

Presentation: Best Practices for Surveillance of Health Care Associated Infections

This document is current to August 7, 2008, and is not updated. It was prepared at a time when PIDAC reported directly to the Minister of Health and Long-Term Care and Chief Medical Officer of Health. Note that effective April 1, 2011, the responsibility for and functions of the Provincial Infectious Diseases Advisory Committee ("PIDAC") were transferred to the Ontario Agency for Health Protection and Promotion ("Agency"), and that PIDAC now reports to that Agency. You may wish to consult www.pidac.ca or the Agency's website at www.oahpp.ca for more information.

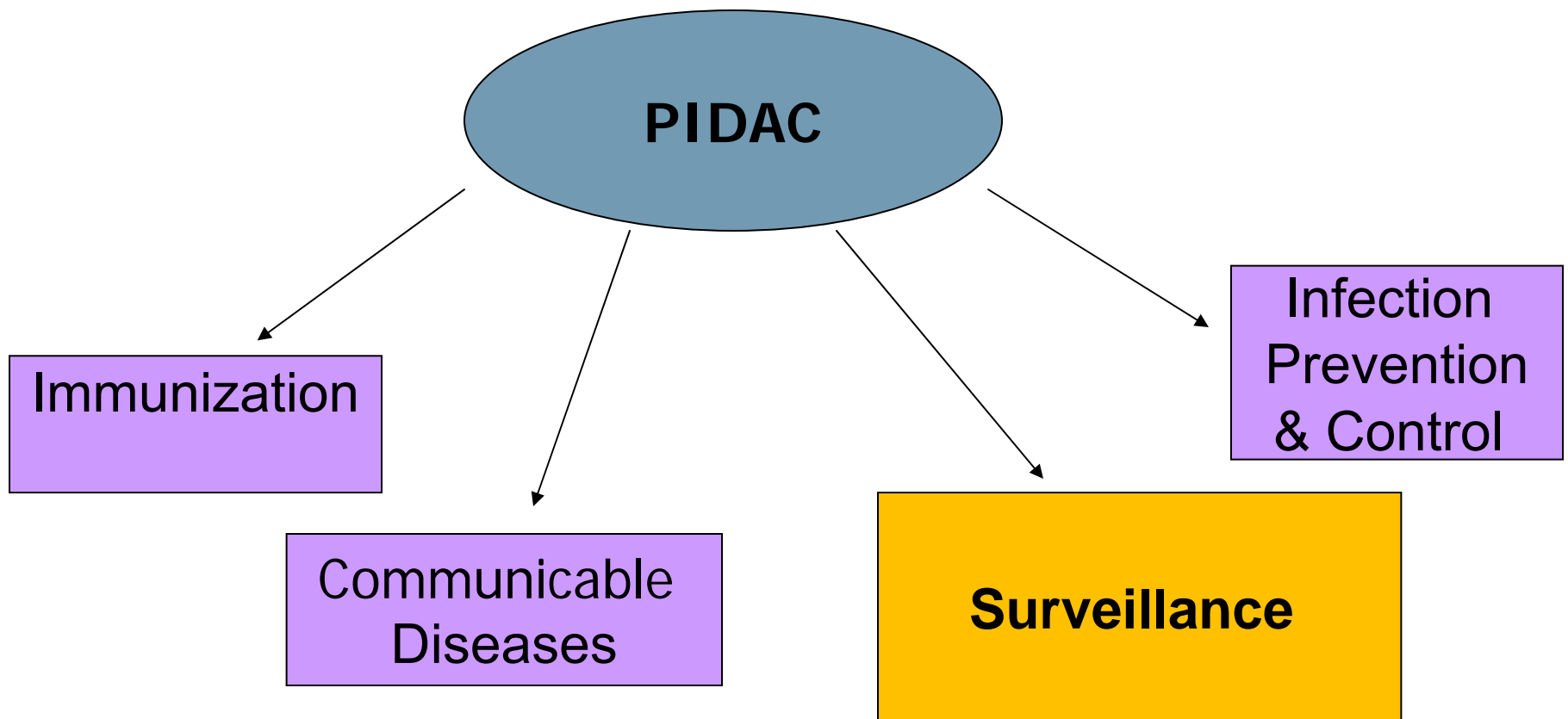
Best Practices for Surveillance of Health Care Associated Infections

Sandra Callery
Chris O'Callaghan
Ian Johnson

Provincial Infectious Diseases Advisory Committee (PIDAC)

- **Provision of expert advice relevant to ongoing and emerging infectious disease issues in Ontario.**
- **Development of standard evidence-based informational materials.**
- **Establishing linkages and communications with regional networks across Ontario dedicated to infectious disease issues.**

PIDAC Sub committees



Committee

Sandra Callery (Chair) – Infection Prevention and Control, Sunnybrook Health Sciences Centre Toronto

Faron Kolbe – Public Health, Toronto Public Health Unit

Brenda Guarda – Public Health, Simcoe- Muskoka Public Health Unit

Dr. Chris O'Callaghan – Epidemiology, Queens University

Karen Hay- ex officio –Public Health Division, MOHLTC

Dr. Charles Gardner- Medical Officer of Health, Simcoe-Muskoka Public Health Unit

Dr. Ian Johnson- Epidemiology, University of Toronto

Dr. Dick Zoutman- Infection Prevention and Control, Infectious Disease, Queen's University

Surveillance Sub committee

- Reviewing the scientific literature and other sources of evidence.
- Making recommendations to PIDAC and thereafter the Chief Medical Officer of Health on infectious disease surveillance issues.

Why do it?

Uses of Surveillance:

- Improve outcomes and processes
- Establish baseline data
- Population trends
- Sentinel events
- Investigation of problems

Uses of Surveillance in Health Care Settings

- Evaluate control measures
- Evaluate and reinforce practice
- Educate health care team
- Research
- Risk management
- Satisfying requirements and standards

Surveillance in Health Care Facilities

- a) A systematic review of the scientific literature identified 11 studies that examined changes in the rates of nosocomial infections following the introduction of nosocomial surveillance.
- b) The studies compared the risk of nosocomial infection at the beginning of a surveillance program (before any impacts associated with the program could be expected) to the risk of infection after the surveillance program was established and operational.

Surveillance in Health Care Facilities

- c) There was a clear connection between implementation of a surveillance program and subsequent decline in the rates of nosocomial infection. Reductions in the rates of nosocomial infections generally ranged from 7% to 60% following the implementation of surveillance programs.

- d) Several of the studies indicated that the reductions in rates of nosocomial infections were the result of changes to infection prevention and control practices informed by the feedback provided by the surveillance system.

Development of Best Practice Document*

This document applies to these health care settings:

- *Hospitals (e.g. tertiary care, community care, mental health, rehabilitation)*
- *Long-term/chronic care homes*
- *Complex continuing care settings*

This document does not apply to these health care settings:

- *Primary care*
- *Community health settings (clinics, physician offices, dental offices)*
- *Home health care*

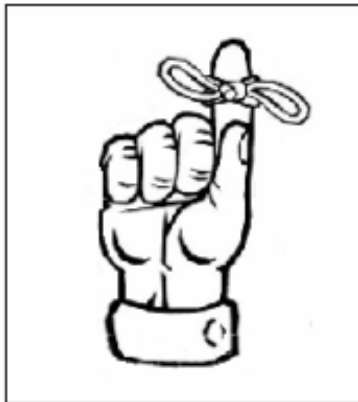
Best Practice Document

- This document deals with the surveillance of infections that result as an outcome of health care.
- Monitoring of processes, such as hand hygiene and sterilization techniques, are measured through the health care setting's practice audits rather than through the outcome surveillance systems as described in this guide.

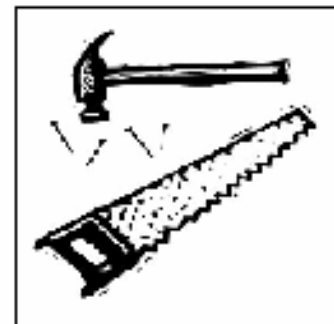
The Best Practice for Surveillance of Health Care Acquired Infections*

How to use this document:

