critical elements in the mix.

Because no prescription for a remedy of K–12 education in America will have the hoped-for benefits until the pre-K playing field is leveled, we

should create policies that link child care, family support, and education now, anticipating linkages to models of improved K–12 education such as the Department of Defense has achieved over many years.

In the United States, some of these ideas have been taken up and promoted by nonprofit organizations such as Zero to Three (Zero to Three 2002), and they have even found their way onto the agenda of the National Governors Association. Approximately one-third of all elementary schools in the nation have started prekindergarten education programs, but age at entry, access, and quality vary greatly across districts, and many of them are in jeopardy because of uncertain funding (Olson 2002).

Recognizing both the need for better integration of policies that govern child care practices with K–12 education and the deficiencies in existing programs intended to promote child development, some individual states have acted to create programs that include many of the things we believe to be essential. For example, Bright from the Start (Georgia Department of Early Care and Learning 2005), created by Governor Zell Miller of Georgia in 1992, has become an excellent model for the rest of the nation to follow. The Georgia Department of Early Care and Learning now has responsibility for child care and education services for all children from birth to age four. It administers the state's pre-K program; licenses and registers child care learning centers and group day-care homes; administers federal child and adult nutrition programs; maintains a Standards of Care program to enhance the quality of child care provided to infants, toddlers, and three-year-olds; partners with and funds child care resource and referral agencies; collaborates with other state agencies such as Smart Start Georgia to blend federal, state, and private monies to enhance early child care and education; and distributes federal child care and development funds.

Key factors in the success of Bright from the Start have been strong, personal, and committed leadership from the state's governors and the creation of a public-private partnership to support a universal expansion of pre-K programs to accommodate all eligible four-year-olds in the state, not just those from needy families.

Financing and Jurisdiction

In his presentation to the National Governors Association Forum on Quality Preschool in December 2003, W. Steven Barnett of the National Institute for Early Education Research (NIEER n.d.) stated, "America can afford any early education system it wants" (Barnett 2003: slide #346,12).

He noted that adequate public funding requires a small but not insignificant share of government revenue, comparing the \$16 billion spent on all major federal birth-to-age-five programs and the \$2 billion spent on all state pre-K programs with the national gross domestic product of \$10.35 trillion, federal annual spending of \$2.5 trillion, and agribusiness subsidies of \$20 billion. He left the governors with the message that “research evidence alone will not make the case. Early education must be marketed to voters, its natural constituencies and to new constituencies” (ibid.: slide #346,11).

In America, policy makers and the public have accepted the principle of universal access to education, and funding is provided through taxation because we believe it to be a public good. If, by effective marketing and enlightened leadership, we can move to the next step and agree that our collective responsibility really should begin at birth rather than on entrance to kindergarten, we will have to find answers to several hard questions, including what is the most effective and equitable way to provide publicly supported, developmentally sound early child care? Tested alternatives include both center- and home-based care and publicly supported, privately provided programs. Parental choice must be respected and considered along with the natural rights of the child and the interests of society. As already noted above, all such programs should be available to every family, regardless of their financial circumstances.

The question of who should pay for the necessary care and developmental support is also crucial. On one hand, an obvious possibility would be to give school districts that responsibility and the necessary taxing authority, as has been done in some European centers. The existing and planned policies for linking care and education in Europe are all at least subsidized by substantial cash contributions from the federal government.

On the other hand, given that 70 percent of all child care in the United States is currently paid for by individuals and provided in the private sector, it may not be wise to attempt to move child care and development programs entirely under the public schools’ jurisdiction and pay for them entirely through ad valorem taxes. Rather, a made-in-America model could be developed such as the one evolving in Georgia that incorporates intersectoral, collaborative standard setting and curricular design and having multiple funding streams from federal, state, local, and private sources. This would look more like funding postsecondary education than K–12.

We would argue that if the nation is going to come close to eliminating educational and health disparities, the task cannot be left entirely to

regions of the country that are already suffering economic and social privation, with little prospect for early change. A good starting point would be for state and local child care providers and payers to work together, under federal oversight, to agree on consistent care and development objectives and a common set of measurement standards for assessing a child's progress. Without them, further investments cannot be targeted effectively and disparities will persist.

What has happened in the state of Georgia over the past decade offers encouraging evidence that knowledge about the critical importance of the first years of life can foster new thinking and action in the policy arena. What has happened in other jurisdictions and agencies where progress either has been nonexistent or has stalled indicates, as Barnett has said, that the case for integrating early child care and education policies needs to be strengthened in the minds of both administrators and the general public. In creating such a case, we would stress that all of the already published rationales for state and local support of Zero to Three or pre-K programs have pointed to the benefits of better academic performance, lowered school dropout rates, and improved economic prospects; very few have also linked these proven benefits to better health outcomes, for which there is at least as much evidence.

Benefits of a New, "Education Starts at Birth" Policy

The evidence therefore suggests that a new policy linking early child care with education would result in significant improvement in the health of the American population, while reducing the health disparities that afflict so many and the income inequalities that breed social problems in all regions of the country. This expectation is further supported by Günther Rehme (2001) in a study of redistribution of personal incomes, education, and economic performance in OECD countries. His work showed that there is a negative relationship between income inequality and economic growth—less inequality, more growth—and that, in relatively wealthy countries, spending more on education would both enhance growth and decrease pre- and posttax inequality.

In the context of our thesis, then, Rheme's work points to the possibility of achieving four highly desirable objectives together: a policy based on evidence from research on the social determinants of health and that integrates early child care and education would not just strengthen educational attainment and the stock of human capital, but it would also improve

overall health status, reduce income inequality, and promote economic growth. This possibility should be a sufficient incentive to engage the attention of policy makers throughout the country, whatever their usual domain of interest.

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