In the past four years, the health of young children has emerged as a political issue with no enemies: many prominent federal and state politicians from both ends of the political spectrum have declared themselves proponents of improved health for young children, newborns, and the yet-to-be-born. One manifestation of the consensus has been the dramatic expansion of eligibility for Medicaid that was first allowed and then mandated by Congress. Beginning in January 1992, all infants and pregnant women whose family incomes are below the poverty level will be eligible for Medicaid. Also, states may opt to expand eligibility for children under eight years old in poverty and for infants and pregnant women up to 185 percent of the poverty level. As of March 1988, thirty-two states had adopted legislation to expand access to Medicaid for young children up to the poverty level.

Range of available services. Eligibility for Medicaid automatically entitles children not only to ambulatory and hospital care as needed for acute illness, but also to well-child care. States must offer all eligible children Early Periodic Screening, Detection and Treatment (EPSDT) services according to a schedule determined under the state’s Medicaid plan. In thirty-two states, well-child care also can be reimbursed under the basic Medicaid program. Some states have found other ways to increase children’s access to well-child care. Florida and Hawaii, for example, have used their regulatory authority to mandate that health insurance plans include well-child care. Some large private insurers, such as Blue Cross and Blue Shield of the National Capital Region, have recently added well-child care to their basic benefit package. The “Basic Health Benefits for All Americans” bill, S.768, introduced in April 1989 by Sen. Edward Kennedy (D-MA), contains a provision mandating well-baby care. It is a safe bet that any federal mandated benefits bill intro-
duced in the future will contain some provision for well-child services.

The continuing expansion of access to well-child care as part of the package of services offered to young children appears to be sound public policy, but often overlooked in the policy debate is how much and what kinds of services are effective or cost-effective. Many states and private insurers look to the experts—the pediatricians who deliver these services—to define what is necessary. The profession, through its American Academy of Pediatrics (AAP), has developed a set of guidelines specifying a visit schedule and the content of each visit. The AAP guidelines call for thirteen well-child visits with a physician for children from birth through age six and fifteen visits for children up to age eleven. A survey of forty-nine state EPSDT programs found that six states used the AAP guidelines for setting their schedule for children up to age six. The Florida and Hawaii insurance laws also adopted the AAP periodicity schedule, as did the Blue Cross plan mentioned above.

The cost implications of the AAP schedule are not trivial. Well-child visits to a clinic or physician’s office involve substantial time and inconvenience to families, as well as financial outlays. If every child were to receive the recommended number of visits at an average cost of twenty-five dollars per visit, the annual national well-child care bill for children up to age six, not counting additional charges for laboratory procedures or immunizations, would be roughly $1.2 billion. Few children actually receive the full complement of visits, and some major payers, such as certain state Medicaid programs, pay very low fees to physicians. Therefore, the actual national expenditure on well-child care at present is probably a good deal below the $1.2 billion estimate. Nevertheless, the bill is potentially high, so it is reasonable to ask what kinds of improvements in children’s health the expenditure buys.

Standards of effectiveness. For many years now, the medical community has accepted the notion that when unequivocal evidence deems a given procedure, drug, or device ineffective or dangerous to patients, it should quickly be abandoned. But for many services, unequivocal evidence about positive or negative impact on health does not exist. Medical judgment determines how the evidence that is available should be interpreted, and clinicians may judge the evidence differently.

Professional societies and government agencies have in recent years issued practice guidelines developed by expert groups through a consensus process in which evidence and opinions are blended together to render a bottom-line judgment. Experience has shown that the content of such consensus judgments can vary widely according to the membership of the expert group and the standards used to judge the evidence.

Even when a health intervention is unequivocally effective, the ques-
tion may arise as to whether the health benefits are worth the cost of achieving them. This question can be answered definitively in only two situations: when the service both improves health and reduces total health care costs compared to its alternatives (cost-saving); or when the service is not effective at all.\(^6\) If the service under study both improves health and increases costs, whether the expenditure is justified in terms of its health benefit remains a clinical or political judgment. A first step in any analysis of the cost-effectiveness of a given service is to assess how effective it is in improving health.

