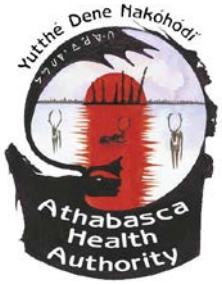
Saskatchewan Caesarean Section Surgical Site Infection Surveillance Report: 2015-16

Saskatchewan Infection Prevention and Control Program
October 2016

Government of Saskatchewan



The Saskatchewan Infection Prevention and Control Program is a collaboration among Regional Health Authorities (RHAs), the Ministry of Health, and other stakeholders. Its mandate is to ensure that all participants are aware of leading infection control practices and emerging standards.

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Melissa's Story

Melissa and her husband had spent the last 9 months preparing for the arrival of their first child and couldn't wait to start their new life together as a family. Ten days overdue, Melissa was to be induced. Up until this point, Melissa's pregnancy was completely normal, and there were no indications of potential problems before delivery. Melissa was induced three different times. Finally, after the third attempt at inducing labour, Melissa awoke early the morning of May 5 with painful cramping. At 6a.m., she went to the hospital and shortly thereafter her water broke. Melissa spent the rest of the day in labour, exhausted and in pain. With a labour that wasn't progressing and the baby's heart rate dramatically dropping, her healthcare providers made the decision to perform an emergency caesarean section. Melissa does not remember many of the details, but does insist that she had an amazing group of healthcare providers in the operating room calming her down and explaining to her what was happening. In her words, "I had wonderful care." Melissa delivered a healthy baby boy May5 at 11:58 p.m.

A week and a half later, Melissa began to experience a throbbing pain and swelling around her incision area. She called HealthLine to discuss her concerns. Because there was no fever or discharge, it was unclear if she had an infection, so she would have to make the decision whether to follow up with her family physician. Three days later, Melissa noticed pus coming from her incision so she immediately booked an appointment with her family physician. Her healthcare provider examined her incision, diagnosed her with a surgical site infection, and prescribed antibiotics. Shortly after the first round of antibiotics, Melissa and her family went to the lake for the Canada Day long weekend. Once there, she began to feel sick again and noticed swelling around her incision. Fortunately for Melissa, her family physician clinic provided 24-hour on-call service, and she was able to contact a healthcare provider immediately. Her husband then drove back into town to pick up a second course of antibiotics. Shortly after completing the second round of antibiotics, Melissa began to experience the same symptoms and was prescribed a third course of antibiotics. Melissa could not understand why she still had an infection. She says, "I took the medication religiously and did everything they told me to do. I cleaned my wound properly and didn't bath. I did everything I was supposed to."

For three months, Melissa struggled with a surgical site infection. To this day, Melissa says she could cry thinking about friends out walking with their newborn babies a day after they delivered. One month after her delivery, Melissa was still unable to climb a flight of stairs because the pain was so bad. She was unable to drive, cook meals, do housework, or even lift her baby on her own, and therefore had to rely on her husband and family for assistance. Despite how amazing and supportive her husband and family were during her ordeal, in Melissa's words, "I felt like an invalid." She describes the three months post-delivery as "awful – the pain, the infection, the swelling." In addition to the anxiety and chaos that comes with being a new mom, Melissa also had to endure the added stress of doctors' appointments, twice-daily dressing changes because her wound oozed so much, multiple rounds of antibiotics, and considerable pain and suffering. But it is not just Melissa's physical health that has been affected by her surgical site infection. This experience significantly affected her family and her emotional well-being.

It has been two years since Melissa's caesarean section, and when asked whether she is planning to have another child, she replies, "I think he may be an only child as I haven't really gotten over the experience." "It was a lovely and wonderful and amazing experience, but the labour and delivery still haunts me every day."

Opportunities for Improvement

Listening to Melissa's story is a powerful reminder that preventing patient harm is at the core of our Provincial Surgical Site Infection (SSI) Surveillance and SSI Prevention Bundle programs. Melissa's story suggests two areas where there is opportunity for improvement:

1. Appropriate collection of wound swabs, and
2. Post-discharge wound care instructions.

The Saskatchewan Infection Prevention and Control Program is currently developing an SSI wound education toolkit. This toolkit offers information to healthcare providers on how to recognize the signs and symptoms of a surgical site infection, and when and how to collect a wound swab to ensure appropriate treatment. A patient fact sheet for preventing surgical site infections was developed in 2015 and is included in the Saskatchewan SSI Surveillance Protocol. The fact sheet tells patients what they can do to prevent developing an SSI, lists the signs and symptoms of an SSI, and advises them to contact their healthcare provider if they develop any of those symptoms. Health regions are encouraged to provide this fact sheet or similar document to patients as part of the discharge process.

Editor's Note:

To protect patient privacy, "Melissa" is a pseudonym.

Melissa responded to our request for a Patient and Family Advisor who had experienced a surgical site infection following caesarean section. She told her story to the Provincial Infection Control Coordinator who wrote this document. The section called "Melissa's Story" was sent to Melissa for approval. She has confirmed its accuracy in portraying her experience.

Summary

POSTOPERATIVE CAESAREAN SECTION SURGICAL SITE INFECTIONS CAN CAUSE **EXCESS MORBIDITY AND MORTALITY**, **DELAY RECOVERY**, AND CAN **NEGATIVELY IMPACT THE QUALITY OF LIFE** FOR NEW MOMS AND BABIES. MANY OF THESE INFECTIONS ARE PREVENTABLE.

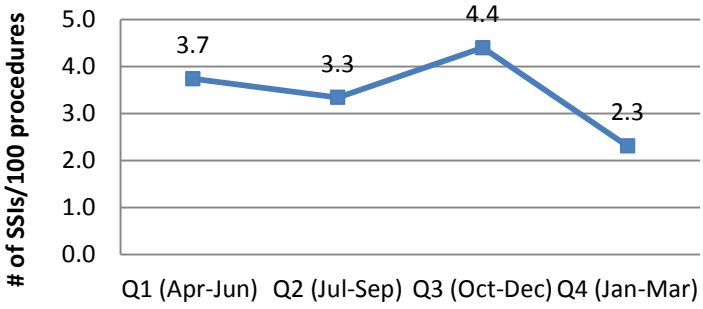
The Saskatchewan surgical site infection (SSI) surveillance program began on April 1, 2015. This annual report summarizes the SSIs following caesarean sections reported in quarter 1 (Q1) through quarter 4 (Q4) of fiscal year (FY) 2015-16 (April 1, 2015 to March 31, 2016).

