Testimony before the Committee on Appropriations, Subcommittee on Labor, Health and Human Services, Education, and Related Agencies, United States House of Representatives

CDC's Role in Preventing Healthcare Associated Infections

Statement of

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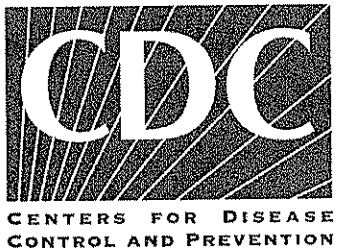

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Background:

Good morning Chairman Obey, Ranking Member Tiahrt, and other distinguished Members of the Subcommittee. I am Dr. Richard E. Besser, Acting Director of the Centers for Disease Control and Prevention (CDC), and it is my pleasure to be here today. CDC appreciates the opportunity to address this timely issue.

In the area of healthcare associated infections (HAIs), CDC defines and monitors the size and scope of the HAI problem, determines who is at risk, develops strategies to prevent infections, and tests the impact of existing interventions. I look forward to discussing with you CDC's activities directed toward preventing healthcare-associated infections. These activities can be categorized as: 1) tracking and monitoring HAIs; 2) developing guidelines for prevention; 3) implementing prevention strategies; 4) developing new strategies for prevention; and 5) identifying and responding to new and emerging threats. CDC is committed to these activities in alignment with the Department of Health and Human Services (HHS) Action Plan to Prevent Healthcare Associated Infections and through collaborations with other agencies and partners. I will also share with you information surrounding the HAI spending plans under the American Recovery and Reinvestment Act and FY2009 Omnibus, as well as implications for the future of HAI in our health system.

Healthcare associated infections are infections that patients acquire while undergoing care in any healthcare setting, including hospitals, long-term care facilities and ambulatory surgical care facilities. CDC estimated in 2002 that approximately 1.7 million HAIs occurred annually in U.S. hospitals, affecting five to ten percent of patients, and are associated with 99,000 deaths. There has also been a rapid increase in complexity and number of healthcare procedures being performed in settings outside of hospitals that have led to life-threatening infections.

Based upon CDC data, the four most frequent infections that account for approximately three quarters of HAIs are: 1) urinary tract infections; 2) surgical site infections; 3) bloodstream infections; and 4) pneumonia. Infections are caused by well-recognized pathogens such as *Staphylococcus aureus*, including MRSA, and by evolving pathogens such as drug-resistant *Klebsiella pneumoniae*. HAIs also have a tremendous financial toll, resulting in an estimated $28 to $33 billion of excess healthcare costs each year. However, despite their pervasiveness, most HAIs are preventable. CDC and its public and private sector partners are working together to prevent these costly and deadly infections that threaten the public's health.

The HHS Action Plan sets specific targets for monitoring and preventing HAIs nationally and represents a blueprint for prevention. CDC has played an integral role in the HHS led effort to develop and implement the HHS Action Plan, including chairing the Prevention and Implementation working group and co-chairing the Information Systems and Technology working group. In September 2008, CDC hosted a meeting of experts to help define prevention targets and metrics for the Action Plan. CDC continues to work closely with HHS and the other agencies to implement the plan.

Summary of CDC Activities in HAIs: Tracking and Monitoring HAIs

Leading the nation's activities to track HAIs, CDC emphasizes the importance of these activities to understand the impact of HAIs across the population and in communities. CDC has developed and validated standardized definitions for tracking HAIs and mechanisms to compare facilities and regions that are now used by most hospitals in the United States, and by many hospitals around the world. The National Healthcare Safety Network (NHSN), formerly the National Nosocomial Infection Surveillance (NNIS) System, is a tracking and prevention tool for hospitals and state health departments to measure HAIs. Participation in NHSN has increased dramatically in the past few years from 300 to over 2,000 U.S. healthcare facilities in all 50 states. This represents roughly 1/3 of all U.S. hospitals. The network is

expected to continue to expand in order to accommodate local, state, and federal HAI reporting initiatives and state legislative mandates.