Pearls of Wisdom



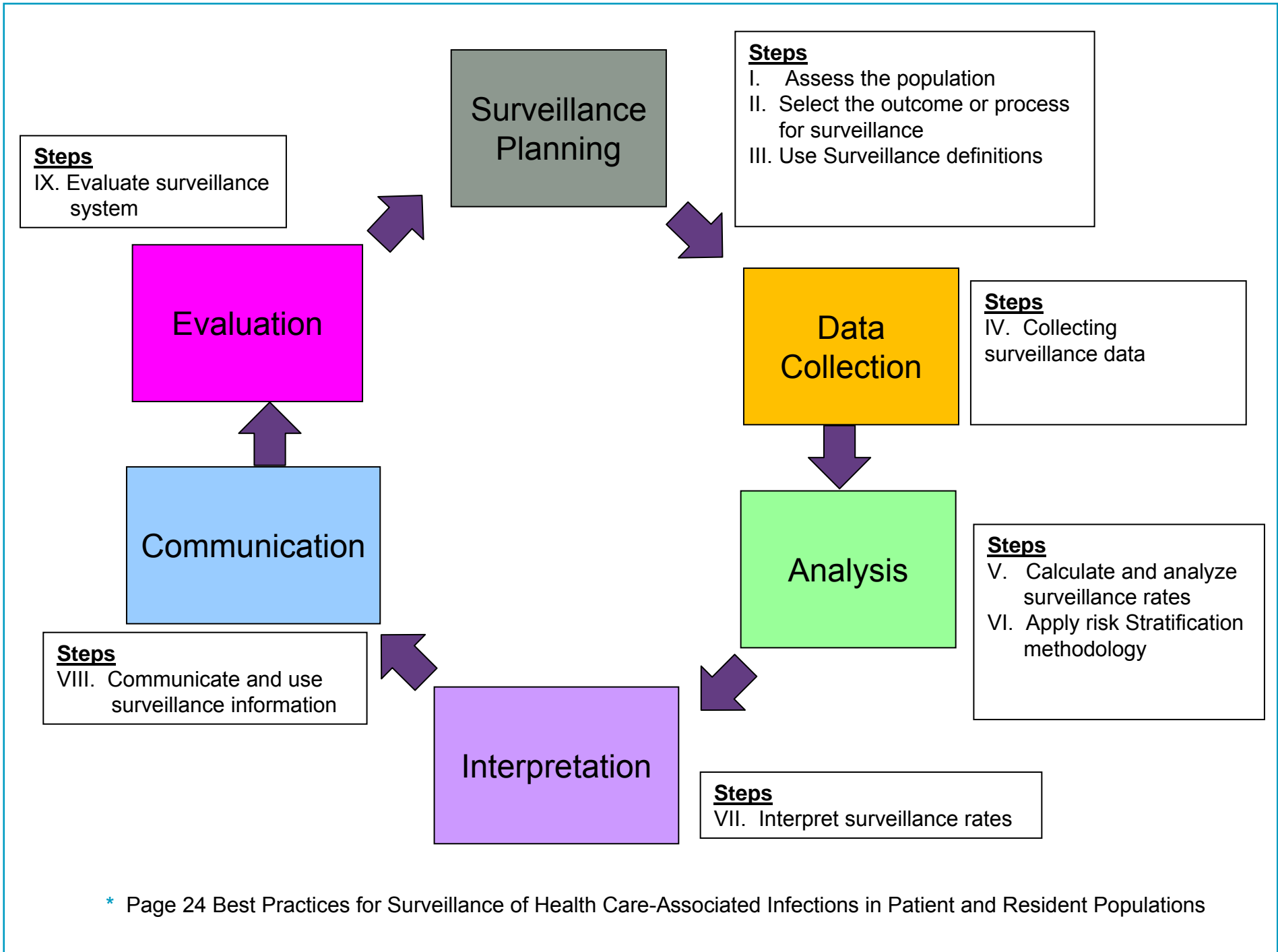
Recommended Practice

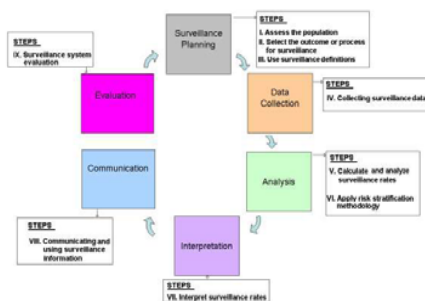


Tools to assist

Surveillance

- It works, but...
- It's harder than you think.....
- Establish a plan.....

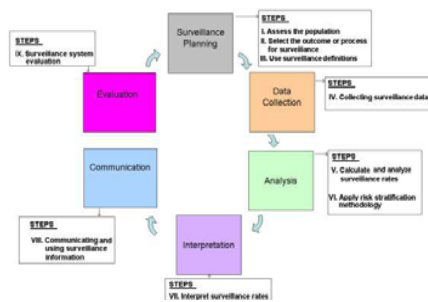




Step 1: Assess the Population

- Who is being covered by the surveillance program?
 - All patients? (e.g. *C. difficile*)
 - Specific groups of patients? (e.g. surgical site infections)
 - Possible special attention to high-risk patients

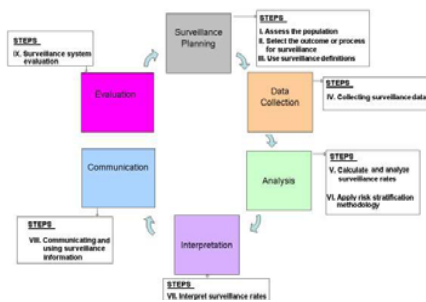
Surveillance
Planning



Step 1: Assess the Population

- Sometimes patient population selection is affected by availability of information and data.
- Where feasible, plan to use organization specific data to assess population
 - e.g. med records, financial services, surgical data bases, QA/RM/QI reports, information services, admin/management reports, etc.

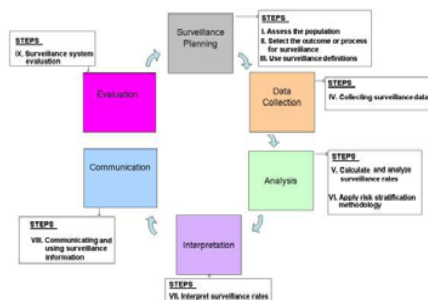
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Step 2: Select Outcome or Process for Surveillance

- Various measures are possible. Use criteria such as:
 - relative frequency of event?
 - cost or impact (eg. LOS, Tx, M&M, litigation, PR)?
 - potential for successful prevention?
 - relationship between process and outcome?
 - quality indicators?

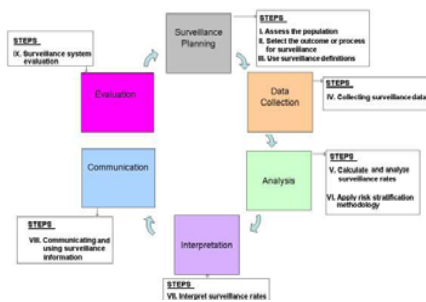
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Step 2: Select Outcome or Process for Surveillance

- Selecting measures can be iterative and change over time.
 - Responsive to new demands and changes in priorities
 - Responsive to changes in resource allocation
- Re-evaluate the outcome measures regularly

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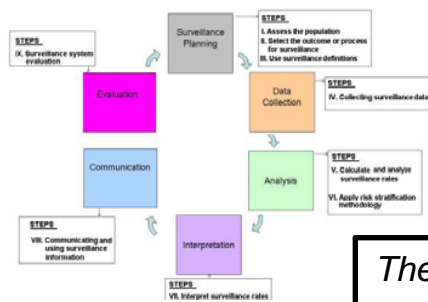
Step 2: Select Outcome or Process for Surveillance

- Two common approaches
 - Comprehensive, total surveillance
 - Priority-directed, site-specific surveillance
 - flexible, risk adjustments, resource based, sound methodology
 - limited info about endemic rates
 - miss clusters/outbreaks

Surveillance
Planning

Priorities – What to Consider?

| Type of Infection | Number/ Percent of all nosocomial infections | Number/ Percent that require extra days | Number/ Percent that incur extra costs | Number/ Percent that are preventable |
|-------------------|---|--|---|---|
| Surgical Wound | | | | |
| Pneumonia. | | | | |
| UTI | | | | |
| Bacteremia. | | | | |
| Other | | | | |



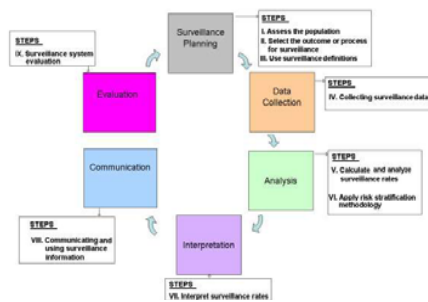
Step 2: Example – Acute Care

The example data below could be used to frame thinking about the infections selected for monitoring. Surgical site infections constitute a substantial proportion of the nosocomial infections presented here, entail extended duration of hospital stay and increase health care costs. A considerable proportion of these infections are also preventable. The hospital may use the data presented in the table below as a basis for prioritization (or continued prioritization) of surgical site infections in its allocation of surveillance resources through intensive surveillance activities. Also, if a hospital wished to expand its surveillance activities into new areas, the data could be used to identify the infections where surveillance would likely have the most impact.

Data used for prioritization of nosocomial infection surveillance in a fictional hospital

| Type of Infection | % of all nosocomial infections | % extra days hospitalized due to infection | % extra costs due to infection | % of preventable infections |
|-------------------------|--------------------------------|--|--------------------------------|-----------------------------|
| Surgical Site Infection | 24 | 57 | 42 | 35 |
| Pneumonia | 10 | 11 | 39 | 22 |
| Urinary Tract Infection | 42 | 4 | 13 | 33 |
| Bacteremia | 5 | 4 | 3 | 32 |

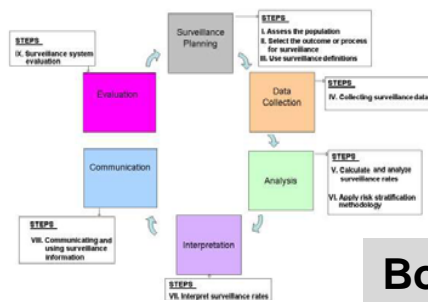
Surveillance Planning



Step 2: Select Outcome or Process for Surveillance

- Other questions to consider when determining priorities include:
 - *What are the most common diagnoses?*
 - *What are the most frequently performed invasive procedures (e.g. surgeries for hospitals, indwelling urinary catheters for long-term care homes)?*
 - *Which services or treatments are utilized most frequently?*
 - *What types of patients/residents are at greatest risk of infection?*
 - *Are there any health concerns emerging from the community (e.g. community-associated MRSA, tuberculosis)?*

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Planning

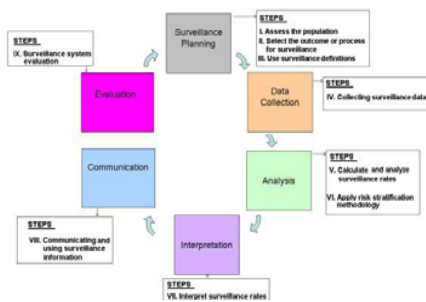


Step 2: Example – Long Term Care

Box 5: Population Assessment and Selection of Surveillance Outcomes (long-term care example)

- *Forest Manor is a fictitious 100-bed long-term care home. Half of all residents are dependent on staff for assistance to carry out normal activities associated with daily living.*
- *Symptomatic urinary tract infections (UTIs) comprise one-third of nosocomial infections and 10% of residents have urethral catheters. Lower respiratory tract infections account for half of the remaining nosocomial infections. Approximately 20% of infections developed by residents at Forest Manor are skin and soft tissue infections.*
- *Forest Manor conducts surveillance of lower respiratory tract infections, skin and soft tissue infections and UTIs associated with indwelling catheters. Forest Manor also tracks the percentage of residents receiving annual influenza vaccine to assess how vaccine uptake correlates with lower respiratory tract infections in the resident population.*

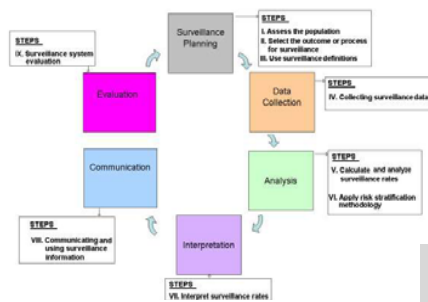
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Step 3: Use Surveillance Definitions

- Why?
 - Previously validated
 - Consistency allows for internal comparison of results over time so as to monitor change.
 - Consistency allows for comparison of results across institutions and the province.

