



Writing a research proposal

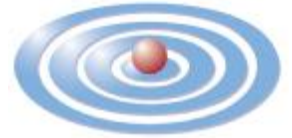
Coming to grips with your next research idea



Why are you writing a research proposal?

The reason for writing the proposal underpins the way in which you write it, its structure and the information you put in it

Constraints on research proposals



- Page numbers (can be 2-20 pages), prescribed font, margins, numbers of illustrations
 - Does the number of pages include references?
 - Check the referencing style (superscript takes less space)
- Time to write the proposal (2 week tender to 6/12 research proposal preparation time)
- Reliance (or not) on researcher track records
 - cases can be made for new researchers
 - Define the research team and outline what each brings to the project
- The amount of background required to underpin the research and the methodological approach proposed
- The audience for which the proposal is written
 - Skills & bias of the evaluators
 - Social leanings of the evaluators or the research funding source



The same research question can be written in different styles for different purposes

Know why and to whom you are writing
your proposal, focus it accordingly and
make it a planned exercise

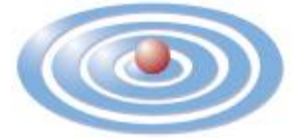
Don't waste effort – recycle!!!

**Good ideas without a structure or purpose rarely
get funded!!**

Research proposals should not be 'one-off'



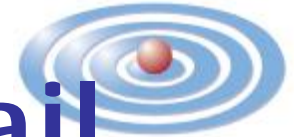
- Proposals should be part of a big visionary picture
- Your research career should be linked with the type of research activities you undertake that will make you an expert in a specific area
- Build on your strengths or those of your supervisor/ colleagues
 - Easier to build on a track record than start a new one!!!



Step 1

***Read the background material
for the research project***

Look closely at the detail

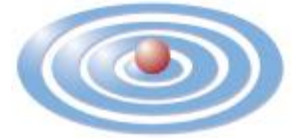


- What will the research grant pay for?
 - limits on oncosts, personnel salaries, travel, equipment, infrastructure
- What is the structure of the research proposal?
 - aims / objectives / goals / background / significance / outcomes / methods etc
 - understand how these terms are defined – examples are often provided
 - an ‘aim’ for one research grant is a ‘goal’ for another
- What did the research grant scheme fund in the past few years?
 - get some background detail on successful grant applications

Don't leave the boring stuff until the last minute



- A lot of detail & paperwork is often required, yet overlooked until the end
 - last minute scrambles make stressed researchers!!! (or researcher's secretary @#%!@)
- Start early, collecting
 - research team and defining team members' roles
 - mobile phone numbers
 - CVs & biographical details
 - track record and capability statements
 - publication lists
 - signatures



Step 2

Start early on the budget



Research = funding

Who has the money to spend
on research, and what
outcome/ output is required
from the expenditure?

Define \$\$ you need to fund your research before you design your project



- Unfunded research should rarely be undertaken, and should only be small pilot studies to prepare for a larger study
 - if you undertake unfunded research make sure you tell everyone about it and why – make it ‘pay’ for your research progress
- Key questions in determining basic funding needs
 - number of subjects to be tested (sample size)
 - amount of time taken to collect measurements from each subject (considering all follow-up contacts)
 - communication costs (telephone, internet access, fax, postage, copying)
 - equipment costs
 - specialist computer programs, measuring devices, reagents, expertise)
 - data entry & analysis time
 - travel costs to collect data and report on progress
 - report writing time
 - writing the findings up into publications

Calculating the budget



- Get help from your business or research unit
 - most hospitals & universities have fixed costs for researchers at different levels, depending on the type of research
 - understand the recommended salary rate, university levy, oncosts, terms of employment (PT, FT, 12 months, longer etc)
 - make your salary allocations equitable
- NH&MRC/ ARC only funds research officers (not Chief Investigators)
 - no margin for profit making
- Consultancies/ contract research funds all input
 - considerable margin for profit making
 - split between university, school, research centre
- Decide on a 'ball park figure' before you start writing – put your effort into perspective



Step 3

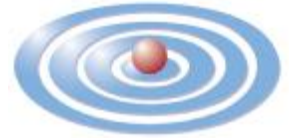
Work out your team

Team composition



- For inexperienced researchers, tack onto the end of a more experienced team for a proposal or two, to see how others do it
- Get to know people whose skills you admire and who you could work with
 - offer to work with them as project officer on an existing grant to see how it is done
- Don't work with people you don't like, unless it is on a specific and defined task in a project
- Don't make research alliances unless there is mutual respect and a long term plan involved
- Don't work in a team that is 'cobbled' together for the sake of the research project
 - It always looks like that to the assessors
- Always be fair – unfair comes back to haunt you!!!

