Bridging Education and Health: Opportunities for Collaboration on Research and Data Systems

ETS Policy Report
Bridging Education and Health: Opportunities for Collaboration on Research and Data Systems
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Introduction

The education and health sectors of our society are key areas of public investment. For example, in 2011, the World Bank estimates\(^1\) that the U.S. governments’ (local, state and national) expenditures on education and health were 5.22% and 8.07% of Gross Domestic Product (GDP), respectively. The nation’s elementary, secondary and postsecondary education systems play essential roles in educating and training the broad array of health professionals, which consisted of approximately 2,751,000 individuals in 2014.\(^2\) Beyond this connection of education and training of the health professions workforce, however, public investment in each sector appears to be separate from investment in the other. Consequently, researchers and policymakers have paid too little attention to the interconnectivity between the education and health sectors in society and how advancements and access in one sector contribute to improvements in the other. Despite popular rhetoric of the value of health to the success of education and the value of education to the health and well-being of the world’s population and environment, social, behavioral and education science researchers have devoted limited attention to building the data and information systems needed for conducting research that would lead to broader understating and action.

To address the challenge, Educational Testing Service (ETS) convened a conference of social, behavioral and education science researchers and other experts in the fields of health and education on May 5 and 6, 2016, in Princeton, N.J. Support for this conference, *Understanding the Opportunities for Collaboration between the Health and Education Sectors in a Culture of Health*, was provided by a grant from the Robert Wood Johnson Foundation (RWJF). This conference began to build a bridge between the health and education data information systems and a small number of leading researchers, with the expectation of 1) learning the data and information systems available for cross-sector education and health research focusing primarily on elementary and secondary level education; 2) understanding how existing data systems can be connected toward conducting analyses and research on the interrelationship of health and education at the K–12 level of education; and 3) understanding the state of existing research on the relationship between education and health and health interventions, especially as it pertains to improving outcomes for the most vulnerable populations in society.

This conference was intended to explore opportunities for collaborations between the health and education research sectors aimed at benefiting K–12 education and human and community health outcomes. Researchers of both the education and health sectors recognize that the disparities in education and health require frameworks that include a variety of social, neighborhood, school and family characteristics that influence opportunities to thrive and prosper across multiple domains of life. For this conference, a small group of health and education experts were assembled to present their research and sources of data and information; to discuss the strengths and limitations of existing data and research; and to offer advice about steps towards strengthening data systems and research that will

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contribute to advancing health and education in K–12 schools and school systems in the United States. A list of participants is presented in Appendix A and a list of presentations is included in Appendix B.

The conference had three objectives around which this report is organized. The objectives are:

1. Define research opportunities available given existing data systems.
2. Identify research priorities for advancing health and K–12 education collaborations.
3. Recommend measures and methods to consider in future health and education data systems.

Exploration of Education and Health Research

ETS, founded in 1947, is a nonprofit whose mission is to advance quality and equity in education by expanding opportunities for learners and communities, improving teaching and learning, and informing education policy and assessment. ETS’s history of research on the intersection between health and education includes *The Family: America’s Smallest School*,\(^3\) which looks at the relationship between students’ home lives and their educational outcomes.

RWJF has spent the past 40 years taking on some of the most challenging health, healthcare and health education issues in our society. RWJF is striving to build a national Culture of Health — a society that gives every person an equal opportunity to live the healthiest life they can, whatever their ethnic, geographic, racial, socioeconomic or physical circumstance happens to be. As part of that vision, claiming and sustaining health will become part of our collective beliefs and practice. The intended outcome for the Culture of Health initiative\(^4\) is improved population health, well-being and equity. Over the same time, RWJF has advanced research into understanding the social determinants of health and given grants to initiatives that study and develop approaches to addressing the impact of these social factors, including education, on health.

*Tracy Costigan*, Senior Learning Officer, RWJF, defines a Culture of Health as a society where living longer, healthier lives now and in future generations is a priority. Everyone should be able to achieve optimal mental, physical and community health and have the opportunity to live the healthiest life possible.

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RWJF has identified an Action Framework to translate the Culture of Health vision into specific, measurable benchmarks. The Framework includes four primary Action Areas to promote the Culture of Health,\(^5\) which include a corresponding a set of drivers and measures. As defined by the RWJF model, drivers are indicators of where our nation needs to accelerate change and measures are the

corresponding evidence-based indicators of progress/success in each of these areas. The Culture of Health Action Areas are:

1. Making Health a Shared Value. Driving indicators include mindset and expectations, sense of community and civic engagement.
   - Examples of measures include: **value on health interdependence**, which is defined as the percentage of adults, 18 years and older, in strong agreement that their health is influenced by peers, neighborhood and the broader community; **social support**, defined by the percentage of adults, 18 years and older, noting they have adequate social support from partner, family and friends; and **volunteer engagement**, defined as the percentage of adults and young people who reported volunteering.

2. Fostering Cross-Sector Collaboration to Improve Well-Being. This includes engaging those not typically thinking of themselves as being in the health care arena. Driving indicators include number and quality of partnerships, investment in cross-sector collaboration and policies that support collaboration.
   - Examples of measures include: **local health department collaboration**, which is defined by the percentage of local health departments that collaborated with community organizations in at least four public health program areas in the past year; **federal allocations for health investments related to nutrition and indoor and outdoor physical activity**, defined as the annual dollar amount of federal appropriation to select health initiatives; and **health in all policies (support for working families)**, defined as the annual percentage of families with parents eligible for Family Medical Leave Act (FMLA) coverage who also can afford it.

3. Creating Healthier, More Equitable Communities. Driving indicators include built environment and physical conditions, social and economic environment, and policy and governance.
   - Examples of measures include: **youth safety**, which is defined as percentage of middle and high school students who reported feeling safe in their communities and schools; **early childhood education**, defined as the number of states where 60 percent or more of 3- and 4-year-olds are enrolled in preschool; and **air quality**, defined as the percentage of the population covered by comprehensive smoke-free indoor air laws.