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Planning



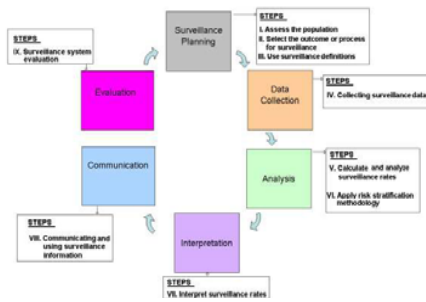
Step 3: Example – Importance of Consistency

Box 8: Consequences of Inconsistently Applied Case Definition for Nosocomial Infection

- *In a U.S. community hospital, a surgeon was repeatedly investigated by the hospital's infection control team searching for explanations for an elevated infection rate among patients undergoing laminectomy. The surgeon was prepared to discontinue his practice when strict attention to infection control procedures did not result in a decrease in the rates of infection.*
- *Upon further examination it was found that the surveillance case definition used to collect data on the surgeon's patients included all those who had a positive culture, with or without symptoms of infection. For other surgeons, the case definition required positive cultures plus clinical signs of infection. Hence, patients who were only colonized with bacteria had been included in this surgeon's rate of infection, making it appear high.*
- *The high rates of infection were deemed the result of surveillance error, not of poor operative technique, and the surgeon did not abandon his practice. This case emphasizes the importance of uniform application of case definition.*

Ehrenkranz NJ, Infect Control Hosp Epidemiol 1995

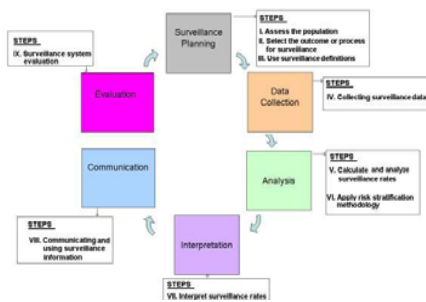
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Step 3: Use Surveillance Definitions

- Some challenges or issues with case definitions are:
 - Defining
 - “Nosocomial”,
 - “Health-care acquired” versus
 - “Community-acquired” infections
 - Clinical definitions versus epidemiological definitions.
 - Need for consistency and consensus

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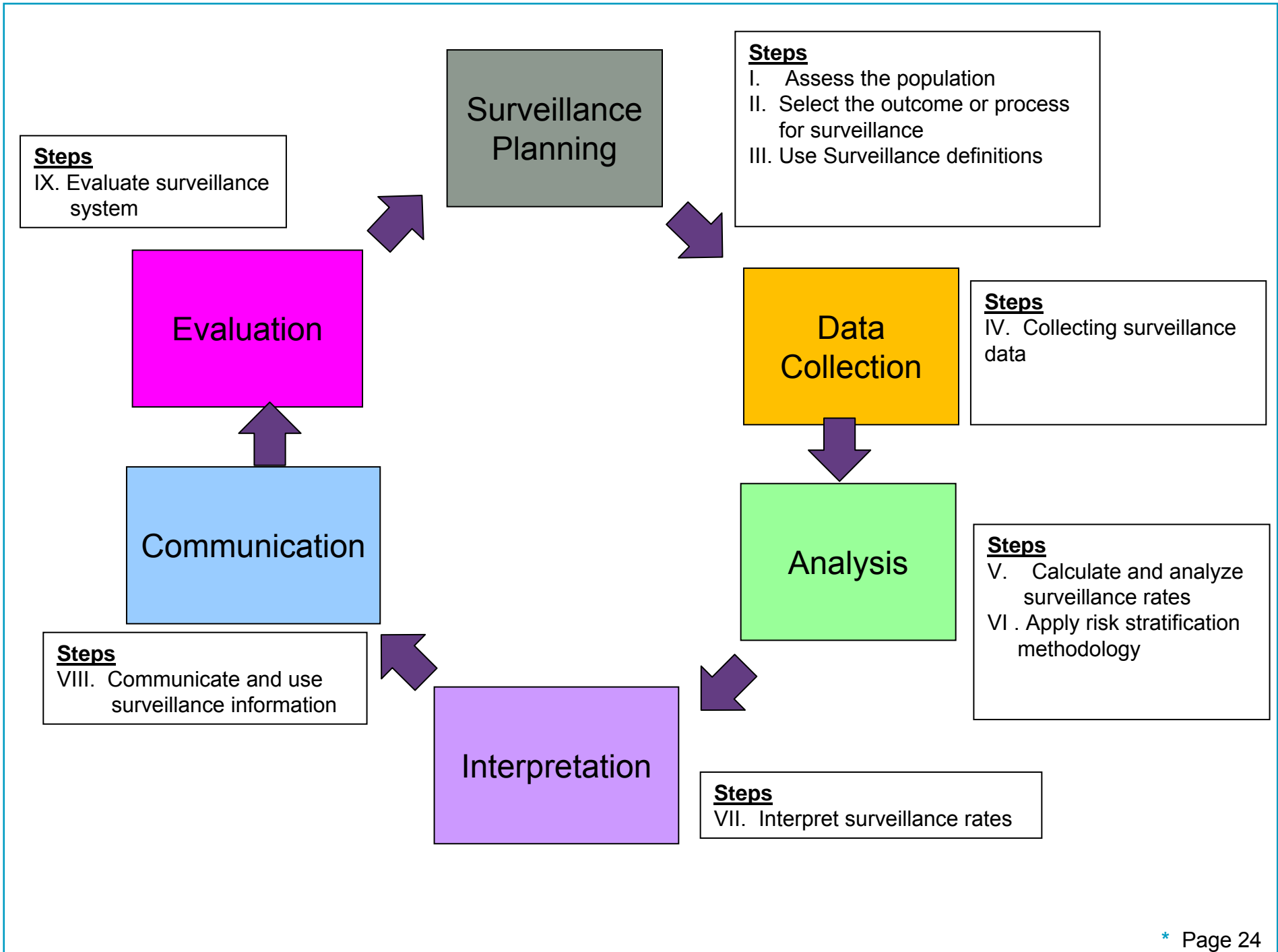
Step 3: Use Surveillance Definitions

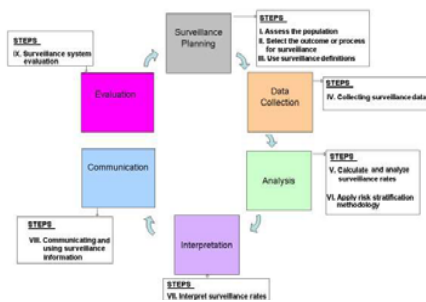
- As a result, some definitions do change over time!
 - Be aware of any changes in definitions or interpretation.
 - This is uncommon but happens.

Surveillance
Planning

Some good starting places for getting standardized case definitions

- National Healthcare Safety Network-NHSN manual: patient safety component protocols.
<http://www.cdc.gov/ncidod/dhqp/nhsn.html>
- Horan, Gaynes, et al. Surveillance of Nosocomial infections. In: Mayhall CG, editor. Hospital Epidemiology and infection control. 3rd edition. Philadelphia: Lippincott Williams & Wilkins; 2004 p.1659-1702.
- McGeer, Campbell et al. Definitions of infection for surveillance in long-term care facilities. Am J Infect Control. 1991 Feb;19(1):1-7. No abstract available. PMID: 1902352; UI: 91214059

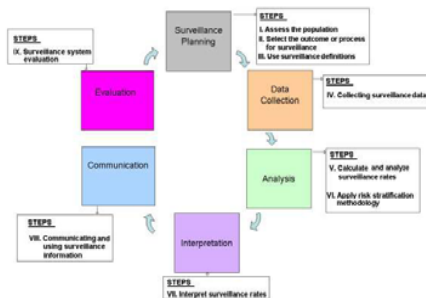




Step 4: Collecting Surveillance Data

- Have data collection managed by trained (and ideally experienced) professionals.
- Choose methods and data sources that fit the specific surveillance objectives.
- Data collection should match the objectives and resources as determined in planning steps (e.g. total versus targeted surveillance, continuous versus periodic data capture).

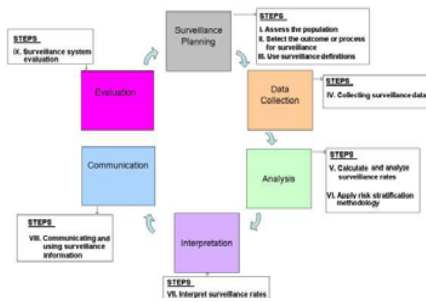
Collecting
data



Step 4: Collecting Surveillance Data

- Collect data from a variety of sources (don't focus on one area exclusively).
- Incorporate post-discharge information where appropriate.
- Beware of potential biases (especially in passive reporting).

Collecting
data



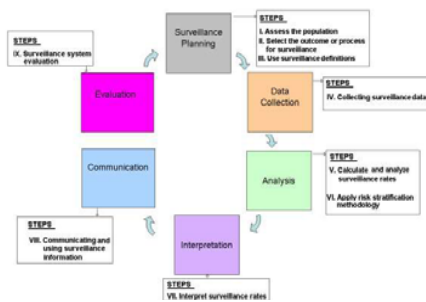
Step 4: Collecting Surveillance Data

Decisions on data collection should be made collaboratively with stakeholders

Other decisions include:

- Concurrent or prospective?
- Retrospective or Post-discharge?

