

PART 2: FRAMEWORK

I. INTRODUCTION

A. Magnitude of the Problem

Health care-associated infections (HAIs) are infections that people acquire while they are receiving treatment for medical or surgical conditions in a health care setting. HAIs can be acquired in any facility where health care is delivered, including but not limited to inpatient acute care hospitals, outpatient settings such as ambulatory surgical centers (ASCs) and end-stage renal disease (ESRD) facilities, and long-term care facilities (LTCFs), such as nursing homes and rehabilitation centers.

HAIs are linked with a variety of risk factors, which include but are not limited to the use of indwelling medical devices such as bloodstream, endotracheal, and urinary catheters; having a surgical procedure; receiving injections; contamination of the inanimate environment, such as table surfaces; and transmission of communicable diseases between patients and health care workers. The overuse of antimicrobial agents increases the likelihood of some infections (e.g., *Clostridium difficile* infections [CDIs]) and especially the risk of infection with an antimicrobial-resistant microorganism. HAIs may be caused by any type of infectious agent, including bacteria, fungi, and viruses.

HAIs exact a significant toll on human life. Even if only those infections that have their onset in hospitals are measured, HAIs are a significant cause of morbidity and mortality. At any given time, about one in every 20 hospitalized patients has an HAI, while over 1 million HAIs occur across the U.S. health care system every year. In LTCFs, about 1.6 million to 3.8 million infections occur annually.¹ Currently, there are no reliable overall estimates of the total burden of infections that occur as a result of treatment in outpatient settings.

Based on 2002 data, nearly 80% of all hospital-acquired HAIs are caused by four types of infections. Urinary tract infections (UTIs) comprise the highest percentage (34% of all hospital-acquired HAIs), followed by surgical-site infections (SSIs [17%]), bloodstream infections (14%), and pneumonia (13%).²

In addition, the cost to the American economy is steep. Based on 2002 estimates of the numbers of HAIs, hospital-acquired HAIs alone were responsible for \$28 billion to \$33 billion in excess health care costs in 2002.³ A recent report using a different methodology from the U.S. Department of Health & Human Services (HHS) Office of the Inspector General estimated that

¹ Smith PW, Bennett G, Bradley S, et al. SHEA/APIC Guideline: Infection Prevention and Control in the Long-Term Care Facility. *Infection Control and Hospital Epidemiology* 2008; 29:785-814.

² Klevens RM, Edwards J, Richards C, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Reports* 2007; 122:160-166.

³ Scott RD. The direct medical costs of healthcare-associated infections in US hospitals and the benefits of prevention. Atlanta: Centers for Disease Control and Prevention; 2009.

hospital care associated with adverse and temporary harm events, including hospital-acquired HAIs, cost Medicare an estimated \$324 million in October 2008 alone.⁴

It has been known for many years that some HAIs are largely preventable and that the number of these infections can be drastically reduced in order to save lives and avoid excess costs. Today, there is a growing consensus that the aspirational goal should be the elimination of HAIs. The growing demands on the health care system, coupled with increasing concerns about antimicrobial-resistant pathogens and steadily rising health care costs, reinforce the imperative to address this issue.

B. Background/Context

To maximize the efficiency and improve the coordination of prevention efforts across the Department, HHS established in 2008 a senior-level Steering Committee for the Prevention of Health Care-Associated Infections.⁵ Members of the Steering Committee currently include clinicians, scientists, and public health leaders who are high-ranking officials within their operating and staff divisions. Among the divisions contributing to the effort from the beginning have been the Agency for Healthcare Research and Quality (AHRQ), Administration for Community Living (ACL) (formerly the Administration on Aging), Centers for Disease Control and Prevention (CDC), Centers for Medicare & Medicaid Services (CMS), Food and Drug Administration (FDA), Health Resources and Services Administration (HRSA), Indian Health Service (IHS), National Institutes of Health (NIH), and, from within the HHS Office of the Secretary (OS), the Office of the Assistant Secretary for Health (OASH). Also included from the beginning have been the Office of the Assistant Secretary for Planning and Evaluation (ASPE), and the Office of the National Coordinator for Health Information Technology (ONC). More recently, the Department of Veterans Affairs (VA) and the Department of Defense (DOD) have been included.

Since its inception, the Steering Committee has marshaled extensive and diverse resources (see Table 3), formed public and private partnerships, and initiated discussions that have enhanced new approaches to HAI prevention and collaborations and worked towards identifying other approaches.

⁴ Department of Health and Human Services. Adverse events in hospitals: national incidence among Medicare beneficiaries. Washington, D.C: Office of the Inspector General; November 2010. OEI-06-09-00090.

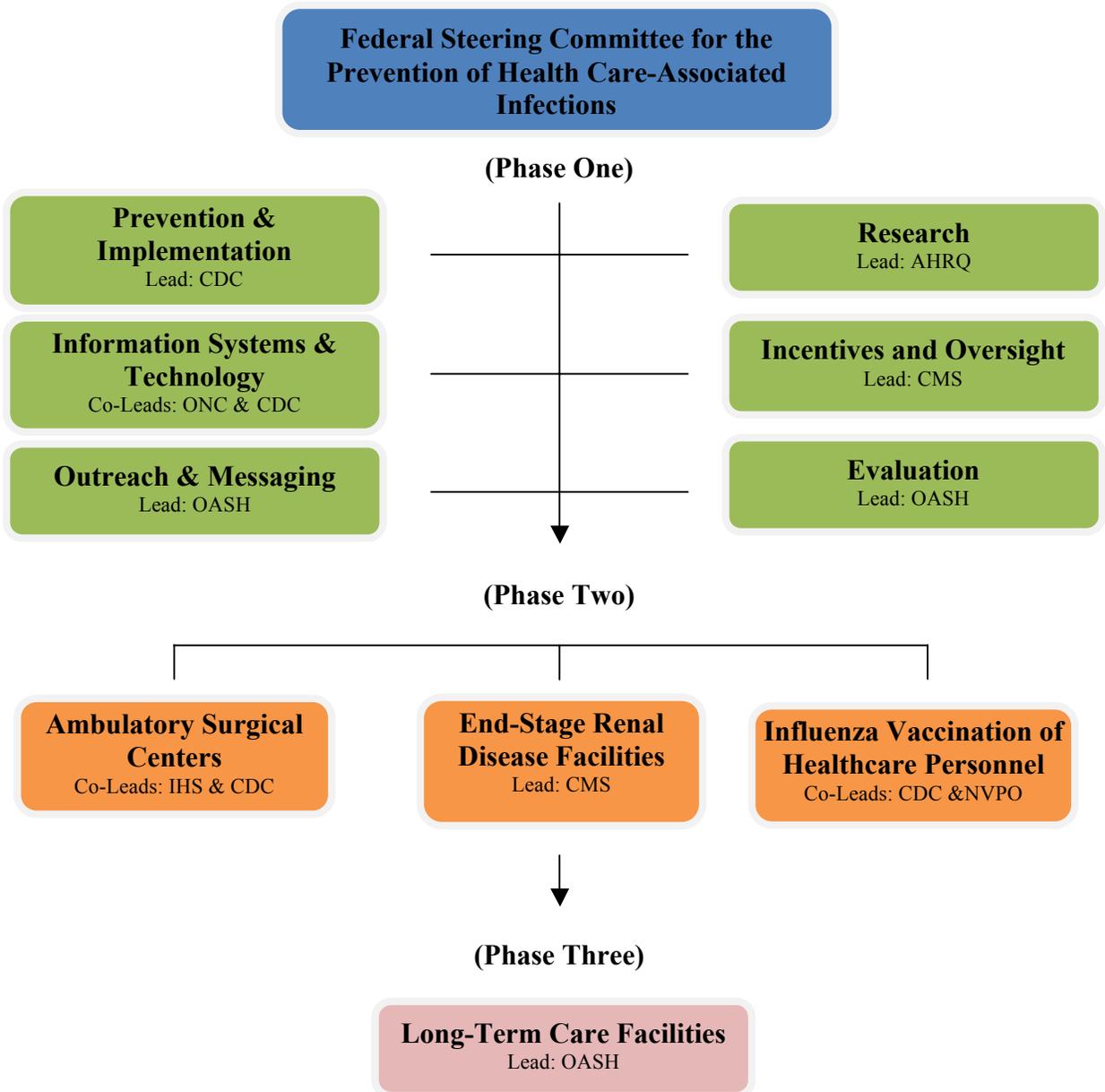
⁵ Organizational Structure of the HHS Initiative for the Prevention of Healthcare-Associated Infections, <http://www.hhs.gov/ash/initiatives/hai/orgstructure/index.html>