4. Strengthening Integration of Health Services and Systems. This area includes efforts which aim to better integrate medical services treatment with public health and social services. Driving indicators include access, consumer experience and quality, and balance and integration.
   - Examples of measures include: **routine dental care**, which is defined as the percentage of adults, 18 years and older, who report a dental visit in the calendar year; **population covered by an Accountable Care Organization (ACO)**, defined as the percentage of the population whose health care provider is part of an ACO; and **practice laws for nurse practitioners**, defined as the number of states that have laws and regulations that support full scope of practice for nurse practitioners.

In January 2016, RWJF completed three design sessions on the creation of a Culture of Health in schools. As Jennifer Ng’andu, RWJF Senior Program Officer, told conference participants, the foundation
has determined that its next steps are to invest in the translation of research into policy and practice, coordinated strategic action, policy analysis and the support of emergent work connecting these efforts. Toward this end, short-term goals include:

- Align the knowledge and strategies of diverse stakeholders in education, including community leaders, school administrators, teachers and parents.
- Create broad awareness of the bi-directional link and interconnection of health and education.
- Take action to integrate more comprehensive health and communication efforts into school environments.
- Conduct policy analysis in order to understand how best to approach efforts to improve health and education, including points of intervention and collaboration.
- Advance these identified efforts to improve health and education through continued policy analysis and development.

**Michael Nettles**, ETS Senior Vice President and Edmund W. Gordon Chair, Policy Evaluation & Research Center (PERC), presided over the conference. The intersection and the bi-directionality of the relationship between health and education is of interest to his department at ETS. PERC focuses on topics that are prominent on the agendas of national, state and local governments and educational institutions, applies research findings to craft policy and program ideas for educational improvement, and publishes and disseminates reports that increase understanding of education challenges and promote improvement of education and education policies.

While this conference began to define data and research priorities aimed at improving health and K–12 outcomes, it was clear from conference participants’ suggestions that they kept the goals of communicating and translating that research into policy and practice in mind as well. Though the participants’ discussion of the existing research literature revealing the causal links between health and education outcomes was valuable, they also found value in discussing the direction of major research investment initiatives such as the NIH investment in the Education and Health: New Frontiers research grant program. The participants made suggestions to focus on research with high potential for supporting positive interventions to have immediate impact on the improvement of health and education of disadvantaged youth. In addition, the participants discussed the approaches to communicating and changing the public discourse on the connection between health and education and the disparities that exist within those inter-related systems.

**Education and Health Data Opportunities**

Overall, the participants focused on three approaches for expanding the available health and education data: 1) increasing the use of existing data; 2) linking current data sets with other data, including administrative records such as individual school data or medical data; and 3) adding new survey data to be nested into existing data sets.
Increasing the Use of Existing Data

The conference highlighted many existing primary sources of health and K–12 data, including federal study data and federal and state administrative data records. Angela Pagliaro, ETS Knowledge Services Consultant, compiled a list of available health and education data sets found in the public domain, which was discussed during the conference. Based on the participants’ feedback and review, this list will be revised and made public.

In the federal system, there are two major funders supporting separate interests and research strands with separate funding streams: the U.S. Department of Education (ED) and U.S. Department of Health and Human Services (HHS). These federal departments have distinct research studies and surveillance systems optimized for supporting and improving education and health, respectively. Increasingly, however, the federal education and health sectors collaborate on the development of studies (e.g., the ED and National Institutes of Health [NIH] collaboration on the development of the Early Childhood Longitudinal Study [ECLS] surveys) and fund work that explores the intersection of health and education, (e.g., the NIH Education and Health: New Frontiers grant opportunities).

Federal Education Data

The National Center for Education Statistics (NCES) collects health data, including information on physical and emotional health, access to medical care and health insurance, faculty perceptions of health as a problem for students, nutrition, and safe environment. According to Christopher Chapman, Branch Chief, Institute of Education Sciences, NCES, U.S. Department of Education, disabilities data is the health area best covered by NCES. School records data that pertain to disabilities is consistently collected per the Individuals with Disabilities Education Act (IDEA) law, which ensures services to children with disabilities from birth through age 21. Most NCES survey studies (such as ECLS) collect data about whether individuals have disabilities, as defined by IDEA. However, some studies, especially those conducted in the health sector, look beyond the medical disability diagnosis and also gather information about students’ functional abilities — for example, a question posed to parents is, “Does your child have difficulty walking?”

NCES collects comprehensive administrative records data about schools and school systems, including the following:

- **Common Core of Data (CCD),**[^6] which is collected annually from all public K–12 schools and includes data on enrollment, faculty and finances

- **Private School Universe Survey (PSS),**[^7] which is similar to CCD but is collected every other year from private K–12 schools

- **Integrated Postsecondary Education Data System (IPEDS),**[^8] which annually collects data from all postsecondary institutions providing Title IV funding. It includes enrollment information, degree programs offered, completion information and cost-of-attendance data.

[^6]: For more information, see [https://nces.ed.gov/ccd/](https://nces.ed.gov/ccd/)
[^7]: For more information, see [http://nces.ed.gov/surveys/pss/](http://nces.ed.gov/surveys/pss/)
[^8]: For more information, see [https://nces.ed.gov/ipeds/](https://nces.ed.gov/ipeds/)
Due to coordination with NIH during development, the most extensive health data in a NCES data set is not found in an administrative records collection, but in the Early Childhood Longitudinal Studies (ECLS),\(^9\) which follow children from early development. Health measures include direct height and weight measures, body mass index (BMI), hearing, and survey data about children’s physical activity and emotional health (and emotional health of parents), recent doctor and dental visits, and health insurance.

The National Assessment of Educational Progress (NAEP), another NCES assessment, collects health-related data including factual indicators of disability status and perceptions from the student on his or her own health. Additionally, teachers and administrators are asked about student health and other related issues at the school. Work connecting NAEP to socioeconomic status (SES) factors such as neighborhoods, threats to individuals and how these factors relate to achievement is established\(^{10}\) and could serve as a guide for future endeavors looking at social disparities and the impact of physical and emotional stress on education outcomes.