Collecting
data

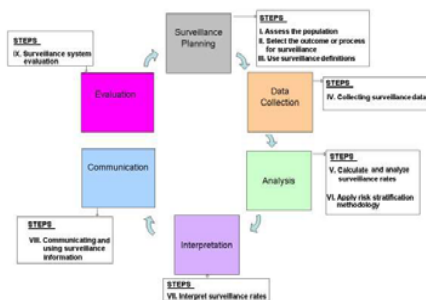


Step 4: Collecting Surveillance Data

Get into details

- Who collects data?
- How does the data link to the selected outcome or process measures?
- “Nice to know” data versus “Need to know” data

Collecting data



Step 4: Collecting Surveillance Data

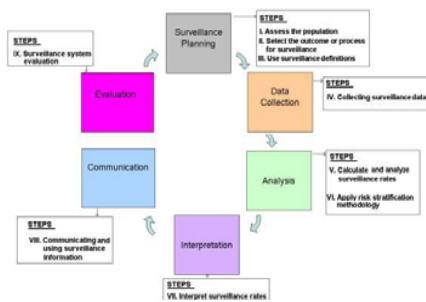
Some common data collection tools include:

- Line Listings
- Infection Reports
- Sentinel Sheets
- Computer Data forms
- Transfer of Computerized Data

Collecting
data

Sources of Data.. examples

- Microbiology Data
- Medical Charts
- Admission Records
- Patient Care Plans/Kardex
- Interviews/Ward Rounds
- Temperature Charts
- Diagnostic Imaging



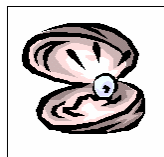
Step 4: Collecting Surveillance Data

Don't forget about population data!

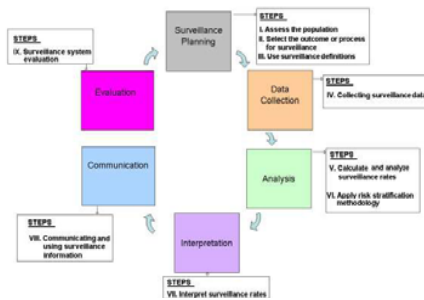
Proper analysis will require numerators and denominators.

Often the denominators are harder to get than the numerator! – Population at risk

Collecting data



Pearl of wisdom: Don't forget the denominator!



Step 4: Collecting Surveillance Data

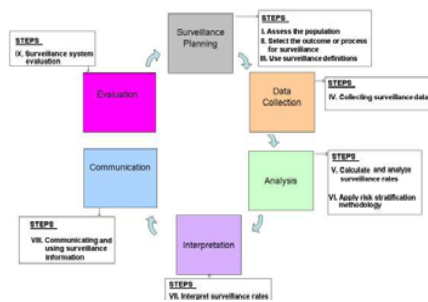
Sources of population data include:

- Demographics (age, sex, Date of Admission, diagnosis, underlying disease)
- Clinical information (number of patients in the ICU, etc.)
 - Risk factors (surgical procedures, IVs, diabetes, etc.)
 - Interventions (e.g. antibiotics, treatments, devices removed)
 - Length of stay and costs of care

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Denominator Data

- # of Admissions
- # of Discharges
- # of Surgeries
- # of Procedures
- # of Patient Days ***



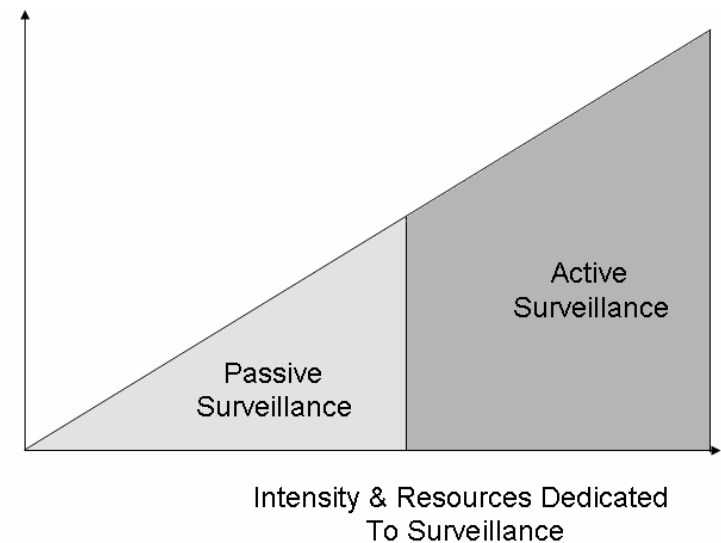
Step 4: Collecting Surveillance Data

Methods of data collection: **Case finding**

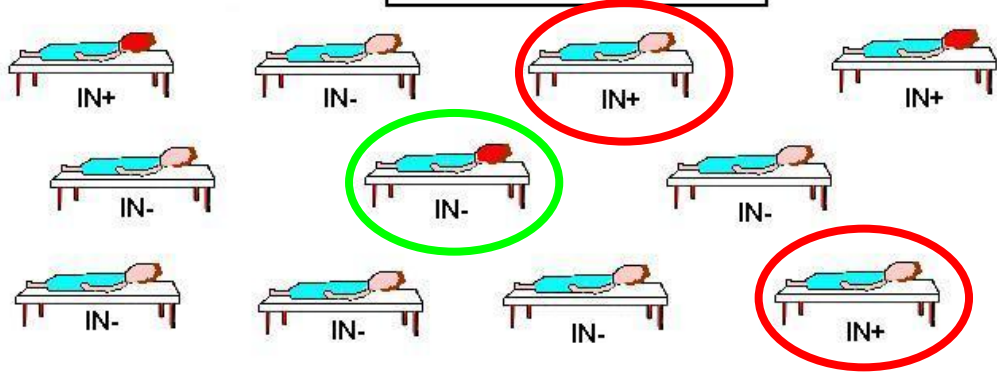
- Direct observation methods - gold standard
- Indirect (chart review):

Collecting data


- sensitivity: 83.8%
- specificity: 99.8%



PATIENT POPULATION

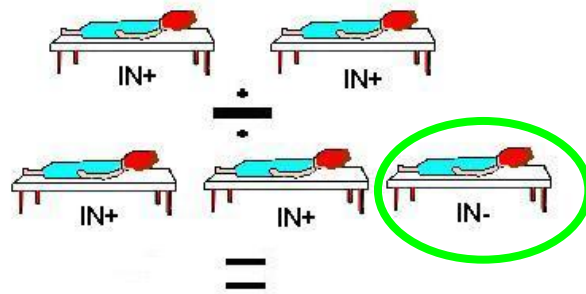


LEGEND

-  = True infection
- IN+ = Detected infection
- IN- = No detected infection

SENSITIVITY

Proportion of true positive infections that are detected by the case finding method

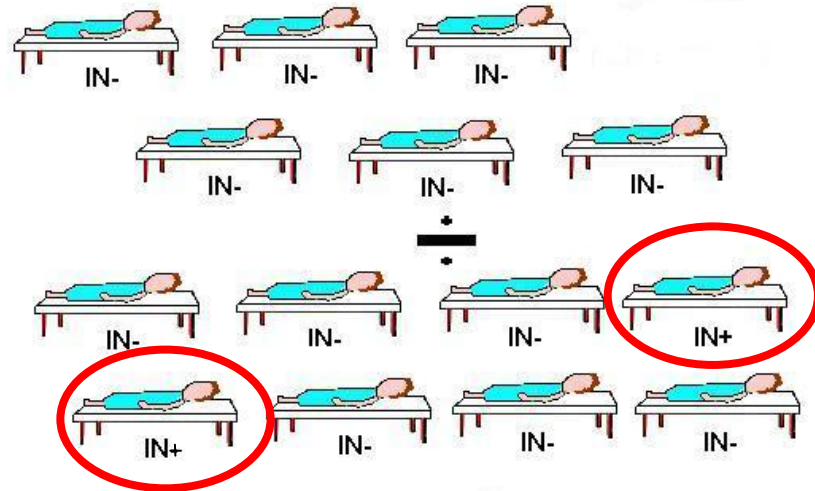


0.67

$$\frac{\text{\# true positives}}{\text{\# declared positive}}$$

SPECIFICITY

Proportion of true negative infections that are not detected by the case finding method



0.75

$$\frac{\text{\# true negatives}}{\text{\# declared negative}}$$

Case Finding for Infection surveillance

- Computer alerts for antibiotic orders
- Point prevalence Surveys
- Syndromic Surveillance
- Post procedure Surveillance

Step 4: Example – Acute Care

Box 9: Case Finding and Data Collection (acute care example)

- *The ICPs at City General Hospital conduct active surveillance. Each ICP is responsible for undertaking surveillance in a particular patient care area.*
- *To identify nosocomial infections, the ICPs first undertake a daily review of hospital laboratory reports to identify positive culture results that might indicate infection.*
- *From this laboratory report, the ICP formulates a list of potential infections in his/her assigned patient care area.*
- *The ICP then visits the nursing units for follow-up of the positive cultures and for identification of additional potential infections through discussions with unit nurses and notes on patient profiles ('Kardexes').*
- *From these data sources, the ICP develops a full list of potential infections to be confirmed through more detailed chart review and consultation with clinicians.*

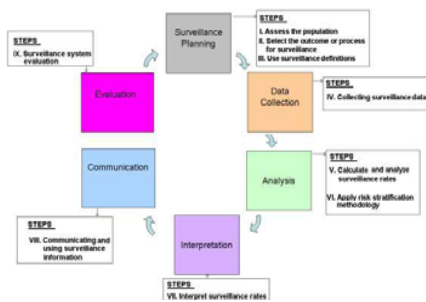
- *The form below assists the ICP in organizing the information collected:*

| Potential infections for investigation | | | | | | | |
|--|--|-------------|--------|----------------|---|----------------------------|--|
| Date: _____ Patient care area: _____ | | | | | | | |
| Patient ID | Source of data (check all that apply) | | | | Indication of possible infection (e.g. + cultures, fever, antibiotics, new orders for precautions) | Findings from chart review | Findings from discussion with patient care staff |
| | Lab Cultures | Ward Rounds | Kardex | Sentinel sheet | | | |
| 001 | | | | | | | |
| 002 | | | | | | | |
| ... | | | | | | | |

- *For surveillance of device-associated infections (e.g. CVC-associated BSI, ventilator-associated pneumonia), the ICP obtains denominator data (the number of patients exposed to procedures and devices) from the ICU's specialized database.*
- *For surgical site infections, denominator data (total number of patients undergoing the selected surgical procedure) is obtained from the City General Hospital's surgical database.*

