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**Health Protectionomics: A New Science
of People, Policy, and Politics
George Washington University School
of Public Health and Health Services
September 19, 2007**

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RUTH KATZ, J.D., M.P.H.: – or if you can't find a seat, at least get ready to roll. We are going to have a terrific afternoon, I promise you. Good afternoon, everyone, and thank you all for coming. I am Ruth Katz, the very, very proud dean of the School of Public Health and Health Services and it is indeed great to see you all here, and it is in fact wonderful to be back here again for the second annual public health Grand Round series at the School of Public Health and if last year is any example at all, you can be sure that it will be another very stimulating year.

We are very grateful to Pfizer which is supporting this series again this year and especially to Dr. Barbara Debono. Barbara, where are you so I can call on you in just a moment? Barbara has been the champion of this program and we are delighted to have her back again this year. Without Barbara and without Pfizer, this event simply would not be possible. I want to thank as well Dr. Catherine Clary who is with us from Pfizer as well. She is vice president for U.S. External Medical Affairs at Pfizer and we are delighted to have you here with us for our second annual event.

Let me take just a couple of moments to tell you about Grand Rounds. Our theme this year is translating science into public health policy. That is a commitment we take very

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seriously here at the School of Public Health. There is a tremendous amount of scientific research underway here but it is work designed to take place in the real world, to shape policy and inform the law, to identify best practices in public health, and to influence the structure and financing of our health care system. By its very nature, turning good science in to sound policy is about effective collaboration that cuts across disciplines. We need to reach out to clinicians and bench scientists as well as to legislators, policy makers, and community advocates, to talk about what we know, what we need to know, and how we can use the information we get. That is what we will be doing here today with Dr. Gerberding and all year long with our Grand Rounds series.

By the way, that is one reason we issue an open invitation to this event. Many students from the school of public health are here of course, but we are also drawing in medical students and health providers of all stripes, students and faculty throughout the university and indeed the general public as well. One other aside, I think as you look around the room, you can see we have a terrific crowd again this year. No doubt it would have been even larger except that Governor Bill Richardson, democrat candidate for president, is also speaking right now at an obesity conference sponsored by our Department of Health Policy. [Laughter] Frankly, I don't know

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how it happened but all I can see however is I think there are very few places perhaps other than CDC and GW School of Public Health where students and faculty are forced to choose between two such high profile events. In any event, I am just absolutely delighted that you are here with us now and I hope you will return again and again throughout the year, as other distinguished speakers come to share our knowledge.

The next Grand Rounds is scheduled for October 16th at noon in the hospital auditorium. We will hear then from Dr. Arthur Kellerman who directs the Center for Entry Control at Emory University's School of Medicine. Dr. Kellerman is also a member of the Institute of Medicine's committee on the future of emergency care in the United States Health System. Check the school's website for updated information about Grand Rounds, for Dr. Kellerman, and again throughout the year and I hope that you will join us for each and every lecture, but in case you miss any of them, you will be able to get much of the information electronically thanks to the generosity of the Kaiser Family Foundation. Again, this year Kaiser is webcasting and pod casting the entire series and Kaiser, through this effort, has really given us an opportunity to share the experience of public health Grand Rounds with a much wider audience. Again, my thanks to Kaiser and to Pfizer and to all of you for being here. I would now like to introduce

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you all to Dr. Barbara Debono of Pfizer to say just a few words about Pfizer's interest in supporting the essential work of public health. Dr. Debono? [Applause]

DR. BARBARA DEBONO: Thank you very much, Dean Katz. It is really and truly a pleasure for us to be here and to sponsor the public health Grand Round series here at GW and as Dean Katz has mentioned, this is the second year in which we are doing this and it was really her brainchild, her concept, her idea, that there be a public health Grand Rounds here at GW. Now, imitation of course is the finest form of flattery. We have over the intervening year many of the other schools of public health have seen how incredibly successful this public health series has been and Pfizer was then inundated over the last year with requests from other schools of public health to have a Grand Round series and we said actually you know what? We are going to hold off. We are going to let the entire year go by, GW series, which has been again enormously successful, and we just issued actually an RFP to schools of public health to fund, based on those proposals and based on what looks really good and exciting and good for students and good for faculty, we will fund up to about 20 or so Grand Round series at schools of public health throughout the country but it happened here and it started here at GW thanks to Dean Katz' leadership.

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The other thing I wanted to mention, that is again unique here and I think really important, is that interface between medicine and public health and I am delighted that Dean Katz has invited the dean of the school of public health, Jim Scott, here. The school of health medicine, did I say public health? You are the dean of the school of public health! He is the dean of the medical school! Okay. [Laughter] You see, I conflate the two. There you go. Yes, I think it is really fantastic to make this linkage. You know, if there is any goal that I have on a personal and professional level it is to really begin to blend those worlds such that every physician in this country understands epidemiology, understands what public health is, thinks in terms of population health, while they are also treating their individual patients because a patient resides in a community which resides in a county in a state in a nation and I think the ability to link those two is critically and vitally important to the nation's health. So I am delighted that the dean of the Medical School is here, so with that I again want to say how proud and pleased we at Pfizer are that we have been privileged to sponsor the series and again it is thanks to your dean and her brainchild that we are here today. Thank you. [Applause]

RUTH KATZ, J.D., M.P.H.: Thank you Barbara and it is nice to know that once again GW leads the way. Thank you for

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those very kind remarks. It is now my great pleasure to introduce Dr. Julie Gerberding and then turn the rest of the afternoon over to her. I love traditions. My office will tell you that and I am absolutely thrilled that Dr. Gerberding is helping to create a new one at the school of public health. We were fortunate enough to have her kickoff last year's series, Inaugural Grand Rounds, and she graciously accepted our invitation to ring in this year's lectures as well. I already told her in my office what I am going to say publically.

