HEALTH BASICS

Incidence

Incidence measures how many new health events occur in a defined population over time.

WHAT IT IS
A measure of new health events over time

WHERE IT COMES UP
Public health reports, research studies, and risk discussions

WHY IT MATTERS
Shows how often new health events occur

WHAT IT IS NOT
Not a disease, diagnosis, or personal risk prediction

WHO TO ASK
Clinician, epidemiologist, or public health service

HOW IT IS CHECKED
Counting new events in a defined population and period

Overview

Incidence is a way to measure new health events in a population during a set period. The event might be a new diagnosis, infection, injury, pregnancy, treatment complication, or another outcome being studied.

For example, researchers might count how many people are newly diagnosed with diabetes in one city during one year. They compare that number with the number of people who could have developed diabetes during the same period.

Incidence is not a disease or diagnosis. It also does not tell you whether you personally will develop a condition. It describes what happened in a group.

An incidence figure needs context. At minimum, you need to know:

Incidence is often reported per 1,000, 10,000, or 100,000 people. Using a standard-sized population makes groups easier to compare. It does not mean exactly that many people were studied.

- What event was counted
- Which population was studied

- How long people were observed
- What number was used as the denominator
- Whether people or separate events were counted

How it works

The numerator, or top part of the calculation, is the number of new events. The denominator, or bottom part, represents the population at risk or the time that population was observed.

There are two common forms of incidence.

Cumulative incidence , sometimes called incidence proportion, describes the proportion of an at-risk group that develops an outcome over a stated period. For example, a study might report the proportion of participants who developed an infection within 30 days. When measured properly, this can estimate the probability, or risk, of that outcome during those 30 days.

Incidence rate , sometimes called incidence density, uses person-time. Person-time combines the number of people observed with how long each person was followed. Ten people followed for one year contribute ten person-years, as do five people followed for two years.

An incidence rate describes how quickly new events occur. It is not itself a probability. This matters when comparing studies that followed people for different lengths of time.

Researchers must also decide who is "at risk." A person who already has the condition at the start is usually not counted as a new case of that condition. However, some studies count repeat events, such as repeated falls, asthma attacks, or hospital admissions. The report should state whether it counted people, first events, or every event.

Case definitions matter too. A study may identify new cases through laboratory tests, medical records, insurance claims, questionnaires, or registries. Different definitions and data systems can produce different incidence estimates.

Why it matters for your health

Incidence helps show whether new health events are becoming more or less common. Public health teams use it to monitor infections, cancers, injuries, workplace exposures, and other health concerns.

Researchers may compare incidence between groups. For example, they might compare people with and without a particular exposure. This can suggest an association, but it does not

automatically prove that the exposure caused the outcome. Age, access to care, testing practices, and other factors may influence the comparison.

Incidence can also affect how research findings are presented. A treatment might reduce relative risk by a large percentage while changing the absolute number of events only slightly. Knowing the original incidence helps you understand the size of the difference.

For an individual, a population incidence figure is only a starting point. Your own chance of an outcome may be influenced by factors such as age, medical history, family history, environment, and length of exposure. A statistic from a population unlike yours may not apply closely to you.

Incidence is different from prevalence. Incidence counts new events during a period. Prevalence counts everyone who has a condition at a particular time or during a period, including people diagnosed earlier. A long-lasting condition can have high prevalence even when relatively few new cases occur each year.

What can go wrong

Incidence can be misunderstood when important details are missing.

A report may give a number without naming the time period. "Ten cases per 100,000" is incomplete unless it says whether that means per month, per year, or another period.

Changes in testing can affect reported incidence. If a community begins testing more often for COVID-19, HIV, cancer, or another condition, more cases may be found even if the underlying rate has not changed by the same amount. A new diagnostic definition can have a similar effect.

Incomplete reporting can make incidence appear lower than it is. This can occur when people do not seek care, clinicians do not report cases, or a surveillance system does not capture every clinic or hospital.

Small populations can produce unstable figures. A change of only a few cases may look like a large percentage increase. Confidence intervals, which show the uncertainty around an estimate, help put such changes in context.

Comparisons can also be misleading when populations differ in age or other important features. Cancer incidence, for example, is strongly affected by age. Researchers may use age-adjusted rates to make population comparisons fairer. An age-adjusted rate is a statistical comparison tool, not the actual rate experienced by one person.

Reports of suspected medication side effects do not usually provide incidence by themselves.

Voluntary reporting systems may not show how many people used the medicine, and the reports may be incomplete or unverified. They can identify possible safety signals, but they cannot establish how often an effect occurs.

An apparent cluster of cancer, infection, birth defects, or another outcome also needs careful assessment. Investigators need a clear case definition, an appropriate population, and enough observation time before deciding whether incidence is higher than expected.

What you can do

There is no personal test for "incidence." It is calculated from population data rather than measured in your body.

When you see an incidence figure, record the full statement rather than only the headline number. Look for the event, population, period, denominator, and source.

Useful questions include:

If a statistic relates to your diagnosis, treatment, family history, or exposure, ask the relevant clinician how closely the study population matches you. A clinician may use other information or tests to assess the specific health issue, but those tests do not measure incidence itself.

An unclear incidence figure is usually a routine question for a clinician, pharmacist, research team, or public health service. Incidence has no symptoms and does not create an emergency. Seek urgent or emergency care based on what is happening to you-not on a population statistic. Severe chest pain, major breathing difficulty, signs of stroke, or another immediate threat should be handled through local emergency services.

- Does this count people, first diagnoses, or repeat events?
- Is this cumulative incidence or an incidence rate?
- What time period does the figure cover?
- Is the number observed, estimated, or age-adjusted?
- What comparison group was used?
- Are absolute numbers provided alongside percentages?
- How uncertain is the estimate?

Common questions

Is incidence the same as my risk?

Not always. Cumulative incidence can estimate risk over a defined period when the study design supports that interpretation. An incidence rate based on person-time describes the speed of new events and is not a direct personal probability.

What does "per 100,000 person-years" mean?

It is a rate based on combined observation time. For example, 100,000 person-years could come from 100,000 people followed for one year or 10,000 people followed for ten years. Real studies usually include people followed for different lengths of time.

Can incidence be more than 100%?

A cumulative incidence proportion cannot exceed 100% when each person is counted once. An incidence rate can be greater than one event per person-year if repeat events are possible, because it is a rate rather than a percentage.

Does rising incidence always mean more people are becoming ill?

No. A real increase is one possibility, but broader testing, better reporting, changed definitions, or shifts in the population may also raise the recorded figure.

Which is more useful: incidence or prevalence?

They answer different questions. Incidence shows how often new events occur. Prevalence shows how many people currently have a condition. The useful measure depends on the question being asked.

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