Possible Methods for Surveillance, Post Procedure

- Direct examination of wounds on post-op visit
- Review records of clinic patients
- Questionnaire administration to patients
 - via mail
 - via phone
- Questionnaire administration to surgeons
 - via mail
 - via phone
- Computerized searches of health care data bases

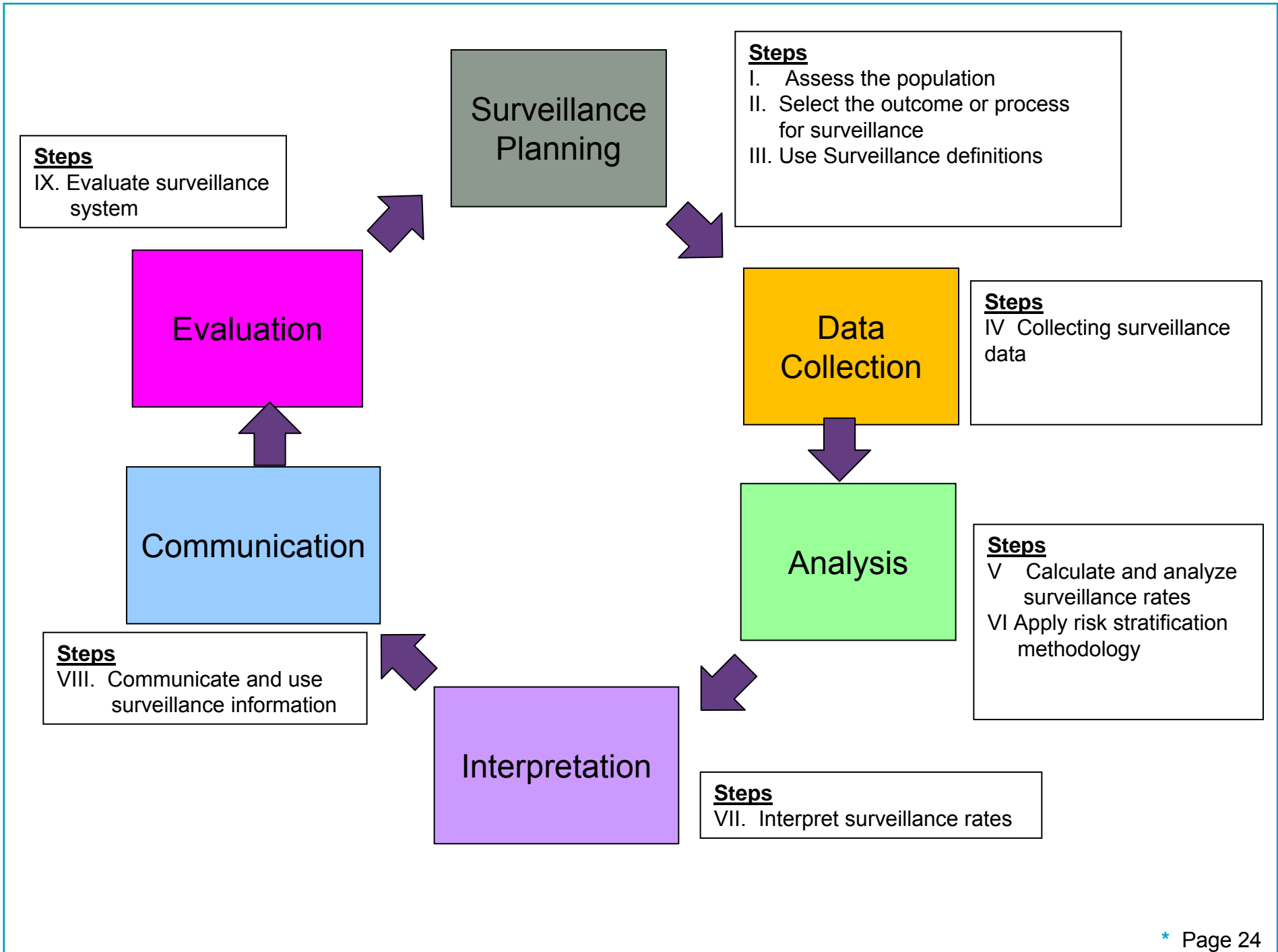


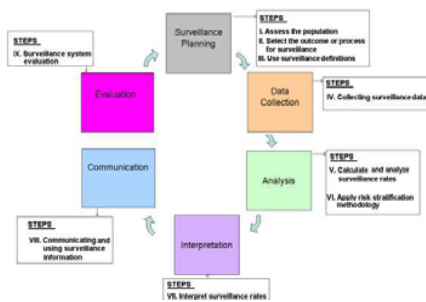
Step 4: Collecting Surveillance Data

General rule on missing data?

- If > 20% of patients at risk of infection are lost to follow up or are excluded due to missing data, then the validity of the data may be compromised.
- This limitation should be disclosed if reporting rates.

Collecting data





Step 5: Calculate & Analyze Surveillance Data

Determine appropriate and feasible measures prior to data collection

- For example:
 - Rates, proportions, or ratios
 - All patients versus category-specific rates
 - Incidence rates versus prevalence rates

Analysis

Selection of rates should match the anticipated outcomes from the planning step.

Methods of Measurement

- **Rate**: all members of the numerator must be members of the denominator. Rates also a measured relative to time.
- Example:
 - Numerator: number of persons who met the case definition for a surgical site infections for a knee replacement operation during a fixed time period.
 - Denominator: all persons who had had knee replacement surgery during this same time period.

Persons in the denominator must have been “at risk” of being in the numerator during the time period.

Example of Rate Calculation

- Using the same example, assuming you had 2 cases of SSI in one month and there were 150 knee replacement surgeries done in that same month, what is the rate of SSI per 100 procedures?

| Type of surgery | Number of surgical site infections following surgery | Number of patients undergoing surgical procedure per quarter | Rate of infection (No. infections per 100 procedures) |
|--------------------------|--|--|---|
| Knee replacement surgery | 2 | 150 | <p><u>Calculation:</u></p> $\frac{2}{150} \times 100$ <p>= 1.3 per 100 procedures</p> |
| Hip replacement surgery | 4 | 125 | 3.2 per 100 procedures |
| Laminectomy | 2 | 75 | 2.6 per 100 procedures |
| CABG | 7 | 250 | 2.8 per 100 procedures |
| Colectomy | 10 | 250 | 4.0 per 100 procedures |
| Abdominal hysterectomy | 4 | 91 | 4.4 per 100 procedures |

Methods of Measurement

- Proportion
 - A ratio where the numerator is included in the denominator.
 - Difference from rates is that there is no time period.
- Example:
 - 40% of the cases of *C. difficile* are over age 75.

Methods of Measurement

- Ratio
 - divide one number by another, no relationship between numerator and denominator
- Example:
 - A stillbirth rate is normally defined as the number of still-births divided by the number of live births.

Importance of differentiating incidence versus prevalence.

Incidence:

Number of new infections that occur in a population over time. It reflects the rate of new cases and the trend in infections.

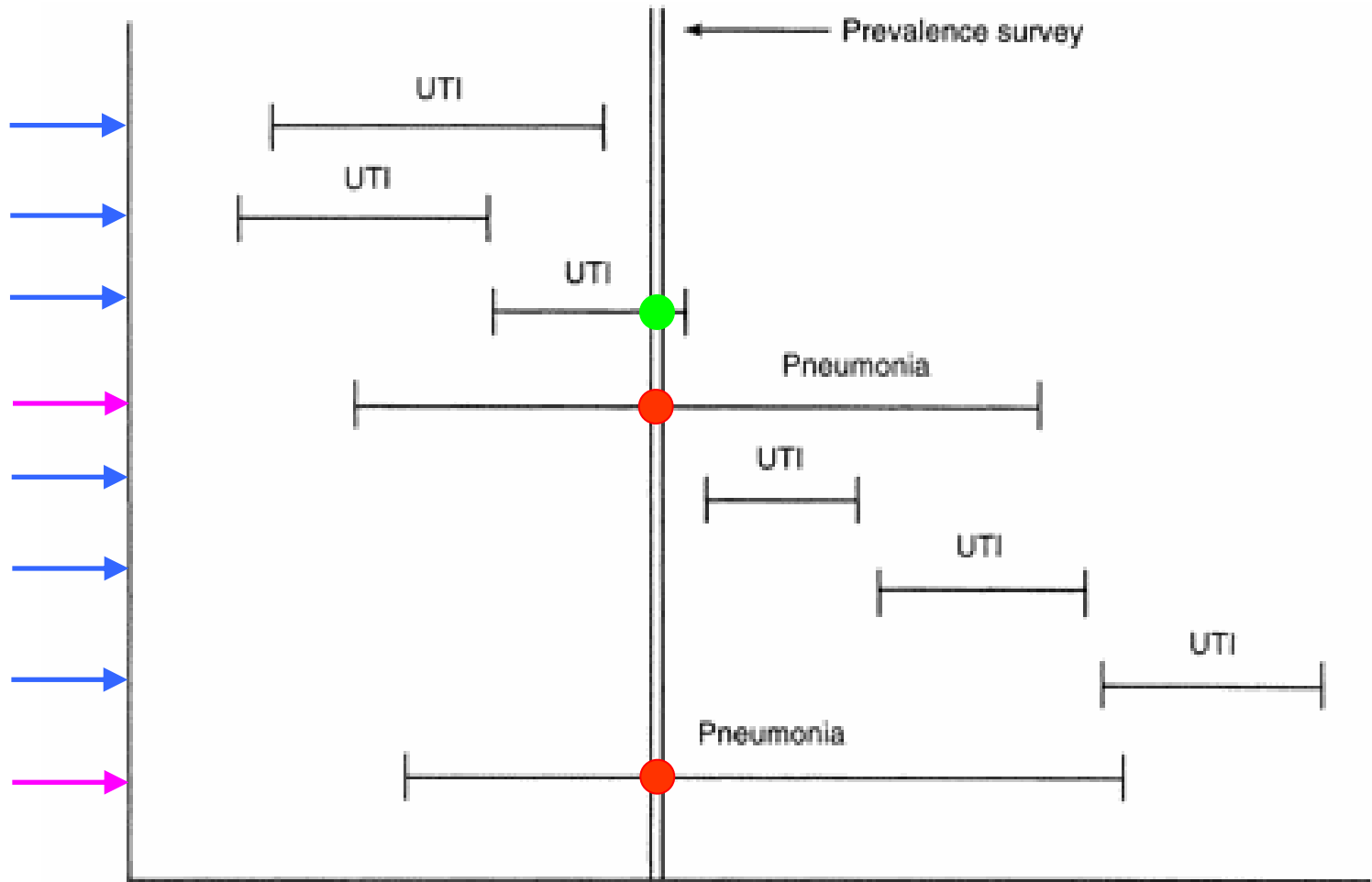
Answers the question “is it getting worse or better?”

