Delaware-specific and Hospital-specific Standardized Infection Ratios (SIR) for the Second Quarter 2012: Central Line–associated Bloodstream Infections (CLABSI), Surgical Site Infections (SSI), and Catheter Associated Urinary Tract Infections (CAUTI)

In 2007, Delaware passed the "Hospital Infections Disclosure Act" that requires hospitals to report Hospital Associated Infections (HAI) to the Department of Health and Social Services (DHSS) through the Centers for Disease Control and Prevention's (CDC) National Healthcare Safety Network (NHSN) - http://delcode.delaware.gov/title16/c010a/index.shtml . In February 2012, Delaware regulations were amended requiring health care facilities to report the same HAIs required to be reported to the Centers for Medicare and Medicaid Services (CMS). In keeping with CMS requirements, the April through June 2012 report includes central line-associated blood stream infections (CLABSI) and catheter-associated urinary tract infections (CAUTI) reported from all intensive care units in Delaware's acute care hospitals. The report also includes surgical site infections (SSI) following abdominal hysterectomies and colon surgeries reported by Delaware's acute care hospital, with the exception of A I DuPont.

Catheter Associated Urinary Tract Infections (CAUTI)

A urinary tract infection (UTI) is an infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney. UTIs are the most common type of healthcare-associated infection reported to the National Healthcare Safety Network (NHSN). Among UTIs acquired in the hospital, approximately 75% are associated with a urinary catheter, which is a tube inserted into the bladder through the urethra to drain urine. Between 15-25% of hospitalized patients receive urinary catheters during their hospital stay.

Central Line–associated Bloodstream Infections (CLABSI)

A "central line" or "central catheter" is a tube that is placed into a patient's large vein, usually in the neck, chest, arm, or groin. The catheter is often used to draw blood, or give fluids or medications. It may be left in place for several weeks. A bloodstream infection can occur when bacteria or other germs travel down a "central line" and enter the blood. CLABSI is a primary laboratory confirmed bloodstream infection in a patient with a central line at the time of (or within 48-hours prior to) the onset of symptoms and the bloodstream infection is not related to an infection from another site.

Surgical Site Infections (SSI)

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only while others are more serious and can involve tissues under the skin, organs, or implanted material.

National Healthcare Safety Network (NHSN)

The National Healthcare Safety Network (NHSN) is a secure, internet-based surveillance system managed by the CDC and is available for use by all types of healthcare facilities in the United States, including acute care hospitals, long term acute care hospitals, psychiatric hospitals, rehabilitation hospitals, outpatient dialysis centers, ambulatory surgery centers, and long term care facilities.

Standardized Infection Ratio (SIR):

The standardized infection ratio (SIR) is used to compare HAI rates between hospitals. The SIR is the observed number of infections divided by the "expected" number of infections in a standard population, which are derived from historical data reported to the NHSN. Different intensive care units (ICU) are compared to similar types of ICU, based on hospital size, teaching status, ICU size, and type of patient population served. For SSI, the SIR is risk-adjusted for procedure type, length of surgery, type of surgical wound and the patient's physical condition.

Interpretation of the Standardized Infection Ratio (SIR):

- A **ratio of less than 1** means the hospital had fewer reported HAI than "expected".
- A **ratio of 1** means that the hospital's number of reported HAIs was similar to "expected".
- A **ratio of more than 1** means that the hospital's number of reported HAIs was higher than "expected".

Please note that the "expected" number of HAI does not mean that one would expect to get an infection when hospitalized; rather it reflects the anticipated number of infections based on previous reports to the NHSN. The CDC provides guidelines and tools to the healthcare community to help control and prevent HAI.

Confidence Intervals (CI):

Even though the SIR is calculated using the best possible information, it still has some uncertainty, especially when the population being studied is small. In a small group, such as a small hospital, the snapshot may change a lot from year to year. If one HAI is diagnosed in a small hospital one year, and three the next year, the SIR for that hospital might change dramatically. These big fluctuations are less likely to occur in larger hospitals. Likewise, the overall rate for Delaware may fluctuate due to the relatively few hospitals that contribute HAI data, compared to bigger states.

We can tell how much uncertainty there is for an SIR by looking at its **confidence interval**. A confidence interval is a range of values that shows where the SIR could reasonably be. We typically calculate 95% confidence intervals (95% CI), meaning that we are 95% sure that the true ratio within the confidence interval.

- If the 95% confidence interval **crosses over** the reference line of 1.0, we conclude that the hospital's infection rate is similar to (not significantly different) from "expected".
- If the 95% confidence interval falls **completely below** the reference line of 1.0, we conclude that the hospital's infection rate is significantly lower (i.e., better) than "expected".
- If the 95% confidence interval falls **completely above** the reference line of 1.0, we conclude that the hospital's infection rate is significantly higher (i.e., worse) than "expected".