Julie, we expect to see you here next September. [Laughter] I am issuing the invitation one year in advance. Seriously, as I am sure you all know, Dr. Gerberding is the director of the Centers for Disease Control and Prevention, a post that she has held since July 2002. She joined the CDC four years before that and as you can imagine she has guided the agency through some extremely challenging years ever since. At a time when bioterrorism, avian influenza, and emergency preparedness have been very much on our minds, Dr. Gerberding has worked hard to put a real face on CDC, making it an instantly recognizable name to most Americans. In doing so, she has helped to breathe life into the concept of public health and given people a much clearer and better understand of just what CDC does and why it is absolutely essential. Fortunately, Dr. Gerberding has exactly the right training and experience for her current

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responsibilities. She did her residency in internal medicine at the University of California at San Francisco and completed a fellowship there in clinical pharmacology and infectious diseases before earning a master of public health degree at University of California at Berkeley for which I still have not forgiven her two years later. Prior to joining the CDD, Dr. Gerberding was on the faculty at UCSF and her lengthy CV includes memberships on numerous scientific advisory committees and consultancies for the NIH, the American Medical Association, the National AIDS Commission, and the World Health Organization and the list goes on and on and on. Dr. Gerberding is the perfect person to open this year's public health Grand Rounds because her work in fact focuses so much on policy as it does on science. In fact, as I observe how many times and how much time Julie spends in Washington, I wonder whether or not policy making has now become her first true passion. [Laughter] The doctors in the room may give you a hard time about that. In any event, we are absolutely delighted to have Dr. Gerberding back. Julie, thank you so much for being here. Ladies and gentlemen, Dr. Julie Gerberding. [Applause]

JULIE GERBERDING, M.D., M.P.H.: Thank you. It is really an honor to be here and I have to admit that when the dean asked if I would come back again next year, I didn't even

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have to think about it because this really is one of the most exciting and fun things for me to do, not just because it is here at the UC Berkeley of the east [laughter] but also because as you said of the conflation, the fact that this is a room full of people from the school of public health and the school of medicine and a whole lot of other disciplines in the areas that care about health and the more we come under one big tent, the more we work together, the more likely we are really to be successful in protecting people's health so I am here representing CDC and the whole army of wonderful people there who are passionate about many of the same things that you are passionate about and I hope I can do justice to our views of health and the science of health and people in policy and politics as we have a conversation today.

I wanted to start this with a little reflection. This is a pretty big topic and I like to make up words so I admit, there is a neologism here but when I was really thinking about health protection which I believe is what we in public health stand for, I was reminded of my recent travels. I was in Africa as part of a delegation led by my boss, Secretary Mike Levitt, and the head of the PEPFAR, Ambassador Diybul and Roger Glass who heads the Fogarty and several other distinguished people who were interested in looking firsthand in how the PEPFAR program was doing for AIDS in Africa and how we were

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doing on the malaria initiative in terms of combatting malaria in the countries where that has been launched and you know there is a thousand stories to tell about the trip because we were in five countries and it takes your heart to really see the wonderful work that is going on and the hope and spirit of all these people coming together, the NGOs, multinationals and the citizens themselves in the countries, but the best stories are the stories of the individual people and I just want to tell you a couple of perspectives. The first happened in South Africa where we saw some women who were the grandmothers of AIDS orphans and they were coming together to [inaudible] a lot of wonderful mentors and teachers [inaudible] family at their age and at their station in life and so one of the things that the women did was come together and learn to sew and so there was in a hut a set of sewing machines and kind of a solar powered apparatus to keep them running and the society of women were all sitting around their sewing machines and they had just finished sewing some gym clothes for the kids and they were now busily sewing things for themselves so we had a chance to go in there and talk to these women and kind of teased apart their stories. One of the most remarkable things that one of the ladies said was you know, I thought I was coming here because I needed help feeding my grandchildren and then I thought I was coming because I needed to learn how to keep them healthy and

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safe but what I am really learning is that I am here to help myself because if I can learn how to make friends and share my burdens with the other women here, I think all of us will have a little bit easier time going through our lives together so it's just that little power of women coming together and learning from each other, solving problems and developing a little microeconomy of their own and that gave us a lot of hope in the context of the big AIDS picture.

A sad vignette happened in Rwanda in an environment where everyone is still recovering from the genocide and I met some women who were pregnant, a lot of them had HIV infection or were worried about HIV infection and I saw one woman sitting right in front of me and in an effort to be friendly and try to make a personal remark, I asked her if she was hoping for a boy or a girl and she said oh, I want a boy and I said well why is that? And she started to cry and I felt sad. I didn't really understand why she was crying and so one of the nurses who was assisting who could speak her tribal language engaged her in a conversation and as they were talking the tears became more and more apparent and I really could not understand what the problem was. Well the problem was she had been raped and so she was pregnant as a consequence of the rape and in her tribe if you are raped and you deliver a boy it is the way of more or less exercising the rapist from your system but if you have a

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girl, you carry that with you and you are stigmatized by your peers in perpetuity. And so here I was thinking from a western perspective oh, is it a boy or is it a girl and this woman was desperately hoping for the best possible outcome so that she could have a chance of resuming a normal life in her society.

