



FACULTY OF GENERAL DENTAL PRACTICE (UK)
THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

RESEARCH COMPETENCIES FRAMEWORK

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FOREWORD

Prior to reading the Faculty's *Research Competencies* document, it is important to understand what research competencies are, the reasons why the document has been produced, and its objectives.

What are research competencies?

For any particular clinical or research topic, three levels of learning outcomes have been described. They are:

Be familiar with: At this level there is a basic understanding but little or no practical experience (I have read about it).

Have knowledge of: At this level there is a sound theoretical knowledge but limited practical experience (I have read about it and understand it).

Be competent at: At this level there is sound theoretical knowledge and understanding of the topic, together with sufficient practical experience to be able to complete/carry out the task concerned independently and without assistance (I have read about it, understand it and can do it consistently to a satisfactory standard).

A research competency is a description of this third level and specifies the knowledge and skills required. It does not describe how they may be acquired, although it is useful to provide this information in a competency document. However, it should be borne in mind that there are usually many ways in which a specific competency can be acquired.

Why has the Faculty produced a Research Competencies document?

The Faculty's position is that all clinical procedures should be informed by the best available scientific research. Unfortunately, at present, there is little research evidence to support most clinical practice in oral healthcare, and many clinicians are unable to critically appraise research reports and other relevant literature. There is thus a need to ensure that in the future all Faculty members (and all other oral healthcare providers) should be competent in critical appraisal of the scientific literature relevant to their practice, and that some will have the ability to carry out research in primary care settings, such as their practices. As a first step it is essential to describe the knowledge and skills that they require to be competent in the topics relevant to research in primary oral healthcare, including critical appraisal.

Apart from providing a description of competencies in the range of research skills relevant to oral healthcare, the document also suggests how they may be acquired. A number of suitable training courses and web-based resources exist to help Faculty members to acquire research competencies. They will need to be quality-assessed by the Faculty. This process will be informed by the competencies document as the desired training outcomes for each competency are set out. The document therefore provides a list of standards against which courses and training material can be assessed.

What are the objectives of the Research Competencies document?

The objectives are to:

- Describe the competencies (knowledge, skills and learning outcomes) required in the different aspects of research relevant to primary oral healthcare.
- List suggested learning and assessment methods relevant to each competency.
- List existing Faculty training material and references relevant to the competencies.
- Demonstrate that the Faculty has an ongoing commitment to the development of evidence-informed primary oral healthcare, and to research in this area.

Footnote

It is important to understand that the descriptions will evolve with time, and will need periodic review and updating.

A handwritten signature in black ink, appearing to read 'Crawford Gray', written over a horizontal line.

Dr Crawford Gray
Chair
FGDP(UK) Research Committee

EXECUTIVE SUMMARY

This document details the approach to and content of a competency-based framework for research for use within the Faculty of General Dental Practice (UK) (FGDP[UK]). Two appendices, which illustrate and develop different aspects of the application of the competencies described in this document, follow the body of the document.

Although they may not necessarily have undertaken a research project, in an era of evidence-informed dentistry, individuals who aspire to complete the Faculty's Career Pathway should have an understanding of the processes involved in research and be able to critically appraise the science that underpins their practice. It is also suggested that in future, Divisional Research Contacts (formerly known as Divisional Research Co-ordinators) or individuals supporting research for or with the FGDP(UK) should be able to demonstrate the competencies described in this document that are relevant to their roles and employment.

The framework for the research competencies detailed in this document is based on an evolutionary model. Many individuals entering the Career Pathway will have previously acquired a range of competencies at varying levels. Therefore the initial step involves mapping an individual's existing competencies against those defined in this document for a particular function. Many will not seek, or indeed need, to acquire all the research competencies listed in this document while they undertake the Career Pathway. However, as mentioned above, they should all be able to understand the processes involved in research and be able to critically appraise the science that underpins their practice.

The competencies have been grouped into five domains. They are:

- Practical skills
- Problem-solving, thinking and communication skills
- Personal attitudes and professional ethics
- Dissemination
- Roles and functions

The rationale for the selection of these topics is based on the logical process of the scientific method, namely the identification of a problem; the formation of a hypothesis; deductive reasoning, data collection and analysis; and the derivation of a conclusion. The concepts of structure, process and outcome to complete the scientific method and the adoption of current good practice are also included in the domains.

The competencies form a curriculum that should be used both to identify the target audience and its training requirements, and to specify how such training may be delivered. These competencies (for research and dissemination) will, in part, be common with other existing competencies within the career pathway. They should be monitored and updated as the science and practice of care evolves.