In this Commentary, we review the nature of the evidence on the effectiveness of well-child care and suggest policy strategies that result from that review. The review uses a standard of evidence that requires at least one reasonably well-controlled study to show that a particular well-child care service is effective; without such evidence, it is inappropriate to conclude that the service is effective. This standard may seem unduly harsh, especially in light of the fact that many services performed in the name of medical care do not meet this standard of proof. To argue, as proponents of preventive services often do, that it is unfair to hold prevention to a higher standard than that required for therapeutic services misses the point: one genie out of the bottle does not justify letting the other one out, too.\(^7\)

We argue that well-child care is an effective and even cost-saving service for young children, but that evidence to support the large number of visits called for by the AAP does not exist. For a fiscally responsible well-child care program, we suggest that more conservative schedules be considered, in conjunction with programs and incentives to assure greater access for all children to effective well-child care.

### Defining Well-Child Care

One’s interpretation of the evidence on the effectiveness of well-child care depends partly on how such services are defined and what their intended objectives are. The most obvious objective of well-child care is to prevent premature death or illness by immunizing a child, counseling the family on healthy behavior, or identifying illness early enough to intervene with effective therapy. Other proposed goals for well-child care include support and reassurance for families of young children and the provision of a “medical home” in the event that an acute illness develops. It is widely believed that a continuous relationship between the patient and a single source of medical care has beneficial effects, including greater patient satisfaction, improved adherence to medical regimens, and more effective and less costly acute care, when it is needed.\(^8\)
The provision of both well-child care and medical services for sick children at the same site or by the same caregiver enhances a child’s continuity of care. At the same time, access to a continuous source of medical care may increase the likelihood that a child will get the full complement of well-child care services. Thus, it is difficult to untangle the effects of well-child care per se from the effects of improved continuity of care. Sometimes the distinction is not drawn, and access to well-child care is equated with access to primary care.

Whether or not continuity of care improves health or reduces costs has been the subject of substantial research. In the review that follows, we assume that such continuity can be provided with any level of prescribed well-child care and that the services provided to children as part of a well-child care package must be justified on their own merits.

Effectiveness Of Well-Child Care

Well-child care encompasses two main aspects of prevention: immunization (administration of vaccines) and health supervision (physical examinations and other tests that screen for illness or developmental problems, health education, and parental guidance). These are generally integrated in a series of scheduled visits. A typical well-child care visit is ten to twelve minutes and may be followed by specific laboratory or screening measures, such as tuberculosis testing or vision screening.

Immunization. Immunization provides the starkest example of the power of prevention to save or prolong lives, prevent significant disability, and lower medical care costs. Today, children in the United States are routinely vaccinated against diphtheria, tetanus, pertussis (whooping cough), polio, measles, mumps, rubella (German measles), and, most recently, Haemophilus influenzae b (Hib). A vaccine for herpes varicella (chicken pox) is currently under development but has not been introduced for general use.

Many studies have examined the effectiveness and costs of the vaccines that are recommended for routine use in this country. Virtually all have found that childhood immunization not only yields considerable benefits in reducing disease, but also offers substantial savings in health care costs. Even the most controversial vaccine—for pertussis—has withstood the test of both effectiveness and efficiency. A recent study found that over a six-year period in a hypothetical cohort of one million children, the pertussis vaccine prevents more than 92,000 cases and saves a total of $44 million in direct lifetime medical costs. That study did not account for the rapid rise in the cost of the pertussis vaccine following a vaccine liability crisis, but even adjusting for the higher vaccine prices of
1987, the vaccine still pays for itself in medical care savings.

**Child health supervision.** While immunization works well, the evidence on child health supervision is much more limited and equivocal. The evidence is based on studies that examine five different kinds of interventions: (1) varying schedules for the frequency of well-child care visits; (2) Medicaid's EPSDT program; (3) services specifically aimed at improving behavioral/developmental outcomes among children; (4) comprehensive care programs for poor children begun in the 1960s and early 1970s; and (5) varying structures of health service delivery or insurance programs that offer more or less well-child care.