The last vignette also happened in Rwanda which was this wonderful woman who is out in a tent in the school yard in a mobile HIV testing clinic, some other people operate there, a terrific program for kids, but my colleague from CDC who is working in Rwanda, there is our country director, Donald Schreiber, said well you know, she is one of the only women in Rwanda who is famous for riding a motorcycle. I said that is kind of interesting. Women don't ride motorcycles here. So, I chatted with her a bit and I said why do you ride a motorcycle? And she said you know why? Because there is no one here in Rwanda to tell me not to. [Laughter] And I laughed at that too, but then of course the reason was because her entire family had died in the genocide and she was a woman who was courageously trying to learn English. She was working for the CDC. She attended to recreative family so she had found several other people who had similar social circumstances and they were renting a house together and creating their own family and one of her major missions in life was to really reach out to make sure that Rwanda didn't have a second

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genocide as she puts it, trying to keep the HIV epidemic away from the people who survived the first catastrophe in the last couple of decades, so these people are just a few of hundreds of people that we talked to and I am sure those of you who have travelled internationally and been in environments where people are really in desperate need of additional support for protecting their health and improving their status in life could tell similar stories. But what they meant to me was that as the CDC, we needed to really think a lot more broadly about health and we need to understand health in the context not just of the disease or the body part that we are concerned of or the pathogen but in the context of the human story that goes along with it, the social context, the environment, the economy, the culture and the whole geopolitical situation that people are striving for improved health and I know we all know that. That is part of the fabric of public health but sometimes I think we forget when we said about our agendas of change, or agendas of health improvement, to really recognize that we have to start there if we are really going to ultimately end up with people who have better health. So at CDC we have been struggling with this and we have thought a lot about what is our mission. This is the way we traditionally frame the CDC mission; safer, healthier people through prevention; but we have really been rethinking that and I

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wanted to share with you a little bit some of those thoughts because I think they are very german to the science and policy intersection. We really are talking now about our role in health protection as one of two main frames of our work and we still mean prevention. We are still very much committed to the prevention of disease, injury and disability but we are also increasingly focusing on health promotion in a broader context of the things that promote and engender good health as well as preparedness, given the times and the requirement that we have for preparing against emerging threats so these three P's, promotion, prevention and preparedness, are really a broader frame of our work at CDC. The investments that congress and policy makers are making in us but they don't tell the whole story because whether we have ever made it explicit or it is just implicitly part of our hearts and our genes if you will, there is another lane that we care as much about and that really is the whole concept of health equity. You didn't see it in our mission statement in the past but we are working our way to making this a very visible and prominent part of what we intend to accomplish at CDC and we haven't even quite settled on our organizational definition of health equity. Obviously it is the absence of disparity, however you define it, but equity brings into play a much broader dimension, the social context and the sense of justice and fairness that we all want

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to achieve for people who are trying to develop their optimal health status. So health protection, health equity really are the framework for CDC's work and like all organizations, probably you too, we have our core values that we still hold very dear to our hearts and I think they are core values of everyone in public health. We have established some organizational goals. We have set some strategic imperatives and we have developed a balanced score card to measure our excellence and I am not going to dwell on this because that has probably already made you half way fall asleep. [Laughter] But the point is that if you read these goals, healthy people in every stage of life, healthy people in healthy places, global health and preparedness, these are big ticket items. These are really big goals and our congress and our government, our tax payers have given us about \$10 billion dollars to try to accomplish these goals. That is about what the CDC budget is and that is a whole lot of money. We would like to have more. I won't deny it but that is still a tremendous investment in health protection and health equity and we of course have a responsibility to try to get the best value from that investment so we have to think about what is health value? If we are going to optimally invest \$10 billion dollars where would we put it to really try to achieve these two kind of overarching requirements of health protection and health equity?

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We need the best deal. We need the best value. We need the best buy and I am not sure we can easily figure out what that is so I knew I was coming to a place where there are a lot of really smart people in the room and I figured I would get a consult and maybe ask for some help so I have you know sort of \$10 billion dollars here [laughter] and I am going to give that money to the dean. It is \$10 billion dollars and I am going to ask her for her advice on how should we invest that \$10 billion dollars to get the best possible health for the people of this country and beyond? What are the really most important things that we should be doing to assure that we truly are achieving the best possible health? So I am going to ask her to think about this because I might ask her a few questions later. But in the meantime, I would like to talk a little bit about how we traditionally have or would normally approach a problem like this. Generally what happens and let's just take kind of the framework of policy makers or congress or decision makers. Typically what they will do is say boy there is a bad problem we want to solve. Let's say diabetes, diabetes is a tragic problem and affects many, many people. It is growing in scope and magnitude. It is very expensive. It is very debilitating and it causes a lot of excess morbidity and mortality among people of all ages so let's put some money into diabetes.

