Louisiana State Healthcare Associated Infections Plan

The Louisiana Department of Health (DHH), Office of Public Health (OPH), and Infectious Disease Epidemiology Section (IDES) will be the section coordinating these program activities. The activities will be carried throughout the state, starting with the 120 acute care hospitals. IDES has a Disease Surveillance Specialist (DSS) and a Central Office Surveillance Epidemiologist assigned to each region. These staff are already working with the hospitals in their region on communicable disease surveillance and outbreak investigations. The HAI program will also be integrated into the activities. The total staff assigned to some part of the program will be three senior epidemiologists, 3 epidemiology supervisors, 9 surveillance epidemiologists, 1 education specialist and 1 administrative assistant. The best guaranty to have a sustainable program is to achieve integration for the onset. The role of the coordinator is to maintain the relation with CDC, ensure that reporting to funding agencies is timely, and update plans.

The following **abbreviations** are used in this plan: CLABSI=Central Line Associated Blood Stream Infection, CAUTI=Catheter Associated Urinary Tract Infection, DHH=Louisiana Department of Health and Hospitals, ELR=Electronic Laboratory Reporting, FTE=Full Time Equivalent, HAI=Health care Associated Infections, HCP=Health Care Providers, IDES=Infectious Disease Epidemiology Section, IDRIS= Infectious Disease Reporting Information System, IP=Infection preventionist, NHSN=National Health Safety Network, OPH=Louisiana Office of Public Health, SSI=Surgical Site Infection, VAP=Ventilator Associated Pneumonia.

This plan addresses these four activity areas**:**
1-Integration, Collaboration, and Capacity Building;
2-Reporting, Detection, Response and Surveillance;
3-Prevention;
4-Evaluation, Oversight and Communication

Planning Level	Check Items Underway	Check Current /Planned Items	Items for implementation	Steps	Target Dates
1-Activity area: Integration, Collaboration, and Capacity Building Successful HAI prevention requires close integration and collaboration with state and local infection prevention activities and systems. Consistency and compatibility of HAI data collected across facilities will allow for greater success in reaching state and national goals.				
Level I	x		1.1-Form a multidisciplinary group to develop HAI prevention plans	Establish the State HAI Prevention Program Advisory Committee	completed
	x		1.1.1-Collaborate with local and regional partners (e.g., state hospital associations, professional societies for infection control and healthcare epidemiology, academic organizations, laboratorians and networks of acute care hospitals and long term care facilities (LTCFs))	Members of this Committee are: State Health Officer, State Laboratory Director, LA Medical Society, LA State Medical Association, LA Health Care Review Organization, LA Public Health Institute, Tulane University School of Medicine, LSU School of Medicine, LA Hospital Association, LA DHH Bureau of Health Standards, LA DHH Bureau of Rural Health, LA Health Care Consumers' Right to Know Health Data Panel, local APIC Chapters	completed
		x	1.1.2-Identify specific HAI prevention targets consistent with HHS priorities	The first specific HAI prevention targets are SSI and CLABSI. Hospitals already using NHSN for other prevention targets will be encouraged to continue to pursue their objectives	10/2009 completed
			1.2-Train professionals in HAI prevention		
	x		1.2.1-Designate a State HAI Prevention Coordinator	Hire 1 epidemiologist hired to coordinate communication with CDC, stake holders, and the IDES staff working on the HAI prevention program.	10/2009 Completed

		x		1.2.2-Develop dedicated HAI staff with at least one FTE (or contracted equivalent) to oversee the four major HAI activity areas (Integration, Collaboration, and Capacity Building; Reporting, Detection, Response and Surveillance; Prevention; Evaluation, Oversight and Communication)	Training of IDES staff will be implemented progressively and address the following areas: -Program objectives -HAI types (SSI, BSI, UTI, VAP), -Case definitions -Surveillance techniques, -HAI metrics	11/2009 12/2009 1/2010
				1.3-Integrate laboratory activities with HAI prevention efforts		
			x	1.3.1-Improve laboratory capacity to confirm emerging resistance in HAI pathogens	Mandate that microbiology laboratory submit all or a representative sample of MDRO diagnosed in acute care facilities	06/2010
		x		1.3.2-Perform typing where appropriate; outbreak investigation support	The OPH Laboratory has been performing PFGE on specimens submitted by acute care facilities for suspected clusters or outbreaks of HAI	on going
		x		1.3.3-HL7 messaging of laboratory	Develop the ELR component of the Infectious Disease Reporting Information System (IDRIS)	03/2010
Level II		x		1.4.1-Improve coordination with state government	Coordination with DHH Bureau of Licensing, Louisiana Health Care Consumers' Right to Know Health Data Panel, State Licensing Board will be done by committee meeting to discuss progress, and bi-monthly reports to the State HAI Prevention Committee.	on going
		x		1.4.2-Collaborate with local and regional partners	Coordination with the Louisiana Hospital Association, the Medical Society, the Association of Practitioners in Infection Control (APIC), Louisiana State University School of Public Health, and Tulane School of Public Health will be done by committee meeting to discuss progress and bi-monthly reports to the State HAI Prevention Committee.	on going
			x	1.5-Train professionals in HAI prevention	IDES will prepare a contract with the Louisiana Hospital Association to subsidizes infection control training (APIC training) for IPs according to needs	03/2010