Table 3. Departmental and HHS Operating Division Roles and Activities in Implementing the National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination

U.S. Department of Defense	
	Provides health care to eligible members of the military and their families
U.S. Department of Health & Human Services	
AHRQ	Supports and conducts research on ways to organize, manage, and deliver quality care Supports and conducts research on approaches for preventing and reducing HAIs Funds expansion of the CUSP (Comprehensive Unit-based Safety Program), also known as the Keystone Project, to reduce bloodstream infections nationwide Manages system to collect patient safety data (Network of Patient Safety Databases) Manages the longitudinal evaluation of HAI Action Plan implementation on behalf of HHS
AoA	Provides resources/programs to support coordination of care between care settings (e.g., hospitals, skilled nursing facilities, home, adult day care) Provides resources/programs that support the activation of consumers and caregivers to better understand, participate in and control personal health, chronic conditions, and health care decisions Supports the State Long-Term Care Ombudsman programs to resolve problems of individual residents and bring about changes at the local, state, and national levels that will improve residents' care and quality of life
CDC	Investigates outbreaks and emerging threats in health care facilities Identifies the magnitude of these outbreaks and threats, the populations at risk, and prevention methods Conducts research to develop approaches for HAI prevention, surveillance, and evaluation Develops laboratory methods for detection and identification of key HAI pathogens Produces evidence-based guidelines to prevent HAIs through the Healthcare Infection Control Practices Advisory Committee (HICPAC) and provides guidance on prevention practices Provides HAI data (National Healthcare Safety Network [NHSN]) immediately available for use by reporting facilities, hospital groups, and state health departments to target prevention activities Evaluates impact of prevention interventions Supports surveillance and prevention efforts being led by state and local health departments
CMS	Leverages payment policies to enhance delivery of quality care (Value-Based Purchasing, measurement of Hospital-Acquired Conditions [HACs], Meaningful Use incentives) Implements traditional quality improvement programs (Quality Improvement Organizations, ESRD Networks, External Quality Review Organizations) Publicly reports data on hospital quality (Hospital Compare) Makes national coverage decisions that can incorporate best available evidence. Develops regulations and enforces regulatory authority (e.g., Conditions of Participation, surveys, deeming authority) Uses demonstration authority to test new approaches Supports the Partnership for Patients to rapidly spread best practices and reduce preventable HACs by 40% by 2013
FDA	Approves, or clears where necessary, treatments (drugs, devices), equipment, and other technologies to reduce the risk of infection
HRSA	Provides resources/programs to train health professionals Provides access to uninsured, isolated, and medically vulnerable populations
HIS	Provides access to quality health care for Native American communities
NIH	Supports and conducts biomedical research on the pathogenesis, transmission, and colonization of health care-associated pathogens
OS/ASPE	Develops patient safety measures as a part of its planning and evaluation role
OS/OASH	Coordinates and manages overall effort
OS/ONC	Leverages resources to advance a coordinated HAI information systems strategy
U.S. Department of Veterans Affairs	
	Provides health care to eligible veterans, partners with other federal departments and agencies to measure the frequency and impact of HAIs, implements and evaluates HAI prevention strategies, and investigates HAI outbreaks at VA health care sites

Through late 2008 and 2009, the Steering Committee, along with scientists and program officials across the government, developed the *HHS Action Plan to Prevent Health Care-Associated Infections*, thereby providing a road map for HAI prevention in acute care hospitals. In the first iteration of the Action Plan, the Steering Committee chose to focus on infections in acute care hospitals because the associated morbidity and mortality was most severe there and the scientific information on prevention and capacity to measure improvement was most complete. Thus, prevention of HAIs in acute care hospitals became the first phase, or Phase One, of the Action Plan (Figure 1).

Figure 1. Organizational Structure of the HAI Steering Committee



Given the substantial breadth and depth of HAIs and the complexity of addressing these problems, the Steering Committee, at the time of its formation in 2008, decided to take a phased approach and concentrate its activities and the content of the initial Action Plan on six high-priority HAI-related areas within the acute care hospital setting. In addition, the Steering Committee included in the Action Plan five-year goals for specific measures of improvement tied to the six HAI prevention priority areas (see Table 4). Focusing on these six high-priority, high-burden areas allowed for a concentration of resources and effort during the initial phase of Action Plan implementation. It also allowed the Steering Committee to take advantage of the substantial expertise and experience both within and outside HHS in HAI prevention in the acute care hospital setting.

