PIP Digest

CCRA ACRC Canadian Cancer Research Alliance / Alliance canadienne pour la recherche sur le cancer

PIP PPP Patient Involvement in Cancer Research Program / Programme de Participation des Patients à la recherche sur le cancer

RESEARCH STUDIES: Assessing Evidence

You need comprehensive, authoritative evidence to make decisions about your health and that of loved ones. This PIP Digest explains how to evaluate scientific evidence and research studies.

Key Concepts

- Types of clinical studies
- How to assess research
- The Cochrane Library

Related PIP Digests

- Cancer Research: What is a Clinical Trial?
- Clinical Trials: Finding a Clinical Trial
- Clinical Trials: Precision Medicine and Clinical Trials

Types of Clinical Studies[1]

Different types of clinical studies suit different circumstances. Most research studies are either observational studies or clinical trials.

Observational Studies

Observational studies help researchers understand factors that could affect cancer rates. These studies do not involve experiments or tests of new treatments. They do, though, provide insights and hypotheses that could inform such experiments. Observational studies often determine correlations between cancer rates and other factors, but do not typically prove causality. For example, a study could demonstrate that people living with higher levels of environmental pollutants have higher rates of cancer. But definitively proving that pollutants cause cancer requires a different type of research.

Types of observational studies:

- **Case Studies** (and Case Series) involve detailed descriptions individual patients' situations. By documenting new and unusual cases, researchers generate ideas (hypotheses) about potential causes or risk factors.

[1]From: https://www.nih.gov/sites/default/files/health-info/clinical-trials/infographic-why-researchers-different-kinds-clinical-studies.pdf (accessed on August 1, 2017)

- **Ecological Studies** compare the rate of a disease or condition for groups of people in different climates, socioeconomic status, and many other contextual factors.
- A **Cross-Sectional Study** offers a snapshot of many people at one moment in time. Such studies can show how common a condition is and help identify factors associated with it.
- **Case-Control Studies** compare a group of people who have a condition with a "control group" who do not, to analyze possible causes or risk factors.
- A **Cohort Study** monitors a large group of people over time. Development rates for a disease or condition within a cohort provide useful data that can point to possible causes or risk factors.

CanPath
Canadian Partnership for Tomorrow's Health

The Canadian Partnership for Tomorrow's Health (CanPath) is Canada's largest cohort study and is designed to address key questions about what causes cancer and chronic disease. CanPath is comprised of more than 330,000 Canadians aged 30-74 years from six regional cohorts—BC Generations Project, Alberta's Tomorrow Project, Manitoba Tomorrow Project, Ontario Health Study, CARTaGENE (Quebec), and Atlantic PATH (Nova Scotia, New Brunswick, Newfoundland and Labrador, and Prince Edward Island). Recently, Saskatchewan and Manitoba have joined the study.

During recruitment, all participant volunteers completed a questionnaire that assessed their individual lifestyle, health, and risk factors. Some volunteers also underwent a series of physical measurements at an assessment centre, and donated samples of blood, urine, and saliva. Participants will be followed over time and asked to provide additional information.

Researchers are using this platform to test ideas (hypotheses) about different factors that may contribute to cancer. Some of the studies conducted to date have looked at genetic susceptibility factors for breast cancer, predictors of colorectal cancer, and the factors that make it easier for people to engage in physical activity and, thereby, reduce their cancer risk.

For more information, see https://canpath.ca/.

Clinical Trials

Clinical trials test new ways to prevent, detect, or treat disease. Treatments might be new drugs or combinations of drugs, new surgical procedures or devices, or new ways to use existing treatments. Clinical trials can also test other aspects of care, such as ways to improve the quality of life for people with cancer and their caregivers.

Often, clinical trials draw on data from observational studies, building on known correlations to try to establish clear cause and effect. Results may confirm earlier findings, contradict them, or add new aspects to scientists' understanding.

A well-designed clinical trial is the gold standard for proving that a treatment or medical approach works, although they often face logistical limitations.

Assessing Research Studies

To make the most informed decisions about treatments, tests, and other interventions, it is important to know how to identify and critically appraise research. The "evidence pyramid" on the next page shows the hierarchy of clinical studies. Some journals publish editorials, letters, and opinion pieces that are not research studies and should factor much less into decision-making.

