

**Commencement address
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Stony Brook University School Of Medicine
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**Graduates, faculty, family members, and esteemed guests:
Thank you for inviting me here today to share this milestone
with you. On behalf of the National Institutes of Health, I
want to be among the first to congratulate you on your
achievements and to wish you the very best in your future
endeavors.**

**I'm Gwen Collman from the National Institute of
Environmental Health Sciences, which is one of 27 institutes
that make up NIH. While NIEHS has in-house labs and is home
to the National Toxicology Program, I run the Division for
Extramural Research and Training.**

**D.E.R.T. or "dirt" as we affectionately call ourselves is the
group that is charged with making critical investments in
biomedical research. Dozens of institutions, including Stony
Brook, Columbia, and Mt. Sinai, collectively receive millions of
dollars in grants to conduct everything from basic research to
large population studies all focusing on our critical mission –
understanding the impact of exposures in our environment on
health and human disease. Some of you may have had some
experiences working on NIEHS funded projects.**

On a personal note, I'm a native New Yorker, like many of you – I grew up in Brooklyn. And you should know that I almost went to Stony Brook as an undergrad. Many of my friends went to Brooklyn College. But my parents were willing to consider a state university for me and the tuition that went with it - that was about \$1500 at the time.

After driving around the state, I was getting ready to decide between Binghamton, which is about a 4.5 hour drive away, and Stony Brook, which is about 1.5 away from our house. My mother said, "I think you should go to Stony Brook – that way you could take the LIRR and come home on the weekends or we could come out to visit you all of the time."

Well that sealed the deal and I went to Binghamton! So it's my mom to blame -- I would have been here, but what can I say, my mother was a helicopter parent before her time!

But I'm here now, and that's what counts! Anyway, I realize you may not have heard of NIEHS, but you need not look beyond our name to know that what we do is of utmost importance to the country. We are lucky enough to have the public trust to support the highest quality science across the US and in other parts of the world to understand the health impacts of environmental exposures. You could say our middle name is "Environmental Health" and that really speaks

to our robust prevention mission. For us, “environment” is not about saving the trees, although we certainly care about them. No, we’re about understanding the environmental causes of human illness and disease. This often takes the form of pollution and exposures to environmental chemicals, but really we’re talking about any external influences to our innate genetic programming.

More anecdotally, while you may not of heard about NIEHS (before today),

- *We are* the ones who supported the discovery that lead in your house paint and gasoline was leading to cognitive deficits in children.
- NIEHS scientists have been studying the dangers of mercury in fish.
- *We are* the ones supporting research to discover that exposure to the particles in air pollution can cause heart disease.
- Scientists in NIEHS and the NTP are studying a class of chemicals found in everyday products that act like hormones in the body. They are called endocrine disrupting chemicals and we’re finding they have all sorts of long term deleterious effects in the body.
- And *we are* the ones behind new studies of exposures from man-made technologies: cell phone radiation, nano materials.

- **Finally, most recently we've been heavily involved in ongoing efforts in the Gulf. NIEHS's worker training program was on site within days of the Deepwater Horizon disaster, and over the course of the clean-up effort, we helped train about 150,000 workers. And with our ongoing health study, we are following up to 50,000 residents of the gulf community, to determine the short and long range health effects of exposure.**

So, that's a lot of stuff, but I think you'll all agree that it's important. Various studies estimate that the environment plays a role in nearly 85 percent of all disease. NIEHS is on the front lines of the fight against diseases like cancer, autism, Parkinson's, asthma, heart disease, diabetes, focusing on how exposures to environment agents may cause them. And even more importantly how to reduce these exposures to prevent them.

All this puts NIEHS at a unique confluence: while other NIH institutes focus on disease and cure, we at NIEHS say that while you can't change your genetics, you can change your environment, and in so doing, change your susceptibility to disease.

Isn't that's why you're here today? I argue that "public health means prevention" – In your studies leading up to today's commencement you've learn how to look at the

causes of diseases in communities and populations, here in the US and around the world. Being a graduate of a school of public health I know that you've have learned how to do the fundamental research to understand risk factors for these diseases and how to modify those risk factors. I'm sure you've thought about interventions – reducing cancer and CVD risk by stopping smoking, keep babies and mothers healthy by taking vitamins during pregnancy while reducing the risk of birth defects, or reducing asthma by staying inside on high ozone days – and how to include these activities in the world of public health practice.