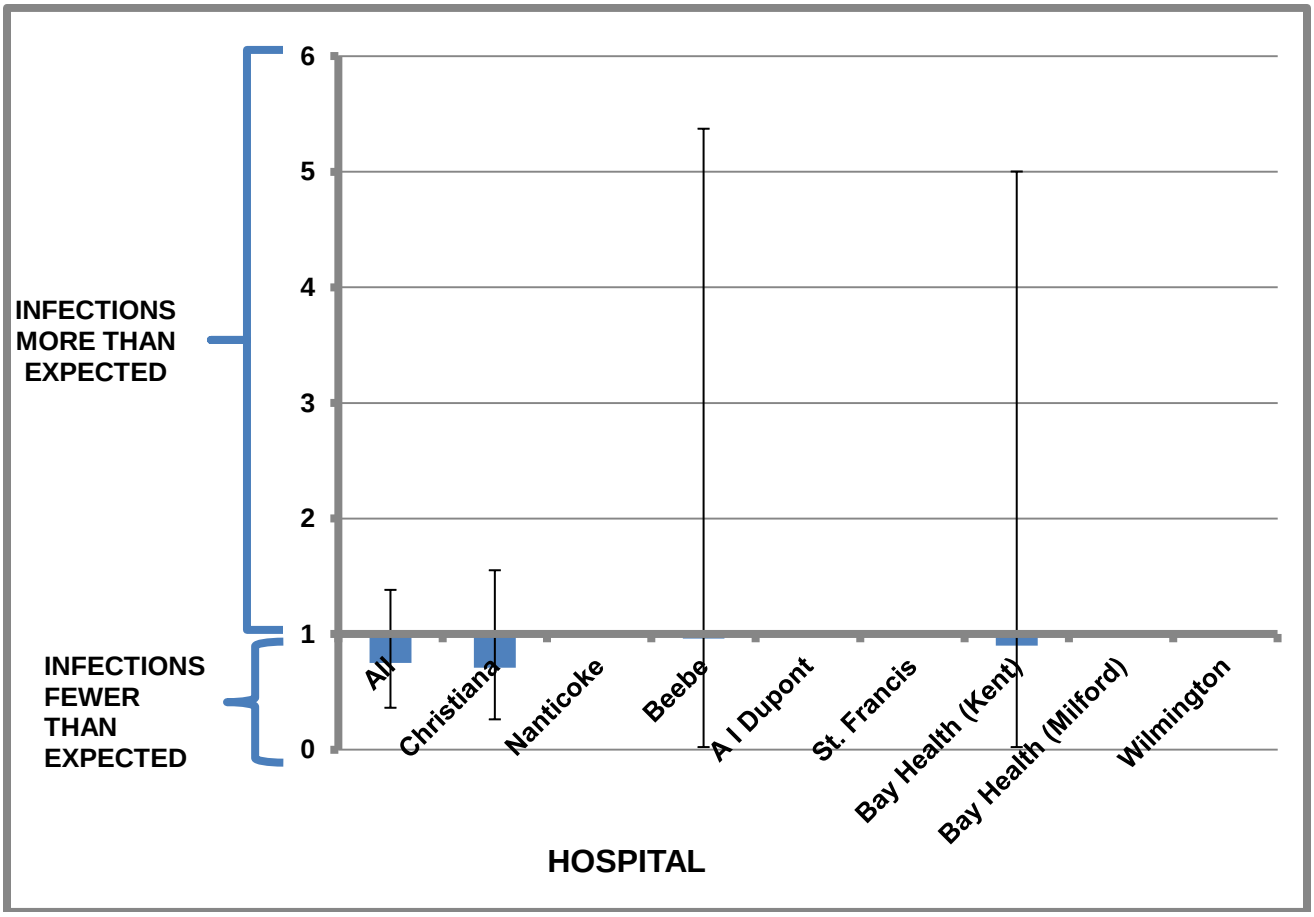
All conclusions are based on the assumption that a hospital's patient population is similar to that of the NHSN pooled patient population for that ICU type. The SIR is not calculated when the "expected" number of infections is less than 1, which is usually due to small numbers of devices or procedures.

