

GUIDANCE ON REQUIREMENTS RELATING TO DOCTORAL THESES FOR THE PhD DEGREE AT THE FACULTY OF MEDICINE, UNIVERSITY OF BERGEN

Adopted by the Programme Board for the PhD programme at the Faculty of Medicine on 05.09.16.

This document replaces the following documents:

- *Guidance on requirements relating to doctoral theses for the PhD degree at the Faculty of Medicine, University of Bergen*
- *Publications in Doctoral theses, the Faculty of Medicine, the University of Bergen.*
- *Guidelines for summaries to PhD theses, the Faculty of Medicine, the University of Bergen.*

Definitions of terms used in this document

*In this document, **thesis** refers to the complete written PhD work, and includes the synopsis, the articles and any appendixes, or a monograph. **Synopsis** refers to the candidate's general presentation and discussion of the work that forms the basis for the PhD. **Summary or abstract** - refers to a brief introductory presentation of the thesis, and normally include the thesis' purpose, methods, main findings and conclusions. The summary is usually less than one page.*

1 General information about the doctoral thesis

1.1 Other Regulations and guidelines

The formal requirements of the doctoral degree PhD at the University of Bergen are found in *Regulations for the Philosophiae Doctor (PhD) degree at the University of Bergen*, adopted on 20 June 2013.

In addition, the Faculty of Medicine has adopted *Guidelines for the evaluation process of the doctoral degree at the Faculty of Medicine, University of Bergen*.

1.2 Scientific quality

A PhD thesis should contain new observations of scientific value within the field of the Faculty. The thesis must be an independent academic work that meets international standards. It must be at an advanced scientific level with respect to the formulation of the research topic, conceptual clarification and methodical, theoretical and empirical rationale, as well as in respect of the documentation of sources and formal presentation. The thesis must contribute to the development of new knowledge within its field and must qualify for publication as a part of the academic literature in the field.

The requirement for scientific quality is absolute. The problems addressed should be clearly and precisely expressed. The materials and methodology employed must be adequate and appropriate. The results must provide good, verifiable documentation. Tables, figures and other illustrations must be appropriately presented. The conclusions drawn must be justifiable. The treatment of the literature must be adequate with regard to critical selection and evaluation. The references must be correct. The presentation of the text must be clear, precise and linguistically satisfactory.

1.3 Thesis structure

Normally, a doctoral thesis from the Faculty of Medicine consists of a number of scientific articles published in or prepared for international journals with a peer review system, and a synopsis that includes a presentation of the results and a thorough scientific discussion. Monographs are also accepted. The requirements for scientific quality and the scope of the thesis are the same for both formats.

1.4 Scope

A doctoral thesis should be at an international PhD-level, and the scope of the thesis should correspond to 2.5 years of full time work.

Normally, the thesis consists of three articles published in or prepared for international journals with a peer review system. The number of articles will, however, depend on the size and quality of the papers and the candidate's contribution. Where the candidate has put an unusually large amount of work into a paper and that article is of a very high quality, the number of articles can be reduced.

As a general rule, the doctoral candidate should be the principal author of at least two articles. Where the candidate is not the principal author, he / she should have contributed considerably in the collection of data, interpreting of results and writing of the article.

1.5 The synopsis

An article-based thesis should, in addition to the individual articles, include a presentation of the scientific results with a detailed, up-to-date comparative discussion. This general presentation should be a scientific document that gives the candidate the opportunity to discuss aspects of his/her articles in more depth, and, if necessary, correct certain aspects of them. The synopsis should demonstrate scientific overview and maturity, as well as the ability to penetrate specialised scientific problems. Please see Part 3 for further details about the structure and requirements of the synopsis.

