

# The cost of healthcare associated infections

## Measured in Lives, Reputations and Dollars

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### Introduction

#### A Fundamental Shift

Nearly 100,000 people die annually due to healthcare associated infections (HAIs).<sup>1</sup> HAIs carry a heavy financial price tag as well, with \$35 to \$88 billion spent annually on these debilitating – and all-too-often fatal – infections.<sup>2,3</sup> This serious healthcare problem, highlighted with the publication of the Institute of Medicine’s landmark report “*To Err is Human*” in 2000, has remained largely intractable over the last decade, despite some promising developments.

Why has there been so little apparent progress? For the most part, until recently, HAIs have been characterized as random and inevitable by-products of healthcare. In addition, hospitals have had little motivation to share information on HAIs with patients. As a consequence, prevention of HAIs has received less attention than it deserves. Despite the human and financial costs of such infections, healthcare providers have placed more emphasis on other more visible HACs such as falls, medication errors, and foreign bodies retained after surgery. Fortunately, change is imminent. Delivery system and payment reform have moved from the distant horizon to the “here and now,” highlighting the imperative to increase quality and moderate costs.

Through changes in payment rules, the federal government is seeking to pay providers for the quality of care delivered to Medicare beneficiaries, with a special focus on HACs and HAIs. In particular, the Centers for Medicare and Medicaid Services (CMS) has implemented policies to not pay for additional hospital costs associated with HACs, forcing hospitals to absorb the entire incremental cost of treating these conditions. In a complementary move, through its *Partnership for Patients* program, the federal government is leading the charge by targeting HACs/HAIs and readmissions through a highly focused public/private sector initiative.

Finally, a good reputation has always been highly valued by hospitals. As transparency of HAC and HAI data increases, consumers will have more information to make educated choices about their care based on these data. This could prompt many to stay away from hospitals whose reputations have been diminished by the higher rates of HAIs and HACs.

But there is good news: there’s no need to “search for a cure.” Instead, hospitals now can implement proven interventions to reduce the number of HAIs. In addition, emerging technologies offer hope to make even greater progress and to keep HAI rates low over the long-term. This whitepaper assesses the scope of the HAI problem in terms of the costs, measured in lives, reputation and dollars. The final tally makes it clear that HAIs are worthy of significant focus and effort. A concluding glimpse at how healthcare organizations can affect change illustrates how the industry can – and should – move toward improved patient safety and reduced costs via the significant reduction of HAIs.

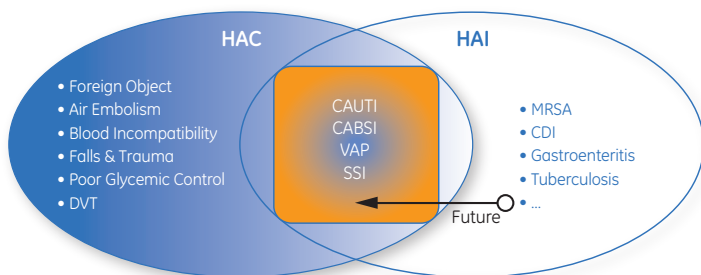
## Defining Healthcare Associated Infections (HAI) and Hospital Acquired Conditions (HAC)

The Centers for Disease Control and Prevention (CDC) defines an HAI as “a localized or systemic condition resulting from an adverse reaction to the presence of infectious agent(s) or its toxin(s).” Essentially, an HAI is an infection that a patient acquires while receiving medical treatment at a healthcare facility. This condition may surface during the hospital stay or after the patient is discharged (i.e., within 48 hours).

HAIs include surgical site infection (SSI), catheter associated bloodstream infection (CABSI), catheter associated urinary tract infection (CAUTI), clostridium difficile-associated disease (CDI), and ventilator-associated pneumonia (VAP).

An HAC is an undesirable condition not present at patient’s admission but that arises during a time spent in a medical facility.

The current list of ten HACs for which CMS will not allow additional Medicare payment includes falls, retained foreign objects, air embolism, and four of the most burdensome HAIs.<sup>4</sup> In the future, the list is expected to expand to include other HAIs. Because infections continue to present as a troublesome component of the overall problem, this paper will focus on HAIs in an effort to draw attention to the size, scope and cost of this significant subset of HACs.



