

Calculation of Infection Rates

Knowing just the numbers of cases of infection identified by surveillance activities is not sufficient to identify the risk (probability) of infection occurring in the facility residents; rates must be used. Rates measure the probability of occurrence in a population of some particular infection. An **incidence rate** is typically used to measure the frequency of occurrence of **new cases** of infection within a defined population during a specified time frame.

$$\frac{\text{\# of Infections}}{\text{Population at Risk}} \times \text{constant (k)} = \text{Rate of Infection}$$

The “**number (#) of infections**” is the cases identified by surveillance activities (for example five UTIs), during a defined time frame in a defined population. The “**population at risk**” would be all the patients on the patient care unit during the time frame where surveillance occurs (for example, 120 patients on the Medicare Unit in April) or all the patients in the facility, if facility-wide surveillance is being conducted. The “**constant or K**” is usually an assigned value of 100, 1,000, 10,000 or 100,000, which represents a standard population and time period for interpretation of the rate. Using 100 as the “K” will give an infection rate that may be interpreted as a percentage. A percentage rate is easiest for most people to understand and to display when presenting data month to month.

For example, to find the **percentage** of residents with a UTI infection in April on the Medicare Unit:

$$\frac{5 \text{ UTIs in April}}{120 \text{ Residents on Medicare Unit in April}} \times 100 = 4.2\% \text{ UTI rate in April}$$

Another way to calculate infection rate is by using the number of resident days for the population at risk. Using the same example, perform the following calculation:

$$\frac{5 \text{ UTIs in April}}{120 \text{ residents on Medicare Unit} \times 30 \text{ days in April} = 3600 \text{ resident days}} \times 1000 = 1.4 \text{ Infections per } 1000 \text{ resident days}$$

In addition, incidence rates can be further defined to specific medical devices. To calculate the incidence of UTIs related to urinary tract catheterization, use the same formula:

$$\frac{3 \text{ catheter-related UTIs in April}}{20 \text{ residents on Medicare Unit with catheters in April} \times 30 \text{ days} = 600 \text{ catheter days}} \times 1000 = 5 \text{ infections per } 1000 \text{ catheter days}$$

The incidence rate is a way to measure the extent or frequency with which residents experience infections; it does not matter which method is used to calculate the rate. Choosing one method and using it consistently ensures rates can be compared accurately over time. The information can be displayed in charts or graphs for comparison purposes. They can be used to report trends and to identify and implement control measures, and monitor impact of those measures, as indicated.