1. INTRODUCTION

- 1.1 This document details the approach to and content of a competency-based framework for use within the FGDP(UK).
- 1.2 Three further sections and two appendices follow this introduction.
- The first section gives a brief outline of the principles of competency development.
 - The second sets out the competencies and gives examples of the knowledge and skills in which individuals will be expected to be proficient. Some of these competencies are transferable to other aspects of practice, including audit and management.
 - The third provides a summary.
 - Appendix 1 maps the competencies in a series of tables.
 - Appendix 2 gives an example of a possible pathway to acquire relevant competencies for research in primary dental care.
- 1.3 It is accepted that although individuals may not necessarily have undertaken a research project, in an era of evidence-informed dentistry, those who aspire to complete the Faculty's Career Pathway should have an understanding of the processes involved in research and be able to critically appraise the science that underpins their practice. It is also suggested that into the future Divisional Research Contacts should be able to demonstrate the relevant competencies which will enable them to fulfil their role.
- 1.4 The FGDP(UK) has produced supporting material, in the form of leaflets, to help individuals, employing organisations and those planning education programmes. These research leaflets can be found at <http://www.fgdp.org.uk/research/downloads.html>.
- 1.5 It should be stressed that this document does not include detailed lists of specific skills, such as the ability to perform specific statistical tests. These details have to be tailored to the requirements of individual researchers. Furthermore, it does not set out a detailed curriculum. To do so would mean that it would rapidly become out of date. Instead, it provides guidance on the generic skills required to undertake research, and suggests training activities that can enable its readers to acquire the particular mix of competencies to match their individual requirements.

2. PRINCIPLES UNDERPINNING THE DEVELOPMENT OF COMPETENCIES

The principles underpinning competency development are common to all areas of training within the FGDP(UK). They are that:

- Competencies can be acquired through multiple means. Knowledge alone is unlikely to allow an individual to achieve competency. Other experiences that complement training should reinforce the acquisition of competencies.
- A single curriculum is unnecessary to define the acquisition of competencies. Individuals will have experienced opportunities that are unique, and the programme to help them achieve competencies should be tailored to their specific needs.
- Those involved in the development of curricula should identify the target audience and level of competence to be achieved on completion of training. These should be specified in a training contract.
- The competencies for research will in part be common with other existing competencies developed for adoption within the Career Pathway.
- The competency framework should be monitored and updated as the science and practice of dental care evolves.
- The competency framework should deal with generic research skills and not prescribe detailed “packages”. Such “packages” must be tailored to meet the individual needs of each researcher.

3. FRAMEWORK OF RESEARCH COMPETENCIES

- 3.1 The basis for the framework for the research competencies utilises an evolutionary model. An individual entering the Career Pathway will previously have acquired a range of competencies of varying levels, some of which have relevance to research. The initial phase is therefore to map the individual's existing competencies against those defined in the curriculum of competencies for research, and then identify those that may need to be developed.
- 3.2 Individuals will have acquired some competencies during their undergraduate dental studies. The framework is designed to help them identify, and where necessary achieve, a higher level of competence in some areas, and/or acquire new competencies in other areas.
- 3.3 Within the framework its five domains cover aspects relevant to research. Each domain is sub-divided into more specific areas of competence. A description is given of the training activities that can be undertaken to enable individuals to achieve each competency. At the end of the description, there are cross-references to the relevant research leaflets that the FGDP(UK) has produced, and to other materials.
- 3.4 In future, within health and oral healthcare, it is expected that an employer will identify the areas and levels of competency that any prospective employee will require, to ensure that they can meet the requirements of the job/post concerned. In an era of evidence-informed practice, all those working in healthcare will require some of the competencies identified within this paper.
- 3.5 The competencies have been grouped into five domains. They are:
- Practical skills
 - Problem-solving, thinking and communication skills
 - Personal attitudes and professional ethics
 - Dissemination
 - Roles and functions

The rationale for the selection of these topics is based on three concepts. The first is the logical process of the scientific method, namely the identification of a problem; the formation of a hypothesis; deductive reasoning, data collection and analysis; and the derivation of a conclusion. The second is the utilisation of a framework using the concepts of structure, process and outcome to complete the scientific method and the adoption of current good practice. The third is the importance of dissemination, and the skills required to write a research paper.

3.6 DOMAIN A: PRACTICAL SKILLS

This domain is divided into five competencies. They are:

- Find and use resources
- Use library and information technology effectively
- Recognise and know when to use primary and secondary resources
- Observe and record behaviour
- Demonstrate basic computer competency

A1: Find and use resources

All projects have resource implications. The individual responsible for overseeing or advising a research project should be able to make an assessment of, and provide guidance on, the financial, personnel and time resources required to complete the proposed project. In addition, the individual should have knowledge of the potential sources for funding any project and be able to identify the appropriateness of the sources.

An individual should be able to develop a research plan appropriate to the investigative method(s) to be used. They should be aware of and be able to identify keywords, synonyms and related terms for the information needed. The individual should be able to identify resources using controlled vocabulary specific to the discipline or information retrieval source, and construct a search strategy using appropriate commands for the information retrieval system selected: for example, Boolean operators, truncation, and proximity for search engines. They should be able to implement a search strategy employing various information retrieval systems via different user interfaces and search engines, with different command languages, protocols, and search parameters using investigative protocols appropriate to the discipline.

Suggested learning and assessment methods

- Guided demonstrations
- Specific search tasks
- General search tasks
- Validated self-assessment

Further reading

FGDP(UK) research leaflets:

- [Ethical Considerations](#) (formerly titled "General Considerations")
- [Practical Issues in Conducting Research](#)
- [Introduction to Grantsmanship](#)

Reference

Cleary M, Freeman A. Facilitating research within clinical settings: the development of a beginner's guide. *Int J Ment Health Nurs* 2005;14:202-8.

A2: Use library and information technology effectively

The foundation for any research project is the completion of a review of the current literature. In order to develop the review an individual should understand why it is important and why it is needed. They should either know how to access, store, critique and synthesize the literature, or be able to direct researchers to individuals with the capabilities to undertake such a review. This competency will include the critical appraisal element of the MFGDP(UK). Individuals should be aware of, and able to demonstrate the ability to access, the main databases of completed and validated reviews, such as Medline.

