Department of
Youth & Community
Development

TESTIMONY

BEFORE THE NEW YORK CITY COUNCIL

COMMITTEE ON YOUTH SERVICES

OVERSIGHT HEARING

"Examining the goals of the City's youth mentoring programs. Are these goals being met?"

PRESENTED BY

DEPUTY COMMISSIONER SUSAN HASKELL

SEPTEMBER 9, 2015

Good morning Chairman Eugene and members of the Youth Services committee. I'm Susan Haskell, Deputy Commissioner, Youth Services at the Department of Youth and Community Development (DYCD). I'm joined by Tracy Garcia, Director, Service Learning, and Cynthia Malave-Baez, Project Manager, Service Learning. Thank you for inviting us to testify today.

My testimony will focus on DYCD's Cornerstone mentoring programs. As you know, DYCD funded provider organizations operate Cornerstone programs in 94 New York City Housing Authority (NYCHA) community centers. Programs offer services and activities to youth, adults and families that include afterschool programming, and recreational and enrichment programming. The DYCD Cornerstone program began in February 2009 with 25 centers, added 45 centers in January of 2014, and has grown to 94 centers as of Fiscal Year 2016.

Since January 2012, all 25 original Cornerstone centers have been operating a mentoring program funded by the City's Young Men's Initiative (YMI). YMI was launched in 2011 as a cross-agency initiative to relieve the disparities in outcomes between young Black and Latino men in areas related to education, health, employment, and criminal justice. The YMI Cornerstone Mentoring Program targets youth in fifth through ninth grade who are at risk of dropping out of school. Programs are located in every borough, in neighborhoods such as Soundview, Mott Haven, Highbridge, Bronx River, Morrisania, East New York, Bushwick, Canarsie, South Jamaica, Astoria, Flushing, Far Rockaway, East Harlem, Washington Heights, and Staten Island's North Shore.

Each Cornerstone mentoring program receives $32,000 in YMI funding to serve 12 mentees. A designated mentor coordinator works with the Cornerstone director to implement the program. Mentoring is delivered in a group format, with up to four youth matched to an individual volunteer mentor, and occurs for at least one and a half hours each week. Each Cornerstone has flexibility to customize the design of the mentoring program based on the needs of the youth served and their community. DYCD provides guidance to the programs and supports on-site technical assistance through The Mentoring Partnership of New York, a nonprofit focused on growing the City's mentoring capacity. Mentoring program staff can attend training and networking events, receive materials on effective mentoring practices, and obtain one-on-one support from a staff member who is a mentoring specialist.

In Fiscal Year 2015, 303 youth ages 10 to 17 participated in Cornerstone mentoring programs, with 95% between the ages of 10 to 15. About one-fifth of the participants were female. 68% of the participants were Black and 25% were Latino. Mentees are recruited from the Cornerstone afterschool participants. Cornerstone directors and mentor coordinators have discretion to identify participants based on a perceived need, or the program may accept applications on a first come, first served basis.

Mentoring activities vary across programs, but usually include group discussions, sports, field trips, meals, academic support, and community service projects. Specific examples of such activities include:

- Poetry/spoken word workshops facilitated by Urban Word NYC
- Nature walks in New York City parks and trips to Governors Island
- Basketball games at Barclays Center
- End of the year Broadway show
- Food and toy drives, park clean ups and neighborhood beautification, and tree plantings

Through Cornerstone mentoring programs, youth develop relationships with positive and caring adults who support them in school and in life, with the ultimate goal of keeping youth on-track in school, and looking forward to college and successful careers. Program mentors are recruited in various ways. Most of the mentors are Black and Latino men connected to their local Cornerstone program: some are staff members in nearby schools or housing facilities, while others are adults who grew up in the community and are now working professionals. Some are selected through NYC Service's online website of volunteer opportunities. Additionally, for two years, 22 mentors were placed in Cornerstone centers through a partnership between DYCD and the New School, where the mentors completed a youth-mentoring course. All mentors must successfully complete a criminal background check with fingerprinting. Mentor coordinators receive centralized training from DYCD at the beginning of the school year, and in turn, train their mentors with materials and resources from The Mentoring Partnership of New York.

DYCD's Cornerstone mentoring programs have had a very positive impact on the mentees who have participated. A 2013-14 evaluation study by Policy Studies Associates contained encouraging findings.

When patterns of participation were examined, we learned that:

- Mentoring participants are more engaged in other positive activities in Cornerstone programming than their peers who are not enrolled in mentoring.

- The retention rate in the mentoring program is higher than retention rates typically found in traditional afterschool programs – 43 percent of mentoring program participants were in their second year of mentoring, compared to 35 percent of middle school youth over multiple periods in DYCD's COMPASS programs.

The study also identified four programmatic tools or best practices used in the mentoring program to promote participant growth. They are dialogue, role modeling, trips and academic support.

- Through formal or informal dialogue, mentors and middle school youth discussed pertinent issues together. Dialogue was consistently present in the programs as mentors were charged with engaging participants in relevant, age-appropriate conversation.

- Mentors were positive role models, and represented caring, successful, and admirable adult figures for youth. Mentors understood that a primary responsibility was to serve as a strong, positive adult example for the mentees. As educated adults, they helped to reinforce the value and importance of school and education. Mentors also helped mentees learn how to navigate the complicated terrain of race and class, and importantly, to build and sustain positive relationships with adults.

- Trips, or excursions out of the neighborhood, were a regular part of the mentoring experience, and a big draw for participants. They were an integral component of the mentoring program, since it augmented program recruitment and retention, provided enriching experiences that engaged and exposed participants to new ideas and environments, and provided an avenue for mentors and mentees to bond and strengthen relationships.

- Academic support, including tutoring and homework help, allowed program staff to set high academic expectations, while encouraging their mentees to do their best. Mentor coordinators and mentors expected participants to go to school and do their homework, and reinforced these expectations by checking in with mentees frequently about their education.

Finally, the study found the impact of the program on participants was three-fold:

- Mentoring program participants reported positive attitudes about their abilities to do well in school and beyond, compared to non-mentoring participants in the Cornerstone afterschool program.

- Mentoring program participants are engaged in learning experiences.

- Mentees had very positive perceptions about their mentor and reported high levels of trust and positive relationships with their mentor.

The evaluation study also surveyed the attitude changes of the program participants across eight indicators. The mentoring participants ranked higher than the non-mentoring participants on the following questions:

- I feel like I can succeed in middle school
- I have more ideas for what kind of job I want when I am older
- I feel more confident in myself
- I feel better prepared for high school
- I have a better idea of my strengths
- I am more willing to take risks and stand up for what is right
- I feel better prepared to be a leader at school
- I feel better prepared to be a leader in my community

To conclude, I'd like to share quotes from focus groups we've held, where we spoke with mentoring participants about the program's positive impact on their lives:

- *"The mentoring program helps me focus and think better."*
- "*Most of us knew each other but we didn't get along. Now we're friends.*"
- *"It (*the mentoring program) *helps us develop, and learn to resolve arguments."*
- *"It gets you to think about the future, about what we want to be when we grow up, what we want to happen in the next 10 years"*
- *"The program helps – it gives us good experiences. We learn how to make better choices and how to choose a better path in life, doing it step by step, so when we graduate from high school and when we become parents, we will be able to help our kids make good choices.*"
- *"We learn to do good things -- like service projects -- because it helps the community; people appreciate it, and they are fun."*

As I've testified today, the Cornerstone mentoring program fits squarely within best practices of quality youth development programs, especially giving youth the chance to form caring adult relationships. We have been very pleased with the program's success, and look forward to strengthening it even further. Thank you again for the chance to testify today. We are happy to answer any questions.

NEW YORK CITY COUNCIL

COMMITTEE ON YOUTH SERVICES

Harlem Children Society Afterschool STEM Initiatives Preparing & Retaining Under-resourced & Under-served Urban & Rural Youth In STEM Careers for a 21st Century Workforce

Prepared for:
NEW YORK CITY
COMMITTEE ON YOUTH SERVICES

PUBLIC HEARING

SUBJECT: Oversight: An examination of the goals of the City's youth mentoring programs and, are these goals being met?

PURPOSE: To examine the role that New York City's Youth Mentoring Programs plays in the Developing Our Youth for 21st Century Careers, and in Community Development in Poverty prone neighbourhoods.

LOCATION: 14th Floor Committee Room, 250 Broadway, New York, New York

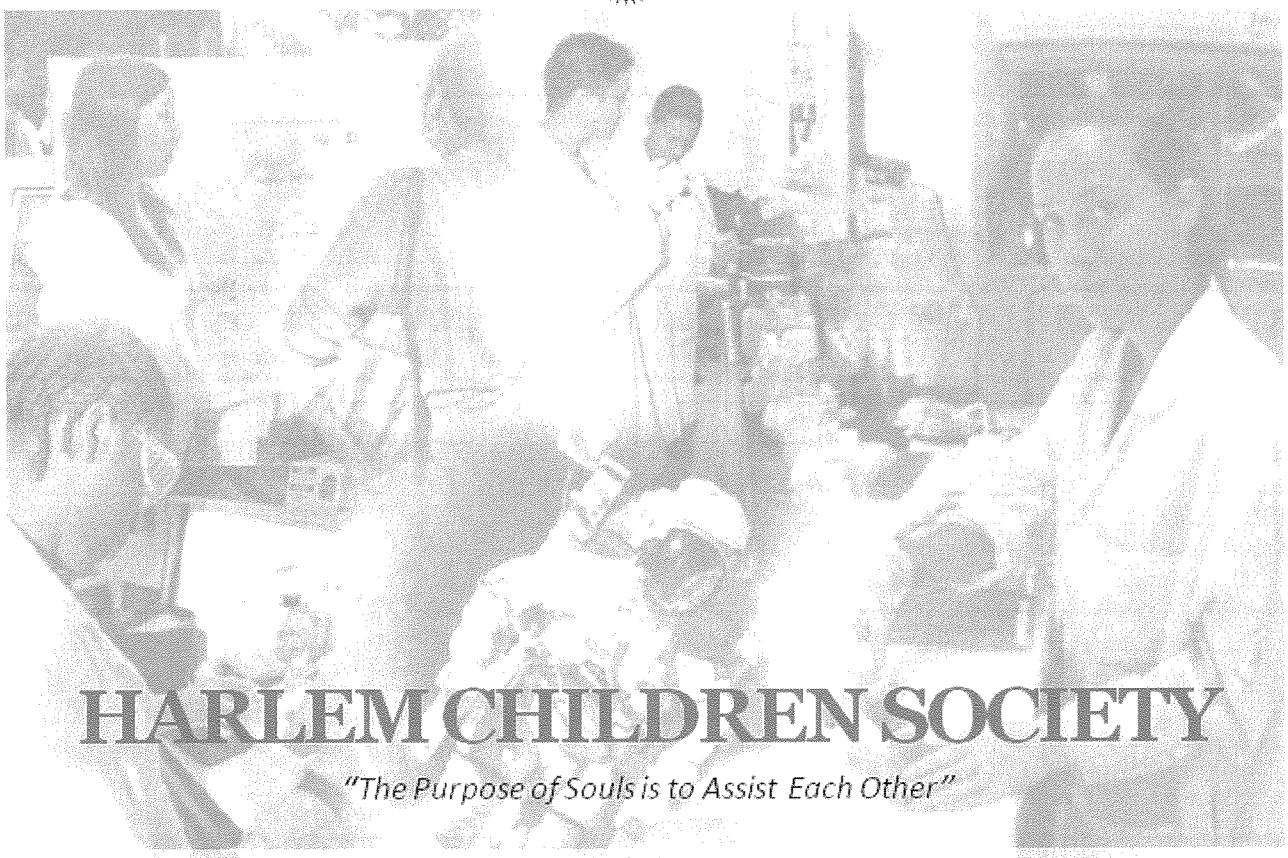
Prepared by: ***Dr. Sat Bhattacharya,***
Founder, President & CEO,
Harlem Children Society
C: 646-643-8543; E: BhattacS@HarlemChildrenSociety.org

Date: **Wednesday, September 9th, *2015, 10.00 AM***

Report: **Harlem Children Society Afterschool STEM Initiatives Preparing & Retaining Under-resourced & Under-served Urban & Rural Youth in STEM Careers for a 21st Century Workforce.**

Harlem Children Society

'The Purpose of Souls is to Assist Each Other'



HARLEM CHILDREN SOCIETY

"The Purpose of Souls is to Assist Each Other"

Advancing the World Through

Science

Technology

Engineering

Mathematics

Dr. Sat Bhattacharya
Founder, President & CEO
536 E 82nd St Suite 5F New York NY 10028
T:(646) 643-8563 F:(646) 225-6678 C:(646) 643-8543
Email: bhattacs@harlemchildrensociety.org URL: www.HarlemChildrenSociety.org

HARLEM CHILDREN SOCIETY

NEW YORK CITY
COMMITTEE ON YOUTH SERVICES

Harlem Children Society Afterschool STEM Initiatives Preparing & Retaining Under-resourced & Under-served Urban & Rural Youth In STEM Careers for a 21st Century Workforce

Table of Contents

Prepared for:

NEW YORK CITY
COMMITTEE ON YOUTH SERVICES

Harlem Children Society Afterschool STEM Initiatives Preparing & Retaining Under-resourced & Under-served Urban & Rural Youth In STEM Careers for a 21st Century Workforce

Why is STEM Education & Training is Important to the 21st Century Work-force

Science, technology, engineering and mathematics (STEM) education is a relatively new mode of thinking about how best to educate high school students for the workforce and for post-secondary education. We define STEM education as the preparation of students in competencies and skills in the four disciplines (science, technology, engineering, and math). A successful STEM education provides students with science, math, and engineering/technology in sequences that build upon each other and can be used with real-world applications.

STEM education is not simply a new name for the traditional approach to teaching science and mathematics. Nor is it just the grafting of "technology" and "engineering" layers onto standard science and math curricula.

STEM education removes the traditional barriers erected between the four disciplines, by integrating the four subjects into one cohesive means of teaching and learning. The engineering component puts emphasis on the process and design of solutions instead of the solutions themselves. This approach allows students to explore math and science in a more personalized context, while helping them to develop the critical thinking skills that can be applied to all facets of their work and academic lives. Engineering is the method that students utilize for discovery, exploration, and problem solving.

The technology component allows for a deeper understanding of the three other parts of STEM education. It allows students to apply what they have learned, utilizing computers with specialized and professional applications like CAD and computer animation. These and other applications of technology allow students to explore STEM subjects in greater detail and in a practical manner.

Why is this so important? Because science is the one subject that encompasses everything in life and helps students be curious, ask questions, and make connections as to why the world exists as it does. It is the backdrop for understanding our world, and helps us to explain and appreciate it in new ways.

- STEM education creates critical thinkers, increases science literacy, and enables the next generation of innovators. Innovation leads to new products and processes that sustain our economy. This innovation and science literacy depends on a solid knowledge base in the STEM areas.
- It is clear that most jobs of the future will require a basic understanding of math and science—10-year employment projections by the U.S. Department of Labor show that of the 20 fastest growing occupations projected for 2014, 15 of them require significant mathematics or science preparation.

It is imperative that as a nation, we make STEM education a top priority. We have a lot of work to do. Please consider this:

- U.S. student achievement in mathematics and science is lagging behind students in much of Asia and Europe. International test scores tell us that in science U.S. eighth-graders were outperformed by eighth-grade students in Singapore, Chinese Taipei, Republic of Korea, Hong Kong SAR, Estonia, Japan, Hungary, and Netherlands.
- In math, U.S. eighth-graders were outperformed by their peers in 14 countries: Singapore, Republic of Korea, Hong Kong SAR, Chinese Taipei, Japan, Belgium, Netherlands, Estonia, Hungary, Malaysia, Latvia, Russian Federation, Slovak Republic, and Australia.
- The 2010 ACT College and Career Readiness report found only 29% of the tested 2010 graduates are considered college-ready in science and 43% are considered college-ready in math.
- According to the National Center for Education Statistics, about one-third of the fourth-graders and one-fifth of eighth-graders cannot perform basic mathematical computations, and U.S. high school seniors recently tested below the international average for 21 countries in mathematics and science. As a result, fewer American students than ever are graduating from college with math and science degrees.
- When compared with our international competitors, we are not performing well. In 1995, U.S. fourth graders ranked 12th against other nations when it came to mathematics competency. By the 8th grade their ranking dropped to 19th, below not only Asian students in countries such as Korea, Japan and Taiwan, but also below students in many Eastern European nations such as Bulgaria, the Czech Republic and Slovenia.
- A similar deterioration has occurred in science. In 1995, U.S. fourth graders ranked 6th in science competency. By the 8th grade their ranking dropped to 18th, below many of the same countries cited above. More recent rankings of U.S. students relative to their counterparts around the globe have been no more encouraging with respect to America's future ability to compete.
- Countries outperforming the U.S. in science and math, on average, spend 10 percent less of their respective GDPs on primary and secondary education than we do. Obviously, there are other important educational elements that go beyond funding, such as the fact that nearly 70 percent of U.S. middle school students are taught math by teachers with neither a major nor certification in this critical subject. Internationally, the average is 29 percent.
- The story is not much better at the higher educational levels. The interest of young Americans' in science and technology has eroded over time. In 1960, one out of every six (17 percent) U.S. bachelor or graduate degrees was awarded in engineering, mathematics or the physical sciences but by 2001, that number had dropped to less than one in 10 (just 8 percent) of all degrees awarded in the U.S. This constitutes more than a 50 percent decline from 1960. In terms of actual numbers of graduates in these critical areas, the U.S. produced just 148,000 in 2001 — the smallest number in two decades. At this rate, our educational system will fail to meet our economy's workforce demands by the end of this decade.

National Initiative

President Barack Obama has declared we need to increase student achievement in mathematics and science and expand STEM education and career opportunities to underrepresented groups, including women.

- In a speech at the National Academies of Science, President Obama said, "Reaffirming and strengthening America's role as the world's engine of scientific discovery and technological innovation is essential to meeting the challenges of this century. That's why

I am committed to making the improvement of STEM education over the next decade a national priority."

- Obama's Educate to Innovate campaign is designed to lift American students to the top of the pack in science and math achievement over the next decade. The campaign involves public-private partnerships involving major companies, universities, foundations, non-profit organizations, and government agencies.
- One of the main goals of this campaign is to increase STEM literacy so all students have the opportunity to learn deeply and think critically in science, math, engineering, and technology. Funding will come from the many corporate, private, and foundation sponsors who are interested in taking part in the campaign efforts by serving students with their own initiatives.

Increased commitment from businesses and other stakeholders that support STEM education is critical, now more than ever. STEM education creates the pipeline of future innovators that will move this country forward. Making STEM education a priority is important, for our nation's short and long-term future.

What New York City Can We Do to Improve STEM Education & Career Training

High school education must adapt to the changing needs of America's economy. All sectors of the workforce – from entry-level jobs to more advanced positions – are requiring workers to have a greater capacity to think critically, work independently, and apply an ever widening set of sophisticated skills. Even entry-level jobs require these sophisticated skills from their "unskilled" workers.