3,437 caesarean section procedures were performed in Saskatchewan. 119 women developed a surgical site infection. That's an infection rate of 3.5% or 3.5* per 100 procedures.[1]

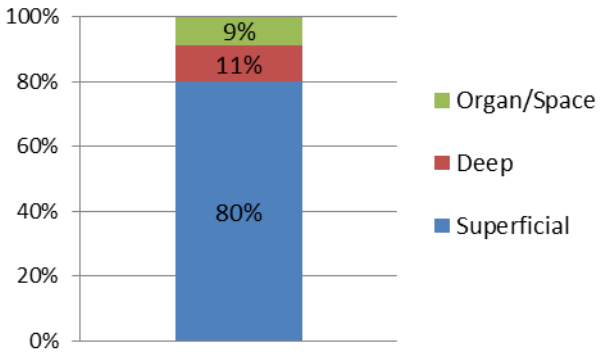
86% of infections were identified following discharge from hospital

13% of women who developed an SSI were readmitted to hospital

Provincial SSI Rate for Caesarean Sections (2015-16)



Proportion of SSI following Caesarean Section by SSI Type



QUALITY IMPROVEMENT EFFORTS TO REDUCE SSI

- Each Regional Health Authority has implemented and is auditing compliance with the *Safer Healthcare Now!* SSI Prevention Bundle components.

*National Healthcare Safety Network (NHSN) benchmark SSI rate for caesarean sections is 1.46 – 2.43 per 100 procedures.

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Introduction

Surgical site infections (SSIs) are the third leading cause of healthcare associated infections (HAIs) in Canadian hospitals, resulting in additional length of hospital stay, increase in readmission rates, morbidity, and mortality.[2,3,4] SSIs pose an enormous clinical and economic burden on both the healthcare system and the patients who incur them.[5]

Since April 2015, each regional health authority (RHA) has submitted SSI surveillance data for caesarean sections to the Patient Safety Unit on a quarterly basis. This annual report represents the cases of SSI reported in FY 2015-16.

Please note that the data in this report should be interpreted with caution. Comparison of the numbers of cases and rates among RHAs is not recommended. There are many factors that can affect the rate of SSI including the health conditions and medical history of the population served, the complexity of the services offered, and the case finding methodology used for detection. See "About This Report" for other limitations.

Surveillance Results

Regional Rates of SSI following Caesarean Section

The quarterly and annual crude (unadjusted) SSI rates for caesarean sections for each regional health authority are shown in Figures 1 and 2. [A list of RHAs and a map are provided in the Glossary.]

NOTE: There is variation in post discharge surveillance intensity among RHAs which may account for differences in SSI rates. For this reason, comparison of SSI rates among RHAs is not recommended. In addition, low procedure volumes may produce unreliable data (i.e. rates based on small numbers may fluctuate dramatically, even when differences are not meaningful).

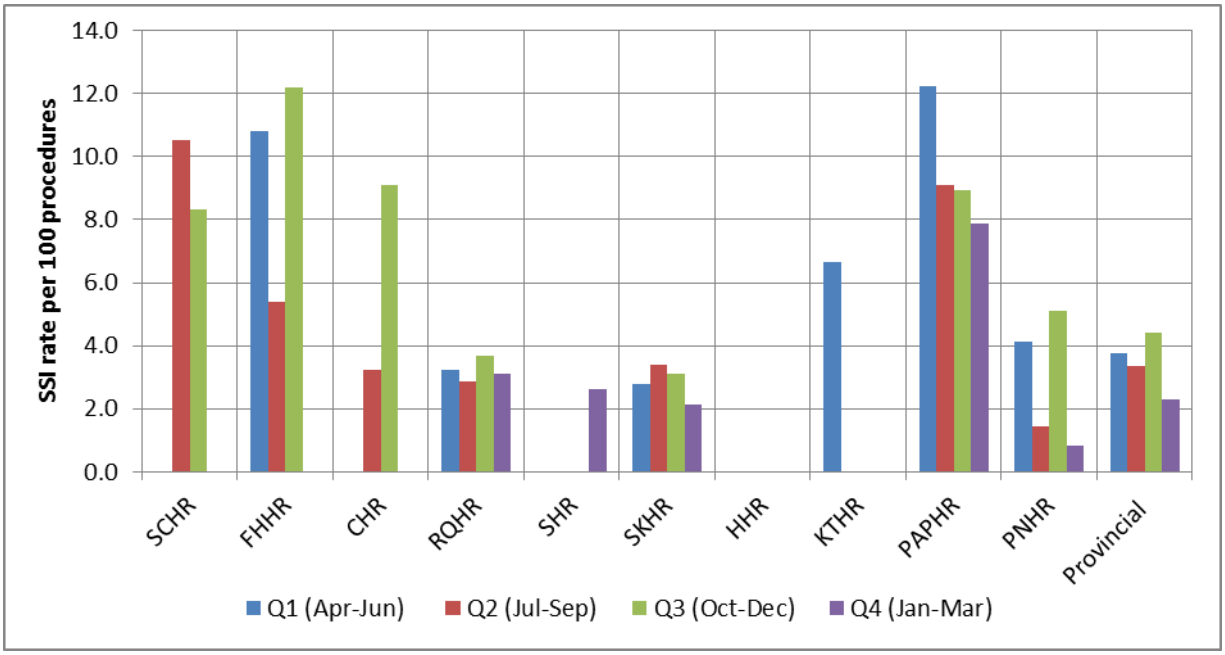


Figure 1: Quarterly SSI rate (crude rate) by RHA following caesarean section procedure