NHSN has multiple modules and allows healthcare facilities, as well as states, to track both infection prevention safety practices and infection rates. NHSN also has a broad set of analytic tools to enable users to evaluate the effectiveness of interventions and thereby focus prevention strategies. Additional options include the system's ability to track MRSA and other multidrug resistant organisms like *Clostridium difficile* infections (CDI).

In recent years, many states have passed laws requiring reporting of facility-specific HAI data to state health departments with public disclosure of infection rates. Currently, 27 states mandate hospitals to report HAIs publicly, the majority of which use NHSN. CDC provides training, technical assistance and data analysis to the 19 states that are using NHSN to fulfill state reporting requirements and assists states that are considering legislation to mandate public disclosure of HAI data. CDC's support has been critical in improving state efforts to implement evidence based best practices regarding reporting.

In order to decrease time for data collection and to increase data accuracy, CDC is improving its ability to capture data from electronic sources in an automated fashion. As part of the HHS Action Plan, NHSN will be used for measurement of outcomes, standardization of data, and comparisons of individual healthcare facilities within states and collaborative groups, and within the national user data.

Summary of CDC Activities in HAIs: Developing Guidelines for HAI prevention

CDC in collaboration with the HHS Healthcare Infection Control Practices Advisory Committee (HICPAC) has developed evidence-based guidelines for HAI prevention. These guidelines are translated into practice in several ways, and are the basis for the 'checklists' developed and implemented by multiple groups in

hospital settings for the prevention of HAIs. These include those activities funded by Agency for Healthcare Research and Quality (AHRQ) research funds. They have also served as the basis for national healthcare quality initiatives such as the Institute for Healthcare Improvement's 100,000 Lives Campaign and the Centers for Medicare and Medicaid Services (CMS) Surgical Care Improvement Project. Several of these evidence-based recommendations have also been incorporated into Joint Commission standards for accreditation of U.S. hospitals and have been endorsed by the National Quality Forum. CDC helped to shape the development of national prevention targets and metrics for the HHS Action Plan, including identification of priority recommendations from CDC guidelines for implementation within the plan. In addition to developing guidelines, CDC also develops and disseminates educational materials and toolkits for healthcare providers and the public.

Summary of CDC Activities in HAIs: Implementing Prevention Strategies

Implementation of CDC guidelines has been shown to successfully prevent and reduce HAIs. For example, through CDC supported efforts in Southwestern Pennsylvania, local hospitals have reduced bloodstream infections by as much as 70 percent. Similar success was observed when Michigan fully implemented CDC guidelines in an AHRQ funded project in more than 100 ICUs.

CDC and its partners have translated successful pilot projects at the local level into regional and ultimately national implementation programs. CDC funded and collaborated with the Pittsburgh Veterans Affairs Medical Center to prevent MRSA infections using CDC recommendations. These efforts led to greater than 60 percent reductions in MRSA rates. Because of this success, healthcare facilities in southwestern Pennsylvania collaborated on the development of a regional MRSA initiative and subsequently, the Veterans Health Administration launched a national MRSA prevention initiative involving every Veterans Health Administration hospital in the country, modeled after Pennsylvania's success. In order to increase adherence to CDC recommendations, CDC is working with several groups to assess the effectiveness of

many other successful implementation strategies, such as Positive Deviance strategies. These and other prevention implementation examples demonstrate the savings in lives and healthcare costs that can result from national implementation of evidence-based HAI prevention programs.

CDC and its partners are working together to prevent infections caused by *Clostridium difficile* (CDI) in Ohio hospitals and nursing homes. In concert with CDC, the Ohio Hospital Association, the Ohio Department of Health, and the Ohio Prevention Epicenter are implementing a set of tiered interventions to reduce CDI rates using by NHSN definitions for reporting. This is one of the first and largest CDI prevention collaboratives to date, and demonstrates the preventability of CDI among a large cohort of hospitals while helping to define the most effective strategies for prevention.

