CLINICAL MANAGEMENT

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Planning, Conducting, and Interpreting Prevalence and Incidence for the Wound Practitioner

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This continuing educational activity will expire for physicians on January 31, 2014.

PURPOSE:

To enhance the learner's competence with knowledge of planning, conducting, and interpreting prevalence and incidence for the wound practitioner.

TARGET AUDIENCE:

This continuing education activity is intended for physicians and nurses with an interest in skin and wound care.

OBJECTIVES:

After participating in this educational activity, the participant should be better able to:

1. Demonstrate knowledge of types of prevalence and incidence rates and the benefits of incorporating a prevalence and incidence team in a healthcare facility.

2. Apply information of how to start a prevalence and incidence team and scenarios of how to handle data collection situations as they arise.

ABSTRACT

Prevalence is a 1-time "snapshot" of cases present on a specific date, and incidence measures the new cases of a disease or condition in a given period. This article discusses prevalence and incidence and gives practical tips for wound care practitioners who plan and conduct prevalence/incidence audits.

KEYWORDS: prevalence, incidence, skin surveillance, facility-acquired prevalence/incidence

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INTRODUCTION

Prevalence and incidence are statistical terms for describing disease occurrence and can be helpful to healthcare providers in determining how pervasive the disease is or the rate at which it is occurring. Both terms are epidemiological expressions and reflect the unit of occurrence in a defined human population versus an individual patient. Prevalence and incidence information is critical in today's healthcare milieu as it provides key data in carrying out evidence-based practice, information to the healthcare team that is useful in assessment and treatment of an individual, and important statistics when making facility financial decisions and serves as a means to evaluate the effectiveness of new initiatives, as well as an indicator of quality of care to internal and external entities.[1–5] In addition, prevalence and incidence data are being used to help shape public policy in regard to reimbursement issues and resource allocation.[2] The terms *prevalence* and *incidence*, although helpful to healthcare providers, are often confused with one another and thereby used incorrectly.[1,2] Careful application of the terms is essential when comparing data within the facility, across facilities, and globally.

After reading this article, healthcare providers will be better able to differentiate between the terms *prevalence* and *incidence* and gain knowledge on planning and conducting prevalence/incidence audits.

PREVALENCE

Prevalence can be expressed as a number, a percentage, or a ratio. Prevalence describes disease burden of a disease or condition, such as healthcare-acquired infections, ventilator-acquired pneumonia, and, in wound care, pressure ulcers (PrUs). Prevalence can also describe a detrimental health status, such as the rate of high cholesterol or smoking in a population. Healthcare workers often find it beneficial to describe the prevalence of health activities in a population—for example, the prevalence of seatbelt use or perhaps presence of a turning schedule for patients. Prevalence has been referred to as a 1-time "snapshot" of cases present on a specific date, and the term is often used to describe the extent of the disease or condition in a population and to demonstrate the need for public health services.

Types of Prevalence

Point Prevalence. Point prevalence is a very common way of reporting prevalence. It measures the proportion of people in a defined population who have a disease or condition at a particular moment in time, such as on a particular date.[1,2,6] Therefore, it provides statistical information on the occurrence of a disease or condition at a particular point in time.[7] In considering point prevalence for PrUs, the statistic would provide a snapshot of the number of patients with a PrU on a given date, regardless of whether they were admitted to the healthcare facility with the PrU or had developed it between admission and the date of the data collection. As with incidence, prevalence is reported in terms of a specific period, often a year, but can be calculated for shorter or longer periods. Prevalence is reported for the number of patients with the disease or condition, such as PrUs, *not* the total number of PrUs in the population. Thus, prevalence will indicate to healthcare providers how common a disease is for a population over the identified time period.