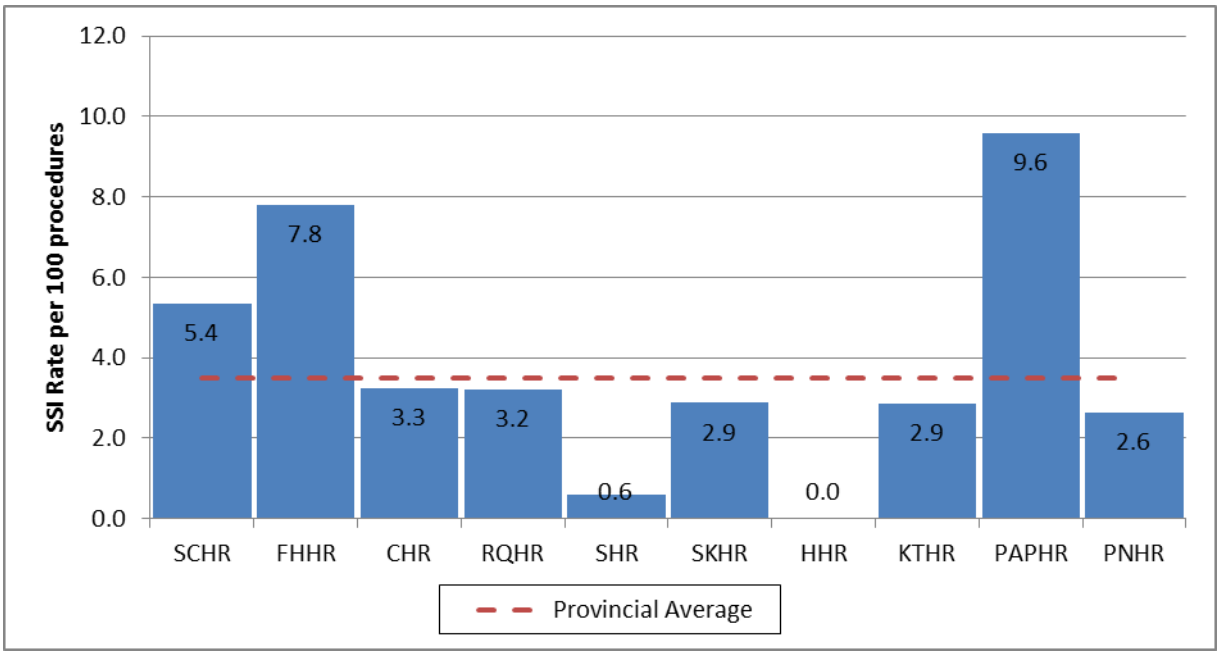


Figure 2: Annual SSI rate (crude rate) by RHA following caesarean section procedure

Table 1 shows the annual risk-stratified SSI rates for caesarean sections for each regional health authority. NOTE: KTHR and HHR were not required to collect risk factor information due to low surgery volumes performed; therefore they are not included in this table.

Table 1: Annual SSI rate by RHA and patient risk index following caesarean section procedure

	NHSN Risk Index	# of Procedures	# SSI	SSI Rate
SCHR	0	51	3	5.9
	1	4	0	0.0
	2	1	0	0.0
	Unknown	0	0	N/A
	Total	**56**	**3**	**5.4**
FHHR	0	137	9	6.6
	1	4	2	50.0
	2	0	0	N/A
	Unknown	0	0	N/A
	Total	**141**	**11**	**7.8**
CHR	0	77	3	3.9
	1	46	1	2.2
	2	0	0	N/A
	Unknown	0	0	N/A
	Total	**123**	**4**	**3.3**
RQHR	0	544	15	2.8
	1	150	6	4.0
	2	19	2	10.5
	Unknown	157	5	3.2
	Total	**870**	**28**	**3.2**
SHR	0	136	0	0.0
	1	32	1	3.1
	2	0	0	N/A
	Unknown	1	0	0.0
	Total	**169**	**1**	**0.6**
SKHR	0	1,185	28	2.4
	1	189	9	4.8
	2	14	3	21.4
	Unknown	1	0	0.0
	Total	**1,389**	**40**	**2.9**
PAPHR	0	67	4	6.0
	1	123	13	10.6
	2	8	2	25.0
	Unknown	0	0	N/A
	Total	**198**	**19**	**9.6**
PNHR	0	299	7	2.3
	1	144	3	2.1
	2	8	0	0.0
	Unknown	3	2	66.7
	Total	**454**	**12**	**2.6**

SSI rates are per 100 procedures

N/A: An SSI rate is not calculated as there were no procedures performed for that particular risk category

Unknown: ASA score or procedure duration was not recorded and therefore the risk index could not be calculated

Surgical site infections are classified as superficial, deep, or organ/space according to the Centers for Disease Control and Prevention/National Healthcare Safety Network (CDC/NHSN) definitions. Figure 3 shows the infection type as a proportion (percentage) of the total SSIs for each RHA.

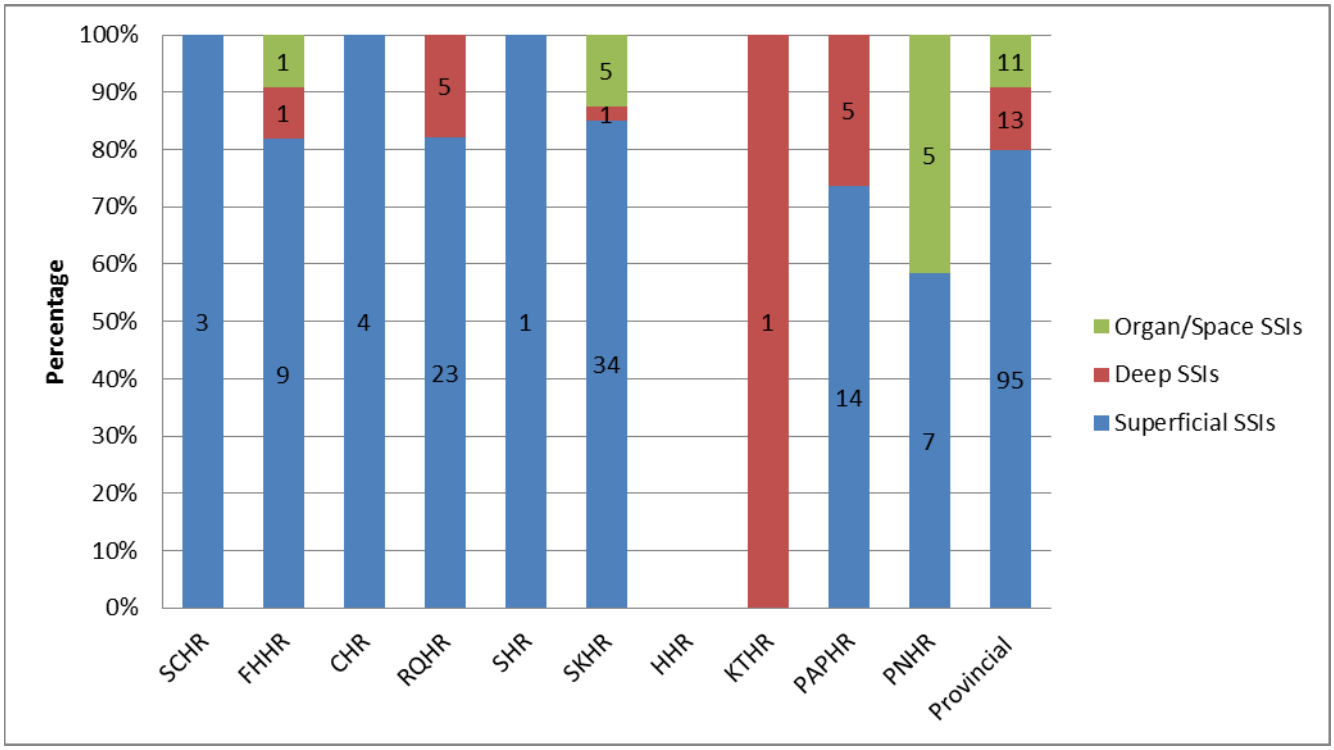


Figure 3: Proportion of SSI following caesarean section procedure by RHA and infection type

Provincial Rates of SSI following Caesarean Section

A total of 3,437 caesarean section procedures were performed in Saskatchewan in FY 2015-16 resulting in 119 surgical site infections.