Other NCES survey studies\(^{11}\) collect data about education across the human lifespan:

<table>
<thead>
<tr>
<th>NCES Survey Studies</th>
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<tbody>
<tr>
<td>Household surveys about newborn children through adults</td>
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<tr>
<td>Elementary and secondary teacher and principal surveys</td>
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<tr>
<td>Student and school crime and safety surveys</td>
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<tr>
<td>Middle Grades Longitudinal Study (MGLS), which is being launched for the first time in 2017-2018</td>
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<tr>
<td>High School Longitudinal Studies (HSLS)</td>
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<tr>
<td>Secondary Longitudinal Studies Program, which consists of three completed studies:</td>
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<tr>
<td>• National Longitudinal Study of the High School Class of 1972 (NLS:72)</td>
</tr>
<tr>
<td>• High School and Beyond (HS&amp;B) longitudinal study of 1980</td>
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<tr>
<td>• National Education Longitudinal Study of 1988 (NELS:88)</td>
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<tr>
<td>International elementary and secondary assessments, which include:</td>
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<tr>
<td>• Progress in International Reading Literacy Study (PIRLS),</td>
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<tr>
<td>• Programme for International Student Assessment (PISA)</td>
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<tr>
<td>• Trends in International Mathematics and Science Study (TIMSS)</td>
</tr>
<tr>
<td>Programme for the International Assessment of Adult Competencies (PIAAC)</td>
</tr>
</tbody>
</table>

\(^9\) For more information, see http://nces.ed.gov/ecls/  
\(^{10}\) For more information, see http://nces.ed.gov/nationsreportcard/pdf/researchcenter/Socioeconomic_Factors.pdf  
\(^{11}\) For more information on NCES surveys and datasets, see https://nces.ed.gov
**Federal Health Data**

Several Centers for Disease Control and Prevention (CDC) school-based surveillance systems provide opportunities to examine the association between health and education. Shannon Michael, Health Scientist, School Health Branch, Division of Population Health, CDC, reviewed several CDC school-based surveillance systems including:

- the Morbidity and Mortality Weekly Report (MMWR),\(^{12}\) which includes the National Youth Risk Behavior Survey (YRBS)\(^{13}\) that runs every other year and monitors priority health-risk behaviors that contribute to the leading causes of death, disability and social problems among youth and adults in the United States.
- the School Health Profiles,\(^{14}\) which are a system of surveys that assess school health policies and practices in large urban school districts, states and U.S. territories.
- the School Health Policies and Practices Study (SHPPS),\(^{15}\) the largest, most comprehensive assessment of school health policies and practices in the United States, which is completed on a biannual basis.

Other CDC surveillance systems include the National Youth Physical Activity and Nutrition Study (NYPANS), National Health and Nutrition Examination Study (NHANES) and Behavioral Risk Factor Surveillance System (BRFSS).\(^{16}\)

Other existing federal data that may be of interest to researchers who examine the intersection of health and education include the administrative data from the CDC State Public Health Action Programs, also known as 1305. The 1305 program funds all 50 states and the District of Columbia to improve school health, and is often used to provide statewide professional development and technical assistance aimed at improving school nutrition and increasing physical activity and preserving recess in schools. Thirty-two states receive enhanced funding for this effort, which includes more intensive work within those states with 10 to 15 individual school districts. The administrative data from the more intensively served 1305 districts could be especially useful when connected to district-level education outcomes data.

**State-Level Administrative Health and Education Data**

Each state has education and program administrative data that could be used to explore the connection between health and education. These data are often used for state-level accountability; however, the data could be used to both increase the knowledge base and coordinate interventions. For example, Natalia Pane, Senior Vice President, Child Trends, Inc., highlighted her organization’s work on the Early Childhood Data Collaborative and provided an example of how linking New Jersey administrative data from across departments led to an intervention aimed at preventing homelessness among youth who had experienced foster care.

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\(^{12}\) For more information, see [http://www.cdc.gov/mmwr/index.html](http://www.cdc.gov/mmwr/index.html).

\(^{13}\) For more information, see [http://www.cdc.gov/healthyyouth/data/yrbs/index.htm](http://www.cdc.gov/healthyyouth/data/yrbs/index.htm).

\(^{14}\) For more information, see [http://www.cdc.gov/healthyyouth/data/profiles/index.htm](http://www.cdc.gov/healthyyouth/data/profiles/index.htm).

\(^{15}\) For more information, see [http://www.cdc.gov/healthyyouth/data/shpps/index.htm](http://www.cdc.gov/healthyyouth/data/shpps/index.htm).

Linking Datasets

One promising approach for expanding the available health and education data is for researchers to find a way to link different data systems. Linking datasets would expand the depth of information available and make it possible for researchers, evaluators and policy analysts to address additional health and education questions. While promising, there are methodological challenges with linking data sets that are differently sampled and designed to collect information for different units of analysis, such as the individual, community or nation.

Geographic Information Systems

One way to do this is to visually link and map data using Geographic Information Systems (GIS). Using maps that overlay health and education data can show health and education disparities, which may provide strategic insight into how to best plan and develop interventions. On the national level, the CDC maps social determinants of health including poverty, unemployment, high school education and health insurance,\textsuperscript{17} and NIH maintains a Community Health Maps website that provides information on low-cost mapping tools for community-based organizations.\textsuperscript{18} Mapping community-level health and education factors could help inform local policymakers and focus on priority setting and program planning. The Virginia Commonwealth University’s Center on Society and Health has been mapping local health disparities, and has worked to identify the neighborhood and individual mediators as well as educational and health outcomes.\textsuperscript{19}

Local Assessments and Practice Data

At different times during the conference, participants noted the common and persistent challenge of getting program implementation and other practice data, which can include highly informative information from the community and schools. Two reasons were cited: First, practitioners, who have other daily priorities, struggle to enter data into systems that will be usable. Second, current school assessments and program evaluations are not generally connected to other education data systems, nor are they health related. If local assessments and practice data are longitudinal, focused on formative data or linked to larger data sets, they can become more useful. Thus, there are many opportunities for research discovery using these localized data systems.