Increasingly more college graduates are opting out of technical fields like engineering and the hard sciences, reducing the supply of potential workers for America's emerging needs within these fields. As current workers in the engineering and hard science fields reach retirement age, the United States will not be able to fill these positions to keep itself competitive in the international labor market.

STEM education provides an early groundwork for fostering students' interest in these kinds of careers and provides the entry-level skills for the workforce and for post-secondary education. Based on the work we do everyday at HCS here's what we have come up with –

1) Combine SYEP Program with High-end Training and Employment for City Youth:
Summer Youth Employment Program (SYEP) is a job program that provides youth between the ages of 14 – 24 years old with work experience, life skills training and income during the summer months and qualified organizations with free summer help. *SYEP is a seven-week program that will begin on Tuesday, July 6, 2010 and continue through Saturday, August 21, 2010.*

We have in the past have experimented with the DYCDs SYEP program recruiting students to our High training initiatives. However, it has been marred by spectacular disruptions, with little successes. This is because – we did not have any input on the selection of student candidates. This resulted in students – non-performing – and also disrupting the entire programs.

We therefore recommend, to create special initiatives that the City may incorporate – so as to be select motivated students and youth to programs such as HCS which not only provide critical High Technology training in 21st century Careers. These youth when go back to their neighborhoods in turn motivate other youth to succeed and therefore get rewarded. Such New York City policy would train and retain our youth in 21st Century Careers in a Globalized economy.

2) Recruit, Train and Keep Qualified Teachers:

Experts agree that one key to improving student performance is the recruitment, training and retention of qualified teachers. Recent studies suggest that, in the U.S. alone, 2.2 million new teachers will be needed in the next decade; yet, statistics indicate that U.S. colleges of education will not produce nearly enough graduates with degrees in education to meet the expected demand. Furthermore, graduates with degrees in science, mathematics, physics or engineering are unlikely pursue teaching careers. The lure of higher salaries in the private sector is further depleting the supply of qualified K-12 science, physics and mathematics teachers, while the pursuit of reduced class sizes and other demographic factors increase the demand for more qualified teachers.

A related concern is the number of teachers who are currently teaching out of their respective fields of expertise. In 1998, 28 percent of seventh and eighth grade math teachers in the U.S. were not certified to teach that subject, and 27 percent of science teachers at those grade levels were not certified to teach science. We recommend that **New York State policy makers should enhance the recruitment, training, and retention of qualified STEM teachers by creating programs which:**

- Examine how other supporting organizations (like *Harlem Children Society and others)* can play a role in preparing Urban, Rural & Mixed urban-rural students especially from Under-resourced & Under-served communities in STEM careers for a 21st century workforce.
- Support and Partner with organizations (like *Harlem Children Society and others)* in Developing & Sustaining Innovative Models for intensive STEM content, one-on-one hands-on research & mentoring, and programmatic, community, and parental support.
- Evolve and foster already existing Models (like ones developed by *Harlem Children Society and others)* providing to serve as a bridge between high school and university/college -playing a role in preparing such students for academic institutions while maintaining student retention, academic achievement and degree completion in STEM careers.
- Attract STEM teachers via scholarships, student loan forgiveness, bonuses, and tax incentives;
- Facilitate alternative certification and transition-to-teaching programs for engineers and other technical professionals;
- Create distance learning opportunities for K-12 STEM teachers and students;
- Include/increase STEM coursework in pre-service/university teacher training;
- Allow for differential pay scales to help attract and retain qualified STEM educators;
- Improve in-service professional development focusing on STEM curricula;
- Institute mentoring programs for STEM personnel in schools; and,
- Apply knowledge of how students learn in teacher professional development programs.

3) Promote Partnerships and Outreach Activities:

HCS partners with entities, research institutions and the private sector to further K-12 STEM learning. We recommend that **New York State Policy makers should support the development of partnerships among educational institutions, industry & non-profit organizations which:**

- Foster adopt-a-school programs;
- Promote relevant corporate summer externships for teachers in K-12 STEM positions;
- Address school infrastructure needs for STEM education, including the implementation of current technology and provision of material resources;
- Develop recognition awards for private sector K-12 STEM involvement;
- Produce, evaluate, and disseminate best practices in K-12 STEM programs, on-line curricula, & funding opportunities to educators via well-publicized, centralized web site;
- Create incentives for STEM professionals to work with teachers and students; and,
- Create and fund the publication and dissemination of materials for public outreach and parental education on the importance of a quality K-12 STEM education.

4) Implement High Standards for Student Performance:

Development of effective STEM curriculum and assessment tools must be based on high standards of achievement. Nationally recognized standards for science, technology and math exist and have been widely adopted by the states. These standards extend well beyond requiring knowledge of fundamental STEM facts; they require curricula that cultivate creative, critical thinking skills and encourage interdisciplinary approaches to issues and problems. **To enhance student achievement in STEM coursework, we recommend that New York State policy makers and other stakeholders should:**

- Strengthen and align standards with expectations of higher education and industry;
- Resist the tendency to "push back" standards when assessment results are less than satisfactory;
- Promote and endorse private sector standard-setting projects;
- Pursue the development of better assessment mechanisms aligned with standards; do not equate standards with standardized tests;
- Integrate STEM concepts throughout entire curricula to demonstrate relevancy; and,
- Support the development of hands-on, open-ended, problem-solving curricula and modules of engineering problems, grouped by discipline and level of difficulty, for the K-12 classroom.

5) Promote Diversity in the STEM Pipeline:

Remaining competitive in the global economy will require the cultivation of technological literacy, talent, and expertise across all sectors of society. Efforts should be made to attract greater participation of women and minorities into STEM fields of study and careers. Minorities and women are significantly underrepresented in the STEM workforce. We recommend that **New York City policy makers can**:

- Provide incentives & mentoring for women & minorities to pursue K-12 STEM teaching careers;
- Foster outreach and STEM career materials to K-12 guidance counselors, teachers, and parents to insure that resources, curricula, and activities appeal to all groups of students, including females, minorities and the disabled;
- Support STEM magnet schools in school districts with large minority enrollments;
- Foster public-private partnerships to ensure those schools serving large minority enrollments have computer labs and other technologies to support the delivery of high-quality STEM education;
- Open minority teacher recruitment centers; and,
- Provide diversity training for teachers to avoid proliferation of subtle and cultural discriminations.

6) Provide Tax Incentives for Corporate, Non-Profit Involvement:

Efforts to promote private sector involvement in STEM education can be encouraged by linking stakeholders, such as interested nonprofit organizations, area businesses, and informal education facilities, with each other to combine resources and deliver best practices.

- Encourage the private sector to assist with instruction in grades K-12, i.e. help teachers teach certain topics, volunteers in schools, fund tours;
- Provide tax incentives to corporations for use of facilities for teacher computer or technology training, or assisting with school computer or laboratory maintenance.
- Provide tax incentives for the donation of computer hardware or laboratory equipment and expendables;
- Foster learning opportunities and practical experience for teachers through externships at corporations; and,
- Offer tax incentives for non-profits organizations that provide professional development to teachers and administrators.

****

The Harlem Children Society (HCS) Model in STEM Disciplines

The mission of the Harlem Children Society is to bring science to communities from all of the New York City Burroughs, across the state, and nationwide – all of whom live below the poverty line – and creating education and skill developmental, in order to benefit their health, livelihoods and communities and, in doing so, to create a more humane local and global (Glocal) society. To achieve this purpose, HCS prepares promising high school students from under-resourced and under-served communities and schools to become doctors, engineers, research scientists and mathematicians. Students are immersed in science learning environments and equipped with the skills they need to gain access to higher education and careers in the sciences. By educating a generation of young people from ethnic minorities and impoverished communities that are underrepresented in the sciences, HCS builds leadership, capacity and expertise that will, in turn, benefit developing communities. Over fifteen years, HCS has evolved unique customized hands-on based programs in STEM and allied sciences, shoring local talent in a unique approach to education – with highly successful results. These are categorized as: Urban and Rural programs and several combinations suiting to local needs, demands, and yet raising the bar to raising the next breed of creative talent in STEM and allied fields.

HCS services redress a long-standing social inequity – that is, the limited access to education and careers in the sciences for minority, low-income public school students. The continuing under-representation of minorities in the sciences – especially engineering and research -- is well documented. Evaluations of HCS programs show that 100% of HCS students attend college, 80% majoring in science and math; over 20% attend Ivy League schools. HCS prepares public school and undergraduate students for 21st Century science careers, thus strengthening the competitiveness of American science/technology in our globalized economy.

HCS has evolved unique ways to get the schools, families and communities also as regarded partners who with their engagement, have spurred a renewed interest in the sciences and ensuing progress in the long term. HCS envisions a Science, Technology, Engineering and Math program (HCS-STEM) that will serve as a bridge between high school and university/college -playing a role in preparing such students for academic institutions while maintaining student retention, academic achievement and degree completion in STEM careers. HCS-STEM directly supports high school students to become doctors, scientists, engineers and mathematicians. It is envisioned as an educational institution that provides passage into the sciences for low-income, under-resourced and under-served public school students. It re-tools public school education in order to prepare a diverse, American workforce capable of competing in a global economy. HCS-STEM programs will provide rigorous academic support to level the playing field for low-income and under-served students; curricula will bridge students' high school learning to their internships and hands-on learning in the lab. HCS-STEM instruction and supports will enable students to:

- Meet the challenges of their internships;
- Compete successfully in the SAT/ACTs;
- Acquire rigorous thinking skills and other requirements of college; and

Remain engaged during the under-graduate years (especially the first few critical years) in STEM fields.

HCS demonstrates a powerful record of success and expertise in implementing its model of science education. The HCS model draws on more than SIX thousand science mentors from over 500 institutions worldwide continue to mentor promising high school students.

HCS-STEM prepares promising public high school students from under-resourced and under-served communities and schools for higher education and careers in science, technology, engineering and math. HCS provides tools, guidance, opportunities and networks that students need to establish a solid college and career trajectory. This, along with an indirect engagement of several thousand more students, teachers and school district will spur increase in rendering and implementing change in STEM education. A vital HCS-STEM objective is to eliminate obstacles that interfere with students' access to higher education and careers in the sciences. Students are matched with mentors – doctors, research scientists and engineers -- from prestigious research institutions, universities, and hospitals, including the Memorial Sloan Kettering Cancer Center, NYU School of Medicine and the Albert Einstein School of Medicine. During the past year, eight New York City students were matched with mentors at the NASA Kennedy Space Center in Florida and the Space Center at the University of Wisconsin in Madison.

Our successful project model provides:

- **Summer and After School Employment Opportunities for Youth.** HCS offers summer employment opportunities through paid internships for hundreds of students at each center. HCS utilizes the 'work readiness performance indicator' (Section 36 of the Work Investment Act) to assess the effectiveness of summer employment for youth;

- **Year-Round Youth Activities**. Employment opportunities for high school, college and graduate students are provided on a part-time basis throughout the year;

- **Prepare Students for 21st Century Careers in the Health Care Sector**. HCS addresses the health professions workforce shortage by providing education and preliminary training in STEM fields. HCS advances diversity in the sciences;

- **Foster Community-Based Science Innovation**. Students participate in research projects that are organically connected to their communities (e.g., epidemiological studies; agricultural research etc.). Research projects will focus on energy efficiency and renewable energy among other relevant topics;

- **Improve Education and Schools at the Middle and High School Levels**. HCS works closely with local educational agencies (LEA's) to build their educational and staffing infrastructure;

- **Target High-Need Schools and Subjects**. HCS engages low-income public high school students in sophisticated science education and technology;

- **Engage Families and Communities in STEM education**. HCS will continue fostering ways of engaging families and communities with unique ideas – like the HCS Science Parades, and Science Street Fairs & Festivals; and other creative ways of expressive scientific talent, while fostering sustainable development.

SUMMARY OF HCS PROGRAMS

Harlem Children Society (HCS) (www.HCS2k.org) Programs focusing on exploring efficacy of an educational model promoting STEM competencies among underrepresented high school students, testing non-classroom educational pedagogy, tools & curricula targeted at improving students' understanding of STEM concepts. It aims at broadening the implementation of HCS programs in students from under-resourced pre K-12 student populations in the following categories: **1) Urban students** in New York City (NYC), Washington D.C., New Orleans & Detroit; **2) Rural students** from Upstate New York; Hopi & Navajo Reservations, AZ; & **3)** students from **Mixed Urban & Rural communities** in from Pueblos in Albuquerque, NM. This proposal builds on 10-years experience implementing an HCS model with over 2000 students from 150 schools in cities & communities across the country.

HCS established in 2000 by Dr. Sat Bhattacharya, a scientist at Memorial Sloan Kettering Cancer Center, involving low-income and underrepresented students in high-level research internships & education in STEM fields, with heavy emphasis on use of technology & STEM careers – has demonstrated proven success with this model in urban & rural environments. Since its inception, 100% of HCS participants articulated to college/University (over 20% to Ivy League universities), with more than 80% retention in the STEM fields.

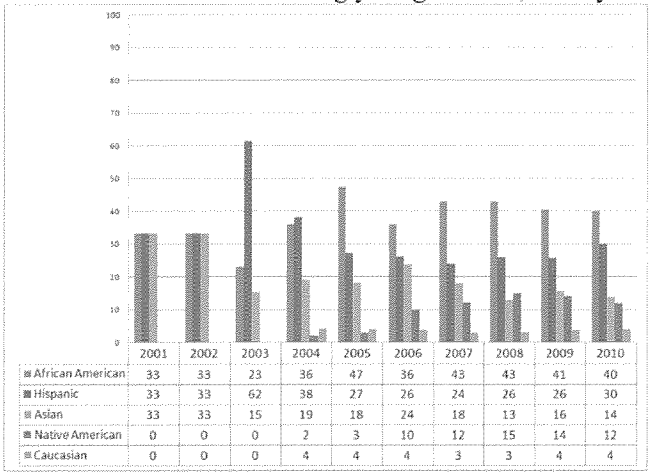
The success of HCS is directly attributable to its innovative model of intensive STEM content, hands-on one-on-one mentoring, and programmatic, community, and parental support. The model has the potential to have high impact exerting a sustained powerful influence in the field of STEM education by expanding it to a national level and testing its efficacy in preparing underrepresented students in urban, rural & mixed urban-rural communities nationwide, thus retaining the competitive edge. The **intellectual merit** of the programs rest on: the rigor of STEM content that will be aligned with standards in the computing disciplines at K-12 levels; the effectiveness of an internship model that involves students in high level research in computing disciplines; of involvement of underrepresented groups in STEM and IT, including attention to creating a system that provides engagement, capacity, and continuity. [1] The **broader impact** of the project is its ability to effectively engage students from underrepresented groups; to involve at least 50% females in computing disciplines (with a typical representation of 20-25%); and an assessment of the viability of applying the HCS approach to efforts to broaden participation in computing disciplines. The program already has wide appeal in multiple pilot sites across the U.S., and has the potential for extensive dissemination.

The projects builds on **Fifteen years of experience** in existing HCS programs developing a model engaging high school students in STEM fields that can be replicated and integrated in efforts to broaden participation across the state and nationally by: Promoting a hands-on research based learning and evaluation promoting cyber-learning strategies enhancing STEM education, teacher training, parental & community involvement & broaden participation to improve workforce development. Furthering public understanding of science and advancing STEM literacy has been a focus through Science Street Parades and Fairs & Festivals. The model includes refining computing curricula and evolving strategies in developing sustainable replicative model in furthering STEM education in bridging the urban and rural divide. The program already has wide appeal in multiple pilot sites across the U.S., and has the potential for extensive dissemination. The model also includes refining computing curricula and evolving strategies in developing sustainable replicative model in furthering STEM education in bridging the urban and rural divide. Formative evaluation involves development of materials and practices; outcome and summative evaluation and longitudinal tracking. The program has much to share with the informal science field about setting up powerful internship experiences, recruiting mentors, and increasing the number of students from underrepresented groups who are prepared to meet challenges of the 21st century.

INTRODUCTION

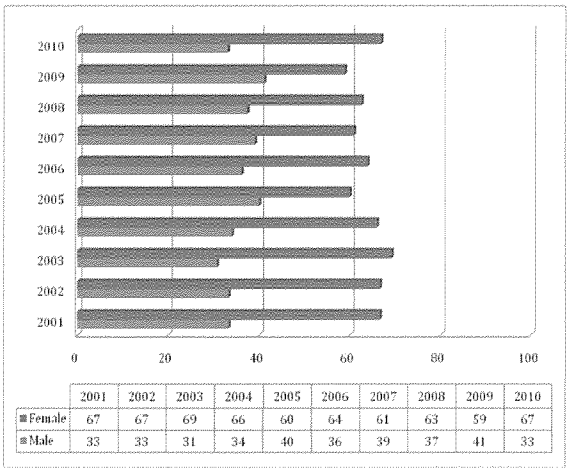
The Harlem Children Society (HCS) (URL: http://www.HCS2k.org/) Science and Engineering Program involves low-income and underrepresented students in high level research internships and informal education in STEM fields. Promising high school students are matched with mentors from top research universities, hospitals, and other science-rich institutions in summer and after school programs. Intensive STEM content, one-on-one mentoring, and a powerful system of support engages students, families, and communities.

Established in 2000 by Dr. Sat Bhattacharya, a research scientist at Sloan Kettering Cancer Center with 3 students from 2 schools in New York City, HCS in 2014 consisted of over 330 young scholars from diverse ethnicities (40% African American, 26% Hispanic, 16% Native American, 14% Asian, and 4% Caucasian). In a continuing trend in the organization's history, young women constituted roughly 58% of the total 2009 student population. In accordance with its central mission, HCS served under-resourced and under-represented students in 2009 at an inverse ratio to most US universities' math and science student populations. The program is particularly successful in attracting young women, mostly from ethnic and racial minorities.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
African American	33	33	23	36	47	36	43	43	41	40
Hispanic	33	33	62	38	27	26	24	26	26	30
Asian	33	33	15	19	18	24	18	13	16	14
Native American	0	0	0	2	3	10	12	15	14	12
Caucasian	0	0	0	4	4	4	3	3	4	4

HCS Student Ethnicity (in percentages) (2001-2010)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Female	67	67	69	66	60	64	61	63	59	67
Male	33	33	31	34	40	36	39	37	41	33

HCS Student Gender (in percentages) (2001-2010)

The US Harlem Children Society Class of 2010 consisted of over 330 young scholars from diverse ethnicities (40% African American, 30% Hispanic, 12% Native American, 14% Asian, and 4% Caucasian). In a continuing trend in the organization's history, young women constituted roughly 60% of the total 2010 student population. In accordance with its central mission, HCS served under-resourced and under-represented students in 2010 at an inverse ratio to most US universities' math and science student populations. growth both in the US and abroad. The organization has measurably empowered hundreds of students to pursue otherwise impossible dreams since its establishment in 2000. Through influencing students from under- served and under-resourced Communities to engage in STEM/allied science research, and to evolve as professionals and responsible citizens, HCS is in the global vanguard effecting socio-economic change.