Table 4. HHS Action Plan to Prevent Health Care-Associated Infections (2009) Priority Areas and Five-Year Goals

Priority Area	Measure/Metric	Five Year (2013) Goal	National Baseline Period
Catheter-Associated Urinary Tract Infection	Catheter-associated urinary tract infections	25% reduction	2009
<i>Clostridium difficile</i> Infection	Hospitalizations with <i>Clostridium difficile</i>	30% reduction	2008
	<i>Clostridium difficile</i> infections	30% reduction	2010-2011
Central Line-Associated Bloodstream Infection	Central line-associated bloodstream infections	50% reduction	2006-2008
MRSA Infection	MRSA invasive infections (population)	50% reduction	2007-2008
	MRSA bacteremia (hospital)	25% reduction	2010-2011
Surgical Site Infection	Surgical site infections	25% reduction	2006-2008
	Adherence to CMS Surgical Care Improvement Project (SCIP) processes	95% adherence	2006-2008
Ventilator-Associated Events (formerly VAP)	-	-	-

Thus, Phase One of the Action Plan addressed the most common infections in acute care inpatient settings and outlined specific recommended optimum clinical practices to prevent the infections; a prioritized research agenda; an integrated information systems strategy; policy options for linking payment incentives or disincentives to quality of care and enhancing regulatory oversight of hospitals; and a national messaging and communications plan to raise awareness of HAIs among the general public and of HAI prevention strategies among health care personnel.

The plan was initially released in January 2009 for public comment. A revised version that incorporated additional content and responses to comments was released in June 2009.⁶ The Steering Committee clearly articulated the need to maintain the Action Plan as a “living document,” developing successor plans in collaboration with public and private partners to incorporate advances in science and technology, shifts in the ways health care is delivered, changes in health care system processes and cultural norms, and other factors.

⁶ http://www.hhs.gov/ash/initiatives/hai/actionplan/hhs_hai_action_plan_final_06222009.pdf

C. Expansion of the Action Plan

Over the past five decades, the dramatic changes in medical care and the health system in the U.S. have allowed patients with complex health problems to be managed outside the acute care hospital, thereby avoiding many long inpatient stays. Thus, patients at risk for HAIs are now frequently managed at home, have surgical procedures of many types performed on an outpatient basis at free-standing clinics, and may have intravascular and urinary catheters as well as other indwelling medical devices in place for extended periods outside the hospital. At the same time, a growing proportion of individuals are admitted to nursing facilities for Medicare Part A short-term rehabilitation and post-acute care.

Movement of patients between their homes, community-based settings, outpatient facilities, acute care hospitals, and LTCFs occurs constantly. Thus, infection control and the prevention and elimination of HAIs can no longer be compartmentalized within the time span from a patient's date of admission to date of discharge at any one particular facility. For patients who were hospitalized, the chain of transmission may have multiple links connecting to the hospital's intensive care unit, not just to other wards in the hospital but all the way to the patient's home.

The health care and public health communities are therefore increasingly challenged to identify, respond to, and prevent HAIs across the continuum of settings where health care is delivered. The public health model's population-based perspective can increasingly be deployed to enhance the prevention of HAIs, particularly given the shifts in health care delivery from acute care settings to ambulatory and LTCF settings.⁷

Thus, following publication of the initial Action Plan in 2009, the Steering Committee quickly moved to expand the scope of its activities to include both the outpatient environment and the role of health care personnel in ensuring optimal patient outcomes. In late 2009, the Steering Committee approved an expansion of the Action Plan through the addition of three new chapters:

- (1) Prevention of HAIs in Ambulatory Surgical Centers
- (2) Prevention of HAIs in End-Stage Renal Disease Facilities
- (3) Increasing Influenza Vaccination Coverage of Health Care Personnel

These chapters comprise Phase Two of the Action Plan, extending its scope to the outpatient environment and addressing the health and safety of health care personnel as well as the risks of influenza transmission from health care personnel to patients (see Chapters 4, 5, and 6 in the Action Plan).

ASCs and ESRD facilities were selected as areas of focus because of the complexity of care delivered in those settings, their continued growth in terms of number of patient care encounters, the infection control challenges faced in those settings, and, in the case of ASCs, recent large-scale outbreaks that demonstrate the urgency of addressing infection control and prevention for patients in that setting. Similarly, recent experiences in which public health authorities needed to consider the risk of influenza and persistent concerns about sub-optimal rates of vaccination

⁷ American Hospital Association. *TrendWatch Chartbook 2002: Trends Affecting Hospitals and Health Systems*. Falls Church, VA: The Lewin Group, Inc.; 2002.

among health care personnel against seasonal influenza led the Steering Committee to request a report on that subject. Drafts of these additional sections were released for public comment in September 2010.⁸ These sections, revised based on public comments, have now been incorporated in the latest iteration, the *National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination*, or the HAI Action Plan.

In 2012, the Steering Committee approved the inclusion of HAI prevention in LTCFs as Phase Three of the HAI Action Plan. A growing number of individuals are receiving care in long-term care settings, such as skilled nursing facilities and nursing homes. The population in these facilities is requiring more complex medical care as a result of increased transitions between health care settings. These trends can create an increased risk for HAIs, which can worsen health status and increase health care costs, thus raising awareness of the need for strategies to address HAIs in these facilities.

D. Partnership for Patients

On April 12, 2011, HHS launched the Partnership for Patients, a new public-private initiative to improve the quality, safety, and affordability of health care for all Americans. The Partnership for Patients brings together leaders of major hospitals, employers, physicians, nurses, and patient advocates along with state and federal governments in a shared effort to make hospital care safer, more reliable, and less costly.

The two goals of this new partnership are to:

- **Keep patients from getting injured or sicker.** By the end of 2013, preventable hospital-acquired conditions would decrease by 40% compared with 2010. Achieving this goal would mean approximately 1.8 million fewer injuries to patients, with more than 60,000 lives saved over three years.
- **Help patients heal without complication.** By the end of 2013, preventable complications during a transition from one care setting to another would be decreased so that all hospital readmissions would be reduced by 20% compared with 2010. Achieving this goal would mean more than 1.6 million patients would recover from illness without suffering a preventable complication that required rehospitalization within 30 days of discharge.

Achieving these goals will save lives and prevent injuries to millions of Americans and has the potential to save up to \$35 billion across the U.S. health care system, including up to \$10 billion in Medicare savings, over the next three years. Over the next 10 years, it could reduce costs to Medicare by about \$50 billion and produce billions more in Medicaid savings.⁹

⁸ <http://www.federalregister.gov/articles/2010/09/23/2010-23762/solicitation-of-written-comments-on-draft-tier-2-strategies-modules-for-inclusion-in-the-hhs-action>

⁹ Savings estimates developed in 2011 by CMS and AHRQ, including data obtained from the following two sources: HHS Office of the Inspector General, *Adverse Events in Hospitals: National Incidence Among Medicare Beneficiaries* (November 2010), available at <http://oig.hhs.gov/oei/reports/oei-06-09-00090.pdf>; and Stephen F. Jencks S, Mark V. Williams MV, and Coleman EA. "Rehospitalizations among Patients in the Medicare Fee-for-Service Program," *New England Journal of Medicine* 2009; 360:1418-1428.

