A PUBLICATION OF

The Children's Partnership

Measuring DIGITAL OPPORTUNITY for AMERICA'S CHILDREN:

Where We Stand and Where We Go From Here

Including the DIGITAL OPPORTUNITY MEASURING STICK 2005

ABOUT THE CHILDREN'S PARTNERSHIP

The Children's Partnership is a national nonprofit, nonpartisan child advocacy organization with offices in Santa Monica, CA and Washington, D.C.

We undertake research, analysis, and advocacy to place the needs of America's over 70 million children and youth, particularly the underserved, at the forefront of emerging policy debates.

The hallmark of The Children's Partnership is to forge agendas for youth in areas where none exist, to help ensure that disadvantaged children have the resources and opportunities they need to succeed, and to involve more Americans in the cause for children.

Since 1993, our work has focused on securing health coverage for uninsured children and working to extend the benefits of technology to all children and their families.

National Advisors

The Children's Partnership relies on experts in a broad range of fields to inform our work for children and families. Below are our National Advisors:

Richard S. Atlas
Goldman, Sachs & Co. (retired)

Angela Glover Blackwell
PolicyLink

Holly Holmberg Brooks
Highwood Productions

Marlene Canter
Former CEO,
The Canter Organization

Peggy Charren
Founder, Action
for Children's Television

Robert Greenstein
Center on Budget
and Policy Priorities

Harold Hodgkinson
Institute for
Educational Leadership

Shirley M. Hufstedler
Morrison & Foerster LLP

Judith E. Jones
Free to Grow

Carol Kamin
Children's Action Alliance

Janice C. Kreamer
Greater Kansas City Community
Foundation & Affiliated Trusts

Celinda Lake
Lake Snell Perry & Associates, Inc.

Stuart Lazarus
Electronic Classroom of Tomorrow

Lawrence S. Lewin
Founder & Former CEO,
Lewin Group

Donna Lucas
(on leave) Chief of Staff
to First Lady, Office of Governor
Arnold Schwarzenegger

Milli M. Martinez
KABC-TV

Shelby Miller
Consultant

Tamara Ritchey Powers
Community Volunteer

Mark Real
KidsOhio.org

Nancy Daly Riordan
Children's Advocate

Jack Sansolo
Getty Images

Lisbeth B. Schorr
Harvard Project
on Effective Services

Raphael J. Sonenshein
Department of Political Science,
California State University

James P. Steyer
Founder, Common Sense Media

Arthur Ulene, MD
Feeling Fine Company LLC

Steven O. Weise
Heller Ehrman White
& McAuliffe LLP

Barry Zuckerman, MD
Boston University
School of Medicine

MEASURING DIGITAL OPPORTUNITY FOR AMERICA'S CHILDREN: Where We Stand and Where We Go From Here

Including the Digital Opportunity Measuring Stick

A Publication of The Children's Partnership

June 2005

Project Directors: Wendy Lazarus and Laurie Lipper
Written By: Wendy Lazarus and Andrew Wainer with Laurie Lipper
Research Director: Andrew Wainer
Research Assistance: Marcie De La Cruz, John Du, Ambar Espinoza, Robert Fairlie, Maral Farsi
Editorial Support: Carrie Spencer and Karen Roberts

This report is available online at www.contentbank.org/DOMS.

For copies of the print version of the report, contact:

The Children's Partnership
1351 3rd Street, Suite 206
Santa Monica, California 90401
Tel: 310-260-1220
Fax: 310-260-1921
E-mail: frontdoor@childrenspartnership.org

This project was funded in part by the Annie E. Casey Foundation. The Children's Partnership thanks them for their support, but acknowledges that the findings and conclusions presented in this report are those of the authors alone, and do not necessarily reflect the opinions of the Foundation. We also thank The Atlantic Philanthropies and Verizon for their support of the report's production and dissemination.

© 2005 The Children's Partnership. Permission to copy, disseminate, or otherwise use this work is normally granted as long as ownership is properly attributed to The Children's Partnership.

ACKNOWLEDGMENTS

A number of people contributed to the Digital Opportunity Measuring Stick Project. We are extremely grateful to our Project Advisors for their good counsel on everything from overall strategy for the project, to research design, to new literature, to recommendations. They also reviewed drafts and gave us invaluable feedback.

Our special thanks go to Professor Robert Fairlie in the Economics Department of the University of California, Santa Cruz, who conducted special data runs with the 2003 Current Population Survey data, helped us interpret these numbers, and worked with us to refine our methodology related to analysis and use of data. We also appreciate the leadership of John Du, who managed this project during its early months and spearheaded the early research. Our thanks, too, to Amy Sausser for editorial services, and to Alan Arkatov and Dan Shaw for contributing public relations advice and assistance.

We greatly appreciate the input of the following colleagues who gave us leads, reviewed sections of the report, or served as a sounding board on key issues: Parry Aftab, Saeed Ali, Amy Dominguez-Arms, Lauren Asher, Matt Barreto, Cynthia Baur, Robert Blomeyer, Jackie Brand, Laura Breeden, Bob Cabeza, Sandy Calvert, Delia Carmen, Anne Collier, Cheryl Collins, Brian DeChellis, Hellan Roth Dowden, Maya Eagleton, David Eisner, Constance Flanagan, Linda Fowells, B. Keith Fulton, Michael Funk, Leslie Harris, Kevin Hickey, Linda Jackson, Margaret Honey, Josh Kirschenbaum, Keith Krueger, David Lah, Judith McDivitt, Tim Marshall, Jim McConnaughey, Jeff McIntyre, Rosie McLaren, Kathryn Montgomery, Jennifer Monti, Francisco Mora, Mario Morino, Bill O'Hare, Manuel Pastor, Susan Patrick, Brenda Roberts, Erica Sabatino, Ralph Smith, Cherie Thomas, Ken Thompson, Joseph Turow, Elizabeth Van Ness, Tom Watanabe, Megan Waters, Erin Weltzien, and Andy Zucker.

We could not have undertaken this project successfully without the help of our team at The Children's Partnership, all of whom contributed in big or small ways to this effort: Marcie De La Cruz, Shari Davis, Ambar Espinoza, Maral Farsi, Dawn Horner, Jenny Kattlove, James Lau, Beth Morrow, Karen Roberts, Carrie Spencer, Kristen Golden Testa, and Dania Wasongarz.

Our thanks also to Charles Roussel with The Atlantic Philanthropies and to Nancy Williams and B. Keith Fulton at Verizon for supporting the printing and dissemination of this research.

Finally, we are grateful to the Annie E. Casey Foundation for providing the seed funding for this project. Ralph Smith and Delia Carmen provided us with encouragement and extremely helpful ideas and feedback as the project took shape and "grew up."

Advisors to the Digital Opportunity Measuring Stick Project

Alan Arkatov	Rogers and Associates and California Postsecondary Education Commission
Byron Auguste	McKinsey and Company
Walter Baer	RAND
Angela Glover Blackwell	PolicyLink
Patricia Senn Breivik	San Jose State University Library
Richard Chabran	California Community Technology Policy Group
Molly Joel Coye	Health Technology Center
Aimee Dorr	School of Education and Information Studies, University of California at Los Angeles
Robert Fairlie	Department of Economics, University of California at Santa Cruz
Alan Hammond	School of Law, Santa Clara University
Violet Harada	Information and Computer Sciences Department, University of Hawaii
Tom Kalil	Office of the Chancellor for Science and Technology, University of California at Berkeley
David Keyes	Community Technology Office, City of Seattle
Paul Lamb	Street Tech (Ret.)
Stuart Lazarus	Electronic Classroom of Tomorrow
Elsa Macias	Tomás Rivera Policy Institute
Karen Mossberger	Department of Political Science, Kent State University
Barbara O'Connor	Institute for the Study of Politics and Media, California State University, Sacramento
Randal Pinkett	BCT Partners, Inc.
Mark Real	KidsOhio.org
Jorge Schement	Department of Telecommunications, Penn State University
Jaleh Behroozi Soroui	American Institutes for Research
Mary Stansbury	School of Library and Information Science, Kent State University
Caroline Tolbert	Department of Political Science, Kent State University

TABLE OF CONTENTS

Information and Communications Technology (ICT) and America's Youth: Ten Years of Enormous Change 02

Highlights Report

I. Introduction and Executive Summary 04

Improving the Quality of Life for Young People With Disabilities 11

II. Impacts: How Does ICT Affect Opportunity for Children and Young Adults? 12

III. The Digital Opportunity Measuring Stick (DOMS): to What Extent Are We Providing Technology-Based Benefits To Children and Young Adults? 15

Disparities in Digital Opportunities for Children and Young Adults 20

IV. The Vital Connection Between Youth Opportunity and ICT Access at Home 28

V. ICT Risks Facing Children 30

VI. Recommendations: Creating a Future Where All of America's Youth Benefit From ICT-Enabled Opportunities 32

A Closing Word 37

References 38

Appendices

Digital Opportunity Measuring Stick (DOMS) Methodology 41

A Guide to the Measuring Stick Indicators 41

Additional Resources Available Online
www.contentbank.org/DOMS

- **Impacts of Technology on Outcomes for Youth: A 2005 Review**
- **Resources/Annotated Bibliography**

INFORMATION AND COMMUNICATIONS TECHNOLOGY AND AMERICA'S YOUTH: Ten Years of Enormous Change

UNITED STATES' CHILDREN, YOUTH, AND PARENTS

- Children ages 7–17 in the United States in 1994: 42 million[1]
- Children ages 7–17 in the United States in 2004: 46 million[2]

- Young adults ages 18–25 in 1994: 29 million[3]
- Young adults ages 18–25 in 2004: 32 million[4]

- Parents living with their children under age 18 in the United States in 1994: 63 million[5]
- Parents living with their children under age 18 in the United States in 2003: 62 million[6]

TECHNOLOGY AND YOUTH AT HOME

- Children ages 7–17 who live in households with personal computers in 1994: 36%[7]
- Children ages 7–17 who live in households with personal computers in 2003: 77%[8]

- Children ages 7–17 in households with a computer modem in 1994: 15%[9]
- Children ages 7–17 in Internet-connected households in 2003: 68%[10]

- Children ages 7–17 with broadband connections at home in 1994: 0
- Children ages 7–17 with broadband connections at home in 2003: 14 million or 26%[11]

TECHNOLOGY AND YOUTH IN SCHOOLS

- Percentage of public schools with Internet connections in 1994: 35%[12]
- Percentage of public schools with Internet connections in 2003: 100%[13]

- Percentage of public schools with Internet access using broadband connections in 2003: 95%[14]

- Percentage of public school "instructional rooms" with Internet connections in 1994: 3%[15]
- Percentage of public school "instructional rooms" with Internet connections in 2003: 93%[16]

- Percentage of public school "instructional rooms" with wireless Internet connections in 2003: 11%[17]

- Percentage of children ages 7–17 who use a computer at school in 1994: 81%[18]
- Percentage of children ages 7–17 who use a computer at school in 2003: 90%[19]

HOW YOUNG PEOPLE USE INFORMATION AND COMMUNICATIONS TECHNOLOGY

- Percentage of online youth ages 12–17 who use instant messaging (IM) in 1994: 0
- Percentage of online youth ages 12–17 who use instant messaging (IM) in 2001: 74%[20]

- Percentage of online youth ages 12–17 who have worked on or created Web pages in 1994: 0
- Percentage of online youth ages 12–17 who have worked on or created Web pages in 2001: 24%[21]

TECHNOLOGY IN THE COMMUNITY

- Percentage of youth ages 7–17 who use the Internet at a public library in 1994: No data available
- Percentage of youth ages 7–17 who use the Internet at a public library in 2003: 11%[22]

- Percentage of youth ages 7–17 who use the Internet at a community center or after-school program in 1994: No data available
- Percentage of youth ages 7–17 who use the Internet at a community center or after-school program in 2003: No data available

ECONOMIC DISPARITIES

- Percentage of youth ages 7–17 with access to a computer at home in 2003:

  Annual household income under $15,000: 45%[23]
  Annual household income more than $75,000: 96%[24]

- Percentage of youth ages 7–17 with access to the Internet at home in 2003:

  Annual household income under $15,000: 29%[25]
  Annual household income more than $75,000: 93%[26]

- Percentage of youth ages 7–17 with access to broadband at home in 2003:

  Annual household income under $15,000: 7%[27]
  Annual household income more than $75,000: 51%[28]

I. INTRODUCTION

In 1994, The Children's Partnership (TCP) published *America's Children & The Information Superhighway,* the first-ever analysis of the impact that the information revolution could have on the lives of America's children. We wrote:

"Every one of the 67 million children in America today, along with the approximately 4 million born each year, will be affected by the information revolution. But the needs and interests of America's children have not been comprehensively addressed."

At that time, we, as a nation, were just starting a public debate on the importance of Information and Communications Technology (ICT). There had been virtually no discussion about what was best for the millions of children in the United States facing this new frontier. Furthermore, the body of research to help inform our collective action on behalf of children was practically nonexistent.

Now, more than 10 years later, the information age has advanced to the point where we can begin to assess the difference that computers, the Internet, and emerging information technologies can make in the lives of children. Over this 10-year period:

- Information and Communications Technology—most notably the Internet—has spread faster than any previous communications invention and has begun to affect nearly every aspect of children's lives;
- Commercial and social applications of ICT including online shopping, gaming, e-mailing and instant messaging have taken a firm hold, as have some hazardous uses like gambling and pornography;
- Children have been at the forefront in using these new tools, eager to incorporate them into their day-to-day living; and
- Tens of billions of dollars have been invested by government and the private sector to equip children, "wiring" homes, classrooms, youth centers, children's health facilities, and places where young people are trained for work.

Now it is time to address the question: **How can the Internet help our children succeed?**

The purpose of this report is to answer that fundamental question. In answering it, we focus on four areas of children's lives that matter most and are essential to providing them with opportunity. These four areas are also the traditional rungs on the ladder of opportunity that have benefited generations of Americans. Our review of the evidence analyzes whether, and in what ways, technology tools can help children:

1. Increase educational achievement;
2. Lead healthy lives;
3. Prepare for the workforce; and
4. Become engaged in meaningful ways in their local community.

Children today need what children have always needed to become healthy and productive adults—caring parents, a safe place to live, a strong education, and health care, among other basics. What we set out to answer is whether Information and Communications Technology can help address these needs in new and sometimes more effective ways. Our analysis of existing research and data finds that when applied effectively by parents, teachers, doctors, and others, ICT holds the potential to be a powerful conduit to opportunity.

Report Scope and Purposes

Using our findings about ICT's impacts on youth opportunity as the research base, this report is designed to help guide us in choosing how best to deploy Information and Communications Technology for children and young adults. More specifically, the report:

- Summarizes what has been learned about the impact technology can have on children's lives to improve well-being, opportunity, and success;
- Provides an accountability tool—the Digital Opportunity Measuring Stick (DOMS)—that paints a picture of our progress in providing these measurable technology-enabled opportunities to young people, thereby giving us a way to hold ourselves accountable for extending opportunities wisely to all children;
- Identifies the children and young adults who are missing out on certain benefits technology can offer, particularly low-income, ethnic minority, and disabled children; and
- Offers recommendations to public- and private-sector leaders about what can be done to maximize these ICT-driven opportunities for youth, make more cost-effective investments in ICT, and provide digital opportunities to all children.

By providing this foundation to understand the benefits of technology tools and the extent to which they are being deployed for all children, the report can serve as a springboard for action and further investigation. It is written for policymakers, philanthropists, researchers, corporate leaders, and practitioners who operate programs for youth.

Report Methodology

This year-long study conducted by The Children's Partnership includes:

- A review of relevant literature in order to identify the most significant technology impacts that have been documented by the most rigorous research, such as initiatives that have been formally and independently evaluated. This data is used primarily in Chapter II, the Impacts section;
- An original analysis of available survey data from the federal government and nonprofit research organizations that provide us with the most up-to-date indicators for the Digital Opportunity Measuring Stick. The surveys we use in this report have their own methodology, and various caveats apply regarding the data collected. The sources are fully cited so interested readers can learn about these details (Chapter III);
- An analysis of the latest and most comprehensive national household survey data—the 2003 Current Population Survey—to identify ICT use patterns and gaps by income and race (Chapter IV); and
- Input from a diverse group of Project Advisors and other national experts from business, education, health care, government, youth services, university research, and other sectors who helped guide the development of this project.

Our Strategic Goals

We hope that those who care about children begin to see ICT's potential to meet important goals for young people and make digital opportunity a consistent part of the children's agenda in this country. We also hope that this report helps public- and private-sector leaders understand the gaps facing low-income, ethnic minority, and disabled youth in the U.S. Finally, we hope that this new information helps provide a road map for where we ought to go in deploying ICT toward positive outcomes in children's lives.

EXECUTIVE SUMMARY

Our report finds that after years of start-up and experimentation, Information and Communications Technology (ICT) has secured a strong foothold in the lives of children and young adults. More significantly, our research shows that ICT has begun to change the way opportunity is provided to young people across the fields of educational achievement, improved health, economic opportunity, and community and civic participation. ICT is changing how the ladder of opportunity works for America's children in these four areas, but there has not been a concerted effort to harness these changes and direct them in ways that can benefit the largest number of children.