National Assessments and Data

As participants noted, new and interesting opportunities for analyses become available when multiple existing data sets are joined. For example, the ZIP code data collected by NAEP could be used to examine possible education impacts of aggregate neighborhood health

\textsuperscript{17} For information, see http://www.cdc.gov/dhdsp/maps/social_determinants_maps.htm and http://www.cdc.gov/gis/index.htm.
\textsuperscript{18} For information, see https://communityhealthmaps.nlm.nih.gov/.
\textsuperscript{19} For information, see http://www.societyhealth.vcu.edu/work/products/ and http://www.societyhealth.vcu.edu/work/the-projects/educational-and-health-outcomes-neighborhood-and-individual-mediators.html.
characteristics. Additionally, NCES administrative data collections recently added geospatial identifiers that make it possible to link these data to other surveys and larger data sets.

Linking data could help develop research focused both on individual behaviors and policies and practice. The CDC’s Shannon Michael noted that potential research opportunities include 1) exploring the relationship of individual behaviors on academic achievement and 2) looking at the impact of school health policies and practices on student achievement.

To focus research on individual behaviors, it would be possible to add questions to the CDC’s YRBS 2019. Areas of questioning that could be explored include attendance, disciplinary actions and attitudes toward school. Also, YRBS data could be linked with other education data such as Common Core of Data (CCD) and Market Data Retrieval (MDR) information. The YRBS is not representative at the school level, so it cannot be linked to school-level data; however, it can be matched with state-level data. Efforts have been made to encourage states to make these linkages and complete the analyses.

To focus research on policies and practices, opportunities for analyses include linking school-level data from School Health Profiles and SHPPS with CCD and MDR or aligning SHPPS district-level data with YRBS district-level data.

As an example of collaboration in action, during the meeting, Christopher Chapman of NCES mentioned that he would be able to help the CDC match the YRBS data with state-level education data.

There is federal momentum on the effort to make data more accessible. In 2013, President Barack Obama issued an Executive Order resulting in the Open Data Policy, which mandates that each federal department maintain internal and external data asset inventories. Specifically, each agency is tasked with using a common format to maintain a complete listing of all data sets owned, managed, collected, and/or created by the agency. Though these inventories are in the beta state of development, they make it easier to understand and build potential research questions with the data and variables collected. The ED inventory can be found at http://datainventory.ed.gov/ and the HHS inventory at https://www.qualitymeasures.ahrq.gov/hhs/index.aspx.

Data Enclaves

Participants also discussed the value of a health and education data enclave. A data enclave is a research repository that allows for the sharing of highly sensitive confidential data, such as survey respondents’ personally identifiable information. Enclaves allow researchers to safely conduct analyses within a secure context and ensure the confidentiality of survey respondents, thus balancing privacy with scientific utility. Such a health and education data enclave, open to the research community, could be valuable and play a critical role in the merging or coupling of one data set with another to conduct unique analyses.

The Federal Statistical System Research Data Centers, which are partnerships between federal statistical agencies and leading research institutions, provide secure facilities for the authorized access
of restricted-use micro-data for statistical purposes only. These are the future of big open data, which will allow us to look deeply and systemically at individual growth and development (including health and education) over time.

Aggregated and de-identified data are more secure, but tend to be less informative to researchers. The creation of a data enclave may be a creative way to expand on current assessments. Support for a health and education data enclave could be a very valuable contribution to the research community. Identifiers for longitudinal follow-up could be created within the enclave, such that existing assessments could be linked to future associated performance and other administrative and policy-oriented data sets.

**Challenge: Legal Issues with FERPA and HIPPA**

During discussion, participants noted that there may be significant legal challenges to connecting health and education data sets (within and outside the establishment of a data enclave) because it necessitates balancing the mandates and legal restrictions of both FERPA and HIPPA. Legal support will be needed throughout any major data-linking effort. Securing outside funding as a possible way to support efforts to add new survey questions was discussed at the conference. However, questions about data ownership will have to be dealt with, especially when supplementing federal data sets.

There is interest in facilitating a HIPPA/FERPA discussion (with NIH and ED) to find ways make it easier to share education and health data across sectors. As another example of Collaboration in Action, Michael Spittel, Program Officer at NIH, had scheduled an initial meeting between the federal departments, but it was cancelled due to the adoption of new rules that needed to be adapted to on the individual department level first. He asserted it is time to reschedule and prioritize this effort.

**Creating New Data**

Participants discussed another way to expand the available health and education data — create and collect new data. This can include adding questions to existing large-scale surveys such as NAEP, leveraging the utility of evaluations by developing and promoting the use of common health and education metrics, and investing in the use of novel data sources such as smartphone applications and social media logs.

**Additional Questions to Existing Surveys**

In terms of expanding data availability, data integration and linking has a strong temporal advantage over adding new variables to existing data sets. The challenge is the extended timeframe for adding new survey questions. NAEP, like other NCES surveys, has a longer development timeline relative to academic research studies. Even established questions from the research community cannot be added to NAEP until they go through a rigorous vetting process that typically takes three to four years. That timeline includes conducting cognitive interviews, pilot testing and operational assessments.

Jonas Bertling, Director, NAEP Survey Questionnaires, ETS, noted that some survey expansions have already begun, independent of timeline constraints. Survey questionnaires on educational large-scale assessments have started collecting broader types of contextual variables reflecting the increased policy
interest in noncognitive skills and additional outcomes. For example, the Programme for International Student Assessment (PISA) broadened the range of constructs captured with the student questionnaires and introduced health and well-being facets in 2015; in 2018, PISA will include an optional well-being questionnaire. NAEP also has started innovating their survey questionnaires and will introduce a series of new contextual modules including noncognitive indices. NAEP 2017 will be adding five Core Modules: Grit/Perseverance (including self-control); Desire for Learning; Components of SES; Technology Use; and School Climate.

When considering additions to questionnaires, there may be value in adding good health proxy questions to student surveys. Many student questions cannot be added by NCES without explicit parent permission (for example, questions about behavior). At the conference, there was a discussion on the kind of benign health proxy questions that might be asked about fitness or nutrition — questions that may be allowed without parental consent. While some examples were given, the consensus was that more consideration would be needed to develop proxy questions that can gather (albeit by proxy) better data about students’ health and well-being.

