ABSTRACT. The demographics of children in the United States and the determinants of child health outcomes are evolving rapidly. This evolution will require those responsible for children's health and well-being to acquire new skills and access new resources in the future to ensure the relevance of the field of pediatrics to the health of children. The objective of this article is to define a new paradigm for the practice of pediatrics that integrates the knowledge, attitudes, and skills of pediatrics with the principles, practice, and resources of public health to address the current challenges to child health in the United States. Historical and contemporary advances in the understanding of child health provide a precedent and framework to facilitate this integration. Pediatrics 2005;115:1202–1208; pediatrics, public health, social determinants, medicine and public health.

ABBREVIATIONS. AAP, American Academy of Pediatrics; CATCH, Community Access to Child Health; SCHIP, State Children's Health Insurance Program.

As presented in the article by Markel and Golden earlier in this supplement,1 the development of pediatrics in the United States has been characterized by a circuitous history that sometimes has placed the best interests of children in jeopardy. In contrast, the history of modern public health is one that has been written, in great part, in jeopardy. In contrast, the history of modern public health, pediatricians will benefit from a more thorough understanding of the relevance of these principles to their work and the well-being of children.

This article will describe the potential of formal pediatrics-public health partnerships to improve the health and well-being of children, integrate and expand the education of health care professionals, and increase the knowledge base of pediatrics and public health. The journey toward this end may begin by developing simple strategies for implementing collaborative programs for these 2 health professions on the local level. Such strategies could range from improving the mutual knowledge of and access to the respective resources of clinicians and public health professionals to the joint development of clinical and educational programs, research, and advocacy and policy initiatives.

PRINCIPLES FOR THE INTEGRATION OF PEDIATRICS AND PUBLIC HEALTH

A set of principles to support the interface between medicine and public health was developed in 1998 by the New York Academy of Medicine Center for the Advancement of Collaborative Strategies in Health.3 These principles define strategies to inte-
egrate the work of pediatricians and public health professionals.

- Improve health care by addressing the determinants of health that go beyond medical care.
- Improve access to care by implementing strategies to provide care for the uninsured or underinsured.
- Improve the quality and cost-effectiveness of care by applying a population perspective to medical practice.
- Use clinical practice to identify and address community health problems.
- Strengthen health promotion and health protection by mobilizing community partnerships.
- Shape the future direction of health systems by collaborating in health policy development, advocacy, health care professional training, and research.

The synergies created by collaboration between pediatrics and public health also will contribute to the development of newly conceptualized but not yet fully realized academic-public health institutions. Links between academic health centers and health departments can generate outcomes of great importance to both disciplines. This institutional model will expand the potential of communities to:

- Define the leading causes and social determinants of child morbidity for the community.
- Develop new population-based approaches to health issues that make sense for communities and strategies for collaboration between pediatricians and public health professionals to participate in them.
- Contribute to the education and workforce development of pediatricians and public health professionals.
- Establish a platform for translational, community-based participatory, health services, and population-based research and contribute to the evidence base for pediatrics and public health.
- Develop joint local public policy and child advocacy initiatives locally.
- Link the assets and resources of pediatric programs and academic health centers with public health departments to contribute to the capacity, financial base, and sustainability of both sectors.
- Generate policies, statements, and protocols to advance this integration.

In addition to the assets of individual institutions and agencies, both partners bring stakeholders and extensive resources to contribute to this partnership and future endeavors. The following sections of this article present a history, rationale, and examples of collaboration to further legitimize and conceptualize the partnership of these 2 disciplines. Ultimately, the hope is for the development of such partnerships to leverage and integrate the assets and resources of pediatrics and public health, advance the training of health professionals, and expand the knowledge base through collaborative research to improve the health and well-being of children and families.

HISTORY OF PEDIATRICS AND PUBLIC HEALTH

In the early 1900s, after the publication of Flexner’s seminal article on medical education, the paths of public health and medicine diverged. Subsequently, despite tremendous improvements in the health of the US public attributable to advances in both medicine and public health, the 2 disciplines have remained largely isolated from each other. However, with (1) the increasing understanding of the importance of the environment and social determinants to health outcomes, (2) the recognition of the relevance of population-based health, advocacy, and public policy to the practice of medicine and public health, and (3) the expanding application of translational and community-based participatory research to medicine, the importance of the intersection between public health and medicine has been rediscovered. Examples of recent efforts to advance this integration include:

- The Medicine and Public Health Initiative was founded in 1994 as a collaborative endeavor between the American Medical Association and American Public Health Association, with the following 5 organizing principles: (1) engage the community, (2) change the education process, (3) create joint research efforts, (4) work together in health care provision, and (5) jointly develop health care assessment measures.
- The American Medical Association formalized its effort to bridge medicine and public health through the development of its Roadmaps for Clinical Practice, which includes the Primer on Population-Based Medicine and case-study monographs addressing the 10 leading health indicators.
- The Guide to Clinical Preventive Services and federal Healthy People 2010 initiatives provide context for intersectoral collaboration, validation of the leading health indicators, data-based and measurable health objectives, and investment in population-based health promotion by a broad constituency that includes health care professionals, voluntary and membership organizations, local and state governments, the corporate sector, health advocacy associations, and the public.
- The AAP CATCH program, supported by the AAP policy statement on community pediatrics, has mobilized the involvement of pediatricians in communities around the country to deal with community health issues affecting children. These planning grants and the joint AAP-Maternal and Child Health Bureau Healthy Tomorrows Partnership for Children Program address some of the most complex health issues affecting children and families. These and more recent collaborations between the AAP and other health agencies (eg, the National Center of Medical Home Initiatives for Children With Special Needs, Healthy Child Care America, the Equity Project, State Children’s Health Insurance Program (SCHIP) partnerships initiatives) link pediatricians with systems of care outside the practice environment and operate at the interface of pediatrics and public health.
As an acknowledgment of the importance of these programs to pediatrics, pediatricians, and the AAP, the Department of Community Pediatrics was established by the AAP to expand the focus of pediatrics from 1 child to all children in the community, recognize the importance of the social determinants that affect the health of children, synthesize clinical practice and public health principles, and increase access to community resources.9

The recent Institute of Medicine Report Who Will Keep the Public Healthy?17 recognized the historical role of physicians in ensuring the health of the public. The report asserts that “meeting the public health challenges of the 21st century will require medical, scientific, and public health communities to work together,” and “strongly recommends” that “serious efforts be undertaken by academic health centers to provide joint classes and clinical training in public health and medicine.”17

The Anne E. Dyson Community Pediatrics Training Initiative itself is an endeavor that is leveraging the resources of the community to advance the training of pediatricians and provide them the capacity to deal with the critical health issues affecting our most vulnerable children.14 Although not initially conceptualized as an endeavor focused specifically on integrating pediatrics and public health, the knowledge and skills required to accomplish the goals of the Dyson Initiative are bringing pediatricians and public health practitioners together in communities to improve the health and well-being of children.

There is no medical discipline for which this link between medicine and public health holds more promise than pediatrics. Children are particularly vulnerable to the effects of the physical environment, social determinants, poverty and income inequality, and a lack of social capital (eg, family, school, peer relationships). In the same way that consideration of the new morbidity catalyzed a response to the psychosocial needs of children by pediatricians in the 1980s, recognition of social and environmental determinants as the millennial morbidity35 could catalyze a similar response by contemporary pediatricians, including establishing closer working relationships with public health colleagues.

A similar unfolding of events is happening in public health. Current efforts to define public health and the competencies required of public health practitioners, credential health departments and public health professionals, advance workforce development, and establish closer ties between local health departments and academic institutions are, in general, occurring without recognition of the potential importance of this intersection.11,36–41 This is an opportune time for pediatrics and public health to explore their common roots and opportunities to contribute to the development of US health systems and the health of children.

**Rationale for the Integration of Pediatrics and Public Health**

The evolving demography of children and social epidemiology of child health, the increasing marginalization of populations of children, and the recognition of the effects of the physical environment on health establish the imperative for the integration of pediatrics and public health. Through a process of answering the following questions, a rationale for this integration is presented for consideration.

**Who Are the Children?**

Nearly 50% of children in the United States are living in functional poverty.42 Among children in US communities, 30% live in single-parent families,43 40% are on the free- or reduced-fee lunch programs,44 and <80% graduate from high school.44 Additional groups of marginalized children include minority, legal and illegal immigrant, migrant, refugee, rural and core urban, homeless and “street,” incarcerated, foster care, and special needs children. The health and social issues affecting these children will require resources that are only available to pediatricians through links to public health. In turn, public health departments need pediatricians for their expertise in child health and collaboration in population-based health, public policy, and advocacy initiatives. Children and families will benefit from the integration of clinical and population-based approaches to prevention and child health.

**What Are the External and Environmental Threats to the Health and Well-being of Our Children?**

A response to the threats to children’s health enumerated in Table 1 will require population-based, interdisciplinary, and intersectoral approaches to child health. Child health policy and advocacy expertise, data and data analysis, systems integration, use of legal systems, and social science resources will be required to understand and respond to the effects of these factors on children. No discipline or sector in isolation will be able to mobilize these resources, nor do they have the expertise to meet these challenges individually.