The Digital Opportunity Measuring Stick

Taken as a whole, the Digital Opportunity Measuring Stick provides the first-ever snapshot of how America's children and young adults use ICT today in ways that relate to positive outcomes. The Measuring Stick analysis of 40 quantitative indicators from respected national data sources shows that these potential benefits are starting to reach large numbers of children and young adults.

But are they being delivered to all children? The Measuring Stick also documents a disturbing gap between low-income, ethnic minority, and disabled children and their peers in terms of reaping the benefits of digital opportunity. This gap prevents millions of children from receiving the ICT-driven opportunities we document. We envision a Digital Opportunity Measuring Stick report in 2015 that documents significant progress toward making ICT benefits available to all young people in the U.S.

In addition to a call to hold ourselves accountable for providing all children with digital opportunity, we offer five recommendations for spreading these potential benefits to more children and leveling the playing field for the children at risk of missing out on these new forms of opportunity.

As the basis for our action plan, we pose and answer what we see as the key questions regarding digital opportunity for youth.

1. HOW CAN ICT IMPROVE OUTCOMES FOR YOUNG PEOPLE IN IMPORTANT AREAS OF THEIR LIVES?

Our review of existing research on the impacts of ICT on youth outcomes revealed its potential to produce important and measurable impacts in four areas that matter to children:

First, Improved Health: We found some of the strongest evidence of positive impacts as well as some of the most exciting untapped potential of ICT in the area of improving the health of children. ICT is proving to be an effective way to keep parents, patients, and doctors in closer communication; a cost-effective means to manage chronic health problems common among children, such as asthma; and a resource offering teenagers and young adults a safe way to learn about sensitive subjects like birth control, pregnancy, and AIDS that has been shown to lead young people to make better choices about healthy behavior.

Second, Educational Achievement: Various studies have documented that appropriate use of technology in an educational context can help students achieve better grades, increase scores on standardized tests, increase school attendance, and improve school behavior. However, often these results are achieved in conjunction with other educational elements, such as highly trained teachers, and therefore it is difficult to measure the specific impact of the technology itself. There is also early evidence that technology can have a particularly significant impact on improved academic performance among students with lower grades or from low-income or rural backgrounds.

Third, Economic Opportunity: Young people with well-developed digital media skills can benefit from their skills in two ways: (1) they are prepared for better jobs, and (2) they can more easily use their skills to search, apply for, and obtain jobs.

As greater numbers of workplaces incorporate computers and the Internet in their everyday work, young people's ability to use these tools means they have better job opportunities. Early evidence suggests that teaching at-risk youth marketable ICT skills (such as word processing, Web design, desktop publishing or video production) helps them get jobs, resume their education, and see a productive path to adulthood. Similarly, use of the Web to post and find jobs means that youth proficient in searching for jobs online will be more competitive in the job market.

Fourth, Community and Civic Participation: There is a growing "youth civic culture" on the Web with thousands of sites offering a variety of ways for young people to become involved in their local communities or communicate with others who share their interests. Although there is very little empirical research about impacts on children and young adults, ICT appears to hold considerable promise to increase community involvement by offering young people a new forum in which to state their views on community issues; get connected to a local youth organization; or transact business with government—whether to get a work permit, apply for a driver's license, or apply for college financial aid.

2. ARE ICT-ENABLED OPPORTUNITIES REACHING U.S. CHILDREN TODAY?

Indicators on the Digital Opportunity Measuring Stick reveal the answer is a qualified "yes," with opportunities most widespread in the education arena.

EDUCATIONAL ACHIEVEMENT

- More than half—57%—of children in school ages 7–17 use a home computer to complete school assignments;
- More than half of teachers—53%—use technology in their classroom instruction; and
- Schools, as institutions, are almost universally connected to the Internet, and 88% of public schools have a Web site.

IMPROVED HEALTH

- Almost 20% of all young adults ages 18—25 use the Internet to search for health information; and
- Almost one of six physicians' offices now uses computer-based patient records that hold the potential to make health care for children more efficient and effective.

ECONOMIC OPPORTUNITY

- Nearly four of 10 children ages 7–17 use word processing or desktop publishing programs at home; and
- Among young adults ages 18–25, 26% use graphics or design programs on the computer at home, and 18% use spreadsheet or database programs.

COMMUNITY AND CIVIC PARTICIPATION

- Roughly four of 10 online young people use the Internet to visit the Web sites of clubs, groups, and teams of which they are members; and
- About the same percentage of online young people also go to sites where they can express their opinions.

3. IS THERE A DIGITAL OPPORTUNITY GAP CONFRONTING LOW-INCOME AND ETHNIC MINORITY CHILDREN?

There is cause for concern across all four fields based on a variety of Measuring Stick indicators.

EDUCATIONAL ACHIEVEMENT

- While 77% of children in school ages 7–17 from higher-income households (earning more than $75,000 per year) use a home computer to complete school assignments, only 29% of children from households earning less than $15,000 annually do so; and
- The parents of children from low-income households use e-mail to communicate with their children's teachers one-third as frequently as parents from higher-income households.

IMPROVED HEALTH

- The rate at which Asian American and White young adults ages 18–25 use the Internet to search for health information (23% and 22%) is almost double that of Native Americans, African Americans, and Latinos (13%, 12%, and 11% respectively), even though these ethnic minorities have disproportionate prevalence of certain conditions like AIDS and hypertension.

ECONOMIC OPPORTUNITY

- Children ages 7–17 living in households earning more than $75,000 annually are more than three times as likely to use a home computer for word processing or desktop publishing as children in homes with an income of less than $15,000 annually (57% versus 17%); and
- White and Asian American children ages 7–17 are much more likely to use a home computer for word processing or desktop publishing (45% and 41%) than are Latino (23%), African American (22%) or Native American (21%) children.

COMMUNITY AND CIVIC PARTICIPATION

- Although submitting and downloading government forms online is not common among any income group, 20% of young adults from households earning $75,000 or more annually do so compared to 11% of those from households earning less than $15,000 annually; and

- Similar disparities exist according to race and ethnicity.

4. WHEN ACCESS IS AVAILABLE TO LOW-INCOME AND DISABLED CHILDREN, DO THEY USE TECHNOLOGY TOOLS IN WAYS THAT ENHANCE THEIR OPPORTUNITIES?

Our Measuring Stick indicators suggest that ICT is beginning to help level the playing field for low-income and disabled youth.

- Lower-income online youth are downloading study guides more frequently than their higher-income counterparts (43% compared to 36%);

- Young adults who identified themselves as "lower class" are slightly more likely than others to visit a doctor or clinic because of information they obtain online (17% compared to 14%); and

- Those young people living in lower-income online households are also slightly more likely to visit Web sites or bulletin boards where they can express their opinion about things than those in higher-income online households (43% compared to 36%).

We found anecdotal but promising information about ICT's potential to enhance the quality of life for children with disabilities. ICT shows particular potential for disabled youngsters in special education and for young adults seeking to live independently and to work.

- For the estimated 6% of young people ages 5–20 who live with a disability (more than 4 million), ICT devices can, for example, help those with vision impairments read, or provide to those who are hearing-impaired simultaneous on-screen translations, or enable the physically impaired to work or take care of themselves at home; and

- Although we could not find comparable information for children, 35% of disabled adults report that not being able to use an ICT-assistive device would mean they could not take care of themselves.

5. HOW IMPORTANT IS HOME COMPUTER AND INTERNET ACCESS TO DIGITAL OPPORTUNITY FOR CHILDREN?

ICT access at home has emerged as a prerequisite to children fully realizing digital opportunity. Some of the most severe disparities facing low-income and ethnic minority children on Measuring Stick indicators—such as students using computers to help with homework, parents e-mailing teachers, and young adults using software applications which employers value—were clearly a function of the limited access these children have at home to computers, the Internet, and to high-speed connections.

The latest census data reveal that home access is marked by distinct inequalities—in some cases as serious as the ones we found 10 years ago when we published *America's Children & the Information Superhighway.*

- Children from higher-income families (annual income of more than $75,000) are more than twice as likely to have access to a computer at home as those in low-income families (annual income under $15,000)—96% compared to 45%; and

- For Internet access, the figures are 93% versus 29%, for broadband 51% versus 7%. Similar disparities face Latino, African American and Native American children.

Not surprisingly, low-income families (who have less ICT access at home) also use ICT less in other settings. Although almost all schools are wired with high-speed Internet, only 36% of children ages 7 to 17 from households earning less than $15,000 annually say they use the Internet at school compared to 63% of children from households earning more than $75,000 annually.

Data on home access to computers and the Internet for people with disabilities are dated and not specific to children. However, the limited data that exist show far more limited home access for the disabled than for the population as a whole, making it likely that children with disabilities are disadvantaged by less access to ICT-driven opportunities.

6. WHAT ADDITIONAL RESEARCH IS NEEDED?

While the research compiled in this report provides a useful starting point, the research base is limited. Additional research is needed across our four focus areas—health, education, economic opportunity, and civic participation. Research related to ICT's potential to affect civic participation by young people is particularly thin.

Moreover, research is needed regarding ICT's potential to help children and young adults with disabilities. Despite the fact that assistive technology such as voice recognition devices, screen readers, and special keyboards can help disabled young people get an education or hold jobs, the lack of information limits the analysis of whether children with disabilities are receiving these digital opportunities. Research related to the disabled should focus on the particular impacts ICT can have, current use of promising technologies, and disparities affecting low-income and ethnic minority children with disabilities.

In addition, the scarcity of data about the extent to which ICT is being used to help young people prepare for college, find an appropriate college, and then obtain financial aid for their college education needs to be addressed.

7. IN ADDITION TO POTENTIAL BENEFITS, WHAT ARE THE RISKS ASSOCIATED WITH ICT FOR CHILDREN?

Any look at the opportunities ICT can offer young people would be incomplete without addressing the evolving risks ICT brings as well. Because ICT risks to children can harm their healthy development and deter parents from using these new tools, these rapidly changing risks need to be monitored and addressed.

Some of the dangers reviewed in this report have received considerable public attention and, therefore, useful resources and strategies are available. These include online pornography, online predators, commercialism, and privacy concerns. In other newer arenas, such as "cyberbullying," online gambling and other online addictions, strategies are less developed, and effective tools need to be created for parents, teachers, and youth to use in managing these new risks.

RECOMMENDATIONS: CREATING A FUTURE IN WHICH ALL OF AMERICA'S YOUTH BENEFIT FROM ICT-ENABLED OPPORTUNITIES

The evolution and application of new technology tools is at a sensitive and pivotal juncture today. We now have the benefit of early stage knowledge and experience with ICT that did not exist 10 years ago. We have also been given a loud wake-up call about the existence of a digital opportunity gap that could lock millions of children out of health, educational, and economic opportunities if we allow it to continue. Most importantly, with so much of the story of the information and communications revolution still to be written, we have ample time and the ingenuity to make sure that no child is left behind in this increasingly technology-based world.

We make five recommendations that constitute a digital opportunity action agenda for youth. This agenda will help create a future in which all children in our country benefit from these new forms of opportunity and in which ICT tools are invented to address some grand challenges facing American youth. Each is laid out in more detail in Chapter VI.

RECOMMENDATION #1: We should identify and capitalize on the ICT advances with proven value, spreading them in local communities across the country to achieve shared goals for children.

RECOMMENDATION #2: We should invest in powerful but not-yet-developed ways in which ICT can help meet national goals for children related to literacy, healthy behaviors, immunization, and entrepreneurship.

RECOMMENDATION #3: We should create the benchmarks necessary to hold ourselves accountable for providing digital opportunity to all children, guiding the next 10 years of ICT's evolution in ways that truly help children and families.

RECOMMENDATION #4: We should take the necessary steps to ensure that every child has access to ICT tools where it matters—at home, school, and in the community. Parents and young people must be well informed about the opportunities and risks found through the Internet.

RECOMMENDATION #5: We should develop a long-range research agenda that can inform our decisions and actions in deploying technology effectively for children and young adults over the next decade.

Conclusion

New information and communications tools hold the potential to improve outcomes for children and young adults, but only if carefully applied and if we hold ourselves accountable for achieving the goals we set out. We hope that the new information in this report is used by those who care about children's well-being to set a course for the next 10 years. The 2015 Digital Opportunity Measuring Stick will then demonstrate the level of ICT progress for children and young adults that will make us proud.

About the Terms Used in This Report

The terms used to refer to the information technologies discussed in this report are changing as rapidly as the field itself. Ten years ago, people used the term "Information Superhighway." Today, many people refer to "computers and the Internet." Some time in the future, wireless technologies, such as cell phones and other hand-held devices, could deliver the information and opportunities described in this report.

For now, we use the term **Information and Communications Technology (ICT).** By it, we are referring to computers and their applications—particularly the information sent over the Internet through dial-up, high-speed, or wireless connections. In this report, we sometimes refer to "technology tools," "information technologies," or "computers and the Internet" to mean the same thing as ICT.

Digital opportunity refers to the ways in which the use of these technology tools can improve the lives of children or young adults. We broadly define the potential benefits of technology including its capacity to engage young people who are out of school and not on a path to self-sufficient adulthood. The more narrow definitions of achievement, such as those used in education today by the federal government and states' standards-based approach, are a subset of our framework. Also, while we recognize that young people use cell phones and text messaging in great numbers, we have not yet seen the research that demonstrates the cell phone as a tool for gaining opportunity.

Digital Opportunity Measuring Stick (DOMS) refers to a new analytic tool presented in this report that uses 40 indicators to measure the U.S.'s progress in extending ICT-enabled opportunity to all children and young adults. We also use the terms "DOMS" and "Measuring Stick" to refer to the Digital Opportunity Measuring Stick.

Children, youth, and young adults are the focus of this report. Our report recognizes that appropriate uses of information technologies change depending on the young person's age. We focus on school-age children (ages 7 to 17) for most indicators that are relevant for younger children. We use ages 12 to 17 for indicators relevant to adolescents. For indicators tied to employment, health, and other matters affecting young adults, we generally use ages 18 to 25. Exceptions to these groupings are made when available data sources did not collect information according to these age groupings.

We have used various definitions of **"low income"** to better understand disparities among children in receiving ICT-related opportunities. Where possible, we have defined low-income as an annual family income of less than $15,000. However, because we use a variety of data sources for our Measuring Stick indicators, we relied on whatever income comparisons the data set allowed.

INFORMATION AND COMMUNICATIONS TECHNOLOGY: IMPROVING QUALITY OF LIFE FOR YOUNG PEOPLE WITH DISABILITIES: AT A GLANCE

YOUNG PEOPLE WITH DISABILITIES

- Number of those ages 5–20 with a disability in 2003: 4 million[29]
- Percentage of all youth ages 5–20 with a disability in 2003: 6%[30]

THE POTENTIAL OF ASSISTIVE TECHNOLOGY FOR YOUNG PEOPLE WITH DISABILITIES

- Percentage of disabled adults who use voice recognition technology, a special keyboard or mouse, or any other similar device to help with limited dexterity in 2004: 7%[31]
- Percentage of disabled adults who use a screen reader, special computer software, or similar device to assist with limited vision or blindness in 2004: 13%[32]
- Percentage of disabled adults who say not being able to use an assistive device would mean they could no longer care for themselves at home in 2004: 35%[33]

PEOPLE WITH DISABILITIES AND ACCESS TO ICT TOOLS

- Percentage of people with disabilities ages 15–64 with a computer at home in 1999: 33%[34]
- Percentage of people without a disability ages 15–64 with a computer at home in 1999: 56%[35]
- Percentage of people with disabilities ages 15–64 with Internet access at home in 1999: 16%[36]
- Percentage of people without a disability ages 15–64 with Internet access at home in 1999: 34%[37]
- Percentage of disabled adults ages 18 and older who use the Internet in 2003: 38%[38]
- Percentage of all adults ages 18 and older who use the Internet at home in 2003: 58%[39]
- Percentage of disabled people who do not use the Internet because their disability impairs or makes impossible that use in 2003: 28%[40]

THE BARRIERS TO ACQUIRING ASSISTIVE TECHNOLOGY FOR DISABLED PEOPLE

- Percentage of adults with disabilities who have tried to acquire assistive technology but could not afford it in 2004: 54%[41]
- Percentage of adults with disabilities who have not attempted to get an assistive device primarily because of cost barriers in 2004: 61%[42]

II. IMPACTS: HOW DOES INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) AFFECT OPPORTUNITY FOR CHILDREN AND YOUNG ADULTS?

Children today need what children have always needed to become healthy and productive adults—caring parents, a safe place to live, a strong education, and health care, among other basics. What we set out to answer is whether Information and Communications Technology (ICT) can help address these needs in new and sometimes more effective ways. Our analysis of existing research and data finds that when applied effectively by parents, teachers, doctors, and others, Information and Communications Technology hold the potential to be a powerful conduit to opportunity.

Additional Resources Available Online
www.contentbank.org/DOMS

This section is excerpted from a much more extensive review of the most rigorous available research across the fields of health, education, employment, and civic participation:

- **Impacts of Technology on Outcomes for Youth: A 2005 Review.**
- **Resources/Annotated Bibliography**

1. WE IDENTIFIED FOUR KEY AREAS IN CHILDREN'S LIVES WHERE ICT CAN HAVE A POSITIVE IMPACT:

- Improved health;
- Educational achievement;
- Economic opportunity; and
- Community and civic participation.