Team composition



- Each person on the team should have a purpose, not just a 'name'
- The role of each team member on the grant is essential
 - relates to the role/ naming of authors on publications
 - who is actually going to do the work?
 - granting bodies are alert for 'all chiefs, no Indians'
- Don't commit to research that you aren't / can't be, part of
 - you may be asked to take over and have no knowledge of what is happening

Subjects



- Subjects are part of your research team
 - you cant do the research without them!!!!
- Who are they?
- How many of them will you need to test?
- What do you already know about them?
 - Location
 - Disease prevalence
 - Confounders / subgroups
 - Potential barriers to participation
 - Potential response to treatment



Step 4

Design your research plan

Design the research to fit the research grant



- If funding is limited, can your research be broken up into smaller answerable step-wise projects?
 - Work your question around the funding requirements
 - Recycle grant ideas – don't waste effort
 - BUT if a funding source / specifications doesn't fit your current interests, don't try to massage your interests into their requirements
 - there will always be something else!

Research designs



- Some research funding schemes support some research designs more than others
 - NH&MRC supports more effectiveness studies (RCTS) than anything else
 - ARC Linkage supports pragmatic RCTs, observational and action research
 - DoHSA supports more pragmatic experimental research, clinical research, action or qualitative research
 - Industry funded research (tenders) support mixed methods and action research linked to industry requirements
 - the method needs to fit the agenda
 - Philanthropic research takes a social justice view of benefit for all, and sustainability
 - the method needs to fit the agenda

Give your research a clear framework



- Any type of investigation on the continuum of research is appropriate as long as
 - Its purpose is clear
 - It is part of a bigger research picture
 - It adds something to the body of knowledge
 - It adds to your track record
 - It flags your interest in an area
 - It makes valued improvements somewhere



To inform & refine measurement

To identify clinical problems

To intervene in a causal path

Qualitative research

Reliability/ validity studies

Experimental research

Basic science research

Quality assurance/ quality improvement studies

Descriptive studies

Observational studies

To understand causality

Performance monitoring



UniSA



Different types of research proposals

Writing for admission to a higher degree



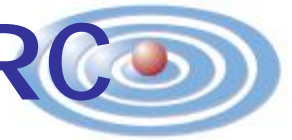
- Demonstrate the gaps in current knowledge that your research will fill
 - Demonstrate your broad knowledge of the relevant literature
 - Demonstrate who will be interested in your 'new' knowledge?
- Demonstrate how you will use your candidature to learn about being a researcher
 - What are your time frames?
 - What skills will you need to acquire and how?
 - How will you end up a better researcher than you started?
 - Consider ethical issues for yourself, subjects, other researchers?
 - Establish your own biases early (particularly clinical)
 - How will your supervisors assist you?
 - What barriers do you anticipate to your timely completion?
 - What range of research methodologies will you use and why?
 - What will your end product look like?
 - Establish any ethical concerns
 - Establish and consider potential conflicts of interest
 - Do you anticipate new findings, corroboration of existing ones, or simply more questions?

Writing for Category 1 (NH&MRC)



- Demonstrate the gaps in current knowledge that your research will fill
 - Demonstrate your specific knowledge of the relevant literature
 - Demonstrate your pilot / preliminary work that informs this research plan
 - Demonstrate how your new knowledge will add to the current 'jigsaw puzzle' of knowledge
- Demonstrate how you will conduct this specific piece of research
 - Justify your choice of methodology
 - Justify your sample and how you will select it
 - Justify your research project acceptability to participants
 - Consider ethical issues
 - Demonstrate no conflict of interest
 - Do you anticipate new findings, or corroboration of existing ones?

Writing for Category 1 (ARC Linkage)



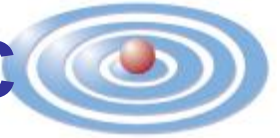
- Demonstrate the gaps in current knowledge that your research will fill with respect to industry
 - Demonstrate your specific knowledge of the relevant literature and current industry activity
 - Demonstrate your pilot / preliminary work that informs this research plan
 - Consider the value of activities undertaken by your industry partner
 - Demonstrate your existing relationships with the industry partner(s)
 - Demonstrate how your new knowledge will add to your industry partners' capacity to do things better with your research
- Demonstrate how you will conduct this specific piece of research
 - Justify your choice of methodology
 - Pure or applied?
 - Justify your sample and how you will select it
 - Justify your industry partner's relationship to your research plan
 - Justify your research project acceptability to participants and industry
 - Consider ethical issues
 - Demonstrate no conflict of interest
 - Do you anticipate new findings, or corroboration of existing ones?
 - Consider how industry will use your findings?