Sources: Inpatient Prospective Payment System (IPPS) FY 2009 Final Rule. Section 5001(c) of Deficit Reduction Act (DRA). CDC (<http://www.cdc.gov/HAI/index.html>)

## The Patient Safety Number: Measuring the HAI Toll in Lives and Quality of Life

An article from *CNN Health* illustrates how hospital stays sometimes can result in unexpected – and unwanted – problems:

*In August of 2008, Katie Roche, a 19-year old soccer player, went into a New York City hospital to correct her scoliosis, or curvature of the spine. The surgery went well and Katie was discharged six days later.*

*After returning home, however, the incisions on her back had opened up – and Katie was feeling weak. Turns out, she had an infection and would need to undergo another surgery. That surgery was followed by two additional surgeries. Eventually, Katie developed a Clostridium difficile infection – a common HAI. Although the cause of this infection could not be definitively pinpointed, Katie did share a hospital room with a feverish six year old during her hospital stay.*

*Fortunately, the antibiotic Flagyl eventually cleared up the CDI and Katie recovered, but the infection had a negative impact on Katie’s intestines – and she suffered for quite some time. Because of the infection, she dropped from 120 to just 90 pounds.*

*“She got so weak, she couldn’t even get out of bed to go to the bathroom – I had to carry her,” says her mother, Kathleen Roche. “For about 37 hours, I didn’t think we’d have Katie with us much longer.”<sup>5</sup>*

Sadly, this story is not a rare exception. In fact, the bacterium that made Katie sick is more common than ever, according to a study published in the *Archives of Pediatric and Adolescent Medicine*. The study, which was published in early 2010, found that CDI increased 15% per year between 1997 and 2006.<sup>6</sup>

“This is huge and really concerning,” said Peter Pronovost, M.D., Director of Patient Safety Institute, Johns Hopkins University. “Most of these infections are preventable.”

In addition, according to a study published in the *Journal of the American Medical Association (JAMA)*, more than half of all patients in ICUs around the world develop infections and those with infections are more than twice as likely to die as those without infections.<sup>7</sup>

## HAI Mortality, By the Numbers

Doing no harm is not only part of the physician's Hippocratic Oath, it is also a primary goal of hospital patient safety efforts. The unfortunate reality, however, is that patients are affected by HAIs in significant numbers with grave consequences.

Consider the following: HAIs result in more deaths than prostate and breast cancer combined. Such infections pose a far more serious mortality risk than AIDS and automobile accidents. With about 100,000 deaths in the United States as a result of HAIs (see chart) they rank as one of the top 10 leading causes of death.<sup>1</sup>

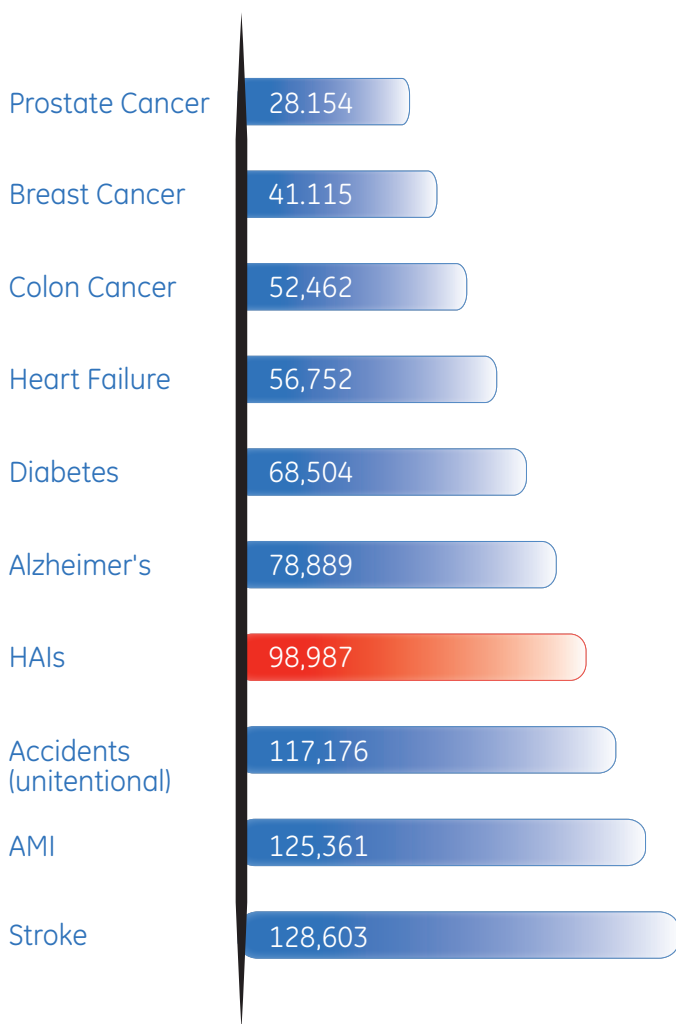
Compounding the tragedy of these sobering numbers is the fact that the incidence of HAIs has only decreased minimally since the 1990s, with 1.9 million HAIs estimated in 1995<sup>9</sup> and 1.7 million in 2002.<sup>10</sup> In addition, there is no evidence that the HAI death rate has dropped significantly over the past two decades, with a fairly consistent 6% probability of death if one is infected with an HAI.<sup>11</sup>