These four areas—and the more specific positive outcomes our analysis identified within each area—provide the basic structure for this report and for the Digital Opportunity Measuring Stick. We chose these four areas because they are critical to a rich childhood and potential for success in adulthood. They have also been traditional "rungs" in the ladder of opportunity for Americans for many generations. In each of the four areas, this analysis discusses how technology has been integrated to improve opportunity for children.

2. ALTHOUGH ICT IMPACTS ON YOUTH OUTCOMES IS AN UNDERDEVELOPED FIELD, AVAILABLE EVIDENCE SHOWS THAT THERE IS A GROWING CONNECTION BETWEEN ICT AND IMPROVED OPPORTUNITY.

Because the four areas have received different levels of research attention, the extent to which impacts are documented in each section varies widely.

3. WE FOUND SOME OF THE STRONGEST EVIDENCE OF POSITIVE IMPACT AS WELL AS SOME OF THE MOST EXCITING UNTAPPED POTENTIAL OF ICT IN THE AREA OF IMPROVING THE HEALTH OF CHILDREN.

There is early evidence of the benefits of e-mail and Web-based communication between parents, patients, and doctors to exchange information.[43] ICT also has the potential to be an effective way to manage chronic health problems common in children. One initiative found that children with asthma whose families used the Internet to monitor asthma symptoms and send the information to health care providers had far fewer (48%) days of limited activity and were less likely to have asthma-related difficulties.[44]

The Internet is also proving to be a relevant source of health information for young people. One survey found that among 15- to 24-year-olds who use the Internet, 44% use it to search for information on sensitive subjects such as pregnancy, birth control, and AIDS; and 39% of young online health information seekers have changed their personal behavior because of information obtained online.[45] Finally, teaching elementary-school students about nutrition through multimedia computer programs has shown the potential of these tools to change critical health behaviors in young people.[46]

4. IN THE REALM OF EDUCATIONAL ACHIEVEMENT—THE MOST WIDELY DISCUSSED OF THE FOUR AREAS—THERE IS EARLY EVIDENCE OF ICT'S POTENTIAL TO ENHANCE STUDENT LEARNING, ESPECIALLY FOR LOWER-ACHIEVING STUDENTS.

When used with other educational tools, ICT has been shown to have the potential to help students achieve better grades, increase scores on standardized tests, increase school attendance, and improve school behavior. However, often these results are achieved in conjunction with other educational elements, such as highly trained teachers, and therefore it is difficult to measure the specific impact of the technology itself.

One national study found that 78% of online youth ages 12 to 17 said they believe the Internet helps them in school.[47] And there is early evidence of its potential to have particular impact in improving learning among students with lower grades or from low-income or rural backgrounds. In one study, researchers using regression analysis found that the introduction of technology accounted for an 11% increase in basic skills achievement scores among a rural, low-income student population.[48]

The benefits of education technology have been observed as early as preschool. For example, children in a rural Head Start program who had access to ICT achieved better measures on school readiness and cognitive development assessments.[49] Although research on educational outcomes related to technology is more plentiful than in the other sectors we studied, a need remains for more broad-based, longitudinal research to test these early findings and to better understand the effects from ICT specifically, as a potential value-added to other educational supports.

5. EVIDENCE OF THE ECONOMIC OPPORTUNITY PROVIDED YOUNG PEOPLE THROUGH ICT COMES LESS FROM SOCIAL SCIENCE RESEARCH AND MORE FROM LABOR MARKET DATA AND EMPLOYMENT PRACTICES—AS THE MAJORITY OF WORKPLACES NOW USE COMPUTERS AND THE INTERNET AS NORMAL OPERATING TECHNOLOGIES, AND AS YOUNG PEOPLE USE THE INTERNET TO FIND JOBS.

Three of the 10 fastest-growing occupations through the year 2012 are expected to be computer-intensive,[50] and several others benefit from employees having ICT skills. Between 2000 and 2010, there are projected to be more than 2.5 million new jobs for IT professionals.[51]

For young people fortunate enough to work in the information technology sector, the average wage is often twice the average overall private-sector industry wage. Bureau of Labor Statistics figures from 2004 show that computer software publishers earn an hourly wage of about $38 compared to the overall private-sector wage of about $16. Computer systems designers' hourly earnings of $31 also compare well with the average private-sector hourly earnings.[52]

Although less studied than other outcomes, a handful of demonstration efforts as well as anecdotal evidence suggest that teaching at-risk youth marketable ICT skills (such as Web design, desktop publishing, or video production) improves their economic prospects by helping them get jobs, resume their education, and follow a productive path to adulthood.[53] In addition, many more employers are posting job openings online—sometimes only online—making ICT access and skills important tools in finding a good job. The greatest challenge today is how best to take these career-enhancing program models to scale so that more at-risk youth can enjoy these technology-enabled opportunities.

6. ICT'S ABILITY TO INCREASE COMMUNITY AND CIVIC PARTICIPATION AMONG YOUTH APPEARS TO HOLD CONSIDERABLE PROMISE, ALTHOUGH THERE IS STILL RELATIVELY LITTLE EMPIRICAL EVIDENCE IN THIS ARENA.

Research shows there is a growing youth civic culture on the Web with hundreds of sites promoting a variety of causes to engage youth.[54] Yet research on civic participation and ICT has been focused generally only on adults. Given young people's avid use of online communications, it is reasonable to expect that impacts shown for adults may be even more pronounced for youth.

In one example assessing adults' use of ICT for interfacing with government, a greater number and diversity of residents offered their views about a civic issue (a strategic plan related to transportation) when they could participate through Web-based discussions rather than through traditional written submissions.[55] In addition, access to the Internet and online election news has been shown to increase the probability of voting (up from an 8% increase in 1996 to 12% in 2000).[56] Most promising may be the untapped potential of ICT to help young people transact business with government—whether to get a driver's license, apply for college financial aid, or get a work permit.

7. ALTHOUGH YOUNG PEOPLE WITH DISABILITIES PERHAPS STAND TO BENEFIT MOST FROM THE VARIOUS KINDS OF ASSISTANCE THAT TECHNOLOGY CAN OFFER, WE FOUND LITTLE RESEARCH ON ACTUAL USES OF THESE TOOLS OR ON THEIR IMPACTS ON CHILDREN WITH DISABILITIES.

An estimated 6% of young people ages 5 to 20 —4 million—live with a disability. ICT devices exist that can help children with vision impairments read, or provide those who are hearing-impaired with simultaneous on-screen translations, or allow the physically impaired to use assistive tools, helping them to learn and become more independent. While 35% of disabled adults report that not being able to use an assistive device would mean they could not take care of themselves, we were unable to find any information on actual benefits ICT has brought to children with disabilities.[57]

WHAT THE RESEARCH ON IMPACTS ADDS UP TO

There are clear limitations to the research on technology's impacts on youth. What is known is often based on research involving small numbers of people for short periods of time, sometimes focuses on adults and not children, and in many cases does not address some of the most important questions.

However, this research provides a starting point from which to monitor progress in providing digital opportunity, begin applying early lessons to practice and policy, and develop the next generation of needed research.

III. THE DIGITAL OPPORTUNITY MEASURING STICK (DOMS): TO WHAT EXTENT ARE WE PROVIDING TECHNOLOGY-BASED BENEFITS TO CHILDREN AND YOUNG ADULTS?

We developed the Digital Opportunity Measuring Stick (DOMS) to monitor our progress in providing technology-based benefits to children and young adults. It offers a national snapshot, but could also be adapted to provide a state-by-state or more localized picture.

The Measuring Stick includes 40 indicators organized around educational achievement, improved health, economic opportunity, and community and civic participation. Using a focus on children and young adults, the Measuring Stick provides an original analysis of available survey data from the federal government and nonprofit research organizations. (See Appendix A for further information about the methodology used to develop the Measuring Stick.) Each indicator has a logical connection to the research on impacts cited above. (See Appendix B for further information on each indicator, including what it measures, why we selected it, where the data come from, and notable facts.)

Taken as a whole, the Measuring Stick provides the first-ever snapshot of how America's children and young adults use ICT today in ways that relate to these positive outcomes. Equally important, it identifies where disparities exist for low-income and ethnic minority children with regard to these ICT-enabled opportunities.

Overall, our indicators reveal that one of the primary functions the Internet serves for youth today is that of a massive information resource. Young people use the Internet for such diverse functions as conducting research for school, seeking health information, and finding out about clubs, groups, or sports teams. Furthermore, youth are starting to use computer applications such as word processing and graphic design programs that will give them an advantage in starting a career in an economy that relies increasingly on ICT tools.

However, ICT's potential to improve youth outcomes is not being consistently realized. We found a digital opportunity gap that is developing as low-income, ethnic minority, and disabled children are left behind in certain key areas. Page 20 presents some of the key digital disparities facing children and young adults today.

See the next page for the Digital Opportunity Measuring Stick: At a Glance. Our more detailed findings are presented in the following pages.

DIGITAL OPPORTUNITY MEASURING STICK: AT A GLANCE

NUMBER	INDICATOR	CURRENT STATUS	SOURCE
	Educational Achievement		
	ENRICHED LEARNING		
✓ 1.	Percentage of children in school ages 7–17 who use a home computer to complete school assignments	57%	CPS
✓ 2.	Percentage of all high schools in the nation with students enrolled in distance education courses	38%	U.S. DOE
✓ 3.	Percentage of online young people ages 12–17 who download study aids from the Internet	34%	Pew
✓ 4.	Number of states that have education technology standards by grade level	25	TCP
	ENHANCED INSTRUCTION AND COMMUNICATION		
✓ 5.	Percentage of public school teachers who "somewhat" or "strongly" agree that computers and other technology for their classroom are sufficiently available	57%	U.S. DOE
✓ 6.	Percentage of public schools or districts that offer professional development for use of the Internet in the classroom	82%	U.S. DOE
✓ 7.	Percentage of K-12 special education students in U.S. public schools using ICT tools as part of their Individual Education Plan	N/A	N/A
✓ 8.	Percentage of online young people ages 12–17 who use e-mail and instant messaging to contact teachers or classmates	41%	Pew
✓ 9.	Percentage of parents with online children ages 12–17 who use e-mail to communicate with their child's teacher	28%	Pew
✓ 10.	Percentage of public schools with a Web site or Web page	88%	U.S. DOE
	IMPROVED ASSESSMENT AND PREPARATION FOR HIGHER EDUCATION		
✓ 11.	Number of states that test student knowledge of technology to see if the instruction is having an impact	3	Education Week
✓ 12.	Percentage of students who research colleges using the Internet	N/A	N/A
✓ 13.	Percentage of students who use the Web for SAT or ACT test preparation	N/A	N/A
✓ 14.	Percentage of students who obtain college scholarships or financial aid through the Web	N/A	N/A

NUMBER	INDICATOR	CURRENT STATUS	SOURCE
	Improved Health		
	EFFECTIVE MANAGEMENT OF HEALTH CARE NEEDS/CONDITIONS		
✓ 15.	Percentage of parents who use e-mail to communicate with their child's doctor	N/A	N/A
✓ 16.	Percentage of physicians' offices that have adopted computer-based patient records	17%	Harris
✓ 17.	Percentage of disabled youth who are able to get the ICT-related assistive technology they need	N/A	N/A
✓ 18.	Percentage of parents who access health records online for their child	N/A	N/A
✓ 19.	Number of states that reimburse for telemedicine expenses under Medicaid	18	CMS
	BETTER INFORMED ABOUT HEALTH NEEDS/CONCERNS		
✓ 20.	Percentage of young adults ages 18–25 who use the Internet to search for health information	19%	CPS
✓ 21.	Percentage of online parents who search the Internet for health insurance information	29%	Pew
✓ 22.	Percentage of online youth ages 15–24 who use the Web to find information about birth control, STDs, or AIDS	44%	Kaiser
	INCREASED HEALTHY BEHAVIOR		
✓ 23.	Percentage of online "health information seekers" ages 15–24 who have changed their personal behavior because of health information obtained online	39%	Kaiser
✓ 24.	Percentage of online health information seekers ages 15–24 who have seen a doctor because of online information	14%	Kaiser

See Appendix A for more about the methodology used to develop the Measuring Stick. Appendix B contains further information about each indicator, including why each was selected, the data source, and more extensive analysis of the data.

NUMBER	INDICATOR	CURRENT STATUS	SOURCE
	Economic Opportunity		
	PREPARATION FOR CONTEMPORARY LABOR MARKET		
✓ 25.	Percentage of young people ages 7–17 who use word processing or desktop publishing programs on the computer at home	**38%**	CPS
✓ 26.	Percentage of young people ages 18–25 who use spreadsheet or database programs on the computer at home	**18%**	CPS
✓ 27.	Percentage of young people ages 18–25 who use graphics/design programs on the computer at home	**26%**	CPS
✓ 28.	Percentage of online young people ages 12–17 who have created or worked on a Web page	**24%**	Pew
	INCREASED AVENUES FOR EMPLOYMENT		
✓ 29.	Percentage of young people ages 18–25 who have used the Internet for a job search	**19%**	CPS
✓ 30.	Percentage of young people ages 18–25 who have submitted a resume online	**8%**	CPS
✓ 31.	Percentage of disabled young adults ages 18–25 who say they would not be able to work without an ICT-related assistive device and have one	**N/A**	N/A
✓ 32.	Percentage of young people who have taken a technology skills course to enhance their career mobility	**N/A**	N/A
✓ 33.	Percentage of young adults ages 18–25 without a high school diploma who have used the Internet to earn their GED	**N/A**	N/A

NUMBER	INDICATOR	CURRENT STATUS	SOURCE
	Community and Civic Participation		
	INVOLVEMENT WITH COMMUNITY		
✓ 34.	Percentage of online young people ages 12–17 who visit Web sites for clubs, groups, or sports teams of which they are members	39%	Pew
✓ 35.	Percentage of young people ages 18–25 who search the Internet for community events or volunteer opportunities	N/A	N/A
✓ 36.	Percentage of disabled young people ages 12–17 who say that ICT helps them connect with peers and pursue their hobbies and interests	N/A	N/A
	ACTIVE CITIZENSHIP		
✓ 37.	Percentage of young people ages 18–25 who seek information online about candidates for office or ballot issues	N/A	N/A
✓ 38.	Percentage of online young people ages 12–17 who visit Web sites where they can express opinions about something	38%	Pew
✓ 39.	Percentage of young adults ages 18–25 who use the Internet to search for government information	19%	CPS
✓ 40.	Percentage of young adults ages 18–25 who use the Internet for downloading or submitting government forms	16%	CPS

LEGEND

N/A—Data not available

CMS—Data from the Centers for Medicare and Medicaid Services, U.S. Department of Health and Human Services

CPS—Data from the October 2003 Internet and Computer Use, Current Population Survey Supplement

Education Week—Data from the online magazine Education Week on the Web

Harris—Data from 2002 survey by Harris Interactive

Kaiser—Data from the Kaiser Family Foundation

Pew—Data from the Pew Internet & American Life Project

TCP—Data collection and analysis by The Children's Partnership

U.S. DOE—Data from the U.S. Department of Education

DISPARITIES IN DIGITAL OPPORTUNITIES FOR CHILDREN AND YOUNG ADULTS: AT A GLANCE

EDUCATIONAL ACHIEVEMENT

Percentage of children in school ages 7–17 who use a home computer to complete school assignments:[58]

- Annual household income of less than $15,000: 29%
- Annual household income of $75,000 or more: 77%

Percentage of parents with online children ages 12–17 who use e-mail to communicate with their child's teacher:[59]

- Annual household income of less than $30,000: 9%
- Annual household income of $50,000 or more: 33%

Percentage of public schools with a Web site or Web page:[60]

- Schools where three-fourths or more of students are eligible for free or reduced-price lunch: 72%
- Schools where about one-third of students are eligible for free or reduced-price lunch: 96%

IMPROVED HEALTH

Percentage of young adults ages 18–25 who use the Internet to search for health information:[61]

Latino: 11%
African American: 12%
Native American: 13%
White: 22%
Asian American 23%

ECONOMIC OPPORTUNITY

Percentage of young people ages 7–17 who use word processing or desktop publishing programs on the computer at home:[62]

Native American: 21%
African American: 22%
Latino: 23%
Asian American: 41%
White: 45%

Percentage of young people ages 18–25 who use graphics/design programs on the computer at home:[63]

- Annual household income of less than $15,000: 18%
- Annual household income of $75,000 or more: 42%

Percentage of young people ages 18–25 who have used the Internet for a job search:[64]

Latino: 11%
Native American: 17%
African American: 18%
Asian American: 21%
White: 21%

COMMUNITY AND CIVIC PARTICIPATION

Percentage of young adults ages 18–25 who use the Internet for downloading or submitting government forms:[65]

- Annual household income of less than $15,000: 11%
- Annual household income of $75,000 or more: 20%

Percentage of young adults ages 18–25 who use the Internet for downloading or submitting government forms:[66]

Latino: 8%
African American: 9%
Native American: 11%
Asian American: 18%
White: 19%

Percentage of young adults ages 18–25 who use the Internet to search for government information:[67]

African American: 12%
Latino: 12%
Native American: 13%
White: 22%
Asian American: 22%

WHAT THE DIGITAL OPPORTUNITY MEASURING STICK SHOWS

Educational Achievement

- **For children and youth, ICT has its strongest presence in schools, a fact that, in certain respects, has helped make at least a minimal level of digital opportunity available to all children.** Almost all public schools in the nation are wired, and almost all of these schools provide high-speed Internet access. A majority of teachers use technology in the classroom, and almost all schools have an Internet presence in the form of a school Web site. Teachers, parents, and students are using ICT to communicate, typically through e-mail, but also using instant messaging. Distance education is growing increasingly common, with classes now available in 9% of all schools and 38% of high schools.[68] Furthermore, a handful of states assess their students' technology skills, some of which are very advanced. For example, almost one-quarter of online young people are building Web pages, and one-third of online young people are downloading study aids from the Internet.[69]

  Due to efforts to equip public schools with the ICT resources they need, many of the Measuring Stick education indicators show parity among youth from different income groups. For example, income does not appear to be a deciding factor in terms of young people enrolling in distance education. In wealthier areas, with low poverty concentration, 36% of high schools have students enrolled in distance education. In poorer areas, 40% of high schools have students enrolled in distance education. Our initial impression is that distance education[70] holds the potential to level the playing field for high school students in poorer areas.