The Partnership for Patients is committed to addressing all forms of harm that can affect patients in hospitals. Addressing all causes of harm means to tackle safety and quality in every care setting and embedding a new ethos into the system and the culture of care. As a starting point, the Partnership for Patients identified nine focus areas, including four HAIs: catheter-associated urinary tract infections (CAUTIs), central line-associated bloodstream infections (CLABSIs), SSIs, and ventilator-associated pneumonia (VAP).

Because it is a component of the Partnership for Patients, success in achieving the HAI Action Plan goals will strongly align with and vitally contribute to the success of the Partnership. Joining our accumulated HAI knowledge base and other resources developed since 2008 to the Partnership's foci, energies, and additional resources promises escalated action in the fight for patient safety and health care quality and against preventable human and economic costs.

E. Key Partnerships

The breadth and complexity of the health care delivery and public health systems requires that a national initiative to eliminate HAIs be a shared responsibility of practicing health care professionals and their representative organizations, the health care industry, federal, state and local governments, and consumers. The growth of a proactive, highly engaged health care consumer movement has been one of several factors that have greatly accelerated the patient safety movement since the publication of the Institute of Medicine report *To Err Is Human* in 1999.¹⁰

The HAI Action Plan goals cannot be achieved, however, without a broad-based network of partners comprising all segments of the health care and public health enterprise in the United States. In recognition of this reality, the Steering Committee committed to widespread engagement of stakeholders and the solicitation of their input into the development of the first iteration of the HAI Action Plan. In September 2008, HHS, through CDC, convened a meeting of key stakeholders from academia, federal and state governments, professional provider organizations, consumer groups, and others with the purpose of soliciting individual input on setting potential national prevention targets regarding the elimination of HAIs. At this meeting, participants identified near- and long-term process and outcome measures for benchmarking progress in the prevention of HAIs.

Since that initial meeting, HHS and its component operating and staff divisions have held numerous stakeholder meetings to continue proactive engagement with groups and individuals throughout the U.S. involved in eliminating HAIs.¹¹ The result of this ongoing engagement has been the development of a network of organizations comprising a broad range of private and public sector groups coordinated through OASH. This network, initially established through the Steering Committee to more closely link HHS operating and staff divisions, has joined together governmental and nongovernmental partners by leveraging established contacts already existing within each of the HHS component organizations. The network has achieved rapid success in filling a clearly recognized need for better communication and bridging between bureaucratic

¹⁰ Kohn ., Corrigna J, Donaldson S, et al. *To Err Is Human*. Washington, D.C.: National Academy Press; 2000.

¹¹ http://www.hhs.gov/ash/initiatives/hai/Events/hai_events.html

and organizational silos both within and outside the federal government as well as at the state level and among various components of the health care system.

As the Steering Committee seeks to achieve the goals of the HAI Action Plan, the federal government will increasingly look to its multidisciplinary partners to codevelop and amplify key messages, increase the adoption of recommended practices, and serve as local, state, regional, and national leaders in a coordinated effort to eliminate HAIs. More progress can and will be accomplished working together, focused on the end goal of eliminating preventable infections and their associated consequences.

F. Setting Elimination as an Aspirational Goal

Since the publication of *To Err Is Human* in 1999, experts in the field of patient safety have discussed the concept and feasibility of not just reducing, but actually eliminating, HAIs. Scientific advances, a changing culture of safety within the health care system, and the proven success of smaller-scale prevention initiatives have now led to a consensus of the foremost experts in the field that the ultimate elimination of HAIs is a worthy aspirational goal and that the elimination of HAIs is in fact possible.^{12,13} The Steering Committee, through the HAI Action Plan, subscribes to that challenge and seeks to continue to provide leadership to move the field as far as possible towards the elimination of HAIs.

II. CHANGING LANDSCAPE

A. Introduction

The publication of the 2009 *HHS Action Plan to Prevent Health Care-Associated Infections* was a milestone in national efforts to address this serious public health problem and provided a road map for HHS activities in this area.

The HAI Action Plan also described the process by which the Steering Committee has been monitoring progress toward the success of the effort through regular reporting by the Steering Committee's various working groups and the HHS operating and staff divisions: building HAI prevention infrastructure at the regional, state, and local/community levels; obtaining ongoing input from and dialogue with stakeholders; having formalized independent evaluation performed by external consultants; and, most importantly, employing measurements using identified metrics towards corresponding five-year national HAI prevention targets.

¹² Cardo D, Dennehy P, Halverson P, et al. Moving toward elimination of healthcare-associated infections: a call to action. *Infection Control and Hospital Epidemiology* 2010, 31:1101-1105.

¹³ Frieden TR. Maximizing infection prevention in the next decade: defining the unacceptable. *Infection Control and Hospital Epidemiology* 2010, 31:S1-S3.

B. Progress Toward Achieving Five-Year National Prevention Targets

A summary of the progress made toward achieving the goals established in the 2009 Action Plan (Table 4) was presented during the Steering Committee’s meeting “Progress Toward Eliminating Health Care-Associated Infections” held in September 2010 in Arlington, Virginia. Overall, HAI prevention efforts resulted in decreases in the national incidence of CLABSIs, invasive MRSA (methicillin-resistant *Staphylococcus aureus*) infections, SSIs, and CAUTIs when compared to baseline data.

Increases in national rates of adherence to specific processes to reduce the risk of SSIs using CMS SCIP (Surgical Care Improvement Project) measures were also reported. Experts at the meeting also reported, however, that the national rate of hospitalizations with *C. difficile* infection was on the rise. Progress data for the remaining 2009 Action Plan measures were not available for the meeting, as national baselines were still in the process of being established. A more complete summary of the data illustrating progress toward achieving the 2009 Action Plan goals is available on the [HHS HAI Initiative page](#).¹⁴

C. Recent Advances

Since the publication of the 2009 HAI Action Plan, a number of developments have served to greatly accelerate and facilitate the HAI prevention effort. The Steering Committee’s activities in themselves have successfully leveraged both existing and new investments in prevention and monitoring initiatives throughout HHS. The Steering Committee’s working groups (Figure 1) regularly report on each group’s progress in implementing the components of the HAI Action Plan and provide leadership and support to the public health and health care-delivery communities in working toward the achievement of the five-year HAI Action Plan targets.