Period Prevalence. In contrast to point prevalence, period prevalence is a measure of the proportion of people in a defined population who have a disease or condition over a specific period, such as a week, a season, or a year.[1,2] Obtaining data for period prevalence can be more easily accomplished by facilities as it allows for a wider span or time period of data collection: a week or season versus a single day. In effect, period prevalence is a combination of incidence and prevalence.[2] Period prevalence is often used for reporting acute illnesses, such as influenza or pertussis.[3]

Lifetime Prevalence. Lifetime prevalence is the number of cases in a defined population diagnosed at any time in their lives, up to the time of the assessment, with a disease or condition. Lifetime prevalence data can be combined with age-at-onset information to assist healthcare providers in resource management and to aid sociologists in understanding population shifts.[8]

Hospital- or Facility-Acquired Prevalence. Hospital- or facility-acquired prevalence is a measure of the number of patients who acquired a PrU after admission to the facility that is measured at a specific point in time.[1,4,9] Facility-acquired prevalence is frequently used as a proxy measure for incidence. Long-term-care facilities have mandatory PrU reporting to the Centers for Medicare & Medicaid Services, and they often report both point and facility-acquired prevalence.

Calculation of Prevalence

Both prevalence and incidence represent proportions or fractions, each containing a numerator and a denominator.[3] In keeping with the wound theme, PrUs will be used to give

examples of how to determine the various kinds of prevalence (Table 1).

It is important to note that individuals who already have the condition or disease during the time period being studied for incidence are not included in the calculation.

DEFINITION OF INCIDENCE

Incidence is a measurement of the *new* cases of a disease or condition in a given period, often a year.[4,7] It is used to describe the rate at which new cases occur and is helpful in examining the causes of disease (etiology) or to look at the order in which events occur. Because incidence translates to disease risk, a high incidence rate implies a population with a higher risk. It is important to note that individuals who already have the condition or disease during the time period being studied for incidence are not included in the calculation. When conducting evaluations of prevention protocols, such as PrU prevention protocols, incidence provides the strongest evidence of support for the effectiveness of such initiatives.[4,5]

Types of Incidence

Calculation of incidence is complex, as the unit of time is the sum of the hours, days, or months that each person in the population was at risk but was free from the disease or condition being studied. In addition, it may be difficult to pinpoint the start of a disease or condition and a conundrum as to what information to use for the time of onset. Oftentimes, discussion ensues as to whether the onset of symptoms, time of reporting, or presentation to an emergency department would suffice as the onset.[7] Therefore, the time of diagnosis most often serves as the time of onset. For practical reasons and ease of calculation, a simplified method for incidence analysis is called incidence estimate, or simply incidence.

Calculation of Incidence

As stated previously, incidence is represented as a proportion or fraction and contains both a numerator and a denominator. Special consideration should be given to the incidence denominator at times, depending on the entity being studied. Although it generally does not affect prevalence or incidence in wound care, the concept of gender-specific reporting should be noted. For example, if cervical cancer risk is being investigated, the denominator should be gender-specific to women, with men excluded. Another important consideration when calculating incidence is that the numerator must be large enough to represent the sample. That is, if the number of cases or persons varies, the numerator must be large enough to lend stability to the calculation.[7]

As with prevalence, incidence reporting is in relation to patients; therefore, it is important that studies of wound occurrence

Table 1.
CALCULATIONS FOR PREVALENCE AND INCIDENCE

Point prevalence

$$\frac{\text{number of existing cases (patients with a PrU) on a specific date}}{\text{total number of patients assessed (with and without PrU) on a specific date}} \times 100^{*}$$

Period prevalence

$$\frac{\text{number of patients with a PrU at any time during a specific time period}}{\text{total number of patients in the population studied during a specific time period}} \times 100^{*}$$

Lifetime prevalence

$$\frac{\text{number of patients ever developing a PrU anytime in their life}}{\text{total number of patients in the population studied over a specified time period}} \times 100^{*}$$

Hospital- or facility-acquired prevalence

$$\frac{\text{number of patients developing a PrU since they were admitted to the facility}}{\text{total number of patients in the population studied over specified time period}} \times 100$$

Incidence

$$\frac{\text{number of patients (new cases) developing a PrU during the specified time period}}{\text{total number of patients in the population studied over specific time period}} \times 100$$

*The formulas provided indicate the prevalence per 100 patients or the percentage of patients with the disease or condition during the designated time period. Prevalence is actually a proportion, but for convenience, it is often referred to as a rate. For larger populations, prevalence rates are often calculated per 1000 patients. Very common diseases, such as diabetes, would be reported as a prevalence rate in the format of 167 per 1000 people, whereas as a less common condition could occur as infrequently as 0.23 per 1000 population.

count patients with specific types of lesions (such as PrUs, venous ulcers, and so on), regardless of how many the individual has, not individual lesions themselves.