In addition to monitoring, NHSN also proves to be an effective prevention tool. Since 1990, facilities reporting to NHSN have seen significant reductions of up to 70 percent in rates of catheter associated urinary tract infections (CAUTI) in ICUs. From 1997 to 2007, hospitals participating in CDC's NHSN have decreased bloodstream infections by up to 50 percent. A total of 10,600 device-associated infections are estimated to have been prevented, and at least 1,300 lives are estimated to have been saved.
Several states have implemented initiatives based on CDC guidelines and included the use of NHSN to monitor HAI rates. For example, in New York, the Greater New York Hospital Association used CDC guidelines as the basis for their prevention initiatives, one of which focused on incrementally building the infrastructure needed for prevention of bloodstream infections and other future prevention initiatives.

Summary of CDC Activities in HAIs: Developing New Strategies for Prevention

CDC supports the identification and evaluation of effective HAI prevention strategies and funds extramural research through a network of academic centers, called the Prevention Epicenter Program. The Epicenters

work in a collaborative manner to identify new ways to improve infection control and healthcare quality, assess the effectiveness of existing prevention strategies, including the prevention of MRSA and other resistant organisms, and pilot new implementation tools to bring CDC guidelines to the bedside. Research activities include developing new methods for electronic data collection, assessing new strategies to decrease MRSA and bloodstream infections. Collaborations among the Epicenters resulted in improved detection of surgical site infections, decreased inappropriate use of antimicrobial agents, reduced bloodstream infection rates in ICUs, and decreased infections caused by MRSA and vancomycin-resistant enterococci. Other examples of additional CDC funded research projects include the development and testing of methods to assess compliance to prevention recommendations. These research activities complement the health research services of AHRQ.

Summary of CDC Activities in HAIs: Identifying and Responding to New and Emerging Threats

CDC serves as a national and global leader in the investigation and control of outbreaks of HAIs. Through outbreak investigations, CDC identifies problems, develops new prevention strategies, and works with the Food and Drug Administration (FDA) to implement policy changes. Since the1970s, CDC has responded to hundreds of requests for assistance from state and local health departments to identify sources of outbreaks of HAIs. These investigations have identified several preventable causes of infections including issues with the construction, use, and cleaning of medical devices; contamination of medical products; and unsafe clinical practices. Several potential infections were prevented because of interventions that were implemented in collaboration with FDA and other partners to stop the outbreaks. These strategies included the recall of contaminated or defective products, changes in device construction, revised recommendations for device use, and changes in healthcare practices to prevent additional infections.

CDC deploys experts including epidemiologists, physicians, and laboratory scientists to assess healthcare settings, evaluate practices, review data and perform microbiologic testing in response to a recognized

outbreak or problem. Information from these investigations not only serves to control the immediate problem, but also has a direct impact on future HAI prevention nationwide. Experience from investigations also contributes to refinement of infection control guidelines and improvements in HAI tracking. Increasingly, CDC activities incorporate investigations of outbreaks in outpatient settings, including recent investigations related to lapses in injection safety in Nevada, and a recent outbreak of an emerging HAI pathogen, carbapenem resistant *Klebsiella pneumoniae* in a long term care facility.

CDC maintains critical core laboratory capacities to support public health activities and respond to environmental and diagnostic needs. As part of this laboratory capacity, CDC is able to investigate microorganisms at a molecular level in order to inform prevention efforts, identify threats to public health and guide interventions for outbreak control. CDC is providing insights that lead to new technologies for the prevention or mitigation of infections, examples include: the use of biofilm research investigating how microorganisms attach to surfaces such as implanted medical devices and intravascular catheters. Extensive activities are ongoing to identify causes and mechanisms of antimicrobial resistance and improve strategies for prevention, improve sampling methods to detect infectious agents in the environment, and develop and evaluate methods for detection of antimicrobial resistance in bacterial agents. CDC epidemiological and laboratory activities are crucial in the identification of emerging problems, such as newly virulent strains, and in the development of new strategies for prevention of these problems. For example, CDC identified a new virulent strain of CDI and is now working to evaluate the role of environmental cleaners, sanitizers, and new cleaning regimens for CDI prevention.