Participants also discussed the value of adding established questions to existing surveys. For example, the student self-reported grades question asked on the YRBS has consistently shown that students with higher grades are significantly less likely to engage in risk behaviors such as smoking or watching television for more than three hours a day on an average school night. If the question is included in more surveys, it can be used to make further connections between education and health outcomes. Here is the question:

<table>
<thead>
<tr>
<th>During the past 12 months, how would you describe your grades in school?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Mostly A’s</td>
</tr>
<tr>
<td>B. Mostly B’s</td>
</tr>
<tr>
<td>C. Mostly C’s</td>
</tr>
<tr>
<td>D. Mostly D’s</td>
</tr>
<tr>
<td>E. Mostly F’s</td>
</tr>
<tr>
<td>F. None of these grades</td>
</tr>
</tbody>
</table>

Common Metrics Could Leverage the Utility of Evaluations

In the same way that using established survey questions could be valuable across large-scale surveys, it is also possible that having common questions and approaches to various constructs across evaluations could expand the knowledge base connecting health and education. If there are common health and education variables in program logic models, and researchers and funding organizations agree to incorporate common measures into their work, the field will be poised to expand both its understanding and impact on improving health and K–12 outcomes. As Natalia Pane noted, evaluators and funders should be encouraged to use common metrics when working in education and health. Much can be learned from evaluation data, but the challenge is that different funders often use different metrics, which cannot be used in research syntheses. A potential goal would be to define which metrics in national data sets can align and be used locally. Knowledge and a collective strategy cannot grow when projects continue to measure different things. Laura Leviton, RWJF Senior Advisor for
Evaluation, pointed to the positive program and policy impact experienced upon the acquisition of unified metrics and definitions in tobacco cessation as an example of the possible impact of this type of effort.

In this discussion, Michael Spittel added that if researchers can measure experiences, they can understand them enough to figure out how to change them. The field needs to develop a way to alter what data is looked at, assessed and compiled in order to push the health and education agenda. What gets measured can get changed.

Use of Applications and Other Novel Data Sources

Technology is allowing the quick collection of new and novel data. Participants noted that the line is being blurred between what is possible in social science and medical research. Social scientists are no longer limited to questionnaires to access certain health characteristics. For example, smartphone applications are now able to assess cortisol levels, track physical movement and even make some disease diagnoses. According to Natalia Pane, other electronic data sources, including social media and text-based services, were also new sources of health-based data that could be linked to educational outcomes.

Research Opportunities and Priorities

Participants were eager to discuss potential research opportunities that they saw as priorities, including the following actions:

- Align health and education accountability
- Define and suggest the use of common metrics
- Develop an education and health logic model
- Explore specific areas for research
- Use new and innovative analytic methods

Align Health and Education Accountability

Participants noted that without an accountability structure to connect health and education, there is no alignment of goals and metrics for success. Participants also noted that though there is rhetorical support for connecting health and education, this topic has not been embraced as a priority mission, as evidenced by federal, state and local financial investment.

To move this work forward, participants discussed how the field will need to build consensus on what the goals of schools should be in respect to health. Since schools are under so much academic performance pressure, they may need help from the community to work beyond basic academic accountability. Local school and higher education partnerships can be full of opportunity when it comes to facilitating this movement into social, emotional and physical health. One recommendation, made during the discussion, was that when approaching school officials and educators about health, start a conversation about memory, attention span, critical thinking, school connectedness and engagement, and attendance, and then demonstrate how health is related to each of these prerequisites for learning.
Define and Suggest the Use of Common Metrics

Participants discussed how the development of a common metrics list or database would be a major contribution to the field. A comprehensive list of valid and reliable items that measure important health and education constructs efficiently could be used nationally and locally by academics, program evaluators, policymakers and funders. This work can be part of the proposed paper highlighted later in this report. If common metrics are adopted, administrative records data and evaluations and other interventions will become more easily linked and comparable.

Yet, when considering common metrics, caution should be exercised when using average effect size, since there can be a loss of contextual information that makes it challenging to determine what studies are most effective and under what circumstances. If the fundamental mission of this initiative is to improve health and education, efforts need to be made to gain the attention of those people who can put into practice the ideas generated. Thus, research should demonstrate what is possible in given situations, and hopefully inspire improved practice. Effect-size changes are useful from a research perspective; however, they may not be inspirational metrics for some practice-oriented health and education professionals — for example, it is hard to conceptualize what it means for a program to produce a .25 standard deviation change. Thus, effect sizes should be expressed or used in combination with other more concrete metrics for change.

Develop an Education-Health Logic Model

Natalia Pane made the research priority suggestion to develop an education-health logic model with path estimates and effect sizes for multiple subpopulations. For instance, researchers and policymakers could look at the health and education variables at play for high school graduation and understand which variables matter most to which group.

This suggestion prompted the group to discuss the transition in the field from basic research and secondary data analyses to technical assistance, knowledge translation, evidence reviews and evaluations. For instance, one participant advocated that funders be encouraged to use a “plan-do-study-act” cycle approach to the research investment. This process of inquiry can be used to identify, adapt and successfully scale up promising interventions in education aimed at optimizing research for learning to improve implementation, and is highlighted in the book Learning to Improve: How America’s Schools Can Get Better at Getting Better.20 This approach, along with the cross-sector enthusiasm to collaborate on improvement, could lead to relatively speedy and significant improvements at the intersection of health and education.

Explore Specific Areas of Research

During the conference, participants discussed specific research areas that hold promise for being potential points of intervention to improve K–12 and health outcomes. These include exploring individual health factors that impact education outcomes; social and emotional skills; and neighborhood and school safety factors.

