

Calculation of Infection Rates

Knowing just the numbers of infections identified by surveillance activities is not sufficient to identify the risk (probability) of infection occurring in the facility residents; **rates must be used**.

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.

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

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 in the facility during the time frame when surveillance occurs (for example, 120 patients - average daily census- in the facility in April). 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 expressed as a percentage.

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

$$\frac{5 \text{ UTIs}}{120 \text{ Residents (average daily census)}} \quad \mathbf{X \ 100 = 4.2\% \text{ UTI rate in April}}$$

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:

$$\frac{5 \text{ UTIs}}{3600 \text{ resident days (120 x 30 days in April)}} \quad \mathbf{X \ 1000 = 1.4 \text{ Infections per 1000 resident days}}$$

In addition, incidence rates can be further defined to specific medical devices. To calculate the incidence of Catheter-Associated UTI (CAUTI), use the same formula:

$$\frac{3 \text{ CAUTI's}}{600 \text{ catheter days (20 residents with catheters x 30 days in April)**}} \quad \mathbf{X \ 1000 = 5 \text{ CAUTI's per 1000 catheter days}}$$

****Count residents with catheters on a daily basis and then total for the month.**

The incidence rate is a way to measure the extent or frequency with which residents experience infections. The information can be displayed in charts or graphs for comparison purposes. Rates can be used to report trends, identify and implement control measures, and monitor impact of those measures.