Okay, what should we do about diabetes? Well one place to look

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are the healthy people objectives. For example, in healthy people 2010 objectives, there is an objective, in healthy people 2000 there was an objective that said let's get 11-percent reduction in the prevalence of diabetes. Unfortunately what was actually achieved was about a 33-percent increase in the prevalence of diabetes so back to the drawing board. Let's try to do better than that. For healthy people 2010, we said let's get a 38-percent reduction and so far what we have seen is a 25-percent increase. So, something is wrong with the way we are investing our resources in accomplishing this particular categorical health goal and it is not hard to understand what is wrong with this picture. If you take a very simple model of diabetes, we have got some people who are vulnerable for lots of reasons. We have got some people who have uncomplicated diabetes might not be diagnosed and then some people who have complicated diabetes and some of those who die and what we have said is we want to reduce the prevalence of people in those two boxes but we also said some other things in Healthy People 2010, we said we wanted to increase the percentage of people who were diagnosed from 68-percent to 80-percent, and we wanted to decrease the death rate from diabetes by 11-percent. So what is the net effect of all of this if we really apply our money in this way? Well, if we said let's increase the diagnosis we would end up with higher prevalence of diabetes,

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right? If we decrease the death rate, we are going to end up with a higher prevalence of diabetes because fortunately people will live longer and we will have more unhealthier people with diabetes. So the people who develop the 2010 control objectives are not stupid people. These are very smart people and they knew that we needed to do something else and that of course is you would need to decrease the incidence. And I am not sure how the math was created to pick the number but one of the philosophies in doing this was to do better than the best and apply it to everyone as an effort to address the health disparities issue so in this case, we said we would decrease the incidence by 29-percent. Well, if you actually look at this in a complex systemic way, what you will discover is that these things are all mutually exclusive and impossible to simultaneously achieve. Even if we reduce the incidence of new cases of diabetes to zero, we would only at best reduce prevalence by 14-percent under the best case scenario modeling so this isn't a very good way to think about investing our dollars from a standpoint of targeted categorical objectives, particularly since we know that the chances of reducing the incidence of diabetes to zero are zero in the current climate of our growing obesity epidemic. So that does not really lead us to an understanding of how best to achieve value with those investments.

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So let's look at it another way. I am an epidemiologist and I don't know if anybody read the *New York Times* Sunday Magazine but I didn't find it particularly useful. It was an article that really took epidemiologists to task for really not being able to provide the same kind of science that a randomized clinical trial provides and we all agree with that. Nevertheless, I think there is great value in epidemiology in defining risk factors and describing the burden of disease in the population and these are data that are traditionally used to define burden in the United States, either burden in terms of morbidity or risk factors for death and if you were going to make decisions about how to invest this \$10 billion dollars based on this kind of chart, you would say well, heart disease, cancer, stroke would be high targets for investment or maybe to go upstream a bit, let's invest in tobacco and some of the other items listed here and that makes completely good sense to me. That is one of the things that we are trying to do more of at CDC. So we, as a nation over many decades, have begun to invest in tobacco issues. We are not done yet but because of some of the investments and the application of the tobacco settlement dollars to programs to reduce tobacco use among teenagers for example, this year we have the lowest ever teenage use of tobacco in our country. Not low enough, but the lowest ever, really showing that if you

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invest in a risk factor you really can achieve a measurable impact and result in a truly significant reduction in that risk factor. That is great and I would never want in any way to discourage more investment in tobacco cessation or prevention but the picture is a little bit more complicated than that because at the same time we are announcing that we have the lowest ever tobacco use rates in adolescence. We are also reporting an increase in the suicide rate among adolescents in our country. Now we are not investing as much in suicide prevention as we need to be obviously but it is just a small little vignette to help us think about the fact that whether we are talking about tobacco, reproductive health, methamphetamine, suicide, motor vehicle injuries, we are talking about the same population of people and we can't dissect them into their risks. We have to begin to think about them as the way Dr. Mom thinks about them as holistic people who are at risk for a variety of health conditions and mom is not going to be satisfied until we have simultaneously addressed all of those issues because if tobacco goes down but suicide goes up, that is not a healthier adolescent and that doesn't necessarily mean that the categorical approach is the way the way to best influence the overall health status or the health protection and health equity status of any population of people. So, mom would look at this and mom would say well, I

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will be satisfied with the health of my teenage daughter if she is not using tobacco, if she is physically fit and has a good body weight, if she is not using drugs and driving in particular, if she is vaccinated, and is not exhibiting sexual behavior that puts her at risk for sexually transmitted disease, HIV or pregnancy. That is pretty much how mom and dad would think about health from the standpoint of their child and it is the way I think we need to increasingly think about it as leaders in the field and as scientists and policy makers in the field. Lots of people have considered this before. This is not obviously a new idea. This is a statement exploring why previous attempts to change our health care system have failed but I thought it was germane to this discussion. I am basically saying that we don't really look at things in the context of the larger system of changes that are occurring in the environment or in the social cultural milieu and one of the main reasons we don't do that is because those of us in the academic or the political or the policy maker arena fail to see things as a system of a whole. Epidemiologists are really good at stratification. It is one of our best skill sets. We know how to parse things out and independently tease out an association. We don't like confounders. But as a matter of fact, there is beauty in the confounding and we need to pay attention to the confounding as much as we need to pay