2. Reporting, Detection, Response and Surveillance

State capacity for investigating and responding to outbreaks and emerging infections among patients and healthcare providers is central to HAI prevention. Investigation of outbreaks helps identify preventable causes of infections including issues with the improper use or handling of medical devices; contamination of medical products; and unsafe clinical practices. Timely and accurate monitoring remains necessary to gauge progress towards HAI elimination. Public health surveillance has been defined as the ongoing, systematic collection, analysis, and interpretation of data essential to the planning, implementation, and evaluation of public health practice, and timely dissemination to those responsible for prevention and control. Increased participation in systems such as the National Healthcare Safety Network (NHSN) has been demonstrated to promote HAI reduction. This, combined with improvements to simplify and enhance data collection, and improve dissemination of results to healthcare providers and the public are essential steps toward increasing HAI prevention capacity. The HHS Action Plan identifies targets and metrics for five categories of HAIs and identified Ventilator-associated Pneumonia as an HAI under development for metrics and targets (Appendix 1):

- Central Line-Associated Blood Stream Infections (CLABSI)
- *Clostridium difficile* Infections (CDI)
- Catheter-Associated Urinary Tract Infections (CAUTI)
- Methicillin-resistant *Staphylococcus aureus* (MRSA) Infections
- Surgical Site Infections (SSI)
- Ventilator-Associated Pneumonia (VAP)

Level I	x		2.1-Improve HAI outbreak detection and investigation		
			2.1.1-Mandate reporting for outbreak is already in place	Louisiana law mandates reporting of any outbreak of infectious diseases	pre-existing
	x		2.1.2-Work with HCP to improve reporting of outbreaks	By offerings incentives to report: laboratory typing of strains and direct assistance in outbreak investigation	on going
			2.1.3-Establish protocols for reporting of outbreaks	These protocols have been established several years ago	pre-existing
x	x		2.1.4-Provide training for health department staff to investigate outbreaks, clusters or unusual cases of HAIs.	IDES has been proving regular training attended by health department staff and hospital staff: twice yearly Rapid Response Team Training, Field Epidemiology Training and monthly Learn-link training	on going
			2.1.5-Develop mechanisms to protect facility/provider/patient identity	Louisiana law protect all aspects of confidentiality when investigating incidents and potential outbreaks	pre-existing
	x		2.1.6-Improve overall use of surveillance data to identify and	Surveillance is routinely (daily/ weekly) monitored by surveillance epidemiologists to detect any aberrations in	on going

4

Level					
			prevent HAI outbreaks or transmission in HC settings	reporting or clusters of infection	
			2.2-Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues.	Electronic laboratory reporting will allow IDES to identify early clusters of microorganisms	3/2010
Level II			2.3-Improve communication of HAI outbreaks and infection control breaches		
		x	2.3.1-Develop standard reporting criteria including, number, size and type of HAI outbreak for health departments and CDC	Standards must be adapted to the type of facility, of patients, severity of patients and types of HAIs.	02/2010
	x		2.3.2- Establish mechanisms or protocols for exchanging information about outbreaks or breaches among state and local governmental partners		
	x		2-4.Identify at least 2 priority prevention targets for surveillance in support of the HHS HAI Action Plan	The 2 priority prevention targets are SSI and CLABSI	10/2009
	x		2.5-Adopt national standards for data and technology to track HAIs.	The national standards will be the NHSN	06/2010
	x		2.5.1- Develop metrics to measure progress towards national goals	The metrics to be adopted are those described in Appendix I	10/2009
		x	2.5.2-Establish baseline measurements for prevention targets		
			2.6-Develop state surveillance training competencies		
	x		2.6.1-Conduct local training for appropriate use of surveillance systems	Training of IPs is focused on surveillance methods, case definitions, data collection, management and statistical analysis	on going
		x	2.6.2-Conduct local training for use of NHSN including facility and group enrollment, data collection,	pre-existing	