  The findings regarding young people using the Internet to download study aids show that adolescents from lower-income families are, in fact, more likely to access these resources. For online young people ages 12 to 17 from homes with an annual income of under $30,000, 43% download study aids from the Internet. Among the same age group from homes earning $50,000 or more, 36% download study aids.[71]

- **But a substantial gap along income lines exists in relation to who has access to ICT tools as well as ICT-readiness among teachers.** More than half (53%) of teachers in public schools who have computers use them or the Internet for instruction during

EDUCATIONAL ACHIEVEMENT:

Public Financing of Educational Technology Helps Increase College Attendance

In 1998 Boston Public Schools became the first major urban school district to build high-speed technology networks in each of its school buildings and public libraries. Boston programs such as Technology Goes Home provided access, training, content, and curriculum through public schools and neighborhood collaboration. Furthermore, Boston schools offered student graduates and their families new computers, printers, and Internet access for less than $15 per month. This equipment offer was conducted through a special guaranteed loan program with no interest and no down payment.

A program evaluation found this package of programs had measurable impacts on increasing students' opportunities. Some of these impacts include:

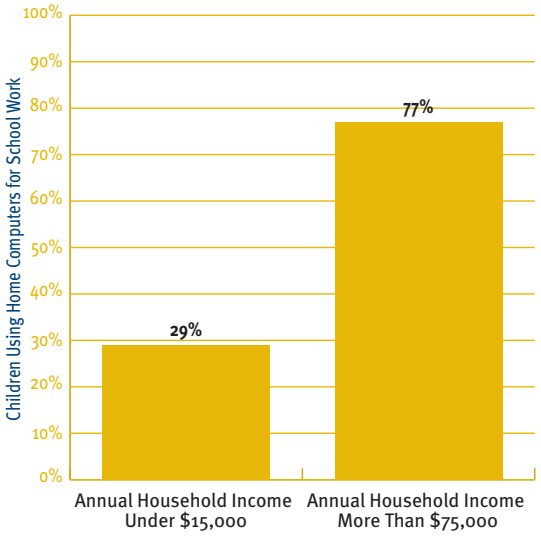
- Approximately 80% of graduates go on to college versus the district average of 65%; and
- 95% of participants made significant improvements in their computer skills.

Additional Resources Available Online
www.contentbank.org/DOMS

- **Impacts of Technology on Outcomes for Youth: A 2005 Review**
- **Boston Digital Bridge Foundation www.digitalbridgefoundation.org**

class. But in schools whose students are from higher-income families, 61% of teachers with computers use them in class compared to 50% of teachers in schools with lower-income students.[72] The disparity is even greater with regard to the percentage of public schools with a Web site, enabling parents easier access to information about school expectations and activities. 96% of schools where most students do not qualify for free or reduced-price lunch have a Web site compared to 72% of schools where the large majority of students are eligible for free or reduced-price lunch.[73]

Children Ages 7–17 From More Affluent Families Are More Than Twice as Likely to Use Home Computers To Complete School Assignments as Their Less Affluent Peers



Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

- **In spite of most schools being wired, there are disparities in who receives the educational opportunities offered by technology when home computer use is related to schoolwork.** Nearly four times as many parents of online children ages 12 to 17 from households earning more than $50,000 used e-mail to communicate with their child's teacher as did parents from online households earning less than $30,000 (33% compared to 9%).[74] Similarly, children from wealthier households are much more likely to use a home computer to help them with school assignments. Some 77% of children ages 7 to 17 from households with an income of $75,000 or above use computers to complete school assignments compared to 29% of children from households with an income of up to $15,000 per year. The same gap appears along racial and ethnic lines: 65% of White children ages 7 to 17 use a computer to complete school assignments compared to 40% of Latino and African American children. These disparities likely result from the income and racial disparities in terms of the presence of computers, Internet and broadband at home.[75] (See Chapter IV for more information.)

- **There appears to be an absence of data about the use of ICT as it relates to students preparing for college.** Although educational achievement is the most studied of our four impact areas, we were unable to find data about teens' use of ICT to seek college scholarships, practice for standardized college entrance exams, and research colleges and universities online. This is an important area for further analysis because of the demonstrated ways in which ICT tools can help students during this crucial transition period.

Improved Health

- **Statistics on young people's use of the Internet for health purposes varies widely, but the data show that almost one out of five young people uses ICT as a resource related to improving his or her health and well-being.** Although youth do not use ICT for health purposes as frequently as for education, about one of five (19%) young people ages 18 to 25 uses the Internet to research health information. Among young adults ages 18 to 25, 15% of those from low-income households use ICT to search for health-related information compared to 21% of those from higher-income households.[76] There is near parity with regard to visiting a doctor as a result of information obtained online. Economic status had little impact when it came to 15- to 24-year-old health information seekers. Seventeen percent of online health information seekers who self-identified as "lower-class" visited a doctor or clinic because of health information obtained online, the highest percentage of any economic class identified. Fourteen percent of "upper class" respondents said they saw a doctor because of the information obtained, the lowest percentage of any economic class.[77]

- **Among teens and young adults, Latinos and African Americans are much less likely to use the Internet to search for general health information than Asian Americans and Whites.** Asian Americans ages 18 to 25 are the most likely to conduct Internet health searches (23%). Whites use the Internet for this purpose nearly as frequently (22%) as Asian Americans. But African Americans and Latinos are about half as likely to use the Internet as a resource for health searches (12% and 11% respectively), despite the disproportionate prevalence of certain conditions like AIDS and hypertension among these groups.[78]

IMPROVED HEALTH:

ICT-based Tools Reduce Limitations Caused by Asthma Among Children

Internet-related devices that enable children with asthma and their parents to monitor asthma symptoms and send the information to health care providers resulted in a 48% reduction in asthma-related limits on activity, compared to using a traditional written diary. Asthma is one of the most frequent reasons why children miss school.

One research experiment involved a group of 70 inner-city children using an electronic asthma self-management device. The experiment revealed that the electronic tool allowed children and their families to assess and effectively monitor their asthma symptoms by transmitting medical information to health care providers through a secure Web site. The children who used the electronic asthma monitoring device were less likely to have limitations in activity due to their asthma and to experience a battery of asthma-related difficulties, when compared with the traditional asthma diary method of self-management.

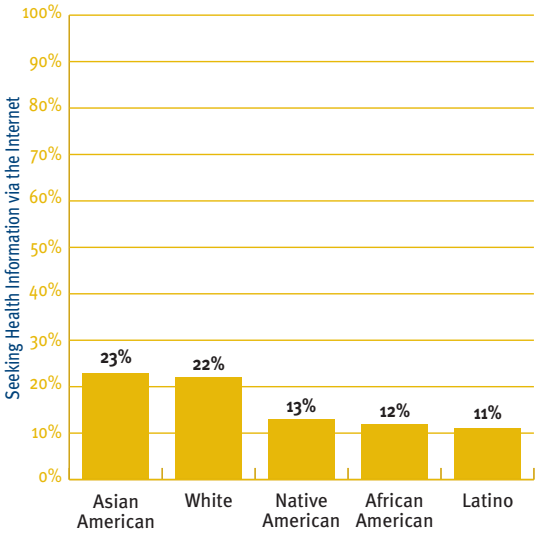
The electronic device is connected to a home telephone and programmed to present questions and information on a screen, and to record responses. Using a standard Internet browser, a nurse coordinator sends a set of queries to the children each day that they answer by pressing one of four buttons. The questions' content is tailored for children and designed for a third-grade reading level for easy understanding and response.

For more information on this research, see Sylvia Guendelman, et. al. "Improving Asthma Outcomes and Self-management Behaviors of Inner-city Children." Archives of Pediatric and Adolescent Medicine, *Vol. 156, February 2002, p. 114–120.*

- **The extent to which children, families, and physicians use ICT tools to enhance children's health is still largely unexplored.** Although there are data on young people's use of the Internet to search for health information, relatively little information exists about how health care practitioners and institutions use ICT to improve children's health. Unlike schools, which are the subject of a variety of government-sponsored measures of ICT use, there has not been systematic surveying in pediatric settings—including doctors' offices, clinics, and hospitals—to understand to what extent staff use ICT to enhance pediatric care. Information about public policies that support these ICT health applications is also sparse except for the fact that 18 of the 50 states reimburse for telemedicine expenses through their Medicaid programs.[79]

Similarly, although some states are using electronic applications to expedite and simplify children's enrollment into publicly funded health insurance programs, there is little systematic information about the extent of this practice or its impacts. Measures of the extent to which the health care industry is using ICT to improve access to and quality of pediatric care would provide much-needed insight about U.S. progress in harnessing the power of ICT to improve children's health outcomes.

Asian American and White Young Adults Ages 18–25 Are More Than Twice as Likely as Latinos to Use the Internet to Search for Health Information



Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

Economic Opportunity

- **The Measuring Stick indicators relating to economic opportunity show that substantial numbers of young people are using ICT applications that are of growing importance to our economy.** Word processing is the most common computer application young adults use at home. Almost 40% of all young adults ages 18 to 25 use word processing programs at home. About one-fifth use spreadsheet programs at home, and more than one-fourth use graphic design programs.

  As jobs are increasingly advertised on the Internet, about 20% of youth are searching for jobs by using the Web. The frequency of submitting resumes for job searches over the Internet is uniformly low, with only 8–9% of all income groups posting resumes online.[80]

  In some ways the Measuring Stick indicators on use of the Internet to connect to potential employers is fairly uniform for young adults regardless of household income. For example, while 21% of 18- to 25-year-olds from households earning less than $15,000 use the Internet to search for jobs, 22% of the same age group from households earning more than $75,000 do so. There is a similar pattern among different income groups as it relates to posting a resume online. Although only 8% of 18- to 25-year-olds use the Internet to post a resume online, the percentage was the same for young adults from the highest and lowest income categories mentioned above. There are, however, some notable differences among young adults of different races and ethnicities:[81]

  Percentage of young people ages 18–25 who have submitted a resume online:[82]

Latinos: 5%	African Americans: 9%
Whites: 8%	Asian Americans: 12%

HAMBURGERS TO HTML:
Technology Transforms High School Student's Life

At the age of 17, Lizette was working her first job at a fast-food restaurant flipping burgers during the night shift in one of the highest crime-rate areas in California. Today, Lizette is an accomplished Web designer working as a Junior Project Manager with a community technology training program while also attending community college in the San Francisco Bay Area. Her future plans include studying digital arts at a university.

What made such a huge change in her life? A focus on the benefits of a technology career.

A few years ago Lizette was attending high school in El Cerrito and working at a fast-food restaurant. Representatives from a local technology-training organization came to one of her classes to talk about a technology program and recruit students. She could see the growing convergence of art and technology in many different industries and the possibilities for her future.

She submitted her application, and Lizette was accepted for the fall 2001 semester. Her first course, "Beginning Web Design," she describes as "awesome" even though learning HTML coding was very challenging. Lizette stuck with technology because of its higher pay and long-term opportunities.

Lizette was hired as a Teaching Assistant in the technology-training program very quickly. She thrived because she was able to serve as a role model. As she put it, "You gain respect (from your peers) and also encourage them, which increases their self-esteem."

Thanks to TechFutures in Richmond, California for the background information for this case study.

- **Some of the most pronounced Measuring Stick disparities along income and ethnic group lines are evident in the extent to which young people use at home computer applications such as word processing, spreadsheets, and graphics programs that can make them more marketable when they enter the labor force.** Word processing is one of the most basic functions used at school and in the workplace. Yet, children ages 7 to 17 living in households earning more than $75,000 annually are more than three times as likely to use a home computer for word processing or desktop publishing as children in homes with an income of less than $15,000 (57% versus 17%). Very substantial disparities are also seen along income and racial lines among young adults who use spreadsheet or database computer programs at home.[83]

  Percentage of young adults ages 18–25 who use spreadsheet or database programs on the computer at home:[84]
  - In households earning less than $15,000: 13%
  - In households earning more than $75,000: 29%

  Latinos: 9%
  Whites: 21%
  African Americans: 11%
  Asian Americans: 29%

There are also pronounced disparities when it comes to some of the most advanced computer programs with career relevance—graphics and photo programs. Young adults ages 18 to 25 with an annual household income of over $75,000 are more than twice as likely to use these types of multimedia programs at home as young adults in households making less than $15,000 (42% compared to 18%).[85]

Percentage of young adults ages 18–25 who use graphics/design programs on the computer at home:[86]
- In households earning less than $15,000: 18%
- In households earning more than $75,000: 42%

Community and Civic Participation

- **The Internet has demonstrated its potential to serve as a forum where youth can connect with friends, family and others who share similar interests.** The Internet is also a place where young adults turn to catch up on the news of the day. About 40% of online young people visit Web sites to follow their interests and/or visit Web sites where they can express themselves on issues that matter to them.[87] Youth engagement with government on the Internet remains low, with only 16% of young adults interacting with government online by downloading or submitting forms via the Internet.[88]

  In many respects, there is parity across income and ethnic groups among children who use the Internet to engage with friends, community, and the government. For example, among online young people ages 12 to 17 living in households with annual incomes below $30,000, 37% go to Web sites to connect to clubs or groups in which they are interested; this compares to 41% of online young people in households earning $50,000 or more.[89]

  The same pattern holds for online young people who go to Web sites or bulletin boards where they can express their opinions. In this regard, those online young people living in lower-income households are more likely to visit such sites than those with a higher household income: 43% for online youth ages 12 to 17 in households with annual incomes of less than $30,000, compared to 36% among the same age group living in households with incomes of over $50,000.[90]

- **Disparities exist regarding young people's propensity to use the Internet to connect with government.** Among 18- to 25-year-olds from households with incomes of less than $15,000 annually, 17% use the Internet to search for government information compared to 24% of young adults from households earning more than $75,000.[91]

  Measuring Stick indicators showed more pronounced differences according to race and ethnicity, with Whites and Asian Americans significantly more likely to use the Internet to search for government information.

  Percentage of young adults ages 18–25 who use the Internet to search for government information:[92]

African Americans: 12%	Asian Americans: 22%
Latinos: 12%	Whites: 22%

  Among young adults who use the Internet to engage government further, by downloading or submitting government forms, there are disparities based on income. Young adults ages 18 to 25 with a household income of more than $75,000 annually are nearly twice as likely to use the Internet to interact with government as young adults from households earning less than $15,000 (20% compared to 11%).[93]

  As more government functions move online—whether obtaining a work permit or student financial aid, or applying for a driver's license—young people who do not have access to these opportunities and time-saving strategies will be at a disadvantage. Further research on the extent to which youth use ICT to interact with government would help policymakers understand where government is succeeding and what more can be done to connect with young people online.

IV. THE VITAL CONNECTION BETWEEN YOUTH OPPORTUNITY AND ICT ACCESS AT HOME

This report focuses on the positive outcomes that access to Information and Communications Technology (ICT) can produce. A closer look at the Measuring Stick indicators reveals that access—particularly home access—is an essential prerequisite for young people to get the full range of benefits ICT can offer. Some of the most severe disparities on Measuring Stick indicators—such as students using computers to complete school assignments, parents e-mailing teachers, and young adults using software applications that employers value—were clearly a result of the limited access low-income children have at home to computers, the Internet, and to high-speed connections.

Community technology programs, schools, and libraries have and continue to play a vital role in providing access to underserved communities and training residents to use ICT tools. But because the opportunities analyzed by the Measuring Stick rely on children and their parents having ICT access on an "as-needed" basis, access at home is increasingly important. To understand better what the home access picture looks like today for America's children, we analyzed the most recent census data published by the U.S. Department of Commerce (Current Population Survey, October 2003). These data had not previously been analyzed for children of various income and racial/ethnic backgrounds. To our knowledge, what follows is the first detailed and up-to-date picture of home computer, Internet, and broadband access for America's children.