Over 3,000 students from over 500 schools have gone through our programs in the last 15 years, since Dr. Bhattacharya founded the 'Harlem Children Society' (HCS) in his laboratory at Memorial Sloan Kettering Cancer Center. This Hands-on Training program *typical starts at grades 9-12 (although we have started with lower grades as well), and continue this process - where they are still in the program in the under-graduate and graduate schools. We follow our students through till adulthood.*

Even though, all of our students are below poverty and many in extreme dire situations - with the training they receive, including the format of interacting with the diverse population - prepares them for college & University retention and increase their career prospects. Over 20% of the students go on to Ivy League

Colleges. Consistently, over 100% have remained in college, with 80% still in STEM filed. Many already are doctors, engineers & other professionals - and have started their own giving-back! We believe that this cultural engagement in this high-end STEM programs - prepares them in college and in their professional careers and help in assimilating themselves in the mosaic of our society - and be productive citizens of our communities!

The national program has expanded exponentially and now serves 300 students from over 75 schools with 1500 mentors at 150 institutions. In 2015-2016, the cohort will expand to 400 students. What began as a small-scale experiment has grown into a substantial effort. To date, all graduates of the HCS have continued on to college (more than 20% in Ivy League universities) and close to 90% have chosen to major in STEM fields.

Pilot programs are under way in rural and urban sites in the U.S. and around the world (e.g., Hopi reservation in Arizona, Albuquerque NM, Washington DC, Detroit, MI; and other places) serving an additional 400 students. Since the program's inception, 100% of HCS participants have gone on to college (over 20% to Ivy League universities), with more than 90% retention in the STEM fields. Alumni who are now undergraduates have been returning to the program, seeking to sustain the relationships, research, and learning.

The project builds on ten years of experience in existing HCS programs developing a model engaging high school students in STEM fields that can be replicated and integrated in efforts to broaden participation nationally by: Promoting a hands-on research based learning and evaluation promoting cyber-learning strategies enhancing STEM education, teacher training, parental & community involvement & broaden participation to improve workforce development. HCS prepares students for the 21st century STEM workforce by providing an enriched learning environment *and* professional mentoring relationships, two factors that are shown to foster students' educational and personal growth. Students participate in a full-time summer internship, working one-on-one with one of the program's 1000 active (out of a pool of over 7000) mentors, all leading scientists, engineers, doctors and other professionals in their field from over 250 partner institutions, and attend weekly course seminars throughout the year. All courses are taught in real time, using interactive videoconference technology, by HCS PI and staff, scientists and experts from participating medical institutions and universities.

Students work onsite with their mentors at laboratories, undergoing rigorous training in lab techniques & procedures, and scientific experiments, practices and inquiry. Students are required to submit an extensive research report, science poster boards, and PowerPoint presentations which are also posted on the HCS website. These presentations provide an authentic training ground for HCS students to join the next generation of scientists. Annually, students join with program staff, and communities to mount Harlem Science Parades and Science Street Fairs & Festivals held at program sites concurrently all over the country are connected simultaneously via live streaming. HCS staff and mentors provide ongoing support for students in planning higher education and career paths.

Parents and the community are encouraged to support students' future career aspirations through network building activities and social events, by attending program seminars, participate in the HCS STEM Initiatives. The pedagogical approaches, tools, and curricula used to develop and implement the model are shared with the educational and scientific community on the program's website, podcasts, webcasts and extensive network of participants established by Dr. Bhattacharya, through students' own presentations at conferences; and science street parades and fairs & festivals.

Engaging impoverished students from ethnic minorities that are under-represented in the sciences is a central aspect of HCS's mission. The continuing under-representation of minorities in the sciences – especially engineering and research -- is well documented. The National Science Foundation (NSF) notes that (1996) "Despite substantial gains over the past decade, minorities are still underrepresented in

science and engineering, both in employment and training." Our thesis intends to test an educational model that is designed to spear head a national initiative to prepare high school students from poor rural and urban communities around the country to go to college and continue on to postgraduate education to follow and remain in careers in STEM. The goal is to develop a model of content, pedagogy, tools, and curricula that can be implemented in any community to prepare 21st century workers enabling the U.S. regain its competitive edge in science and technology.

PROGRESSIVE OUT-COMES:

HCS-STEM is successfully redressing the issue of *access* to education and careers in the sciences for minority, low-income public school students. Follow-up studies show that 100% of HCS students articulate to college; over 20% attend Ivy League schools; and 80% major in science and/or math. HCS participants have received numerous awards and scholarships from such groups as the Posse Foundation, the Gates Millennium Scholarship and the New York Times Scholarship Fund. They have also received class credits, written scientific presentations, and participated in and received awards at top local, regional and national scientific symposia (e.g., Am. Chemical Society Nat'l Convention, Wash. D.C.).

HCS-STEM immerses students in science-learning environments (including the laboratory, symposia, presentations, journal writing, and science fairs) – in which they acquire and practice new knowledge and are equipped with hard and soft skills that benefit them in numerous ways:

* Enhanced scientific knowledge and skills. Students develop proficiencies in the language of science as well as the practice of scientific methodologies.
* Increased access to workforce and careers. Students learn about workforce domains from their mentors and other professionals in these fields; students build networks, contacts and resources.
* Increased knowledge about education requirements, options and strategies to achieve degrees in the sciences. Students plan their education with support from college fairs, coaching, and comprehensive staff assistance with college applications, finances and SAT and ACT preparation.
* Improved general reading, writing, math and research skills: Students' academic skills are enhanced through hands-on work in the laboratory, science dialogue journals, presentations, lectures and classes, research papers and ongoing exchange with HCS staff and other science professionals.
* Enhanced workplace skills. Students develop employment skills including functioning effectively as a team member, solving problems and managing authority.
* Enhanced developmental skills. Students' cognitive and meta-cognitive skills are developed as they learn to reflect critically on their work, theorize, solve problems and apply logic.
* Increased self-efficacy. Students' confidence is bolstered as they master internship responsibilities, research programs and presentation tasks.
* Well-formed plans for the future. Students pursue STEM education through high school and into college, and persist in science careers using this training. They leave the HCS program with contacts at their chosen schools; a support system back at HCS; and a clear plan for their future.

SPECIFIC AIMS

HCS aims to provide a model of education, pedagogy, tools, and curricula that opens the world of science and technology to low-income and underrepresented students across the state and U.S. By matching promising underrepresented high school students with mentors from research universities, hospitals and other science-rich institutions in summer and after school internship programs, HCS aims to close that gap by training and building a STEM workforce that can compete in the 21st century workforce. The aims of this model are to: (1) increase students' interest in STEM fields; (2) increase students' knowledge of STEM concepts and competencies in STEM skills; (3) increase the number of women and underrepresented minorities attending college; (4) Increase the number of women and underrepresented minorities who aspire to pursue higher education and careers in STEM fields.

This program aims to determine the efficacy of the model in urban, rural, and mixed urban-rural environments, and to disseminate the findings so that others may prepare students to compete with any worker in the world and close the gap in the percentage of underrepresented populations working in the following STEM disciplines: Aerospace Engineering; Bio/Medicine & Bioinformatics; Aerospace Engineering; Computer Modeling & Cybernetics; Engineering; Environmental Studies; Forensics; Green Architecture; Information Technology; HIV/ AIDS Research; Mathematics; Nanotechnology; Nutrition; Pharmaceutical Research & Development; Protein Modeling; Renewable Energy Studies; Robotics; Social & Behavioral Studies; Sustainable Agriculture; Computer Modeling & Cybernetics; Environmental Studies, and others.

Potential Impact.
The HCS model has the potential to expand the future STEM workforce in two ways. 1) Since 2000, all graduates of HCS have continued on to college and close to 90% have chosen to major in STEM fields. The program gives them the knowledge and skills in STEM competencies, requires them to evaluate their work by standards of professional science, and advances to the next level of participation in scientific and technological education and careers. 2). Others can replicate the model.

The Approach
The HCS model has four components: 1) Summer internships; 2) Academic Year Courses; 3) Support for STEM Education and Careers; and 4) Communication and Dissemination of STEM learning to families and the community. College credits are planned for students for their research work and participating in the HCS seminars, conferences, workshops and college preparatory courses.

Target Population
The population targeted for participation is low-income under-represented high school students in grades 9-12 with demonstrated interest and capacity in science from under resourced inner city and rural communities. HCS seeks to recruit students who are often overlooked—talented and motivated—but from schools and communities where enriched environments, networks, and supported professional relationships may be limited. It is especially critical for Native American students who are isolated in extremely rural communities such as the Hopi (in AZ) and other Indian reservations across New York.

In the ten years since it's founding, HCS has succeeded in serving this population effectively. Current HCS students come from families with incomes below the US poverty guidelines. In 2009, 97% of the young people were from minority backgrounds: 43% were African American, 26% Hispanic, 13% Asian, 15% Native American, and 3% Caucasian. Over 50% of the students come from families who are the first ever to attend college. In a continuing trend, young women constituted roughly 65% of the total 2008 participants, an increase from 33% in 2000. In accordance with its central mission, HCS served under-resourced and under-represented students in 2009 at an inverse ratio to most US universities' math and science student populations. The program is particularly successful in attracting young women, mostly from ethnic and racial minorities. The national program has expanded exponentially and now serves 460 students from over 150 schools with 1500 mentors at 150 institutions.

PROGRAM ACTIVITIES:
The project design addresses the student program and the model development. Implementation of the student program involves:

- Recruitment and selection of students and mentors
- Orientation and participation in a timeline of activities
- Internships
- Student planning, career exploration, family involvement

Implementation of the model development involves:

- Partnership building meetings for potential alliances
- Testing of materials and practices by potential Alliance partners

Student Program:

Recruitment and selection of students and mentors: HCS works in partnership with high schools to recruit and select students, using electronic, telephone, and regular mail contact. Relationships are established with teachers, principals, and guidance counselors; these school personnel identify students (usually 15-20 per school) who are eager to pursue careers in science and perform well in school, based on teacher reports, report card, and grade point average. The selection committee, composed of the HCS director and an advisory committee and/or HCS board member, meets with applicants in face-to-face interviews to discuss the expectations of the program and to determine the fit between the student's interests, expectations, and time schedule and the HCS program requirements. Selected students are informed by letter or email, with written materials describing the program. They are further queried about their science, technology and research interests so that they can be appropriately matched with a mentor at the outset of the program. The students' parents and guardians are informed about the expectations, extent, and importance of the program for their child; and about the critical role they play in supporting their child's participation and future plans. The program **provides performance-based stipends** for all high school and under-graduate students.

To date, mentors have been recruited and selected through Dr. Bhattacharya's extensive networks. He has identified more than 7000 mentors, with an active pool of 1000 that is constantly growing. As a respected researcher himself, Dr. Bhattacharya has been able to convince researchers to take on high school students and explain what needs to be different compared to their usual experience with graduate students and post-docs. More than 500 institutions are participating: in New York City the list includes Memorial Sloan Kettering Cancer Center, Weill Cornell Medical College, Columbia University, Rockefeller University, Albert Einstein School of Medicine, Stevens Institute of Technology, American Museum of Natural History, Bronx River Alliance, NYU, Gaia Institute in New York, among others.

Orientation and participation in activities: **All** students begin the program in early summer and participate for at least two to five summers (eight 40-hour weeks each summer) and two to five academic years (12-24 hours/month). Students thus spend a minimum of 460 hours per year for five years. They receive performance-based stipends, providing both incentive and a means of ensuring that students stay up to date with their commitments.

Students begin with an orientation that lays out expectations, introduces them to their peers in their site and in other sites, familiarizes them with the host institutions, covers principles of scientific research, and starts the process of career development. They are assigned mentors and introduced to the work they are then involved in over the course of the next two or more years. The summer session, eight 40-hour weeks, includes basic training in computing, lab techniques and safety, the technologies they will be using in their research, communications and presentations, mini-courses in the discipline of their research, field trips, and indoor and outdoor fun and team building experiences.

During the academic year, students put in 12-24 hours each month at their internship sites and in weekly seminars at Rockefeller, Columbia, New York and Cornell Universities either actually or virtually. This breaks down to approximately 3-6 hours per week. Past experience in the HCS program has demonstrated that young people are willing to make the commitment. Clear expectations during recruitment and orientation, substantive and engaging activities, and a vision of how their current experience connects them to their future help to motivate students.

Internships: Incoming students are interviewed during the recruitment and application process to ascertain their interests and preferences. They are assigned mentors at the outset of the program and receive thorough background on the research in which they will be engaged from their mentors and the project staff. They undergo rigorous training, both by their mentors and by the HCS project staff, on the

tools and technologies, safe and proper handling of devices, instruments, chemicals, and biologicals. Students are responsible for producing an extensive research report, science poster boards, and power point presentations that are also posted on the HCS website. They will be trained to present their research at the weekly meetings and make presentations in their schools, community organizations, and at professional conferences.

The selection of STEM topics for research and development projects and the identification of appropriate roles for high school and under-graduate students require a thoughtful process that combines high expectations with realistic analysis of availability and prior training. Most students join an existing research or development team with a defined agenda. Within this structure, they are then supported to identify questions of particular interest to them, the technologies that support these questions, and helped to develop an individual project within the investigation from which they can derive a coherent data set and publications, while understanding how their piece contributes to the overall effort. They interact on a regular basis with post docs and graduate students, and participate in research and development team meetings when their schedules permit.

Research in STEM, Computing training and activities: Training and education are provided by the experts in the range of computing fields covered in the project, by Dr. Bhattacharya, the institutional liaisons, the mentors and their post docs, and other scientific researchers and science educators identified by Dr. Bhattacharya and the project advisors.

Weekly seminars are held at Rockefeller, Columbia, New York and Cornell Universities either actually or virtually. To provide high school students with computing content and skills, the project offers intensive, college-level course material to students. The seminars also address the research process, including data collection, organization, analysis, and communication and how computing is used in these processes; production of scientific papers, and development of power point presentations and posters. Guest lectures and meetings with distinguished computing scientists and researchers deepen students' understanding of computing content and skills, and introduce them to the range of career and higher education possibilities. The students sometimes get college credit for their research work and participating in the HCS seminars, conferences, workshops and college preparatory courses.

Students from the New York City project communicate with students in other HCS sites, using telecollaboration to construct a map of their research projects, and form online communities to exchange information. The map and telecommunication encourage them to continue communication after meetings, and foster friendship and understanding of each other across communities and cultures.

To learn the skill of communicating scientific information to a range of professional and lay audiences, students constantly present their work—at their schools, to their peers, and at professional conferences. They use peers, mentors, and researchers as "critical friends" critical friends for review during the seminars, and refine their presentations for conferences and online dissemination. They become adept at PowerPoint, sharing web-based data, and multi-site electronic communication. Past HCS experience in involving students in professional conferences has been quite successful. Fifty students each year are selected to present their research at the Annual International Conference of the Sigma Xi Scientific Research Society; several of these students have already won first prizes in their fields at the conferences (2007, Detroit, Michigan; 2008, Washington DC; 2009, Huston, Texas; 2010, Raleigh, North Carolina).

Student planning, career development, and family involvement to support persistence in computing and STEM: Students will receive intensive support to help them plan their futures and mediate the transitions—academic, emotional, and social—to college and beyond. Inclusion of family in this planning is essential both to increase the likelihood that young people continue in the computing track and to decrease inequities in technology access.

Project staff and mentors help students begin planning for their futures as soon as they enter the program. Students are counseled on course taking, college options, financial planning, and career possibilities. Project staff builds relationships with college admissions officers and computing science professors, and introduce prospective students to schools that have strong departments in areas of student interest. Students build networks of contacts and electronic rolodexes that they can use as they move forward. They take field trips to research institutions, businesses, and industries that use high-level technologies. Career panels and fairs are hosted to introduce students to the range of computing careers and trends for the future. Each student constructs a guiding plan for his or her future, flexible and responsive to changes in interest but designed to keep options as open as possible with solid foundations in STEM fields and science courses.

Families are engaged at the outset with information about the program and the opportunities available to their children, invitations to their children's presentations, and workshops and information on college applications, financial aid, and opportunities in the computing workforce. Family and community events create a welcoming and joyful environment. An Annual Science Boat Cruise around Manhattan is a huge hit with families; students and their families put on science skits and science entertainment as the boat circles the New York skyline.

Science Parades and Street Fairs & Festivals: These innovative events bring high-level science, cutting edge technology, and compelling issues directly to the public. In 2009 a science parade, which HCS believes to be one of a kind anywhere, spanning from central park to 125th street (a total of 15 city blocks) was organized, leading to the Sixth Science street Fairs & Festivals at the New York State Office building Plaza/125th street in Harlem. This unique event, attended by more than 6000 people, was organized in collaboration with the Salem United Methodist Church, Sigma Xi Scientific Research Society and other scientific bodies; local community based organizations, government bodies, high schools, colleges/universities, hospitals & other institutions, non-profit organizations, consular and UN bodies, and business entities. It featured hands-on technology and research exhibits, experimental theater involving the general street audience participation in health, technologies, environmental and other issues, a poster competition with participation by 400 students, representation by colleges seeking to recruit promising science students, and an all-star live performance including music and dance line up. Sister events were held in on the same day/same time, breaking the time and digital divide at six other locations spread across the country and worldwide in all continents. All events were broadcast live electronically on the web and presented to the audiences at these separate locations.

Overview, student hours, and timeline:
The program has three components: 1) student internships and research projects; 2) seminars and training; and local, regional and national professional conferences and 3) community science street fairs. Family involvement and post program follow-up provide students with support to plan their futures and mediate the transitions—academic, emotional, and social—beyond college.

Based on their interests, selected students are matched with a mentor. They enter the program at the beginning of the summer with an orientation, and spend eight forty-hour weeks starting their research and getting basic training in lab techniques and safety, and the technologies they will be using in their research, communications and presentations. During the academic year, students put in 12-24 hours each month at their internship sites and in weekly seminars at Rockefeller University either actually or virtually. Students are required to submit an extensive research report, science poster boards, and power points that are also posted on the HCS website.

They are trained to present their research at the weekly meetings and make presentations in their schools, community organizations, and at professional conferences. They join with program staff, fellow students, and supporters to mount an annual science parade and fairs & festival on the streets of Harlem, replete with high tech projectors and sound stage; and at the Hopi Satellite HCS Health Fair held in conjunction

with the Tuhisma Art Festival and Market that draws the finest Hopi artisans and visitors and buyers from around the world. Students thus spend a minimum of 460 hours per year for at least 2-3 years involved with HCS, but many spend significantly more time.