An individual should be able to select the most appropriate investigative methods or information retrieval systems for accessing the required information, either by constructing and implementing well-designed search strategies to retrieve information online, or in person, using a variety of methods. They should be able to refine the search strategy if necessary and subsequently extract, record, and manage the information collected, including the sources.

Suggested learning and assessment methods

- Guided demonstrations
- Discussion and feedback from a supervisor
- Validated self-assessment

Further reading

FGDP(UK) research leaflet:

- Accessing the Literature

References

Doig GS, Simpson F. Efficient literature searching: a core skill for the practice of evidence-based medicine. *Intensive Care Med* 2003;29:2119-27.

Magarey A, Veale B, Rogers W. A guide to undertaking a literature review. *Aust Fam Physician* 2001;30:1013-15.

A3: Recognise and know when to use primary and secondary resources

Data can be obtained from either primary or secondary sources. The former provides original data containing first-hand knowledge about the subject; the latter a commentary on, or analysis of, a primary source. A researcher should be able to classify and distinguish between the data sources, as well as recognising the strengths and limitations of the two categories.

An individual should demonstrate a detailed knowledge and clear understanding of the range of ideas, issues and information through logically structured narratives, description and arguments that relate to the research area concerned. They should be able to describe the concepts and terms

used in the analysis and interpretation of data relating to the research area concerned, and be able to develop explanations for the complexity of differing interpretations, based upon the source material. The individual should be able to show awareness of the effect of values and perspectives or viewpoints on the interpretation of the data, and recognise the strengths and weaknesses of research evidence used, particularly in terms of deficiencies and bias.

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflet:

- [How to Review the Literature](#)

Greenhalgh T. How to Read a Paper – the basics of evidence-based medicine (Third Edition). Oxford: Blackwell Publishing, 2006.

References

Sutherland SE, Matthews DC. Conducting systematic reviews and creating clinical practice guidelines in dentistry: lessons learned. J Am Dent Assoc 2004;135:747-53.

Needleman IG. A guide to systematic reviews. J Clin Perio 2002;29 (Suppl 3):6-9.

A4: Observe and record behaviour

A researcher should appreciate and be able to articulate the differences between direct and indirect observation, and the various methods that can be used to gather data about behavior. A researcher should understand the difference between descriptive, inferential, and evaluative observations.

A researcher should be able to demonstrate awareness of differing techniques and instruments to observe and record individual and population behaviors in an objective manner. They should show awareness of the issues surrounding bias, and be able to develop solutions to overcome them. Where no instruments exist, the individual should be able to construct one and be able to argue its strengths and weaknesses.

Suggested learning and assessment methods

- Implementing research proposal
- Discussion and feedback from a supervisor

- Peer discussion and feedback
- Support and feedback from research interest groups
- Attendance at appropriate meetings
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries and progress reports

Further reading

FGDP(UK) research leaflets:

- [Data Collection](#)
- [Practical Issues in Conducting Research](#)
- [Questionnaires](#)

References

Davies C, Collins R. Balancing potential risks and benefits of using confidential data. *BMJ*;333:349-51.

Coleman T. Using video-recorded consultations for research in primary care: advantages and limitations. *Fam Pract* 2000;17:422-27.

A5: Demonstrate basic computer competency

To enable research to be conducted effectively and efficiently, an individual should be able to use a computer to carry out tasks commonly associated with research. These include: understanding and recognising the differences between files and folders, and the different types of the former; accessing the internet; using database and word processing packages and emailing software.

To demonstrate basic computer literacy, individuals should be able to initiate a file, operate word processing software, understand how to gain access to the web, and demonstrate command of the basic skills needed to perform simple online data retrieval and manipulative operations in key statistical packages.

Suggested learning and assessment methods

- Taught course on use of statistical software and use of statistics
- Guided demonstrations
- Completion of database and statistical tasks
- Use of these programmes to process and write up the research outcomes
- Validated self-assessment
- Ongoing supervisor assessment
- Successful application of analysis and production software

Reference / suggested qualification

European Computer Driving Licence (see <http://www.bcs.org> for more information).

3.7 DOMAIN B: PROBLEM-SOLVING, THINKING, AND COMMUNICATION SKILLS

This domain is divided into five competencies that deal with the individual's ability to critique, communicate, and identify shortfalls in existing information. They are the ability to:

- Understand the difference between subjective and objective information
- Recognise when information provided is sufficient
- Evaluate when the basis for conclusions is laid out completely and clearly
- Generate research questions by recognising gaps in knowledge
- Use oral and written communication to express ideas effectively

B1: Understand the difference between subjective and objective information

Objective information consists of complete, valid, unbiased or balanced data, whereas subjective information is biased and either provides an incomplete picture or merely a viewpoint or opinion. A researcher should be able to appreciate the differences, and to define criteria that could be used to distinguish between the two.

An individual should be able to identify, distinguish and critique the differences in the qualities of various sources of data. They should be aware of and understand the strengths and weaknesses of the classifications used to rank scientific journals.