ICT Access at Home Has Emerged as a Prerequisite to Children Fully Realizing Digital Opportunity

Data from the U.S. Department of Commerce report issued in late 2004, *A Nation Online: Entering the Broadband Age,* reveal that Internet users with broadband connections at home are much more likely to engage in all online activities, including the opportunity-related activities reflected in our Measuring Stick indicators. The Commerce Department report found that broadband subscribers used the Internet for banking, purchasing products or services, and searching for information on health services or practices.

Findings from the Digital Opportunity Measuring Stick build on this research and suggest that low-income families (who have less ICT access at home) also use ICT less in other settings. For example, although almost all schools are wired with high-speed Internet, only 36% of children ages 7 to 17 from households earning less than $15,000 annually say they use the Internet at school compared to 63% of children from households earning more than $75,000. A number of other Measuring Stick indicators depend on home access—like young people using computers for homework and graphics/design programs—and parents using e-mail to communicate with a child's teacher. Not surprisingly, low-income children enjoy these educational advantages less than their wealthier peers.[94]

The Measuring Stick makes it clear that without access to technology at home and support from parents, it is doubtful that low-income children can reap many of the opportunities ICT can offer. One piece of good news from the latest census data is that large majorities of children have access to computers and the Internet in their homes. Among children ages 7 to 17, 77% have access to a computer at home. Among the same group of children, 68% have Internet access at home. More than one in four children (26%) in this age group has broadband access at home. All of these figures represent significant progress compared to 10 years ago.[95] At the same time, recent data also show troubling disparities in home access.

Yet Severe ICT Access Gaps Face Low-income and Ethnic Minority Children Today

Because of gaps in home access, the overall trend toward increased ICT access in American homes is marked by distinct inequalities—in some cases as serious as the ones we found 10 years ago when we published *America's Children & The Information Superhighway*.

Children from higher-income families (annual income of over $75,000) are more than twice as likely to have access to a computer at home as those in very low-income families: 96% compared to 45%. For Internet access the figures are 93% versus 29%; for broadband 51% versus 7%.[96]

ACCESS GAPS CONTINUE TO BE PRONOUNCED FOR CHILDREN WHO ARE LATINO, AFRICAN AMERICAN AND NATIVE AMERICAN (2003)

Home ownership of a computer among children ages 7–17:[97]

African American: 56%
Native American: 58%
Latino: 58%
Asian American: 86%
White: 87%

Internet access at home among children ages 7–17:[98]

Native American: 41%
African American: 43%
Latino: 44%
Asian American: 75%
White: 80%

Broadband at home among children ages 7–17:[99]

Native American: 13%
Latino: 14%
African American: 14%
White: 32%
Asian American: 33%

Data on home access to computers and the Internet for people with disabilities are now five years old and not broken out for children. However, the limited data that exist show far more limited home access for the disabled than for the population as a whole, increasing the likelihood that children with disabilities are disadvantaged by limited home access to ICT and related opportunities.

DISABLED PERSONS ALSO FACE SERIOUS ACCESS DISPARITIES

- Percentage of people with disabilities ages 15–64 with a computer at home in 1999: 33%[100]
- Percentage of people without a disability ages 15–64 with a computer at home in 1999: 56%[101]
- Percentage of people with disabilities ages 15–64 with Internet access at home in 1999: 16%[102]
- Percentage of people without a disability ages 15–64 with Internet access at home in 1999: 34%[103]
- Percentage of disabled adults ages 18 and older who use the Internet at home in 2003: 38%[104]
- Percentage of all adults ages 18 and older who use the Internet at home in 2003: 58%[105]

When There Is Access, Low-income and Disabled Children Use Technology in Ways That Enhance Their Opportunities

Lower-income online teens are downloading study guides more frequently than their higher-income counterparts (43% compared to 36%).[106] In terms of health, young adults who identified themselves as "lower class" are slightly more likely than others to visit a doctor or clinic because of information they obtain online (17% compared to 14%).[107] Furthermore, those online young people living in lower-income online households are also slightly more likely to visit Web sites or bulletin boards where they can express their opinion as those in higher-income online households (43% compared to 36%).[108]

We found anecdotal but promising information about ICT's potential to enhance the quality of life for children with disabilities. ICT shows particular potential for disabled youngsters in special education and for young adults seeking to live independently and to work. For the estimated 6% of young people ages 5 to 20 who live with a disability (4 million), ICT devices can, for example, help those with vision impairments read, or provide those who are hearing-impaired with simultaneous on-screen translations, or allow the physically impaired to work or take care of themselves at home.[109] Although we could not find comparable information for children, 35% of disabled adults report that not being able to use an ICT-related assistive device would mean they could not take care of themselves.[110]

V. ICT RISKS FACING CHILDREN

In focusing on the opportunity side of Information and Communications Technology (ICT), we would be presenting an incomplete picture of what matters to children if we did not also acknowledge ICT's potential risks. Surveys indicate that the risk to children associated with going online is a major reason people avoid using the Internet. Dangers such as online predators, ubiquitous advertising, violations of privacy, and exposure to pornography, gambling, and other adult content are issues that parents and youth should be knowledgeable about and have strategies to manage.

This chapter briefly reviews the risks to children from ICT. We hope that by putting the risks in perspective and providing some resources to address them, parents, teachers, and others will feel better equipped in guiding children toward the opportunities and away from the risks.

Online Pornography

Exposure to pornography, both adult and child pornography, is one of the greatest concerns regarding children using ICT. A Pew Internet & American Life Project report states, "Americans are deeply worried about criminal activity on the Internet, and their revulsion at child pornography is by far their biggest fear."[111] Some 92% of Americans say they are "concerned" about child pornography on the Internet, and 50% of Americans cite child pornography as the single most heinous crime that takes place online. While exposure to child pornography is especially egregious (and illegal), parents are also worried that children will be exposed to adult pornography. As a 2003 National Academy of Sciences report states, unlike other media, children can be exposed to sexually explicit material without it being sought.[112]

While there is justified concern about children accessing harmful online content, there are many Web sites dedicated to helping parents steer their children away from harmful Web content. The sites http://www.getnetwise.org and http://www.wiredsafety.org are helpful starting points for parents and teachers. And http://www.netfamilynews.org can help them stay abreast of the latest online threats and strategies to prevent them. Parents can also find strategies for ensuring children's safety online in other publications by The Children's Partnership, particularly in *The Parents' Guide to the Information Superhighway* (http://www.childrenspartnership.org).[113] Other sites with good information are http://www.safekids.com, http://www.safeteens.com, and http://www.isafe.org.

Cyberbullying and Online Predators

Many Internet risks to children are based on more traditional risks children and young people face, which have been given a new dimension online. This is the case with "cyberbullying," which one recent study claims is more harmful to children than traditional bullying.[114] According to the study conducted at Queensland University of Technology in Australia, cyberbullying is more dangerous because "there's no escaping online bullying… the way a child's home is [an escape] when s/he runs away from a traditional bully." The conclusions from this study were based on a year of research at a primary school in Brisbane, Australia, that gave more than 30 children a series of in-depth tests and interviews to establish their attitudes toward cyberbullying. For more information on cyberbullying, visit http://www.cyberbullying.ca.

Also linked to concerns about cyberbullies are the risks of online predators. Some 57% of parents worry that strangers will contact their children online, and, indeed, almost 60% of teens have received an instant message or e-mail from a stranger.[115] But in spite of the millions of children who go on the Internet everyday, children are at a far greater risk of being sexually abused by a relative than by someone they meet online.[116] In 2000, there were 500 arrests for Internet-related crimes compared to 65,000 for sexual exploitation overall.[117] While the risk is statistically limited, needless to say, parents need to be sure to teach their children safe Internet habits. Many of the Web sites cited previously offer a good start.

Commercialism Online

Although surveys indicate that parents are most concerned with pornography and online predators, child development experts on Internet safety are especially concerned with the Internet's potential commercial impact on children. Business Week states that, "the business of marketing to kids online is booming."[118] More than two-thirds of all Internet sites designed for children and teens use advertising as their primary revenue stream. Sites often use techniques such as games and puzzles in order to present their advertisements to children. Research shows that the number of children's sites with no advertising has dropped from 10% of all kids' sites in 2000 to 2% in 2001.[119]

The American Psychological Association (APA) (http://www.apa.org) has studied the challenges for parents raised by advertising. One APA report states, "Parent-child conflicts occur commonly when parents deny their children's product purchase requests that were precipitated by advertising."[120] Experts stress that it is important for parents to help their children recognize the sales pitches in games and puzzles when they are embedded within children's sites. There are also a variety of software tools parents can use to keep children from visiting sites they choose to block. Of course, the best protection is to have an informed parent close by while children—particularly young children—are on the Internet.

Privacy Concerns

Linked to online advertising and Internet commerce are the risks involving children's personal privacy online. Studies show that parents worry that their children could reveal information that will identify them to strangers on the Internet. Although the Federal Trade Commission implemented the Children's Online Privacy Protection Act (COPPA) in 2000, research shows that some Web sites with high volumes of child visitors are not abiding by these regulations to protect children.[121] In this arena, too, parents can protect their children best by being personally involved in their ICT use and coaching them about safety do's and don'ts. Parents can brief themselves at http://www.ftc.gov/privacy/privacyinitiatives/childrens.html.

Gambling and Other New Risks

One of the more recent but serious risks to emerge is the lure of online gambling. A 2002 informal survey by the Federal Trade Commission (http://www.ftc.gov) found that minors can access gambling sites easily and that minors were often exposed to ads for online gambling on non-gambling Web sites.[122] FTC staff also found that among the 100 popular gambling Web sites surveyed, the sites had "hard-to-find warnings about underage gambling prohibitions, and that some 20% had no warning at all." They found no mechanisms to block minors from entering gambling sites online. For more information about this issue, visit http://www.nati.org, and for more information directed at young people, visit http://www.wannabet.org.

While some of the dangers reviewed in this chapter have been around for some time, they are constantly changing. However, useful and current resources and strategies are available. Other dangers are newer, such as addictions to a variety of online activities like shopping and gaming. In addition, there have been numerous reports over the past few years about the emergence of online communities, comprised mainly of adolescents and teenagers, which support negative and even dangerous behaviors such as eating disorders or self-mutilation ("cutting"). In these arenas, experts are just beginning to examine the connection and influence of the online media with children and teens' mental health, and strategies for young people, parents, and others are still developing. As these media and digital tools evolve, advocates for children must remain ever vigilant to spot emerging risks that are bound to come along in this rapidly changing environment.

VI. RECOMMENDATIONS: CREATING A FUTURE WHERE ALL OF AMERICA'S YOUTH BENEFIT FROM ICT-ENABLED OPPORTUNITIES

The Digital Opportunity Measuring Stick presents a mixed picture. It tells the story of tremendous progress in applying ICT tools in some areas as well as untapped opportunities in others. The digital opportunity gap facing many low-income, disabled, and ethnic minority children is a stark reminder of the urgent work that must be done immediately.

These findings lead us to recommend five strategies designed to continue the positive progress and deploy ICT's potential for good for millions more children. Social applications of technology are still relatively "young," much as business applications were 40 years ago. It was only through years of experimentation—and some mistakes—that business identified positive applications of Information and Communications Technology, including finding better ways to manage inventory and data, share and produce information, and work from remote locations. One chief lesson from the corporate experience with technology is there is no substitute for trial and error to learn what works and what does not. Therefore, we are careful not to overstate the conclusiveness of our findings or recommendations. Rather than providing definitive solutions, our recommendations set us on a course to achieve positive results for children, measure progress over time, and make ICT investments more effective.

A Digital Opportunity Action Agenda for Youth

A more strategic focus on improving youth outcomes via technology will enable investors to direct the tens of billions of dollars now spent on technology more effectively. In addition, this focus on youth opportunity will help prepare the next generation of young Americans for a self-sufficient and productive adulthood in the increasingly technology-based society.

Like most developments to date in Information and Communications Technology, accomplishing what is needed for America's children will require partnerships that involve industry, government, researchers, philanthropy, and the parents and professionals who have day-to-day contact with children. We believe that acting on the following five recommendations will make the most difference for children over the next decade to improve their health, educational achievement, economic opportunity, and civic participation.

RECOMMENDATION #1:
We should identify and capitalize on the ICT advances with proven value, spreading them in local communities across the country to achieve shared goals for children.

There are many ICT uses that have proven valuable. These uses should be spread to reach large numbers of children, especially those at risk of being left behind. For example:

Health care applications show some of the greatest promise. They can achieve three important outcomes for children, parents, and young adults in new and more effective ways:

- Improve the quality of care, manage chronic conditions more effectively, and produce cost savings;
- Impart vital health information; and
- Help young people enroll in health programs and stay up-to-date on their immunizations.

These uses of ICT ought to be implemented in health and community centers, providers' offices, and hospitals in low-income neighborhoods where disproportionate numbers of children are not getting the health information and care they need.

In **education**, we know that young people need at least a high school diploma and often a college degree to successfully pursue most careers in the 21st century. The following ICT applications can help achieve these goals.

- Sophisticated software and ICT tools can be used to continually assess student learning and customize curriculum to meet the child's unique learning style and needs;
- Effective models should be built and spread that enable students to prepare for the GED online and to perform their best on college entrance exams; and
- We should also build models for making Advanced Placement (AP) and other courses available online that students in low-income communities cannot access in their neighborhood schools. These new forms of learning must incorporate high-quality human supervision to assure students learn the material and earn course credit.

New forms of **economic opportunity** offer the chance to engage young people who have dropped out of school or have not seen a viable career path through higher education. Just as vocational coures —such as auto mechanics—are available for youth who want technical job skills, mid-level and advanced ICT skills training should be readily available to young people through high schools and community centers so they can move successfully from school to careers. Schools, libraries, and community centers are also key places to coach young people in using online tools to learn about and apply for jobs.

In **community and civic participation**, we know that young people view the Internet as an important forum to express their opinions and connect with peers. The Web is also proving to be a more inclusive forum than traditional means for discussion and providing input on governmental or civic issues.

Immunization Rates Among Washington, D.C.'s School Children More Than Doubled Through Internet-Based Registry

A Washington, D.C. initiative added an Internet-based immunization registry to an existing program in 2000 and raised immunization rates among school children from 40% during the 2000–2001 school year to 94% during the 2004–2005 school year.

Children needing vaccines are identified through the computerized registry according to what public school the student attends and if the student is up-to-date on immunizations. Once identified, the school nurse then contacts the student's parents via phone or mail to inform them of immunization options. Children are referred to their regular doctor or clinic to get the vaccinations needed. Children who are underinsured or uninsured are seen initially at the walk-in immunization clinics operated by the Department of Health. Uninsured children are referred to the Alliance, an agency within the Department of Health, to obtain health insurance and to be linked to a doctor or clinic.

In addition to keeping health records and facilitating vaccinations, the electronic registry program prints official immunization records for clients. It also has a broadcast fax system to send out health alerts and notices for upcoming immunization clinics to schools, child-care centers, churches, and other places where children frequently go. As of 2003, there were 65,000 students enrolled in this program.

The D.C. Immunization Program works with key partners to integrate this Internet-based children's health initiative into the community. Some of the partners include D.C. Public Schools, D.C. Medicaid Administration, health care providers, community partners, and parents.

To learn more, contact Dr. Karyn Berry at Karyn.Berry@dc.gov.

In addition, the Web holds potential for facilitating increased contact and neighborhood ties that can help young people engage in collective action around local issues. Some ideas include:

- Schools should incorporate the Internet and Web-based communications into their civics curriculum so that children and young people can make the connection between technology, community, government, and civic participation;

- Local government should establish programs that use the Internet to connect young people to their neighborhoods and municipalities. This could be done by producing local content that is relevant to young people's lives and educates them on good citizenship and ways to participate in the community; and

- Community centers and organizations should include a "cyber-civics" component into their after-school and other programs that help facilitate community involvement.

Local school and library boards, children's commissions, and other state and local groups with authority to allocate resources for children are well positioned to bring these important new tools to children in their community. They ought to have the needed information and help to do this job well. How-to manuals setting out a menu of ways in which technology can enhance the effectiveness of local programs for children need to be developed and used to brief these decision-makers. Technical assistance to bring about the necessary changes in policy and practice should also be made available to local leaders for children.

RECOMMENDATION #2:

We should invest in powerful but not-yet-developed ways in which ICT can help meet national goals for children related to literacy, healthy behaviors, immunization, and entrepreneurship.

New applications could:

- Allow children reading one or two grade levels behind to catch up and help us achieve one of the key goals of the No Child Left Behind Act: that all children are proficient in reading at their grade level by 2014;[123]

- Use children's attraction to games to teach at-risk youth skills such as how to start a business successfully or manage family finances;

- Use the persuasive power of multimedia to reduce the prevalence of behaviors like teenage pregnancy, smoking, dropping out of school, or using drugs; and

- Create public health information systems to dramatically reduce the gap in childhood immunization between wealthy and poor neighborhoods.

Just as we used the value of property to finance public education and land grant colleges in the 1800's, a Digital Opportunity Investment Trust (DO IT) is being considered by Congress to invent ICT tools that advance societal goals in our knowledge-based economy. The proposed trust, financed by revenues from investing $18 billion received from mandated FCC auctions of radio space, would serve as a venture fund for innovation much like the corporate sector used when it invested in a variety of ICT business applications.