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**Individual Health Factors Affecting Education Outcomes**

**Charles E. Basch**, the Richard March Hoe Professor of Health and Education at Teachers College, Columbia University, specializes in research on school-age urban minority children living in poverty, and has written on the health barriers to learning and the education opportunity gap. In this conference, he highlighted eight high-priority, educationally relevant health factors disproportionately affecting poor and minority children:

<table>
<thead>
<tr>
<th>Health Factor</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>Vision problems</td>
<td>Approximately 20% of low-income youth</td>
</tr>
<tr>
<td>Asthma</td>
<td>Approximately 3% of youth less than 18 years old</td>
</tr>
<tr>
<td>Teen pregnancy</td>
<td>6% of 15- to 19-year-olds annually</td>
</tr>
<tr>
<td>Violence</td>
<td>20% of high school students bullied at school annually</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Two-thirds of youth do not get enough physical activity</td>
</tr>
<tr>
<td>Breakfast</td>
<td>14% of high school students skip breakfast</td>
</tr>
<tr>
<td>ADHD</td>
<td>12% of 12- to 17-year-olds</td>
</tr>
<tr>
<td>Untreated caries (cavities)</td>
<td>23% of 2- to 11-year-olds</td>
</tr>
</tbody>
</table>

These health problems can influence children’s motivation and ability to learn, thus having powerful impacts on academic performance. More research on these factors and the possible school health interventions aimed at alleviating the effects of these factors is needed.

**Chandra Muller**, Professor, Department of Sociology at the University of Texas-Austin, presented on her “High School and Beyond Education Longitudinal Mid-life Follow-up” analyses. She has found that individual health characteristics such as overweight status, depressive symptoms and disability status were all related to less rigorous course-taking in high school. One of her primary conclusions is that individuals who are academically marginalized in high school have much worse health outcomes at mid-life. According to Muller, when students “lose their seat at the education table,” there is an association with a slew of negative health and life outcomes.

This presentation led the group to discuss the need to understand the long-term health and education impacts of exclusionary school disciplinary measures and of having fewer opportunities to learn. The Civil Rights Data Collection (CRDC) gathers data on key education and civil rights issues in public schools, including data on school suspensions, expulsions and opportunities to learn, which could be used to begin to answer this question.

**Social-Emotional Skills and Education**

There is a growing interest in social-emotional skills, as evidenced by the interest among policymakers, but the level of actual policies and programs still greatly vary. While we are still learning how to promote social-emotional health to support learning, these skills can be improved by changing the learning environments and mobilizing intervention programs.

**Patrick Kyllonen**, Senior Director of Academic and Workforce Readiness and Success (AWRS) at Educational Testing Service (ETS), presented the research connections between social-emotional skills
and higher grades as well as relationships between these skills and mortality rates, divorce rates, physical health, parenting and other indicators of health and happiness. There is now a worldwide interest in developing social-emotional skills, as shown, for example, in expected 2019 launch of the Organisation for Economic Co-operation and Development (OECD) international longitudinal study of skills development in cities, which focuses on the development of social-emotional skills. The OECD Skills framework that was outlined in the OECD report *Skills for Social Progress: The Power of Social and Emotional Skills*, measures both cognitive and social-emotional skills. The OECD *Skills for Social Progress* policy messages highlight the fact that children need a well-balanced set of skills for success, and that their capacity to achieve goals, work effectively with others and manage emotions helps improve lifetime outcomes. Regular social-emotional skills assessments provide valuable information to improve learning contexts and ensure they are conducive to skill development.

**Impact of Neighborhood Health and Safety on Education Outcomes**

David Osher, Vice President of the American Institutes for Research (AIR), discussed the impact of neighborhood health and safety on education outcomes. Longitudinal studies can be used to learn how neighborhoods and school environment affect educational outcomes, but also how being in multiple neighborhoods (moving from place to place) can impact learning. Neighborhood health and safety measures can be predictive indicators for students having school difficulty. For example, there is preliminary research on the negative educational impacts on a number of environmental factors, including bullying and living in an unsafe neighborhood. However, he said, there is more to learn in this area.

Osher spoke on how AIR supports student and school performance though the Conditions for Learning Survey, which assesses four core constructs: a safe and respectful climate, challenge and high expectations, student support, and social and emotional learning. This survey, completed in the Cleveland Metropolitan School District, revealed that many students indicated that the school environment was not conducive to learning, in that a majority of students agreed with the following survey indicators:

1) Most students at my school do not stop and think before they do something when they are angry.
2) Most students at my school think it is okay to call a person a nasty word when they deserve it.
3) Most students at my school think it is okay to fight with someone when they insult you.

While the Conditions for Learning Survey can evaluate school climate, there is a need to learn more about quality environmental interventions. How can health and education experts bring good interventions that are well coordinated into schools and neighborhoods? How do they create monitoring and intervention systems that are well integrated with the community?

**Use New and Innovative Analytic Methods**
As increasingly complex data sets are developed, researchers will depend on new and innovative analytic methods to examine them. For example, statistical simulation models are also a useful tool for projecting a real-world process and possibility into the future. Simulations allow researchers to estimate the promise of targeted interventions.

Steven Culpepper, Associate Professor, Department of Statistics at the University of Illinois at Urbana-Champaign, presented advanced statistical techniques that could be used for latent variable modeling. Large-scale surveys include hundreds of variables, which means that identifying the most relevant predictor variable of achievement can be challenging. When there is a large number of variables compared to the number of respondents, this is referred to as a “high-dimensional setting.” Therefore, applied researchers should use high-dimensional statistical procedures for testing hypotheses. Culpepper and his colleague developed a method (Generalized Laplace [GAL] priors) that can be effectively used in a high-dimensional setting where there are a large number of variables.

Culpepper also mentioned that new statistical advances allow researchers to use Cognitive Diagnostic Models (CDMs) more widely. The new procedure can be employed to assess existing cognitive theory or developmental theory and CDMs can accurately be applied to understand learning progressions.