Internships, Research projects, and STEM Content:

The HCS program engages young people in IT in all aspects of their work—the research, presentation, intra and inter-site communication, and public involvement. Given the range of mentors and host institutions, students are involved in an extraordinary range of STEM and medical topic areas (including genetics, molecular biology, protein chemistry, astrophysics, marine biology, environmental science; cancer, cardiology, diabetes, sickle cell anemia, and Alzheimer's; nanotechnology, database building, rocketry, robotics) with projects that range from gene mapping analysis of sickle cell anemia through bioinformatics to marine sponges as a model for cellular recognition to construction of rigid DNA nanostructures to data networks testing at the Network Computing Laboratory of Columbia University, which builds experimental software systems. Six to ten students do research through distance learning and on site at the Kennedy Space Center in robotics, propulsion and plasma research, with travel and support by HCS.

While HCS students are engaged in a diverse array of topics and technologies, they are joined together by a common understanding of the process of scientific inquiry and the collection, organization, analysis, and communication of data and evidence. HCS use the technology of tele-collaboration to enable young people and sites to share and visualize data, map who is doing what kind of research in the HCS program and link them to resources in the scientific community, discuss the functions of the tools and IT they are putting to use in their research, and understand the role of technology in advancing science and medicine. This comparative lens will be useful as well in linking the Hopi perspective on sustainable agriculture, which uses primarily traditional tools, with environmental and earth sciences projects using GIS, modeling, and simulating tools. Once assigned to their mentors, students receive thorough background on the research in which they are engaged with their mentors and the project staff. They undergo rigorous training on the tools and technologies, safe and proper handling of devices, instruments, chemicals, and biologicals. While most are joining an existing research team, students are given individual projects within the investigation from which they can derive a coherent data set and publications, while contributing to the overall effort.

Seminars, presentations, and conferences:

Students' experience begins with an intensive orientation to the program, scientific research, and participation in scientific and technical education and careers. The orientation is held either at Rockefeller, Cornell, Universities or NYU by Dr. Sat Bhattacharya, during which scientists and experts are invited to talk to the students, including presentations by students. Weekly meetings offer training in the research and data collection process, including writing, production of scientific papers, and development of power point presentations and posters; guest lectures and meetings with distinguished researchers; and presentations of their research by students to their peers, mentors, researchers, and other critical friends for review. These meetings, as well as the orientation session, are webcast to satellite sites.

Students are constantly presenting their work—at their schools, to their peers, and at professional conferences. They become adept at PowerPoint, sharing web-based data, and multi-site electronic communication. In November 2009 and 2010, 47 students were selected to present their research at the Annual International Conference of the Sigma Xi Scientific Research Society in Houston, TX; and Raleigh, NC. These opportunities are being expanded to include travel to conferences such as AISES (American Indian Science and Engineering Society), SACNAS (Society for the Advancement of Chicanos and Native Americans in Science), and discipline-specific conferences and technology meetings.

Science Parades and Street Fairs & Festivals:

These innovative events bring high-level science, cutting edge technology, and compelling issues directly to the public. The Harlem event in 2010, attended by more than 5000 people, and was organized in collaboration with the Sigma Xi Scientific Research Society. It featured hands-on technology and research exhibits, experimental theater involving the general street audience participation in health, technologies, environmental and other issues, and a poster competition with participation by 500 students, representation by colleges seeking to recruit promising science students, live performance and cultural activities. Sister events were held in on the same day in Montreal and on the Hopi reservation. All three events were broadcast live electronically on the web and presented to the audiences at these separate locations.

Family involvement and post-program planning:

Families are engaged at the outset with information about the program and the opportunities available to their children, invitations to their children's presentations, and workshops and information on college applications, financial aid, and opportunities in STEM workforces. They are involved in the planning of the street fairs, and invited to special guest lectures with their children. Parents are asked to keep journals about their children's experiences, and their own histories and reflections on science, technology, and society, as part of an archive and publication that captures powerful and often poignant stories of people seeking a future for their children, communities, and society.

Project staff and mentors help young people begin planning for their futures as soon as they enter the program. Students are counseled on course taking, college options, financial planning and career possibilities. Project staff build relationships with college admissions officers and IT and science professors, and introduce prospective students to schools that have strong departments in areas of student interest. Students build networks of contacts and electronic rolodexes that they can use as they move forward. They take field trips to other research institutions, business and industry using high level IT; the project host career panels and fairs to introduce students to the range of IT careers and trends for the future. Each student construct a guiding plan for his or her future, flexible and responsive to changes in interest but designed to keep options as open as possible with solid foundations in IT skills and high level mathematics and science courses.

Collection of Data and Analysis:

Dr. Bhattacharya and HCS staff determines the effectiveness of our expanded program by examining data that will be collected in the following ways:

- Feedback from mentors and teachers who are working with students who show the greatest need to 'catch up" in the sciences;
- Surveys to assess the frequency with which mentors use the curriculum – e.g., refer students to certain chapters in the text to reinforce or bolster learning in the lab and during internships;
- Students' feedback through focus groups; and Tracking of students' SAT scores, matriculation to college, and college graduation/attrition.

Dissemination:

The project capitalizes on its extensive and growing networks to disseminate its work on-line and in person. The project produces a website with on-line discussion forums such as Moodle as well as materials to facilitate dissemination of the program model and support replication of the model in other settings. The materials described above are posted on the website. Project staff and students present at major conferences that represent the computing community and disciplines students are engaged in (e.g., ACM, IEE Computer Society), and organizations that concentrate on underrepresented groups in STEM (e.g., AISES, SACNAS, Coalition to Diversity Computing). The project connects with research institutes, universities, and other science rich institutions including natural history and science museums to publicize the project.

The HCS network of mentors and institutions where students conduct research serve as a major dissemination vehicle. It includes those who are directly involved in the computing disciplines as well as those in other research areas who are committed to broadening participation in STEM. Regular postings alerts list members to information about project strategies, requests for materials review, queries about what works in their institutions, presentations by HCS students, and teleconference conversations about broadening participation.

HCS webcasts, podcasts and tele-collaboration between the New York City site and HCS students in other locations offer fertile ground for spreading the word by students about the benefits of persistence in STEM fields. As part of their program activities, students mount periodic webcasts that both inform peers and involve them in interactive activities and discussions. These webcasts are advertised to schools, after school and summer programs, education departments within museums and other science-rich institutions, university summer school programs for high school students, and REU programs. Student presentations of their research at regional, national and international conferences with other experts in the field such as the Sigma Xi Scientific Research Society conferences and other such academic conferences and competitions bolster the process of interaction between the students and peers. Students and staff produce briefs on program development for publication in technology and science education journals, and practitioner magazines such as NSTA's *Science Teacher*, ASTC's *Dimensions*. A compendium of the stories from the journals of students, mentors, teachers, families, and project staff are posted on the HCS website, along with profiles and products of the students' experiences.

Evaluation Plan:

The project has an IRB from Copernicus Group IRB process already in place, based on a review of instruments indicated in this document. Evaluations assess the efficacy of the model and evaluate the progress of the project in reaching specified milestones of implementation and impact. The *formative evaluation* take place throughout the year to assess the effectiveness of the implementation of the model's four components – the summer internship, academic year coursework, education and career preparation, and community outreach and engagement – in providing rigorous high-level training and support for students in essential STEM knowledge and skills to increase STEM competencies using inquiry educational pedagogy, tools and curricula. Each year, evaluation identifies successful elements of the model and areas in need of strengthening and make recommendations for modifications in the model, if indicated.

HCS staff is also deeply interested in identifying and capturing the impact of the curriculum on students' experience of learning, self-efficacy and confidence. Therefore, HCS evaluates these factors as part of our broader program evaluation, which is conducted by project staff, HCS committees, invited mentors, students themselves, and an external evaluator. Based on the evaluation – a replicable prototype are being developed and refined.

The evaluation focuses broadly on the outcomes for young people and the extent to which HCS is preparing them in STEM areas. Formative evaluation includes examination of how the project components are working, monitoring of the mentoring relationships, reflective journals by students and mentors, documentation of recruitment and retention of mentors, and rationale and examination of how the matches are made. The use of the curriculum – as a study guide, reference book and teaching tool – are incorporated into this formative evaluation.

The outcome evaluation documents and assesses how young people are gaining skills and knowledge in STEM and determine how this program can be replicated nationwide. Baseline data are collected on entering students (including school transcripts and teacher reports, demographics and socioeconomic status, parents' education).

HCS evaluates criteria for an effective program at three distinct levels: (1) student participation (referrals by schools, mentor/student match, student attendance and program completion); (2) student program achievement (mastery of laboratory skills; completed research presentation); and (3) student educational and career progress (graduation from high school; articulation to college; choice of college major; and career choice). Measurements of student outcomes and project results are monitored in the following ways:

- School referrals, mentor matches, and program completion rates are documented;
- Daily attendance rates are tracked;
- Students' rates of completion and presentation of original scientific research papers;
- Students' written presentations are evaluated and graded by a panel of experts;
- Rate of student participation in HCS *Annual Science Street Fairs*;
- Observations and evaluations of student work in the laboratory;
- Class credits awarded to students by DC-DOE are tracked;
- Students' lab skills (*including* the ability to work in a team milieu*)* are evaluated via pre- and post reports prepared by mentors;
- Program follow-up data is collected on rates of participating students: graduation from high school; articulation to college; choice of college major; graduation from college and degree awarded; and employment status.

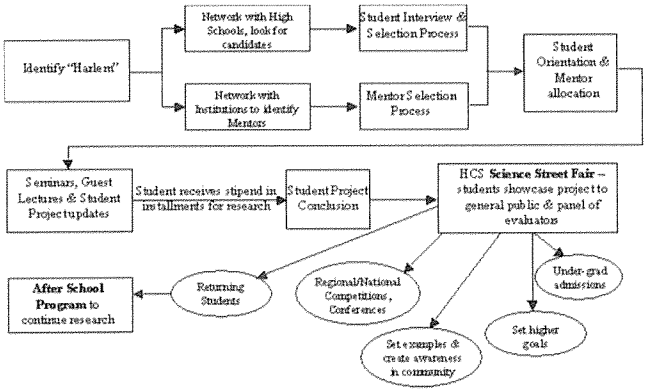
Selective Recognitions of HCS Programs by National & Local Press/Media:

- "Getting NYC Teens into Science", **WYNC News**: http://beta.wnyc.org/articles/wnyc-news/2010/jul/19/getting-nyc-teens-science/
- "The Science of Dr. Sat", **The Responsibility Project, New Times Reporter**: http://www.responsibilityproject.com/reporting/the-science-of-dr-sat#fbid=aJi6kkFbFen
- "Bio-Med Program Helps Mentor Young Minds, **New York 1 News**: http://www.ny1.com/content/122345/bio-med-program-helps-mentor-young-minds?ap=1&MP4
- "Worms May Hold Clues to Neurological Disorders", **National Science Foundation (NSF)** News: http://www.livescience.com/health/motor-neuron-disease-worms-100910.html
- "Taking Science into the Streets", **United Nations** (IPS) News: http://www.ipsnews.net/news.asp?idnews=52121
- "Harlem Hearts Science", **Science Cheerleader**: http://www.sciencecheerleader.com/2010/09/harlem-hearts-science/
- "Worms May Hold Clues to Neurological Disorders", **Harlem World**: http://harlemworldblog.wordpress.com/2010/09/23/worms-may-hold-clues-to-disorders-in-harlem/
- "The Harlem Science Renaissance," **Scientific American**: http://www.scientificamerican.com/podcast/episode.cfm?id=the-harlem-science-renaissance-10-10-15
- "Med Student will come back and help her Staten Island Community", **Staten Island News.com**: http://www.silive.com/northshore/index.ssf/2009/10/med_student_will_come_back_and.html
- "Harlem Children Society Searches for the Einstein of the Bronx" – **The New York Sun**: http://www.nysun.com/new-york/harlem-children-society-searches-for-the-einstein/81123/
- "From the Streets to the Science Lab: The program has produced Future Scientists"– **National Science Teachers Association (NSTA)**: http://harlemchildrensociety.org/misc/pr/NSTA%20Report-A-Oct1-2008-USE.pdf
- "Harlem Children Society & Dr. Sat Bhattacharya Score an "A"" – **Education Update**: http://harlemchildrensociety.org/misc/Education%20Update%20Combination-Aug13-2008.pdf

WHERE OUR GRADUATED STUDENTS ARE (partial list) . . .

Columbia University; Massachusetts Institute of Technology (MIT); Cornell University; Swarthmore University; Brandeis University; Dartmouth College; Rutgers University; Smith College; Brown University; Carnegie Mellon University; California Institute of Technology; Franklin Marshall University; Rensselaer Polytechnic University; Bobst University, Connecticut; Ithaca College, New York; SUNY at Stony Brook; SUNY New Paltz University; University of Rochester; Bard College, New York; Penn State University; DeVry Institute of Technology; Buffalo State University; Syracuse University; University of Central Florida; Florida State University - Veterinary Program; Steven's Institute of Technology; California Institute of Technology (CalTech); Hunter College, CUNY Babson College; Lehman College; Bronx Community College; St. John's University; Binghamton College, SUNY; Drexel University; New York University; Tennessee Technological University; University of Arizona; Northern Arizona University; Cortland University; University of Detroit Mercy; St. Bonaventure College; Norfolk State University; New Jersey School of Medicine and Dentistry; 7-year Medical Program; New Jersey School of Medicine and Dentistry; MD/PhD Program; and others.

OUR SEED/TEMPLATE PROCESS:



REPRESENTATIVE PARTICIPATING SCHOOLS (partial List) ...

Banana Kelly Collaborative High School, Bronx, NY; High School of Medical Science, Bronx, NY; Gregorio Luperon High School of Science & Math, West Harlem, NY; High School of Math, Science & Engineering @ CCNY, East Harlem, NY; Lincoln Academy/Hostos, Bronx, NY; Manhattan/Hunter College High School of Science, West Harlem, NY; Young Women's Leadership High School, East Harlem, NY; East Side Community High School, Lower East Side, NY; Frederick Douglas Academy, West Harlem, NY; Thurgood Marshall Academy, West Harlem, NY; Manhattan Center for Science and Math, East Harlem, NY; Life Sciences High School, Manhattan, NY; Academy of Mount Saint Ursula, Bronx, NY; Aquinas High School, Bronx, NY; Grover Cleveland High School, Queens, NY; High School of; Fashion Industry, Manhattan East side, NY; Union Hill High School, Union City, New Jersey, NY; Clara Barton High School, Brooklyn, NY; Edward R. Murrow High School, Brooklyn, NY; Brooklyn Tech High School, Brooklyn, NY; Erasmus Hall Campus for Science and Math, Brooklyn, NY; Science Skills Center High School, Brooklyn, NY; Ossining High School, Brooklyn, NY; Science and Skills Center, Brooklyn, NY; Midwood High School, Brooklyn, NY; Erasmus Hall Campus for Science and Math, Brooklyn, NY; William Cullen Bryant High School, Long Island City, NY; High Tech High School, New Jersey & Cornell University, N J; Princeton High School, Princeton, NJ; High School for Health Professions & Human Services, Lower East Side, NY; Union Hill High School, Union City, NJ; Rutgers University, NJ; Union Hill High School, Union City, NJ; UNDMJ, NJ; Frederick Douglas Academy, West Harlem, NY; Swarthmore University, NY; Post University, CT; Yale University, NY; SUNY, New Paltz; University of Rochester, NY; Cornell University, NY; Bronx School for Law Government and Justice, Bronx, NY; Flagstaff Arts & Leadership Academy, Flagstaff, AZ; Rensselaer Polytechnic Institute, NY; A. Philip Randolph High School, Brooklyn, NY; Thurgood Marshall Academy, West Harlem & Penn State University, PA; HS for Dual Language and Asian Studies, Lower Manhattan; Manhattan International HS, East Manhattan, NY; High school of Fashion Industry, East Manhattan, NY; Stevens Institute of Technology, NJ; A. Philip Randolph High School, Queens, NY; Bronx Community College, Bronx, NY; Science Skills Center High School, Brooklyn, NY; Gateway High School of Environmental Research and Technology, Bronx, NY; Gateway to Health Sciences Secondary School, Queens, NY; George Washington; Carver High School for the Sciences, Queens, NY; Horace Mann HS, Bronx, NY; St. Aquinas High

School, Bronx, NY; Bard High School, West Manhattan, NY; New York Harbor School, Brooklyn, NY; Clarkstown North High School, NY; High Tech HS, NJ; Orange HS, NY; Purnell Swett High School, Pembrook, NC; Freeport High School, NY; Coalition HS for Social Change, Bronx, NY; Mt. Vernon HS, Bronx, NY; Life Science Secondary School, Harlem NY; The Dwight School, Manhattan, NY; William; Maxwell HS, Harlem, NY; Science Museum MS, Harlem, NY; Jane Adams HS, Bronx, NY; Beacon HS, Bronx, NY; Cass Technical High School, Detroit, MI; Cibola High School, Albuquerque, NM; Forest Hills High School, Queens, NY; George Washington Carver HS for the Sciences, Queens, NY; Port Richmond High School, Staten Island, NY; Dr. Charles E. Brimm Medical Arts High School, Camden, NJ; Flagstaff; Arts & Leadership Academy, AZ; Hopi Jr./Sr. High School, AZ; Santa Fe Indian School, AZ; Chadsey High School Detroit, MIHeH

REPRESENTATIVE PARTICIPATING INSTITUTIONS (partial list) . . .

There are **OVER 1500 Mentors for 365 Students** in the following **175 Institutions**:
Memorial Sloan-Kettering Cancer Center, NYC; Mount Sinai School of Medicine, NYC; Hunter College, NYC; Columbia University, NYC; Cornell University Medical Center, NYC; American Museum of Natural History, NYC; Lehman College Natural Sciences, NYC; Bronx Community College, Bronx, NY; The Gaia Institute, NYC; Bronx River Alliance, NYC; Beth Israel Hospital, NYC; New York University, NYC; Albert Einstein School of Medicine, NYC; Rockefeller University, NYC; Fordham University, NYC; Rock in the Boat, NYC; Stevens Institute of Technology, NJ; Yeshiva University, NYC; Rocking the Boat, NYC; The River Project, NYC; Brooklyn Botanical Garden, NYC; Pathways Bioinformatics & Biomolecular Center, CCNY, NYC; NYU School of Medicine, NYC; High Performance Learning Institute, NYC; Bellevue Hospital, NYC; Bronx Community College, NYC; Brooklyn College, NYC; City Meals On Wheels, NYC; Columbia Center for Children's' Environmental Health, NYC; Columbia; University Division of Child and Adolescent Psychiatry, NYC; Lamont Doherty Earth Observatory Center, NYC; Downstate Hospital, NYC; Exponent, NYC; Community Service Society, NYC; Museum of; Northern Arizona, Flagstaff, AZ; Hopi Healthcare Center, AZ; Environmental Testing Laboratory, Long Island; South Mall Laboratories, Long Island; New Jersey University of Medicine & Dentistry, NJ; St. John's University, NYC; Lehman College, City College of New York, NYC; High School for Health; Professionals and Human Services, NYC; Lamont Doherty Earth Observatory, Columbia University, NY; LANG Program, Columbia University, NYC; Instituto Cervantes, NYC; Maimonides Medical Center, NYC; Montefiore Medical Center, NYC; City College of New York, NYC; Vanderbilt Clinic, NY; Polytechnic University, NYC; Queens College, City College of New York, NYC; The New York Eye and Ear Infirmary, NYC; Health Professions & Human Services, NYC; SUNY Downstate University, NYC; New York City College of Technology, NYC; Piermont Marsh Research Program, NYC; Beacon Center, NYC; Soffie Davis College, NY; Boston Scientific, NJ; Princeton University, NJ; Roswell Park Cancer Institute, NJ; Hofstra University, LI; Helmuth, OBATA & Kassabaum (HOK) Inc., NYC; Kennedy Space Center & NASA, FL; Natwani Coalition, AZ; New Jersey Community Water Watch, NJ; NPR Science Radio, NYC; City College of New York (CCNY), NYC; Metropolitan Hospital, NYC; Los Alamos Research Center, NM; Bagley High School, Bagley, MN; Tennessee Technological University, TN; University of North Carolina at Pembrook, NC; Tulane Cancer Center, Tulane University, New Orleans, LA; Louisiana State University Health Sciences Center, New Orleans, LA.