We believe it is appropriate and important that DO IT be enacted into law and serve as the vehicle for supporting the development of innovations that can substantially improve the quality of life for all children. Its investments should tap the experience and knowledge of researchers, experts in child development and education, and other specialists. They should place a high priority on what works for the low-income, ethnic minority, and disabled children being left behind in the digital age.

RECOMMENDATION #3:

We should create the benchmarks necessary to hold ourselves accountable for providing digital opportunity to all children, guiding the next 10 years of ICT's evolution in ways that truly help children and families.

At this still relatively early stage of ICT's deployment, we have the ability to set the right course and make progress over the next decade. This will be possible if we establish quantitative goals and regularly monitor progress toward those goals.

- **Strategy Summit and National Benchmarks:** A panel of experts from across the fields of education, health, youth development, and technology should be convened to examine the ideas in this report and determine the highest-payoff strategies for moving forward. In addition, this panel of experts should oversee the development of national quantitative goals for where the

U.S. ought to be in providing digital opportunity to youth by the year 2010—like the U.S. Surgeon General's goals for disease prevention and health promotion.[124]

- **A U.S. Youth Digital Opportunity Survey should be conducted at least every five years.** This household survey would interview parents and young people themselves (as appropriate for age) to obtain an accurate and detailed picture of how ICT is being used to help children succeed, where the missed opportunities are, and the extent to which the disparities along income, racial/ethnic, and disability lines have been eliminated.

- **Digital Opportunity Measures in Children's Scorecards:** We should also build on the Children's Scorecards, now compiled in every state and in many localities, so they address issues of digital opportunity. While still new terrain for many leaders for children, the digital arena is now so influential in young people's lives that it needs to be incorporated into any contemporary snapshot of children. Although state-by-state and local data about digital opportunity are still more limited than national data, data for a variety of possible indicators for children's scorecards exist, and additional local data should be generated.

RECOMMENDATION #4:

We should take the necessary steps to ensure that every child has access to ICT tools where it matters—at home, at school, and in the community. Parents and young people must be well informed about the opportunities and risks found through the Internet.

With ICT a proven conduit to opportunity for young people, we must make it available to all children. This includes computers (or new devices that might replace computers) and access to high-speed Internet, including wireless connections. Our recommendation is consistent with President Bush's national goal for "universal, affordable access for broadband technology by the year 2007."[125] In addition, our recommendation includes equipping parents and teachers to encourage children's appropriate use of technology and helping parents and teachers use it themselves to communicate with each other, government, doctors, etc.

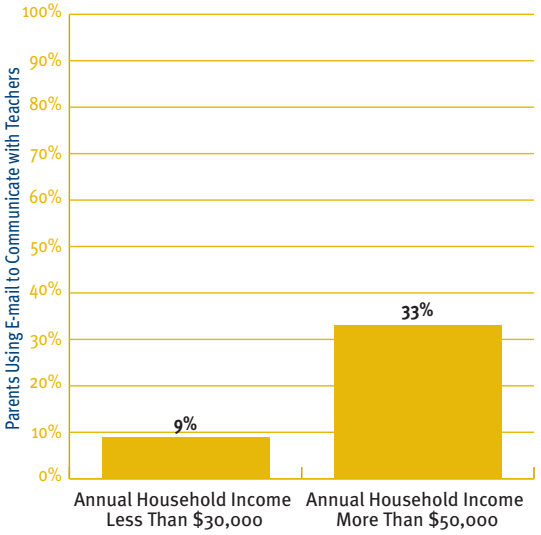
- **Access for All Young People:** Community technology programs, libraries, and schools have made a crucial difference in the early years of ICT's evolution by offering tools and training to those who are low income, disabled, rural, and other groups that otherwise would not have access. They will continue to play an essential role as voices that can represent the needs of their local communities when policies regarding these new forms of communications are debated and implemented. These institutions can also serve as extremely valuable test sites when new ICT applications for children are tried out and evaluated. And they provide the much-needed training and expertise in using ICT both for young people and their parents.

  In addition, as this report makes clear, the benefits ICT can offer children depend on children having access on an as-needed basis at home. Leaders in the public and private sectors ought to monitor the availability of broadband and other indicators of quality access at home, especially in low-income and rural communities. Deployment should be monitored at the neighborhood level, by census tract, in order to see where meaningful disparities must be addressed. Policies need to be developed that ensure access to high-speed communications for every household.

- **Getting Parents Engaged:** Parents are perhaps the least acknowledged key player in providing a strong technology base for children at home. The 62 million parents in the U.S. living with children under 18 represent a vastly underutilized network of people who are well positioned to help young people get the benefits technology can offer. Tips, information tools, and training should be developed to educate parents on a continuing basis about what they should expect from technology, and how they can be effective advocates for children in this new arena.

  Parent organizations as well as parent meetings in schools, child care programs, and places of worship present valuable opportunities to help get this important job done well. It will also be vital that leaders for children join with organizations that have played a leadership role in Internet safety—like the National PTA and WiredSafety—to keep the public

Higher-Income Parents of Young People Ages 12–17 Are More Than Three Times as Likely to Use E-mail to Communicate With Teachers as Their Less Affluent Peers



Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

and government focused on needed responses to ICT risks. While existing evidence demonstrates that the benefits outweigh the risks, only by continuing to monitor the risks and identify new ones early on can we develop strategies to avoid or minimize them.

RECOMMENDATION #5:

We should develop a long-range research agenda that can inform our decisions in deploying technology effectively for children and young adults over the next decade.

Assembling research on ICT's impacts on youth opportunity for this report was a sobering reminder of the underdeveloped nature of the current research base. What is known is often based on small numbers of people for short periods of time, may only focus on adults and not children, and in many cases does not address some of the most important questions. However, having the relevant research now aggregated in one place in this report provides a starting point from which to develop the next generation of needed research.

- **Digital Opportunity for Youth Research Summit:** Building on the existing research base, a Digital Opportunity for Youth Research Summit should be convened by philanthropy, government, and children's experts to define the most valuable research agenda for the next decade. The summit should identify the core research questions whose answers will help us use ICT most effectively to promote improved health, educational achievement, economic opportunity, and civic participation. Research should answer, for instance:

  How do new ICT tools increase the quality of life for disabled or chronically ill children?

  What is the impact of ICT tools in enhancing basic educational skills acquisition as measured through standardized tests?

  What kinds of ICT skills are most helpful to enhance young adults' employment and career opportunities?

  How can the Web be of the greatest value in building young people's interest in their local community and getting them engaged in volunteering and other forms of civic engagement?

- **Longer-Term Research Agenda:** We should also identify new areas of research that will grow in importance, such as whether and how ICT provides value-added for preschool-age children; and exploring ways in which the power of video games can be harnessed to bring about positive change for children.

  Together, we must devise a plan for getting this research financed and carried out, tapping government, philanthropic, and corporate resources. This includes more effective coordination among government, academic, and private stakeholders and a more systematic approach to research, development, testing, and evaluation.

A CLOSING WORD

Our nation now has the benefit of early lessons about using technology effectively. And while there is still a great deal to learn, this report gathers in one place substantially more guidance for decision-makers allocating billions of ICT dollars than has existed before. The Children's Partnership will continue to educate the public about children's interests in these fast-moving developments. We look forward to helping build a positive ICT platform for children as our recommendations and other aspects of a national strategy for children and families are implemented.

REFERENCES

INFORMATION AND COMMUNICATIONS TECHNOLOGY AND AMERICA'S YOUTH: TEN YEARS OF ENORMOUS CHANGE

[1] U.S. Bureau of the Census. Current Population Survey, Basic, Sept. 1994.

[2] Ibid. Basic, Sept. 2004.

[3] Ibid. Basic, Sept. 1994.

[4] Ibid. Basic, Sept. 2004.

[5] Laura Beavers. Telephone conversation, April 12, 2005. Original data from U.S. Bureau of the Census. Current Population Survey, March Supplement, 1994.

[6] Laura Beavers. Telephone conversation, April 12, 2005. Original data from U.S. Bureau of the Census. Current Population Survey, March Supplement, 2003.

[7] Ibid. Computer Ownership/Uses, Nov. 1994.

[8] Ibid. Internet and Computer Use, Oct. 2003.

[9] Ibid. Computer Ownership/Uses, Nov. 1994.

[10] Ibid. Internet and Computer Use, Oct. 2003.

[11] Ibid.

[12] Basmat Parsad, Jennifer Jones, and Bernard Greene. "Internet Access in U.S. Public Schools and Classrooms: 1994–2003." Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

[13] Ibid.

[14] Ibid.

[15] Ibid.

[16] Ibid.

[17] Ibid.

[18] U.S. Bureau of the Census. Current Population Survey. Computer Ownership/Uses, Nov. 1994.

[19] Ibid. Internet and Computer Use, Oct. 2003.

[20] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[21] Ibid.

[22] U.S. Bureau of the Census, Current Population Survey, Internet and Computer Use, Oct. 2003.

[23] Ibid.

[24] Ibid.

[25] Ibid.

[26] Ibid.

[27] Ibid.

[28] Ibid.

INFORMATION AND COMMUNICATIONS TECHNOLOGY: IMPROVING QUALITY OF LIFE FOR YOUNG PEOPLE WITH DISABILITIES

[29] U.S. Bureau of the Census. 2003 American Community Survey. (http://www.census.gov/acs/www/Products/Profiles/Single/2003/ACS/Tabular/010/01000US2.htm)

[30] Ibid. Calculation by The Children's Partnership.

[31] David Krane and Kristina Hanson. "National Organization on Disability/Harris 2004 Survey of Americans with Disabilities." New York: Harris Interactive, 2004.

[32] Ibid.

[33] Ibid.

[34] Stephen Kaye, "Computer and Internet Use Among People with Disabilities." San Francisco, CA: University of California, San Francisco, Disability Statistics Center, 2000.[35] Ibid.

[35] Ibid.

[36] Ibid.

[37] Ibid.

[38] Amanda Lenhart, et al. "The Ever-Shifting Internet Population." Washington D.C.: Pew Internet and American Life Project, 2003.

[39] Ibid.

[40] Ibid.

[41] David Krane and Kristina Hanson. "National Organization on Disability/Harris 2004 Survey of Americans with Disabilities." New York: Harris Interactive, 2004.

[42] Ibid.

II. IMPACTS: HOW DOES INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) AFFECT OPPORTUNITY FOR CHILDREN AND YOUNG ADULTS?

[43] Dana A. V. Braner, et al. "Interactive Web Sites for Families and Physicians of Pediatric Intensive Care Unit Patients: A Preliminary Report." *Pediatric Critical Care Medicine*. Vol. 5 No. 5. 2004, p. 434–439.

[44] Sylvia Guendelman, et. al. "Improving Asthma Outcomes and Self-management Behaviors of Inner-city Children", *Archives of Pediatric and Adolescent Medicine*, Vol. 156, February 2002, p. 114–120.

[45] Victoria Rideout. "Generation Rx.com." Menlo Park, CA: Kaiser Family Foundation, 2001.

[46] Tom Baranowski, et al. "Squire's Quest! Dietary Outcome Evaluation of A Multimedia Game." *American Journal of Preventive Medicine*. Vol. 24 No.1. 2003. p. 52–61.

[47] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[48] Dale Mann, et al. "West Virginia Story: Achievement Gains from a Statewide Comprehensive Instructional Technology Program," 1999.

[49] Xiaoming Li and Melissa Atkins. "Early Childhood Computer Experience and Cognitive and Motor Development," *Pediatrics*, June 2004.

[50] U.S. Department of Labor. Bureau of Labor Statistics. February 2004. (http://www.bls.gov/ emp/empfastestind.htm)

[51] Carol Ann Meares and John F. Sargent, Jr. "Education and Training for the Information Technology Workforce." Washington, D.C.: U.S. Department of Commerce, 2003.

[52] Bureau of Labor Statistics. "Hours and Earnings." January 2005. (ftp://ftp.bls.gov/pub/suppl/empsit. ceseeb15.txt)

[53] James Lau and Wendy Lazarus. "Pathways to Our Future: A Multimedia Training Program For Youth That Works." Santa Monica, CA: The Children's Partnership, 2002.

[54] Kathryn Montgomery, Barbara Gottlieb-Robles and Gary O. Larson. March 2004. "Youth as E-Citizens: Engaging the Digital Generation." Washington, DC: Center for Social Media, School of Communication, American University, 2004.

[55] J. Woody Stanley and Christopher Weare. "The Effects of Internet Use on Political Participation: Evidence from an Agency Online Discussion Forum." *Administration and Society*. Vol. 35 No. 5, November 2004, p. 503–527.

[56] Caroline J. Tolbert and Ramona S. McNeal. "Unraveling the Effects of the Internet on Political Participation." *Political Research Quarterly*. Vol. 56 No.2, 2003, p. 175–85.

[57] David Krane and Kristina Hanson. "N.O.D./Harris 2004 Survey of Americans with Disabilities." New York: Harris Interactive, 2004.

III. THE DIGITAL OPPORTUNITY MEASURING STICK: TO WHAT EXTENT ARE WE PROVIDING TECHNOLOGY-BASED BENEFITS TO CHILDREN AND YOUNG ADULTS?

[58] U.S. Bureau of the Census, Current Population Survey, Internet and Computer Use, Oct. 2003.

[59] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[60] Basmat Parsad, Jennifer Jones, and Bernard Greene. U.S. Department of Education, National Center for Education Statistics, U.S. Department of Education, 2005.

[61] U.S. Bureau of the Census, Current Population Survey. Internet and Computer Use, Oct. 2003.

[62] Ibid.

[63] Ibid.

[64] Ibid.

[65] Ibid.

[66] Ibid.

[67] Ibid.

[68] J. Carl Setzer, Laurie Lewis, and Bernard Greene. "Distance Education Courses for Public Elementary and Secondary School Students: 2002–2003." Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

[69] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[70] J. Carl Setzer, Laurie Lewis, and Bernard Greene. "Distance Education Courses for Public Elementary and Secondary School Students: 2002–2003." Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

[71] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[72] National Center for Education Statistics. "Teacher Use of Computers and the Internet in Public Schools," 2000.

[73] Basmat Parsad, Jennifer Jones, and Bernard Greene. "Internet Access in U.S. Public Schools and Classrooms: 1994–2003. Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

[74] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[75] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[76] Ibid.

[77] Victoria Rideout. "Generation Rx.Com." Menlo Park, CA: Kaiser Family Foundation, 2001.

[78] U.S. Bureau of the Census, Current Population Survey, Internet and Computer Use, Oct. 2003.

[79] David Brailer and Emi Terasawa. "Use and Adoption of Computer-Based Patient Records." California HealthCare Foundation, 2003; and Centers for Medicare and Medicaid Services. "Medicaid and Telemedicine." December 2004. (http://www.cms.hhs.gov/states/telelist.asp)

[80] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[81] Ibid.

[82] Ibid.

[83] Ibid.

[84] Ibid.

[85] Ibid.

[86] Ibid.

[87] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[88] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[89] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[90] Ibid.

[91] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[92] Ibid.

[93] Ibid.

IV. THE VITAL CONNECTION BETWEEN YOUTH OPPORTUNITY AND ICT ACCESS AT HOME

[94] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[95] Wendy Lazarus and Laurie Lipper. "America's Children & The Information Superhighway: A Briefing Book and National Action Agenda." Santa Monica, CA: The Children's Partnership, 1994.

[96] U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, Oct. 2003.

[97] Ibid.

[98] Ibid.

[99] Ibid.

[100] Stephen Kaye. "Computer and Internet Use Among People with Disabilities." San Francisco, CA: University of California, San Francisco, Disability Statistics Center, 2000.

[101] Ibid.

[102] Ibid.

[103] Ibid.

[104] Amanda Lenhart, et al. "The Ever-Shifting Internet Population." Washington, D.C. Pew Internet and American Life Project, 2003.

[105] Ibid.

[106] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[107] Victoria Rideout, "Generation Rx.Com." Menlo Park, CA: Kaiser Family Foundation, 2001.

[108] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[109] U.S. Bureau of the Census. 2003 American Community Survey. April 2005. (http://www.census.gov/acs/www/Products/Profiles/Single/2003/ACS/Tabular/010/01000US2.htm)

[110] David Krane and Kristina Hanson. "N.O.D./Harris 2004 Survey of Americans with Disabilities." New York: Harris Interactive, 2004.

V. ICT RISKS FACING CHILDREN

[111] Susannah Fox and Oliver Lewis. "Fear of Online Crime: Americans Support FBI Interception of Criminal Suspects' Email and New Laws to Protect Online Privacy." Washington, D.C.: Pew Internet and American Life Project, 2001.

[112] Computer Science and Technology Board. "Youth, Pornography, and the Internet." Washington, D.C.: National Academy of Sciences, 2003.

[113] Wendy Lazarus and Laurie Lipper. "The Parents' Guide to the Information Superhighway: Rules and Tools for Families Online." Santa Monica, CA: The Children's Partnership, 1998.

[114] Net Family News. Feb. 2005. (http://www.netfamilynews.org/nl041022.html#4)

[115] Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet and American Life Project, 2001.

[116] Lawrence Magid. E-mail correspondence, April 21, 2005.