In addition to responding and preventing MRSA and CDI, CDC is responding newly emerging resistant bacteria such as Acinetobacter bacteria and Carbapenemase-producing Enterobacteriaceae (CRE, including carbapenemase-producing *Klebsiella pneumoniae Carbapenemase,* or KPC) that have caused nearly untreatable HAIs. These pathogens are readily transmitted in healthcare settings and new treatment options

are non-existent. State public health laboratories and clinical laboratories will continue to rely on CDC to provide laboratory guidance to ensure that U.S. laboratories can correctly identify the dangerous strains so that prompt infection control interventions can be instituted. Ongoing monitoring is required to changing patterns of resistance and to track the spread of these pathogens. Well established state based programs for HAI prevention are crucial to the effective implementation of such strategies.

New technologies and other advances in care provide great promise including life-saving treatments in healthcare settings. At the same time, new devices, materials, and medications can be accompanied by unintended risks and new problems. To give an example, in 1998 the Occupational Safety and Health Administration (OSHA) mandated the use of needle-less connectors between intravascular tubing and patients' intravenous catheters. These connectors reduced the risk of needle stick injuries to healthcare personnel. Upon investigating a subsequent outbreak of bloodstream infections, CDC determined that these newly required connectors were associated with the increase in infections. The investigations identified recommendations for the safe use of the new connectors with improved cleaning and maintenance. Numerous other examples reiterate the importance of maintaining vigilance in order to adapt to rapid and sometimes unexpected changes in healthcare delivery, and ensure that patients receive the safest care possible.

Summary of CDC Activities in HAIs: Collaborations with HHS Agencies

CDC and other HHS agencies have made concerted efforts to establish greater consistency and compatibility of HAI data collected across the Department. CDC's collaborations with AHRQ include programmatic input and technical assistance for AHRQ's Patient Safety Organization (PSO) program, including providing specifications for data collection and reporting of HAI data based upon those used in CDC's NHSN. CDC has provided technical support and additional funds to define the best strategies in MRSA prevention activities funded by AHRQ, including projects that test implementation of novel MRSA-reducing practices. In addition, CDC and AHRQ partner on projects to develop and apply interventions related to CDI, reduce the overuse of antibiotics in ambulatory and long-term care settings, improve measurement of surgical site infection risk, and to reduce infections caused by highly resistant *Klebsiella pneumoniae*.

CDC has worked with CMS to provide technical support and collaboration in the implementation of the Hospital Acquired Conditions provision of the Value Based Purchasing Program of the Deficit Reduction Act. CDC has also worked with CMS to develop a quality initiative to reduce MRSA infections nationally through the Quality Improvement Organization (QIO) program's 9th Scope of Work, which will increase use of NHSN by hospitals participating in the QIO. CDC worked with CMS to support the Surgical Infection Prevention Program (SIPP) and subsequent Surgical Care Improvement Project (SCIP) and provided substantial technical assistance to CMS on infection control regulations and surveyor guidance in dialysis, hospitals and long term care facilities, including providing interpretative guidance to surveyors. CDC and CMS worked together to develop and pilot a new survey tool in multiple states that state inspectors can use to better ensure the quality of care in ambulatory surgical centers. Currently, CDC is working with CMS to coordinate collection of data on infections and infection control practices in dialysis units, and the use of these as quality measures.

CDC's Support of HAI Tracking and Prevention through the American Recovery and Reinvestment Act (ARRA) and the FY 09 Omnibus:

The American Recovery and Reinvestment Act (ARRA) provided $50 million under the Prevention and Wellness fund for states to carry out activities to implement HAI reduction strategies. The HHS Steering Committee for HAI Prevention has coordinated efforts for the $50M that are consistent with the goals, objectives, and recommendations in the HHS Action Plan. CDC is excited to utilize these historic resources in partnership with state partners and in cooperation with HHS and the other HHS operating divisions involved in the HHS Action Plan.

CDC believes that it is critical to support state efforts to monitor and reduce HAIs. By creating state health department capacity in HAI prevention, a capacity similar to that which exists in states for food borne illness prevention, immunization, chronic disease prevention, and HIV prevention, HAI prevention will grow from small efforts at a few hospitals to sustainable statewide efforts with large measureable impact. Savings in statewide healthcare costs will contribute directly to national healthcare cost control efforts.