OTHER PARTNERSHIPS (partial list) . . .
Sigma Xi Scientific Research Society, Rockefeller Chapter, NYC; Royal Microscopic Society, Oxford University, Oxford, UK; New York Academy of Sciences, NYC.; Metastasis Research Society, London, UK; European Society for Analytical Cellular Pathology, Germany; American Association for the Advancement of Science, USA; Science Advisory Board, USA; American Chemical Society, USA; Histochemical Society, USA; Federation of American Society for Experimental Biology (FASEB), USA; American Association of Anatomists, USA; National Public Radio (NPR) Science Friday, NYC; Space Center, Orbital Technological Corporation, Wisconsin; Florida Space Center, Orlando, FL; Women's Research Center, University of Central Florida, FL; New York Roentgen Society, NYC.; Memorial Sloan Kettering Cancer Center, NYC; Asphalt Green Fitness Center, NYC.; Harlem Chamber of Commerce, NYC.; Rocking the Boat, NYC; The River Project, NYC; Brooklyn Botanical Garden, NYC; NYU School of Medicine, NYC; High Performance Learning Institute, NYC; Boehringer Ingelheim Mannheim Pharmaceuticals, CT; Natwani Coalition, AZ; Hopi Healthcare Center, AZ; Environmental Testing Laboratory, Farmingdale, Long Island; South Mall Laboratories, Plainview, Long Island; Salem United Methodist Church, West Harlem; American Indian Science & Engineering Society (AISES), USA.

Harlem Children Society Programs in Bio/Medical, Engineering, Technology & Allied Fields

Harlem Children Society provides an extremely high end, one-on-one, hands-on Scientific Research in Bio/Medicine, Engineering, Technology & Allied fields with leading scientists, engineers and doctors in reputed institutions and universities in the country for under-resourced and under-served youth during the summer and after school intensive programs. Among other services are workshops, lectures and seminars with some of the best internationally acclaimed scientists, engineers and doctors including Nobel Laureates and leading figures. They qualify for College, University and School Credits including a handsome stipend/ scholarship. Among other services include SAT preparations, math and computer instructions, preparation for College/ University, opportunity to present research at various local, regional, national and international Research conferences and Symposia, site visits to leading laboratories, pharmaceutical companies and other research institutions. These services will help the development of leadership, social networking abilities and creative talent, including a good parental and community involvement. Similar services are available for teachers with the possibility of earning "G" credits, professional development and memberships for leading research organizations. These services will enhance educational options and vastly improve the school's abilities and performances.

HCS Student Support Programs at a Glance

1. Scientific Research in Bio/medicine, Engineering, Technology & allied fields: ***Engaging students from groups that are under-represented in the sciences and get them involved in hands-on scientific research, is a central aspect of Harlem Children Society's mission***

The selected students are matched with mentors – leading experts in science, medicine, engineering & technology. Students work onsite at laboratories and clinics, where they undergo rigorous training in lab techniques and procedures, scientific experiments, practices and inquiry (e.g., safe and proper handling of devices, instruments, chemicals and biological products). Students acquire hands-on experience as they explore specific areas of science with state-of-the-art equipment. Under the watchful eyes of their mentor and HCS staff, students conduct their own individual research projects. They explore future academic and career paths. HCS's staff designs the training sessions to meet the needs of the students in topics such as research and data collection, writing and the production of scientific papers, communications and presentation skills. At the end of each term students are required to draft a report and present their work to their colleagues. Mentoring is conducted during three consecutive semesters - summer, fall and spring. There is no substitute for HCS' scientific research experience.

2. College Credits: Students who successfully complete two years or more of research with **HCS have the potential to earn up to 12 College/ University credits**. Students will also be given an original official transcript of the said credits from the University of Albany, which may be transferred to any university thereafter.

3. HCS Lectures, Seminars & Workshop Series in Science Technology, & Math: HCS students are routinely brought together across disciplines to present their research, hear from renowned guest lecturers, and increase their understanding of complex scientific problems. *Students present their own research*, and are privy to the presentations of leading scientists and experts in a variety of fields. **This helps HCS students to network with their peers and leading members of the scientific community.** The summer seminar **series included Nobel Prize winners Dr. Richard Axel and Dr. Sydney Altman.** ***Presenters from UNESCO and UNICEF*** *have helped to broaden students' global perspectives, while live-streaming satellite meetings and webcasts connect HCS students from the Hopi and Navajo Indian reservations in Arizona, NASA Space Centers at the Universities of Wisconsin and Central Florida, Camden in NJ and other HCS sites to events in New York. These interactions have helped students across the time and cultural divide to interact and therefore turn their lives around.*

HCS has evolved a mechanism to further enhance and hone the students' English and note-taking skills during these intense series – *thus thoroughly preparing them for college anywhere. Our programs compare with the best, even at the university level.*

4. SAT Preparations: HCS provides high-quality preparation for the SAT and SAT11 (Biology, Chemistry, Physics, Math, History, and English) for 9th – 12th grades. Students are provided with all workbooks and websites access to enhance this learning experience.

5. Computer Instruction: HCS Students **receive a six-week course covering a wide range of computer competencies**—everything from programming to achieving your final product. At the end of the workshop, students acquire the following: basic concepts and terms in computer science: Boolean logic, algorithm, design and problem solving, read and create flowcharts and technical drawings/diagrams, teamwork and leadership, research skills, past and current topics/news in technology, documenting work and collaborating with technologies such as blogs and online forums, project management, communicating and presenting ideas effectively.

6. Preparation for College/University: Workshops on **financial management and affording college are offered to both students and parents**. HCS helps students identify and apply to colleges and universities that support their strengths and interests. HCS staff also help with editing personal essays, apply for and understand financial aid, and plan for the academic and socio-emotional transition from high school to college.

7. Site visits to Leading Laboratories, Pharmaceutical companies and research Institutions:
HCS organizes **site visits to leading laboratories, Pharmaceutical Companies and Research Institutions**. This helps broaden the students' horizons and exposes them to cutting edge technologies, thereby nurturing a spirit of enquiry and instilling a solid scientific mentality and expanding their horizons of development.

8. College Visits and interviews with College Admissions/ Financial Officers: HCS plans to **arrange for College and University visits and to set up interview sessions with admissions and financial officers** of leading educational institutions. These sessions help the students to identify their choices and enhance their selection process according to their individual needs and provide a tailor made, custom specified requirements for each student.

9. International Science Parades, Street Fair and Festival: Our Annual International Harlem Science Parades, Street Fairs and Festivals are well known for **bringing science to the local community and providing a forum that allows students to explain their work in a non-traditional setting.** Family members, friends, college representatives and special guests are all invited. The festival is shared via satellite with HCS programs in several countries in the Americas – North & South and Central, Africa, Middle East and Asia.

10. Intel, Siemens Science and other competitions organized by HCS: The **Intel and Siemens Science competitions** are considered the two most prestigious science competitions in the US. Students are assisted with essay writing and the application process in order to successfully submit their original research for competition. In addition, students are provided with guidance to enter and participate in other competitions and symposia like - **Young Epidemiologist Scholarship and the Junior Science High School (JSHS) science fair.**

11. Parental and Community Involvement: Recognizing the importance of parental involvement in a student's academic life, we've developed opportunities for families to participate throughout the student's tenure at HCS. **Parents are engaged at the outset and are a substantial part of the outreach and recruitment process.** Families are invited to attend student presentations and special guest lectures.

Parents also have an active role in planning the annual Harlem Science Parade, Street Fairs and festivals. In keeping with our goal to ultimately increase the number of minority students pursuing scientific careers, we provide workshops and informational sessions about the college application process, financial aid and planning, and career opportunities. We also **manage a growing alumni network that encourages HCS graduates who are currently enrolled in college to support new graduates as they begin their college career.** Additionally, there is a **consortium of student advisors, both current students and alumni, who provide guidance in determining programs and activities.**

13. Sigma Xi Scientific Research Society Annual Research Conference: Selected students are invited to all-expense paid trip Sigma Xi Annual Research Conference. **Sigma Xi Scientific Research Society is scientific honor society, which serves 6,000 members worldwide, 200 of who are Nobel Prize Laureates.** Additionally, 250 scientists and researchers from leading research centers such as Memorial Sloan-Kettering Cancer Center, Boston Scientific, Columbia University, and NASA have opened their laboratories to HCS students and have volunteered to serve as mentors. **Dr. Sat Bhattacharya serves as the President of the Rockefeller University Chapter of Sigma Xi, and uses this and other sources of contacts to enhance HCS's activities. Selected students after graduation from high school from our program are invited by Dr. Sat to join the prestigious society to further nurture their interest in science and technology.** The work of Harlem Children Society would not be possible without the numerous strategic relationships (in over 30 leading national and international scientific organizations) developed by Dr. Bhattacharya over the past ten years.

14. Other relevant Volunteer opportunities: HCS students are given opportunities to participate in a number of volunteer activities. This serves not only to hone in our students social responsibilities but also enhance their college and university resumes. The activities would also be made available to the parents and guardians. **For the school, it will provide the students and their families to evolve a better community spirit and an unparalleled opportunity to develop them as part of a creative and productive citizenry.**

15. Development of Leadership, Social Networking Abilities and Creative Talent: HCS has initiated several "for fun" and entertainment related activities connected with developing and honing Confidence building, Self-discipline, leadership and networking skills and abilities. In the summer, we organize our HCS Science Boat Cruises around NYC where students, their families, many of our mentors get together and socialize and get to know each other which is extremely important in any field. The Science Cruise is a unique celebration of having fun and combining science and arts by HCS students addressing some important issues of our times – providing information in an extremely creative way. **These "Science and Society" thematic socio-cultural events and presentations spark and sprout untapped talent in the HCS students.** The students are organized into groups led by our senior students as group leaders. **HCS is one of the few organizations of its kind that involves students from many schools involved by a huge and diverse pool of esteemed researchers and professionals from many institutions. These activities help develop leadership qualities in our students.**

Evaluation

HCS's effectiveness is measured by the number of students who successfully complete our program and pursue careers in science or technology. We will continue to track our student's path long after they leave HCS. The long-term outcomes we plan to track are the number of students who pursue science or technology as a course of study, the number of students who receive their college degrees, and the number of students who work in the science or technology field after undergraduate or matriculate into a science or technology graduate program. Monitoring student performance, soliciting feedback from teachers and reviewing academic records will measure the short-term outcomes of our work. These outcomes include improved verbal communication skills – the ability to present complex ideas in simple terms, improved writing skills, improved academic performance, and increased parental involvement. We will administer evaluation forms to both students and mentors to solicit feedback regarding their experience and perception of the program. These collective feedbacks are implemented to make program improvements or changes and continually monitor our effectiveness.

These involvements, we feel, will help better the performance and abilities of students in your school - improving their science and math and develop scientific mind and intellect. This guidance will serve a long way to further their higher education needs and aspirations. Our involvements also foster the indirect development of other students and involve parents and guardians to facilitate a better understanding of sciences and education.

HCS has developed and demonstrated a sound and successful model for engaging high school students from underserved communities in scientific research and study that increases their interest in science, improves their study skills and self-confidence, and prepares them for entry into competitive institutions of higher education.

We can proudly say that this program has evolved, in a short period of time, into one of the biggest and one of the best programs of its kind – not only in the country. , But anywhere!

THE LOWER EASTSIDE
GIRLS CLUB
OF NEW YORK

September 9, 2015
The Lower Eastside Girls Club of NY
Raising the Next Generation of Ethical, Entrepreneurial and Environmental Leaders!

Samantha Waite, Program Director
Erikka James, Program Coordinator

Youth Services: Oversight - An examination of the goals of the City's youth mentoring programs and, are these goals being met?

Introduction:
My name is Samantha Waite. I am the Program Director at the Lower Eastside Girls Club. The Girls Club was founded in 1996 by a group of committed community volunteers to address the disparity of services and facilities for girls in the Lower East Side. Today LESGC has grown from a small volunteer-led organization into a recognized leader and innovator in the field of community-based youth programming. At our new state-of-the art 30,000 sq. foot Center for Community on Avenue D we have a staff of 24 who offer 50+ programs on a weekly basis to low income youth ages 8 - 18 and their family members - with a special emphasis on serving Middle/High School youth and families from low income housing.

The City Council has previously discussed the need for mentoring programs for the city's most vulnerable youth populations. Mentoring programs not only connect youth to caring adults, they also open doors to potential careers and create pathways for youth to self-sufficient livelihoods. We are grateful that the City Council acknowledges the need for comprehensive mentoring programs, and we are here to highlight the ways in which our organization's mentoring programs could serve as an example for programs city-wide.

Current Challenges
The 300 youth who participate in LESGC programs live within walking distance from our center and reflect the local NYCHA housing. The majority of our members live in a household with a low-wage earning adult and over 40% of our members have a family member who is incarcerated.
LESGC addresses the specific social, emotional and academic needs of this population through after-school mentoring and tutoring programs, entrepreneurial training and economic empowerment, and our STEM, arts, literacy, nutrition and environmental education. Career awareness and job training is a major focus of our programming, and a significant area where mentors have a great impact.
Young girls in the Lower East Side are struggling against multiple forces: the daily challenges of poverty, society's low expectations, and a lack of access to opportunity. Given this reality, LESGC believes it is fundamental to offer girls a stable, supportive bond with a caring adult mentor who can offer emotional support, academic guidance, and encouragement - while also routing them to valuable social and cultural resources.
At the LESGC, mentoring is a primary program. With the help of female leaders, who are paired with girls annually for a minimum of one year (with the majority participating for two or more years) youth safely explore their passions and discover their talents in a nurturing and creatively exciting environment. Younger girls take monthly cultural outings with their mentor, while older girls access professional workplace experience through ongoing conferences and internships.
In FY15, the Girls Club paired 125 economically disadvantaged girls ages 8-18 with 125 adult, professional mentors. Mentors undergo an application and screening process led by the LESGC's volunteer coordinator. Mentors represent the diversity of NYC and have professional backgrounds in major growth industries in NYC: fashion, tech, finance, and the arts. Current mentors work at Google, BNY Mellon, Neuberger Berman, Martha Stewart, The Guggenheim, The Clinton Foundation, CAA and many others.

THE LOWER EASTSIDE
GIRLS CLUB
OF NEW YORK

LESGC's model of mentoring combines structured organization-led activities for pairs with unstructured time scheduled between girls and their mentors. Group mentoring has a wide array of benefits for both mentor and member. The engagement of mentor/girl pairs with other pairs fosters a deep sense of community with the mentors, girls and staff.

Impact of Mentoring

My name is Erikka James. I am a Program Coordinator at the Lower Eastside Girls Club. Insights from mentoring.org's most recent study of the benefits of mentoring[1] point to several insights that can inform City Council support of mentoring initiatives:

Youth with mentors are more likely to report positive behaviors and less likely to report negative ones.

- At-risk young adults who had a mentor are more likely to aspire to enroll in and graduate from college than those who did not have a mentor (76 percent versus 56 percent).
- At-risk young adults who had a mentor are more likely to be enrolled in college than those who did not have a mentor (45 percent versus 29 percent).
- At-risk young adults who had a mentor are more likely to hold a leadership position in a club, sports team, school council, or another group than those who did not have a mentor (51 percent versus 22).
- At-risk young adults who had a mentor are more likely to volunteer regularly in their communities than those who did not have a mentor (48 percent versus 27).

Insight Area 2: The Value of Mentors

Young people believe mentoring provides them with support and guidance to lead productive lives.

- Youth report that formal mentoring programs provide a variety of benefits, and most commonly offer that they receive advice about school, get help with school issues and/or schoolwork. They also make reference to receiving help to address life problems, assistance in getting a job, choosing a career and getting into college – though these benefits were less commonly reported.
- Youth in informal mentoring relationships commonly offer that their mentors provided developmental, more than academic, support. These mentors conveyed advice and encouragement to help them make good decisions, taught young adults how to make the right decisions and follow the right path and become motivated.

Conclusion

The LESGC is grateful to the City Council for holding this hearing. We encourage the City Council to support current organizations where all young people in NYC have access to a quality mentoring relationship and the support they need to succeed in school, work and life.

"Being Wisdom's mentor has not only given me profound insight in resharing and revisiting experiences as a young girl, but has also given me the honor to listen, understand, and be a part of her own experiences and her incredibly thoughtful views of the world around her as she matures into an amazing young woman. I have shared so many brilliant moments with her, but mostly because I see so much of myself and my own struggles when I was her age within her, the questions she asks me, and the moments of reflection she so generously shares with me." - Olivia Ahn, 2014-2016 Mentor

[1] http://www.mentoring.org/mentoringeffect/fact_sheet/

Testimony for the New York City Council

On the topic of STEM Opportunities in After-School Programs

Provided
by

Meghan Groome, PhD

Executive Director, Education, New York Academy of Sciences

Wednesday, September 9,
2015

Good morning and thank you for inviting me to testify before the Committee on Youth Services. My name is Meghan Groome and I am the Executive Director of Education at the New York Academy of Sciences. For nearly 200 years the New York Academy of Sciences (or the Academy) has brought together extraordinary people working at the frontiers of discovery and has promoted vital links between science and society. The Academy has a history of building new scientific communities through our over 20,000 members, constructing innovative connections among an extensive scientific network, and driving path-breaking initiatives for scientific, social and economic benefit.

In recent years, the Academy has redoubled its efforts to bring New York's wealth of scientific resources to bear on the needs of the City's schools, with a focus on improving science education for all students, especially those traditionally underrepresented in the STEM (science, technology, engineering and math) fields. The Education Department has simple mission: to identify high-impact, scalable pathways for scientists to directly increase the number of children who are STEM-literate. Our theory of change relies heavily on the core competencies of the Academy – to serve as a connector between the well-resourced scientific community and the under-resourced education community (including high-need students and teachers).