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attention to controlling for it. I think this is another quote that I love because I am one of those people that are all over the internet and I am familiar with the telescope and I am familiar with the microscope and I talk a lot about the retrospectoscope because people in Washington use that instrument a lot. [Laughter] On a day like today where I just came from a press club where we launched the year's seasonal flu vaccine campaign, I would love to have a prospectoscope so I could look in my crystal ball and figure out what strains are going to be here and how effective the vaccine is going to be but there is another instrument that someone else thought of that I think is very important to the discussion we are having today and that is a discussion about the macroscope, that we need a tool that helps us try to understand and direct effective action in the world that is looked at as an integrated whole. We need to be able to see all the parts of the pieces together in their context, the network if you will, and a macroscope that allows us to step back away from the stratified orientation and begin to understand the relationships. Now, if you go back to the CDC frame here, thinking about our goals and how we think about them and our commitment to excellence and I am going to focus particularly on excellence in science here. When you read through our explanation of these goals, I think you can begin to see the

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flavor of a systems thinking starting to emerge. We are talking about life stages, not disease categories. We are trying to focus on people's health in a holistic way in the context of their society and their environment, you know, through the microscope. We are trying to focus on equity for everyone and we want to really have results so that we are definitely moving the needle on the dial in health and safety and we love talking about this and we are very passionate and committed about it and I think we will make some progress but we have got a challenge and the challenge is that the science necessary to really do this and approach things in this way is not as developed as the other scientific disciplines that we traditionally bring to bear on our problems so if we are really going to move this agenda forward, we are going to have to expand the toolbox of scientific skills that we have at our disposal and we are lucky enough to be faced with this challenge in a time where that is already happening in many, many disciplines. This is the era of integrative science and I am glad the dean from the school of medicine is here because I know the school of medicine has probably got a center of integrative science if they are like most schools of medicine. These are cropping up all over. This really started with the concept of genomics, the genome word first appeared in 1920 but I think the concept that there is a domain of investigation led

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to the ohms that we are seeing so many of and you know the Journal of Ohmacology [misspelled?] if you can believe it where we integrate lots of domains of biology and research and discovery into platforms that help reinforce and feed off of each other and there are lots of ohms. I encourage you to go to Wikipedia and look up ohms. There is a wonderful website on the subject. There is just an ever increasing array of ohms starting with genomics and becoming progressively larger in scope and frame. Netomics is the study of networks; sociomics, the study of societies; religiomics; predictomics, that one again I would love to have more of at CDC. [Laughter] And then there are some additional ones that are included there, other "ohmics" [laughter], pseudohmics and unknowhmics, which I really found fascinating and then a couple that are questionable pedigree, nonsensohmics and antiohmics. I know who the antiohmics people are, and then the last two that really weren't part of Wikipedia but I thought they deserved mention and that was Reaganomics and cohomics. [Laughter] So this is all just a way of saying that people are thinking about their science in a progressively integrated way and these things are tending to build more interdisciplinary approaches to problem solving and the convergence is moving up the scale from the most micro/nano level to the macro level, one that we can really view with the microscope. This is from Wikipedia that

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for biologists, ohmics easily conveyed the key concept, the implications of a complex systems approach, and approach that is closely tied to the study of networks, emergent properties and so forth so that there is a trend here that I think is building and building and building momentum. We see it in our basic science at CDC in the reactone for influenza, integrative biology. I have to at least give some loyalty to Georgia here. But notice that they are talking about ecology, evolution and behavior, not just molecular and cell biology or bioinformatics so that macroscopic view is coming into play here.

Presentation of antarctic biology, which is dealing with climate change and the adaptation of antarctic marine organisms or the convergence conferences that have come forward where they knowingly bring cognitive sciences into play with informatics and molecular sciences. This is a list of the people who on the website were suggested to attend the convergence congress and I would feel bad if I wasn't included but actually they didn't invite epidemiologists so I have sent them a nice e-mail and hopefully next time will appear on the list. [Laughter] The convergent doctrine is, you know if the cognitive scientist can think it, the nano people can build it, the Bio people can implement it and the IT people can monitor and control it but we are just building up the scale. Which brings us to a scale that I think is more familiar to us in the

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public health dimension, the population health dimension where we can begin to think about syndemics [misspelled?]. And I hope this is a term that is familiar to you but a syndemic is really the interplay of two or more afflictions in the population where in a sense their whole impact is greater than the additive effects of their independent contributions and result in excess burden of disease in the population. These are important because as I tried to point out with the suicide and the tobacco analogy, you can't just solve one problem in the population and expect everything else to stay stable or improve as well, you have to deal with the underlying issues or forces that tie those afflictions together. This first became a conspicuous issue in the context of AIDS. This is to my knowledge the first time the word syndemic was coined. I suppose if this were today it would be called a syndomic, not a syndemic, but anyway, it is just the recognition that in AIDS you can't really solve the problems of the health status of people with HIV infection if you don't deal with violence and substance abuse at the same time because they are so integrally related to each other.