A. Standardized Infection Ratios (SIR) by Hospital, Delaware, April - June 2012 for Central Line-Associated Bloodstream Infections (CLABSI) reported from all Intensive Care Units:

HOSPITAL	Central Line Associated Bloodstream Infections (CLABSI)		SIR	95% Confidence Interval (CI)		Interpretation
	Observed	Expected	Actual	Lower	Upper	
All	10	13.35	0.75	0.36	1.38	Number of infections statistically similar to "expected"
Christiana	6	8.42	0.71	0.26	1.55	Number of infections statistically similar to "expected"
Nanticoke	0	0.5	*NR	*NR	*NR	Numbers too low for interpretation
Beebe	1	1.04	0.96	0.02	5.37	Number of infections statistically similar to "expected"
A I DuPont	2	0.99	*NR	*NR	*NR	Numbers too low for interpretation
St. Francis	0	0.47	*NR	*NR	*NR	Numbers too low for interpretation
Bay Health (Kent)	1	1.00	0.9	0.02	5	Number of infections statistically similar to "expected"
Bay Health (Milford)	0	0.477	*NR	*NR	*NR	Numbers too low for interpretation
Wilmington	0	0.34	*NR	*NR	*NR	Numbers too low for interpretation

*NR - Not Reported because the "expected" number of infections was less than "1".

Standardized Infection Ratios (SIRs) by Hospital, Delaware, April - June 2012 for Central Line-Associated Bloodstream Infections (CLABSI) reported from all Intensive Care Units:



Notes:

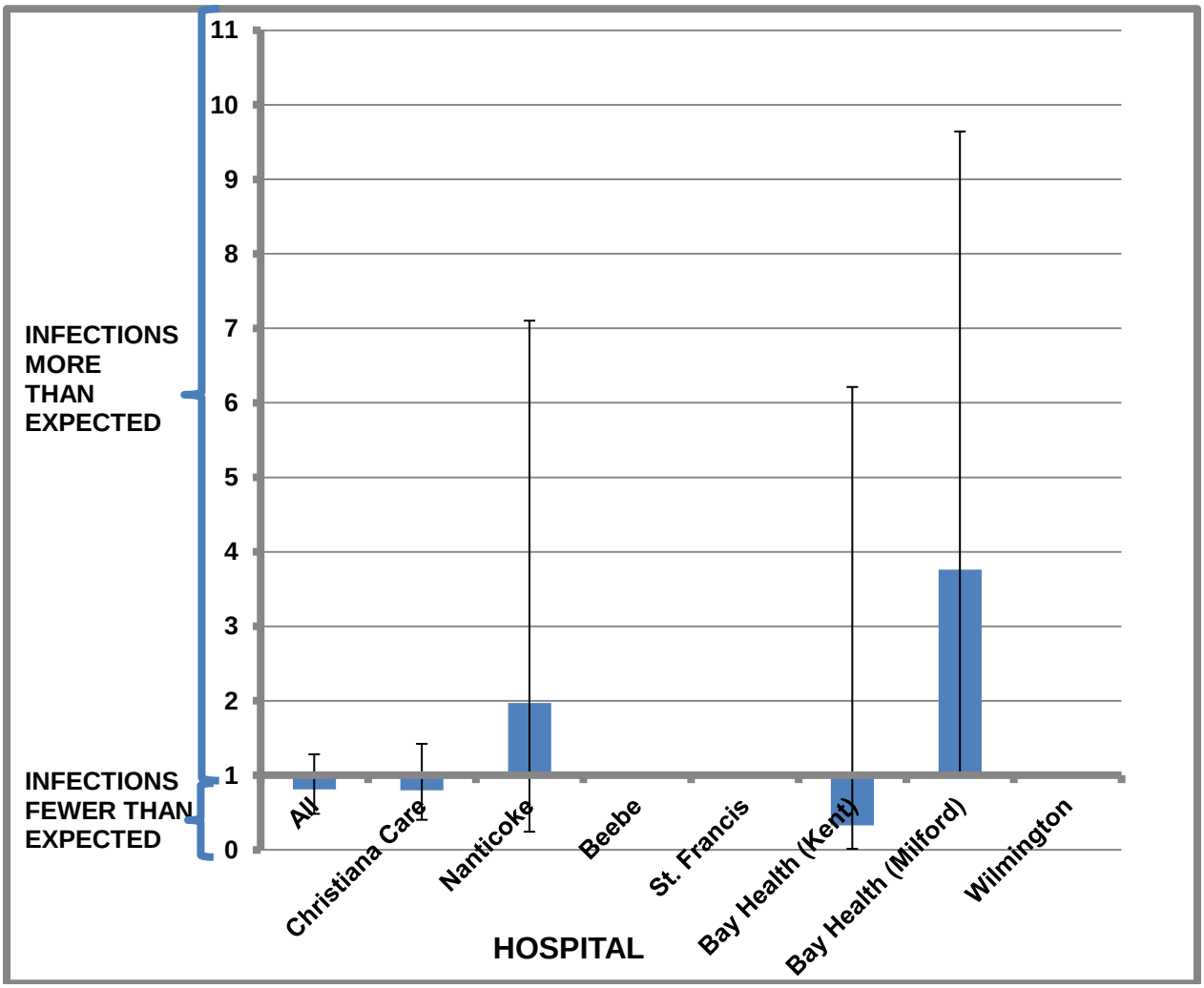
- Nanticoke, A I DuPont, St. Francis, Bay Health (Milford), and Wilmington hospitals had "expected" number of CLABSI of less than "1". SIR calculated only when the "expected" number of infections is "1" or more.
- Confidence Interval (**CI**):
  - If the 95% confidence interval **crosses over** the reference line of 1.0, we conclude that the hospital's infection rate is similar to (not significantly different) from "expected".
  - If the 95% confidence interval falls **completely below** the reference line of 1.0, we conclude that the hospital's infection rate is significantly lower (i.e., better) than "expected".
  - If the 95% confidence interval falls **completely above** the reference line of 1.0, we conclude that the hospital's infection rate is significantly higher (i.e., worse) than "expected".