In addition, each of the HHS divisions conducts far-reaching programs in accordance with its individual mission for the prevention of HAIs. All of these entities have achieved significant accomplishments in their domains. Some of the highlights include the following:

- CDC’s Prevention Epicenter research network has addressed priority gaps in prevention knowledge.
- Scientific evidence and past experience have highlighted the importance of employing appropriate strategies to implement guidelines and recommendations for the prevention of HAIs. Efforts such as AHRQ’s spreading the use of the CUSP (Comprehensive Unit-Based Safety Program), aimed at preventing CLABSI, have demonstrated the improvements that are achievable when CDC guidelines and recommendations for care are coupled with practical and explicit approaches to implementation for use by hospitals and other health care-delivery organizations.^{15,16,17} The CUSP approach was designed to improve the culture of safety and help clinical teams to learn from their mistakes by

¹⁴ <http://www.hhs.gov/ash/initiatives/hai/>

¹⁵ Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *New England Journal of Medicine* 2006; 355:2725-2732.

¹⁶ Centers for Disease Control and Prevention. Reduction in central line–associated bloodstream infections among patients in intensive care units—Pennsylvania, April 2001–March 2005. *MMWR Morbidity & Mortality Weekly Report* 2005; 54:1013-1016.

¹⁷ <http://www.ahrq.gov/qual/haicusp.htm>

integrating safety practices into the daily work of a unit or clinical area. The CUSP, which was first shown to be effective in reducing CLABSI through the AHRQ-supported Keystone Intensive Care Unit Project in Michigan, has been implemented at a large number of organizations and has achieved significant reductions in CLABSIs. AHRQ is currently expanding this effort to the prevention of other forms of HAIs (i.e., CAUTI, SSI, and VAP) as well as to patient-care areas of the hospital other than intensive care units (ICUs).

- A new supply chain of HAI data has been launched. As a first step in implementing the Affordable Care Act, data from CDC's NHSN (National Healthcare Safety Network) are being supplied to CMS's Hospital Inpatient Quality Reporting Program. NHSN is providing CLABSI data for the CMS Hospital Inpatient Prospective Payment System (IPPS) for acute care hospitals. As a result of the CDC-CMS collaboration, NHSN has been serving as a national data source for publicly reported HAI data, beginning with CLABSI data in 2011, which are included in the health care quality measurement data made publicly available on the Hospital Compare website.¹⁸ This initial data collection was followed in January 2012 by the collection and reporting of CAUTI and SSI data. Additional HAI measures may be added to the program in subsequent years. These new achievements in HAI systems integration and data standardization are occurring at the same time that new federal efforts, enabled by funding through the HITECH Act and guided by ONC and CMS, are supporting the accelerated adoption of electronic health records (EHRs). With more ubiquitous use of EHRs on the near-term horizon, new opportunities are arising for HHS agencies and their partners to catalyze and coordinate the transition from manual to electronic methods of HAI detection and reporting.
- AHRQ and CDC have worked together to ensure that HAI data standards are applied to the new patient-safety reporting program established by AHRQ that will enable voluntary and confidential HAI reporting to designated Patient Safety Organizations (PSOs). Health care providers voluntarily work with PSOs to report non-identifiable patient safety event data to the Network of Patient Safety Databases using AHRQ's Common Formats, which includes HAIs using CDC definitions.
- In terms of coverage, more than 11,000 health care facilities have enrolled in NHSN as of November 2012, and there are currently 79 listed PSOs in 30 states and the District of Columbia.

D. Building Sustainability: Infrastructure and Stakeholder Network

The HAI Action Plan's overall coordinating structure seeks to bring into alignment the disparate agencies, programs, and organizations at the national, regional, state, and local levels that can together significantly reduce HAIs. The Steering Committee pursues an overall multilevel, multisystem approach to HAI prevention.

National Level

A critically important component of the initiative has been the development of an informal national network of organizations comprising a broad range of public and private sector

¹⁸ <http://www.medicare.gov/hospitalcompare/?AspxAutoDetectCookieSupport=1>

groups. This network, which initially connected HHS divisions, rapidly expanded to include nongovernmental partners by leveraging the established contacts existing within each of the HHS components. This network quickly became effective because it filled a clearly recognized need for better communication and bridging between bureaucratic and systemic silos both within and outside the federal government.

In the prevailing economic, regulatory, and scientific environment, this informal network served the needs of all parties to have structured lines of communication and the capacity for ongoing interaction created under the auspices of the Steering Committee. These structures soon evolved a wide array of secondary and tertiary communication channels that provided to all participants the means to interact with greater facility. The Steering Committee and OASH, on behalf of the Steering Committee, continue to maintain the basic infrastructure of the network.

Regional Level

HHS is currently sponsoring regional pilot projects implemented by the HHS regional offices. The projects evaluate new programs and leverage state activities across multiple states in a region. Through the development and implementation of these projects, state coordination across the regions has strengthened, complementing the coordination between local, state, regional and national-level efforts and activities.

State Level

The HAI Action Plan outlines strategies needed to achieve and sustain progress toward reducing HAIs at the national level. However, measurable progress depends on the leadership of states in coordinating prevention efforts at the state and local levels. Many state health agencies have been leaders in advancing HAI prevention through public reporting, quality assurance processes that include surveys, and outreach and training for health care personnel.

Investments in State Activities

The American Recovery and Reinvestment Act (ARRA) of 2009 provided a total of \$50 million in funding for state-level HAI prevention activities. The funding created opportunities for strengthening and building the state-level infrastructure for HAI prevention. As determined by the Steering Committee, the HAI ARRA program was administered by CDC and CMS. In addition, other HHS funds from annual appropriations to AHRQ, CDC, CMS, and OASH are being used to directly support state efforts.

The component of the ARRA program administered by CDC built state health departments' HAI prevention capacity. Through the Affordable Care Act, CDC continues to invest in state public health programs and provides technical assistance to states for surveillance and prevention of HAIs, collaboration initiatives, workforce training activities in HAI prevention, and measurement of outcomes. The states, the District of Columbia, and Puerto Rico have begun implementation of their State Action Plans and have hired HAI state coordinators to

implement prevention collaboratives and pursue validation of data to improve the measurement and reporting of HAIs.

Many states have shown successes in HAI prevention, including making progress toward goals set in Phase One of the HAI Action Plan. States are also furthering HAI prevention efforts outside acute care settings, including ESRD facilities, ASCs, and LTCFs. Federal investments have not only accelerated these efforts but have also supported new, successful HAI prevention programs in states without previous programs.

The component of the ARRA program administered by CMS was designed to support State Survey Agencies in their efforts to enhance the inspection process of Medicare-participating ASCs, specifically to include case-tracer methodology and a CDC-CMS-developed infection-control assessment tool in surveys. Two of the initial findings from the enhanced inspection process were that over two-thirds of the facilities surveyed in the pilot phase of the project had lapses in infection control and that half of the facilities had not undergone a full inspection in more than five years.¹⁹

Through CMS's policy-setting mechanism, all states were required to use the enhanced inspection process and survey one-third of ASCs in FY (fiscal year) 2010. Prior to the ARRA-funded program, ASCs were inspected at an average frequency of every 10 years; the goal with the new program is to inspect facilities every three years.

