

What is the importance of statistics in healthcare and can you provide examples?

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Statistics is a branch of mathematics that involves collecting, analyzing, interpreting, and presenting data. In healthcare, statistics play a crucial role in understanding and improving various aspects of the healthcare system. It helps in identifying patterns, trends, and relationships in data, which can aid in decision-making and policy development.

One of the key reasons for the importance of statistics in healthcare is its ability to provide evidence-based insights. By analyzing data from various sources such as patient records, clinical trials, and surveys, statistics can help healthcare professionals make informed decisions about treatments and interventions. For example, a statistical analysis of patient outcomes can identify the most effective treatment for a particular disease, ultimately improving patient care.

Moreover, statistics also play a critical role in tracking and monitoring public health trends. By analyzing data on disease outbreaks, vaccination rates, and population health indicators, healthcare professionals can identify areas of concern and take preventive measures to address them. This can help in controlling the spread of diseases and improving overall population health.

Additionally, statistics can also help in resource allocation and financial planning in healthcare. By analyzing data on patient demographics, healthcare utilization, and costs, hospitals and healthcare organizations can make informed decisions about resource allocation and budget planning. This can lead to more efficient and effective use of resources, ultimately improving the quality of healthcare services.

In conclusion, statistics is of utmost importance in healthcare as it helps in evidence-based decision-making, tracking public health trends, and resource allocation. Its role in improving patient care and population health cannot be overstated, making it an essential tool in the healthcare industry.

The Importance of Statistics in Healthcare (With Examples)

The field of statistics is concerned with collecting, analyzing, interpreting, and presenting data.

In the field of healthcare, statistics is important for the following reasons:

Reason 1: Statistics allows healthcare professionals to monitor the health of individuals using descriptive statistics.

Reason 2: Statistics allows healthcare professionals to quantify the relationship between variables using regression models.

Reason 3: Statistics allows healthcare professionals to compare the effectiveness of different medical procedures using hypothesis tests.

Reason 4: Statistics allows healthcare professionals to understand the effect of lifestyle choices on health using incidence rate ratio.

In the rest of this article, we elaborate on each of these reasons.

Reason 1: Monitor the Health of Individuals Using Descriptive Statistics

are used to *describe* data.

Healthcare professionals often calculate the following descriptive statistics for a given individual:

Mean resting heart rate. Mean blood

pressure. Fluctuation in weight during a certain time period.

Using these metrics, healthcare professionals can gain a better understanding of the overall health of individuals.

They can then use these metrics to inform individuals on ways they can improve their health or even prescribe specific medications based on the health of the individual.

Reason 2: Quantify Relationship Between Variables Using Regression Models

Another way that statistics is used in healthcare is in the form of .

These are models that allow healthcare professionals to quantify the relationship between one or more predictor variables and a .

For example, a healthcare professional may have access to data on total hours spent exercising per day, total time spent sitting per day, and overall weight of individuals.

**Weight = 124.33 - 15.33(hours spent exercising per day)
+ 1.04(hours spent sitting per day)**

Here's how to interpret the in this model:

For each additional hour spent exercising per day, total weight decreases by an average of 15.33 pounds (assuming hours spent sitting is held constant). For each additional hour spent sitting per day, total weight increases by an average of 1.04 pounds (assuming hours spent exercising is held constant).

Using this model, a healthcare professional can quickly understand that more time spent exercising is associated with lower weight and more time spent sitting is associated with higher weight.

They can also quantify exactly how much exercise and sitting affect weight.

Reason 3: Compare Medical Procedures Using Hypothesis Tests

Another way that statistics is used in healthcare is in the form of .

These are tests that healthcare professionals can use to

determine if there is a statistical significance between different medical procedures or treatments.

For example, suppose a doctor believes that a new drug is able to reduce blood pressure in obese patients. To test this, he may measure the blood pressure of 40 patients before and after using the new drug for one month.

He then performs a using the following hypotheses:

**$H_0: \mu_{\text{after}} = \mu_{\text{before}}$ (the mean blood pressure is the same before and after using the drug)
 $H_A: \mu_{\text{after}} < \mu_{\text{before}}$ (the mean blood pressure is less after using the drug)**

If the of the test is less than some significance level (e.g. $\alpha = .05$), then he can reject the null hypothesis and conclude that the new drug leads to reduced blood pressure.

Note: This is just one example of a hypothesis test that is used in healthcare. Other common tests include a , , , and .

Reason 4: Understand Effects of Lifestyle Choices on Health Using Incidence Rate Ratio

An incidence rate ratio allows healthcare professionals to compare the incident rate between two different groups.

For example, suppose it's known that people who smoke develop lung cancer at a rate of 7 per 100 person-years.

Conversely, suppose it's known that people who do not smoke develop lung cancer at a rate of 1.5 per 100 person-years.

We would calculate the incidence rate ratio (often abbreviated IRR) as:

$$\text{IRR} = \text{Incidence rate among smokers} / \text{Incidence rate among non-smokers}$$
$$\text{IRR} = (7/100) / (1.5/100)$$
$$\text{IRR} = 4.67$$

Here's how a healthcare professional would interpret this value: The lung cancer rate among smokers is 4.67 times as high as the rate among non-smokers.

Using this simple calculation, healthcare professionals

can gain a good understanding of how different lifestyle choices (like smoking) affect health in individuals.

Additional Resources

The following articles explain the importance of statistics in other fields:

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