Table 2: Provincial quarterly SSI rate (crude rate) following caesarean section procedure

Procedure Date	# Procedures	# SSIs	SSI Rate	Annual SSI Rate
Apr-Jun 2015 (Q1)	829	31	3.7	3.5
Jul-Sep 2015 (Q2)	898	30	3.3	
Oct-Dec 2015 (Q3)	887	39	4.4	
Jan-Mar 2016 (Q4)	823	19	2.3	

Table 3 shows the annual risk-stratified SSI rates for Saskatchewan. Most caesarean section procedures (n=2,496, 73%) fall into risk category 0 as patients tend to be younger and are less likely to have comorbidities or chronic illnesses compared with patients undergoing other surgical procedures. A total of 162 (5%) procedures had one or more of the risk index components missing and therefore a risk index score could not be calculated. The National Healthcare Safety Network (NHSN) benchmark SSI rate for caesarean section is included in Table 3.[1] The Provincial SSI rate for Saskatchewan is higher in all risk index categories compared to the NHSN rate.

NOTE: The number of procedures performed in some of the risk index categories is small and may produce unreliable data (i.e. rates based on small numbers may fluctuate dramatically, even when differences are not meaningful).

Table 3: Provincial annual SSI rate by patient risk index following caesarean section procedure

NHSN Risk Index	# Procedures	# SSIs	Provincial SSI Rate	NHSN Rate†
0	2,496	69	2.8	1.46
1	692	35	5.1	2.43
2	50	7	14.0	3.82
Unknown	162	7	4.3	
Total	3,400*	118*	3.5	

*Kelsey Trail and Heartland health regions' total number of procedures and SSIs are not included in this table as these regions were not required to collect risk factor information due to low surgery volumes.
†National Benchmark

Details of SSI Cases

Figures 4-10 provide detailed information about the SSI cases reported in Saskatchewan in FY 2015-16.

The length of time in days between caesarean section procedure and onset of infection is shown in Figure 4. The majority of SSIs were identified between days 1-10 (n=58, 49%), with the highest number of infections identified on day 7.

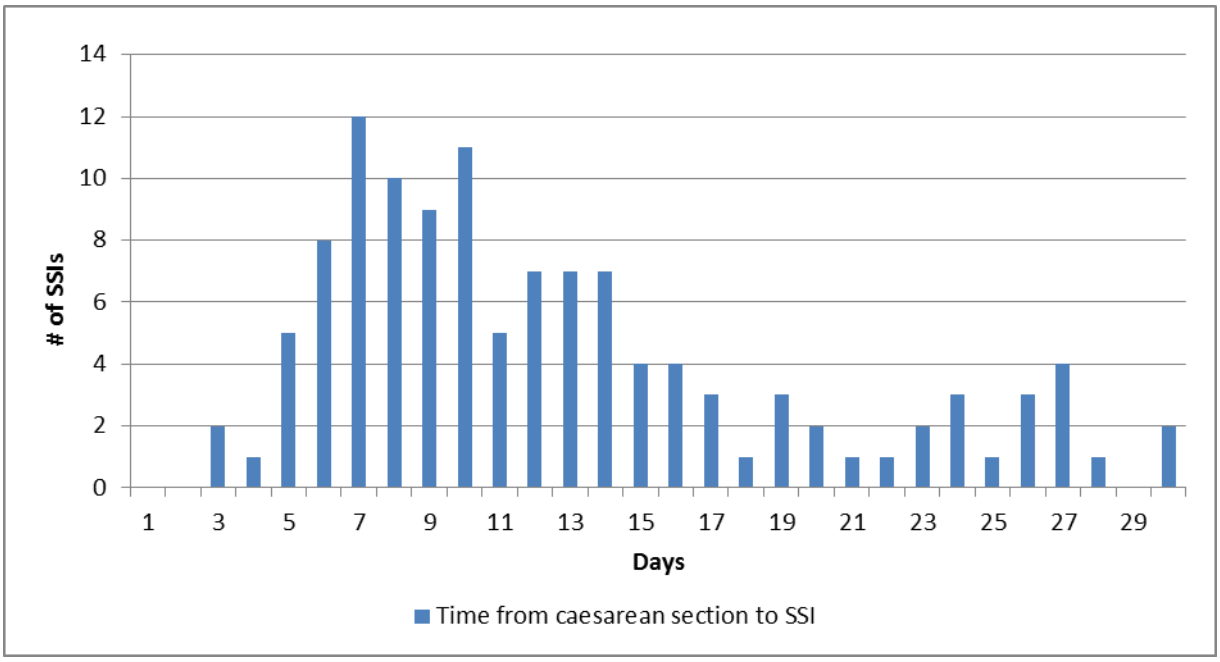


Figure 4: Length of time (days) from caesarean section procedure to onset of SSI

The frequency of causative organisms in SSIs following caesarean section is shown in Figure 5. Microbiology data was available for 64 (54%) of the 119 SSIs identified. Conversely, 55 (46%) of SSIs identified did not have a swab collected.