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [How to Review the Literature](#)
- [Data Collection](#)
- [Questionnaires](#)

Reference

Trochim, W. *The Research Methods Knowledge Base* (Second Edition). Mason: Atomic Dog Publishing, 2001. ISBN: 1-59260-291-6

B2: Recognise when information provided is sufficient and when it is not

Research relies upon the laws of probability to determine the extent to which observed occurrences arise through chance or not. The processes involved in any analyses rely upon the null hypothesis, and consequently, proof is always limited. The researcher should be able to articulate why the level of proof has been determined to be sufficient (which will vary according to circumstances), and how this can be assessed using statistical methods.

An individual should be able to demonstrate an understanding of the concepts of probability and interpret the results of basic statistical tests. They should be able to conduct simple data analyses using appropriate methods using common statistical software packages. They should also appreciate the need to seek statistical advice at an early stage when planning a research project and whilst developing a research protocol.

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [Statistics for Research](#)
- [Introduction to Statistics](#)
- [Testing for Statistical Significance](#)
- [Designing a Protocol](#)

Reference

Juni P, Altman DG, Egger M. Systematic reviews in healthcare: Assessing the quality of controlled clinical trials. *BMJ* 2001;323:42-46.

B3: Evaluate whether or not the basis for conclusions is laid out completely and clearly

A researcher should be able to identify and articulate whether or not any conclusions drawn from analyses of data are valid and based on the material provided. Where shortfalls exist, the individual should be able to identify the rationale for the shortcomings.

An individual should be able to describe the terms internal, construct and external validity. They should be able to provide an understanding of the issues surrounding reliability and statistical power. They should be able to assess the extent to which any conclusions are applicable, given the presentation and analysis of data used to support the argument(s).

Suggested learning and assessment methods

- Taught course
- Reading and interpreting research publications
- Discussion and feedback
- Peer discussion
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [Sampling](#)
- [Testing for Statistical Significance](#)

Reference

Lohr KN. Rating the strength of scientific evidence: relevance for quality improvement programs. *Int J Qual Healthcare* 2004;16:9-18.

B4: Generate questions by recognising gaps in knowledge

Following the analysis of the literature relevant to the research question, a researcher should be able to articulate where the gaps in knowledge exist. This stage will, in part, be complementary to the other competencies in this domain.

An individual should be able to identify shortcomings in the knowledge that is required to support a hypothesis. They should be able to articulate the main elements required to follow an evidence-based approach to care delivery. They should be able to suggest methodologies that could be used to overcome shortcomings, and the types of studies that could be used.

Suggested learning and assessment methods

- Taught course
- Reading and interpreting research publications
- Discussion and feedback
- Peer discussion
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [How to Review the Literature](#)
- [Practical Issues in Conducting Research](#)

Reference

Baxter H. Understanding research: 1. Methodologies used to answer research questions. *J Wound Care* 2001;10:269-72.

B5: Use oral and written communication to express ideas effectively

An individual should be able to determine the appropriate subject topic, assess an audience, paraphrase and summarise source material, and produce an effective lecture. They should be able to listen effectively, to respond appropriately to verbal and non-verbal questions, and to describe and assess the characteristics of the different types of mass media and their influence on individuals and society. The researcher should also be able to prepare and write drafts, and to revise and edit written material which delivers a coherent and well-developed document that supports an expressed or implied idea or concept.

An individual should be able to construct and deliver a presentation to differing audiences on a theme (or themes) within their research field. They should be able to state and describe the main components of a presentation. The individual should be aware of the differing roles that oral and written communications can fulfill. They should be able to describe the main components of a research paper, and should be aware of the differing formats of various journals.

Suggested learning and assessment methods

- Preparation and rehearsal of presentation
- Identifying likely points for discussion and preparing replies
- Validated self-assessment
- Supervisor assessment of the content, presentation and questions
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of correctly designed and constructed research report

Further reading

FGDP(UK) research leaflet:

- [Preparing for Publication](#)

3.8 DOMAIN C: PERSONAL ATTITUDES AND PROFESSIONAL ETHICS

This domain is divided into three competencies that cover personal attitudes and professional ethics. The competencies are the ability to:

- Demonstrate an appreciation of the necessity and value of research for competent clinical practice.
- Demonstrate an awareness and adherence of ethical principles underpinning research, in particular those produced by the Department of Health.
- Design and implement research studies that evaluate clinical practice and service delivery.

C1: Demonstrate and appreciate the necessity for and value of research for competent clinical practice

An individual should be able to articulate the role of research in improving the quality of healthcare delivery, and what is required to ensure that the highest standards of care are achieved. The basis for achieving these goals lies with the adoption of evidence-informed practice and the requirement of research that is fundamental to achieving this. An individual should be able to demonstrate the importance of the ability to deliver patient-centred care, the quality of which is underpinned by research. They should have appropriate knowledge and skills when making professional judgments, and recognise the limits of their practice.

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [Audit as the Stepping Stone to Research](#)
- Introduction to Research

C2: Demonstrate an awareness of, and adhere to, ethical principles in relation to research activities

An individual should be aware of the ethical principles and standards of professional conduct that underpin research. They need to demonstrate an understanding of their responsibilities to patients, society, the profession, and colleagues, as well as the current governance arrangements produced

by the relevant statutory bodies, such as the Department of Health. They should have an awareness of potentially conflicting principles.