Narayan Sastry, Associate Director, Population Survey Income Dynamics (PSID), and Research Professor, Institute for Social Research, Survey Research Center, Population Studies Center University of Michigan, mentioned the importance of innovation in methods for analyzing longitudinal data. Research on health-education requires longitudinal data on individuals and families as well as rigorous approaches to analyzing that data. Advanced rigorous methods for determining factors that affect both health and education include randomized controlled trials and analysis of natural experiments such as policy changes (e.g., mandatory schooling) as well as advanced approaches such as:

- Instrumental variable analysis (an advanced statistical approach)
- Examining data on siblings (which can be useful for controlling for family background) in statistical models
- Propensity score techniques (another advanced statistical approach)
Recommendations

Throughout the conference, particularly during the final session of the conference, which was facilitated by JoAnn Rock, Senior Research Scientist in ETS’s Research & Development division, the group explored building a research strategy, and collective agency, for improving health and K–12 education outcomes, voiced recommendations and put forth ideas for further consideration. Suggestions included:

<table>
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<tr>
<th>Develop and invest in research. Possible efforts here include:</th>
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<tr>
<td>• Fund secondary data analysis</td>
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<td>• Encourage researchers, especially new academics</td>
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<th>Focus the public discourse and agenda for health and education. Possible efforts include:</th>
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<tbody>
<tr>
<td>• Cultivate strategies for connecting research, communication, advocacy and action</td>
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<tr>
<td>• Continue to encourage cross-sector engagement</td>
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</table>

Develop and Invest in Research

Participants agreed that continued efforts to develop and invest in research are needed. Efforts to fund secondary data analysis and to encourage new academics were suggested.

Fund Secondary Data Analysis

To move the agenda forward, participants suggested the work required to achieve data linkages using the available data sets and fund secondary data analysis will need to be financially supported. Support for a health and education data enclave would also promote researchers in doing secondary data analysis by making the data more accessible. Support for GIS mapping of health and education data would help provide communities with a way to visualize the connections between various health and educational outcomes.

Encourage Researchers, Especially New Academics

Another suggestion was for leading organizations in the field to define research opportunities available given existing data systems, identify research priorities for advancing health and K–12 education collaborations, and support the implementation of this research. This could be done by sponsoring fellowships to study the relationship between health and education at the highest level.

A research agenda can be grown with minimal funding and encouragement. As explored throughout the conference, incredible data resources exist and are ready for new and creative analyses. Provide incentives for researchers and data analysts to do these analyses — for example, provide support for graduate students, sponsor health and education fellows at the state and national levels, and fund related conference presentations. This confluence between health and education is not well studied, and provides an opportunity to make a difference through research, especially for early-career academics.
Focus the Public Discourse and Agenda for Health and Education

One suggestion by multiple participants during the conference was the need to focus the health and education conversation and then plan what will be done next from a narrower scope. One suggested way to do this is to create definitive messages and agendas that can be used to leverage action in the form of funding and policy changes. The opportunity exists now to define, investigate and invest in an agenda focused on key areas of intersection between health and education. The next steps would be to work to assess where different stakeholders are in the support of that proposed health and education agenda, and begin to take action to move that agenda forward. Nonacademic collaborators (including funders) may be willing to rely on experts for guidance and would respond to this.

Cultivate Strategies for Connecting Research, Communication, Advocacy and Action

The field would benefit from developing a communication strategy to clearly inform the nation about the important associations between health and education. While the significance of the connection between health and education has been emerging, the public should become aware of opportunities for improvement and possible strategies for addressing disparities. As social systems, education and health have historically been viewed and approached programmatically in isolation. Opportunities lie in understanding how the connections between these systems can be leveraged to promote public understanding and improve health and education outcomes. For example, findings such as those presented by Charles Basch, which show that unmet needs within eight educationally relevant health factors are associated with educational disparities, should be publicized, and advocacy and action based on this knowledge should be encouraged. The process of connecting research, communications, advocacy and action is an important tactic in promoting improved outcomes.

Communication and advocacy suggestions given during the final discussion included 1) developing concise messages to confidently say what needs to be said about the relationship between health and education and 2) creating a “PISA shock” for Health and Education. Prior to administering PISA, Germany was under the impression that their education system was at the top. However, the initial PISA results showed otherwise, and triggered concern about the quality of education in Germany. The result was increased funding to support education and education research. A new national report on health and education on the scale of the book A Nation at Risk or the National Academies Press report, U.S. Health in International Perspective: Shorter Lives, Poorer Health, would garner national attention and support for research and progress.

Participants discussed the need to be strategic in communications and outreach, such that what is known about how to influence policymakers and decision makers is leveraged. Perhaps families, principals and other officials will be inspired to address health and education issues. Lessons from the Playworks21 implementation were discussed — e.g., with an understanding of the concrete needs of schools, strategies that are easy to implement and can become assets to the schools will be adopted. Knowledge of what motivates action can inform the field in promoting improved health and education outcomes.

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21 For more information, see http://www.playworks.org/
Several models for communication were explored as possible examples that could help move a health and education agenda forward. Participants cited models, exemplified by the CDC and the TECCS initiative, that combine discovery with collaboration and shared investment in improved outcomes.

The CDC has a communication model aimed at improving the use of information and data to inform practice between health and academic achievement within the context of the Whole School, Whole Community, Whole Child (WSCC) model. It calls for greater alignment, integration and collaboration between health and education to improve each child’s cognitive, physical, social and emotional development. The WSCC model combines and builds on elements of the traditional coordinated school health approach and the whole child model.

The CDC invests time in cultivating knowledge and encouraging action based on research, and their process for taking evidence to action is well developed. For example, when presenting the evidence connecting healthy eating and physical activity with academic achievement, the corresponding messages and suggested actions are defined. Core messages and audience-specific messages are developed, and concrete ideas for how key stakeholders can take action are shared.

The Transforming Early Childhood Community Systems (TECCS) initiative, a partnership between the Center for Healthier Children, Families and Communities at UCLA and the United Way Worldwide, mobilizes local partners to develop more effective early childhood service systems through four core components: 1) measurement and mapping; 2) community engagement; 3); targeted, place-based systems improvement; and 4) a shared learning network. It was suggested that this model could perhaps inform the RJWF initiative.

Continue to Encourage Cross-Sector Engagement

Participants were unanimous in suggesting continued cross-sector engagement to improve health and education, which is already part of the Culture of Health action vision. Participants noted that more exploration of this intersection is needed, and that research and related activities that foster cross-sector collaboration between health and education would promote knowledge development and improved outcomes.

Collectively, conference participants observed that policy decisions typically are not made by scientists, only influenced by them. With the idea of leveraging knowledge and expanding influence, it was suggested that health and education experts look for opportunities to serve across domains. For instance, health experts could be encouraged to join local and state boards of education.