These are some people I met not on my most recent trip to Africa but on a trip before that. This is an African family. The woman in the colorful dress, the bright colored dress, is the mom and those are her three sons and her mother-

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in-law in the red. They live in that house and they are really neat people. She has HIV infection and I asked her to tell her story about her antiviral treatment which one of the CDC programs is delivering on a motorcycle to her hut on a weekly basis and she is one of those people who has had complete restoration of her life as a consequence of antivirals, going from near death to a woman who is now able to grow more than enough food to feed her family and this created her own little micro economy to be able to help the status of life in her hut improve significantly but there are a few things to say about this. First of all, when she was recognized as having HIV infection, the first thing people did was not start her on antiviral drugs. The first thing they did was bring her a water vessel because there is obviously no water in this home and the water they were drinking was horrible and intestinal infections in her but also her children were really a major force of morbidity. They also started her on Septa prophylaxis and that certainly helped her diarrheal illness but it also treated her malaria and that with the bed nets really made a significant improvement in how she felt and her nutritional status so they then instituted antituberculosis therapy which she unknowingly had active TB and she really attributes the TB therapy to being the tipping point for her health status improvement but once she had done those things, her family was

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in better health. She was in better health and nutrition. She had learned to take drugs. She was trusting the people who were delivering them. They had bed nets. The malaria was under control, then they started antiretroviral therapy and she at the time I saw her had a very healthy CD4 count and was very optimistic about her future, to a point, but then there is a larger concept, the macro scope if you will, and that really was the point that in her country, in her community, she had no legal rights. She could not inherit property and so although her husband had died of AIDS and she was able to live in the hut, if she died she didn't technically own the property so her sons could not keep the house if something happened to her so her main goal was to live until that tall boy was 18 years old so that he could inherit the home and keep the children together under that roof.

The other thing that she was very wise about was the fact that she needed to protect these boys from HIV and so I asked her, you know, what are you telling your sons? How are you going to make sure that they don't end up where your husband ended up? She said it is very simple. Every morning I walk them out the back door and I show them the place where my husband is buried and I remind them every day that this is what happens if you put yourself at risk for this virus and she said so far, that has been a pretty effective strategy so in the

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context of a syndemic, this woman is experiencing all of them. She is experiencing the juxtaposition, the multiple infectious diseases, and nutrition. She is experiencing the legal, social, climate, the whole concept of her longevity and her ability to provide and protect her children in a longitudinal manner and we see this everywhere. I don't have to dwell on the issue of AIDS and TB only to say as drug resistant tuberculosis grows, a syndemic is probably going to emerge as one of the biggest health challenges we have ever encountered.

We also talk about malaria, the AIDS, TB, and malaria also simultaneously interact and you can't really improve the health status of someone in one of these huts if you don't simultaneously deal with all three of these conditions but fundamentally my large frame on the macro sphere in the environments that I have visited in Africa is that the solution is very macro. It is about two things. It is about water and access to water and sewage and sanitation and it is about women and access to economics and income and rights and empowerment and the ability to feed your children because women who can feed their children without having to have sex for money or having to resort to other strategies for survival are much better positioned to be able to lead the way forward to a safer and healthier society for everyone and we know that from recent Nobel Prize winners who were rewarded for their work in micro

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economies for women but these are very integrated problems and it isn't enough to go in and do something wonderful like treat x-number of people or prevent x-number of cases of HIV infection or even to cut malaria by x-percent. You have got to look at the whole picture if we are really going to provide the maximum health benefit and I think it is easy to see that in a place that is developing but we need to see that in whatever sphere of health we are looking at, this kind of consilience of bringing together a lot of different sciences to bear on problems that are very complex and systematic in their orientation so I use the word health protectionomics which a tongue in cheek but to really imply that the science that we need to solve the health problems, to create health protection and health equity needs to be a much bigger science, a much more integrated science, a much more conflated science. I love that word here with medicine and public health coming together, two deans. That doesn't happen in very many places, that we need to really move up this spectrum of integration to the most macro level so that we can do a better job of creating the science and the knowledge that we need to solve these problems so that unification in that network to really get to the ecosystem as well as the brain system to come into harmony.

So that is what I would declare as the challenge to schools, to policy makers, to government agencies, to all of

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the leaders who are going to be accountable for improving people's health and right now in front of us we have one really huge opportunity because everybody is talking about health care reform or health care transformation or some kind of macro change in the health care environment. The price tags vary. The approaches vary as a government owned, government operated, and government organized. Everybody has a different theory about how to optimize this but there is general agreement that something needs to change in the sense that something will change and that we ought to be part of that change process in a meaningful way.

So I would like to take this concept of health protection, think about this \$10 billion dollars we have on the table and figure out how would we be investing this \$10 billion dollars in the new health system? Well let's talk about where we start. In the starting point, you can kind of think of people in four compartments: They are either safe and healthy. They are vulnerable for a variety of reasons; there are social, genetic or ecological determinants. They may have diseases and they may have complicated diseases and our traditional disease care system, moves them into the stage of disease care quite beautifully. It is obviously focused on the right hand side of this graphic and we make a macro investment there to treat disease. The system does a very poor job of moving people in

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the other direction and it is incomplete. It can perform miracles but it clearly emphasizes one end of the spectrum. It is not affordable and available for more and more people. The results that it achieves aren't very conspicuous. We don't exactly know what they cost. We don't reward people who do a good job and we can't really define the value. We don't know if we are getting our \$10 billion or our \$10 trillion dollars worth out of it.