An individual should be able to apply principles of intellectual property, privacy, copyright, information security and plagiarism, and use information in an ethical manner. They should be able to demonstrate knowledge of current ethical standards regarding treatment of human subjects and confidentiality, and how they apply to a specific research project. In particular, they should have a good working knowledge of the most up-to-date guidance on research governance issued by the Department of Health, and of the workings of local and central research ethics committees.

Suggested learning and assessment methods

- Taught course
- Reading and interpreting research publications
- Discussion and feedback
- Peer discussion
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflets:

- [Ethical Considerations](#) (formerly titled “General Considerations”)
- [Practical Issues in Conducting Research](#)
- [Designing a Protocol](#)

References

Fontenla M, Rycroft-Malone J. Research governance and ethics: a resource for novice researchers. *Nurs Stand* 2006;20:41-6.

Department of Health web site at <http://www.dh.gov.uk> ([click here](#) for research governance section).

C3: Demonstrate the ability to design and implement research studies that evaluate clinical practice and service delivery

A individual should be able to outline the key stages in any research project, and demonstrate the ability to construct a research protocol to answer a specific research question that has direct relevance to clinical practice and/or delivery of care to patients.

An individual should be aware of the various components of a protocol. They should be able to design a protocol for a given research question, and demonstrate knowledge of the differing types of studies and the limitations of each. They should be able to submit an application for ethical approval to a Local Research Ethics Committee, and draft consent and application forms.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflets:

- [Designing a Protocol](#)
- [Practical Issues in Conducting Research](#)
- [Ethical Considerations](#) (formerly titled "General Considerations")

3.9 DOMAIN D: DISSEMINATION OF RESEARCH FINDINGS

This domain is divided into two competencies which deal with the dissemination of research findings and the ability to influence clinical practice. They are:

- Demonstrating the skills required for publication of research reports.
- Changing clinical practice based on outcome studies and other research.

D1: Demonstrate the basic skills required for the publication of research reports

An individual should be able to describe the structure and components of a scientific publication, and describe the content of each component.

An individual should be able to describe the structure and components of a range of scientific publications. They should be able to demonstrate how to organise the different elements of a research publication into a coherent document. The individual should be aware of the differing formats that are used in journals, and the sources of information that exist to help in the submission process.

Suggested learning and assessment methods

- Taught course on writing a research paper
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of correctly designed and constructed research report
- Preparation and rehearsal of presentation
- Identifying likely points for discussion and preparing replies
- Validated self-assessment
- Supervisor assessment of content, presentation and questions

Further reading

FGDP(UK) research leaflet:

- [Preparing for Publication](#)

D2: Change clinical practice based on outcome studies and other research

An individual should be able to articulate an understanding of the barriers, constraints and enablers that can result in the successful implementation of research, and the ways in which successful dissemination can occur.

An individual should be able to demonstrate the importance of responding quickly to change, and show an understanding of the barriers and facilitators to change that arise from research findings. They should be able to articulate reasons and drivers for making change that could include changes in culture, values and skills.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflet:

- [Audit as the Stepping Stone to Research](#)

Reference

Clarkson JE. Getting research into clinical practice - barriers and solutions. Caries Res 2004;38:321-24.

3.10 DOMAIN E: ROLES AND FUNCTIONS OF A RESEARCHER WITHIN A CARE SYSTEM

This domain is divided into six competencies. They are to:

- Engage in activities that contribute to the development of a body of knowledge relevant to health and oral healthcare.
- Design and implement a series of studies that address a significant issue.
- Write research funding applications to major funding bodies.
- Offer help and support to other researchers.
- Publish in major journals, both dental and non-dental.
- Contribute to theory within a particular area of study.

E1: Engage in activities that contribute to the development of a body of knowledge relevant to health and oral healthcare

An individual should demonstrate an ability to identify gaps in knowledge which need researching, demonstrate competence by pursuing external research support, and maintain and actively pursue personal research agendas leading to scholarly publication.

An individual should be able to demonstrate their role in appropriate research methodologies, including the ability to assemble the necessary resources to undertake a research project. They should be able to advise on the collection, analysis and evaluation of relevant data, and subsequently present and agree recommendations. They should show evidence of dissemination activities, either written or verbal.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflets:

- [Budgeting and Finance](#)
- [Audit as the Stepping Stone to Research](#)
- [Introduction to Grantsmanship](#)

E2: Design and implement a series of studies that address a significant issue

Although the initial undertaking of research should be conducted through suitably-sized projects that enable its successful completion, it is important that the individual recognises the limitations as well as the strengths of a single research project. Subsequent development should demonstrate the acceptance of the key role that a wider programme of research will play in addressing a research question.

An individual should be able to identify an issue and argue why it is of significance. They should be able to demonstrate the need for differing types of studies to address the issue, and suggest possible methodologies that could be employed.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposals
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflets:

- Introduction to research
- [Practical Issues in Conducting Research](#)

E3: Write research funding applications to major funding bodies

Success in obtaining research funds is a key component in taking forward any research agenda. The large funding bodies require well-documented applications for grants. An individual should show an awareness of the different application frameworks, and demonstrate the completion of at least one application.