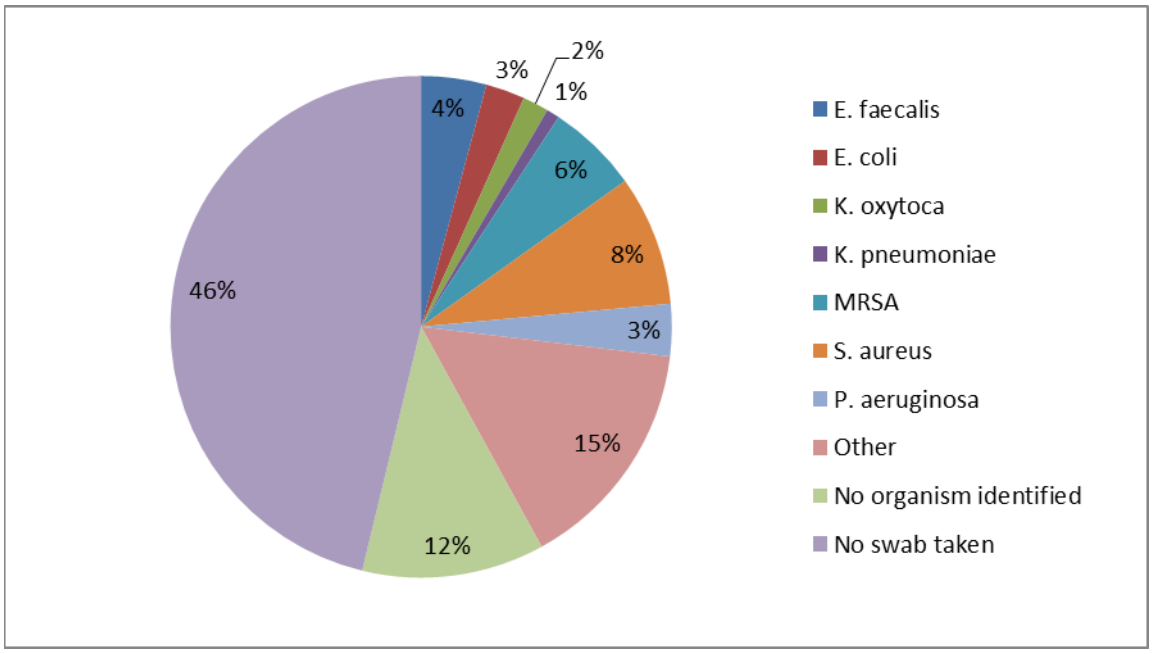


Figure 5: Frequency of causative organisms following caesarean section procedure

As outlined in the Saskatchewan SSI surveillance protocol, all women who undergo a caesarean section are followed for signs and symptoms of a surgical site infection from the time of their admission until discharge, upon readmission, and up to 30 days after the procedure. The location of the patient at the time of SSI identification is shown in Figure 6. The majority of SSIs (n=102, 86%) were identified following discharge from the hospital using post discharge surveillance methods. This shows the importance of conducting post discharge surveillance if accurate surgical site infection rates are to be reported.

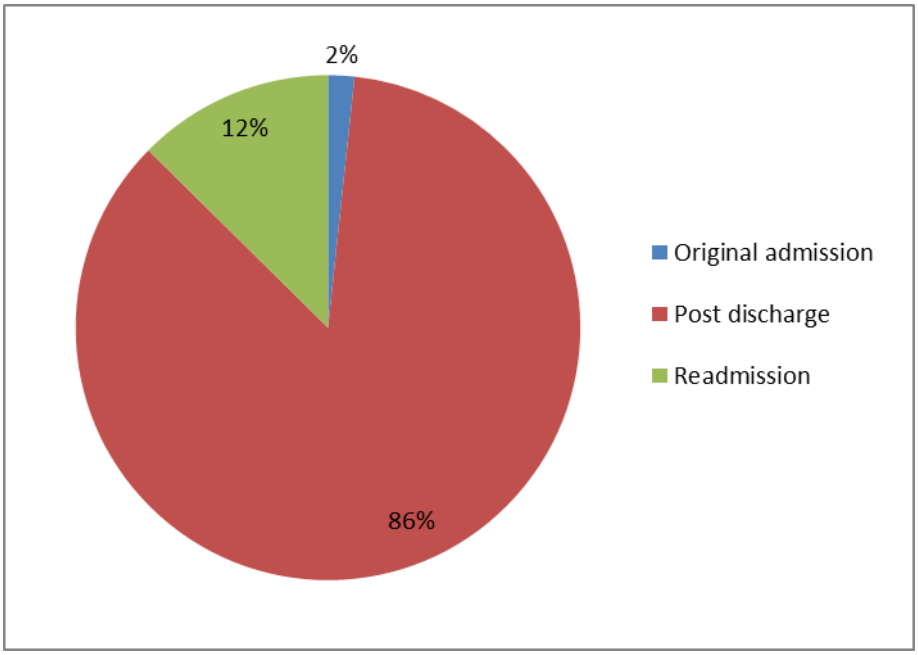


Figure 6: Patient location at time of SSI identification

Figure 7 shows the type of infection as a proportion (percentage) of the total surgical site infections in Saskatchewan. The most common infection type was superficial (n=95, 80%).

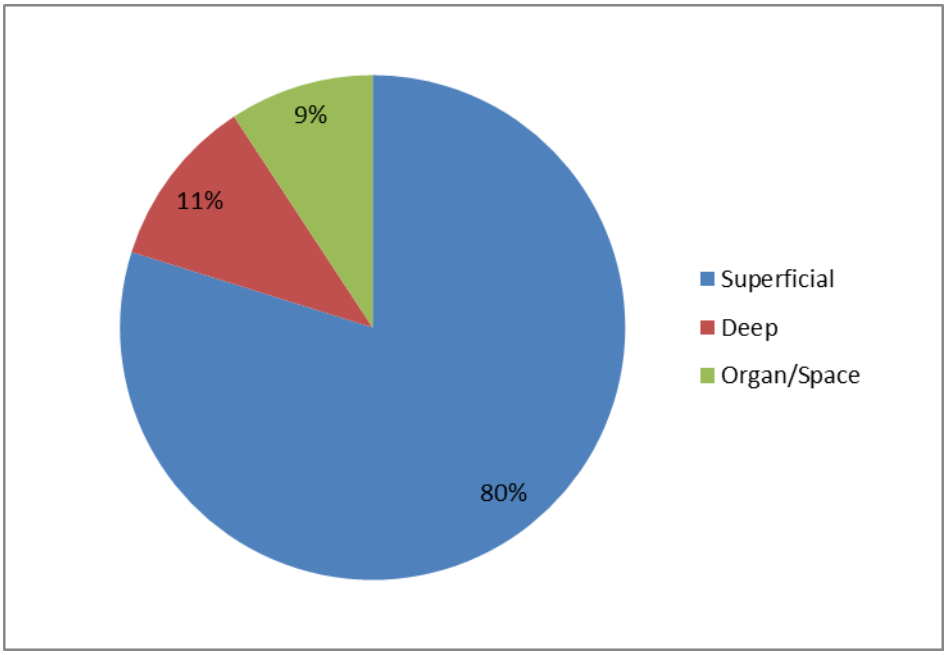


Figure 7: Proportion of SSI following caesarean section procedure by infection type

NOTE: Figures 8-10 present data collected only on those women who developed a surgical site infection. In doing so, the data presented lacks a control group to offer a comparator; therefore, results should be interpreted with caution.

Figure 8 shows the proportion of surgical site infections by the type of operation (elective, emergency). Of the 119 SSIs reported in FY 2015-16, 89 (75%) were reported in women who underwent an emergency caesarean section procedure.