## Diminished Quality of Life

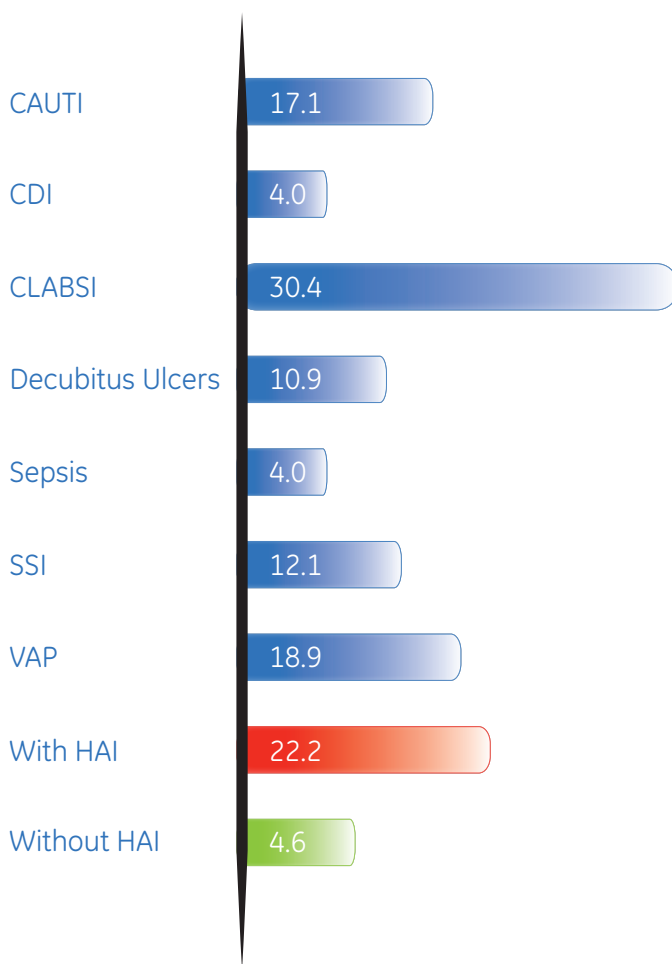
Patient mortality, however, is only part of the safety equation. The diminished quality of life that many HAI survivors experience must also be taken into account. For example, patients who develop HAIs are likely to experience longer hospital stays – with the average length of stay for a patient with an HAI at about 22 days, while those without an HAI (adjusting for patient differences) have an average stay of about five days. Patients with HAIs also are much more likely to return to the hospital, with readmission rates at almost 30% for patients with HAIs, compared to just 6% for patients without this complication.<sup>12</sup>

The extra time in the hospital is sometimes just a precursor to many other long-term consequences. Many patients continue with health problems, making it difficult to return to work or to partake in leisure activities. What's more, many struggle with daily pain and are saddled with additional medical costs, all due to HAIs.

### Leading Causes of Death (US)



### Impact of HAIs on LOS (Length of Stay)



Sources: 2009 National Vital Statistics, CDC. Estimating HAIs and Deaths in U.S. Hospitals, 2002, Klevens 2002

Sources: Dispelling the Myths: the True Cost of HAIs, Murphy (APIC) Aug 2007. CMS Present on Admission Provision for HAIs, Advisory Board 2008. The Impact of HAIs in Penn, 2009, Pennsylvania Healthcare Cost Containment Council's HAI Report (PHC4). Evaluation CDAD as a Risk Factor for CDAD, Dubberke, 2007.