An individual should be able to write, and help to support the development and submission of, protocols and proposals. They should be able to demonstrate knowledge of differing formats that a protocol could take. The individual should have knowledge of the major funding bodies from which funding could be obtained.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposals
- Discussion and feedback from a supervisor

- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences

Further reading

FGDP(UK) research leaflets:

- [Introduction to Grantsmanship](#)
- [Budgeting and Finance](#)

E4: Offer help and support to other researchers

An individual should be able to demonstrate an ability to plan work schedules and delegate, as well as an ability to coach and counsel and keep work focussed on a project. They should also be aware of the various styles of supervision, and understand the principles of sound supervision and motivation techniques and their applications in the work environment. Finally, they should have an ability to evaluate and assign work based on individuals' strengths and interests, and to effect change in an organisation, adapt to change, and guide colleagues through the process of change. An individual should be able to support a researcher in undertaking a project. They should be able to demonstrate an awareness of the differing methods of support and learning available, and the associated resource issues.

Suggested learning and assessment methods

- Taught course
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflet:

- [Practical Issues in Conducting Research](#)

References

Giddings LS, Wood PJ. How to survive (and enjoy) doing a thesis: the experiences of a methodological working group. *Nursing Practice New Zealand* 2006;22:11-22.

Thompson DR, Kirkham S, Watson R, Stewart S. Improving research supervision in nursing. *Nurse Education Today* 2005;25:283–290 (and as an e-publication on 23 March 2005).

E5: Publish in major journals, both dental and non-dental

An individual should demonstrate the ability to submit reports of projects in the form of papers to peer-reviewed dental, and other relevant high-quality journals. They should be aware of the journals' differing formats and requirements with respect to the format of papers submitted to them.

An individual should be able to demonstrate a history of publications in peer-reviewed journals, both dental and non-dental.

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

Further reading

FGDP(UK) research leaflet:

- [Preparing for Publication](#)

E6: Contribute to the development of theory within a particular area or areas

An individual should contribute to monitoring developments within specific areas of research, as well as developments in research regulations and requirements. The individual should be able to demonstrate knowledge of how to develop systems to manage the risks to themselves, staff, and others involved in research, and be able to contribute to the development of research policies, procedures and practices.

An individual should describe and demonstrate what their role is in the research and dissemination process, and how they have contributed to advancing the knowledge base within the subject area.

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposal
- Discussion and feedback from a supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

Further reading

FGDP(UK) research leaflets:

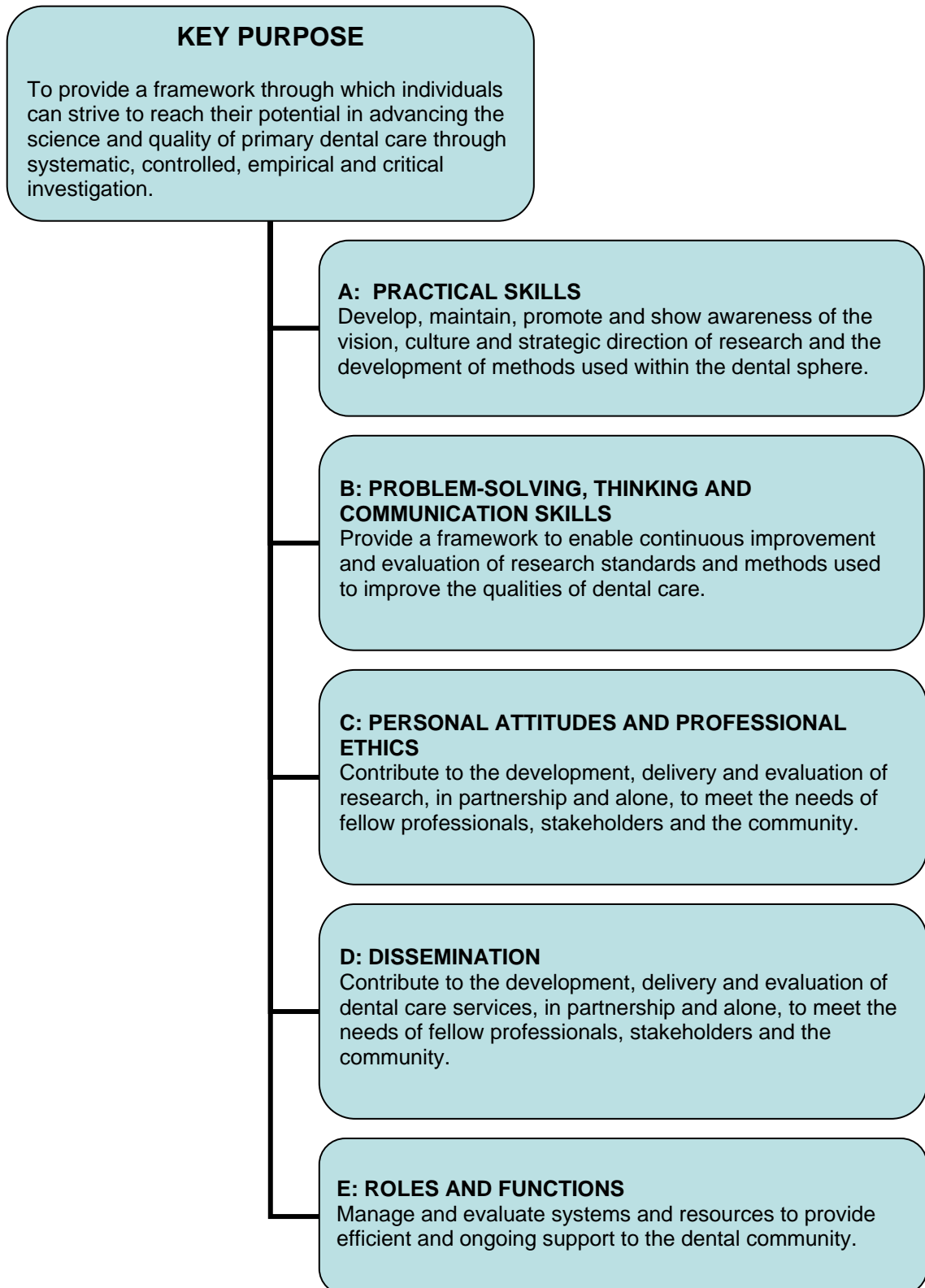
- Introduction to Research
- [Ethical Considerations](#) (formerly titled "General Considerations")
- [Practical Issues in Conducting Research](#)