The first three categories of studies provide the most direct tests of the specific contribution of well-child care to children's health. Studies in the last two categories examine the effect of increased levels of use of well-child care in conjunction with improved access to primary care in general. Consequently, the independent effect of well-child care cannot be identified in these kinds of studies, and we will not discuss them further. At any rate, such studies do not provide any support for the notion that more or less child health supervision alters children's health outcomes.

The impact of reducing the frequency of recommended well-child care visits for low-risk children has been considered in two studies. Neither found any ill health effects associated with a decrease in the frequency of scheduled well-child care visits. The interpretation of these results is clouded, however, because some children randomized to receive fewer visits actually received additional visits.

In theory, evaluations of Medicaid's EPSDT program should tell a great deal about the effectiveness of preventive care, at least for poor children. Unfortunately, the two available evaluations of EPSDT failed to measure impacts on health status; they reported on the rates of identification of problems or "abnormalities" in screening visits. Both evaluations reported a decline in the detection of abnormalities with a child's time in the EPSDT program, although in one study, the decline became apparent only after adjusting for a general trend toward increased case finding. Because virtually no information was provided in these studies about the importance or remediability of the abnormalities found, the results contribute little to an understanding of how well-child care affects health status.

Only one study specifically examined how different styles of well-child care as practiced in clinical settings influence behavioral and developmental outcomes, but a variety of studies have examined how special well-child care programs might affect such outcomes. In the study comparing actual practices, programs to teach parents were found to increase mothers' knowledge about health and development and self-reported
levels of positive interaction with their children.\textsuperscript{15} On the other hand, increased teaching was correlated with increased reported behavior problems among children and was found to be uncorrelated with any formal measures of developmental status.

One study of targeted counseling during well-child care visits in an experimental setting found that after six months, the group that received counseling ranked higher on scales of maternal/infant interaction than the group that did not receive counseling, but no differences were found in development, as measured by the Bayley Infant Development Test.\textsuperscript{16} Two other studies of intensive behavior counseling also found small effects.\textsuperscript{17} One found fewer fears in the intervention group than in the control group, little difference in developmental test results, and significant worsening in the intervention group's responses to the "early school personality questionnaire." The other study found differences in early IQ tests that increased up to age three and decreased thereafter (although sample attrition may have biased these findings). A variety of self-confidence measures also showed improved results in the experimental group. However, the extensive nature of the intervention in the latter study—far broader than current ideas of the content of well-child care—makes it incorrect to generalize as to the effectiveness of well-child care as it is typically provided.

Taken together, the literature evaluating the effectiveness of well-child care is perhaps more remarkable for its limitations than for its findings. No evidence supports the contention that child health supervision significantly influences mortality or morbidity among children or that it enhances the development of a child's social competence. On the other hand, sample sizes have been uniformly too small and follow-up too brief to identify mortality changes; the available measures of childhood morbidity have been inadequate; and most investigators have not even looked at developmental outcomes. The importance of outcome measures examined to date and their duration of impact have not been evaluated.

Specific services, Because of problems in conducting and interpreting studies of the effectiveness of well-child care, a logical approach would be to identify specific procedures or actions that make a difference to children's health and to build evidence from the ground up. We examined the effectiveness of five recommended services: (1) the physical examination; (2) the Denver Developmental Screening Test (DDST), the most widely used and recommended developmental screening tool for children; (3) screening to detect iron deficiency (anemia); (4) preschool screening for hearing deficits; and (5) guidance to parents on the use of automobile child safety restraints. The evidence in each of these areas,
reviewed in detail elsewhere, suggests that the benefits of each of these interventions have not been demonstrated.” However, because of the potential seriousness of the defects induced by iron deficiency (developmental delay or reduced performance on intelligence tests) and the ease of testing and treating the condition, early screening of high-risk infants for iron deficiency would appear to be a reasonable, conservative strategy.