			management, and analysis		
		x	2.7-Develop tailored reports of data analyses for state or region prepared by state personnel		
Level III		x	2.8-Validate data entered into HAI surveillance to measure accuracy and reliability of HAI data collection	Collaborate with the Health Care Review Organization to ensure reliability of data.	08/2010
		x		Use the Louisiana Hospital Inpatient Database to ensure reliability of data	08/2010
		x	2.9-Develop preparedness plans for improved response to HAI	Define processes and tiered response criteria to handle increased reports of serious infection control breaches (e.g., syringe reuse), suspect cases/clusters, and outbreaks	06/2010
		x	2.10-Collaborate with professional licensing organizations to identify and investigate complaints related to provider infection control practice in non-hospital settings, and to set standards for continuing education and training		
			2.11-Adopt integration and interoperability standards for HAI information systems and data sources	Improve overall use of surveillance data to identify and prevent HAI outbreaks or transmission in HC settings 12/2010 (e.g., hepatitis B, hepatitis C, multi-drug resistant organisms (MDRO), and other reportable HAIs) across the spectrum of inpatient and outpatient healthcare settings	will not be achieved within the grant period
				Promote definitional alignment and data element standardization needed to link HAI data across the nation	will not be achieved within the grant period
			2.12-Enhance electronic reporting and information technology for healthcare facilities to reduce reporting burden	Reporting HAI to the public will be a decision made by the LA Health Care Consumers' Right to Know Health Data Panel	08/2010

06/2010

			and increase timeliness, efficiency, comprehensiveness, and reliability of the data		
			2.13-Make available risk-adjusted HAI data that enables state agencies to make comparisons between hospitals.		
			2.14-Enhance surveillance and detection of HAIs in nonhospital settings		

3. Prevention
State implementation of HHS Healthcare Infection Control Practices Advisory Committee (HICPAC) recommendations is a critical step towards the elimination of HAIs. CDC with HICPAC has developed evidence-based HAI prevention guidelines cited in the HHS Action Plan for implementation. These guidelines are translated into practice and implemented by multiple groups in hospital settings for the prevention of HAIs. CDC guidelines have also served as the basis the Centers for Medicare and Medicaid Services (CMS) Surgical Care Improvement Project. 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. Please select areas for development or enhancement of state HAI prevention efforts.

Level I	x		3.1-Implement HICPAC recommendations	Training on HICPAC recommendations has been ongoing	On going
	x		3.2-Enhance prevention leadership through the formation of state prevention advisory council	Assemble expertise to consult, advise, and coach inpatient healthcare facilities involved in HAI prevention collaboratives	06/2010
	x		3.3-Establish HAI collaboratives with at least 10 hospitals		
	x		3.3.1- Identify staff trained in project coordination, infection control, and collaborative coordination		
	x		3.3.2-Develop a communication strategy to facilitate peer-to-peer learning and sharing of best practices		
	x		3.3.3-Establish and adhere to feedback of a clear and standardized outcome data to track progress		
	x		3.4-Develop state HAI prevention training competencies	Establish requirements for education and training of healthcare professionals in HAI prevention	06/2010
Level II	x		3.5- Implement strategies for compliance to promote adherence to HICPAC recommendations		
	x		3.5.1-Develop statutory or regulatory standards for healthcare infection control and prevention		

	x		3.5.2- Coordinate/liaise with regulation and oversight activities such as inpatient or outpatient facility licensing/accrediting bodies and professional licensing organizations to prevent HAIs		
	x		3.5.3- Improve regulatory oversight of hospitals, enhancing surveyor training and tools, and adding sources and uses of infection control data		
	x		3.5.4-Expand regulation and oversight activities to currently unregulated settings where healthcare is delivered		
	x		3.6-Enhance prevention infrastructure by increasing joint collaboratives with at least 20 hospitals		
	x		Establish collaborative to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)		

4. Evaluation and Communications

   Program evaluation is an essential organizational practice in public health. Continuous evaluation and communication of practice findings integrates science as a basis for decision-making and action for the prevention of HAIs. Evaluation and communication allows for learning and ongoing improvement to occur. Routine, practical evaluations can inform strategies for the prevention and control of HAIs. Please select areas for development or enhancement of state HAI prevention efforts.