Of the many areas that NIEHS is involved, I'd like to talk today about a particular passion of mine, and that is breast cancer. Breast cancer is the most common cancer among women worldwide, with nearly 200,000 new cases being diagnosed yearly in the U.S. While the stats are harrowing, breast cancer speaks to me because a big chunk of my career was spent right here on Long Island, studying breast cancer in this community.

These days, the subject of breast cancer is a case study in disease prevention and public relations. It's remarkable to see how a disease, that a generation ago was a disease of silent suffering and perceived as a disease of aging, is today in the spotlight and the public discourse like none other.

Unfortunately today it feels like no woman, no matter how old or young, is free of the fear of developing breast cancer. At NIEHS we are interested in how prevent breast cancer while our sister institutes are interested in how to diagnose, treat and cure breast cancer.

There are some know risk factors for breast cancer and they include early age at first menstrual period, late age at first birth, hormone replacement therapy, early exposures to radiation, and age. Only one of these known risk factors are an environmental exposure. This evidence comes from studying the Atomic bomb survivors in Japan. Young Girls who were exposed to radiation from the bomb went on to have a high risk of breast cancer as adult women. Girls exposed while going through puberty (11-14 years old) had the highest risk. Remember this information about radiation – I will come back to these important facts later.

Almost two decades ago the women of LI believed the high rates of breast cancer in their neighborhoods were due to exposures to environmental chemicals and possibly radiation exposure. They went door to door to map the cases of breast cancer and then worked with scientists here at SB and other institutions to study the maps. Then they went to their elected officials and told them what they knew.

The women of LI wanted a comprehensive federal study of the environmental risks of breast cancer and they got

Senator D'Amato to demand it. In an unprecedented action, The NIH reauthorization bill of 1994 we held up as the amendment for a LI study was crafted – directing the NCI and the NIEHS to carry out a study of breast cancer risk focusing on environmental exposures such as pesticides and industrial chemicals (DDT and PCBs), air pollution (PAHs) and electromagnetic waves from power lines and other sources.

I was the NIEHS lead science administrator for the LI Breast Cancer study project. After many visits to NY, and talking with all the scientists who could contribute, we ultimately created a consortium with several NY universities including Stony Brook, which officially began work on a number of projects in 1994. For 5 years I visited the study teams on a regular basis, working with investigators at several major universities. I worked with Dr. Christina Leske who was the chair of the Department of Preventive Medicine to study the risk of BC from EMF and met many members of advocacy groups all across NYC and LI. I have continued to work with these advocates and scientists even today as we continue our work on BC and the Environment.

So, fast forward 10 years, what did we find?

After all the suppositions about the effects of these exposures, and countless patient visits and community meetings, and a decade of data collection and analysis, we

found... In women with breast cancer compared to women who did not have breast cancer we found NO increased risk from any of environment chemicals studied (PCBs and DDT), no risk from exposure to EMF, and a very modest increase in risk associated with polyaromatic hydrocarbons, which are the combustion by-products found in cigarette smoke and air pollution. Even using cutting edge methods and approaches, negative findings are always disappointing. The community which believed this study alone would answer their concerns once and for all was understandably, not happy. There were repeated articles in the media over the years, pointing out the struggles and suggesting that maybe the scientists weren't listening. The NY Times headline read "*The epidemic that wasn't*" shining a spotlight on the purported failure of the Long Island study.

Did this stop scientists, Federal government scientists and advocates from continuing to work together to study this problem – no! In fact, 15 years later NIEHS has continued to lead the way to understand the impacts of environmental chemicals on the breast. Other research was being conducted on endocrine disrupting chemicals and other exposures and through those studies we were finding out that they work during development not in adulthood – during what we call windows of susceptibility – times when the mammary gland is rapidly developing – during gestation – when the baby is

developing it's organs, during puberty –when girls become women and their breast and reproductive systems are maturing. So in the LI BC study we were studying women who already had the disease – we should have been studying their children and their children's children. Community members who were open minded to what the research taught us, have learned about these new science advances and support the work of scientists who are now intensively studying chemicals such as bis-phenol A, phthalates which are in plastics and in cosmetics in young girls with new tools and methods. The advocates are behind our work in toxicology as they have learned the importance of studying rodents in addition to humans. These models help us learn how these chemicals act on the breast early in life to make it more susceptible to cancer in adulthood. We at NIEHS have totally shifted the paradigm and are now looking at early life exposures and adult diseases.