[117] Net Family News. (http://netfamilynews.org/ nl040611.html#1)

[118] Ellen Neuborne. "For Kids on the Web, It's an Ad, Ad, Ad, Ad, World." Business Week Online, August 2001. (http://www.businessweek.com/print/magazine/content/0_33/b3745121.htm?chan+mz&)

[119] Brian Wilcox. et al. "Report of the APA Task Force on Advertising and Children." Washington, D.C.: American Psychological Association, 2004.

[120] Ibid.

[121] Joseph Turow. "Privacy Policies on children's Websites: Do they Play By the Rules?" Annenberg Policy Center, 2003.

[122] Federal Trade Commission. "FTC Warns Consumers about Online Gambling and Children," 2002.

VI. RECOMMENDATIONS

[123] Rod Paige, Eugene Hickok, and Susan Patrick. "Toward a New Golden Age In American Education". Washington, D.C.: Office of Education Technology, U.S. Department of Education, 2004.

[124] Healthy People 2010: National Disease Prevention and Health Promotion Objectives. Available at http://www.healthypeople.gov.

[125] "Remarks by President Bush on Homeownership," Expo New Mexico, Albuquerque, New Mexico, March 26, 2004. Available at http://www.whitehouse.gov/news/releases/2004/03/20040326-9.html.

APPENDICES

APPENDIX A:
DIGITAL OPPORTUNITY MEASURING STICK (DOMS) METHODOLOGY

MEASURING STICK BACKGROUND

The Digital Opportunity Measuring Stick (DOMS) provides a framework for tracking, in broad terms, the extent to which potential benefits of Information & Communications Technology (ICT) are reaching the nation's children and their families. The Measuring Stick contains 40 indicators organized around four youth issue areas: educational achievement, improved health, economic opportunity, and community and civic participation. These indicators, while often indirect measures, are an attempt to ascertain whether children—all children—are enjoying the impacts of ICT documented in the Impacts section of this report.

We hope that over time the Measuring Stick will provide an impetus to researchers, policy-makers, and philanthropists to produce, gather, and analyze data that are more direct measures of beneficial applications of technology for young people.

CRITERIA USED TO SELECT INDICATORS

In each of our four domains, we selected indicators based on the criteria outlined below. Since technology can play an especially effective role in improving quality of life for children with disabilities, we include a disability indicator in each major category even though national data on young people with disabilities are scarce. While not every indicator meets every criterion, the indicators when taken as a whole meet the following guidelines:

- Has a Logical Connection to the Positive Impacts of ICT for Youth: There is a common sense or logical connection between each of the measures and the well-being of youth within our four target policy domains. The indicators are at least indirectly related to the potential impacts of ICT cited in the report. (See Appendix B for an explanation of why each indicator was selected.)
- Nationwide Data Available: Data exist on this indicator for the nation as a whole—or ought to exist because of its importance to measuring the extent of ICT benefits for children.
- National Data Can Be Analyzed for At-Risk Youth: For a significant portion of indicators, national data exist by income and race/ethnicity. In our analysis of the Measuring Stick, we present data on certain indicators according to race/ethnicity and income. In this way, in addition to an overall picture of how ICT benefits are being extended to youth, we can provide an indication of how ICT benefits are being extended to at-risk children.
- Data Can Be Tracked Over Time: For a significant portion of indicators, data are tracked over time so that the 2005 Measuring Stick results can serve as a baseline for the future. In select cases, we included an indicator in the Measuring Stick even when data were not available to underscore the need to collect these data.

A WORD ABOUT THE AGES USED IN THE MEASURING STICK INDICATORS

Many of our indicators involve children, teens, and young adults. For measures most relevant to children, we include children ages 7–17. Age 7 is when most children are in first grade and exposed to computers. Where the indicator is most relevant to young adults, we use the ages 18–25. Finally, with certain indicators, we use age ranges such as 12–17 and 15–24 because these are the only ranges available in a particular survey. We have tried to organize the indicator ages so that the age ranges are relevant to the indicator being measured while at the same time providing some consistency in the ranges selected for each indicator.

APPENDIX B:
A GUIDE TO THE MEASURING STICK INDICATORS

I. EDUCATIONAL ACHIEVEMENT

Enriched Learning

1 Percentage of children in school ages 7–17 who use a home computer to complete school assignments—57%

Refers to: Percentage of primary and secondary students in public schools who use a computer to help with their homework. These data, like other data on children in the Current Population Survey, are reported by parents.

Why Selected: Using a home computer for schoolwork means a student has access to this ICT tool on an "as-needed" basis.

Notable Facts: 57% of all children in this age range use a computer to complete school assignments. This indicator varies widely by household income. 77% of children from households earning more than $75,000 per year use a home computer to complete school assignments compared to 27% of children from households earning less than $15,000.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

2 Percentage of all high schools in the nation with students enrolled in distance education courses—38%

Refers to: Percentage of all high schools with students who are enrolled in distance education courses. This is a broad question that neither distinguishes the type of course being taken nor the organization administering the course.

Why Selected: Remote or rural populations might not have the staff expertise on site to offer students a rich menu of educational activities and subjects. This may also be true in urban schools that have not been granted sufficient resources to offer the extra classes, courses, and instructors that wealthier schools and districts do. Distance education, if supervised properly, offers youth

the chance to benefit from courses and education they otherwise might not be able to access.

Notable Facts: Overall, the percentage of high schools offering distance education courses is 38%. The percentage of junior high schools offering distance education courses is 4%.

Data Source: J. Carl Setzer, Laurie Lewis, and Bernard Greene. "Distance Education Courses for Public Elementary and Secondary School Students: 2002-03." Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

3 Percentage of online young people ages 12–17 who download study aids from the Internet—34%

Refers to: The percentage of online youth ages 12-17 who download information from the Web in order to help their study skills or process. This refers broadly to any type of study aid online.

Why Selected: In addition to serving as a source for research information, the Internet can serve an educational function for students by offering instruction and tools for them to get more out of their studies.

Notable Facts: Overall, 34% of online youth ages 12–17 use the Internet in this fashion. This indicator varies moderately according to household income. Low-income households are the most likely to download study aids from the Internet. 43% of online 12- to 17-year-olds in households earning less than $30,000 annually download study aids from the Internet compared to 36% of those from households earning $50,000 or more. The lowest percentage is among online middle-income households earning $30,000–$50,000. 28% of online 12- to 17-year-olds from these households download study aids from the Internet.

Data Source: Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet & American Life Project, 2001.

4 Number of states that have education technology standards by grade level—25

Refers to: The number of states in the U.S. that have technology skills goals/standards for grades K–12. Although these standards may vary from state to state, the indicator measures if states have some set of guidelines in place to define the ICT skills children should have at various grade levels.

Why Selected: Technology literacy standards offer both a set of expectations to which teachers can teach and a standard against which to measure skills and competencies.

Notable Facts: Twenty-five states have such standards, which vary widely. Some states such as Louisiana, Mississippi, North Carolina, Ohio, West Virginia, and Wisconsin have education technology standards with grade-level benchmarks that also connect technology skills with other education guidelines such as problem solving, citizenship, etc. Others have very weak or generic education technology requirements.

Data Source: The Children's Partnership's Inventory of Education Technology Guidelines for the 50 States, 2005.

Enhanced Instruction & Communication

5 Percentage of public school teachers who "somewhat" or "strongly" agree that computers and other technology for their classroom are sufficiently available—57%

Refers to: The percentage of teachers who feel that education technology is generally available in their classrooms for instruction.

Why Selected: Although general data exist about the extent to which schools and classrooms are wired to teach using technology, this is one of the few available indicators of the extent to which teachers feel that the technology in their classes is sufficient to be able to improve their teaching effectiveness.

Notable Facts: 57% of teachers agree that these types of technology are sufficiently available. This statistic contrasts with other U.S. Department of Education data showing that classrooms are almost universally wired. Further research on what type of technology tools teachers feel are sufficient will be helpful in defining what technology teachers actually need and use versus what is superfluous.

Data Source: U.S. Department of Education, National Center for Education Statistics. "Computer Technology in the Public School Classroom: Teacher Perspectives," 2005.

6 Percentage of public schools or districts that offer professional development for use of the Internet in the classroom—82%

Refers to: Instruction offered by schools, school units, or school districts to teachers or staff on how to use the Internet in the classroom.

Why Selected: Experts in the field of education technology underscore the importance of professional development in order to deliver the benefits of increased technology infrastructure to students.

Notable Facts: The 82% reported on the indicator is down from 87% in 2002.

Data Source: U.S. Department of Education, National Center for Education Statistics. "Internet Access in U.S. Public Schools and Classrooms: 1994–2003," 2005.

7 Percentage of K–12 special education students in U.S. public schools using ICT tools as part of their Individual Education Plan—(N/A)

Refers to: K–12 special education students who have assistive technology integrated in their instructional plans.

Why Selected: Technology may have its greatest impact on students with learning disabilities. The use of ICT technology in helping level the playing field for special education students is potentially one of the most beneficial uses of technology in the classroom.

Notable Facts: Data collected on use of ICT tools by youth with disabilities are very rare. 35% of adults with disabilities say they would not be able to care for themselves at home without ICT tools. Similarly, the lack of assistive technology for youth at school can limit their learning and ability to benefit from activities offered at school.

Data Source: Not currently available.

8 Percentage of online young people ages 12–17 who use e-mail and instant messaging to contact teachers or classmates—41%

Refers to: The percentage of online young people who use computers and the Internet to facilitate communication with teachers. This indicator does not specify whether the communication is conducted from a home, school, or community computer.

Why Selected: E-mail and instant messaging give students additional avenues to consult and query their teachers.

Notable Facts: Overall, 41% of online young people ages 12–17 use e-mail or instant messaging to contact teachers or classmates. Children in online higher-income households are much more likely to use this form of communication than children from low- and middle-income households. Among online 12- to 17-year-olds in households earning an annual income of more than $50,000, 46% use e-mail or instant messaging to communicate with teachers or classmates. 35% of those in online households earning less than $30,000 and 34% of those in online households earning $30,000-$50,000 communicate in this way with teachers and classmates.

Data Source: Amanda Lenhart, Maya Simon, and Mike Graziano. "Internet and Education." Washington, D.C.: Pew Internet & American Life Project, 2001.

9 Percentage of parents with online children ages 12–17 who use e-mail to communicate with their child's teacher—28%

Refers to: The percentage of parents of online young people ages 12–17 who use e-mail to consult with teachers regarding their child's school issues.

Why Selected: With the demands on working parents in today's society, any additional means of communication between parents and teachers is helpful to students. Research has shown that parental involvement is an important ingredient of student success. Offering parents another channel to participate in their child's education and stay abreast of their child's progress by communicating with teachers is likely to enhance the child's educational experience.

Notable Facts: Overall, 28% of parents use e-mail to communicate with their child's teacher. Analysis by income and race is not available for this variable, but it is logical to assume that lower-income and minority parents who lack computers and the Internet at home are less likely to use ICT to contact teachers.

Data Source: Amanda Lenhart, Maya Simon, and Mike Graziano. "Internet and Education." Washington, D.C.: Pew Internet & American Life Project, 2001.

10 Percentage of public schools with a Web site or Web page—88%

Refers to: The percentage of public schools that maintain a presence on the Internet for students, parents or the general public.

Why Important: Schools that post Web sites offer parents and students another means for learning about their schools, increasing involvement in scholastic and extracurricular activities, and connecting with other students and families. Like other means to communicate using ICT, a Web site offers an interactive method of building connections among a school's community.

Notable Facts: Overall, 88% of public schools in 2003 had a Web site or Web page. The extent to which schools have Web pages varies significantly both by student income and school minority enrollment. Among schools where less than 35% of students were eligible for free or reduced-price lunch, 96% had Web sites in 2003. Among the schools where 75% or more students were eligible for free or reduced-price lunch, 72% had Web sites. There is also variance according to minority enrollment. 90% of low-minority schools (less than 6% minority enrollment) have Web sites compared to 80% of schools where minorities are at least half of the population.

Data Source: J. Carl Setzer, Laurie Lewis, and Bernard Greene. "Distance Education Courses for Public Elementary and Secondary School Students: 2002–03." Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 2005.

Improved Assessment & Preparation for Higher Education

11 Number of states that test student knowledge of technology to see if the instruction is having an impact—3

Refers to: Number of states nationwide that conduct evaluations of students' technology literacy skills.

Why Selected: Only by evaluating the extent to which students are mastering ICT skills can we know whether technology tools are being implemented effectively and efficiently. When states verify the results of education technology, it ensures that investments in this sector are achieving the desired impact.

Notable Facts: Overall, three states (New York, North Carolina, and Utah) test student knowledge of technology to see if the instruction is having an impact. We know of no analysis of trends regarding states' adoption of state-level assessments.

Data Source: Jennifer Park and Lisa N. Staresina. "Tracking U.S. Trends." Education Week On The Web, May 6, 2004.

12 Percentage of students who research colleges using the Internet—(N/A)

Refers to: Percentage of high school juniors and seniors who use the Internet to obtain information on colleges they are interested in attending.

Why Selected: The Internet can serve as a rich resource to students seeking information on where to pursue higher education.

Notable Facts: Some institutions of higher education, such as the Sloan School of Management at the Massachusetts Institute of Technology, require applicants to apply online. As yet, there is no survey of the percentage of students who conduct research on colleges online.

Data Source: Not currently available.

13 Percentage of students who use the Web for SAT or ACT test preparation—(N/A)

Refers to: The percentage of college-bound students who use the Internet and computers to prepare for standardized college-entrance examinations.

Why Selected: At many universities, performance on the Scholastic Aptitude Test or American College Testing program is a decisive factor in determining a student's qualifications for admission. Private companies offer computer-based programs for students to use in order to practice for the test. Such programs can provide an advantage to those students with the access and skills necessary to use them.

Notable Facts: There are many computer-based programs to prepare students for standardized admission tests such as the SAT or ACT. As yet, there are no public data on the extent to which these resources are used, compared to traditional pen-and-paper methods. Many of these college board tests are now offered by computer.

Data Source: Not currently available.

14 Percentage of students who obtain college scholarships or financial aid through the Web—(N/A)

Refers to: The percentage of students who use the Internet to obtain financial aid for higher education, either by seeking out information on scholarships, loans, and grants or applying for such resources online.

Why Selected: Many students and their families are not aware of the funds available to college-bound students. These resources, including loans, are especially relevant to lower- and middle-income students whose families might have to assume debt, believing they cannot afford to send their children to college. Using the Internet to explore funding opportunities for higher education means that more families can access the money necessary to send their children to college.

Notable Facts: Although applications to institutions of higher education and the tests needed for admittance have already migrated to some degree to the Internet, the extent to which students and families use the Internet to explore and apply for financial aid is largely unknown.

Data Source: Not currently available.

II. IMPROVED HEALTH

Effective Management of Health Care Needs/Conditions

15 Percentage of parents who use e-mail to communicate with their child's doctor—(N/A)

Refers to: Percentage of parents of children ages 7–17 who use the Internet to communicate with their child's doctor regarding the child's medical or health issue.

Why Selected: Research has shown that the Internet can facilitate communication between the patient, family, and physicians. E-mail communication between doctors and families can save patients and physicians time, allow flexibility for parents and families, and defuse confrontation.

Notable Facts: Surveys by the Pew Internet & American Life Project have discovered that only 7% of American adults exchange e-mails with doctors or health professionals. About 90% of those who exchange e-mails with doctors find this means of communication useful. We know of no measure of the percentage of parents who use e-mail to communicate with doctors regarding their child's medical condition.

Data Source: Not currently available.

16 Percentage of physicians' offices that have adopted computer-based patient records—17%

Refers to: The percentage of physicians who have integrated some type of computer-based health records into their practice.

Why Selected: Experts state that the use of computer-based patient records (CPR) can improve the efficiency and quality of health care.

Notable Facts: 17% of physicians' offices have adopted computer-based patient records. There have been a number of surveys attempting to measure the extent to which physicians have adopted electronic patient records. How this variable is measured (use in inpatient settings, physician offices, etc.) varies widely. Physician office CPR use rates ranged from 14% to 39% in 2002 according to an analysis performed by the California HealthCare Foundation. We chose the Harris Interactive

study from several surveys cited in this analysis because it has been performed consistently for the past three years.

Data source: Harris Interactive Survey (2002) cited in David Brailer and Emi Terasawa. "Use and Adoption of Computer-Based Patient Records." California HealthCare Foundation, 2003.

17 Percentage of disabled youth who are able to get the ICT-related assistive technology they need—(N/A)

Refers to: Percentage of disabled children and young adults who are able to acquire technology such as large text on computer screens, special computer software, voice recognition technology, or a special keyboard or mouse in order to improve their quality of life.

Why Selected: Youth with disabilities who obtain the technology they need can increase their mobility, productivity, independence, and quality of life.

Notable Facts: 7% of adults with disabilities say they use computer-related assistive technology such as voice recognition technology or a special keyboard or mouse. 13% use computer-related devices for the visually impaired such as special computer software or screen readers. We know of no comparable data for children.

Data Source: Not currently available.

18 Percentage of parents who access health records online for their child—(N/A)

Refers to: Percentage of parents who use electronic records to stay informed about their child's health status.

Why Selected: Electronic health records offer parents a more convenient and comprehensive way to stay abreast of their child's health history.