## Reputation: There's Value in a Good Name

The sentiment in this quotation reflects the critical importance of reputation to an organization's success. Indeed, the conclusion of CMS Administrator Donald Berwick, M.D., that "any potentially preventable complication of care is unacceptable," has become a widely accepted view. HAIs, whose existence is increasingly seen as largely preventable, are posing a serious threat to hospital reputation.<sup>13</sup>

A strong reputation can help a hospital attract top clinical and administrative talent, secure valuable contracts and strategic partnerships, and elicit charitable contributions. Moreover, reputation is even more integral to hospital success as consumers become increasingly involved in their care and exercise growing influence over decisions on where care is delivered and what services are received.

Reputation is becoming an even greater concern for hospital leaders as calls for transparency gain momentum. With hospital performance statistics related to quality of care and patient outcomes becoming ever more ubiquitous, consumers are increasingly likely to base care decisions on publicly available data.

Indeed, it is now possible to compare hospitals on multiple clinically-related dimensions. More than 50 published rankings have emerged that provide data for both consumer evaluation as well as internal hospital benchmarking. For example, high profile national rankings such as *U.S. News & World Report's* Top 50 American Hospitals increasingly play a role in decisions on where to seek care. Various websites and online resources, available via government and private sector initiatives, are upping the pressure for transparency, making the need for hospitals to focus on national patient safety targets, such as HAIs, even more pressing.

### Hospital Compare

The CMS Hospital Compare website, one of the most visible sources of these rankings, is an evolving tool that is expected to contribute to increased transparency on HAI rates. Hospital Compare draws on hospital quality data that virtually all hospitals supply to Medicare. Using this free tool, consumers can compare how hospitals perform on various hospital performance measures, including the incidence of HACs and HAIs.

With such data becoming more readily available, and consumers increasingly gaining access to easy-to-use tools to compare performance, hospital leaders now are more aware of the very immediate and real connection between clinical care outcomes and patient selection of services. Indeed, this linkage is likely to have a significant effect on patient volume and hospital bottom lines in the years to come.

## The Financial Equation: The Cost of HAIs Measured in Dollars

HAIs don't simply lower quality and increase morbidity and mortality. They also create a considerable financial burden that touches patients, hospitals, payers, employers and government. Total costs added to the healthcare system from HAIs are estimated at between \$35 and \$88 billion per annum – and can be divided among unreimbursed costs, payment reductions, and legal costs. Although the exact numbers may vary with specific research methods, these huge dollar costs provide further evidence of the need to focus on reduction of HAIs in an effort to fulfill the central hospital mission of providing patients safe and effective care.

### Unreimbursed Costs

Although HAIs have a negative impact on quality of care, they are also undesirable from a cost perspective because the extra costs needed to treat them are not fully covered by additional revenue associated with these conditions.

For example, CMS has eliminated Medicare payments for additional costs incurred due to several HACs, including infections. As of October 1, 2008, hospitals no longer receive additional payment for three common HAIs: CAUTI, CABSII and VAP. Many observers expect that CMS will eventually reduce payments for additional hospital HAIs.

On average, each HAI costs the involved hospital \$23,228. In essence, there is an effective "HAI tax" of \$1,100 to the hospital for each admission, a significant burden in these challenging economic times.<sup>11</sup> This figure is computed by dividing the total costs of HAIs by the total number of hospital admissions industry wide. Non-payments for the additional costs of managing these complications will deteriorate the hospital financial equation even further.

Even when patients are covered by a private payer that has not implemented a policy like that of CMS, the costs of caring for a patient who gets an infection usually far exceed the payments that the facility receives, according to a study. The study, which analyzed 1.69 million admissions from 77 hospitals,<sup>12</sup> concluded that the infections reduced overall net inpatient margins by \$286 million or \$5,018 for each patient with an HAI.

"A good name, like good will,  
is got by many actions and  
lost by one."

-Lord Jeffery

## Reductions in Payments

CMS is implementing several policies that will reduce payments for cases associated with HAIs. One major priority is hospital readmissions. A hospital's mission to provide high quality care has always made preventable readmissions undesirable. Nonetheless, such readmissions are prevalent with CMS currently spending \$17.4 billion annually on payments for such care.<sup>14</sup> But CMS now is planning to reduce payments by an adjustment factor calculated based on what it determines to be excessive readmissions, some of which are tied to HAIs. This policy will create a direct financial disincentive for HAIs that are likely to lead to readmissions.