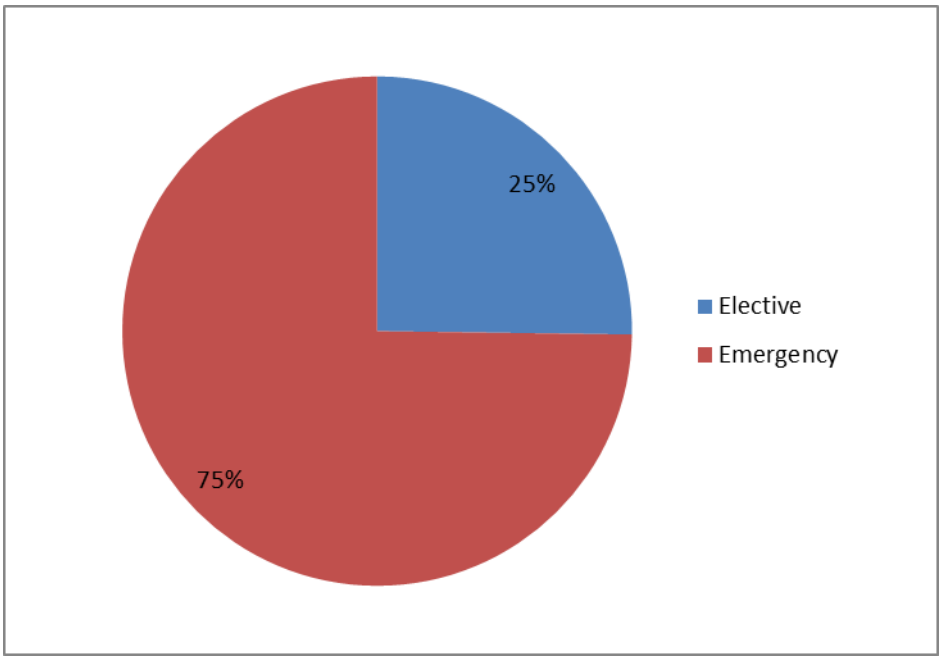


Figure 8: Proportion of SSI following caesarean section procedure by type of operation

Figure 9 shows the proportion of surgical site infections by body mass index (BMI). Of the 119 SSIs reported in FY 2015-16, 50 (42%) were reported in women with a BMI >30. Also important to note is the percent of BMIs that were unknown because the height and/or weight was not documented on the operating room (OR) record.

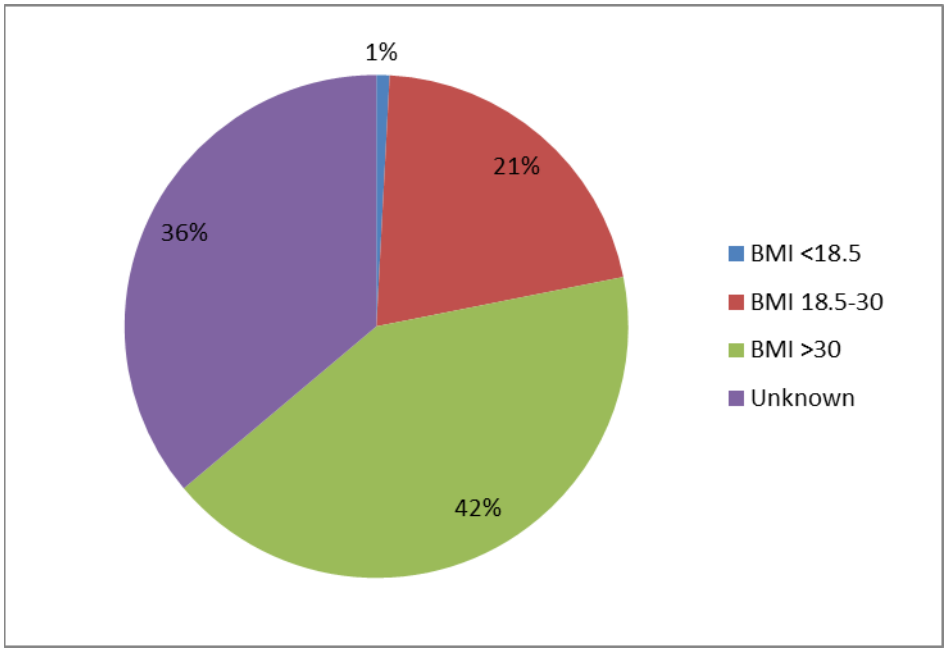


Figure 9: Proportion of SSI following caesarean section procedure by BMI

Compliance with the Safer Healthcare Now SSI prevention bundle components is shown in Figure 10. Of the 119 SSIs reported in FY 2015-16, there was high compliance (ranging from 93% to 97%) with each of the bundle components.