**Impact of well-child care.** To summarize, except for immunization, well-child care, as it is currently organized and delivered in the United States, has not been shown to improve children’s health. Many of the studies contained in our review were conducted in populations of poor or otherwise high-risk children; consequently, the evidence does not seem to suggest that the kinds of well-child care studied may be more effective for high-risk target groups. It is possible that specific well-child care services not reviewed here, such as vision, tuberculosis, or cholesterol screening, do improve children’s health, but it is highly unlikely that these procedures would be required more frequently than the immunization schedule for children age six or under.

Participation in well-child care does seem to provide substantial satisfaction to both parents and providers, which has value in and of itself. Even here, however, the added satisfaction for parents from thirteen visits versus seven or eight visits has not been measured.

The problems of measuring children’s health outcomes appropriately and of conducting studies with sufficient power and validity are formidable and unlikely to be overcome soon. If, in the future, more sensitive and specific measures of child health and development are developed, carefully designed studies may provide evidence supporting the effectiveness of traditional well-child care services. Because the childhood immunization schedule is clearly effective, future evaluations would most profitably focus on the additional health benefits derived from a well-child care schedule with more visits than required for immunization.

**Nontraditional Well-Child Services For High-Risk Children**

Although the literature comes up short in its support for a frequent schedule of well-child care visits for young children (beyond the initial postnatal visit and six visits for full immunization), tentative evidence is mounting that the families of some infants and young children can benefit from a much different and more intensive system of early preventive care. Children at high socioeconomic risk of infant mortality, developmental delay, or child maltreatment appear to have improved outcomes when they and their mothers receive both prenatal and postnatal health services delivered by nurses or other personnel in their homes.
David Olds and colleagues conducted a randomized clinical trial of the effectiveness of a family support program during pregnancy and the first two years after birth for low-income, unmarried, teenage, first-time mothers. Four treatment groups were provided with different combinations of services, including home visits by nurses during the mother’s pregnancy and the child’s first two years of life, free transportation for mothers and children to prenatal and well-child visits, and sensory and developmental screening for the children. The nurse home visitor had three major activities: (1) to educate parents about fetal and infant development and to clarify the parents’ plans for completing their education, finding jobs, and bearing additional children; (2) to involve family members and friends in child care and support of the mother; and (3) to link family members with other health and human services.

Olds found that in the children of unmarried teenage mothers, only 4 percent of those offered the full complement of home visits had incidents of child abuse or neglect (as measured by verified cases reported to the state child protective agency), compared to 19 percent in the control group. These babies also had fewer emergency room visits and higher developmental scores at both twelve and twenty-four months. Whether these developmental benefits would persist over time is unknown, but the emotional, social, and economic consequences of child abuse and neglect argue for serious consideration of any strategy that can deliver results of the magnitude observed in this study.

Other studies of home health visitor programs with high-risk groups have had promising outcomes, although exceptions do exist. At present, most programs of intensive intervention are small and experimental; the limited experience to date does not allow conclusions about what elements of a program’s services or organization are most important in producing positive outcomes or whether the results can be replicated outside of the experimental environment. These programs frequently offer intensive contact with pediatricians, so the independent effect of the nurse home visitor cannot easily be separated from the benefits of the medical care received during pregnancy and early childhood.

Policy Implications

As state and federal legislators consider the merits of mandating well-child care benefits under private or public insurance programs, they will have to address the question of how many well-child visits to require in the benefit package. The most conservative strategy—not to mandate any well-child visits—would miss a major opportunity to increase immunization rates, gain whatever unmeasured benefits there are in health
supervision, and encourage parents to find a “medical home” for their children. The most generous strategy—to mandate the full AAP visit schedule—would grasp these opportunities, but in a costly fashion. A middle-ground approach would let the immunization schedule drive the mandated well-child visit schedule for children under age six or, to be on the safe side, to add an additional one or two visits to cover the period from twenty-four months to five years of age, when no immunizations are required. The evidence on the cost-effectiveness of immunization strongly suggests that, compared to no visits, a seven-visit schedule actually saves total health care costs, even when the full cost of health supervision and administration of vaccines is included.