The Critical Appraisal Skills Programme (CASP) in the UK (https://casp-uk.net) is a valuable resource for patients. It offers free tools for appraising and evaluating published studies. These tools help you assess validity and relevancy of results from all types of studies in the pyramid

What are systematic reviews and meta-analyses?

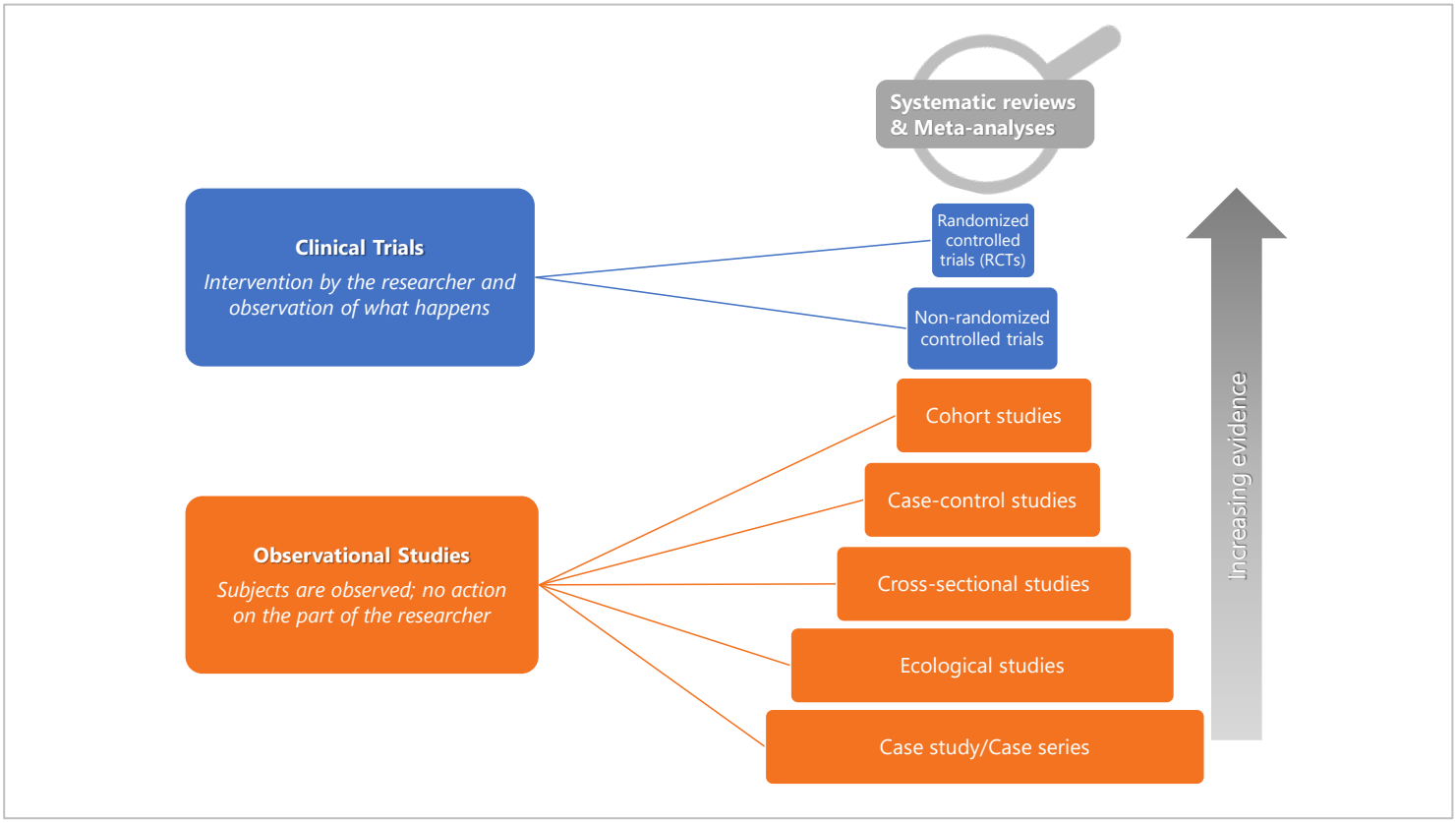
A systematic review identifies all publications related to a common topic of investigation. It compares and compiles results to see if separate findings agree or disagree. Systematic reviews provide a complete picture of the state of evidence on a topic.