So let's talk about the public health system, same set of people. Our system is smaller. It is certainly more oriented toward safe and healthy people and it probably does a better job of helping people move back to states of better health and safety as we go forward but just like the health care delivery system, the traditional public health system has some real challenges. Our capacity is small. We don't measure our results. We don't actually know what our investment is. We don't reward health organizations or schools or local health departments who do an especially good job. Sometimes we punish them, we give them less, and we certainly don't know what the overall value is and our decision makers and or tax payers don't appreciate that or use it when they make decisions about who they vote for or what policies they support, so we are proposing that we look at this as a more integrated system, that we think about how we would take our traditional public

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health system with some of its key components and strengthen those that bring some of the biggest power brokers together, government and businesses, along with the health care delivery system and then add in all of the other players that are a very important part of the public health network and instead of talking about a public health system or a health care system, truly talk about a health system, a health system that includes all of the component parts necessary to support, protect and treat health in a community. A health system is a network of people and organizations. It includes the entirety of those who have a stake. Together, the people in this network really could create an effect that is greater than some of the parts and achieve a common objective, health protection and equity for everyone. If we want to know the value in the system, though, we have to take this one step further. If we really want to know where to put our money or how to get value out of the system, we are going to have to measure it. We are going to have to measure the outcomes of the investments we make. We are going to have to measure the public health outcomes. We are going to have to measure the health care outcomes in terms of health and health status. We are going to have to be willing to acknowledge what it really costs us to do these things directly and indirectly so that we can do the calculus that says for a given investment here, we achieve this result.

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I told you for a big investment in tobacco, we achieve a significant improvement in tobacco but if I told you what we are investing in the biggest problem for adolescence injury, it is about this big so we aren't investing in the places where the problem is the greatest or we have the best opportunity to make a difference and we certainly need to reward results and align things with that. I believe we also need information systems that help us build the tools and give not just decision makers but people, citizens, users; however you want to define it, customers, and constituents. People need information and the personal health record is a great metaphor for putting that kind of information in people's hands so in this kind of system I think we could perform even greater miracles. We could have access. We could have better results and we would have a much better idea whether or not the places that we are investing our money were really achieving results. The challenge with this is that we could probably get this kind of at a conceptual level and I think that businesses are starting to get it because they see the world we do. They have got a pot of x-million dollars that they can spend on the health status of their employees. Right now they are spending almost all of it on health insurance or health benefits but they are beginning to realize that if we invest in a wellness program or we create a better cafeteria or we put a gym in our facility or encourage

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fitness and better exercise, our employees will be healthier. They will be more productive. Our business prosperity will improve and our economic development force will be greater. So businesses are starting to move in this direction and I think the biggest asset that we haven't tapped into yet is Dr. Mom because Dr. Mom still makes more than 80-percent of the health decisions in our country. Right now, she is kind of protected because she doesn't exactly see the investments that the employers are making but as cost sharing increases and families have to make decisions out of the household budget on a monthly basis, how much are we going to put into health this month? They are beginning to ask questions like are we getting our money's worth? Can my family get a better deal by putting our health dollars in a different place than just paying for the end stage treatment that of course we still want to have available to us if we need it and I think as we inform and educate people and empower them to understand what true health value is all about that we have a chance of really informing the debate on health system reform and moving the needle on the dial, not just so people can talk about prevention in the context of what goes on in the doctor's office which is usually screening and some counseling but to truly look at the health system and ask ourselves as a nation or as a global citizen, where do we want to invest our health dollars to get the best

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possible health protection and the best possible health equity for the largest number of people so I don't have an answer to the question I posed to the dean about where these dollars should go but I sure hope that I could inspire people to think a little bit more about that and really try to help us understand where is the best value so that we can do the best job possible informing our decision makers and our citizens what our science tells us is the best way to do our job. Let me stop there and thank you very much for having me here and I look forward to your questions. [Applause]

Thank you. So I would love to take questions. If I don't hear you well, just repeat your question so that everyone can hear it.

FEMALE SPEAKER: This is not a shy group. [Inaudible] you talked briefly about the whole prevention, not just health promotion but [inaudible], moving those diseased people towards safer and healthier communities and could you talk a little bit more about [inaudible] even this go between, end stage treatments and the prevention opportunities [inaudible].

JULIE GERBERDING, M.D., M.P.H.: The concept of prevention and trying to balance the importance of disease treatment with actually preventing disease before it occurs and you know we all understand the upstream, downstream argument and the question is where in the movement of people from one

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health state to another can we have the biggest impact? And I think we know that there are two tragedies. One tragedy is not knowing what to do, not knowing how to prevent or not knowing how to promote but an even bigger tragedy is not doing what we know and there are many missed opportunities to do what we know to actually prevent the onset of disease that subsequently requires treatment. The examples that are probably most on the minds of decision makers right now are examples that have to do with cancer, generally early detection, but certainly as a form of secondary prevention, the missed opportunities to really engage people in early screening and detection that can be so life saving. I am always thinking of that when I go back to San Francisco General and take care of patients which I try to do every year. The hospital is an urban hospital and it is full of people who have the problems that we are supposed to be preventing, late diagnosis, cervical cancer, COPD, hepatitis B liver failure, alcoholism, injuries without helmets and so on and so forth and we know what to do, we are just not doing it. Yes?

MALE SPEAKER: [Inaudible] UNICEF just came out last week with a recalculation of child mortality at 9.7 million children each year dying, decreased from 10.6 million, HIV/AIDS is probably 300,000, malaria might be a million of that 9.7, with your macro scope and that money that you have, how can we

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get more resources to deal with those 8.3 million or so deaths worldwide that are preventable and are treatable and really to a tremendous burden of disease worldwide?