**Table 1. Threats to the Health and Well-being of Children in the United States**

<table>
<thead>
<tr>
<th>Poverty</th>
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<tbody>
<tr>
<td>Marginalization</td>
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<td>Food availability</td>
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<td>Disabilities</td>
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<td>Abuse and exploitation</td>
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<tr>
<td>Access to medical care</td>
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<td>Violence</td>
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<td>Lack of education</td>
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<td>Emerging diseases</td>
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<tr>
<td>Displacement</td>
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<td>Environmental ecosystems</td>
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<tr>
<td>Public policies</td>
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<tr>
<td>Lack of children’s rights</td>
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<td>Mental health parity</td>
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<td>Globalization</td>
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</table>
What Indicators and Determinants of Child Health Are Influenced by These External and Environmental Threats?

The indicators and determinants of child health listed in Table 2 describe a millenial morbidity that redefines the physiology of child health and well-being. Neither pediatrics nor public health can respond adequately to these challenges, but together they provide the synergy required to identify, respond to, and sustain new holistic approaches to child health.

What Are the Public Health Resources That Can Be Used by Pediatricians to Deal With These Determinants?

Knowledge of, access to, and use of the resources available to pediatricians through public health will require a close, sustained relationship between pediatric and public health professionals, beginning in the formative stage of their professional education and continuing into practice (Table 3).

What New Pediatric and Public Health Models and Approaches to Child Health Are Relevant to Interventions for Contemporary Determinants of Child Health?

New perspectives and strategies will be required to deal with the most current and important determinants of children’s health and well-being. Biomedical approaches, although necessary, are not sufficient to affect the underlying systems and environmental determinants of child health. It will be necessary to address societal issues if we are to accomplish the health outcomes that we seek for our children, which will require pediatric and public health professionals to integrate social justice, equity, social capital, human rights, and other contextual principles into their profession and practice (Table 4).

A focus on social justice recognizes the importance of social determinants to children’s health and provides a set of principles to guide the assessment and response to the needs of children.45 Consideration of resource equity recognizes income and resource distribution as powerful predictors and determinants of health outcomes and allows for the generation of relevant public policy and child advocacy to effect change.46 An understanding of the concept of social capital47 and the contribution of human and community relationships to health will lead to attempts to improve and expand social capital as a strategy to improve child health outcomes. Using children’s rights48 as a strategy to define and respond to the critical social, cultural, economic, and political determinants of child health will apply the evolving understanding of the relationship between health and human rights to children and child health.

Whose Responsibility Is It to Ensure That There Are Systems of Care in Place to Meet the Needs of Children?

Children, particularly those with complex health issues, require an integrated and coordinated system of care to meet their needs.49 According to the AAP policy statement on the medical home,50 these systems must:

- Be accessible, continuous, comprehensive, child/family oriented, and compassionate.
- Provide a continuum of care from primary through acute and chronic services.

Such systems should include:

- Accessibility to specialized pediatric services;
- Competent pediatric providers;
- Quality assurance programs;
- Community-based programs;
- Links of pediatricians to community services;
- Ongoing education and training of pediatric providers; and
- Integrated information and communication systems.

Integration of the clinical and systems expertise of pediatrics and public health will be required to build these complex systems of care, which will require sustained collaboration among pediatricians and public health professionals to plan, develop, implement, and evaluate systems of care for children and environments in which all children can be healthy.

EXAMPLES OF COLLABORATION BETWEEN PEDIATRICS AND PUBLIC HEALTH

The following examples of collaboration between pediatrics and public health provide a blueprint for future endeavors.

- The Special Supplemental Nutrition Program for Women, Infants, and Children and other children’s nutritional programs offered by public

<table>
<thead>
<tr>
<th>TABLE 2. Contemporary Indicators and Determinants of Child Health</th>
<th>Indicators</th>
<th>Determinants</th>
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<tbody>
<tr>
<td>Infant mortality</td>
<td>Poverty</td>
<td>Determinants</td>
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<td>Immunization coverage</td>
<td>Economic disparity</td>
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<tr>
<td>Asthma</td>
<td>Welfare reform</td>
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<tr>
<td>Obesity</td>
<td>Depression</td>
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<tr>
<td>Adolescent pregnancy</td>
<td>Violence</td>
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<td>Graduation</td>
<td>Posttraumatic stress</td>
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<tr>
<td>Behavioral risk indicators</td>
<td>Nutrition</td>
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<td>Smoking</td>
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<tr>
<td>Suicide</td>
<td>Substance abuse</td>
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<tr>
<td>Injury</td>
<td>Media</td>
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<tr>
<td>Breastfeeding</td>
<td>Self-esteem</td>
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<tr>
<td>Child abuse</td>
<td>Education</td>
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</tr>
<tr>
<td>Behavioral disorders</td>
<td>Environmental issues</td>
<td></td>
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<tr>
<td>Juvenile justice system</td>
<td>Lack of family resources</td>
<td></td>
</tr>
<tr>
<td>Marginalization of children</td>
<td>Access to information</td>
<td></td>
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<tr>
<td>Social capital</td>
<td>Family disintegration</td>
<td></td>
</tr>
<tr>
<td>Adequacy of child protection</td>
<td>Foster care</td>
<td></td>
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<tr>
<td>Access to health care and a medical home</td>
<td>Meeting the needs of special needs children</td>
<td></td>
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<tr>
<td>Play</td>
<td>Working children</td>
<td></td>
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<tr>
<td>Sexual exploitation</td>
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</table>
health agencies provide access to the nutritional supplementation depended on by pediatricians to ensure the healthy development of their patients.