Prevalence:

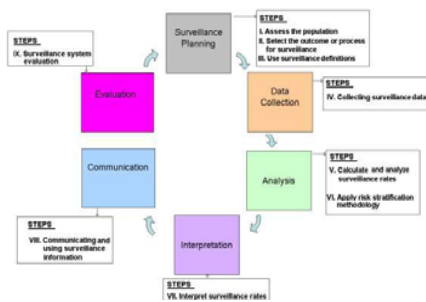
Number of existing cases in the population of patients. It reflects the proportion of patients who have a condition.

Answers the question “what is the amount of disease that is occurring now?”

Prevalence/Incidence of UTIs and LRTIs in month of June



Incidence: **6 UTI**, **2 LRTI** Prevalence: **2 LRTI**, **1 UTI**



Step 6: Apply Risk Stratification Methodology

Consider the application of risk stratification methods

- Compare “apples to apples”
- Allows for better comparisons if patient populations differ (helps avoid comparisons of apples and oranges)
- Facilitates better understanding of the utility of the data.

Analysis

Step 6: Example – Acute Care



Recommended Practice 11.0: It is a recommended best practice that hospitals stratify rates of procedure-specific surgical site infections by wound class.

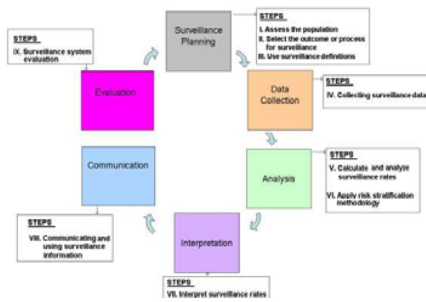
| Wound Class | Risk of SSI |
|---------------------------------|-------------|
| Clean Surgery (I) | 1-5% |
| Clean-contaminated Surgery (II) | 5-10% |
| Contaminated Surgery (III) | 10-15% |
| Dirty Surgery (IV) | > 25% |



Pearl of wisdom: The information required for risk stratification (e.g. wound class, length of procedure) needs to be collected from *both* the patients developing infections and the patient population at risk.

Step 6: Example – Acute Care

| Surgical Site Infections | Surgical site infections following surgery | Total number of patients undergoing surgical procedure over quarter | Rate of infection (No. infections per 100 procedures) |
|--------------------------|--|---|--|
| Colectomy | 10 | 250 | $= \frac{10}{250} \times 100$ $= 4.0 \text{ per 100 procedures}$ |
| Wound class I-II | 4 | 190 | 2.1 per 100 procedures |
| Wound class ≥ 3 | 6 | 60 | 10 per 100 procedures |
| Cholecystectomy | 11 | 300 | 3.7 per 100 procedures |
| Wound class I-II | 5 | 250 | 2.0 per 100 procedures |
| Wound class ≥ 3 | 6 | 50 | 12.0 per 100 procedures |



Steps 5 and 6: Calculate & Analyze Surveillance Data

Data analysis should be understandable to user.

Check list for the analysis

- Do you have adequate numbers?
- Do these results look right (i.e. are they comparable to previous month's numbers)?
- Look for bias and question your own calculations.

Analysis



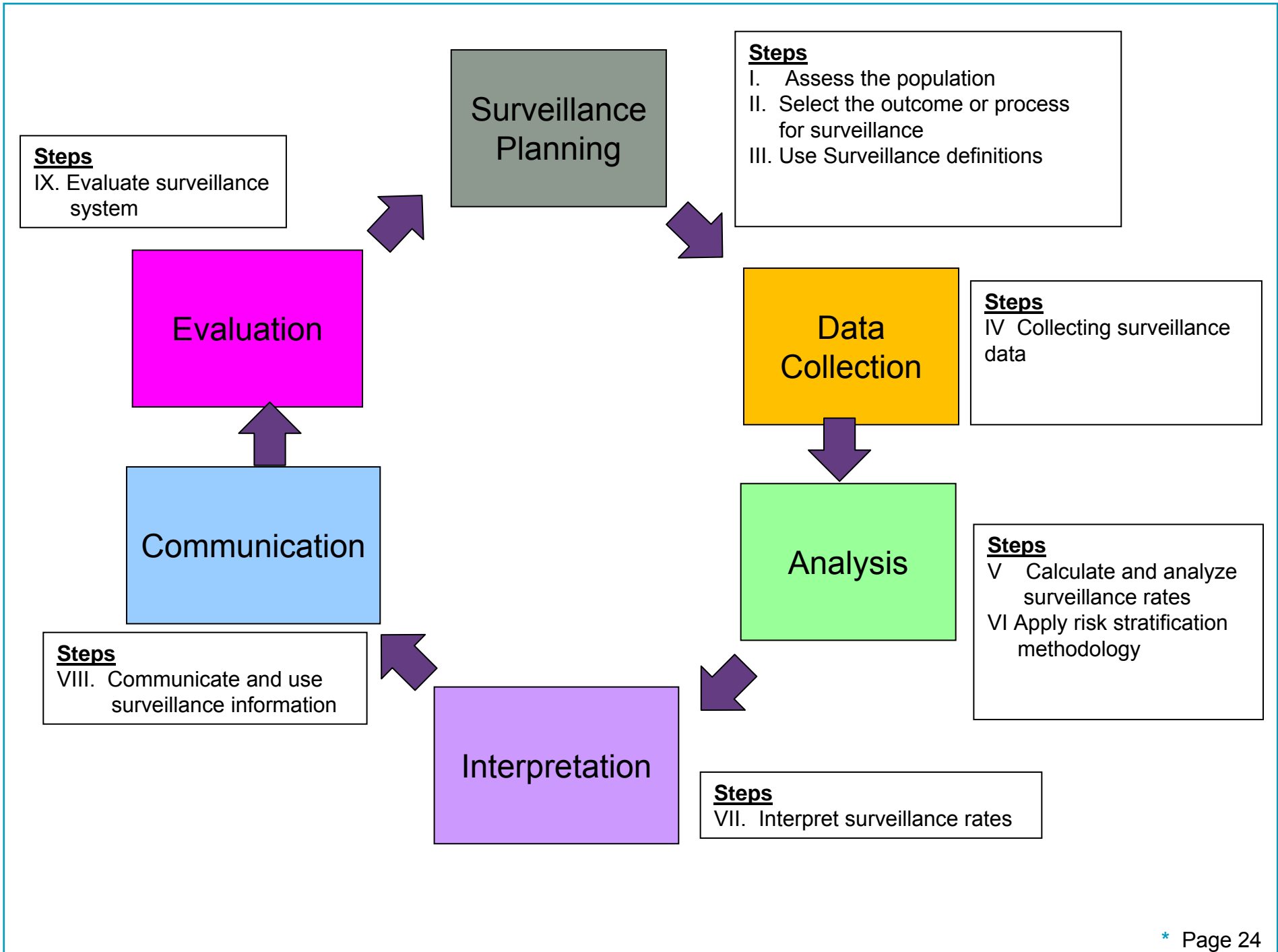
Recommended Practice 13.0: Explore the possibility that differences in rates of infection in your facility from previous surveillance periods may be the result of institutional practices or surveillance practices.

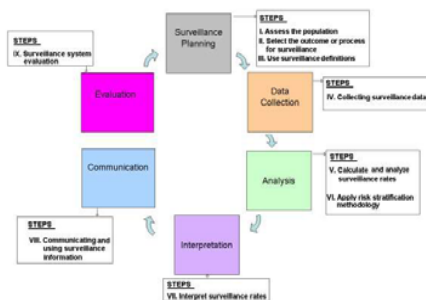
Box 17: Example of How Changes to Hospital Practices Can Affect the Apparent Infection Rate

The following demonstrates how changes in facility practices in one community hospital impacted case finding for surveillance and resulted in an apparent decrease in the rates of MRSA infection over time:

*The Infection Control Team at this hospital was elated when the proportion of *S. aureus* isolates that were resistant to methicillin decreased from 34% to 0% in one surveillance month. Upon further investigation, it was found that two changes in the hospital, unrelated to the risk of MRSA, were responsible for this change. First, surgeons had begun to treat potentially infected wounds based solely on signs and symptoms. Second, the hospital laboratory began screening wound specimens and selected a limited set, meeting specific criteria, for culture. Together these changes reduced the total number of *S. aureus* isolates that were available for testing for methicillin resistance, including those that were positive. The observed reduction in MRSA infections were attributed to these facility changes, impacting the sensitivity of case finding, rather than to any changes in infection prevention and control practice.*

Pottinger JM, Handbook for Hospital Epidemiologists 1998





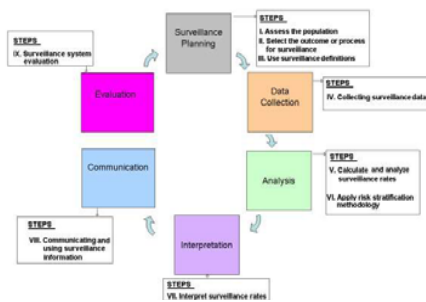
Step 7: Interpret the Surveillance Rates

Interpretation should be guided by the decisions made in the planning process.

Check list for the interpretation

- Am I answering the main question?
(nice to know versus need to know)
- Is this information enough to help make a decision?
 - If so, what is the answer?
 - If not, what other information is needed?