Scientists have listened carefully to breast cancer survivors, many here on LI, to guide their research to make it relevant and to pose reductions to exposures that are commonly found in our environments. We're not there yet, there is still too much breast cancer in the world. But working together, scientists and advocates are looking towards the future, to protect the next generation by taking a precautionary approach. This has lead to some serious

advocacy by multiple stakeholders for new policies and laws which will reduce the number and types of harmful chemicals that are in commerce and in our air, water, consumer products and in our food. A bill was recently passed here in Suffolk county banning the use of Bis phenol A in baby products. Last week a scientist supported by NIEHS, found unsafe levels of flame retardants in baby products such as car seats and changing pads. Chemicals that were banned years ago or have other commercial uses. Our children do not need to be exposed to such chemicals. We need to create a greener world for them to grow up in.

I encourage you to let the lessons of the Long Island study be your guide – for in the real world, breakthrough discoveries are few and far between. Public health wars are lengthy campaigns: a few successes come from countless seemingly dead ends and failures.

I came away from Long Island learning several important lessons:

Lesson 1: Regardless of the discovery, there's value in every project. Although initially disappointed, scientists and many women of LI, eventually saw this study and the participants as a national resource – they saw it as the beginning of a relationship with the government, and an investment and commitment to continue to work on these

problems. And other scientists have used the specimens collected from the Long Island women as a springboard to other knowledge- more than 80 papers have come out of the initial study.

Just the same, every public health intervention becomes an opportunity to create a living laboratory. We can and should bank specimens to develop an investment that can go well beyond the initial needs.

Let me tell you a funny story that I remember vividly from the LI work: we wanted to collect dust as a new biomarker of exposure. The interviewers had these special new filters and vacuums. They would make an appointment and go to the home, bring all their stuff, map out the place on the carpet, and vacuum and vacuum... NO dust. Consistent with my own mother's values, the women had cleaned the house before the study team got there! We tried hard to find the dust – ultimately we got bags and bags, but we had to get familiar with the local culture which demanded that no guest would be allowed in unless the house was spotless. Right moms?

But having that archeological history, those samples, is of tremendous importance. We still have these dust samples - so we have a time machine of exposure to go back and know what some of the environmental conditions were like. But we had to plan for that by having a shared understanding

between scientists and the participants – to understand what research really means and what can be found and what can't.

We don't have all the answers when we want them, but we can keep working towards answers.

Lesson 2: Except for dust collection - Public health science can't be done in a vacuum. Community connections are an integral part of the research process and their concerns about environmental hazards in their neighborhoods and how it affects their health and the health of their children are paramount. These relationships really make or break a study.

Some of my most interesting times have been when community members have taken me in their cars or on walks to show me what their neighborhoods look like and what the environmental hazards they are dealing with. A few years ago I visited a neighborhood in San Francisco called Bayview-Hunters Point- no grocery stores, an abandoned contaminated military superfund site right next to a housing development, automotive plants on a residential street and a concrete plant across the street from a school. There are environmental justice neighborhoods like this all over America. These "toxic tours" as I call them can sometimes have a game-changing effect. They tell stories that aren't written in scientific journal articles.

The final lesson is that research, “successful” or not, is often incremental. In the 90s, it totally made sense to study the women of Long Island like we did. Cancer was a disease of the aging and we were measuring exposures of women who were in their 50s and 60s.

Today, in part due to what we suspected from the Long Island Study and other studies, we know that some chemicals take their toll far earlier in a woman’s life especially before and during puberty. Children have greater exposures to toxic chemicals for their body weight than adults. Infants drink seven times more water per pound than an adult. The air intake (per pound) of an infant is twice that of an adult. These differences result in children being disproportionately exposed to toxic chemicals. Further, complex and highly sensitive development takes place prenatally and continues throughout childhood into puberty. Doses of toxic chemicals at levels that would have no adverse effect in an adult, can disrupt organ formation and cause lifelong functional impairments.

So, in current prospective studies, we are following women through a much wider span: from pregnant moms and following their children all the way through their child bearing years and beyond and we are making the investment in characterizing the environment exposures during these critical time periods.