- CATCH,5 Healthy Tomorrows Partnership for Children Program,6 Healthy Child Care America,8 and other programs supported by a partnership between the federal Maternal and Child Health Bureau and AAP provide public health resources to support clinicians in their endeavors to practice community pediatrics.

- Lead-poisoning and tobacco-use prevention programs including testing, prevalence data, environmental mitigation, public policy development, and advocacy link the resources, technology, and expertise of public health agencies to the practice, research, training, and policy and advocacy pursuits of pediatrics and pediatricians.

- Injury-prevention programs, including car-seat, helmet, smoke-detector, drowning, antiviolence, and child abuse prevention initiatives, depend on the integration of the practice, expertise, and resources of pediatrics and public health to deal effectively with these population-based health issues.

- Immunization endeavors including access to vaccines through the federal Vaccines for Children program,51 social marketing, practice assessments, registries, and new vaccine development are built on a partnership between pediatricians and public health professionals.

- School health programs including nursing and school-based clinics depend on the partnership between pediatricians and public health for access to resources and advocacy to ensure their sustainability.

- Epidemiologic data, related to all aspects of child health, are provided by public health agencies to pediatricians at the local, national, and international levels of organization to ensure the relevance of the practice of both disciplines and the rational allocation of resources.

- The Nurse-Family Partnership,52 Healthy Start,53 and Healthy Families54 programs provide access to home visitation and other wrap-around services to pediatricians to extend their practices and care of children and families beyond the perimeter of their offices.

- The federal SCHIP,54 Medicaid, Vaccines for Children,51 and other state and federal programs require the vigilance and support of pediatrics and public health to ensure their relevance and sustainability.

- Newborn screening and future genetic-testing initiatives55 will rely on the expanded technology and infrastructure of public health and the professional expertise of child health practitioners to meet the full potential of this rapidly advancing technology.

These and other joint pediatrics-public health programs provide a precedent for an expanded integration of the 2 disciplines to meet the evolving needs of children and families as well as those of practitioners of pediatrics and public health. Neither discipline can fulfill their social contract to families and communities in isolation. The growing issues of childhood obesity, mental health, and oral health are examples of ensuing challenges to child health that will require an interdisciplinary response from pediatrics and public health.

**CONCLUSIONS**

Pediatrics must respond to the demographic and epidemiologic transitions that are redefining the health and well-being of children in the United States if the profession is to remain relevant and viable. This response will require the integration of the principles and practice of population-based public health into all aspects of pediatric practice. Historical and recent trends in pediatrics and public health provide the precedent to establish this intersection. The credibility established by the AAP policy statement “The Pediatrician’s Role in Community Pediatrics,”4 the
success of the CATCH\textsuperscript{5} and Healthy Tomorrows\textsuperscript{6} programs, and the development of the AAP Department of Community Pediatrics,\textsuperscript{9} among other initiatives, provide the vision and framework to support future endeavors to advance this integration.

The engagement of pediatrics and public health must happen in the context of service delivery, training, research, advocacy, and the generation of public policy if it is to reach its full potential. The Dyson Initiative\textsuperscript{14} is a unique strategy to advance this integration, and it has demonstrated the courage to envision and initiate the transformation of pediatrics in all these domains through the training of residents and faculty.

The history of advances in child health is the history of interdisciplinary professional endeavors to improve the well-being of children and families.\textsuperscript{2} Markel and Golden’s eloquent digest of this history is a chronicle of the efforts of pediatrics, public health, and other disciplines to respond to the fundamental needs of children and families in the United States.\textsuperscript{1} It is a chronicle of the application of the principles of social justice, equity, and children’s rights to practice, advocacy, and the development of public policy to improve the lives of children and families. The future of pediatrics lies, in part, in its historical roots, which are fully entwined with those of public health.

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REFERENCES

24. Flexner A. Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching. Boston, MA: Merrymount Press; 1910
Integrating Pediatrics and Public Health
Jeffrey Goldhagen
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