In efforts to support state-level HAI collaboration, AHRQ involves state hospital associations in implementing the HAI Action Plan. Funds from AHRQ have awarded projects that address critical gaps in implementing the science, are in alignment with the HAI Action Plan, and demonstrate generalizability and feasibility for widespread implementation. CUSP, which is one such program that has been supported by these funds, has demonstrated how a structured strategic framework for safety can result in dramatic improvements in patient care. AHRQ is currently expanding this successful program across the country.

Federal funds have had a considerable impact in supporting state advancements, but significant challenges remain. Enhanced investment in staffing at various levels, in research, in communication and health information technology, and in investigation of human and organizational factors that contribute to the occurrence of HAIs is necessary to overcome these challenges. State officials have expressed concern that sustaining state-based efforts may prove challenging without the availability of a long-term, sustainable funding mechanism.

State Action Plans

The 2009 Omnibus Appropriations Act required states receiving Preventive Health and Health Services Block Grant funds to certify that they would submit a plan to reduce HAIs to

¹⁹ Schaefer MK, Jhung M, Dahl M, et al. Infection control assessment of ambulatory surgical centers. *JAMA* 2010; 303:2273-2279.

the Secretary of HHS in order to receive the full allotment of grant funds. The Secretary received plans from all 50 states, the District of Columbia, and Puerto Rico in January 2010.

The primary purpose of the State Action Plans was to outline strategies to leverage and enhance state capacity to reduce and prevent HAIs, focusing on achievement of the 2009 Action Plan goals. In addition, states were encouraged to establish statewide HAI prevention leadership through the formation of multidisciplinary groups or state HAI advisory councils led by state health departments.

States were asked to address four areas in their State Action Plans:

- Program infrastructure
- Surveillance, detection, reporting, and response
- Prevention
- Evaluation, oversight, and communication

Through the State Action Plans, states had the opportunity to articulate areas of strength and areas requiring support in their HAI programs, identify which stakeholders to engage in HAI prevention activities, and set benchmarks for future activities. The states outlined a uniform way of addressing HAI prevention that focused not only on acute care facilities but, when possible, on other health care settings, complementing the expanding scope of the HAI Action Plan. By having each state identify its own goals based on the level of infrastructure and resources in place at the time, HHS has been able to gather valuable information that is further guiding prevention efforts.

State Action Plans Report to Congress

*Healthcare-Associated Infections: FY 2010 State Action Plans Report to Congress*²⁰ addressed the adequacy of the state plans for achieving state and national goals for reducing HAIs. Based on a review of the 52 State Action Plans received, HHS reported that each State Action Plan submitted was consistent with the 2009 Action Plan, and, where appropriate, included measurable five-year goals and interim milestones for reducing the infections.

The *Report to Congress* described the great degree of variability across states regarding current prevention activities and resources available to support HAI prevention. Some states had more mature HAI prevention programs and demonstrated an excellent understanding of the necessary scope for an effective and ambitious prevention program. These states had not only identified target initiatives but had also begun implementation several years earlier and were already involved in multiple prevention collaboratives. States with the strongest HAI programs indicated that they had completed extensive efforts to validate HAI data submitted by facilities. These states were also progressing towards interoperability of electronic systems and enhancements of laboratory capacity to improve HAI reporting. Although some states had longstanding programs in place, others were just beginning to launch HAI prevention programs and still needed support to strengthen basic program infrastructure, communications, laboratory capacity, and data collection systems.

²⁰ Report available at http://www.dhhs.gov/ash/initiatives/hai/statelevel/state_action_plans_fy10.html.

State-Based HAI Reporting

*State-Specific HAI Summary Data Reports*²¹ include both national and state-specific data. Additional, regular reporting of state-level HAI data is planned for the remaining HAI Action Plan measures.

E. An Ongoing National Dialogue with Partners

To ensure that the HAI Action Plan is representative of the needs of the many partners and participants in the national effort to prevent HAIs, each of HHS's component operating and staff divisions sponsored and conducted numerous engagement activities to ensure an ongoing, vibrant dialogue with the many sectors within public health and health care as well as with the general public. Examples of engagement activities include:

- *Public Comment Periods (Periodic)*: With the release of each version of the Action Plan to Prevent Health Care-Associated Infections, the Steering Committee requests and carefully reviews written comments from the public on the content of the plan. Public comments provide HHS with important feedback from individuals, professional societies, businesses, advocacy groups, and others. Comments have prompted revisions and additions to subsequent versions of the *Action Plan* to Prevent Health Care-Associated Infections and provided guidance for future work in preventing HAIs.
- *Action Plan Stakeholder Meetings (June to September 2009)*: The Steering Committee hosted a series of engagement meetings in Washington, D.C.; Denver, Colorado; Chicago, Illinois; and Seattle, Washington, in mid-2009 to engage the public and gather feedback on the HHS Action Plan to Prevent Health Care-Associated Infections.
- *HAI Recovery Act State Grantee Meetings (October 2009, 2010, and 2011; November 2012)*: This annual meeting gathers state HAI coordinators and others working at the state level to discuss best practices in HAI prevention. The meeting is one opportunity to link national-, regional-, and state-level perspectives in HAI prevention and progress.
- *Fifth Decennial International Conference on Healthcare-Associated Infections (March 2010)*: Hosted by CDC and the Society for Healthcare Epidemiology of America in partnership with the Association for Professionals in Infection Control and Epidemiology and the Infectious Diseases Society of America, this conference provided a review of accomplishments in the field over the past decade and proposed a scientific agenda for the next decade, including the development of an expert consensus on the prospect of eliminating HAIs.²²
- *Progress Toward Eliminating Health Care-Associated Infections (September 2010)*: This national-level meeting of experts in the field (which included a workshop) reviewed progress toward achieving the five-year national HAI prevention targets for reducing the incidence of specific HAIs, and how to accelerate the prevention, reduction, and eventual elimination of HAIs. The content of the discussions provided input for the present revision of the HAI Action Plan.
- *AHRQ Healthcare-Associated Infections Investigator Meetings (September 2010 and September 2011)*: Hosted by AHRQ as a component of the AHRQ Annual Conference,

²¹ Reports available at <http://www.cdc.gov/HAI/surveillance/statesummary.html>.

²² *Infection Control and Hospital Epidemiology* vol. 31, supplement 1 2010.

these meetings gathered together contractors (at the 2010 and 2011 meetings) and grantees (2011 meeting only) conducting HAI-related work to discuss ongoing efforts and the broader initiative to prevent HAIs that goes across HHS.

