# CRANIOTOMY SURGICAL SITE INFECTION (SSI) SURVEILLANCE PROTOCOL

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# Introduction

Surgical site infections (SSIs) are a significant source of patient morbidity, mortality, prolonged hospitalization, and increased healthcare costs. Surveillance enables monitoring of infection rates, early identification of trends, and evaluation of preventive interventions.

Neurosurgeons within Interior Health have requested targeted surveillance of craniotomy procedures to understand local SSI incidence and support quality improvement. This protocol outlines the standardized approach for identifying, classifying, and reporting SSIs following these procedures.

# Goal

To monitor and reduce the incidence of SSIs following craniotomy procedures performed at Royal Inland Hospital.

# Objectives

- Determine facility SSI rates associated with craniotomy procedures
- Generate actionable data to support interventions that reduce SSIs
- Investigate increases or significant variations in SSI rates
- Establish quarterly and annual SSI rates for trend analysis and benchmarking (internally and externally)
- Strengthen collaboration between IPAC, Neurosurgery and OR teams

# Scope of Surveillance

### Patient Population
All hospitalized patients in Interior Health that undergo craniotomy procedures

### Case definition (Numerator)
SSI definitions follow the Centers for Disease Control (CDC)/National Healthcare Safety Network (NHSN) infection definitions [include link], which classify SSIs as:
1. Superficial Incisional SSI
2. **Deep Incisional SSI**
3. **Organ/Space SSI**

The scope of this surveillance includes only deep incisional and organ/space SSIs. All eligible procedures will be followed for 90 days as per the timeline recommended by NHSN and adjudicated by trained Infection Control Professionals (ICPs) to determine if infection definitions are met.

### Inclusion Criteria (Denominator)
- Select neurosurgery procedures:
  - Cranioplasty
  - Craniotomy – Burr holes
  - Craniotomy – Emergency
  - Craniotomy – Tumor – Neuro Navigator
  - Craniotomy/Craniectomy
  - Craniotomy/Decompress posterior fossa – Chiari mal

- Skull closed with bone flap or plating system (if applicable to the procedure)
- Class I (Clean) procedures
- Elective, urgent and emergent cases
- Primary procedures and revision procedures

### Exclusion Criteria
- Procedures classified as Class II-IV (clean-contaminated, contaminated, dirty/infected)
- Procedures without skill closure using bone flap/plating (where applicable)
- Bedside procedures
- Patients who died within 24 hours of the procedure

# Methodology

### Case Identification

At the end of each fiscal quarter the site ICP will request a list of all eligible craniotomy procedures performed from RIH Surgical Services. Relevant fields included are:
- Patient demographics: PHN, DOB, name
- OR demographics: theatre, surgeon, anesthetist, other OR staff
- Procedure information: procedure name, surgery date, procedure class, length of surgery, time in, cut time, time out, implants
- Prophylaxis information: prophylaxis agent, dose & time, second prophylaxis agent, dose & time (if applicable)
- Patient risk factors: oxygenation, BMI, ASA score, pre-op prep, skin prep

### Laboratory Data Linkage

Using the case line list identified above, the IPAC Epidemiologist will request a laboratory linkage for all eligible microbiology results within 90 days following the craniotomy procedure. Relevant laboratory fields included are:
- Patient name/identifier
- Micro specimen collection date/time
- Specimen number
- Micro procedure name and source
- Organism names

### Case Reviews

Lab linkage output will be reviewed and cleaned by the IPAC Epidemiologist.
- Duplicates are removed
- Ineligible specimen types are removed (urine, sputum, bronchial alveolar lavage, viral cultures, *C. difficile*).
- Include specimen types of post op culture, OR/surgical culture, surface wound culture, blood culture, fluid/aspirate culture
- Exclude patients with no/negative microbiology results

Once data has been cleaned, the ICP will review the remaining cases for possible SSIs that align with the case inclusion criteria and case definitions defined above.

# Reporting

Surveillance findings will be compiled and reported on a quarterly and annual basis to support timely monitoring and long-term trend evaluation. The quarterly summaries will include SSI rates and will be shared with Neurosurgery, OR leadership, IPAC leadership and relevant operational leaders to facilitate prompt review and intervention when needed.

An annual report will consolidate all findings for the fiscal year, providing a comprehensive overview of SSI rates, year-over-year trends, procedure volumes, microbiological patterns, identified risk factors and any quality improvement initiatives undertaken during the year to assess their impact. This report will be disseminated to Neurosurgery, OR leadership, IPAC leaderships and senior operational committees to inform broader quality improvement priorities.

# Data Quality and Limitations

Data used for this surveillance are derived from administrative surgical records and laboratory information systems, each of which carries inherent limitations. Laboratory-based case identification may miss SSIs diagnosed or treated outside of IH facilities, and infections managed clinically without microbiological sampling may not be captured, resulting in potential under-ascertainment. Variability in documentation, coding practices, or specimen submission may also influence the completeness of case identification and classification.

Despite these constraints, the surveillance methodology is applied consistently across sites and audit periods. Standardized data cleaning procedures, consistent application of NHSN definitions, and structured ICP chart reviews enhance the accuracy and comparability of case classifications. While absolute SSI counts may be conservative, the stability of the data sources and methods ensures that quarterly and annual trends remain reliable for monitoring performance, identifying emerging issues, and guiding quality-improvement initiatives.

# Rate Calculations

Craniotomy SSI Rates (per 100 procedures): $\frac{\text{Number of infections}}{\text{Number of procedures}} \times 100 \text{ procedures}$

# References

NHSN SSI definitions: Surgical Site Infection