Incidence: number of new cases during the specified time period × 100/total number of patients in the population studied over a specific time period.

DIFFERENTIATION OF THE TERMS

The terms *prevalence* and *incidence* are easily confused and used interchangeably, even by experienced healthcare providers.[5] The distinction between the terms is that prevalence reflects *all* individuals who are affected by the disease or condition during a particular period, or how widespread the disease is. In contrast, incidence, which reflects the number of *new* cases during a particular time period, translates to the risk of contracting the disease or condition.[9] Point prevalence rates are the most easily and reliably obtained by facilities and as a result are the statistics most commonly reported to regulatory agencies.[6] In turn, regulatory agencies, such as State Departments of Health and Centers for Medicare & Medicaid Services, commonly publish such rates in an effort to assist the public in assessing quality of care. This practice may disadvantage agencies that accept a large number of transfer patients who may arrive to the hospital with the disease or condition as a preexisting entity.

Incidence is always a ratio that is smaller than the prevalence ratio. This makes sense as incidence reports only new cases during the time period of study. In addition, there can be situations of high incidence and low prevalence, and vice versa.

Application of the Concepts in Wound Care. Despite the relatively subjective nature of humans, healthcare workers are increasingly asked to make evidence-based decisions in delivering patient care and for data-driven judgments when managing resources.[10] There is a growing demand for healthcare to be more coordinated, cost-efficient, and affordable. These emerging notions apply to the prevention, diagnosis, and management of skin and wound conditions.

Appropriate interpretation of prevalence and incidence information is imperative for prudent use of the data. Many facilities have individuals equipped with the knowledge on how to interpret such data, but they are not accessed by staff when they conduct the prevalence and incidence studies. Knowledge about epidemiological principles and how to interpret such data, as well as how to place it in context, is important in data analysis. Fortunately, the healthcare professions are increasingly incorporating epidemiological information in the curricula. For example, consideration of events that may affect the results is important, such as an increased population of older-adult patients migrating to warmer states may result in a seasonal increase in PrU rates for facilities that provide healthcare for transient patients or a facility with a high population of spinal cord–injured patients.

Incidence data provide key healthcare information on indicators of care.

Prevalence data assist healthcare providers, government agencies, and insurers by providing probability information. It indicates disease burden and can offer valuable information when planning health services, as it provides data on resource requirements.[2] Prevalence data can be helpful for investigating when and where certain conditions are occurring. For example: Are PrUs being acquired in the surgery suite versus on the nursing unit? Are the patient's/resident's PrUs present upon admission or acquired after admission to the institution? Although the primary concern is for the health of the patient, knowledge about where the condition is acquired can aid in improving the quality of care on the given unit or at the appropriate facility.[5]

Incidence data provide key healthcare information on indicators of care. Incidence data may also lead the healthcare providers to collect additional information on the occurrence of various wounds and thereby stimulate the development of additional prevention strategies.[4] Additional data might include comorbidities or prevention strategies, such as the type of support surface or nutritional supplement information. Incidence is usually more helpful when striving to understand the etiology of a disease, because incidence considers the duration of a condition rather than providing a measure of risk alone. If the incidence rate increases, then there is an underlying risk factor that promotes the change.

CONDUCTING A PrU PREVALENCE AUDIT

Data can be very powerful, depending on the collection methods used. Therefore, poorly or inconsistently collected data are virtually of no use. Therefore, data that cannot be verified or are inconsistent must be discarded. A well-thought-out plan for data collection and analysis will provide reliable data for use by the healthcare team. The following steps are aimed at providing helpful suggestions for obtaining reliable and quality prevalence data.