In Fall 2012, I gave testimony about our Afterschool STEM Mentoring Program and I'm so pleased to report back our success. To give you a short history, in 2010, a group of Deans and Faculty affiliated with the City's research and medical universities asked the Academy to create a program to provide their top young scientists with an opportunity to learn how to teach science/STEM. At the same time, The Department of Youth and Community Development approached the Academy to find a partnership opportunity to provide more STEM education. This led to the Academy placing science mentors in DYCD's COMPASS, SONYC, and Beacon sites. This mutually beneficial relationship is designed to increase the City's youth to role models and provide them with 20+ hours of inquiry based STEM coursework. While this may not sound like a lot of time, consider that the average student receives 2.3 hours of science instruction a week and that many of our mentors report that they are the sole source of science in a child's day.

For the young scientists, and we have over 8,000 in our membership ranks, the program is designed to increase their teaching and mentoring skills in a community service setting. Now, as we begin our 6th year of the program, we've worked with over 1000 young scientists, 13,000 children, and delivered more than 150,000 hours of instruction in all 5 boroughs.

I want to speak briefly about the importance of STEM mentoring in afterschool settings. Afterschool programs typically offer smaller class sizes, freedom from state and local academic standards, reduced anxiety over tests and performance indicators, and more fluid uses of time free from the traditional school day structure. The Afterschool STEM Mentoring Program takes advantage of the existing infrastructure of DYCD programs, which include hundreds of community-based organizations charged with the intellectual and social- emotional safekeeping enrichment of the children in their care.

As science continues to be marginalized in formal classrooms, the role of afterschool programs is increasingly viewed as an important arena for academic enrichment. Expanding the school day

through afterschool programs offers the opportunity to increase a student's exposure to high-quality STEM education by providing three elements that lead to an individual's persistence into a STEM career: engagement, continuity, and capacity. While continuity and capacity are important factors, there is evidence that engagement is potentially more important than achievement or course enrollment. By infusing STEM into existing community-based afterschool programs with strong curriculum partners, the proposed program can bypass the constraints of the formal classroom structure by providing relevant, hands-on curriculum; opportunities to interact with young, diverse scientific role models; and additional content knowledge and resources. Afterschool programs reach large swaths of urban students and provide safe and structured informal learning environments that allow for creative and enriching STEM programming. We are often asked why we don't work directly with schools and the answer is that we do– we are in our third year of piloting the Scientist-in-Residence program with the Department of Education. Through this effort we recruit scientists to be paired with a school teacher to develop their own research project. However, through the Afterschool STEM Mentoring Program we realized that we had a great opportunity to serve the need of our young scientists to learn in an environment where the children's social, emotional, and educational well-being were top priority while hewing to the hands-on, activity learning spirit of afterschool programs.

In 2011 and 2014, we received National Science Foundation grants to better study the effects of the program and our partnerships and I'm happy to report that our external evaluations have shown statistically significant improvements in content knowledge and attitudes towards STEM, that students are more likely to see themselves taking a job in STEM and have increased self-confidence in their ability to do STEM. Additional research shows that 10-15% of our mentors are teaching or looking to teach science in our schools. Our more recent NSF grant links us up with Pace University and the Harbor School Foundation and many other partners such as Good Shepherd Services to see how we can expand their ground breaking work in Career and Technical Education to the middle grades. We have also

partnered with the CUNY Service Corp to recruit, train and place their community college, undergraduate and graduate students in our programs. As a result of the success we've had with the current Afterschool STEM Mentoring Program, we have double-downed on our outreach effort by providing mentors during the summer.

With the generous and sustained support of our funders and the Department of Youth and Community Development, this summer we matched 48 mentors with 24 sites to deliver programming centered on nutrition and health through our Food Connection curricula. This summer, we partnered with DYCD to pilot a program called Hack Your Health where 5 different summer camps came to our office, 7 WTC, for a day to learn how their bodies produce data when they are active that can be tracked with simple coding and sensors. Through these efforts over 600 students experience STEM enrichment that was fun and memorable.

In School Year 2016-2017 we plan to offer more computer science programs and launch our PreK – 2nd grade robotics and coding program. Our goal is to provide a mentor to every DYCD site that wants one and we appreciate your continuing support. I often speak about our program with DYCD at conferences around the world and so many different organizations, governments and universities have requested to start up their own chapter of the Afterschool STEM Mentoring program.

Looking back on all that we have achieved in the past 5 years I am proud to testify that we have recruited over a 1000 of NYC's most talented scientists from over 25 universities to work in a 100 different sites that all funded by DYCD. The end result being that over 13,000 underserved students have benefitted from meaningful contact with mentors totaling over 150,000 contact hours. Through the City's support, we plan to continue our effort and expand whenever possible so that youth become STEM literate and see that they can be future STEM leaders. Thank you.

Big Brothers Big Sisters of NYC
Testimony before the Committee on Youth Services
September 9, 2015

On behalf of Big Brothers Big Sisters of NYC (BBBS of NYC) and the children we serve, I would like to thank Council Member Eugene and the Youth Services Committee for the opportunity to testify today. My name is Hector Batista and I am the Chief Executive Officer of BBBS of NYC.

We are proud to be the founding agency of the nation's mentoring movement. For over 110 years, we have been committed to serving disadvantaged youth and families with the support of caring, carefully screened and professionally trained adult mentors. This past year alone, we served 5,100 youth throughout the five boroughs. This represents a 21% increase from the 4,000 youth served the year before.

Nearly all of our youth are from low-income, single-parent households, and some live with other challenges: they live in foster homes, have an incarcerated parent, have been in trouble with the law, have learning disabilities, or have recently immigrated. Our programs provide all of these children with hope and opportunity, helping them develop the skills and positive attitudes that will help them grow into healthy, contributing members of society.

We have two main programs to meet their needs – a community-based program and a site-based program. In our Community-based Program, our Bigs meet with our Littles eight to ten hours a month participating in activities that promote cultural understanding, community engagement, and self-awareness.

We have several site-based programs, such as the SONYC program that we run at two schools – one in Manhattan and one in Brooklyn. In addition, we have a Community-Impact program with a high school in East Harlem, where we provide the students in the school with mentors and group activities. And finally, we have our Workplace Mentoring Program, which the committee may recall was the focus of my last testimony. In this program, students from NYC public schools are brought to partner companies during after-school hours to be mentored by its employees, introducing Littles to the world of business.

Our recently enhanced Education Initiative also provides the kids in our programs with the resources and support needed for their academic success. This includes enrichment programs such as high school and college-readiness workshops, ACT and SAT prep courses, and college tours.

And I am proud to say that research has consistently shown that our model of mentoring is making a tremendous impact in the lives of the children in our programs. In particular, high school graduation rates are higher than overall citywide rates. In fact, last year alone, 97% of Littles were promoted to the next grade, 96% of high school seniors graduated, and 94% of them were accepted into college. Our youth also experience gains in self-confidence, relationships with peers and adults, and avoidance of risky behaviors.

To further document the positive impact that our programs make on a child, BBBS of NYC commissioned a study with Philliber Research Associates. The last study done on the power of mentoring was in 1995 by PPV. Our goal was to refresh this study, which was now 19 years old, and quantify the impact of mentoring. We chose Philliber Research Associates because of their reputation and experience working with human service organizations. They have the Robin Hood Foundation, for example, as one of their clients. For two years, the study followed a group of kids participating in our mentoring programs, along with a control group of children who did not receive mentoring. We looked at things like academic achievement, behavior at school, bullying, violence, and substance abuse.

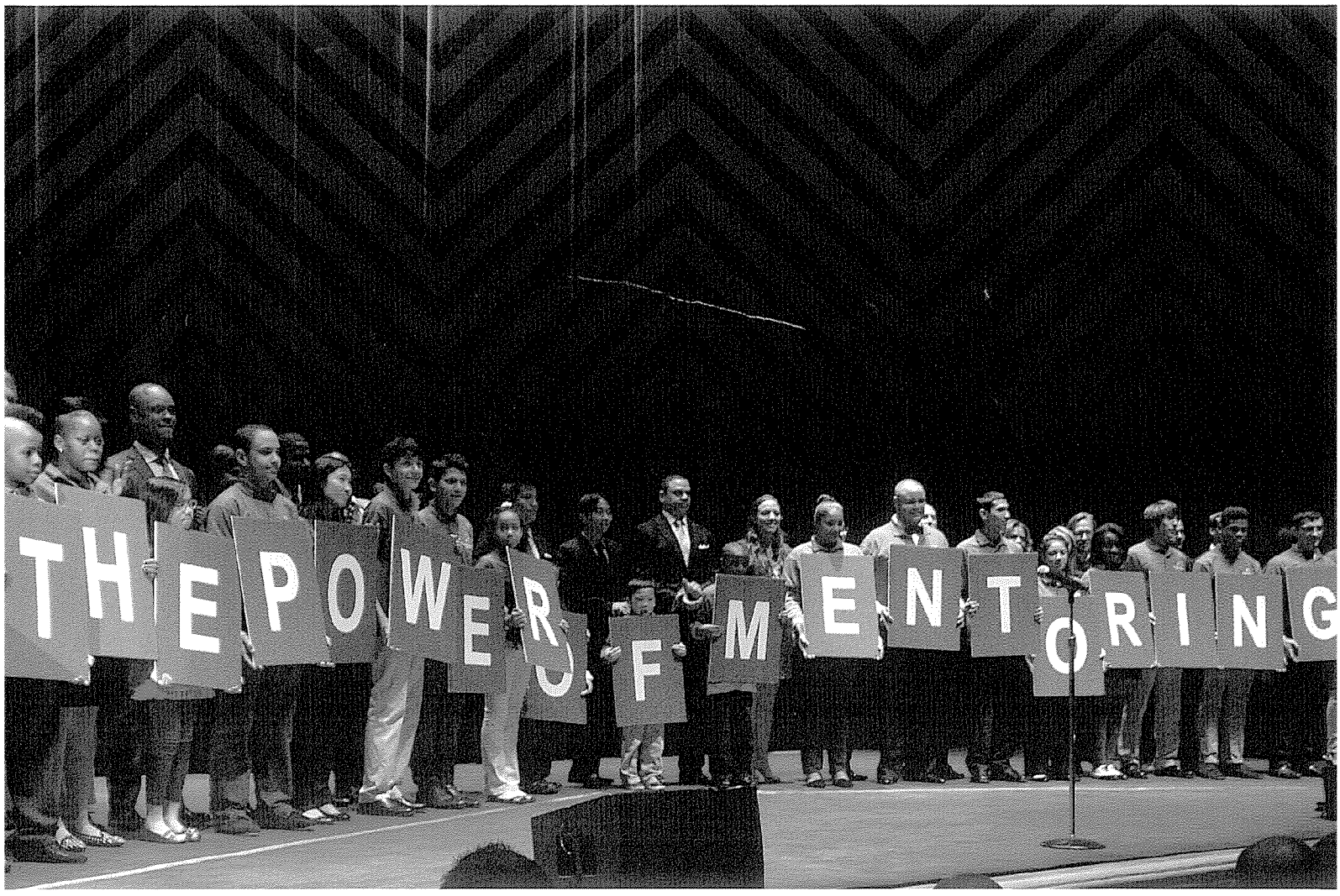
The results of the study confirmed what believed for over a century - that mentoring has the power to change lives. While I am happy to provide the committee with the complete study, I do want to highlight three important points. While risky behaviors tend to increase as children enter the pre-teen and teen years, kids in our mentoring programs remained stable. The impact was also visible after just six months of being matched with a mentor. And mentoring was an effective tool for both boys and girls. Risk Factors declined by 25% among mentored youth, while increasing 13% among non-mentored participants. Additionally, 24% of mentored youth reported a greater number of risk factors at follow-up, which is expected as kids grow-up, compared to 52% in non-mentored youth.

Finally, we recognize that we cannot do this work alone so to further impact NYC youth, in partnership with Fordham University, we created a Center for Training and Professional Development 20 years ago, which trains organizations how to implement their own mentoring programs with the highest standards. Since then, the Training Center has reached over 1,500 organizations and impacted over 50,000 children. As I hope you can see, Big Brothers Big Sisters of NYC works hard to provide the children in our communities with the support and resources to help them reach their full potential and achieve success in life. I thank the Council for their past support of our organization and I look forward to our continued work together in serving the youth of NYC.

Big Brothers Big Sisters of NYC

Ensuring a Positive Future:

Mentoring and the Reduction of Risky Behavior Among NYC Youth



Big Brothers Big Sisters of New York City

THE POWER TO CHANGE LIVES®

Table of Contents

Philliber Research Associates conducted a research study focused on the impact of mentoring on children and young people. Big Brothers Big Sisters of New York City commissioned this study to further document the positive impact that our programs make on a child, which is central to our mission. Data collected from youth at the time they enrolled in BBBS of NYC Community-Based Mentoring Program and again an average of 15-18 months later, as well as a comparison group of non-participant youth surveyed at the same time.

Founded in 1987, Philliber Research Associates is an independent research and evaluation firm that specializes in outcome-based evaluation and program planning services, and has evaluated hundreds of programs across the United States and abroad. As the founder and senior partner of Philliber Research Associates, Dr. William Philliber provided Big Brothers Big Sisters of New York City with more than forty years of experience in program design, development, and evaluation.

We are extremely delighted at the findings, which strongly support what we have believed for over a century – **that mentoring has the power to change lives.**

We are so pleased to share with you the following highlights of this study:

- While risky behaviors tend to increase as children transition through pre-adolescence and adolescence, youth in our mentoring program, including those in middle and high school grades, were stable.
- The impact was apparent after just six months of being matched with a mentor.
- Mentoring was an effective tool for both boys and girls.

It is clear that the consistent support and guidance of a mentor empowers youth to make better choices, engage in less risky behavior, and ultimately, position themselves to build a more successful future than they initially had and a more successful future than their non-mentored peers.

The following are the detailed results of this study.

Sincerely,

Hector Batista
Chief Executive Officer

BACKGROUND

Big Brothers Big Sisters of New York City (BBBS of NYC) provides evidenced-based, impactful mentoring relationships, case management, and educational support to at-risk youth ages 7-18 (up to 21 for teen mothers and youth in foster care). Annually, we serve over 4,000 youth with one-to-one mentors (Bigs) and one-day programs. Nearly all of our youth are raised in low-income, single-parent homes.

Demographically, our youth are:

In 2012, under the leadership of the board of trustees and Executive Director Hector Batista, a strategic planning committee was formed of staff and trustees. The FY12-17 Strategic Plan that was developed emphasizes our commitment to the following: impact, community partnerships, donor network, framework/infrastructure, and governance. Moreover, to refine our focus we revised our vision and mission statements:

- **Our vision is that all children achieve success in life.**
- **Our mission is to provide children facing adversity in New York City with strong and enduring, professionally supported one-to-one mentoring relationships with adults that change their lives for the better, forever. We partner with families, volunteers, organizations and the community to inspire positive change in all.**

During the strategic planning process we determined that stronger impact is vital for the organization. In addition to qualitative measures of impact, which we document through case notes and success stories, we wanted to conduct a research study to evaluate our community-based mentoring programs. Our goal was to come close to replicating the rigor of the gold standard for research on mentoring's impact, which is the landmark study conducted by Public/Private Ventures (P/PV) in 1994-95. That study examined the Big Brothers Big Sisters model nationwide, and found that, compared with a control group, mentored youth were significantly impacted. Mentored youth were 46% less likely to initiate drug use and 27% less likely to initiate alcohol use, compared to control group participants. The mentored youth also earned higher grades, skipped fewer classes, and felt more competent about doing their schoolwork.

To reinforce those results, nearly two decades after the P/PV study, we embarked on a scientific research study of our youth, with a control group by Philliber Research Associates (PRA). To ensure the study would effectively address and assess our work to achieve our mission and vision, an internal interdepartmental research committee was formed to work with PRA and collaborate on implementing a new evaluation protocol. This recent study found that for mentored youth, risky behaviors stabilized in six months, risk-taking in most areas declined after one year in our mentoring program, while in the control group risk-taking increased in most of the areas. This is important for our work, as well as for the organizations and communities that are interested in mentoring as a means of helping youth stay safe and healthy, achieve academic success, and mature into responsible adults.

RESEARCH STUDY OVERVIEW

Evaluating, documenting, and raising awareness of positive impact are all critical parts of providing services to at-risk populations. Mentoring that adheres to our one-to-one model has been demonstrated by scientific research studies to be an evidence-based method to improve youth's behavior, academic performance, self-confidence, and relationships with family and peers. It is also a proven model for preventing delinquency, teen pregnancy, truancy, and violence. Research and evaluation from the US Office of Juvenile Justice and Delinquency Prevention (OJJDP), and the US Substance Abuse and Mental Health Services Administration (SAMHSA) have found that our one-to-one mentoring model is proven to decrease harmful behavior among youth and increase positive, pro-social behavior and attitudes. The Center for Study and Prevention of Violence at the University of Colorado identified BBBS mentoring as the second of eleven "Blueprint" model intervention programs effective for reducing adolescent violent crime, aggression, delinquency and substance abuse, out of a study of 900 programs.

As youth age, especially those considered 'at-risk,' they often engage in more risky behavior as part of their journey from childhood to adulthood. We want to minimize those behaviors as they can cause issues (substance abuse; teen pregnancy; arrest), and they can also lead to future problems (addiction, lack of education, lost career opportunities). Thus, researchers consider a program to have a positive impact among youth if not only decreased risky behavior is found, but also if a stabilizing effect is found—that is, some youth in some areas may not reduce their risky behavior, but at least they have not increased the level of harmful behavior that 'naturally' occurs among most youth.

This research study conducted by Philliber Research Associates for Big Brothers Big Sisters of New York City (BBBS of NYC) demonstrates that among our youth the evidence is strong that providing at-risk children and teens with adult volunteer mentors will have a significant impact on their attitudes and behaviors. Our study showed that despite the changes in society or the evolving needs of young people, our mentoring programs continue to serve as a meaningful intervention for both boys and girls. Our mentees, after a year in our program, engage in dramatically fewer risky behaviors than their peers, with a significant impact made in middle and high school youth. In fact, in grades seven through twelve, among youth not in our programs, there were substantial increases in risk factors (29% in grades seven through nine and 42% in grades ten through twelve), but not among participants in our mentoring programs.

STUDY DESIGN AND YOUTH SAMPLED

Big Brothers Big Sisters of New York City began a two-year study to document the impact that mentoring has on young people. Data was collected from enrolled children and young people, who were matched with mentors. In addition, a cohort of young people who are not served by Big Brothers Big Sisters of New York City agreed to participate as part of a comparison group. The non-participants were students who attended the South Bronx Academy for Applied Media which is a middle school in the Bronx and New Heights Academy which is a high school located in Washington Heights. Both schools are composed of predominantly low-income students receiving free or reduced lunch. The schools were chosen because the students are similar to the young people BBBS of NYC serves.