Level I			4.1-Conduct needs assessment and/or evaluation of the state HAI program to learn how to increase impact	Analyze gaps in surveillance capacities of acute care facilities	
	x			Describe surveillance methods, surveillance metrics, number and training of staff assigned to infection control by conducting a HAI surveillance survey in acute care facilities	On going Complete by 3/2010
	x			Conduct similar surveys in Ambulatory Surgery Centers	6/2010
	x			Conduct similar surveys in Long Term Care Facilities	9/2010
	x		4.2- Develop and implement a communication plan about the state's HAI program and progress to meet public and private stakeholders needs	Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public	12/2010
Level II	x		4.3-Provide consumers access to useful healthcare quality measures		01/2011
Level II	x		4.4-Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs		

Appendix 1.

The HHS Action plan identifies metrics and 5-year national prevention targets. These metrics and prevention targets were developed by representatives from various federal agencies, the Healthcare Infection Control Practices Advisory Committee (HICPAC), professional and scientific organizations, researchers, and other stakeholders. The group of experts was charged with identifying potential targets and metrics for six categories of healthcare-associated infections:

- Central Line-associated Bloodstream Infections (CLABSI)
- *Clostridium difficile* Infections (CDI)
- Catheter-associated Urinary Tract Infections (CAUTI)
- Methicillin-resistant Staphylococcus aureus (MRSA) Infections
- Surgical Site Infections (SSI)
- Ventilator-associated Pneumonia (VAP)

Following the development of draft metrics as part of the HHS Action Plan in January 2009, HHS solicited comments from stakeholders for review.

Stakeholder feedback and revisions to the original draft Metrics

Comments on the initial draft metrics published as part of the HHS Action Plan in January 2009 were reviewed and incorporated into revised metrics. While comments ranged from high level strategic observations to technical measurement details, commenters encouraged established baselines, both at the national and local level, use of standardized definitions and methods, engagement with the National Quality Forum, raised concerns regarding the use of a national targets for payment or accreditation purposes and of the validity of proposed measures, and would like to have both a target rate and a percent reduction for all metrics. Furthermore, commenters emphasized the need for flexibility in the metrics, to accommodate advances in electronic reporting and information technology and for advances in prevention of HAIs, in particular ventilator-associated pneumonia.

To address comments received on the Action Plan Metrics and Targets, proposed metrics have been updated to include source of metric data, baselines, and which agency would coordinate the measure. To respond to the requests for percentage reduction in HAIs in addition to HAI rates, a new type of metric, the standardized infection ratio (SIR), is being proposed. Below is a detailed technical description of the SIR.

To address concerns regarding validity, HHS is providing funding, utilizing Recovery Act of 2009 funds, to CDC to support states in validating

NHSN-related measures and to support reporting on HHS metrics through NHSN. Also, most of the reporting metrics outlined here have already been endorsed by NQF and for population-based national measures on MRSA and *C. difficile*; will work to develop hospital level measures will be conducted in the next year utilizing HHS support to CDC through funds available in the Recovery Act.

Finally, to address concerns regarding flexibility in accommodating new measures, reviewing progress on current measures, and incorporating new sources of measure data (e.g., electronic data, administrative data) or new measures, HHS and its constituent agencies will commit to an annual review and update of the HHS Action Plan Targets and Metrics.

Below is a table of the revised metrics described in the HHS Action plan. Please select items or add additional items for state planning efforts.

Metric Number and Label	Original HAI Elimination Metric	HAI Comparison Metric	Measurement System	National Baseline Established (State Baselines Established)	National 5-Year Prevention Target	Coordinator of Measurement System	Is the metric NQF endorsed?
1. CLABSI 1	CLABSIs per 1000 device days by ICU and other locations	CLABSI SIR	CDC NHSN Device-Associated Module	2006-2008 (proposed 2009, in consultation with states)	Reduce the CLABSI SIR by at least 25% from baseline or to zero in ICU and other locations	CDC	Yes[*]
2. CLIP 1 (formerly CLABSI 4)	Central line bundle compliance	CLIP Adherence percentage	CDC NHSN CLIP in Device-Associated Module	2009 (proposed 2009, in consultation with states)	100% adherence with central line bundle	CDC	Yes[†]
3a. C diff 1	Case rate per patient days; administrative/discharge data for ICD-9 CM coded *Clostridium difficile* Infections	Hospitalizations with *C. difficile* per 1000 patient discharges	Hospital discharge data	2008 (proposed 2008, in consultation with states)	At least 30% reduction in hospitalizations with *C. difficile* per 1000 patient discharges	AHRQ	No
3b. C diff 2 (new)		*C. difficile* SIR	CDC NHSN MDRO/CDAD Module LabID[‡]	2009-2010	Reduce the facility-wide healthcare facility-onset *C. difficile* LabID event SIR by at least 25% from baseline or to zero	CDC	No
4. CAUTI 2	# of symptomatic	CAUTI SIR	CDC NHSN	2009 for ICUs and other	Reduce the CAUTI SIR by at	CDC	Yes[*]