4. SUMMARY

- 4.1 The philosophical basis for the development of a research component of the FGDP(UK)'s Career Pathway is based on the need to ensure the highest quality of care provision. Part of this process involves the adoption of evidence-informed care, and the need for research to underpin current and future practices.
- 4.2 Competencies can be acquired through a number of means and a single curriculum is unlikely to cover the present or future of all individuals. Each individual will have experienced opportunities that are unique, and the programme to help them achieve competency should be tailored to their needs.
- 4.3 The domains identified in this document are: practical skills; problem-solving, thinking and communication skills; personal attitudes and professional ethics; dissemination; and roles and functions. In each domain, key competencies are listed, along with the rationale for their inclusion.
- 4.4 These competencies form a broad curriculum that should be used to identify the target audience, training requirements and necessary training delivery mechanisms. The competencies for research will in part be common with other existing competencies developed within the Career Pathway.
- 4.5 This document therefore outlines suggested learning goals, assessment criteria and methods for acquiring the research competencies, to help educationalists design appropriate training programmes.
- 4.6 As mentioned previously, the growing number of education programmes that the FGDP(UK) provide and accredit means that there is a degree of overlap in the areas covered. The format used in this document should help individuals, programme designers, and prospective employees in identifying their particular requirements.
- 4.7 Many individuals will not seek, or indeed need, to acquire all the research competencies listed in this document whilst they undertake the Career Pathway. However, as mentioned above, they should all be able to understand the processes involved in research and be able to critically appraise the science that underpins their practice.
- 4.8 The competency framework should be monitored and updated as the science and practice of dental care evolves.

APPENDIX 1

FGDP(UK) RESEARCH COMPETENCIES FUNCTIONAL MAP



DOMAIN A: PRACTICAL SKILLS

Develop, maintain, promote and show awareness of the vision, culture and strategic direction of research and the development of methods used within the dental sphere

A1
Find and use resources

A2
Use library and information technology effectively

A3
Recognise and know when to use primary and secondary resources

A4
Observe and record behaviour

A5
Demonstrate basic computer competency

DOMAIN B: PROBLEM-SOLVING, THINKING AND COMMUNICATION SKILLS

Provide a framework to enable continuous improvement and evaluation of research standards and methods used to improve the qualities of dental care

B1
Understand the difference between subjective and objective information

B2
Recognise when information provided is sufficient and when it is not

B3
Evaluate when the basis for conclusions is laid out completely and clearly

B4
Generate research questions by recognising gaps in knowledge

B5
Use oral and written communication to express ideas effectively

DOMAIN C: PERSONAL ATTITUDES AND PROFESSIONAL ETHICS

Contribute to the development, delivery and evaluation of research, in partnership and alone, to meet the needs of fellow professionals, stakeholders, and the community

C1

Demonstrate an appreciation of the necessity and value of research for competent clinical practice

C2

Demonstrate an awareness of and adherence to the ethical principles underpinning research activities, in particular those produced by the Department of Health

C3

Design and implement research studies that evaluate clinical practice and service delivery

DOMAIN D: DISSEMINATION

Contribute to the development, delivery and evaluation of dental care services, in partnership and alone, to meet the needs of fellow professionals, stakeholders, and the community

D1

Demonstrate the basic skills required for the publication of research reports

D2

Change clinical practice based on outcome studies and other research

DOMAIN E: ROLES AND FUNCTIONS

Manage and evaluate systems and resources to provide efficient and ongoing support to the dental community

E1
Engage in activities that contribute to the development of a body of knowledge relevant to health and oral healthcare

E2
Design and implement a series of studies that address a significant issue

E3
Write research funding applications to major funding bodies

E4
Offer help and support to other researchers

E5
Publish in major journals, both dental and non-dental

E6
Contribute to theory within a particular area of study

APPENDIX 2

EXAMPLE OF A POSSIBLE PATHWAY TO ACQUIRE RELEVANT COMPETENCIES FOR RESEARCH IN PRIMARY DENTAL CARE

Introduction

Because of the dynamic and varied nature of research, it is important that the generic competencies listed by the FGDP(UK) are constantly reviewed and updated. Faculty members are likely to have a wide variety of research interests, each of which will require a unique set of competencies and supporting skills and knowledge. It would therefore be foolhardy to limit members to one rigid pathway.

The intention is for primary care workers to be able to evaluate previous and new research, but also have the necessary skills to evaluate or study particular aspects of their own clinical work.