(continued.)

Over the course of the study, 202 youth in the BBBS of NYC one-to-one community-based mentoring programs enrolled in the study, representing approximately one-third of those beginning our programs. These youth were surveyed at intake, and, after being matched with an adult volunteer mentor, they were surveyed six-nine months later (early impact), and then again at 15-18 months (long-term impact). Both participants and non-participants were asked questions about their adjustment to school and family, their risk-taking behaviors, self-confidence, and demographic characteristics

Surveys document at-risk behavior and circumstances among mentored youth in eight areas:

- Family: e.g., youth argues with family most of the time; no adult in home employed.
- School adjustment: e.g., youth does not like school, skipped school, does not plan to attend college.
- School grades: i.e., youth's most recent grades in math, English, science, and social studies.
- Exposure to violence: e.g., in the past three months the youth hit someone, or was in a physical fight.
- Substance abuse: e.g., in the past three months the youth drank alcohol, or smoked marijuana.
- Bullying: i.e, in past three month the youth was a victim or perpetrator of bullying.
- Sexual activity: e.g., in the past three months youth had sexual intercourse or got someone pregnant.
- Self-confidence: e.g., youth is afraid to try new things, does not stand up for him/herself.

Baseline surveys were collected from youth at the time they were first assigned mentors between 2011-2012. On average, these youth engaged in a moderate-high number of risky behaviors, which research indicates is expected from a group of youth who are mostly from low-income, single-parent families and representative of the population we serve. Almost all reported at least one risk factor while over half were at-risk in at least five areas. Youth were most at risk because of family issues, school issues, and violence issues. These youth were similar to the youth in the control group, 180 youth who also had a range of risk factors, again within the expected range for youth in mainly low-income, single-parent households.

Over the course of 15-18 months, youth who were assigned a mentor as part of our one-to-one community-based programs followed our mentoring model, which included the following:

- They met twice a month with their mentor for 6-10 hours per month of enrichment, educational, sports, and/or cultural activities out in the community with the mentor---approximately 100 contact hours per year with the mentor.
- Our staff conducted monthly check-ins, case management and supervision of all parties in the relationship, including parents/caregivers.
- The structure was flexible, framed by frequent contact, goal-setting, and focus on personal achievement and developing pro-social attitudes.

On the following pages we discuss the major findings of the long-term impact surveys. Of the initial youth surveyed, approximately half responded to the long-term impact study, and their baseline risk factors at intake mirrored the risk-factors of those who did not respond to the follow-up. It is also important to note that the size of the sample at final follow-up is sufficient to provide a meaningful analysis of the impact of mentoring.

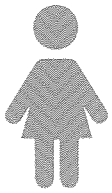
MAJOR FINDINGS

It is typical for risk behaviors to increase as adolescents age, as it is a time of experimentation and individual growth. However, the results of this study indicate that BBBS of NYC participants demonstrate patterns of stability as opposed to the increase in risk behaviors that was manifested among non-participants—risk factors were stable or were reduced among mentored youth and increased among non-participants in nearly every category. Between the time of baseline and follow-up, at 15-18 months, there were increases in the percentage of non-participants reporting family issues, school issues, poor grades, substance abuse issues, bullying issues, violence issues, and sexual activity issues. This suggests that, without the support of BBBS of NYC, risky behaviors among young people are more likely to increase.

The overall positive impact on youth, after one year in the program, was strong. Risk-taking declined among program participants in five of the eight issue areas examined. In particular, we were pleased to see that violence issues (e.g., hit someone, physical fight) and school issues (e.g., skipping school) declined significantly. The other three areas of risk remained stable, meaning they did not increase, which reflects a positive result, as noted above. Meanwhile, the prevalence of risk among those youth not in our program increased, with a higher percentage of non-participants reporting issues in every category at follow-up. There were significant increases in the percentages reporting bullying, sexual activity, and substance abuse. Details include:

Overall, the difference between the two groups was clear: at 15-18 months, risk-taking was **59% higher** among non-participants than among participants.

Risk-taking **decreased 21%** among our mentored youth, while increasing 13% among non-participants.



Among girls, our program participants showed clear improvements, engaging in **fewer risky behaviors**, while risk-taking substantially increased among non-participating girls.

Among boys, our program participants generally **improved or stayed stable**, while non-participating boys generally increased risk-taking in most categories. Substance abuse issues were the most differentiated: the risk decreased by half among mentored youth, while it doubled among non-participants. Non-participating boys also increased significantly in their exposure to risks related to sexual activity and bullying.

Of all of the risk factors included in our study, sexual activity was the most prevalent among non-participants, showing the greatest increase at follow-up. This area remained stable for mentored youth, while increasing for non-participants. This suggests that BBBS of NYC is a critical intervention for avoiding or reducing teen pregnancy and the associated negative effects of early sexual activity, including emotional stress and health risks.

Parents and mentors were also surveyed about their youth, to triangulate the information on our youth's experiences with us. Their surveys were different, but still attempted to address the question of whether our mentoring programming positively impacts our youth. We are pleased to report that the surveys from mentors and parents supported the results we obtained from our youth surveys:

The 298 mentors surveyed, indicated that:

100% Viewed the support received from program manager as positive

76% Improved in self-efficacy (e.g., standing up for themselves)

75% Improved in career orientation

72% Improved in acceptance of responsibility and in school adjustment

69% Improved in community involvement

64% Improved in conflict resolution skills

For the 105 parents surveyed:

96% Said they would recommend our programs to other families

94% Indicated their overall experience was positive

92% Felt support from program manager as very positive

85% Found their experience with their child's mentor to be very positive

Final Thoughts

While youth in our programs were similar to non-participants at the time they enrolled in BBBS of NYC's mentoring programs, their paths took different directions. Risky behavior increased for non-participants, while it decreased or stabilized for those in our programs. A significant finding is that the prevalence of sexual activity and drug use increased significantly among those youth not participating in our programs, but not among our program youth. This reassures us for our program youth, but it also reflects the reality that many at-risk youth will naturally gravitate to riskier behavior as they mature. However, a positive intervention can disrupt the process. Mentoring is well-suited to curbing those specific high-risk behaviors, as mentoring is relatively low-cost compared to the societal long-term costs of, for example, juvenile incarceration, or teen parenthood.

Now that the research study has concluded, we plan to use the survey tool we created to evaluate our community-based mentoring program annually. The results will serve as a management tool to monitor our programs. We also plan to offer our survey tool to organizations that have mentoring programs through our Center for Training and Professional Development where we offer technical assistance to community-based organizations so they can enhance or further develop their mentoring programs.

DEMOGRAPHIC CHARACTERISTICS

The participant and non-participant groups were similar with respect to gender (47% of the participants and 43% of the non-participants were boys) and about half of both groups lived in single parent households. However, participants were less likely to be Hispanic (31% compared to 75%) and more likely to be younger (a third of the participating youth but none of the comparisons were enrolled in elementary school).

The 97 participants who were surveyed at follow-up were similar in age to the 105 who were only surveyed at enrollment. However, those who failed to complete a follow-up survey were more likely to be girls (35% compared to 47%), African-American (53% compared to 39%), and live in single parent households (62% compared to 50%). Both groups reported a similar number of risk factors (3.1 compared to 2.8).

RISK FACTORS

At the time baseline and follow-up data were collected, the youth were asked whether, in the past three months, they had engaged in any of thirty-six different risk behaviors. These behaviors were grouped into eight different domains.[1]

[1]The domains and their associated behaviors were:

Family Issues
Single parent household
No adult in household employed
Parent in jail or prison
Cannot talk to adult in household
Does not get along with family

School Issues
Does not like school
Does not do homework
Parents called because something wrong
Suspended from school
Damaged school property
Does not plan to graduate
Does not plan to go to college
Skipped school

Bullying Issues
Been bullied
Bullied someone else

Substance Abuse Issues
Drank alcohol
Smoked cigarettes
Smoked marijuana
Used other drugs

Poor Grades
Grade equivalent to D or F in:
Math
Language Arts
Science
Social Studies

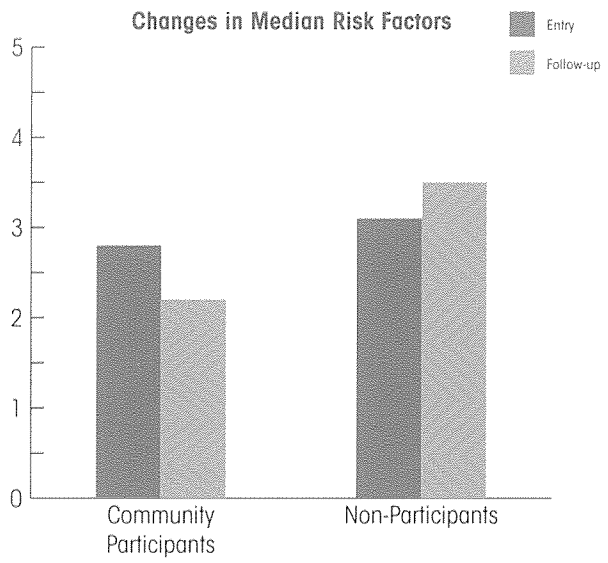
Sexual Activity
Had sexual intercourse
Had sex without a condom
Pregnant or got someone pregnant

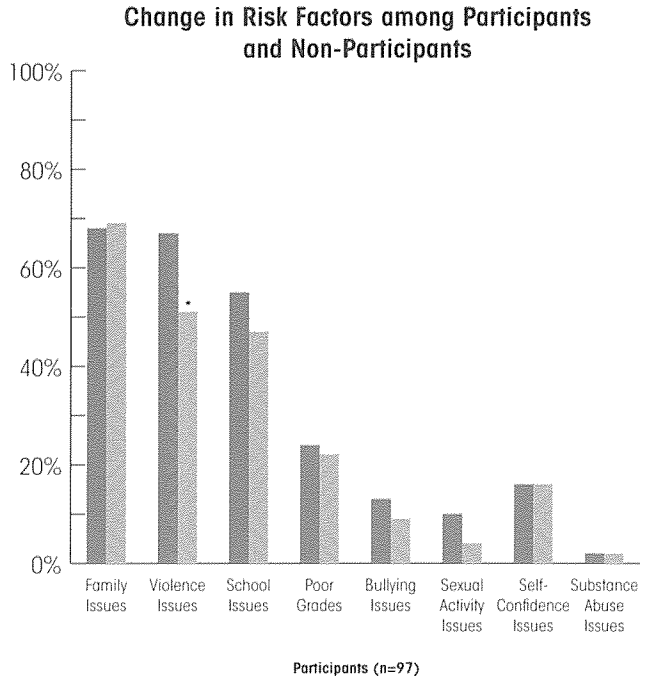
Self-Confidence Issues
Does not stand up for self
Does not like to go to places or meet people
Afraid to try new things
Does not do better than others
Does not make friends easily

Violence Issues
Does not talk to solve problems
Becomes angry
Hit someone in anger
In a physical fight
Carried a weapon

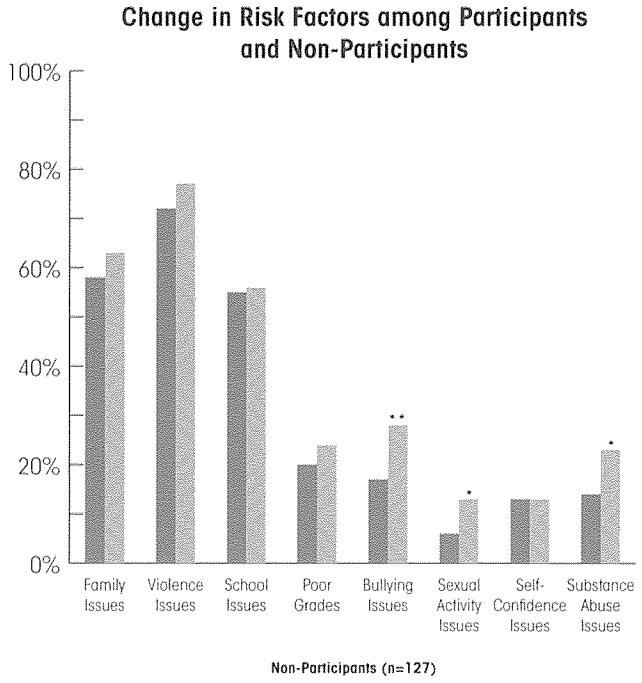
At the time community participants enrolled in BBBS of NYC, their risk factors were similar to those who were non-participants. Participants reported a median of 2.8 risk factors while non-participants reported 3.1. However, risk factors declined among participants while increasing among non-participants such that at follow-up risk factors among non-participants were 59% higher than among participants.

Comparing changes in risk factors among community participants and non-participants by domain reveals a very different change in behavior between the two groups. The percentage of participants reporting violence issues and school issues significantly declined.





* Difference is statistically significant at <.05



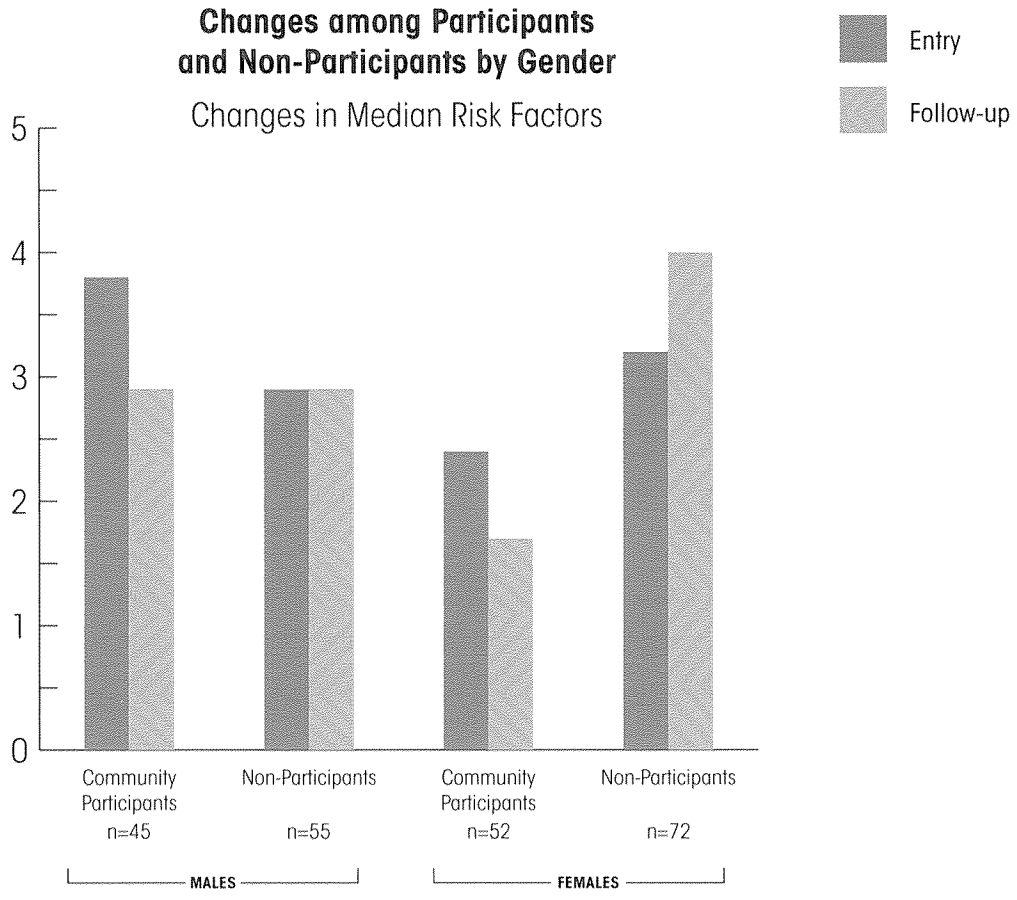
* Difference is statistically significant at <.05, ** <.01

Declines were also found in three of the other domains: poor grades, bullying, and sexual activity. The other three domains remained unchanged. A higher percentage of non-participants, by comparison, reported issues on every domain at follow-up. There were significant increases in the percentages reporting bullying, sexual activity, and substance abuse.

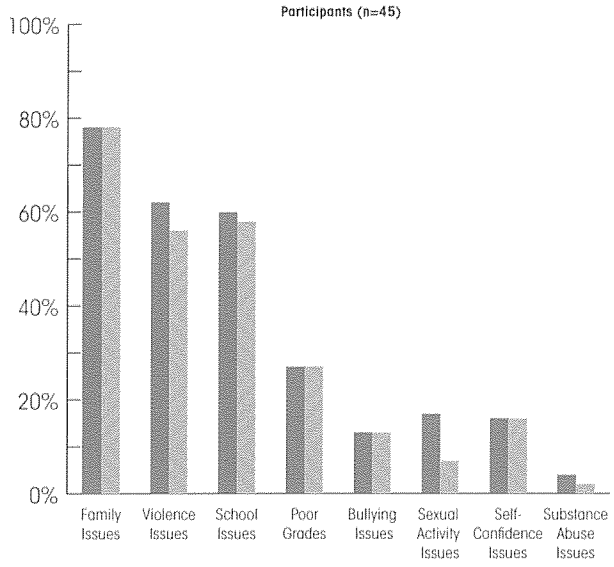
Among participants, the median number of risk factors decreased among both boys and girls. Non-participants showed increases among girls, while boys remained steady with a median of 2.9. Among boys, participants started out their baseline with greater risk, seeing a decrease over time.

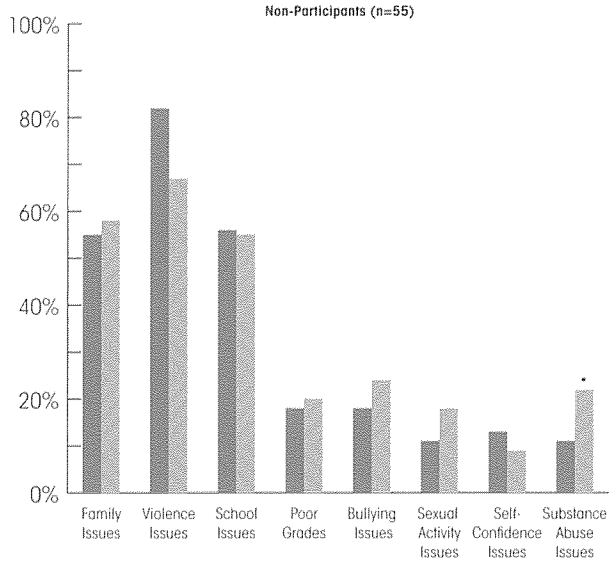
Among males, participants remained stable in the domains of family issues, school issues, bullying, self-confidence, and substance abuse. They demonstrated declines in violence issues and risky sexual behavior. At the same time, the male non-participants increased their risky behavior in the domains of family issues, bullying, sexual activity and substance abuse. They only improved in the areas of violence and self-confidence.