JULIE GERBERDING, M.D., M.P.H.: That is such a thoughtful and hard question. You know, the first question is if we had the resources how would we use them? And I have already said, I think water and women would be the places to invest because I just don't see how you can protect those children if they don't have a clean water supply and effective sanitation. That doesn't decrease the importance of vaccinations or diagnosis and treatment for all of the myriad other conditions in addition to malaria and HIV and TB but how you motivate that is a challenge that you know clearly people like Jeff Sacks are struggling with and I don't have an easy answer. I am going to go again to the Clinton Global Health Initiative next week where these kinds of questions are asked and philanthropists and governmental and non-governmental organizations make pledges to take on specific projects that they believe can be a contributor but the real levers are generally speaking policy changes and marketing and then getting the macro investors to really step up to the plate, the bank, the global community of the developed world and I would like to be optimistic and say never before have we invested more than we are investing right now, but never before is the

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problem as difficult and is as challenging to address. I am hoping that the macro scope will make the concept of this small world so palpable to the citizens who have the means to support those decisions that it will become a no brainer but I know we are a long way away from that. If there is one very important perspective that I have as an optimist, I have the privilege of attending the world economic forum in Davos and they just had a summer Davos in Dallon and I am there because they have global health initiatives and to finally get some of the most wealthy and prestigious companies in the world with their CEO's to sit around a table and learn about malaria or learn about AIDS, TB or the neglected diseases, to see people who have never had to think about that suddenly not only get it from their heart as decent people who can be brought to understand and care, but as people who also care about prosperity and the security of their business and their economic survival and they are beginning to see those three triangles to be an international, the successful business, you need to be successful and prosperous but you also need to be able to secure your work force and protect their safety and you need to protect their health and that macro thinking is beginning to be part of the conversation in the mainstream of some of these meetings and I want to harness that. I think we need to not shy away from them. We need to engage them as part of the solution and so you know

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people here are probably ideally situated in many environments to contribute to that.

MALE SPEAKER: I wanted to measure contributors to health and equity is probably health insurance, how does the CDC in its macro scopic view look at health insurance as a means to increasing access to health care services and prevention services and health promotion services?

JULIE GERBERDING, M.D., M.P.H.: Well, I think we would start with the same place everyone starts, with the anxiety that fewer and fewer people have the security of knowing that their essential health services are going to be affordable and access is counterweight to the good work that we can do in public health because much of the advances that we might be able to make in population health through prevention and promotion depend on access to a delivery system that is either there as a safety net or part of the overall prevention agenda so if history repeats itself at times when access declines, public health requirements will increase and health status, particularly among the disadvantaged people, will suffer. So we are very concerned about lack of access and we are trying to put forward a conceptual framework that would encourage this to be part of the conversation but my fear is that the focus right now is on the economics of access but it is not really on health so the motivation right now is we can't afford health

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insurance. We don't have health insurance. We can't pay for health insurance. The cost of providing access is increasing. We need to save money and so on and so forth but the debate and the dialog are really not about the health of individuals or their families and I would really like the policy makers to start talking to the moms and dads of the world who are of course worried about insurance but they are even more worried about their kids and their parents and each other and their ability to live and enjoy the best possible quality of health so I would like to try to expand the conversation to move beyond just insurance and the affordability of it as the solution that we should be striving for. We don't get very many chances to think about health system transformation and I think on my next slide I was going to show you my personal philosophy which is I think that somehow today we are about right here. We are in a system where we have made a very little investment in protecting health and our health system value is not as high as it should be, especially if we compare ourselves to other developed countries but we may be at a tipping point where, with a little more investment in the broader population, community, social determinants perspective, that we really could have a significant increase in the value of our health system for everyone.

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MALE SPEAKER: The New York City Health Department recently banned trans fatty acids from all the restaurants. I was wondering is there any way that the federal government or the CDC could impose such regulations and if not, what would be the best way to get through to the private industries?

JULIE GERBERDING, M.D., M.P.H.: That is a fun question because I love New York right now. I think they are on the leading edge and they have made it easier for us to do a lot of things. It was a little bit easier for us to launch the opt out approach to HIV testing because New York City went there first and so on and so forth so we kind of like them as the early adapters of change. CDC doesn't regulate at all in the domain of food so we would not be positioned to provide a regulation around any particular approach to food and we like to use an evidence base for making changes like that. The evidence base for trans fat is going to be difficult to substantiate in an epidemiologic solid way that we would normally use for issuing evidence based guidance in terms of if you do X, the health benefit will be Y; but there is a logic model that suggests if you don't need to be eating those compounds and chemicals, then why on earth would you? And if we can implement policy level changes to change diet, it is a step in the right direction. It is not a big enough step and it is not the solution but I don't think anyone would be able

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to mount a very solid argument against the merits of reducing trans fats in our diet. I always worry though about these very specific approaches because just as you know when low fat foods came out, and we would get a low fat Oreo, but it still had 500 calories so you know there is a way in which sometimes people get confused that they are actually doing something that results in a net health benefit but what they are doing is really offsetting one problem with another problem so informing consumers and really helping consumers not understand the value but also the nuances of what it really means to have a healthy diet or what it really means to have a healthy lifestyle, I think these are tough challenges and the place where schools of public health and CDC need to be front and center because somebody has got to credential the information. It is a boutique of junk science out there right now and you can find any justification for anything on the internet. We really need to be the place where people can reliably come to and get the best possible science and that is a pretty tough challenge for all of us but I feel like I am in the mecca of the source of that science and so I feel pretty optimistic. It is great to see so many people here and it is great to see so many young people here. That makes my day and I really appreciate the chance to have a chance to be part of your Grand Rounds and to launch this year's series. Thank you. [Applause]

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George Washington University School of
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