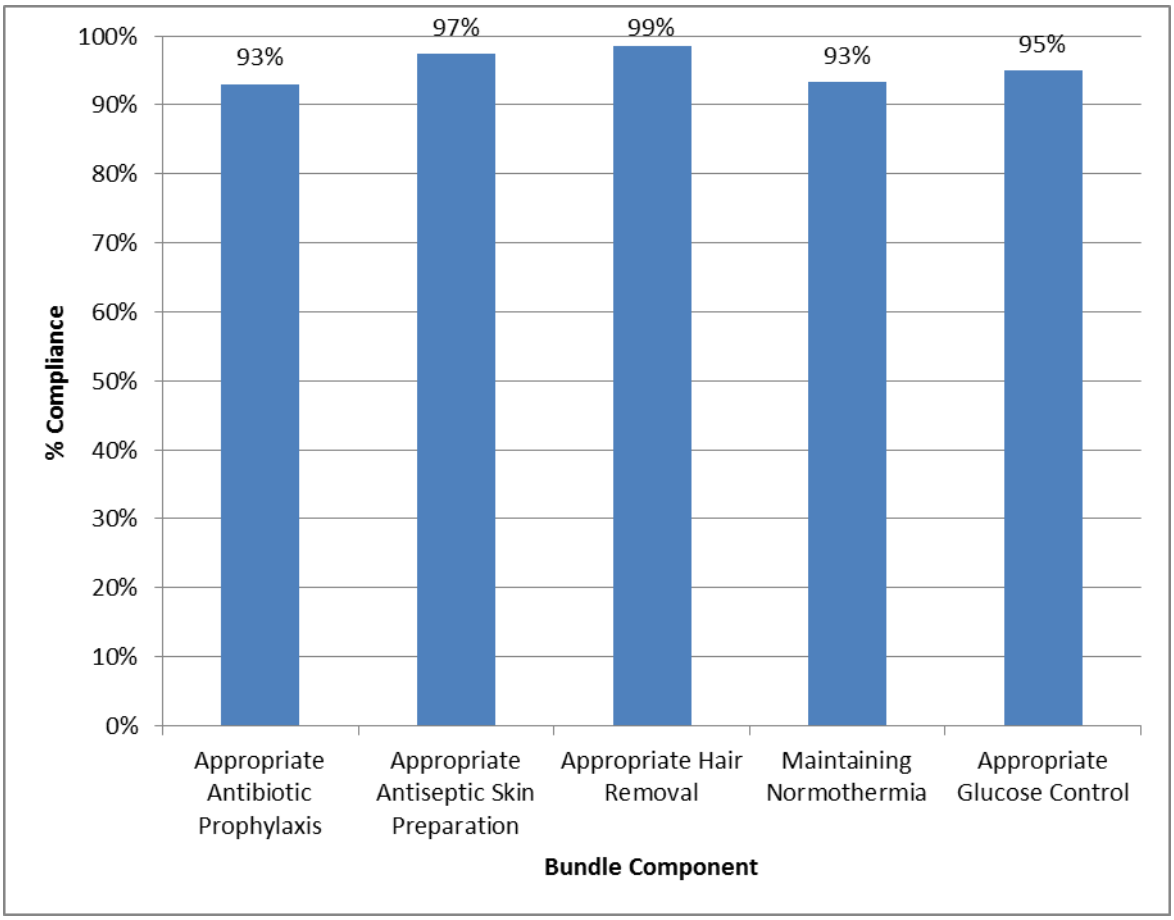


Figure 10: Percent compliance with Safer Healthcare Now SSI Prevention Bundle Components

Discussion

This initial report is intended to provide a provincial baseline for caesarean section surgical site infections in Saskatchewan. At this time, there is insufficient data to identify any trends or make conclusions about the risk of developing an SSI with specific risk factors present (e.g. diabetes, increased BMI).

As illustrated in Figure 6, 86% of surgical site infections were identified after the patient had been discharged from the hospital. This highlights the need for a strong post discharge surveillance program if accurate rates of SSI are to be reported. If minimal or no post discharge surveillance is performed, then SSIs will be missed, along with opportunities for improving patient care.

Surgical site infections occurred in Saskatchewan in FY 2015-16 despite a high compliance with the Safer Healthcare Now SSI prevention bundle components. This information along with Melissa's story has helped to inform the future direction of the Saskatchewan SSI surveillance program. The program will focus on prevention efforts through development of local bundles to reduce the incidence of surgical site infections. In addition, an SSI wound education toolkit is being developed. The toolkit offers information to healthcare providers on how to recognize the signs and symptoms of a surgical site infection, and when and how to collect a wound swab to ensure appropriate treatment. In 2015, a patient fact sheet for preventing surgical site infections was developed. The fact sheet tells patients what they can do to prevent developing an SSI, lists the signs and symptoms of an SSI, and advises them to contact their healthcare provider if they develop any of those symptoms. Health regions are encouraged to provide this fact sheet (or similar document) to patients as part of the discharge process.

About This Report

SSI Surveillance System

The provincial SSI surveillance program involves the participation of the 10 Saskatchewan regional health authorities that perform caesarean section procedures. Working with each RHA, the Patient Safety Unit collects, analyzes, and reports surgical site infection surveillance data at the provincial level.

1. Case Finding Methodology

All women who underwent a caesarean section procedure were followed for signs and symptoms of an SSI from the time of their admission until discharge, on readmission, and up to 30 days after their surgical procedure. Readmission and 30-day discharge requires post-discharge surveillance methods for identification of SSIs. The majority of SSIs are detected after discharge from hospital; therefore, hospitals were encouraged to incorporate post-discharge surveillance methods into their surveillance protocol. Post-discharge surveillance is captured minimally in the Mandatory category and, to a greater extent, in the Optional and Enhanced categories. Case finding methods are detailed in the table below.

Mandatory: RHAs were required to use all of the case finding methods in the Mandatory category.

Optional and Enhanced: RHAs were encouraged to use any or all of the case finding methods in the Optional and Enhanced categories. This decision should be based upon availability of resources and access to various databases.

Mandatory	Optional	Enhanced
• Microbiology reports (Review inpatient AND outpatient reports) • Admission lists (Identify patients readmitted with an SSI) • SSI Case Report Form (Used to notify an infection control professional of an SSI that is identified in one RHA but attributed to a different RHA) • Bed lists (Identify patients with a longer than average* length of hospital stay) *3 days for caesarean sections	• Notification by Physician Offices, Public Health, Home Care, Surgical Unit, and/or Emergency Department through completion of the Post Surgical Follow-up Tool • Notification by Medical Records • Use of databases such as Sunrise Clinical Manager (ER visits), and Pharmaceutical Information Program (outpatient antibiotic utilization)	• Telephone surveillance

2. Criteria for SSI cases

A woman is included for SSI surveillance if:

- She has undergone a caesarean section procedure in a Saskatchewan healthcare facility; **AND**
- The caesarean section procedure was deemed a clean (Class I) or clean/contaminated (Class II); **AND**
- The SSI has met the Centers for Disease Control and Prevention/National Healthcare Safety Network (CDC/NHSN) case definition for a surgical site infection.

Data Sources

The SSI case data are collected based on the criteria defined in the Saskatchewan Surgical Site Infection Surveillance Protocol and entered by infection control professionals (ICPs) into an excel spreadsheet developed by the Patient Safety Unit. Sixty days following the end of each quarter, regional ICPs submit both case and denominator data to the Provincial Infection control Coordinator (ICC) by email. No patient identifiers are provided.
Sources of denominator data include:

- Electronic databases (e.g. CKM, Surgical Information System);
- Medical record systems; and
- Operating Room (OR) theatre records.

Limitations

There may be limitations in case finding strategies and data collection methodologies across RHAs in Saskatchewan. The variation in surveillance intensity and case identification methodology affects the number of SSIs identified. While some regions in the province used only case finding methods in the mandatory category, others were able to implement a more active infection surveillance program (i.e. optional and/or enhanced case finding). This will likely have resulted in some underreporting from some regions, but a more accurate representation of the burden of SSIs from others. In addition, facilities that perform small numbers of surgical procedures may have unstable rates; therefore slight changes in the number of infections or procedures can dramatically affect the rate. Each healthcare facility has unique challenges and different at-risk populations. Each RHA is best situated to respond to SSIs in their region.

Glossary

Crude rate

A crude infection rate is an overall rate, not adjusted for the presence of any risk factors.

Elective Caesarean Section

Defined as a scheduled surgical procedure for which a patient is neither in labour nor has ruptured membranes.