1. *Establish a prevalence and incidence team.* Membership will vary depending on the resources available to the institution; however, consider inviting local partners to fulfill roles that may not be available within a facility (statistics) or to provide an outside perspective. The role of the team will be to lead the planning, data collection, analysis, and interpretation. If the facility is unaccustomed to collecting such data, several meetings may be needed to establish the scope and authority of the group and each individual, as well as to define study

parameters. Prevalence and incidence teams frequently become very efficient working groups that provide quality information to the unit, administration, and other stakeholders.

It is important to include basic demographic data, such as gender and age.

The prevalence and incidence team should familiarize itself with national resources that can assist in data collection efforts. Such resources are often free or low cost and can range from skin and wound organizations to venders of wound products. Facilities can join existing annual prevalence and incidence studies or access resources including data collection forms, instructions, consultants, data entry tips, data analysis assistance, and reporting support.[11,12] Regardless, a consistent data collection methodology will allow for repeated reliable collection of data for meaningful use within the facility and for national comparisons.[5,13]

2. *Garner support*. The support of administration, the Chief Nursing Officer and/or the Director of Nursing, and all unit directors is essential for success and will enhance access and the data collection process. Each unit or facility should assess its own leadership structure and determine whom to contact to obtain study support. Enlisting the support and expertise of the facility's skin care clinicians or champions will lend valuable expertise to the project.

3. *Clearly define the population to be studied*. Identify which units will and will not be included.[5] Normally, psychiatric inpatient and outpatient surgery units are not included, and often birthing center, or obstetric departments are excluded. All medical, surgical, intensive care, pediatric, neonatal, and dialysis areas *are* included. Although a retrospective chart review can be conducted to collect PrU prevalence data, actual examination of patients' skin is the preferred method as it is a direct measurement and thus more accurate.

4. *Determine the data to be collected*. Data collection parameters will be based on the goals or clinical questions the healthcare provider wishes to answer. For example, is the healthcare provider seeking to conduct a straightforward prevalence study or to also collect data to answer a clinical question, such as the rate of compliance to an individual institution's PrU prevention protocol?

5. *Obtain approvals*. Seek and obtain any administrative, institutional, or ethical approvals needed specific to the site and the intended use of the data. For example, if one intends to publish any part of the data collection process or outcomes, it will be necessary to obtain institutional review board approval.

6. *Recruit a team of data collectors*. Consider recruitment of individuals from a variety of health professions to provide interdisciplinary flavor and benefits to the project. Including students from the health profession provides a valuable learning experience and manpower to facilitate efficient data collection.[14]

7. *Decide when to collect the data*. The amount of time to set aside for data collection will depend on the number of patients/residents and the size of the data collection team. Many facilities set aside a day or days (consecutive days recommended if > 1 day is needed) that the prevalence audit will be done on *all* units identified for data collection. Send out and/or post information on the prevalence audit date and units to be included. E-mail or mailbox reminders a few days and 1 day prior to the date will improve audit readiness. Consider that the best time for the skin check is often during the patient's/resident's bath/shower. This works well in a long-term-care facility, where a bath aide frequently does all the baths/showers on every resident during a 1-week time period and can observe and report any abnormalities for further assessment. In acute care, the data collection team may have a target of a single day and do all patients, regardless of whether it is during the bath time.

8. *Develop or select the data collection tool*. It is important to include basic demographic data, such as gender and age. Record the type and identity of the unit to enable capturing of unit trends during data analysis. The patient's or resident's length of stay is helpful, and it is important to include diagnoses and comorbidities for later analysis of results.

9. *Hold educational sessions for all data collectors*. Keep in mind that data collectors need to know the date(s) of data collection, and special arrangements may be necessary to enable them to collect the prevalence data on the dates specified. Data collectors need to know which patients/units are and are not in the prevalence study and that the entire patient/resident body must be assessed. Key information the educational session should encompass includes (*a*) PrU stages, including deep tissue injury and unstageable; (*b*) how to identify nonblanchable areas (Stage I); and (*c*) whom to contact to have any questionable lesions verified. Nonblanchable usually means that the area does not blanch even after 30 minutes of having the patient offloaded on that area. This means that the data collector will need to reposition the individual off that area and return to recheck for blanchability in 30 minutes. A quiz to verify comprehension of how to do the assessment and document the results is very helpful to confirm knowledge acquisition, and establishing interrater reliability will confirm consistency of observation methods between data collectors.