B. Standardized Infection Ratios (SIR) by Hospital, Delaware, April - June 2012 for Surgical Site Infections (SSI) reported from all Acute Care Hospitals:

HOSPITAL	Surgical Site Infections (SSIs)		SIR	95% Confidence Interval (CI)		Interpretation
	Observed	"expected"	Actual	Lower	Upper	
All	18	22.54	0.8	0.47	1.27	Number of infections statistically similar to "expected"
Christiana	11	13.83	0.8	0.4	1.42	Number of infections statistically similar to "expected"
Nanticoke	2	1.02	1.97	0.24	7.1	Number of infections statistically similar to "expected"
Beebe	0	1.97	0	**NR	1.88	Numbers too low for interpretation
St. Francis	0	1.06	0	**NR	3.49	Numbers too low for interpretation
Bay Health (Kent)	1	2.99	0.33	0.01	1.86	Number of infections statistically similar to "expected"
Bay Health (Milford)	4	1.06	3.76	1.03	9.64	Number of infections statistically more than "expected"
Wilmington	0	0.61	*NR	*NR	*NR	Numbers too low for interpretation

*NR - Not Reported because the "expected" number of infections was less than "1".
**NR - Not Reported because there were "0" infections.

Standardized Infection Ratios (SIR) by Hospital, Delaware, April - June 2012 for Surgical Site Infections (SSI) reported from Acute Care Hospitals:



- Standardized Infection Ratio

- 95% Confidence Interval

Notes:

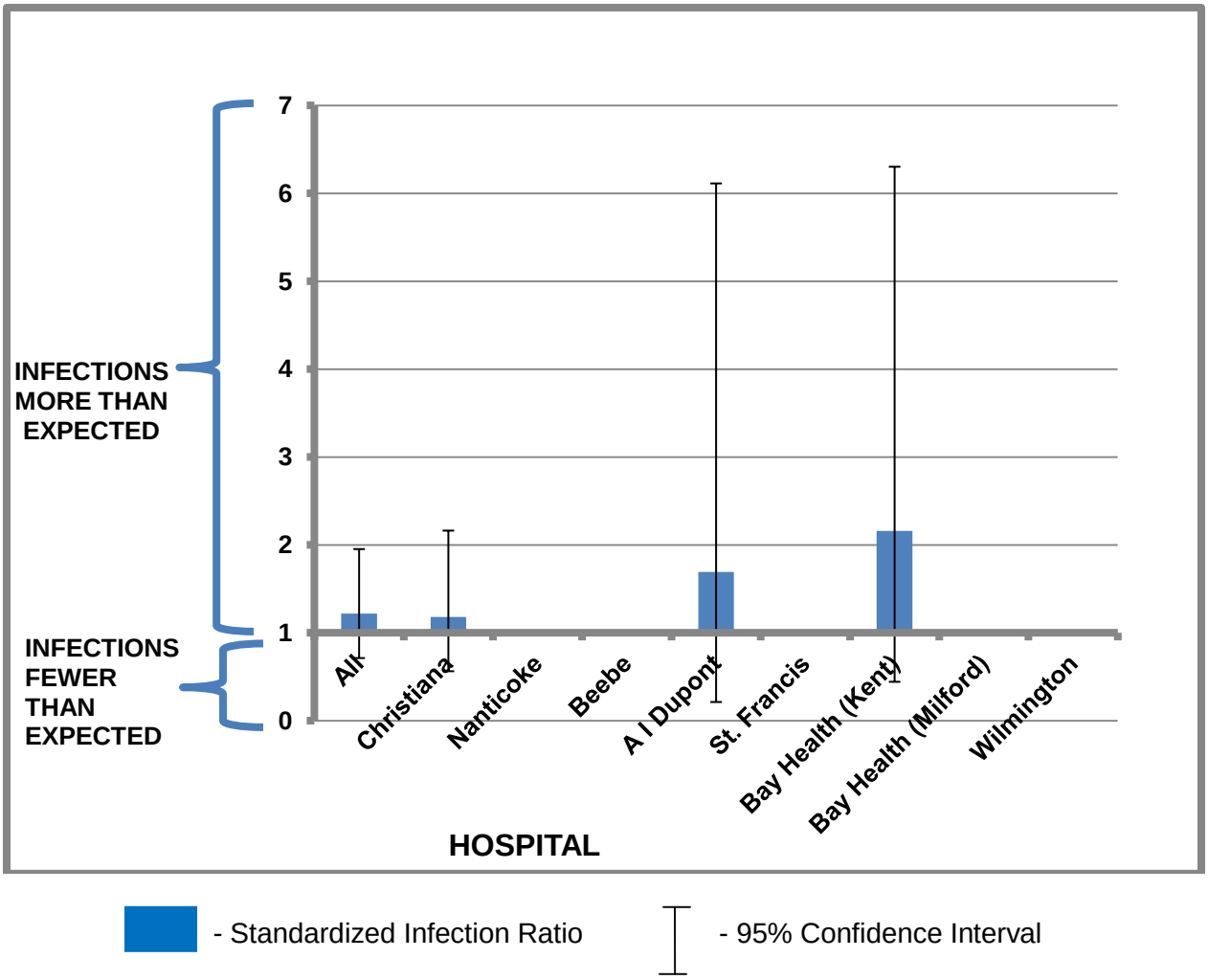
- Wilmington hospital had "expected" number of SSI of less than "1". SIR calculated only when the "expected" number of infections is "1" or more.
- **Confidence Interval** (**CI**):
  - If the 95% confidence interval **crosses over** the reference line of 1.0, we conclude that the hospital's infection rate is similar to (not significantly different) from "expected".
  - If the 95% confidence interval falls **completely below** the reference line of 1.0, we conclude that the hospital's infection rate is significantly lower (i.e., better) than "expected".
  - If the 95% confidence interval falls **completely above** the reference line of 1.0, we conclude that the hospital's infection rate is significantly higher (i.e., worse) than "expected".

C. Standardized Infection Ratios (SIR) by Hospital, Delaware, April - June 2012 for Catheter-Associated Urinary Tract Infections (CAUTI) reported from all Intensive Care Units:

HOSPITAL	Catheter-Associated Urinary Tract Infections (CAUTI)		SIR	95% Confidence Interval (CI)		Interpretation
	Observed	"expected"	Actual	Lower	Upper	
All	17	13.96	1.22	0.71	1.95	Number of infections statistically similar to "expected"
Christiana	10	8.51	1.18	056	2.16	Number of infections statistically similar to "expected"
Nanticoke	2	0.48	*NR	*NR	*NR	Numbers too low for interpretation
Beebe	0	0.82	*NR	*NR	*NR	Numbers too low for interpretation
A I DuPont	2	1.18	1.69	0.2	6.11	Number of infections statistically similar to "expected"
St. Francis	0	0.59	*NR	*NR	*NR	Numbers too low for interpretation
Bay Health (Kent)	3	1.39	2.16	0.44	6.3	Number of infections statistically similar to "expected"
Bay Health (Milford)	0	0.29	*NR	*NR	*NR	Numbers too low for interpretation
Wilmington	0	0.71	*NR	*NR	*NR	Numbers too low for interpretation

*NR - Not Reported because the "expected" number of infections was less than "1".

Standardized Infection Ratios (SIR) by Hospital, Delaware, April - June 2012 for Catheter-Associated Urinary Tract Infections (CAUTI) reported from all Intensive Care Units:



Notes:

- Nanticoke, Beebe, St. Francis, Bay Health (Milford), and Wilmington hospitals had "expected" number of CAUTI of less than "1". SIR calculated only when the "expected" number of infections is "1" or more.
- **Confidence Interval** (**CI**):
  - If the 95% confidence interval **crosses over** the reference line of 1.0, we conclude that the hospital's infection rate is similar to (not significantly different) from "expected".
  - If the 95% confidence interval falls **completely below** the reference line of 1.0, we conclude that the hospital's infection rate is significantly lower (i.e., better) than "expected".
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