The need for interagency and cross-sector collaboration was reinforced multiple times by conference participants. Charles Basch, for example, asserted that children are not served well by a siloed approach to health, education and social services. There are further layers of functional isolation,

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22 For further information on the WSCC model, see [http://www.cdc.gov/healthyyouth/wsc](http://www.cdc.gov/healthyyouth/wsc) or the November 2015 Special Issue of the Journal of School Health, which was devoted the WSCC model. Michael and colleagues article in the Special Issue can be found here: [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4606776/pdf/josh0085-0740.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4606776/pdf/josh0085-0740.pdf).
23 For more information, see: [http://teccs.net/](http://teccs.net/).
as the internal systems within each silo — such as funding, policies, programs and personnel — often operate within their own separate domains. Furthermore there are limited returns on investments for social resources efforts that are not strategically planned, and poor-quality program efforts are often not effectively coordinated. Cross-sector collaboration and strategic guidance are needed to help support school efforts to address priority health disparities.

One recommendation for moving forward from this conference was for there to be continued convenings in which people from both health and education review leading issues, solidify what is known and not known in the field, and develop a strategy for advocacy. Such convenings should have stronger representation from those in the health fields, including professionals and practitioners from the fields of school health and pediatrics. Cross-sector meetings provide opportunities for collaboration that could lead to cooperative activities such as those highlighted earlier between NCES and CDC or NIH and ED.
## Appendix A: Conference Attendees

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<thead>
<tr>
<th>Conference Attendee</th>
<th>Affiliation</th>
<th>Title</th>
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<tbody>
<tr>
<td>Charles Basch</td>
<td>Columbia University Teachers College</td>
<td>Richard March Hoe Professor of Health Education</td>
</tr>
<tr>
<td>Jonas Bertling</td>
<td>Educational Testing Service</td>
<td>Director, NAEP Survey Questionnaire Assessment Development Research &amp; Development</td>
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<tr>
<td>Christopher Chapman</td>
<td>National Center for Educational Statistics</td>
<td>Statistician Sample Surveys Division NCES</td>
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<tr>
<td>Tracy Costigan</td>
<td>Robert Wood Johnson Foundation</td>
<td>Senior Program Officer Research Evaluation Learning</td>
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<tr>
<td>Steven Culpepper</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>Associate Professor Department of Statistics</td>
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<tr>
<td>Christopher Daggett</td>
<td>Geraldine R. Dodge Foundation</td>
<td>President Geraldine R. Dodge Foundation</td>
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<tr>
<td>Elizabeth Garlatti</td>
<td>New Jersey Office of the Secretary of Higher Education</td>
<td>Chief of Staff</td>
</tr>
<tr>
<td>Patrick Kyllonen</td>
<td>Educational Testing Service</td>
<td>Senior Director Academic and Workforce Readiness and Success (AWRS) Research &amp; Development</td>
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<tr>
<td>Laura Leviton</td>
<td>Robert Wood Johnson Foundation</td>
<td>Senior Advisor for Evaluation</td>
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<tr>
<td>Evan Linhardt</td>
<td>New Jersey Department of Education</td>
<td>Chief Information Technology Officer</td>
</tr>
<tr>
<td>Daniel McCaffrey</td>
<td>Educational Testing Service</td>
<td>Principal Research Scientist Stat Analysis Research &amp; Development</td>
</tr>
<tr>
<td>Shannon Michael</td>
<td>Centers for Disease Control and Prevention Division of Population School Health Bureau</td>
<td>Health Sciences and Team Lead</td>
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<tr>
<td>Chandra Muller</td>
<td>University of Texas at Austin Department of Sociology</td>
<td>Professor</td>
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<tr>
<td>Catherine Millett</td>
<td>Educational Testing Service</td>
<td>Senior Research Scientist Policy Evaluation and Research Center</td>
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<tr>
<td>Michael Nettles</td>
<td>Educational Testing Service</td>
<td>Senior Vice President Edmund W. Gordon Chair Policy Evaluation and Research Center</td>
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<tr>
<td>Jennifer Ng’andu</td>
<td>Robert Wood Johnson Foundation</td>
<td>Senior Program Officer</td>
</tr>
<tr>
<td>Name</td>
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<td>Position</td>
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<tr>
<td>David Osher</td>
<td>American Institutes for Research</td>
<td>Healthy Children, Healthy Weight</td>
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<tr>
<td>Angela Pagliaro</td>
<td>Educational Testing Service</td>
<td>Knowledge Services Consultant</td>
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<tr>
<td>Natalia Pane</td>
<td>Child Trends, Inc.</td>
<td>Senior Vice President Research and Operations</td>
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<tr>
<td>JoAnn Rock</td>
<td>Educational Testing Service</td>
<td>Senior Research Scientist Higher Ed Research</td>
</tr>
<tr>
<td>Narayan Sastry</td>
<td>Institute for Social Research Survey Research Center Population Studies Center University of Michigan</td>
<td>Associate Director Population Survey Income Dynamics (PSID) Research Professor</td>
</tr>
<tr>
<td>Michael Spittel</td>
<td>National Institutes of Health (NIH) Department of Health and Human Services</td>
<td>Health Science Administrator Office of Behavioral and Social Science Research (OBSSR)</td>
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</tbody>
</table>
Appendix B: Conference Presentations

Basch, C. (May 6, 2016). Healthier students are better learners: Building a research strategy and agenda for improving health and K–12 education outcomes.

Bertling, J. (May 5, 2016). New survey questionnaire indicators in PISA and NAEP.


Michael, S. (May 5, 2016). CDC’s investment to support the connection between health and academic achievement.


Ng’andu, J. (May 5, 2016). Healthy school environments.


About ETS

At ETS, we advance quality and equity in education for people worldwide by creating assessments based on rigorous research. ETS serves individuals, educational institutions and government agencies by providing customized solutions for teacher certification, English language learning, and elementary, secondary and postsecondary education, and by conducting education research, analysis and policy studies. Founded as a nonprofit in 1947, ETS develops, administers and scores more than 50 million tests annually — including the TOEFL® and TOEIC® tests, the GRE® tests and The Praxis Series® assessments — in more than 180 countries, at over 9,000 locations worldwide.