PC4 STUDY DESIGN & TERMINOLOGY

STUDY DESIGN

2.1 Systematic reviews

Systematic reviews are a summary of the research that already exists in published literature. They are used to help define what we already know about a particular area of research. They use a rigorous process to identify, select and critically appraise all relevant research. These reviews are essential before a research can begin designing a new intervention or randomised controlled trial.

2.2 Observational Study Designs

2.2a Cohort studies

Cohorts are defined groups of study subjects who are followed over time. Cohort studies (sometimes called longitudinal studies) are studies in which a particular outcome (e.g. depression) is compared in groups of people who are alike in most ways but differ by the characteristic of interest to the researchers, such as smoking. By studying the relationship between the characteristic and the outcome over time the researchers can establish whether there is an association between them. Therefore, the question addressed in this example is "Is smoking related to developing depression over time?"

2.2b Case-control studies

These are studies in which a group of people who have already experienced an outcome of interest to the researcher (cases) is compared with a suitable comparison group who are free of this outcome (controls). The exposure to / presence of a particular characteristic is measured retrospectively (in the past) in groups, using records or direct questioning to establish a relationship between the characteristic of interest and the outcome. For example, a group of women with cervical cancer could be compared with a group of similar aged women without cervical cancer using their immunisation history to see if those with cancer were more likely not to be immunised against HPV.

2.2c Descriptive studies

This study design aims to document or describe the magnitude, distribution, and trends of a particular characteristic(s) and/ or outcomes in a defined population. It is possible to have descriptive studies with a cross sectional or longitudinal design.

INTERVENTION VS. OBSERVATIONAL STUDIES

Intervention studies involve "doing something" to a group of study subjects and comparing the effects of this intervention to a similar group of study subjects who did not receive it. The two groups of subjects are usually called the "intervention arm" and "control arm" of the study. In human research the control arm may receive a placebo or not receive an intervention at all. However, it is more common for the control subjects to receive what is considered the "gold standard" or "standard care", that is, the treatment they would have normally received if they were not taking part in a study.

Observational studies do not involve an intervention but are designed to observe or detect a particular characteristic(s) in the study participants. The characteristics may be measured over time to detect change in relation to a particular event or outcome (longitudinal design) or the observation may be made once only (cross sectional design).

PROSPECTIVE VS. RETROSPECTIVE STUDIES

These terms are often used to describe studies which are longitudinal in nature. Technically, these terms refer to the timing of data collection during the study. In a prospective study the study commencement and all the times at which the characteristics of interest will be measured are defined in the future. In a retrospective study the characteristics of interest and the outcome have been measured or occurred in the past.

2.3 Intervention Study Designs

2.3a Randomised Controlled Trial

(In clinical trials this is also referred to as a phase III trial) An intervention study in which the subjects are randomly allocated into an intervention and a control arm of the study. Scientifically this is considered to the best study design to show that an intervention has had a significant effect and that this effect can be expected to occur in people with similar characteristics (e.g. type of cancer) regardless of individual differences (e.g. age, gender etc.).

2.4 Trial phases

The terms below typically relate to trials of treatments such as drugs or surgery. These terms are not commonly used in psycho-oncology or primary care trials but are often encountered with trials conducted by other CCTGs.

2.4a Phase 1 Trials.

These are the earliest trials in the life of a new drug or treatment. They are usually small trials, recruiting anywhere up to about 30 patients, although often a lot less. The trial may be open to people with any type of cancer. They have no control group. Phase 1 trials are conducted to find out:

- The safe dose range
- The side effects
- How the body copes with the drug
- If the treatment has an effect on the problem

2.4b Phase II Trials.

These trials may be done on people who all have the same type of cancer, or with several different types of cancer. Phase 2 trials aim to find out:

- If the new treatment works well enough to test in a larger group of people
- Which types of cancer the treatment works for
- More about side effects and how to manage them
- More about the best dose to use

There may be up to 100 or so people taking part. Phase II trials compare the intervention to standard care but without randomising participants to the intervention and control arms of the study.

2.4c Phase III Trials.

These trials compare new treatments with the best currently available treatment (standard care) and involve many more participants than phase II. These trials may compare:

- A completely new treatment with the standard treatment
- Different doses or ways of giving a standard treatment

WHY RANDOMISE?