Specifically, CDC will allocate approximately $40 million in spending that would be available to all 50 states, the District of Columbia and Puerto Rico. These investments will ramp up state and local efforts to monitor and reduce HAIs by:

- Creating or expanding state-based HAI prevention collaboratives that will implement HHS recommendations and use CDC's NHSN to measure outcomes and prevent HAIs. Those collaboratives will include state hospital associations, QIO's and other partners, and will link to complementary activities supported by AHRQ and CMS.
- Enhancing states abilities to assess where HAIs are occurring and evaluate the impact of hospital-based interventions in other healthcare settings.

- Building a public health workforce in health departments who can lead state-wide initiatives to ensure progress towards the national prevention targets outlined in the HHS action plan.

The HAI prevention collaboratives are modeled after CDC and AHRQ funded projects in Pennsylvania and Michigan. As previously described, concerted efforts by healthcare facilities in those states resulted in HAI rates reductions of approximately 70 percent. While prevention collaboratives have been successful in individual healthcare facilities or healthcare networks, a state or community focus with accountability for prevention results has been missing. Building on this model, the HAI prevention collaboratives would be state campaigns bringing together the state health departments, healthcare facilities and providers, state hospital associations, and Medicare QIOs to develop coordinated strategies, share lessons learned, and create a state-wide HAI prevention focus. Having the state health department as a central convener of state and community efforts to prevent HAIs is critical for creating a population focus on HAI prevention that complements the current hospital centric approach, and will complement the role for state health departments in mandated HAI reporting.

CDC will also use ARRA funds to support new activities in the state-based Emerging Infections Programs (EIPs), which are a critical part of our nation's infrastructure for public health work in infectious diseases. Established in 1995, the EIPs consist of 10 centers of excellence across the U.S. that are collaborations among state health agencies, academic institutions, CDC, and other federal agencies. Collectively, they form a specialized network of research centers for infectious disease work that goes beyond the routine functions of health departments. The EIP network's unique strength and contribution lies in its ability to quickly translate surveillance and research activities into informed policy and public health practice.

CDC will use ARRA resources to support targeted efforts to monitor and investigate the changing epidemiology of HAIs in populations as a result of prevention collaboratives. As HAI prevention collaboratives move forward, the epidemiology of HAIs will change. Reporting through NHSN will provide

a picture of HAIs in hospitals, and increasingly, in long term care facilities and ambulatory surgical centers. The strength of the EIP program is that data collected by the participating states and their academic partners includes the entire population under surveillance thereby creating a guide to state health departments on where prevention efforts may have the most benefit. For example, EIP findings published in the New England Journal of Medicine in fall 2007 demonstrated that while most MRSA infections were healthcare-associated, many occurred after patients left hospitals or while receiving medical care in non-hospital settings. EIP findings will provide us with additional insight into the impact of ARRA funded prevention activities are having, especially outside of the hospital setting.

Based on the success that CDC and AHRQ have seen in local, regional and national initiatives, we anticipate 10-20 percent reductions in HAIs within two years of the successful implementation of the state-based collaboratives. These HAI reductions are contingent up the capacity of state and federal partners to quickly ramp up efforts to track infections and increase adherence to prevention recommendations.
In the long term, CDC will evaluate the lives saved and cost savings of these efforts.

Under the FY 09 Omnibus, Congress provided $10.1 million for NHSN and $2.5 million for responding to and the prevention of outbreaks caused by the re-use of syringes in outpatient settings. The FY 09 Omnibus also includes language compelling states to submit HAI reduction plans to HHS no later than January 2010. These plans must be consistent with the HHS national action plan for reducing HAIs and include measurable 5-year goals and interim milestones for reducing such infections. Under the funding solicitation to states for ARRA funds, there will be specific guidance instructing states that they can choose to use stimulus monies to develop their HAI reduction plans, detect and report Healthcare Associated Infection Data, or establishing a prevention collaborative. States may choose two of the three previously mentioned categories. Using monies from its FY 2009 appropriation, CDC will provide technical assistance to states to take action that is consistent with the HHS action plan. FY 2009 monies will be

directed towards expanding NHSN to support the state collaboratives as they increase the number of hospitals and other healthcare facilities participating and the types of infections collected by each facility. CDC will also continue its investments in transitioning NHSN to an electronic HAI reporting standard that improves automation and reduces manual inputs for the facility, focusing on enabling electronic messaging and electronic document transition. CDC will also help states with data validation. These improvements will not only reduce the burden of data collection, but will also increase interoperability across agency data systems.