10. *Don't forget the denominator!* The actual number of patients/residents assessed on each unit needs to be determined and documented on the day/days of the prevalence

study to know what number to use in the denominator of the equation.

11. *Processing the data*. Be clear with data collectors as to where the data collection forms will be collected and stored at completion of the study. If possible, designate a team member to review the forms as they are turned in or as soon as possible to assess for any unintentionally omitted data or to clarify information collected. This is especially relevant in regard to new data collectors. Scheduling regular meetings of the prevalence and incidence team to process the data through analysis and interpretation will encourage momentum in bringing the data full circle to inform the unit/facility. It is important once the results are tabulated to do an analysis, including assessing type of unit, mean age, diagnoses/comorbidities, and so on, to understand the prevalence rate established for that unit/institution. If a statistician has been secured, it is helpful to involve this individual in interpreting the data as well as the study design phase.

12. *Interpreting the data*. Each facility and unit must establish its initial baseline data and then with each consecutive prevalence audit and benchmark itself against the previous rates.[14–16] It is also very helpful to benchmark the type of unit and facility rates against similar types of facilities and units to see how they are doing regionally or even nationally.

When interpreting the data, it is imperative to do so without confusing the terms *incidence* and *prevalence*, which frequently occurs. Facility or hospital prevalence will include all cases of PrUs present upon admission, as well as those that developed during the study period. Moreover, facility or hospital incidence will include only those PrUs that developed post-admission and during the study period.

13. *Reporting the data*. Prevalence data should be reported to the staff of each unit, to the facility's leadership, to advisory boards, and to any required reporting bodies. Observations and comments should be welcomed at all levels of reporting as collaborative conversation is helpful in problem identification and problem solving.

The facility may choose to calculate and interpret confidence intervals (CIs). Including CIs is important when estimating the prevalence or incidence of diseases or conditions or when monitoring disease status, especially when comparing data with subsequent surveys or other facilities.[9,17] A CI is used to indicate the reliability of an estimate and is an interval around a statistic that contains the true underlying value of the statistic with an identified degree of confidence. A 95% value is the conventional interval reported. A 95% CI for the prevalence of PrUs on a unit will contain the true underlying value of the PrU prevalence 95% of the time.[9,18,19] Confidence intervals measure only random error, as when the occurrence of PrUs fluctuates up and down from one data collection period to another by chance. Confidence intervals do *not* address systematic error or bias, such as when moisture-caused skin damage is assessed as a Stage II PrU.[18,19] Today's computer programs easily provide CIs and manual calculations are generally not necessary.[6]

When interpreting the data, it is imperative to do so without confusing the terms incidence and prevalence, which frequently occurs.

PITFALLS/PROBLEMS WITH PREVALENCE AND INCIDENCE DATA

When planning for the collection of prevalence and/or incidence data, it is imperative that time is spent planning how the data collection will occur. Resources are often needed in terms of manpower and supplies. If the data collectors are new to the process, time must be taken to educate the workers to the procedures of data collection. For example, depending on the culture of the unit or facility regarding reporting of negative outcomes or actions, there may be a tendency to underreport conditions, such as PrUs or failure to turn patients on the prescribed schedule. The data collectors may fear retribution of some kind from their manager or boss, or they may not wish their unit or area to not look good in any way. Instead of viewing an increased PrU incidence as an opportunity to improve the care provided, staff may view the data as a threat to their job security or unit reputation.

All staff on the unit or facility in which data collection will occur must be engaged in the process. Staff must understand the importance of the data and how it contributes to quality patient care as well as the integrity of the unit and organization.[6] The data collectors themselves need to understand the degree of accuracy that is needed in order to achieve accurate measurements and how exactly to achieve such measurements. Staff or personnel who are not directly engaged in data collection can act as ambassadors and answer patient/resident questions and explain the procedures to those who have questions.