In addition, hospitals will be penalized by Medicare if their rate of HACs puts them in the bottom performing quartile. Starting in 2015, hospitals that reach this level will lose 1% of their overall Medicare reimbursement.<sup>10</sup>

Further, based on a legislative requirement, CMS will implement an initial Medicare hospital Value-Based Purchasing (VBP) program, which will reward hospitals for improving quality and efficiency of care based on 12 clinical process-of-care measures used in five health categories: acute myocardial infarction, heart failure, pneumonia, HAIs and surgical care improvement. To fund this program, Medicare reductions in payments start at 1% in 2013 and rise to 2% in 2017.<sup>15</sup> This is a zero-sum program wherein penalties on under-performing hospitals (in low performance percentiles), expected to total less than 1% of Medicare payments, are used to fund the rewards to higher-achieving hospitals. This results in the reallocation of \$850 million in 2013. Four HAIs are among those targeted for 2013 increasing to eight HACs in 2014 with indications for further expansion. The initial reporting period runs from July 1, 2011 to March 31, 2012.

While CMS is actively and aggressively implementing quality-centric financial incentives that include HAIs, private payers are expected to follow suit as well,<sup>10</sup> further driving home the need for initiatives that target these infections.

## Legal Costs

HAIs are often the subject of litigation, the costs of which may be huge. According to research by insurance company Aon Corp., HACs (including HAIs) accounted for 12.2% of total legal liability costs insured by healthcare facilities in 2007. That year, one out of every six claims against healthcare facilities was related to HAIs, injuries, pressure ulcers and foreign objects left in the body after surgery, according to the company's 2008 Hospital Professional Liability and Physician Liability Benchmark Analysis.<sup>16</sup>

## Federal Government: Driving Change, Making HAI a Top Priority

The federal government is making a deliberate effort to affect overall healthcare system change and has launched a set of reinforcing initiatives to improve quality, consistent with initiatives that have been discussed earlier in this paper. Fundamentally, the federal government has recognized that improvements in quality can drive costs out of the system. To get healthcare providers to more acutely focus on quality, the government is adopting a "carrot and stick" approach, providing overall support for change and financial rewards to providers for improved care with reduced payments when clinical care falls short.

In particular, the federal government's programs are zeroing in on HAIs and readmissions in an effort to move the quality, and subsequently the cost, needle in the right direction.

The National Quality Strategy (NQS) serves as the coordinating focus for federal government efforts and has three central goals:<sup>22</sup>

- **Better care:** Improve the overall quality, by making healthcare 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 healthcare for individuals, families, employers and government.

One of the first major initiatives aligned with the NQS is the federal government's Partnership for Patients, a new public-private partnership intended to help improve the quality, safety, and affordability of healthcare for all Americans.<sup>17</sup>

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 campaign, funded by the Accountable Care Act, aims to reduce by 40% the number of harmful preventable conditions by 2013, compared to 2010. Achieving this goal would mean approximately 1.8 million fewer injuries to patients, with more than 60,000 lives saved, over the next three years. The initiative also aims to achieve a 20% reduction in hospital readmissions, some of which are also tied to HAIs, by 2013.

Achieving these goals would save lives and prevent injuries and potentially save up to \$35 billion across the health care system, including up to \$10 billion in Medicare savings, over the next three years. This program could also reduce costs to Medicare by about \$50 billion and result in billions more in Medicaid savings, according to CMS estimates.<sup>17</sup>

Accountable Care Organizations (ACOs) are designed to increase quality and reduce costs by focusing on care coordination and accountability for patient populations. These organizations could ultimately be more effective at reducing HAIs, given the fact that such infections occur across the continuum of care, not just in hospitals.

ACOs are an emerging form of organization that can include physicians, hospitals, and other health care organizations. They're structured to receive and distribute payments to participating physicians and hospitals in order to provide care coordination, to invest in infrastructure and redesign care processes, and to reward high-quality and efficient services. In March of 2011, CMS issued a proposed rule on a Shared Savings ACO model.<sup>23</sup>

The CMS ACO model is based on three design principles: accountability for the entire continuum of care for a defined population of patients, payment reforms that reward quality improvement and slow spending increases while avoiding excessive financial risk for the ACOs, and reliable performance measurement to support improvement and provide public confidence that lower cost can be achieved with better care.