Researchers randomise trials because they need to be sure that the results are correct and not biased for any reason. Of course, researchers are unlikely to be deliberately biased, but it is possible to be biased without realising it. For example, if a new treatment has quite bad side effects, the doctors running the trial might subconsciously avoid putting sicker patients into the group having the new treatment. So as the trial went on, the control group would have more and more of the sickest patients in it. The people in the new treatment group would then do better than the control group. So, when the trial results come out, the new treatment would look as if it works better than the standard treatment but this difference would just as likely to be due to the patients' state of health as the treatment.

In phase III trials patients are usually randomised to the intervention and control arms of the study. Such trials are also known as Randomised Controlled Trials.

2.5 Implementation studies

Implementation research is a growing field of research that looks at how to get results of clinical trials and other studies embedded into the health system. This type of research is focused on the users of the research both patients and health care professionals. Implementation studies explore how the results of trials would work within real life conditions. They aim to determine the best ways to implement the research as well what barriers need to be overcome to make sure implementation is successful.

OTHER TERMINOLOGY

3. Cancer staging

The stage of a cancer is a descriptor of how much the cancer has spread. The stage often takes into account the size of a tumour, how deeply it has penetrated, and whether it has spread to the lymph nodes or other organs. Staging of cancer is important because the stage at diagnosis is the most powerful predictor of survival, and treatments are often changed based on the stage.

- **Stage 1** usually means a cancer is relatively small and contained within the organ it started in
- **Stage 2** usually means the cancer has not started to spread into surrounding tissue, but the tumour is larger than in stage Sometimes stage 2 means that cancer cells have spread into lymph nodes close to the tumour
- **Stage 3** usually means the cancer is larger. It may have started to spread into surrounding tissues and there are cancer cells in the lymph nodes in the area
- **Stage 4** means the cancer has spread from where it started to another body organ - this is also called secondary or metastatic cancer

ACRONYMS AND ABBREVIATIONS

ASM	Annual Scientific Meeting
CAM	Complementary and Alternative Medicine
CAG	Community Advisory Group
CAP	Consumer Advisory Panel
CCTG	Cancer Clinical Trials Group (often synonymous with CTG)
CDW	Concept Development Workshop
COSA	Clinical Oncological Society of Australia
CTG	Clinical Trials Group
Dx	Diagnosis
ECR	Early Career Researcher
HREC	Human Research Ethics Committee
HRQOL	Health Related Quality of Life
MDT	Multidisciplinary Team
MRFF	Medical Research Future Fund
NHMRC	National Health and Medical Research Council
PC4	Primary Care Collaborative Cancer Clinical Trials Group
PRW	Peer Review Workshop
PIS/PLS	Patient Information Sheet/Plain

4. Definitions

Biostatistics Biostatistics are the development and application of statistical methods to a wide range of topics in biology such as cancer research. It encompasses the design of experiments, the collection and analysis of data from those experiments and the interpretation of the results.

Co-design A type of research methodology that engages with the end-users of the research which in health research is patients and their families. Engagement with patients happens across all stages of the research process.

Communication skills training A set of techniques used to modify verbal and nonverbal interactions with the goals of reducing interpersonal conflict and increasing the accuracy of information exchanged.

Education Provision of information through print, audio-visual, or interpersonal channels designed to increase knowledge of a subject area and reduce uncertainty.

Industry-independent trials These studies are not funded by drug companies or companies producing medical equipment that could have a vested interest in the outcomes of the study.

Multidisciplinary care A team approach with input from all relevant medical and allied health areas.

Placebo "Sugar pill" or any dummy medication or treatment. For example, in a controlled clinical trial, one group may be given a real medication while another group is given a placebo that looks just like it in order to learn if the differences observed are due to the medication or to the power of suggestion. A placebo is only used if there is no standard treatment available.

Power calculation This is a type of test statisticians use to work out how many people need to be involved in a clinical trial to be able to successfully test the hypothesis.

Primary care Care that is community-based and accessible (no referral needed), comprehensive (not restricted by type of disease or body part affected), continuous (long-term and patient-centred), and coordinated (provides referrals to expertise).

Randomisation This means the researchers put the people taking part in a study, into two groups using a random process. One group gets the new treatment and the other the standard treatment.

Shared care This is a model of care for cancer patients where their care is not solely given by their oncologist but shared with other health care professionals such as general practitioners.

Statistical significance When you run an experiment, conduct a survey, take a poll you end up with a set of data you can analyse. Statistical significance