Metric Number and Label	Original HAI Elimination Metric	HAI Comparison Metric	Measurement System	National Baseline Established (State Baselines Established)	National 5-Year Prevention Target	Coordinator of Measurement System	Is the metric NQF endorsed?
	UTI per 1,000 urinary catheter days		Device-Associated Module	locations 2009 for other hospital units (proposed 2009, in consultation with states)	least 25% from baseline or to zero in ICU and other locations		
5a. MRSA 1	Incidence rate (number per 100,000 persons) of invasive MRSA infections	MRSA Incidence rate	CDC EIP/ABCs	2007-2008 (for non-EIP states, MRSA metric to be developed in collaboration with EIP states)	At least a 50% reduction in incidence of healthcare-associated invasive MRSA infections	CDC	No
5b. MRSA 2 (new)		MRSA bacteremia SIR	CDC NHSN MDRO/CDAD Module LabID[‡]	2009-2010	Reduce the facility-wide healthcare facility-onset MRSA bacteremia LabID event SIR by at least 25% from baseline or to zero	CDC	No
6. SSI 1	Deep incision and organ space infection rates using NHSN definitions (SCIP procedures)	SSI SIR	CDC NHSN Procedure-Associated Module	2006-2008 (proposed 2009, in consultation with states)	Reduce the admission and readmission SSI[§] SIR by at least 25% from baseline or to zero	CDC	Yes[¶]
7. SCIP 1 (formerly SSI 2)	Adherence to SCIP/NQF infection process measures	SCIP Adherence percentage	CMS SCIP	To be determined by CMS	At least 95% adherence to process measures to prevent surgical site infections	CMS	Yes

[*] NHSN SIR metric is derived from NQF-endorsed metric data
[†] NHSN does not collect information on daily review of line necessity, which is part of the NQF
[‡] LabID, events reported through laboratory detection methods that produce proxy measures for infection surveillance
[§] Inclusion of SSI events detected on admission and readmission reduces potential bias introduced by variability in post-discharge surveillance efforts
[¶] The NQF-endorsed metric includes deep wound and organ space SSIs only which are included the target.

Understanding the Relationship between HAI Rate and SIR Comparison Metrics

The Original HAI Elimination Metrics listed above are very useful for performing evaluations. Several of these metrics are based on the science employed in the NHSN. For example, metric #1 (CLABSI 1) for CLABSI events measures the number of CLABSI events per 1000 device (central line) days by ICU and other locations. While national aggregate CLABSI data are published in the annual NHSN Reports these rates much be stratified by types of locations to be risk-adjusted. This scientifically sound risk-adjustment strategy creates a practical challenge to summarizing this information nationally, regionally or even for an individual healthcare facility. For instance, when comparing CLABSI rates, there may be quite a number of different types of locations for which a CLABSI rate could be reported. Given CLABSI rates among 15 different types of locations, one may observe many different combinations of patterns of temporal changes. This raises the need for a way to combine CLABSI rate data across location types.

A standardized infection ratio (SIR) is identical in concept to a standardized mortality ratio and can be used as an indirect standardization method for summarizing HAI experience across any number of stratified groups of data. To illustrate the method for calculating an SIR and understand how it could be used as an HAI comparison metric, the following example data are displayed below:

Risk Group Stratifier	Observed CLABSI Rates			NHSN CLABSI Rates for 2008 (Standard Population)		
Location Type	#CLABSI	#Central line-days	CLABSI rate*	#CLABSI	#Central line-days	CLABSI rate*
ICU	170	100,000	1.7	1200	600,000	2.0
WARD	58	58,000	1.0	600	400,000	1.5

$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{170 + 58}{100000 \times \left(\frac{2}{1000}\right) + 58,000 \times \left(\frac{1.5}{1000}\right)} = \frac{228}{200 + 87} = \frac{228}{287} = 0.79$$

$$95\% \, CI = (0.628, 0.989)$$

*defined as the number of CLABSIs per 1000 central line-days

In the table above, there are two strata to illustrate risk-adjustment by location type for which national data exist from NHSN. The SIR calculation is based on dividing the total number of observed CLABSI events by an "expected" number using the CLABSI rates from the standard population. This "expected" number is calculated by multiplying the national CLABSI rate from the standard population by the observed number of central line-days for each stratum which can also be understood as a prediction or projection. If the observed data represented a follow-up period such as 2009 one would state that an SIR of 0.79 implies that there was a 21% reduction in CLABSIs overall for the nation, region or facility.