Data collection for wounds such as PrUs can be accomplished by various means. For internal data collection, the facility may wish to train either a team of its staff to conduct the data collection, or they may wish to train all of their licensed nurses to perform the skin assessments on a predetermined schedule. Regardless, using internal data collectors is regarded as likely to lead to consistency in data collection and improved patient consent to participate in the audit as the data collectors are known to them. Although the consistency of the data collection is often improved with internal assessors, the method is a costly

use of resources. Similar to internal data collection, external assessors are also associated with improved data consistency and increased cost. External data collectors, however, may be difficult to recruit, and they may lead to a decrease in patient participation, as the assessors are not known to the clientele.

Conducting routine PrU prevalence and incidence studies at an institution increases staff awareness and even patient awareness to the problem of PrUs.

Quality data are needed for informed decision making and to garner support for initiatives. Care must be taken to ensure that the same methods are used for each data collection period and that the same types of information are collected. For example, if your ''unit'' includes 8 beds located on a different floor, they must always be included or excluded when collecting PrU data. If monitoring for the prevalence of a posted turning schedule for patients or residents, such data must *always* be collected with every PrU assessment.

Some prevalence data are reported in terms of the number of individuals who have the disease, and other prevalence data are reported to include the number of individuals who have the disease or condition but are undiagnosed. In addition, it is important when working with prevalence and incidence data that the source and quality of the data collection be verified. Measurement techniques vary from source to source, and a clear explanation of the instruments and methods used will allow the reader to assess the integrity of the data collection and to replicate the data collection if desired.

It is also important to be aware that the source of the data can lend itself to inaccuracies when reporting prevalence and incidence data, whether the source is a government agency, the local hospital, or practitioner reports. For example, if the practitioner does not capture the information, it is not available for collection. Similarly, if the hospital's electronic health record does not allow for consistent retrieval of certain information from all records, the data will be incomplete and, therefore, inaccurate. When glitches in reporting are detected and fixed, the incidence or prevalence rate may show an increase as the detection of actual cases has been enhanced. Thus, the increase may not be a true increase. Conversely, if there is an actual increase in an incidence rate, the change indicates that the strategies or protocols to prevent the condition (PrUs) or control the disease (whooping cough) have not succeeded.

One last consideration of prevalence and incidence data is that clarity in reporting is needed when individuals could have multiple cases of the disease or condition in the same year. Depending on the reporting practices for the entity, more people than actually are affected can be reflected in incidence data when they have more than 1 episode of the disease or condition during the reporting period, for example, sinusitis, sexually transmitted diseases, or PrUs. It is important to reinforce that, when reporting PrUs, the number of individuals affected is counted and not the number of PrUs experienced by each of the individuals. In other words, PrUs are recorded as an unduplicated count per reporting period. Conversely, when reporting the prevalence of sexually transmitted diseases, it may be advantageous to know the duplicated count so the total disease burden is examined.

CONCLUSION

Although prevalence and incidence methods can be effectively used for a number of disease entities, an optimal use is for the application to PrUs. Conducting routine PrU prevalence and incidence studies at an institution increases staff awareness and even patient awareness to the problem of PrUs. It calls attention to the importance of prevention and early detection of PrUs, as well as the essentials of the facility's PrU prevention program.[4,11,14] A standardized data collection method will provide accurate data and allow healthcare providers and administrators to view changes over time. Prevalence and incidence data provide key information on how a facility rates in regard to what is being studied and how the entity is being addressed and also will increase the ability for data-driven decision making at the institution.

PRACTICE PEARLS

- Incidence measures the entity over time, and prevalence measures the entity at a point in time.
- A careful description of the population and setting for the incidence/prevalence data collection will enable appropriate interpretation and comparisons.
- When collecting data on PrU incidence and prevalence, count people, not ulcers.
- A well-thought-out and detailed plan for collecting incidence/prevalence data will enhance the data collection process and data quality.
- Prevalence and incidence data must be brought ''full circle'' and be analyzed and utilized in order to improve patient care.
- Prevention and early detection of PrUs reduce morbidity and mortality and save healthcare dollars over time.
- Conducting prevalence and incidence studies increases staff awareness of conditions, diseases, and prevention protocols.

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Registration Deadline: December 31, 2014 (nurses); December 31, 2013 (physicians)

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- The registration fee for this test is $24.95 for nurses; $22 for physicians.
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