Writing in response to a call for tender (Category 2)



- Demonstrate that you understand what the tenderer wants (even if they don't know themselves)
- Demonstrate your knowledge in the area
 - Demonstrate your specific knowledge of the relevant literature
 - Demonstrate your own work that informs this research
 - Demonstrate your own skills in research
 - Demonstrate your existing relationships with similar tenderers (credibility)
 - Demonstrate how your new knowledge will add to your tenders' capacity to do things better
- Demonstrate how what you propose will provide what the tender wants?
 - Justify your choice of methodology
 - Usually always applied and mixed methods approaches
 - Justify your sample(s) and how you will select them
 - Demonstrate how you will use the tenders' expertise throughout the project
 - Demonstrate how there will be no surprises at the end of the research
 - Justify your research project's acceptability to all participants
 - Consider ethical issues
 - Demonstrate no conflict of interest
 - How will your findings be presented to the tenderer
 - Workshop, paper-based report, internet access report, compendium of information etc?

Writing for philanthropic money



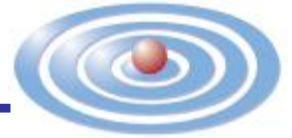
- Demonstrate the greater good that your project provides
 - Value for money
 - Societal good from a small philanthropic outlay
 - Sustainability of impact
- Demonstrate your credibility in being able to carry out what you propose
 - Demonstrate your knowledge in the area
 - Demonstrate your own work that informs this knowledge
 - Demonstrate your own skills in carrying out research
 - Demonstrate your understanding of the purpose of the philanthropic fund
 - Demonstrate how your new knowledge will add to the fund's capacity to meet its audit requirements or shareholders' expectations
- Demonstrate how what you propose will meet the philanthropic fund's requirements
 - Justify your choice of methodology
 - Usually always applied and mixed methods approaches
 - Justify your sample(s) and how you will select them
 - Demonstrate how you will report back to the funder
 - Demonstrate how there will be no surprises at the end of the research
 - Justify your research project's acceptability to all participants
 - Outline the outcome of your project
 - Consider ethical issues
 - Demonstrate no conflict of interest



Step 5

Building the research proposal

Write an abstract first



- One page abstract (summary of why, what, how, when, who, so what) – use it as your guide
 - Background (why)
 - Aim (what)
 - Method (how, when, who)
 - Outcome (so what)



Formal EoI

- Many granting bodies request formal EoI from which to shortlist applications
 - 4-6 pages
- Sell your research idea and your team's capacity to undertake the work
- Limit references, and methods fine detail
- Focus on who will do the work, and the outcomes
 - Novel idea/ approach OR Building on previous work
 - Experienced team with track record &/or
 - Capacity building
 - Leading to further research activities / policy change / better health outcomes



Writing a full proposal

***Focus on how to arrive at the
outcome***

Background



- Provide just enough information to set the scene
 - no more than 25% of the proposal
 - addresses 'why' & 'so what'
 - demonstrate that you know the literature
 - clearly identify the current 'gaps'
 - identify where your research will address the 'gaps', and how
 - demonstrate how your research won't make the same mistakes as other researcher
 - demonstrate how you will add to body of knowledge
 - critically appraise the current body of knowledge as a framework for your argument
 - Previous low hierarchy
 - Previous low methodological quality
 - Variable measures of outcome etc
 - Variable descriptions / applications of interventions or exposures

Aim / Objective / Goal



- Addresses 'what'
- Use the terms & definitions that make sense to you, and make sure the readers understand this
- What are you actually intending to do?
 - Justify/ define every term / measure
- Define your stakeholders
- Define your outcome measures and why you have chosen them
 - take this from your background
- Don't waffle

Significance and outcomes



- Should comprise 10% proposal
- Considers 'who' will benefit from your research, 'how' they will benefit, and 'so what'?
- What will the outcomes of research look like?
 - Findings and their implications, not number of publications!!!
- If new findings or corroboration of existing findings for different patient subgroups
 - How will the findings be disseminated?
 - Who might be interested in your findings?
 - How can you involve these players along the way?
 - How can your research be progressed?
 - Establish a network of stakeholders to assist the research processes (reference group, steering committee etc)

Methods



- Should comprise 50+% of the proposal
- Addresses practicalities [**who, how, when, how many, where, how often, by whom**]
- Research question
 - Link your aims/ objectives / goals with your research question
 - Aim etc: to test the effectiveness of intervention X for condition Y
 - Research question: Considering condition Y, is Intervention X more effective in reducing pain and increasing range of movement than a CONTROL?
 - Be brave, use an alternative hypothesis - Intervention X is twice as effective as a CONTROL intervention for condition Y, using pain and range of movement as outcomes
- Research design type(s)
 - link this with your research question(s) (see next slides)
 - find critical appraisal instruments for your chosen design type(s) and make sure you address all relevant critical appraisal criteria in your proposal
 - if using mixed methods, explain why, and what each research approach will add to the overall proposal
 - be similarly thorough about how you will undertake each element of a mixed methods approach

Questions becoming research designs



- Systematically looking at the findings of many studies
- Test the effect of
- Test an association between...
- Describe the prevalence of...
- Describe the outcome of care..
- Meta-analysis or systematic descriptive synthesis
- Experimental
- Observational
- Descriptive
- Quality assurance

Intervention

Experimental study

What is the effect of?.....