The SIR concept and calculation is completely based on the underlying CLABSI rate data that exist across a potentially large group of strata. Thus, the SIR provides a single metric for performing comparisons rather than attempting to perform multiple comparisons across many strata which makes the task

cumbersome. Given the underlying CLABSI rate data, one retains the option to perform comparisons within a particular set of strata where observed rates may differ significantly from the standard populations. These types of more detailed comparisons could be very useful and necessary for identifying areas for more focused prevention efforts.

The National 5-year prevention target for metric #1 could be implemented using the concept of an SIR equal to 0.25 as the goal. That is, an SIR value based on the observed CLABSI rate data at the 5-year mark could be calculated using NHSN CLABSI rate data stratified by location type as the baseline to assess whether the 75% reduction goal was met. There are statistical methods that allow for calculation of confidence intervals, hypothesis testing and graphical presentation using this HAI summary comparison metric called the SIR.

The SIR concept and calculation can be applied equitably to other HAI metrics list above. This is especially true for HAI metrics for which national data are available and reasonably precise using a measurement system such as the NHSN. The SIR calculation methods differ in the risk group stratification only. To better understand metric #6 (SSI 1) see the following example data and SIR calculation:

Risk Group Stratifiers		Observed SSI Rates			NHSN SSI Rates for 2008 (Standard Population)		
Procedure Code	Risk Index Category	#SSI†	#procedures	SSI rate*	#SSI†	#procedures	SSI rate*
CBGB	1	315	12,600	2.5	2100	70,000	3.0
CBGB	2,3	210	7000	3.0	1000	20,000	5.0
HPRO	1	111	7400	1.5	1020	60,000	1.7

$$SIR = \frac{observed}{expected} = \frac{315 + 210 + 111}{12600 \times \left(\frac{3.0}{100}\right) + 7000 \times \left(\frac{5.0}{100}\right) + 7400\left(\frac{1.7}{100}\right)} = \frac{636}{378 + 350 + 125.8} = \frac{636}{853.8} = 0.74$$

$$95\% CI = (0.649, 0.851)$$

† SSI, surgical site infection

* defined as the number of deep incision or organ space SSIs per 100 procedures

This example uses SSI rate data stratified by procedure and risk index category. Nevertheless, an SIR can be calculated using the same calculation process as for CLABSI data except using different risk group stratifiers for these example data. The SIR for this set of observed data is 0.74 which indicates there's a 26% reduction in the number of SSI events based on the baseline NHSN SSI rates as representing the standard population. Once again, these data can reflect the national picture at the 5-year mark and the SIR can serve as metric that summarizes the SSI experience into a single comparison.

There are clear advantages to reporting and comparing a single number for prevention assessment. However, since the SIR calculations are based on standard HAI rates among individual risk groups there is the ability to perform more detailed comparisons within any individual risk group should the need arise. Furthermore, the process for determining the best risk-adjustment for any HAI rate data is flexible and always based on more detailed risk factor analyses that provide ample scientific rigor supporting any SIR calculations. The extent to which any HAI rate data can be risk-adjusted is obviously related to the detail and volume of data that exist in a given measurement system.

In addition to the simplicity of the SIR concept and the advantages listed above, it's important to note another benefit of using an SIR comparison metric for HAI data. If there was need at any level of aggregation (national, regional, facility-wide, etc.) to combine the SIR values across mutually-exclusive data one could do so. The below table demonstrates how the example data from the previous two metric settings could be summarized.

HAI Metric	Observed HAIs			Expected HAIs		
	#CLABSI	#SSI[†]	#Combined HAI	#CLABSI	#SSI[†]	#Combined HAI
CLABSI 1	228					
SSI 1						
Combined HAI			228 + 636 = 864			287+853.8 = 1140.8

$$SIR = \frac{observed}{expected} = \frac{228+636}{287+853.8} = \frac{864}{1140.8} = 0.76$$

636   287   853.8

$$95\%CI = (0.673, 0.849)$$

[†] SSI, surgical site infection