Female participants demonstrated improvements in violence, school, and bullying issues while remaining stable in other domains. Non-participants reported greater risk taking in every domain assessed.



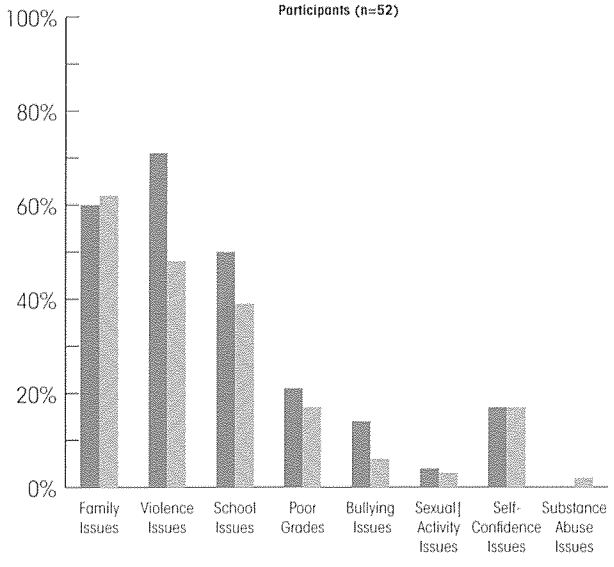
MALES

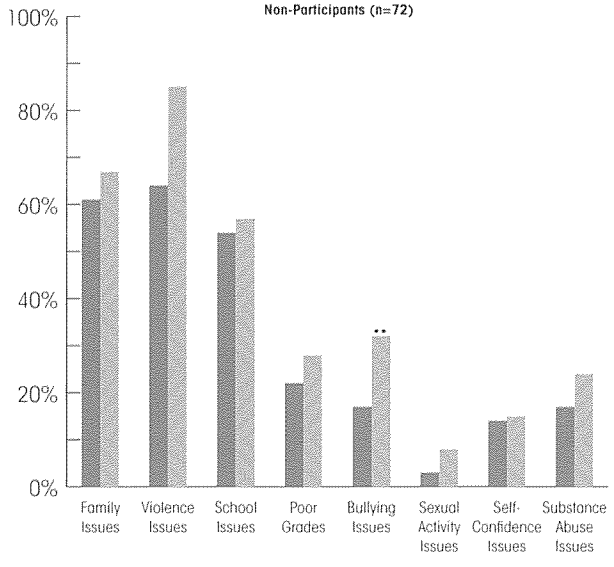




* Difference is statistically significant at <.05

FEMALES

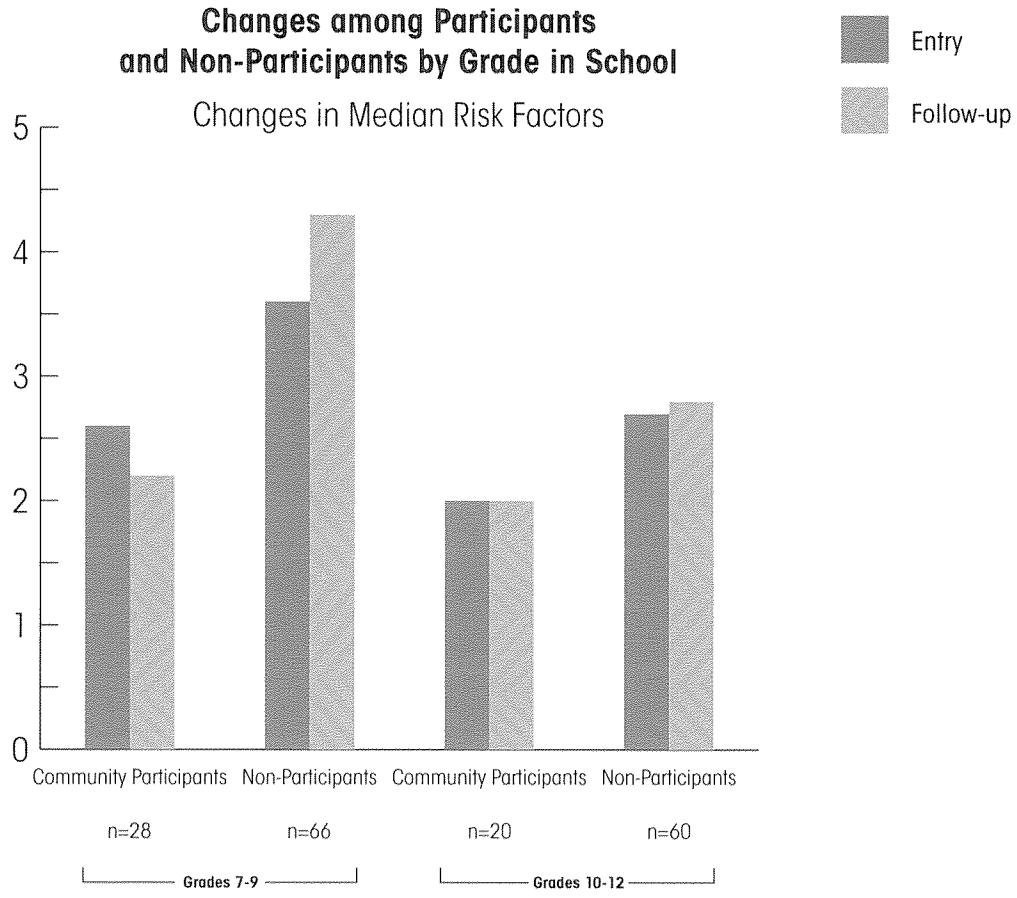




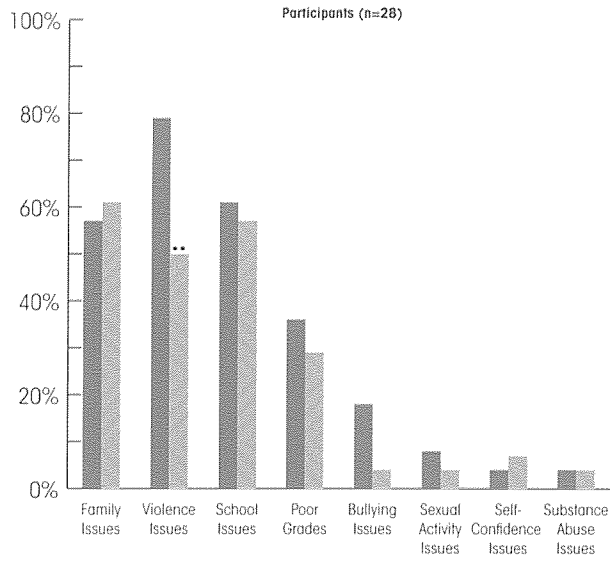
** Difference is statistically significant at <.01

Participants in grades seven through nine showed reduced risk taking in the domains of violence, school, bullying, and sexual activity while non-participants reported greater risk-taking in every domain with the exception of self-confidence.

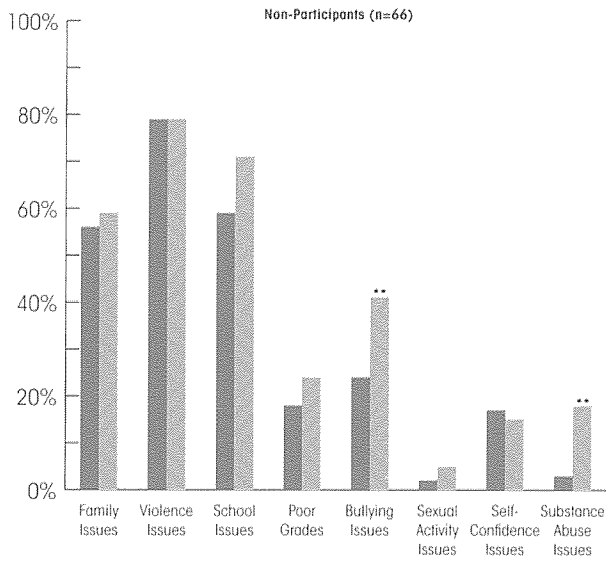
Participants in grades ten through twelve reduced risk related to family, school, sex, and substance abuse. Self-confidence was the only domain in which their risk increased. Non-participants, on the other hand, increased their risk on six of the eight domains while only improving in school related issues.



7-9

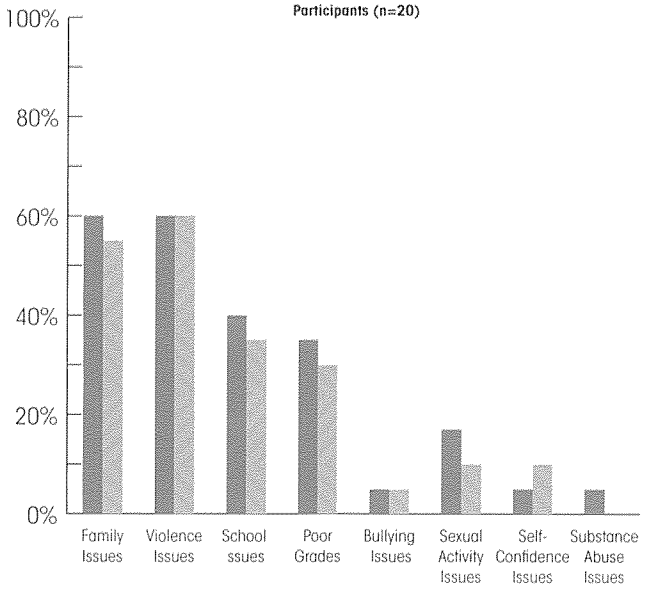


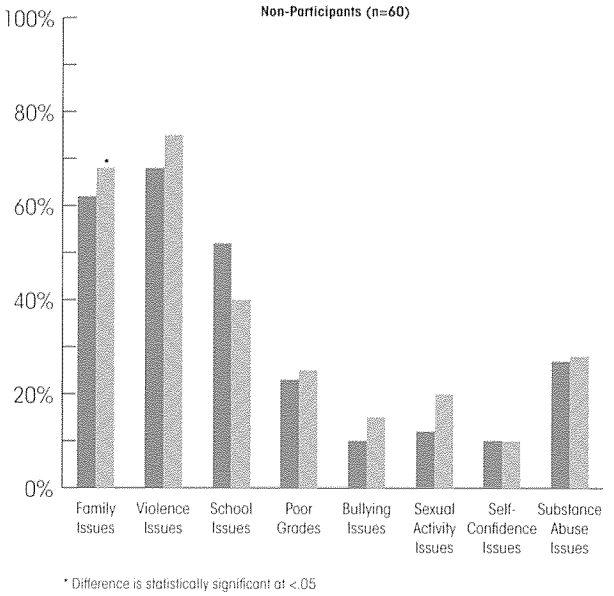
** Difference is statistically significant at <.01



** Difference is statistically significant at <.01

10-12

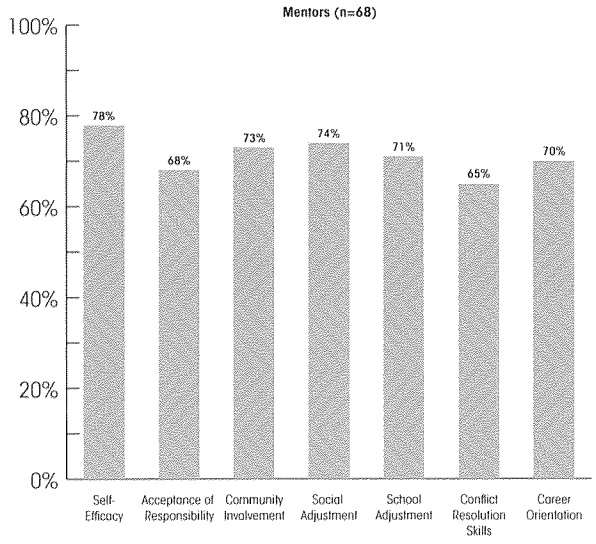




* Difference is statistically significant at <.05

Mentors' evaluation of youth

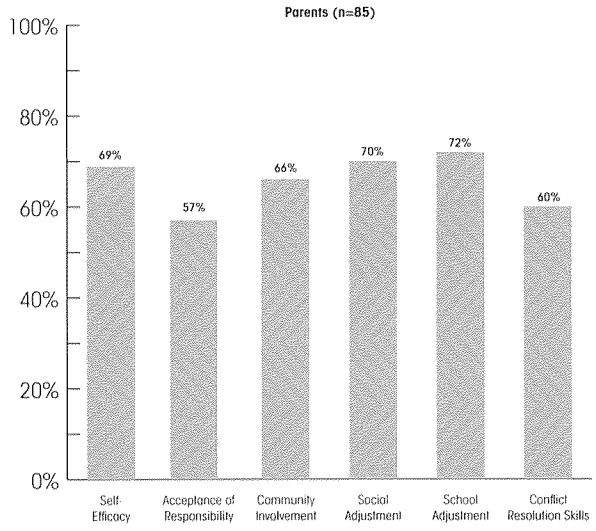
Mentors for 68 community-based mentoring youth who completed follow-up surveys also completed surveys about their mentees at approximately the same time the participants were surveyed. They were asked whether their mentees exhibited twenty-eight different behaviors more of the time, less of the time, or the same amount of time as they had when the match began. The behaviors were grouped into seven domains and scales formed for each domain. Each scale varies from 0 to 100% with a higher number being more positive. The higher the percentage, the more behaviors are perceived as demonstrating positive gains and the fewer behaviors are perceived as demonstrating negative losses.



On every dimension the mentors felt the youth they served had made progress since the time they began working together. The greatest progress was in self-efficacy while the least was in conflict resolution skills. On average, the participating youth received a score of 71%.

Parents' evaluation of youth

Parents of 85 community-based mentoring youth completed follow-up surveys about their children at approximately the same time the participants were surveyed. They were asked whether their children exhibited twenty-eight different behaviors more of the time, less of the time, or the same amount of time as they had before enrolling in BBBS of NYC. The behaviors were grouped into six domains and scales formed for each domain. Each scale varies from 0 to 100% with a higher number being more positive. The higher the percentage, the more behaviors are perceived as demonstrating positive gains and the fewer behaviors are perceived as demonstrating negative losses.



The parents saw improvement in their children on every dimension. The greatest improvement occurred in social adjustment and school adjustment while the least improvement was in acceptance of responsibility. The average youth received a score of 66% from their parents.

[2]The domains and their associated behaviors that were evaluated by mentors and parents include:

Self-efficacy
Happy
Feels good about self
Likes to try new things
Feels someone cares about them
Stands up for self

Community Involvement
Looks for ways to help people
Likes to meet new people

School Adjustment
Works hard to do well in school
Likes school
Likes learning new things
Wants to stay home from school when well

Career Orientation
Demonstrates Leadership
Wants a career
Knows more about workplace
Has a career path

Acceptance of Responsibility
Follows directions
Listens to what others say
Behaves
Accepts consequences of behavior
Tells truth
Completes things started

Social Adjustment
Gets along with friends
Makes friends easily
Listens to others
Respectful to others

Conflict Resolution Skills
Solves problems by talking
Willing to meet others half way
Disagrees with others without anger

CONCLUSIONS

Baseline surveys collected from 202 youth at the time they were first assigned mentors demonstrated the typical young person participating in the community-based mentoring programs of Big Brothers Big Sisters of New York City engaged in a moderate number of risky behaviors. Almost all (98%) reported at least one risk factor while over half (52%) were at risk on at least five factors. Youth were most at risk because of family issues, school issues, and violence issues.

Youth who were assigned a mentor as part of the community-based mentoring programs of BBBS of NYC met twice a month with their mentor in the community.

Follow-up surveys were completed by 97 of the original youth participating in community-based mentoring programs and 127 of the original comparison group. These surveys were completed an average of 15-18 months after the baseline surveys were collected.

While participants were similar to non-participants at the time they enrolled in BBBS of NYC, their paths took different directions. Risk-taking increased 13% among the youth who were not mentored from a median of 3.1 to a median of 3.5. At the same time, risk-taking decreased 21% among participating youth from a median of 2.8 to a median of 2.2. Risk-taking was 59% higher among non-participants than among participants when they were surveyed an average of 15-18 months after enrolling in BBBS of NYC.

Risk-taking declined among participants in five of the eight domains; violence issues and school issues declined significantly. The other three domains remained unchanged. By contrast, a higher percentage of non-participants reported issues on every domain at follow-up. There were significant increases in the percentages reporting bullying, sexual activity, and substance abuse.

Risk-taking decreased among both boys and girls in community-based mentoring programs and among students in middle school.

Big Brothers Big Sisters of New York City

THE POWER TO CHANGE LIVES®

★★★★ CHARITY NAVIGATOR Four Star Charity

We have a 4-star rating from Charity Navigator for sound fiscal management and commitment to accountability and transparency.

Design: Mint Advertising
Printing made possible by: R.R. Donnelley & Sons Company

40 Rector St., 11th floor New York, NY 10006 • Tel: 212-686-2042 • Fax: 212-779-1221
bigsnyc.org • facebook.com/bbbsnyc • twitter.com/bbbsnyc • instagram.com/bbbsnyc

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: 9/9/15

(PLEASE PRINT)

Name: KATE BANCKS

Address: 42 BROADWAY - POWERPLAY

I represent: POWERPLAY NYC

Address:

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: 9/9/15

(PLEASE PRINT)

Name: Samantha Wait

Address: Lower Eastside Girls club.

I represent: 101 Avenue B NY NY 10009

Address:

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 09/09/15

(PLEASE PRINT)

Name: Kristin Breton

Address: 250 Greenwich St, NY NY

I represent: New York Academy of Sciences

Address: 250 Greenwich St

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 09/09/15

(PLEASE PRINT)

Name: Meghan Groome

Address: 250 Greenwich St 40th NYNY 10007

I represent: New York Academy of Sciences

Address: 525 10th St Brooklyn NY 11215

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Cynthia Malave-Baez Proj. Mgr. Service Learning

Address: 2 Lafayette Street

I represent: DYCD

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 9/9/15

(PLEASE PRINT)

Name: Tracy Garcia, Director, Service Learning

Address: 2 Lafayette Street

I represent: DYCD

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 9/9/15

(PLEASE PRINT)

Name: Susan Haskell, Deputy Commissioner

Address: ~~123 William Street~~ 2 Lafayette St.

I represent: DYCD

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 09/09/15

(PLEASE PRINT)

Name: HECTOR BATISTA

Address: _____

I represent: BIG BROTHERS BIG SISTERS

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Dr. Sat BHATTACHARYA

Address: 536 E82ST, #5F, NYC 10028

I represent: HARLEM CHILDREN SOCIETY

Address: Same.

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: 9/9/15

(PLEASE PRINT)

Name: Jean Lahage Cohen

Address: _____

I represent: Mentoring Partnership of NY

Address: 122 E. 42nd St Ste 1520, NY

Please complete this card and return to the Sergeant-at-Arms