Interpretation

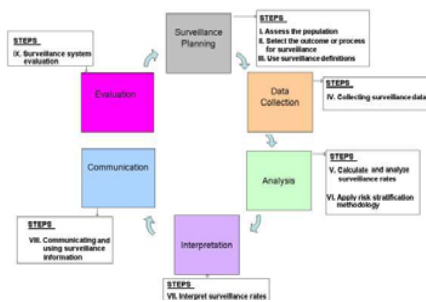


Step 7: Interpret the Surveillance Rates

Compare rates to “benchmarks”:

- Recognized standards or benchmarks.
 - e.g. NNIS/NHSN system publishes reports that present rates of HAIs compiled from 211 participating hospitals.
- Rates from previous surveillance periods.
 - e.g. previous month, quarter, year
- Benchmarks set by one’s own facility

Interpretation

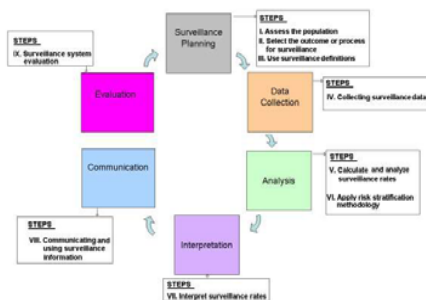


Step 7: Interpret the Surveillance Rates

Separate statistics from clinical care

- Is there a statistically significant change in the rates?
 - Probability of the rate being different by chance alone.
- Is there a clinically significant change in the rates?
 - Is the change in rate sufficient to warrant a change in practice?

Interpretation

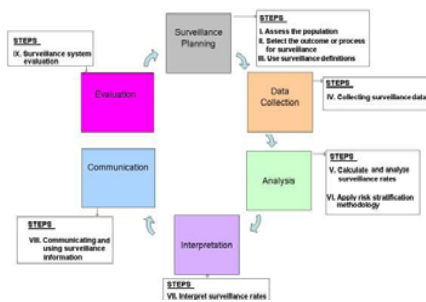


Step 7: Interpret the Surveillance Rates

Who interprets the rates at your institution?

- ICP
- Infection control team
- Infection Control Committee
- Others
- Combination

Interpretation

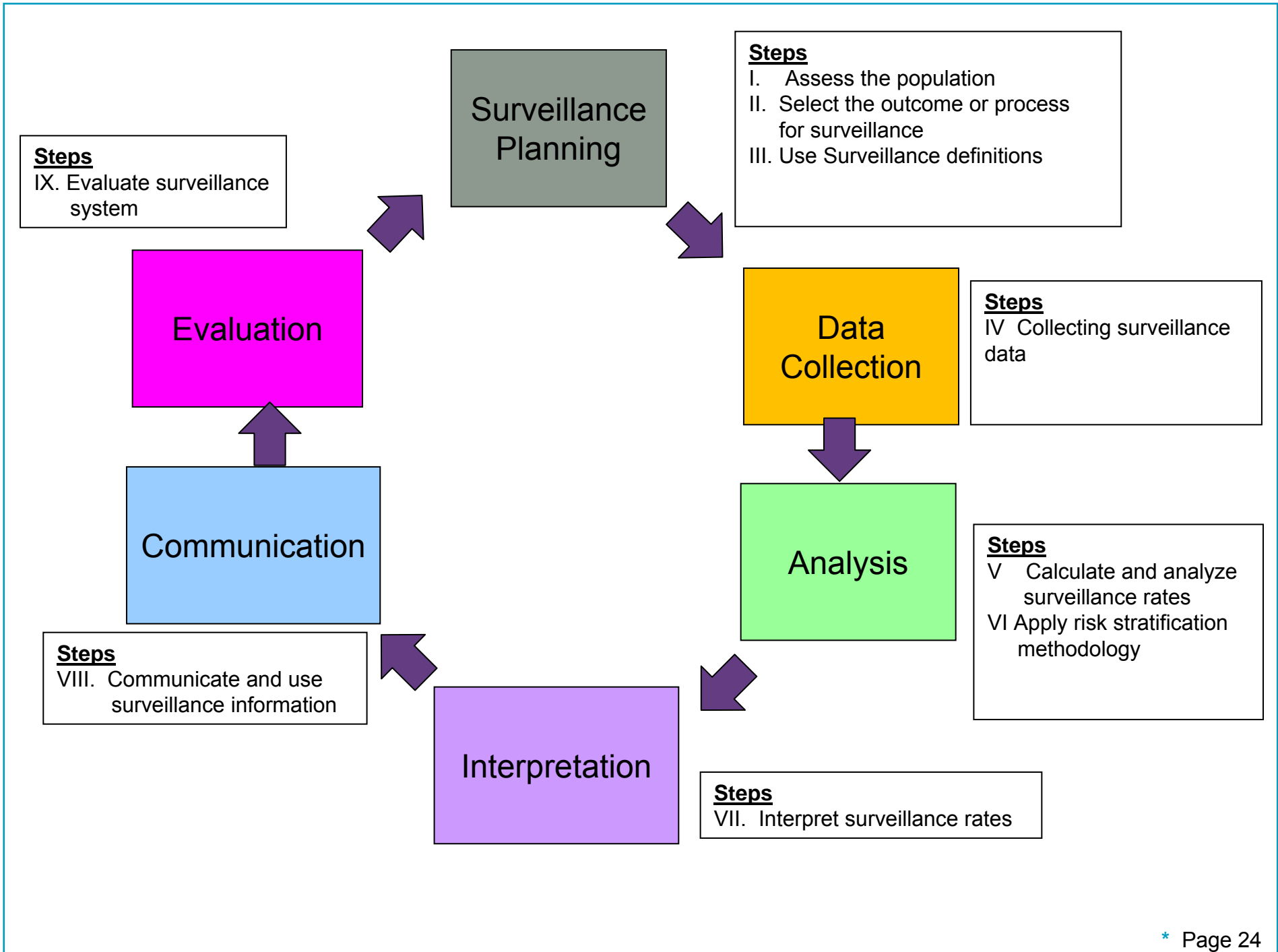


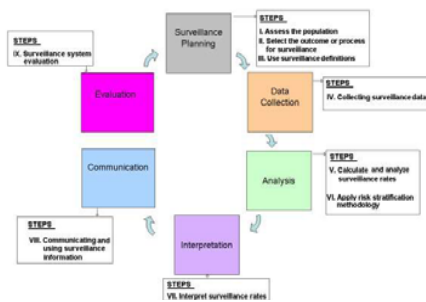
Step 7: Interpret the Surveillance Rates

Guidelines for interpretation:

- Interpret data with people who are trained in epi/data methodology
- Beware of potential problems with external comparisons
- Reports should stimulate improvement in process being measured.

Interpretation





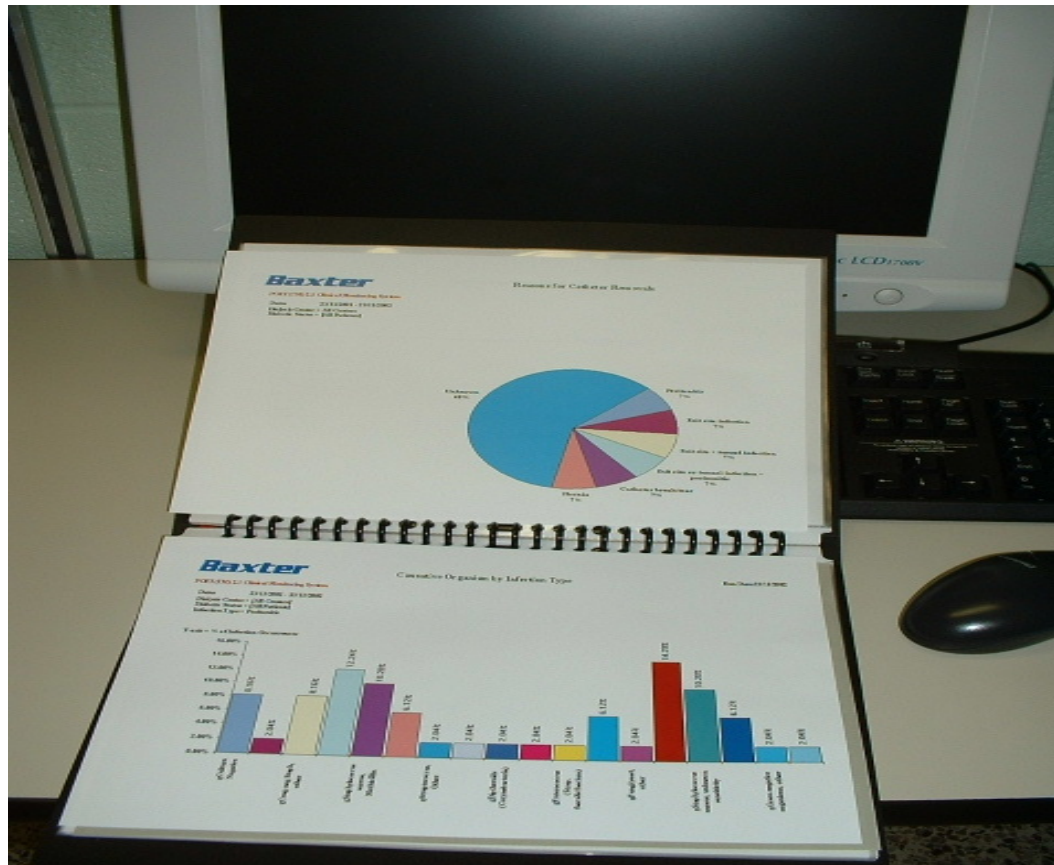
Step 8: Communicating and Using Surveillance Information

Basic guidelines include:

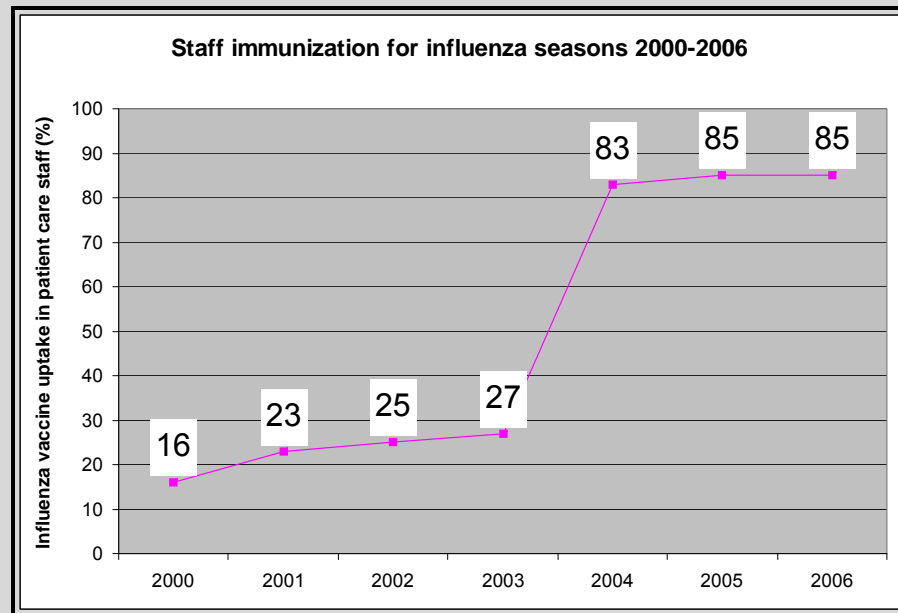
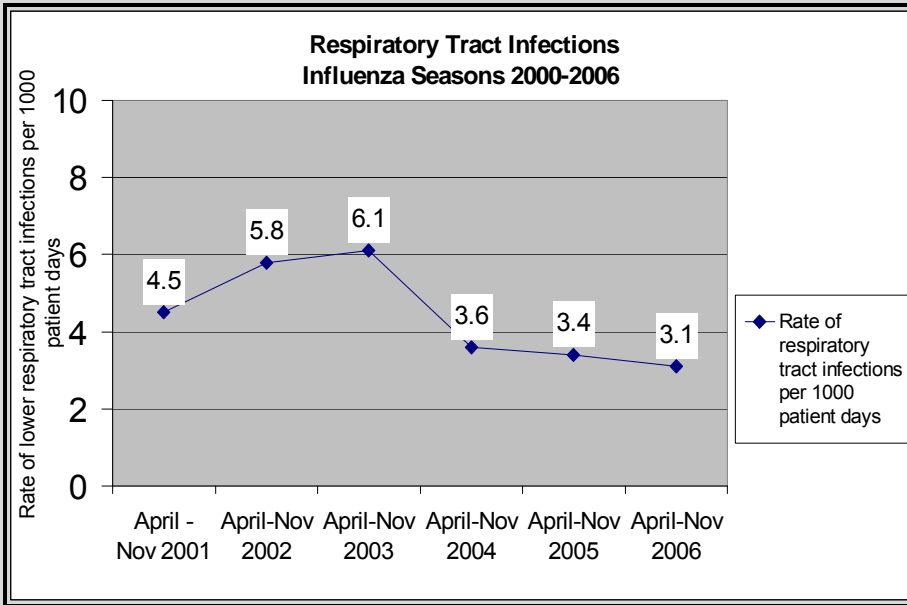
- Know your audience
- Focus on the main messages
- Clear presentation of information through good report design.

Communication

Data Presentation – good report design

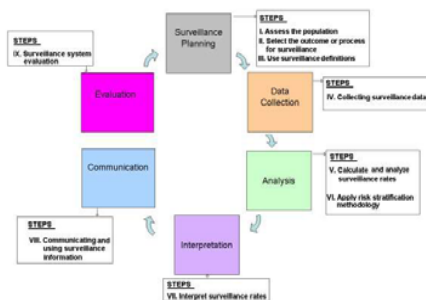


Box 19: Communication and Use of Surveillance Information (long-term care example), con't.



Acute Respiratory Infections

- *The ICP at Forest Manor also compiles data on the rates of lower respiratory tract infections in residents over the past five previous influenza seasons.*
- *The ICP presents this data alongside the proportion of patient care staff receiving annual influenza vaccination, as documented in employee records, in the graphs below.*
- *The graphs demonstrate a substantial decline in the rates of respiratory tract infection over the last two influenza seasons at Forest Manor, coinciding with the highest rates of vaccine uptake among health care providers.*
- *At Forest Manor, the proportion of immunized health care providers increased modestly from 2001 to 2003 following an active education campaign to increase compliance with vaccine recommendations.*
- *It was only in 2005, when vaccination coverage was at its highest, that the most substantial impact on lowering the rates of lower respiratory tract infections was achieved.*
- *This data clearly demonstrated the impact that health care provider immunization had on respiratory tract infections in residents, and was used to form the institutional policies necessary to achieve vaccine coverage in staff.*

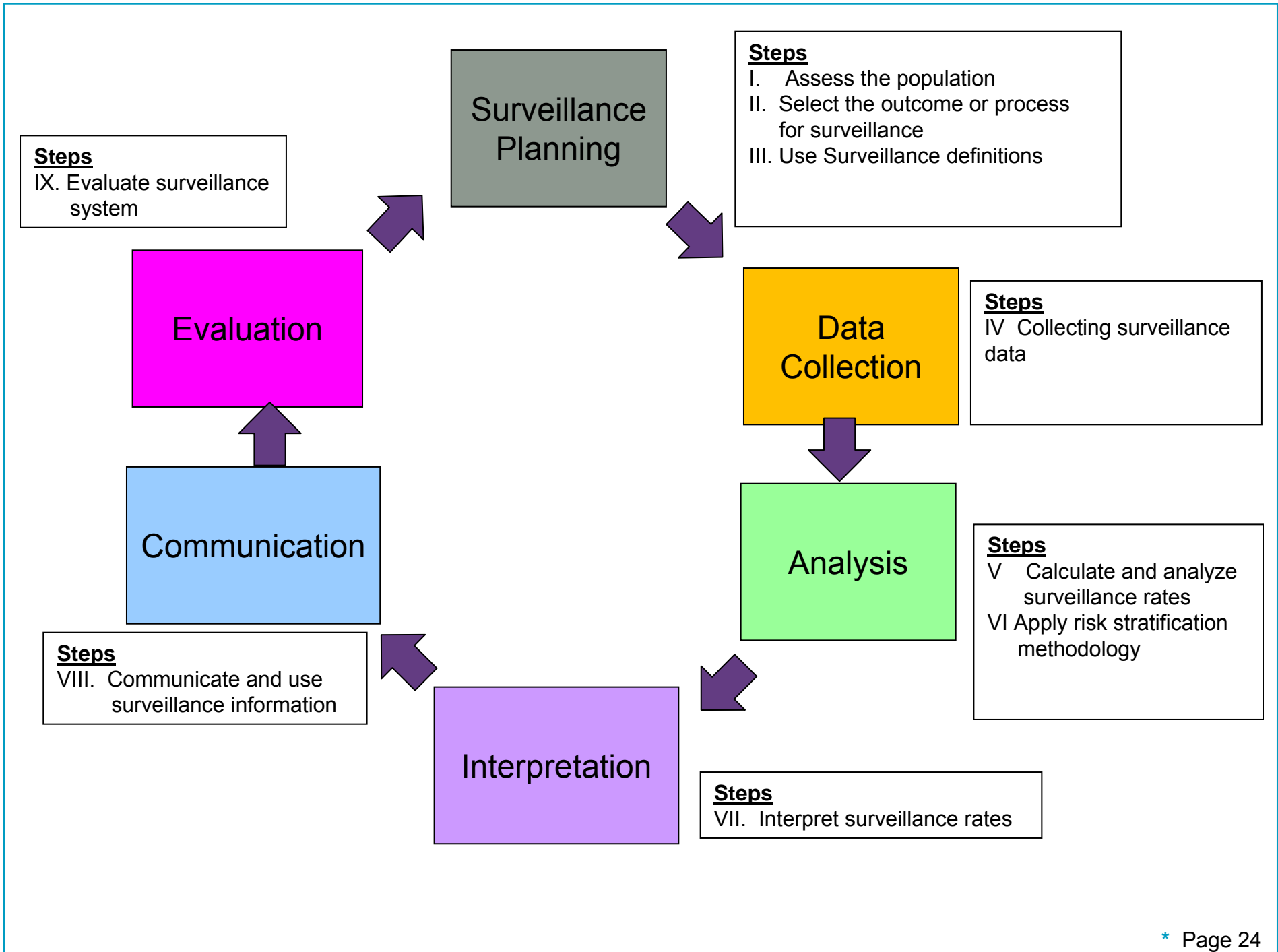


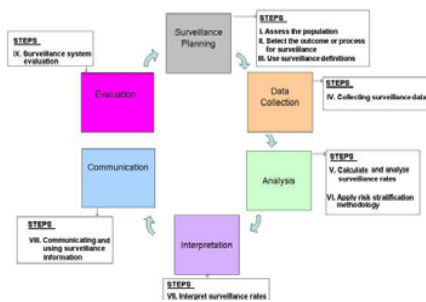
Step 8: Communicating and Using Surveillance Information

A few tips:

- Send reports back to the data providers often enhances further reporting
- Surveillance should never become a “black-hole”
- Clear surveillance reports can spark change when the information speaks for itself.
- Be careful about releasing raw data without an interpretation.

Communication



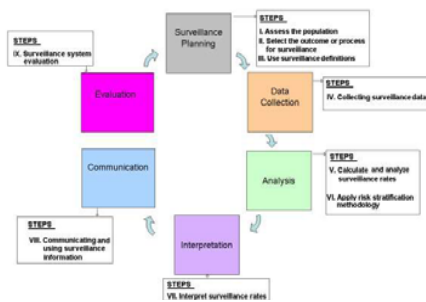


Step 9: Surveillance System Evaluation

Need to go back and see if the results match your original plan (Step 1):

- Process audit steps
 - Timeliness of data
 - Quality of the data
 - Appropriateness of the analysis
- Outcome assessment
 - Did the surveillance system meet its objectives?

Evaluation



In Summary: Steps to Performing Surveillance

- Planning (engage stakeholders)
- Data Collection
- Data Analysis
- Communication of results
- Interpretation of Data
- Evaluation (with IP&C committee)

Questions?