The cousin of the systematic review is meta-analysis, which statistically analyzes the results of a systematic review. It combines the subject populations of all similar studies, giving much more statistical power than any individual study. Meta-analysis is also useful for showing similarities and differences among multiple studies. Studies that are more similar provide stronger analytical results.

Only rarely can a single study or trial provide definitive answers about the effects of an intervention. One small trial could suggest something works, but it could be outweighed by another 10 trials showing the opposite. Also, intervention trials that show benefits tend to garner more publicity — the results of studies showing no benefit might never even be published. This issue is known as **publication bias**. It can make an intervention look more effective than it really is. A systematic review combines the results of many trials to provide a more comprehensive, trustworthy view of that intervention. A systematic review often concludes that there is not enough strong evidence to give a definitive answer, in which case the authors will identify where more research is needed.

If you are interested in how a systematic review is organized, check out "Physical activity in advanced cancer patients: a systematic review protocol" at https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-016-0220-x. This is an open-access, Canadian-authored paper that reviews current evidence on this important subject area.

Evidence Pyramid



Resource: The Cochrane Library

The Cochrane Library is a global non-profit organization headquartered in England that provides summaries of health research findings to help health professionals, patients, and policy makers make more evidence-based choices. Founded in 1993, the organization is named for British epidemiologist Archie Cochrane.

Cochrane has 37,000+ volunteers in more than 130 countries. For the most part, the group conducts systematic reviews of randomized controlled trials of health-related interventions and diagnostic tests and publishes them in The Cochrane Library. There are over 700 reviews in The Cochrane Library related to cancer. See: https://www.cochranelibrary.com/.

Cochrane encourages consumers to take part in its review process. For more information, see: http://consumers.cochrane.org/sites/consumers.cochrane.org/files/public/uploads/cochrane_consumer_network_ebook_2016.pdf

Also of note, Cochrane also offers valuable online resources for patients and the general public at http://training.cochrane.org/path/cochrane-consumers-pathway

Cochrane Canada, the organization's Canadian arm is one of 14 Cochrane Centres worldwide. The Canadian operation:

- acts as the central point of contact for Cochrane within Canada
- promotes awareness, access and use of Cochrane Reviews
- develops relationships with relevant organizations in Canada
- coordinates training activities across Canada on how to use and write Cochrane Reviews
- supports other Canada-based groups

For more on Cochrane Canada, see http://canada.cochrane.org/.

Clinical Practice Guidelines

Clinical practice guidelines define specific diagnostic and treatment modalities for patients. These guidelines result from a consensus-based process involving key experts. Systematic reviews and meta-analyses also provide important evidence to inform these guidelines.

Clinical practice guidelines help both health care providers and patients to make informed decisions about the kinds of interventions that are right for specific clinical circumstances.

Most provincial cancer agencies have such guidelines. CancerCare Manitoba, for example, makes their guidelines available on their website: https://www.cancercare.mb.ca/For-Health-Professionals/treatment-guidelines-regimen-reference-orders.

Use these videos to build your skills for evaluating cancer research and evidence:

- Physiotherapy Association of British Columbia. *Understanding 'Levels of Evidence': What are Levels of Evidence?* (YouTube) April 7, 2012 [5:25 minutes] https://www.youtube.com/watch?v=5H8w68sr0u8
- Let's Learn Public Health. *Epidemiological Studies - made easy!* (YouTube) May 5, 2017 [9:42 minutes] https://www.youtube.com/watch?v=Jd3gFT0-C4s
- Cochrane. *What are systematic reviews?* (YouTube) January 27, 2016 [3:23 minutes] https://www.youtube.com/watch?v=egJlW4vkb1Y

Reviewer: Julia Schippke
Last revised: 2019-Oct-03