Notable Facts: Although the Pew Internet & American Life Project has measured the extent to which parents use the Internet to access health information, we know of no data on the percentage of parents who access health records online for their child.

Data Source: Not currently available.

19 Number of states that reimburse for telemedicine expenses under Medicaid—18

Refers to: The number of states that reimburse for telemedicine expenses under Medicaid. The U.S. Department of Health and Human Services defines telemedicine as "the use of medical information exchanged from one site to another using electronic communications for the health and education of patients or providers and to improve patient care." Medicaid is a federal and state health insurance program designed to provide access to health services for low-income Americans.

Why Selected: Reimbursing for Medicaid is especially helpful in low-income communities that lack health care resources and specialists. Reimbursement for telemedicine expenses can give low-income and rural communities access to medical expertise and services their residents would not have otherwise.

Notable Facts: In 2004, 18 states reimbursed for telemedicine under Medicaid. In February 2004, the Department of Commerce (DOC) reported that "the telehealth community has been generally unsuccessful in persuading Medicare to reimburse many of its applications that include such technologies." The DOC also found that Medicare and Medicaid policies lag behind those of private payers, and that "greater discussion and coordination among payers of reimbursement policies may lead to more informed consideration of technology's impact on access, quality and cost."

Data Source: Centers for Medicare & Medicaid Services. "Medicaid and Telemedicine." December 2004. (http://www.cms.hhs.gov/states/telelist.asp)

Better Informed About Health Needs/Concerns

20 Percentage of young adults ages 18–25 who use the Internet to search for health information—19%

Refers to: The percentage of all youth ages 18–25 who obtain health information through the Internet. Note that surveys on this question have varied depending on the organization conducting the survey. Current Population Surveys tend to show lower percentages of young adults using the Internet to search for health information compared to surveys by the Kaiser Family Foundation.

Why Selected: Multiple surveys indicate that health information online has the potential to change youth behavior, increase comfort in dealings with health care providers, and facilitate communication with friends and family on health matters.

Notable Facts: Overall, 19% of young adults use the Internet to search for health information. This indicator varies somewhat according to household income. Young adults from households earning $50,000–75,000 annually have the highest rates of Internet health searches at 24%. Young adults from the highest level of household income measured (more than $75,000 per year) have the second-highest rate (21%). Young adults from lower-income homes conduct these health searches less often. About 15% of young adults from households earning up to $15,000 conduct health searches online.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

21 Percentage of online parents who search the Internet for health insurance information—29%

Refers to: The percentage of parents with Internet access who use the Internet to search for health insurance information. This could be any type of health insurance information for themselves, their children, or someone else.

Why Selected: Parents search for health insurance information online more often than non-parents. Parents serve as the conduit for their children's health services.

Notable Facts: Overall, 29% of online parents search for health insurance information. Parents are slightly more likely than non-parents to search for health insurance information online.

Data Source: Susannah Fox and Deborah Fallows. "Internet Health Resources." Washington, D.C.: Pew Internet & American Life Project, 2003.

22 Percentage of online youth ages 15–24 who use the Web to find information about birth control, STDs, or AIDS—44%

Refers to: Percentage of Internet users ages 15–24 who use the Web to search for information on reproductive health and sexually transmitted diseases.

Why Selected: At times youth and adolescents may not feel comfortable asking their family or other adults to address their questions and concerns regarding sensitive health issues such as sexually transmitted diseases, birth control, and pregnancy. In these cases, the Internet serves as a valuable and convenient resource for youth to get answers. Finding the information they need online may make the difference between an unplanned pregnancy and contracting an STD, or not.

Notable Facts: Overall, 44% of online youth use the Internet to find information about birth control, sexually transmitted diseases, or AIDS. Unlike their parents, these issues are some of young people's greatest health concerns. African American and Latino online youth are more likely to seek out information on these issues than are Asian Americans and Whites. This is particularly true in the case of AIDS/HIV information. Overall, 31% of online youth ages 15–24 seek out information on AIDS. Among African Americans, 43% of this group seek out this information. 38% of online Latinos look for AIDS-related information, while 27% of Whites and 20% of Asian Americans do so.

Data Source: Victoria Rideout. "Generation Rx." Menlo Park, CA: Kaiser Family Foundation, 2001.

Increased Healthy Behavior

23 Percentage of online "health information seekers" ages 15–24 who have changed their personal behavior because of health information obtained online—39%

Refers to: The percentage of young people ages 15–24 who have sought health information online and who say they have changed their personal behavior because of health information on the Web.

Why Selected: While the value of the Web as a vessel for information is widely recognized, perhaps even more important is its ability to change behavior and increase well-being. Youth's use of the Web to alter potentially dangerous or damaging behavior holds promise for their leading healthier and safer lives.

Notable Facts: According to the Kaiser Family Foundation, 39% of online health information seekers ages 15–24 have changed their personal behavior because of information obtained online. African Americans and Latinos are more likely to change their behavior than are Asian American and White health information seekers. 50% of African American and 41% of Latino health information seekers changed their behavior online compared to 38% of Whites and 22% of Asian Americans.

Data Source: Victoria Rideout. "Generation Rx." Menlo Park, CA: Kaiser Family Foundation, 2001.

24 Percentage of online health information seekers ages 15–24 who have seen a doctor because of online information—14%

Refers to: Percentage of those ages 15–24 who sought health information online and who have seen a doctor because of the information they obtained.

Why Selected: Youth can use online information to change their behavior in one obvious way—to decide to consult a physician. While many youth might otherwise be hesitant to consult a doctor on a health issue of concern, finding information on the Web could confirm questions or concerns they had and make the difference between scheduling an appointment for a needed health care consultation and doing nothing.

Notable Facts: The percentage of online health information seekers who have seen a doctor because of the information obtained online is small—14%. But in this case, the decision to see a doctor demonstrates that at least some percentage of youth regard health information online with enough confidence to deem it worthy of following up with a physician. There is little variation among races in terms of which online health information seekers see a doctor because of information obtained online. 14% of Whites and African Americans; and 16% of Asian Americans and Latinos have visited a doctor or clinic because of the information they found online.

Data Source: Victoria Rideout. "Generation Rx." Menlo Park, CA: Kaiser Family Foundation, 2001

III. ECONOMIC OPPORTUNITY

Preparation for Contemporary Labor Market

25 Percentage of young people ages 7–17 who use word processing or desktop publishing programs on the computer at home—38%

Refers to: The percentage of children and young people ages 7–17 who use word processing or desktop publishing functions and/or software at home.

Why Selected: The ability to use word processing or desktop publishing programs on computers is a staple of many jobs in today's economy. If children are not trained and practiced in using basic word processing applications, they will likely be at a disadvantage in the job market in a variety of career fields.

Notable Facts: Almost four of every 10 (38%) children ages 7–17 use word processing or desktop publishing programs at home. This varies significantly by household income, probably reflecting the relative lack of home computers among children in low-income households. While 57% of children living in households earning an annual income of $75,000 or more do word processing or desktop publishing at home, 17% of children from homes earning up to $15,000 do so.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

26 Percentage of young people ages 18–25 who use spreadsheet or database programs on the computer at home—18%

Refers to: The percentage of young people ages 18–25 who use spreadsheets and database programs on computers at home.

Why Selected: Use of spreadsheets and database programs are becoming a more ubiquitous feature of many job descriptions. These programs are particularly common in the financial and accounting sectors that tend to contain a large number of well-paying positions. Young people's ability to use these programs effectively will likely benefit them when they apply for jobs as well as in their education.

Notable Facts: Overall, 18% of young people ages 18–25 use spreadsheets or database programs at home. But household income still defines to some extent the likelihood that children will use these software applications at home. Among the wealthiest group of children in households earning $75,000 or more annually, 29% use spreadsheets or database programs. The percentage drops to 13% among those in households earning $15,000 or less.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

27 Percentage of young people ages 18–25 who use graphics/design programs on the computer at home—26%

Refers to: The percentage of children ages 18–25 who use graphics/design programs on their computers at home.

Why Selected: Computer animation and graphic design programs are major tools for the entertainment industry and for any business or company that wants to maintain a Web page, publish reports with graphics, or is engaged in advertising. Young people's ability to use these applications successfully will make them more attractive to employers.

Notable Facts: Like other career-relevant ICT applications, the percentage of young adults who use home computers for graphics and photo programs is stratified by household income. Although 26% of young adults ages 18–25 use these programs, the range varies according to economic level. 42% of young adults ages 18–25 from households earning more than $75,000 use these programs compared to 18% of those from households earning less than $15,000.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

28 Percentage of online young people ages 12–17 who have created or worked on a Web page—24%

Refers to: Percentage of online young people nationwide who have built Web pages on the Internet. Again, this is asked broadly and does not specify the quality of the Web site.

Why Selected: This indicator measures advanced ICT skills that offer a distinct advantage in many jobs.

Notable Facts: Overall, 24% of online teens in this age group worked on or created a Web page. This indicator aries somewhat by household income. 12- to 17-year-olds in online middle-income households (earning $30,000–$50,000 annually) are the most likely (27%) to have created or worked on their own Web page. Among those in online households earning $50,000 or more, 25% have created or worked on a Web page. The rate is lowest among online households earning less than $30,000 per year, where 17% of older children worked on a Web page.

Data Source: Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet & American Life Project, 2001.

Increased Avenues for Employment

29 Percentage of young people ages 18–25 who have used the Internet for a job search—19%

Refers to: Percentage of young people ages 18–25 who have used the Internet to search for jobs.

Why Selected: Most major employers and increasingly small companies and businesses are relying on the Web to post job opportunities. Either on their own Web sites or through major job employment sites on the Internet, companies are selecting this option because it is more cost effective than placing such ads in newspapers. If youth are not able to effectively search for jobs online, they will be restricted in their career options and opportunities.

Notable Facts: 19% of all 18- to 25-year-olds searched for jobs online during 2003. The percentage among different income groups varied little. This lack of variance compared to the varied use of computer applications at home may reflect the fact that these job searches were conducted at school or a community center and do not rely on the use of a home computer.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

30 Percentage of young people ages 18–25 who have submitted a resume online—8%

Refers to: The percentage of young people ages 18–25 who have used the Internet to apply for employment.

Why Selected: Not only searching for jobs, but also knowing how to apply for them effectively via the Internet, should be part of 21st century youth's repertoire of job-seeking skills. If youth do not know how to market and express themselves effectively through electronic communication and submit applications online, they will have a more difficult time finding employment.

Notable Facts: Submitting a resume online is less common among young adults than conducting a job search. Only 8% of young adults ages 18–25 took advantage of this means of applying for jobs. This percentage varied little according to household income. It would be interesting for researchers to investigate why twice as many young adults search for jobs online as apply for them.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

31 Percentage of disabled young adults ages 18–25 who say they would not be able to work without an ICT-related assistive device and have one—(N/A)

Refers to: The percentage of disabled young people who have the assistive technology needed to be able to work.

Why Selected: Assistive technology can be vital for young adults with disabilities to work and is one way in which ICT can greatly improve their quality of life.

Notable Facts: 7% of all adults with disabilities say they would be less productive at work if they were unable to use assistive technology. There is no data specific to young adults.

Data Source: Not currently available.

32 Percentage of young people who have taken a technology skills course to enhance their career mobility—(N/A)

Refers to: The percentage of young people who have taken a technology skills course to advance their careers.

Why Selected: For those youth who do not already have fairly advanced ICT skills, coursework that increases skills with computer applications will qualify them for a wider variety of jobs.

Notable Facts: This is a difficult variable to measure, but it would be helpful in determining if the technology education and training pipeline is meeting the needs of our increasingly technology-based economy. A skills course could be offered at the community-college, high school, or professional-certificate level.

Data Source: Not currently available.

33 Percentage of young adults ages 18–25 without a high school diploma who have used the Internet to earn their GED—(N/A)

Refers to: The percentage of young adults who left high school without a degree and subsequently used online education to earn their GED.

Why Selected: For young adults who work and/or have families, online education offers an additional and convenient way to earn their GED.

Notable Facts: In 2002–2003, there were an estimated 328,000 K–12 enrollments in distance education courses among students regularly enrolled in public school districts.

Data Source: Not currently available.

IV. COMMUNITY & CIVIC PARTICIPATION

Involvement with Community

34 Percentage of online young people ages 12–17 who visit Web sites for clubs, groups, or sports teams of which they are members—39%

Refers to: This indicator reveals to what extent online youth are using the Internet to further their interest in extracurricular activities and connect with like-minded peers.

Why Selected: The Internet can provide another communication means for young people looking for connection with peers sharing similar interests. It can also be a way to facilitate getting involved in enriching and structured activities.

Notable Facts: 39% of all online 12- to 17-year-olds are engaged in this online activity, and the percentage varies little among youth from different household income levels. For online teens from households with an annual income of under $30,000, 37% engage in this activity compared to 41% from online households earning $50,000 or more.

Data Source: Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet & American Life Project, 2001.

35 Percentage of young people ages 18–25 who search the Internet for community events or volunteer opportunities—(N/A)

Refers to: The percentage of young adults who use the Internet to participate in their community and volunteer.

Why Selected: Research shows that the Internet can be a tool to increase community cohesion and collective action. A community that is more cohesive and involves children more will benefit children, families, and the community as a whole.

Notable facts: National survey data cited for several other indicators clearly demonstrate that youth look to the Internet as a place to connect to peers and others who share similar interests. Data on the extent to which youth use this resource to locate community events and volunteer opportunities would help expand our knowledge of how youth use the Internet for community and social purposes.

Data Source: Not currently available.

36 Percentage of disabled young people ages 12–17 who say that ICT helps them connect with peers and pursue their hobbies and interests—(N/A)

Refers to: The percentage of young people who count on ICT to help them lead rich and active social lives and connect to their community and the world.

Why Selected: ICT has the ability to improve the quality of life and reduce loneliness and isolation among young people with disabilities who might not otherwise be able to connect with peers and their community.

Notable Facts: 16% of all American adults with a disability say they would not be able to attend social gatherings if they were not able to use special equipment and assistive technology. Data on young people are not available.

Data Source: Not currently available.

Active Citizenship

37 Percentage of young people ages 18–25 who seek information online about candidates for office or ballot issues—(N/A)

Refers to: The percentage of young adults nationwide who use the Internet to get information on political candidates or ballot initiatives.

Why Selected: The Web has the potential to increase young people's knowledge about community issues as well as their civic participation.

Notable Facts: Eighty-four million American adults got political news and used the Internet to participate in the 2004 presidential campaigns. Getting news is one of the most popular functions of the Internet. Tens of millions use the Internet to research policy issues, send e-mail to government officials to seek changes in policy, apply for government benefits, and participate in organized lobbying campaigns.

Data Source: Not currently available for this age group.

38 Percentage of online young people ages 12–17 who visit Web sites where they can express opinions about something—38%

Refers to: Percentage of online young people who use the Internet to express themselves and connect with others.

Why Selected: The Internet is growing as a forum where youth can connect with their peers on topics of mutual interest. It also provides a valuable way in which youth can share their views and concerns more widely.

Notable Facts: About the same percentage (38%) of online teens engage in this activity as do those who go to Web sites where they can engage in activities of interest. This activity is more common among low-income online youth. 43% of those living in online households earning less than $30,000 annually engage in this activity compared to 36% of those in online households earning more than $50,000.

Data Source: Amanda Lenhart, Lee Rainie, and Oliver Lewis. "Teenage Life Online." Washington, D.C.: Pew Internet & American Life Project, 2001.

39 Percentage of young adults ages 18–25 who use the Internet to search for government information—19%

Refers to: The percentage of young people ages 18–25 who have sought information on government through the Internet in the last year.

Why Selected: Like private industry, governmental agencies at the local, state, and federal level are placing increasing amounts of information on the Web. Because youth use the Internet much more often than they visit governmental offices, the Web serves as a potential conduit to increase young people's communications with government. It can also lead to a more efficient processing of governmental transactions for youth such as getting a driver's license, work permit, and tax information.

Notable Facts: The percentage of young people seeking government information online varies slightly according to household income. Overall, 19% of young adults use the Internet to search for government information. The wealthiest cohort of young adults (those with an annual household income of $75,000 or more) have the highest rate of searching for government information—24%. The lowest percentage of government information seekers online is among those from homes with an annual income of $15,000–$30,000 and those with an income of less than $15,000.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

40 Percentage of young adults ages 18–25 who use the Internet for downloading or submitting government forms—16%

Refers to: Percentage of young adults using the Internet to conduct government business.

Why Selected: The Internet provides young people with a new and more time-efficient way of interacting with government at all levels, including renewing a driver's license, applying for financial aid, and registering for military service.

Notable Facts: Like young adults who search for government information online, the percentage of young adults who use the Internet for downloading or submitting government forms also increases according to household income. Overall, 16% of young adults use the Internet to submit or download government forms. About 20% of those young adults from households making $50,000 or more annually use the Internet in this way while only 11% from households earning an annual income of less than $15,000 do so.

Data Source: U.S. Bureau of the Census. Current Population Survey, Internet and Computer Use, 2003.

The Children's Partnership
1351 3rd Street Promenade, Suite 206
Santa Monica, CA 90401

With support from

The Annie E. Casey Foundation

The Atlantic Philanthropies

verizon