- *Public Health Collaboration Models for Infection Prevention in Licensed Healthcare Settings: A Focus on Ambulatory Surgical Centers (October 2010)*: This meeting continued the national-level discussion during the ASC-focused session at the September 2010 meeting, Progress Toward Eliminating Healthcare-Associated Infections, among those working at the state level.
- *Accelerating Health Care-Associated Infection Elimination: Health System, Hospital, and Government Leadership Collaboration (October 2010)*: In response to the need for an enhanced partnership between the federal government and senior leadership at health care facilities and in health systems, OASH collaborated with the Texas Medical Institute of Technology's GreenLight Program to host a meeting of leaders in hospital quality from across the nation regarding the key role of leadership in eliminating HAIs.
- *State-Level Partners Collaborating to Eliminate Health Care-Associated Infections (September 2011)*: This meeting gathered state-level organizations (e.g., state health departments, Quality Improvement Organizations [QIOs], PSOs, and private payers) working on HAIs to discuss national and state programs and policies affecting state-level prevention efforts and the next steps to sustain state-level programs.
- *Health Care-Associated Infections Data Summit (May 2012)*: This meeting gathered public and private stakeholders in HAI prevention to review existing data sources and discuss and make recommendations that focus on efforts already under way or that are envisioned as ways to add efficiencies and enhance the value of the supply chain of HAI data.

In addition to these highlighted activities, many of the organizations with representation on the Steering Committee, as well as each of the Steering Committee's working groups, maintain communication and interaction with a vast array of interested parties.

F. External Independent Evaluation

As part of the national effort outlined in the original HAI Action Plan, AHRQ, CDC, and OASH contracted with an independent evaluation group to conduct a three-year evaluation of all activities associated with the current HAI Action Plan and the impact of the initiative. This iterative, longitudinal, and comprehensive evaluation uses context, input, process, and product evaluations to measure the initiative's effectiveness in reducing HAIs nationwide.

The goals of the evaluation are the following:

- Record the content and scope of the HAI Action Plan, how it is currently designed, and what it will add in the future.
- Provide feedback on how to strengthen ongoing assessments of the scope of HAIs and interventions, how to reduce the number of HAIs, and to begin to understand the effectiveness of the interventions.
- Provide strategic insights from ongoing processes and outcomes to identify high-yield opportunities to reduce HAIs.

The *Longitudinal Program Evaluation of the Health Care-Associated Infections (HAI) HHS Action Plan Year 1 Report*²³ (September 2010) summarizes the initial recommendations. This report gives information on using identified strengths and weaknesses to inform what the HAI initiative should accomplish (the context evaluation) and how it should be accomplished (the input evaluation).

At the state level, the evaluation will not only monitor the progress and impact of the individual State Action Plans and initiatives linked to the plans but will also examine other activities taking place within states that are performed by health departments, state hospital associations, QIOs, and other entities.

G. A National Focus on Improving Health Care Quality and Patient Safety

The Affordable Care Act, passed in 2010, seeks to increase access for all Americans to high-quality, affordable health care and includes an array of provisions designed to enhance coordination, innovation, efficiency, and the quality of health care.

To help guide and coordinate public and private sector activities, the Affordable Care Act calls on the HHS Secretary to establish a National Strategy for Quality Improvement in Healthcare (the National Quality Strategy).²⁴ The National Quality Strategy is a plan for improving the delivery of health care services, achieving better patient outcomes, and improving the health of the U.S. population. It pursues three broad aims used to guide and assess local, state, and national efforts to improve the quality of health care:

- **Better Care:** Improve the overall quality of care, by making health care more patient-centered, reliable, accessible, and safe.
- **Healthy People/Healthy Communities:** Improve the health of the U.S. population by supporting proven interventions to address behavioral, social, and environmental determinants of health in addition to delivering higher-quality care.
- **Affordable Care:** Reduce the cost of quality health care for individuals, families, employers, and government.

The Partnership for Patients initiative, launched in 2011, carries out the broad aims of the National Quality Strategy by implementing a broad multiyear program to significantly reduce harm in hospitals and reduce hospital readmissions through improved care and coordination across health care settings. Despite decades of work to improve patient safety and despite daily efforts by committed caregivers, patients are still harmed by the health care system. The initiative combines broad incentives and programmatic supports to address preventable harm and readmissions.

Existing policy levers and programs, as well as new programs (e.g., supports for state and local cooperative learning networks, programs to engage patients, and the involvement of family members in the care process) are included in the initiative. In addition to HAIs, the harm events targeted for reduction include pressure ulcers, adverse drug events, obstetrical adverse events, injuries from falls, and postsurgical venous thromboembolisms.

²³ Report may be accessed from <http://www.hhs.gov/ash/initiatives/hai/projects/index.html>.

²⁴ Report may be accessed from <http://www.ahrq.gov/workingforquality/>.

Under the framework created by both the National Quality Strategy and the Partnership for Patients, the HAI Action Plan provides a road map to specifically reduce the burden of HAIs in U.S. health care facilities. Data measures and goals across the Partnership for Patients, HAI Action Plan, and other related programs have been aligned to avoid confusion. The Affordable Care Act has clearly demonstrated the importance of preventing HAIs as a critical component in ensuring quality health care and patient safety. The law links payment to quality outcomes and established the Hospital Value-Based Purchasing program in Medicare. This program offers financial incentives to hospitals to improve the quality of care provided. Hospital performance is required to be publicly reported, beginning with measures relating to heart attacks, heart failure, pneumonia, surgical care, and HAIs. HAI-specific reporting began in January 2010 with CLABSIs and became publicly available on the Hospital Compare website in January 2012. Also in January 2012, CMS began requiring additional reporting, to include CAUTIs and SSIs. In 2013, CMS will include reporting of MRSA bacteremia, *Clostridium difficile* infection, and vaccination of health care personnel against influenza. Payments will begin to apply for discharges occurring on or after October 1, 2012.

Also established by the Affordable Care Act, the Center for Medicare and Medicaid Innovation at CMS is a new entity aimed at helping transform Medicare, Medicaid, and the Children's Health Insurance Program through improvements in the health care delivery system, thereby ensuring better health care, better health, and reduced costs for beneficiaries, and ultimately enhancing the health care system in the United States. The new center has both the resources and the charge to rapidly test innovative care and payment models and encourage the widespread adoption of practices that support better health care at lower cost.

III. TEN THEMES FOR TRANSLATING STRATEGY TO ACTION

A. Background

A national effort to achieve and even exceed the HAI Action Plan goals will take place as a result of activities and initiatives within all parts of the health system and as a result of actions taken by every individual and group, including consumers and their families, concerned with the quality of health care in the United States. At the September 2010 meeting "Progress Toward Eliminating Health Care-Associated Infections," experts identified several key themes in HAI prevention strategies that are central to creating and sustaining the core capacities of HAI prevention.