A grounding in research provides individuals with the necessary skills to formulate questions, and to identify and test hypotheses. Such basic skills are also transferable to many aspects of general practice, including audit and management.

One set of competencies and supporting skills that may be applicable to many who wish to carry out research in primary dental care is described in this appendix. It should be viewed as an illustrative example rather than a mandatory pathway for all. In many cases, specific organisations and techniques are mentioned. They may not be applicable to all researchers. For example, although currently widely used, attendance at an SPSS course may not be relevant for all researchers, and in the future SPSS will doubtless evolve into other programmes.

Skills that should be acquired – minimum standards:

Practitioners should acquire these skills via a variety of experiences, including:

- Attendance at research meetings, eg. British Society for Dental Research, journal clubs, etc.
- Carrying out a research project with a supervisor.
- Attendance at relevant courses, including research methods courses and courses on data analysis and statistics.

NB Some practitioners who have undertaken higher degrees, particularly research-based degrees, will be able to demonstrate the key competencies.

An important focus of the research competencies is practical experience of undertaking research and acquiring the skills described below.

Key Competencies

1 Carry out electronic literature searches on internet and library databases

Suggested learning and assessment methods

- Guided demonstrations
- Specific search tasks
- General search tasks
- Validated self-assessment

2 Access paper and on-line journals. Describe how to judge relative “quality” of journals through impact factors and citation indices.

Suggested learning and assessment methods

- Guided demonstrations
- Discussion and feedback from supervisor
- Validated self-assessment

3 Critically appraise research publications including studies with the following methodologies:

- Randomised controlled trial
- Case-control study
- Longitudinal cohort study
- Large scale epidemiological study of either prevalence or incidence

Suggested learning and assessment methods

- Reading research publications
- Discussion and feedback from supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

4 Use and interpret basic statistical analyses

- Tests for normality
- Appropriate use of parametric/non-parametric statistics
- Tests for comparison of categorical and continuous data

Suggested learning and assessment methods

- Taught course
- Reading and interpreting research publications
- Discussion and feedback
- Peer discussion
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries, reviews and critiques

5 Draft a research proposal containing:

- Main objectives
- Introduction
- Hypotheses
- Design
- Statistical analysis
- Power calculation
- Ethical considerations
- Dissemination

Suggested learning and assessment methods

- Taught course
- Modelling on published research and planning proposal
- Discussion and feedback from supervisor
- Peer discussion and feedback
- Research interest groups
- Attendance at appropriate meetings and conferences
- Validated self-assessment
- Ongoing supervisor assessment

6 Submit an application for ethical approval to a local research ethics committee; draft consent and application forms

Suggested learning and assessment methods

- Taught course
- Modelling on successful proposals and planning applications
- Discussion and feedback from supervisor
- Support from research interest groups
- Attendance at appropriate meetings
- Validated self-assessment
- Ongoing supervisor assessment
- Successful outcome of application

7 Carry out a research project (size and scope appropriate to experience and funding available)

Suggested learning and assessment methods

- Implementing research proposal
- Discussion and feedback from supervisor
- Peer discussion and feedback
- Support and feedback from research interest groups
- Attendance at appropriate meetings
- Validated self-assessment
- Ongoing supervisor assessment
- Production of summaries and progress reports

8 Enter data onto a database, use a spreadsheet (such as Excel) and a statistical analysis package (such as SPSS) with help from a statistician, if necessary

Suggested learning and assessment methods

- Taught course on use of statistical software and use of statistics
- Guided demonstrations
- Completion of database and statistical tasks
- Use of these programs to process and write up the research outcomes
- Validated self-assessment
- Ongoing supervisor assessment
- Successful application of analysis and production software

9 Write up the results as a report or paper for publication

Suggested learning and assessment methods

- Taught course on writing a research paper
- Modelling on published research and planning proposal
- Discussion and feedback from supervisor
- Peer discussion and feedback
- Validated self-assessment
- Ongoing supervisor assessment
- Production of correctly designed and constructed research report

10 Present the results at an academic meeting

Suggested learning and assessment methods

- Preparation and rehearsal of presentation
- Identifying likely points for discussion and preparing replies
- Validated self-assessment
- Supervisor assessment of presentation (including good-quality illustrations) and questions

11 Receive and positively respond to constructive criticism of the research (eg. re-draft a paper following reviewers' comments)

Suggested learning and assessment methods

- Comments and suggestions by reviewers
- Positive response to criticism leading to improvements in the research paper

12 Demonstrate motivation and ability to work independently

Suggested learning and assessment methods

- Self-directed approach to planning
- Research output largely the practitioner's own
- Conducting, analysing and writing up the research work

The following is a guide to the steps required in achieving research competencies that are suitable for the FGDP(UK) Career Pathway, and for dentists with a special interest in research:

First stage

Obtain research supervisor
Discuss relevant research projects
Carry out literature review
Formulate research question
Write protocol

Second stage

Undergo relevant training (eg. questionnaire construction, running trial, etc.)
Develop data collection sheet
Develop patient information sheets if relevant
Submit proposal to ethical committee
Attend ethical committee if requested

Third stage

Attend SPSS course or equivalent course
Begin data collection
Enter data onto computer
Complete data collection
Clean data
Analyse data using suitable methods

Fourth stage

Write up project
Present project at scientific meeting (either in the form of a poster or paper)
Submit paper for publication (if relevant)