The CMS proposals combine continued use of fee-for-service payment with the opportunity for shared savings and shared penalties based on performance against both quality and cost metrics. The 65 proposed ACO quality measures include the reduction of HAIs, specifically CABSIs and certain surgical site infections. Thus, depending on the final quality measures adopted, ACOs will likely have both a direct incentive to focus on specific HAIs as well as a general incentive to avoid the costs associated with HAIs, especially as ACOs evolve to adopt risk-based payment models such as partial capitation.

## **The Opportunity for Change: Adds up to Real Potential**

Although HAIs present a daunting problem for the healthcare industry, there is reason for optimism: The opportunity to effect real change is well within our grasp.

Consider the following: Dr. Pronovost, an industry thought leader on HAI prevention, has demonstrated that it is possible to significantly reduce HAIs simply by proactively addressing the problem.<sup>18</sup>

For example, Dr. Pronovost has developed a checklist that contains five basic steps for physicians to follow when placing a central-line catheter: wash their hands; clean a patient's skin with chlorhexidine; wear a mask, hat, gown and gloves and put sterile drapes over the patient; avoid placing a catheter in the groin where infection rates are higher and remove the catheter as soon as possible, even if there's a chance it might be needed again at some point.

"These steps are no-brainers; they have been known and taught for years. So it seemed silly to make a checklist just for them. Still, Pronovost asked the nurses in his I.C.U. to observe the doctors for a month as they put lines into patients, and record how often they completed each step. In more than a third of patients, they skipped at least one," wrote Atul Gawande, a surgeon at Brigham and Women's Hospital (Boston), well-known patient safety advocate, and writer who recently pushed the HAI problem to the front of the public's consciousness via an oft-quoted article in the *New Yorker*.<sup>19</sup>

Checklists are clearly emerging as an effective strategy to prevent HAIs. After adopting an infection prevention checklist in the state of Michigan, the rate of blood stream infection dropped by 63% in just three months. Michigan's infection rates fell so low that its average I.C.U. outperformed 90% of I.C.U.s nationwide. The result: in just eighteen months, Michigan hospitals saved an estimated \$175 million in costs and more than 1500 lives.<sup>19</sup> These successes have been sustained for almost four years.

To further improve care and sustain such improvements, though, hospitals will need to move beyond the simple but powerful checklists approach to sophisticated electronic quality management solutions that can maximize overall management of patient quality and safety.

For example, Intermountain Healthcare is proving how electronic systems can help improve clinical care and patient safety.<sup>20</sup> At Intermountain, evidence-based protocols, which start out as paper-based guidelines, are eventually rolled into a clinical information system and then used as a "shared baseline" at the patient bedside. As such, physicians are expected to base their treatments on these protocols and then to make necessary adjustments to meet the individual needs of each patient. Currently, about 80% of care delivery at Intermountain is evidence-based, as opposed to less than 55% for the rest of the industry. Utilization of such clinical decision support technology drives unnecessary care and unnecessary variation out of the care delivery process – helping to make Intermountain a top performing organization. Indeed, the Salt Lake City-based healthcare system is routinely recognized by the likes of the *New York Times* and President Obama as a provider that delivers top quality care in a cost efficient manner.<sup>20</sup>

Using an electronic system to provide clinicians with evidence-based criteria to implement priority quality and patient safety initiatives holds the promise to make implementing patient safety initiatives even easier and more effective. Because HAIs are prevalent, costly and easily prevented, applying automated clinical decision support to prevent such infections is likely to result in a substantial return on investment.

## Conclusion

Atul Gawande describes HAIs as “the easiest 100,000 lives we can save.”<sup>21</sup> The reason: There’s no need to search for a cure or hope for a miracle. Instead, it’s a matter of putting the systems into place that will enable healthcare organizations to solve this costly and preventable problem. In other words, healthcare organizations can, if they take action, improve patient safety and, subsequently, increase their quality, reputation and the bottom-line.

The time is now for hospitals to increase investment in quality initiatives and make them strategic imperatives. The federal government has made greatly reducing HAIs a top priority, implementing a combination of incentives and penalties. But ultimately, it is hospitals and healthcare professionals who must act to create the needed changes. They must apply the leadership, technology and safe practices necessary to the HAI challenge, focusing on changes to the systemic and cultural factors that have allowed HAIs to remain a very serious and expensive healthcare problem. In particular, hospitals can move beyond infection control to the prevention of infections. Combined with a focus on protocols and checklists, technology to inform clinical action at the point of care will provide the basis to allow healthcare organizations to virtually eliminate HAIs.

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