

Introduction to the research guide

"Science is composed of aggregated facts from which one can create general laws and conclusions"

Charles Darwin

1.1. Introduction

The aim of this publication is to provide insight into the research process and an overview of the strengths and weaknesses of different research methods to young scientists at various levels of their profession and career. This book is 'nectar' of the vast experience of well renowned scientists and senior members of leading healthcare organisations sharing their overall vision related to research methodology.

The contents of the Guide are divided into a total ten chapters including this introduction. The titles are well designed and elaborated from "Why is research in laboratory medicine Important?" to "Auditing of research and planning for the future".

The publication provides answers to the following questions:

- What is research and its methodology?
- How it is submitted and what requirements are essential?
- How is research evaluation organised and practised?
- What are the various ways of presenting research findings?
- How should research be audited to plan for the future?

The target audience is Young scientists; Laboratorians; Clinical chemists; and Pathologists together with any others at an early stage of research in laboratory medicine.

1.2. The IFCC-Task Force for Young Scientists (TF-YS)

The International Federation of Clinical Chemistry & Laboratory Medicine (IFCC) constituted its Task Force for Young Scientists (TF-YS) in 2010. The specific objectives

of TF-YS are networking; training; participation; and multidisciplinary exchanges. The method of operation of TF-YS includes organising educational sessions in different congresses of IFCC and its Member Societies; addressing the perspectives and principles of Laboratory Management and Leadership; and other activities such as interviews, surveys, trainings, mentorship and publications. Thus, TF-YS is devoted to preparing young scientists for their future careers in Laboratory Medicine and healthcare practices.

The suggestion of preparing this Guide arose from the discussion following a TF-YS symposium entitled 'Research design and methodology – identification of need', which was held in Jodhpur, India in December 2014.

1.3. The need for "A guide to conducting research in laboratory medicine"

Research means "a careful investigation or inquiry especially through search for new facts in any branch of knowledge." The purpose of research is to discover answers to questions through the application of scientific procedures to find out the truth which is hidden and which has not yet been discovered. There are numerous reasons to conduct research, including:

- To provide answers to practical problems
- To provide a service to society (and patients in the case of medical research)
- To do some creative work and challenge yourself
- To attain respectability with peers in your profession
- To comply with educational curricula, directives and requirements
- To gain a research degree along with its consequential benefits
- To improve future employment prospects

Research underpins the basis for many government policies in our economic system as a means to improve the standard of living for society. In the case of medical research the benefits are aimed at improving the health of individual patients and the overall wellbeing of society. Medical research can be classified into two main categories:

- Primary research (basic, clinical, and epidemiological)
- Secondary research (meta-analysis and review).

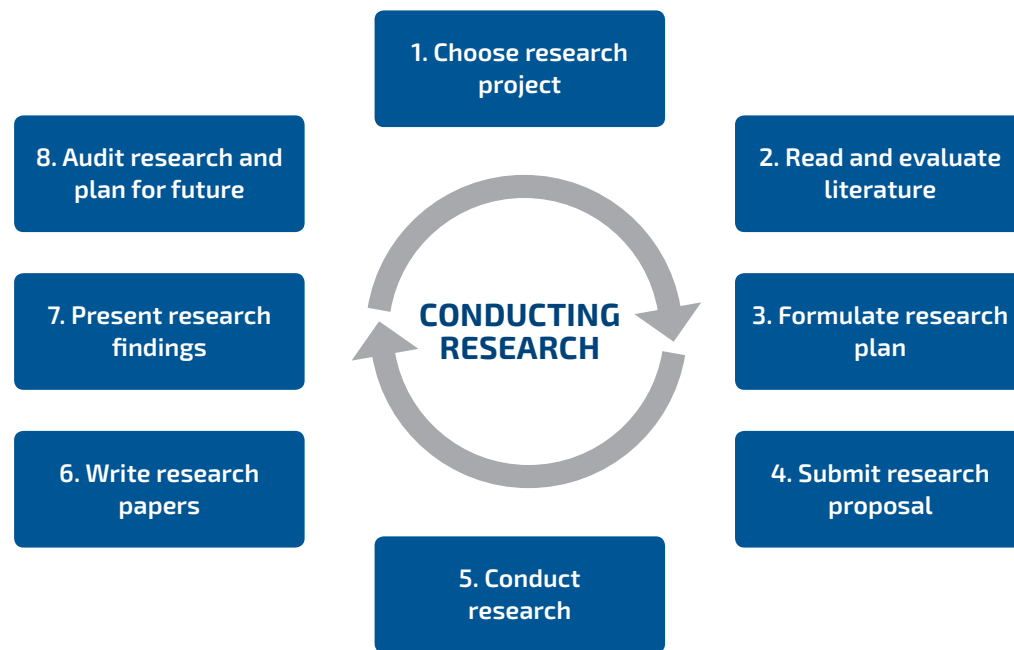
1.4. Conducting research

Conducting research comprises a series of logical sequential steps:

- Define the research problem and choose a research project
- Read and evaluate the literature to discover what is known
- Formulate a hypothesis leading to a research plan
- Submit the research proposal for critical appraisal and possible funding support
- Conduct the research including data collection, testing hypothesis and reaching conclusions by analysing and evaluating the data
- Write research papers to share findings with the scientific community
- Present research findings through oral or poster presentations in scientific meetings
- Audit the outcome of the research and plan for the future

This series of steps may be consider as a cycle (Figure 1.1) since the outcome of the final step will often prompt a further research question.

Figure 1.1. | Conducting research



1.5. Expected outcomes from the guide

This guide will provide the new researcher with an understanding of the major types of medical research and provide a basis for designing a research study. By careful reading of the guide, students may understand the research process including:

- The identification of a suitable research topic
- Specifying the research purpose
- Searching the literature
- Preparing a research proposal, including assessment criteria and associated timelines
- Conducting the research
- Evaluating data and drawing conclusions to answer research questions.
- Preparing a final research report,

In summary, by following this guide young scientists should be in a position to prepare a high quality research proposal.