Before measurement

Intervention

After measurement

**Effect = difference
between before and
after measurement**

No intervention



Observational study

What is the association
between?....

Once only measure
of cause and effect

**Association =
correlation
between cause
and effect**

Experiment

intervention

prospective

baseline

post Rx

Observation

retrospective

exposure

disease

cross-sectional

exposure

disease



Experiment



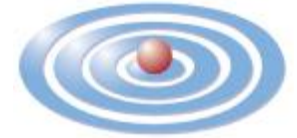
- Deliberate prospective intervention into a patient's treatment, behaviour or environment
 - Requires a control (no intervention other than the passage of time, or a known effect intervention) to provide defensible baseline information
 - Confounding effects (biases) reduced by:
 - Random selection of the sample from a known population
 - Random allocation of the sample to treatment arms
 - Blinded participants
 - Measurer
 - Subject
 - Therapist

Essential quality elements



- Repeatable descriptions of
 - How sample was selected
 - How treatment groups were allocated
 - Baseline characteristics of sample including
 - Measures of outcome relevant to all stakeholders
 - Valid, sensitive, reliable
 - Interventions applied to each Rx group
 - Potential for controlling bias by allocation to groups
 - Likely confounders
 - Number of drop-outs and loss to follow-up

Observational studies (Epidemiology)



- Observation of natural events or subject choices related to disease outcomes
 - Requires
 - Binary data describing disease outcome, exposure and potential confounders
 - Clear cause and effect hypothesis
 - Time period of observation
 - Biases reduced by
 - Random sample selection from known population
 - Blinded participants in hypothesised causal model
 - Measurers
 - Subjects



Essential quality elements

- Repeatable descriptions of
 - How sample was selected
 - How disease, exposure and confounders were measured and classified
 - Valid, sensitive, reliable
 - Time period of study
 - Numbers lost to follow-up
 - Potential for controlling bias by analysis

Methods



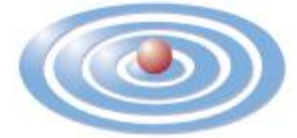
- Subjects
 - how many? (show a standard sample size calculation using an estimated effect size, not a guess)
 - where will subjects come from (external generalisability)
 - how will you choose them?
 - Consider the pragmatics of recruiting subjects
 - likely refusal rate and why
 - incentives??
- Measures
 - use existing valid measuring instruments
 - Provide references, or examples of these, in the proposal
 - Link your choice(s) back to the background information (what others have done)
 - demonstrate how you will undertake your statistical analysis (Stats package, expert statistical help, p value/ confidence intervals rec)
 - demonstrate how you will interpret the findings in terms of your research question and aims

Methods

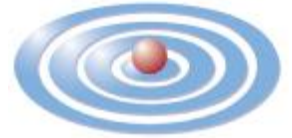


- Write your ethics application at the same time as your research proposal
 - Ethics applications force you to consider
 - Ethical implications of your chosen design
 - Subject recruitment, refusals, retention, follow-up
 - Assurances of confidentiality
 - Possible patient coercion and safety
 - Researcher safety
 - Data collection issues
 - Data ownership and access
 - Data storage issues
 - Production of research reports and authorship

Deliverables



- No more than 5% of proposal 'so what'
- Linked to significance and outcomes
- Linked to research proposal & funding mechanisms
 - Higher degree research ► thesis & publications
 - NH&MRC ► publications and other research grants
 - ARC ► publications, industry application, other research grants
 - Consultancies / tenders ► happy industry customers, policy change, applied knowledge
 - Philanthropy ► demonstrable community good, publications, more applied research



Background

Identifies gaps in current knowledge and/ or processes

Aims related to gaps

Significance related to Aims

Research questions related to Aims

Deliverables related to significance & research questions

Methods related to research questions & deliverables

Outcomes related to Aims

Take home messages



- Good proposals present a clear, easy to read & believable picture of
 - what you want to do
 - why you want to do it
 - who has done something similar before and why you need to add to it
 - how you are going to do it
 - who is going to help you do it
 - what it is going to cost and why
 - what benefits will come out of it
 - how this proposed research project will lead on to other activities