

## Choosing a suitable research project

### 3.1. Factors that stimulate research projects

There are many factors that may give rise to a medical research project. It is convenient to consider these in two categories:

#### GENERAL FACTORS

Most medical research starts with a question or a practical problem for which there is no available answer. These questions or problems may arise from several different sources, including:

- A matter that is topical in the media or national / international research community
- An intellectual challenge
- An area perceived to be important to healthcare
- An area of practice, which has been identified as in need of improvement
- Follow-on from previous research observations or findings
- A priority area identified by government or funding agencies, including research charities

There are different ways to address research questions. For example, the following types of investigation may be prompted by the research question or problem:

- The need to identify the cause of a condition or phenomenon
- The desire to test a hypothesis derived from sound principles
- The development of methodology that will improve the outcome of investigation
- The adoption of improved practices in healthcare

In the context of laboratory medicine the research questions or practical problems centre on trying to improve the quality and/or the clinical relevance of laboratory medicine to patient investigation and care. As Chapter 2 has explained research projects often involve

- Learning more about the pathophysiology of disease
- Developing new methods to aid the diagnosis, prognosis and therapy of individuals
- Identifying patterns of disease and suggesting reasons for those patterns
- Comparing methods or treatment regimens to improve clinical outcomes
- Translating research findings into improved clinical practice

#### PERSONAL FACTORS

It may be a daunting task for the new researcher to assimilate all of the general factors listed above. Therefore, he/she should consider whether personal factors or interests may help to refine their choice of project. A research project which has strong personal appeal to the researcher is likely to cause him/her to be more motivated and committed to seeing it to a successful conclusion. Personal factors that may influence choice include areas:

- Of interest derived from family or personal experience
- Of local significance or interest
- Identified from reading literature or scientific media
- Suggested by peers and/or the local research team
- Suggested by users of the local laboratory medicine service

Having identified one or more potential topics of personal interest the researcher should ensure that the outline topic can comply with two key considerations:

**Simplicity:** The ideal research project addresses a clear question in such a way that the researcher knows when he/she has obtained an answer to that question. It is a common mistake to make research projects and proposals too complex or too open-ended in order to impress others. Simplicity of design is a major factor in predicting likely success.

**Flexibility:** A research project may be simple in design but it should not be so narrow that a single setback can derail it completely. Research rarely follows a smooth and predictable path. A degree of flexibility will be required in all research. That flexibility is best directed in terms of different ways to answer the fundamental research question or problem'

Preparation of an outline research plan is a valuable next step as this may be applied to address whether the identified project is important and practicable.

### 3.2. Importance of the research project

It is easy to make the general statement that all research is important because it adds to the body of scientific knowledge and because it helps the personal development of the researcher. However, the reality is that modern research is conducted in a highly competitive environment. Therefore research projects are likely to be assessed by peers and by funding institutions in terms of their ability to answer two related questions about the importance of the research:

#### IS THE RESEARCH WORTH DOING?

**Nature of research:** The nature of the research proposed to answer the question or problem is a major factor in assessing importance. Therefore, research that is based on testing a new hypothesis derived from earlier findings is likely to be assessed as more important than a 'fishing' research project that measures lots of parameters in the hope that something 'may turn up'.

**Originality:** Research originality may lie in the scientific underpinning of the research project and/or in the methodology that is employed to address the research question or problem. A truly original research project will usually be considered more important than 'me too' research that reproduces already published research findings. However, if the clinical relevance is high then there is value (and importance) in confirming research findings and or adding to the weight of research that may help to change clinical practice. In the international arena confirming research findings in a local population may be important in that locality, although less so to an international audience.

**Clinical relevance:** In laboratory medicine even basic research should be designed to obtain knowledge or to develop methods that have a clinical context. In clinical and epidemiological research the clinical relevance should be increasingly clear and in translational research the main focus of the research is putting research findings into clinical practice. There is an interesting debate about relative importance of different clinical research. From the perspective of society and health administration research into major diseases such as diabetes and cancer will always be considered important. On the other hand the individual patient with a rare genetic disorder will have a different assessment of clinical relevance. In reality clinical relevance may often be determined by local priorities or the source of funding for the research.

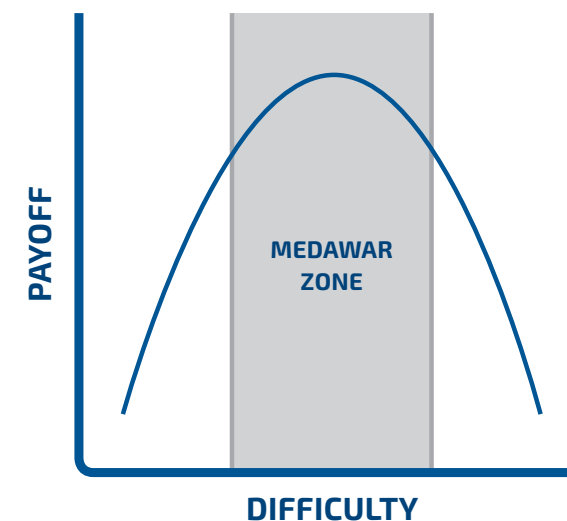
#### WHAT IS THE LIKELY IMPACT OF THE RESEARCH?

Research is often unpredictable. Therefore, it is difficult to assess the likely impact of a research project with great confidence. It is normal practice to take an optimistic view about the proposed research and in such circumstances the likely impact may be assessed by addressing the following four supporting questions:

- Will the research move forward knowledge and understanding?
- What specific outcomes is the research likely to deliver?
- Who will benefit from the research?
- Is the research like to improve clinical practice?