CDC will use its injection-safety resources to ensure that infection control measures are adhered to broadly. Specifically, CDC will provide technical support to CMS HAI prevention activities under the ARRA. CMS works with state surveyors to inspect ambulatory surgical centers (ASCs) to ensure that they are following infection control procedures and protecting the public from poor quality of care. Following the large exposure of patients last year to Hepatitis C in Las Vegas gastroenterology clinics, CDC and CMS worked together to develop a new survey tool that state inspectors can use to better ensure the quality of care in ASCs. As use of the tool expands, CDC will provide subject matter expertise to CMS and state inspectors to improve the quality of care in ASCS nationwide.

CDC also will increase its capacity to respond to outbreaks in healthcare setting related to injection safety and will work with partners to develop a pilot provider education and patient awareness campaign. Finally, CDC plans to convene a meeting with industry and university researchers to identify existing and new technologies that could reduce the possibility of disease transmission through injections in the healthcare setting.

The Future of HAI Prevention

In addition to reducing the cost of healthcare delivery and improving quality of care for patients, this is an opportunity to build state health department capacity to coordinate prevention services with healthcare delivery, reinforce the healthcare oversight and regulatory roles played by the states, and ensure interoperability among federal agencies that assess healthcare quality and monitor performance. Small investments made across states can yield a large impact by preventing thousands of new infections and saving unnecessary costs for patients and the healthcare system.

Timely and accurate monitoring remains necessary to gauge progress towards HAI elimination. Increased participation in NHSN combined with improvements to simplify and enhance data collection, improve dissemination of NHSN reporting results to healthcare providers and the public, enhance analysis and validation functions, and support the work of other agencies including AHRQ research networks, are essential building blocks for successful healthcare reform. Electronic reporting efforts are underway at CDC to foster greater use of electronic data stored in healthcare databases to detect HAIs and monitor antimicrobial use, resistance and quality care indicators. These efforts focus on automated healthcare data transmission and data quality validation, and are essential to reduce the reporting burdens placed on healthcare personnel and state health authorities. Through expansions in electronic data reporting systems and e-surveillance, enabling capabilities like electronically transmitted lab data and pharmacy messages, and algorithmic detection of infections, the impact of HAI prevention methods can be catalyzed in both hospital and outpatient settings.

To date, we have shown remarkable and measureable success in preventing HAIs, such as the prevention of bloodstream infections in ICUs. However, there remains much work to be done for other infections and in other healthcare settings; ongoing commitment will be needed to assure this work is completed. In moving forward, efforts must be expanded beyond ICUs and into other wards and non-hospital settings. As prevention and monitoring efforts move beyond hospital settings into outpatient settings the traditional

reliance on hospital-based prevention strategies no longer suffice. State health departments will increasingly be required to address oversight and regulation of these expanding arenas of care. Targeted efforts to monitor and investigate the changing patterns of HAIs in those settings will be crucial to allow adoption of timely and effective prevention strategies.

Building the infrastructure for HAI prevention in state health departments is a key to sustainability for these efforts. The ARRA and FY2009 funds will lay the foundation for a systematic national approach to preventing HAIs. Assessing the impact and effectiveness of the investments is a priority for CDC. Future efforts of CDC, AHRQ, CMS and HHS will build upon that foundation to extend monitoring and quality improvement throughout hospital settings and into non-hospital healthcare settings, further enhance the accuracy and timeliness of reporting, and respond to new threats to patient and personnel health. Through ongoing monitoring, outbreak response, research, guideline development, and prevention implementation, CDC will continue to work with states, partners and other agencies to lead the prevention of healthcare-associated infections.