But let's be frank – we don't know the cause for breast cancer, and we certainly don't have a cure. Research is a decades-long process. Public health is about prevention, but prevention can't wait for definitive answers, which rarely come from science.

Healthy choices and avoiding exposures help tremendously in mitigating disease, but what are the behaviors should we be instilling? And not all exposures can be reduced by personal choices. People know about diet, but not so much common chemicals. There's a real opportunity for public health practitioners to look through the treasure chest of discoveries to help inform healthy choices and to help inform regulatory policies to keep the bad actors out of commerce or out of our air.

The environment in which Americans live has changed greatly in the past fifty years, especially in terms of the chemicals to which we are routinely exposed. More 80,000 synthetic chemicals have been developed and are used today in most consumer products ranging from foods and food packaging to clothing, building materials, cleaning products, cosmetics, toys, and baby bottles. As I already mentioned, children are especially at risk for exposure to these chemicals.

Ongoing biomonitoring studies conducted by the Centers of Disease Control show that there are detectable levels of more than 200 high-volume chemicals in our population. The surprising to all of us that an overwhelming majority of us have PBDEs, a fire retardant, in us. Also, Bisphenol A, a chemical used in plastics that may have reproductive toxicity. I'll keep going: PFOAs – associated with non-stick cookware. Acrylamide – a byproduct of smoking or cooking food at high temperatures. Perchlorate – used to manufacture fireworks and rocket fuel. We are walking cocktail of toxic or potentially toxic man-made chemicals. And we are still learning about the potential of these chemicals to independently or synergistically have adverse effects on health.

While Grandma might talk about peroxide at the local beauty shop with her friends, she probably doesn't talk about all of these other chemicals...but maybe she should.

And my own kids will come to me, and ask if I can use that water bottle? Or "can I put plastic container in the microwave?" That awareness is extremely important to making healthy choices.

So where does all this lead us?

One of my daughters just graduated from college. Five years ago when she was applying to college she dutifully wrote her essays. She wrote about how she couldn't decide

which career path to take after listening to her parents for so many years talk about our work. At our kitchen table, her father - the physician - would talk about the importance of medical care and treatment of illness and satisfaction from treating someone who's sick and making them better; I talked about the global view of health. "You gotta make a difference at a larger level, I would say. You could do research and prevent hundreds or thousands of cases of diseases and that would quite an accomplishment. "

And like all kids, she rejected it all, went on to study human rights not public health. But shh!! I don't want to tell her – not too dissimilar. Bottom line – good health and adequate public health is a human right and all communities anywhere in the world have the right to clean air, water, access to health care, and so importantly the right to valuable credible unbiased information about healthy choices.

The challenge for all us going forward is to think strategically about the breadth, scope, and goals for environmental health research and it's translation to the community, to health care providers to policy makers. It takes many types of scientists, in many discipline areas to unravel the clues of complex diseases. That's where you come in. Whether you eventually work on the scientific, regulatory,

public policy formation or health communication side of public health, you have the best new methods and technologies at your disposal or you will create new ones. You must be able to communicate with many types of researchers to do groundbreaking team science. And it's your responsibility to share your work with the public. Citizens have a need to know about the multiple risks they face every day and how health choices, whether they be at the individual level or at the policy level can effect each and everyone's of our risks of disease. So be bold and reach out to the communities to which you will study and you will serve. Get to know them as well as you can. Your work will be richer for it, the discoveries will be more relevant, and the messages will be clearer because of the dialog which you initiated.

This is a fine day for you, but your finest are yet to dawn. You've sought a noble cause. You seek answers to society's most intractable questions and your reward is the suffering not seen. My colleague and friend, Dr. Martin Philbert, who is the Dean of the SPH at University of Michigan (one of my PH alma maters) recently said " From bench to trench, the work we do changes lives and reduces the burden of the world's suffering." That's a big responsibility as you graduate, but one I know you are ready for.

So, I want to thank you for inviting me here today – My mom would be thrilled to know that her wish that I

participate in commencement at Stony Brook finally came to fruition – just a few decades later than she planned!

It is a great honor to be able to share this day with you. Again, congratulations on your outstanding achievement.

Best wishes to all of you and your families who supported you in so many ways to help you get to this great milestone. Thank you very much for allowing me join in your celebration.