A convenient tool for assessing the importance of a research project is to consider where it may fit in relation to the Medawar Zone (Figure 3.1). This zone is named after Peter Medawar, a Nobel prize-winning medical researcher who was active from the 1940s to the 1960s, who suggested that there seems to be a certain time when scientific questions are ripe for answering, whereas other questions remain elusive and out-of-reach from investigation. Although it is a qualitative and subjective concept any research project may be assessed in terms of its likely payoff (impact) against the difficulty involved in performing the research. This simple tool may help to answer the question 'is the research worth doing'?

Figure 3.1. | A simple classification of pathology and laboratory medicine



### 3.3. Practicability of the research project

Having designed a high quality personal research project that is assessed to be important the final area to be addressed is practicability. In other words 'is it possible for me to perform this research project in my current role'? There are four considerations in addressing practicability:

#### FACILITIES

The facilities required to undertake a successful research project in laboratory medicine include:

- The fabric, utility services and access to the laboratory in which the research will be performed
- The availability of clinical material (e.g. specimens from or patients of defined clinical status)
- The scientific and computing equipment required to undertake the research together with protected research time to use that equipment
- The availability of appropriate consumables

#### PERSONNEL

Modern research is increasingly collaborative in nature. In order for research to be successful it is necessary to have personnel support in a number of areas:

- A director or head of department who has created a research ethos and environment
- Peers with similar research interests who can be involved in detailed discussion
- Clinical colleagues who will support the research, including the provision of appropriate clinical material
- Skilled technologists and informatics experts who can support specific components of the research

#### PERMISSION

Modern research often requires one or more forms of permission or authorisation, including:

- Agreement in advance from all research collaborators to participate as specified
- Ethical permission from the local, and maybe the national, ethics committee
- Informed consent from patients or volunteers who will participate in the research
- Licences to work with animals, radioactivity or infectious materials

#### FINANCE

Research funding support is often the stumbling block to undertaking a research project. This topic is addressed in detail in Chapter 6. All research requires funding and it is normally a condition of support from collaborators that their contribution to the research will be funded adequately. Finance is required to support one or more of the following research areas:

- The salary and 'on costs' of employing the researcher and/or research technical support
- The cost of consumables
- The cost of hiring specialised equipment or facilities, including informatics
- The capital cost of any equipment that may not be available
- The cost of obtaining suitable clinical material (e.g. reimbursing expenses for volunteers)
- Overheads for the research institution and for allowing for attendance at meetings and conferences

### 3.4. Research supervision and mentoring

All researchers will require support to help them deliver a successful outcome to their research. This support can be provided either as supervision or as mentoring. Depending on the stage of their career individual researchers will require a different balance between these two forms of support. Individuals who are new to research will require substantial supervision while established researchers running their own programmes will benefit most from mentoring. There is no fixed relationship between supervision and mentoring and since the needs of a researcher will change over time it is possible for one person to act first as a supervisor and later as a mentor.

#### SUPERVISION

The supervision of research students is essential for a successful outcome. It comprises a process of fostering and enhancing learning, research and communication by the student with the aim of achieving research quality, effectiveness and productivity. An effective research supervisor encourages inquiry by the student, explores and challenges ideas and provides resources (intellectual and financial). The supervisor gains from the relationship by advancing his/her own knowledge, learning and reputation. Although the traditional model is of a 1:1 relationship between student and supervisor other models are also common.

The research supervisor is usually an experienced researcher who is expert in the

specific area of the research project. Commonly, the supervisor has contributed to the design of the research project, obtained funding for it and provides the facilities to enable the project to proceed. Under these circumstances the supervisor may select the research student, manage research, monitor research and ensure that it is evaluated and reported.

The dynamics between a researcher and his/her supervisor are crucial to a productive relationship and both parties should consider if a harmonious partnership is likely to develop. For both parties this is a key component of choosing a research project.

### MENTORING

One definition of mentoring is 'a dynamic reciprocal relationship environment between an advanced career researcher (mentor) and a less experienced individual (mentee), aimed at promoting the development of both.' The relationship is not as closely linked as supervision and the mentor focuses more on supporting the mentee researcher than on the fine detail of the research project. Therefore, the mentor in laboratory medicine need not be expert in the specifics of an individual project though he/she will need to understand the research and clinical context. Table 3.1 shows the characteristics of a successful relationship.

**Table 3.1. | The characteristics of a successful mentor: mentee relationship**

| CHARACTERISTICS OF A SUCCESSFUL MENTOR: MENTEE RELATIONSHIP              |                                                                                  |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Mentor                                                                   | Mentee                                                                           |
| Interest in serving as a mentor                                          | Definition of the support and help needed                                        |
| Flexibility to make a definite commitment of time and effort             | Recognition that one mentor may not meet all your mentoring needs                |
| Ability to recognise and support the needs of the mentee                 | Recognition that your needs for mentoring change over time                       |
| Knowledge and experience in the area in which you are acting as a mentor | Ability to accept and commitment to work through meaningful advice and criticism |

Academic and research institutes appreciate the value of mentoring as a contributor to high quality research outputs. It is not an easy relationship and training in mentoring and coaching is now widely available.

### 3.5. References

Loehle, C. 1990. A guide to increased creativity in research inspiration or perspiration? *BioScience* 1990; 40:123-129

Cohen L, Manion L, Morrison K. *Research methods in education*. 7<sup>th</sup> Edition, 2011, Routledge, ISBN-13: 978-0415583367

Medical Sciences Board. Code of practice for supervisors. Radcliffe Department of Medicine, University of Oxford, UK. [www.rdm.ox.ac.uk/code-of-practice-for-supervisors](http://www.rdm.ox.ac.uk/code-of-practice-for-supervisors)

Bettmann M. Choosing a research project and a research mentor. *Circulation* 2009; 119: 1832-35