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## [Understanding Cancer Research Study Design and How to Evaluate Results](#) [1]

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Doctors and scientists conduct research studies to find better ways to prevent and treat cancer. Depending on the questions they want to answer, researchers can design these studies in a number of ways. No study design is perfect. Each has strengths and drawbacks. It is important to understand a study's design. By doing this, you can understand the results to know if they apply to your own situation.

In cancer research, there are two main types of research studies:

- **Experimental studies.** This type of study provides an intervention, such as a new treatment, to a group of people. Then, researchers compare their results to those of another group that does not receive the intervention. This other group is known as the control group. The researchers choose who does and does not receive the intervention either randomly or through a selection process. These studies help to learn more about how cancer starts or spreads. Also, they can test new imaging techniques and explore quality of life issues.
- **Observational studies.** This type of study involves observing groups of people in a natural setting and looking at a specific result. A result may include whether one group of people has more cancer diagnoses than another group. In these studies, the researchers can't control the intervention, such as a person's weight or whether they took vitamin supplements. These studies are often described as epidemiologic. It is used to learn how

different risks cause or spread a disease in a community.

## **Types of experimental studies**

Experimental studies are more reliable than observational studies. This is because the volunteers are placed in the intervention or control group by chance. This reduces the chance that the researchers' or the subjects' assumptions or preferences, also known as biases, will change the study results.

In addition, this type of study helps researchers to better find and control other factors, such as age, sex, and weight. These factors could also affect the results of the study.

Researchers may also consider other factors when choosing people to enroll in an experimental study. They could be based on cancer type, stage of the disease, and whether the cancer was just found or has spread.

One of the most common types of experimental studies is the [clinical trial](#) [3]. This is a research study that tests a medical intervention performed with people. Clinical trials test:

- The effectiveness or safety of a new drug or combination of drugs
- A new approach to radiation therapy or surgery
- A new treatment or way to prevent cancer.
- Ways to lower the risk of cancer coming back

Doctors and researchers conduct clinical research in segments called phases. Each phase of a clinical trial provides different answers about the new treatment. For instance, it can show the dose, safety and efficacy (how well it works) of the treatment. There are three phases of a clinical trial, called Phase I, Phase II, and Phase III. Learn more about the [phases of clinical trials](#) [4].

In a clinical trial, volunteers are usually selected by chance to either be in the treatment or control group. Researchers can prevent bias in a clinical trial by keeping volunteers and/or themselves from knowing how the volunteers are grouped. This is a process known as "blinding."

Types of experimental studies include:

- **Double-blind randomized trial.** Most scientists believe this type of clinical trial will produce the best evidence in a study. Neither the volunteers nor the researchers know who belongs to a treatment or control group until the study ends.
- **Single-blind randomized trial.** In this type of trial, the volunteers do not know whether they belong to a treatment or control group. But, the researchers know.
- **Open/unblinded trial.** Both volunteers and researchers know who belongs to each test group within this type of study. This occurs when it isn't possible to use blinding. For instance, the study could compare a surgical treatment to a drug.

## Types of observational studies

In observational studies, researchers have less control over the study volunteers. This means that certain factors could affect the results. These studies, however, are useful in providing initial evidence that can help guide future research.

Types of observational studies include:

- **Case-control studies.** These types of studies compare two groups of people. For instance, they could compare those who have cancer (the case) and those who do not (the control). Researchers may look for lifestyle or genetic differences between the two groups. By doing this, they hope to find out why one group has a disease and the other group does not. These studies are conducted retrospectively. That is, they are researching what has already happened.
- **Cohort studies.** These studies are prospective, which means that researchers study the event as it occurs. They monitor a group of people for a long time and track, for example, any new cancer diagnoses. This type of study can assess whether certain nutrients or actions can prevent cancer. In addition, this approach can find cancer risk factors. For instance, cohort studies have studied the risk of using postmenopausal hormone replacement therapy and an increased risk of breast cancer.
- **Case reports and case series.** These studies are detailed descriptions of a patient's medical history. The individual patient descriptions are called case reports. If a number of patients undergo a similar treatment, the case reports may be combined into a case series. The results of case series studies are descriptions of patients' histories within a specific group. As such, they should not determine treatment options.

- **Cross-sectional studies.** These studies examine how diseases interact with other factors within a specific group at one point in time. However, because these studies only measure interactions at one point in time, they cannot prove that something causes cancer.

## Types of review articles

A large number of cancer research studies are published every year. Given this, it is challenging for doctors, as well as interested patients and caregivers, to keep up with the latest advances. Also, the research studies published in journals are constantly shaping and reshaping the scientific understanding of that subject. No single study provides the final word on a topic, cancer type, or treatment. As a result, review articles, which evaluate and summarize the findings of all published research on a certain topic, are extremely helpful.

Types of review articles include:

- **Systematic reviews.** These articles summarize the best available research on a specific topic. The researchers use an organized method to locate, gather, and evaluate a number of research studies on a particular topic. By combining the findings of a number of studies, the researchers are able to draw more reliable conclusions.
- **Meta-analyses.** These studies combine data from several research studies on the same topic. By combining these data, it can find trends that are hard to see in smaller studies. However, if the single studies were poorly designed, the results of the study may not be useful.

## Evaluating research studies

Here are some tips for finding out the quality of a research study:

- **Find out if the journal uses a peer-review process.** Results from a study are more reliable if they are peer-reviewed. This means that researchers who are not a part of the study have looked over and approved the design and methods.
- **Look at the length of the study and the number of people involved.** A study is more useful and credible if the same results occur in many people across a long time. However, studies of rare cancer types or cancers with a poor prognosis (chance of getting better) are an exception to this rule. This is due to the small number of patients to study. Also, when looking at the length of the study, it may be suitable for some clinical trials to be shorter. For instance, cancer prevention trials are often much longer than treatment clinical trials.

- **Consider the phase of the study when learning about new treatments.** Phase I and II trials usually tell you more about the safety of a treatment and less about how well it works. These studies tend to have a smaller number of patients compared to phase III trials. Phase III trials compare a new treatment with the current (standard) treatment, and doctors consider these studies to be the most reliable.
- **Find out if the study supports or contradicts current research.** New results are exciting, but other researchers must validate the results before the medical field accepts them as fact. Review articles like systematic reviews are of special interest. They review and draw conclusions across all of the published research on a specific topic.
- **Watch out for conclusions that overstate the results.** Each study is a small piece of the research puzzle. Medical practice rarely changes because of the results of one study.

## Talking with your doctor

Always talk with your health care team about what you find in an abstract or study. If you have reviewed a study that suggests a different approach to cancer treatment, do not stop or change your treatment. First talk to your doctor about how the study relates to your treatment plan.

To start a talk with your doctor you may want to ask:

- I recently heard about a study that used a new treatment. Is this treatment related to my type and stage of cancer?
- What type of journals should I read to learn more about my type of cancer?
- Should I consider being a part of a clinical trial?
- What clinical trials are open to me?
- Where can I learn more about clinical trials?

## More Information

[Understanding the Publication and Format of Cancer Research Studies](#) [5]

[Journals and Magazines](#) [6]

[patientACCESS](#) [7]

[Medical News: How to Know If It's Accurate](#) [8]

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### **Links**

[1] <http://www.cancer.net/es/node/24719>

[2] <http://www.cancer.net/es/node/51>

[3] <http://www.cancer.net/node/24863>

[4] <http://www.cancer.net/node/24880>

[5] <http://www.cancer.net/node/24718>

[6] <http://www.cancer.net/node/25373>

[7] <http://www.cancer.net/node/29231>

[8] <http://www.cancer.net/node/24593>