Although there is no simple formula that will lead to the prevention and elimination of HAIs in every setting and every facility and for every patient, well-established strategies to prevent and eventually eliminate HAIs have been tested and proven effective. These strategies include actions taken during patient care in the clinic and at the bedside; actions taken by executives, managers and administrators of facilities and health systems; and broad-based system changes that involve focused and concerted efforts by everyone.

B. Ten Themes for Translating Strategy to Action

Frontline Clinicians

Reduce Inappropriate/Unnecessary Device Use

A large proportion of HAIs are associated with the use of indwelling medical devices, especially intravascular catheters, urinary catheters, and devices associated with mechanical ventilation. Although optimal practices concerning the insertion, maintenance, and care of such devices greatly reduce the risk of HAIs, avoiding the insertion of such devices and removing them as soon as clinically appropriate is the best strategy for preventing device-associated infections.

Improving Adherence to Hand Hygiene and the Use of Barrier Precautions

Mechanically preventing the spread of pathogenic microorganisms, especially to high-risk patients and particularly for antimicrobial-resistant microorganisms, is a simple and powerful prevention tool that requires the consistent adoption of universal proven prevention practices in every patient interaction and in ongoing vigilance relative to the care environment.

Implementing and Improving Antimicrobial Stewardship

Antimicrobial stewardship programs have been shown to be an important factor in reducing the overall prevalence of antimicrobial-resistant microorganisms in the hospital environment. Efforts to ensure optimally appropriate antimicrobial use have been a hallmark of quality improvement activity in both the inpatient and outpatient care settings in recent decades. Ongoing research is allowing for greater precision and understanding of the best use of antimicrobial agents by balancing clinical necessity and optimal patient care with the negative consequences of overuse or inappropriate use of antimicrobial agents; these consequences include the spread of antimicrobial-resistant pathogens, adverse drug reactions in patients, and excess financial cost. Providers and patients must partner to use antibiotics only when needed and to complete scheduled doses appropriately.

Clinical Leaders, Executives, and Administrators

Engaging Leadership Support at the Highest Levels of the Facility

A central role for leadership in supporting practice improvements is vital to efforts to prevent HAIs and other adverse patient safety events. Strong support, in terms of both personal commitment and allocated resources, from health care executives and administrators is frequently cited by front-line health care workers as one of the most important factors in implementing successful HAI prevention strategies in health care facilities and health systems.

Implementing a Culture of Safety

All parts of the health system need to move toward a culture of safety in which patients and families are included as members of the health care team. The broadening of responsibility and accountability for patient safety, including recognition of a role for patients and their families, has been one of the most positive developments in the patient safety movement. Making the prevention of HAIs as important a part of the clinical decision-making process as

any other aspect of patient care, and continuing to acknowledge the role of consumers as partners in prevention — even, and perhaps especially, in clinical settings — can have a profound impact on our ability to eliminate HAIs. Further, all members of the health care team must feel secure in their ability to contribute to the recognition of the risks of sub-optimal practices, and their correction, without fear of adverse consequences.

Government, Advocates, Clinical Leaders, and Administrators

Enhancing Financial Incentives and Regulatory Oversight

The growth of the patient safety and HAI prevention and elimination effort has both prompted, and been advanced by, an increasing alignment of these initiatives with financial incentives provided by public and third-party payers. These incentives provide a greater margin of reimbursement for care that does not involve adverse health care events, such as HAIs. Similarly, accreditation, certification, and other forms of regulatory oversight increasingly incorporate adherence to proven HAI prevention practices in the inspection process. This development has promoted adherence to best practices and facilitated decision making that rewards prevention.

Implementing System-Based Approaches and Evidence-Based Guidelines

A number of authors and organizations have demonstrated the value of system-based approaches to improving health care and preventing medical errors and adverse health care events, including HAIs. These approaches, based on human factors research in the social sciences as much as on the traditional medical sciences, have led to significant improvements in patient outcomes in many different types of facilities in a variety of settings. Introducing checklists and standardizing care or protocols for procedures associated with the incidence of HAIs (e.g., insertion of a catheter) have been helpful in reducing infections and promoting stronger health care teams.

Achieving Better Use of Technology

Technological advances are very powerful tools in the effort to eliminate HAIs. Improvements in medical devices, supplies, equipment, and antimicrobial compounds can impede microbial colonization of indwelling catheters, improve the effectiveness of barrier precautions, enhance compliance with hand hygiene and the effectiveness of that practice, and decrease the risk of cross-infection due to contamination of the environment.

The advance of information technology and the rapidly increasing application of digital technologies to medical records, health care management, and health care administration are of particular importance today. Thoughtful applications of computer-based records and systems (e.g., computerized entry of physician orders) have shown their value in improving patient care and patient safety, including the prevention and elimination of HAIs.

In addition, information technology tools need to be appropriate for smaller, rural, or under-resourced hospitals and the timeliness of data feedback must be improved for real-time improvements.

Improving Public Reporting of Credible Data

Elimination of HAIs will require a clear national will to be successful.²⁵ Public reporting of HAI data has been a vital factor in focusing the attention of both the general public and health care professionals and administrators on the scope and magnitude of the problem. Assuring the validity of reported and published data is a responsibility of all parties in the data collection and reporting process. The continued dissemination of trusted, reliable, and credible data can provide an ongoing stimulus to the HAI prevention effort. The goal is to report actionable, timely data that multi-sector stakeholders can readily use for multiple purposes.

Enhancing Traditional and Nontraditional Partnerships

The modern patient safety movement has succeeded in engaging the attention of everyone who works in or seeks care from the health system. Continuing awareness of this problem is prompting an ever-growing network of committed individuals and organizations. Some of these partners have been advocates for infection control for many decades; others, including consumers, are newly empowered and exercising an increasingly important role. The network and partnerships involving care providers, health professionals, public health officials, academia, industry, payers, employers, and patients and their families have provided both the capacity and the commitment that have led to the call for the elimination of HAIs. Meaningful partnerships across sectors could uncover innovative ways to improve patient safety across the continuum of care.

IV. CONCLUSION

Within the health care and public health arenas, the emphasis on health care quality, patient safety, and particularly the prevention and elimination of HAIs continues to grow in prominence. Growth has been seen in the health system's capacity to measure and improve the health and safety of patients and health care personnel alike, with significant improvements seen in care, reductions in morbidity and mortality, and substantial cost savings from infections prevented.

Continuing this progress, achieving the goal of HAI prevention, and progressing towards elimination will require ongoing commitments of action, energy, and resources on the part of all members of the broad-based HAI prevention network that has grown and been strengthened through the national coalition since 2008.

²⁵ Cardo D, Dennehy P, Halverson P, et al. Moving toward elimination of healthcare-associated infections: A call to action. *Infection Control and Hospital Epidemiology* 2010; 31:1101-1105.