Emergency Caesarean Section

Defined as a procedure for which a patient presents to Labour and Delivery while in labour or with ruptured membranes.

Fiscal Year (FY)

Fiscal year is a term used to differentiate a budget or financial year from the calendar year. Saskatchewan's fiscal year runs from April 1 of the initial year through March 31 of the next year. For example, FY 2015-16 is from April 1, 2015 to March 31, 2016.

NHSN SSI Risk Index

This score is used to predict a surgical patient's risk of developing a surgical site infection. The risk index consists of three risk factors: wound class, ASA score, and duration of procedure. The risk index score ranges from 0 (lowest risk of developing an SSI) to 3 (highest risk of developing an SSI). The risk index score is calculated as follows:

Risk Factor	Score = 0 if:	Score = 1 if:
Wound Class	I (Clean) or II (Clean/Contaminated)	III (Contaminated) or IV (Dirty/Infected)
ASA Score*	1 or 2	3, 4 or 5
Duration of Procedure	< 56 minutes	≥ 56 minutes
SSI Risk Index =	**Sum of scores**	

*ASA Score

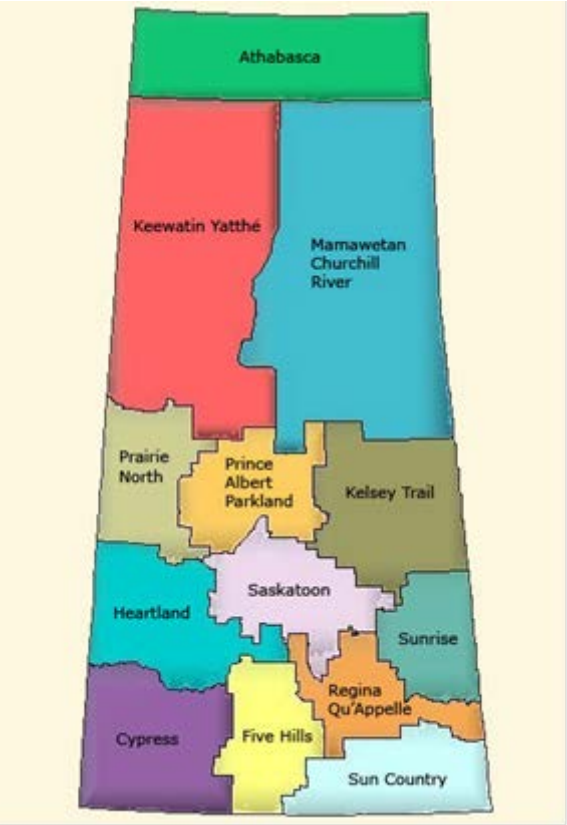
The ASA classification system was developed by the American Society of Anesthesiology. It is an assessment made by an anesthesiologist based on a patient's pre-operative physical condition. A patient is assigned one of the following:

1 = A normally healthy patient
2 = A patient with mild systemic disease
3 = A patient with severe systemic disease
4 = A patient with severe systemic disease that is a constant threat to life
5 = A moribund patient who is not expected to survive without the operation

Regional Health Authority (RHA)

Regional health authorities manage and deliver healthcare services. The ten (10) RHAs in Saskatchewan that perform surgical procedures are:

- Sun Country Health Region (SCHR)
- Five Hills Health Region (FHHR)
- Cypress Health Region (CHR)
- Regina Qu'Appelle Health Region (RQHR)
- Sunrise Health Region (SHR)
- Saskatoon Health Region (SKHR)
- Heartland Health Region (HHR)
- Kelsey Trail Health Region (KTHR)
- Prince Albert Parkland Health Region (PAPHR)
- Prairie North Health Region (PNHR)



Risk Stratification [6]

Some patients will be at greater risk of infection than others having the same type of surgery. Risk stratification is a process to control for these differences in risks. It involves calculating separate rates for patients in the same category of risk (e.g. NHSN SSI Risk Index).

SSI rate calculation for caesarean sections

SSI rate	Calculation
Crude (unadjusted) SSI rate	$\frac{\text{Number of SSI cases}}{\text{Number of procedures}} \times 100$
Risk-adjusted SSI rate	$\frac{\text{Number of SSI cases for each risk index category}}{\text{Number of procedures for each risk index category}} \times 100$
Provincial SSI rate	See calculations for crude and risk-adjusted SSI rate. The number of SSIs and procedures performed April 1, 2015 - March 31, 2016 in all RHAs were used in the calculation.
NHSN SSI rate	Published 2009[1]

Types of SSI

SSIs are classified using the Centers for Disease Control and Prevention/National Healthcare Safety Network (CDC/NHSN) definitions.[7] SSIs are classified as superficial, deep, or organ/space.

Superficial Incisional Surgical Site Infection

Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date)
AND
involves only skin and subcutaneous tissue of the incision
AND
patient has at least **ONE** (1) of the following:

1) Purulent drainage from the superficial incision
2) Organisms isolated from an aseptically-obtained culture of fluid or tissue from the superficial incision
3) Superficial incision that is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or not cultured (NOTE: A culture-negative finding does not meet this criterion)
   AND
   patient has at least **ONE** (1) of the following signs or symptoms of infection:
   - Pain or tenderness
   - Localized swelling
   - Redness
   - Heat
4) Diagnosis of superficial incisional SSI by the surgeon, attending physician, or other designee**

**Designee may be interpreted to mean the surgeon(s), infectious disease physician, other physician on the case, emergency physician, or physician's designee (nurse practitioner or physician's assistant).

Deep Incisional Surgical Site Infection

Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date)
AND
involves deep soft tissues of the incision (e.g., fascial and muscle layers)
AND
patient has at least **ONE** (1) of the following:

1) Purulent drainage from the deep incision
2) A deep incision that spontaneously dehisces or is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or is not cultured
   (NOTE: A culture-negative finding does not meet this criterion)
   AND
   patient has at least **ONE** (1) of the following signs or symptoms:
   - Fever (> 38°C)
   - Localized pain or tenderness
3) An abscess, or other evidence of infection involving the deep incision, that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test

Organ/Space Surgical Site Infection
Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date) **AND** involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure **AND** patient has at least **ONE** (1) of the following: 1) Purulent drainage from a drain that is placed into the organ/space 2) Organisms isolated from an aseptically-obtained culture of fluid or tissue in the organ/space 3) An abscess, or other evidence of infection involving the organ/space, that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test

Wound Class

The surgical wound class predicts the risk of post-operative infection based on the degree of bacterial contamination of surgical wounds at the time of surgery. Surgical wounds are classified as Class I (Clean), Class II (Clean/Contaminated), Class III (Contaminated), or Class IV (Dirty/Infected).

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