Critics of the middle-ground approach argue that mandating less than the full AAP schedule would deprive some children of important though admittedly unmeasured health benefits; that many children already fall short of the AAP schedule and, under a reduced schedule, would probably receive even fewer visits than required for full immunization; and that the immunization-based schedule would become a ceiling rather than a floor on the number of visits.21 These criticisms point up a serious problem: today, many preschool children are inadequately immunized and thus lack access to well-child care. Immunizations are incomplete in 20 to 25 percent of two-year-olds in the United States. Resources must be devoted to ensuring access to the well-child care (both immunization and health supervision) so clearly in the public interest.

Inability to pay, poor availability of services, and inadequate access to information pose barriers to well-child care for poor families. In theory, expanding eligibility for Medicaid or other health insurance that includes well-child care benefits for more children at or somewhat above the poverty line should increase rates of use of these services. However, low Medicaid payment rates to providers and cumbersome eligibility and paperwork requirements have been shown to reduce the benefits of the program, which, on paper, appear to be quite rich. Making the Medicaid program more “user friendly” both for providers and for families with young children makes a great deal of sense, especially when the covered services are limited to those that have been shown definitively to both improve health and save health care costs.

Dramatically increasing fees and reducing paperwork while expanding eligibility for insurance coverage of a pared-down set of well-child visits makes sense for children at low socioeconomic risk. Ironically, however, the traditional concept of office-based, well-child care—no matter how frequent—may be woefully inadequate for some children. Those at high risk of maltreatment or developmental delay, for example, may require innovative, intensive, multidisciplinary approaches to well-child care.
The very intensity of such programs makes them expensive, and the requisite knowledge base simply does not yet exist to define what mix of services works best, how to organize them, and how to target them to children most in need. Public policymakers should move aggressively to develop mechanisms, be they direct grants or Medicaid waivers, to fund more demonstrations and evaluations of more intensive programs of preventive services for children in high-risk families.

In the end, the mix of services judged to be most “cost-effective” may come to encompass less of what we traditionally identify as well-child care for most children, and more of a richer and more intensive set of services for the few children whose futures may depend on such help. It would be dangerous and unfair to children, however, to focus only on reducing the visit schedule without taking the freed-up resources and reinvesting them in better access to the well-child care that unequivocally has been shown to improve children’s health. We are not advocating a reduction in total health care dollars for well-child care; rather, we envision a reallocation of dollars to pay more for fewer visits and, if further studies bear out the preliminary evidence, a potentially substantial increase in spending on nontraditional well-child services for high-risk children.

NOTES

1. Well-child care encompasses a variety of preventive health services delivered by physicians or other health professionals at defined points in a child’s life. These include physical examinations and other tests that screen for illness or developmental problems, immunizations, health education, and parental guidance.

2. States have been notoriously poor in implementing this mandated benefit, so actual provision of care is much below that envisioned by the legislation or regulations governing the EPSDT program.


5. The impact of these two factors is illustrated by the different recommendations for well-child care up to age six issued by the AAP and the U.S. Preventive Services Task Force, a twenty-member, nonfederal panel convened by the Department of Health and Human Services. The task force recommends only six or seven visits for children without high-risk conditions in the first six years of life. See US. Preventive Services Task Force, Guide to Clinical Preventive Services, prepublication copy (Washington, D.C.,

7. Indeed, to be somewhat Byzantine, we could argue that the low effectiveness or high costs of therapy make some preventive services potentially effective or cost saving. Were we to subject therapy to higher evidentiary standards of effectiveness, we might find that many more preventive interventions would not be deemed effective.


18. OTA, Healthy Children.


20. See OTA, Healthy Children, for a review of such studies.