1.6 Correction of formal errors and changes after submission

The thesis will be evaluated exactly in the form in which it has been submitted. However, the candidate may apply for permission to correct formal errors in the thesis after submission. The application must include a complete overview of the errors (errata) which the candidate wishes to correct. Applications to correct formal errors must be submitted no later than four (4) weeks before the committee's deadline for submitting its recommendation, and may only be done once. If the application is approved, the approved list of errors will be presented to the evaluation committee.

1.7 Joint work

A complete thesis may, on exception, be the joint effort of two doctoral candidates. In such cases, the thesis should be equivalent in scope to two normal doctoral theses. In addition, the independent efforts of each individual candidate must be clearly defined and should be equivalent to about half of the scientific work involved. This also applies to the synopsis.

2. Publications in Doctoral theses

2.1. Introduction

The PhD Regulations § 10.1 state that several works may be approved as parts of a thesis if their content constitutes a whole. In addition to the individual parts, a synopsis for the thesis as a whole must be prepared (please see part 3). At the Faculty of Medicine such a compilation of articles by several authors and a synopsis is the most common form of the doctoral thesis. The following is a clarification of the PhD Regulations, and applies to publications which are included in doctoral theses for evaluation by the Faculty of Medicine.

All departments and sections have authorized English names and these should be applied to ensure that the origin of all publications is clearly and correctly indicated and reported. First author is normally responsible for correspondence about the publication, but for junior researchers, it may be helpful that the supervisor assists with the formal correspondence. The Faculty of Medicine recommends that all manuscripts are considered by the group leader before submission.

2.2 Joint authorship

Joint authorship suggests that the work has been conducted by several researchers jointly. The PhD Regulations § 10.2 clarifies when such work can be accepted for evaluation of the PhD degree. It is required that the candidate's contribution represents an independent contribution and that the candidate's contribution can be identified to the extent necessary for assessment.

Upon submission of a doctoral thesis, a statement of co-authorship from the relevant department must be included. The statement must be signed by both the main supervisor and Head of Department jointly on a separate form. If the thesis originates from several departments, all department heads must sign the statement of co-authorship. The statement is a description of the candidate's contribution to each of the individual articles. It should also mention relevant factors that are discussed above, e.g., extensive cooperation with other institutions that have resulted in an unusually large number of collaborators. The statement of co-authorship will be sent to the evaluation committee along with the thesis. The statement of co-authorship must be written in the same language as the thesis.

The faculty follows the Vancouver rules. If a publication has many authors, one should especially ensure that the requirements for authorship have been followed. Particular care must be taken when using data originating from "service divisions" performing routine and character analyses for others. This type of data cannot always be used for scientific purposes. One must consult with the division/department and clarify questions regarding method descriptions, authorship and acknowledgement.

The role of the first author should be such that they naturally can regard the work as their own. This involves having completed the main data collection or experiments, data processing, initial interpretations, drafting the manuscript, and organized the writing until the final publication. The candidate should be the first author of most of the articles in their

own thesis. Shared first authorship should be avoided as far as possible. Where the candidate is not first author, this should be addressed in the co-authorship statement.

The supervisor is responsible for the author sequence for articles included in a PhD thesis. The author sequence should be decided as early as possible. Any disagreements should be settled at the lowest possible level.

2.3 Work that has previously been evaluated for an academic degree

It is a basic requirement that a doctoral thesis must contain original research results. This means that publications that have previously been evaluated for a degree cannot be evaluated for a new degree. This general rule has a few exceptions:

- A single article can be shared by two theses if each candidate's contribution is clearly defined. However, this is not recommended. Both candidates involved must agree beforehand that the article in question can be used in both theses. Also, the co-authorship statement must address that the article is included in another thesis (with the name of the other candidate specified).
- Joint work: A “double thesis” where two PhD candidates submit together may be accepted. This could exceptionally be an appropriate solution within a group, but it requires that the two candidates are at a similar scientific level and approximately at the same stage in the PhD programme. It is a requirement that the final thesis has the scope and quality of two full theses.
- An article that has been evaluated as part of the Medical Student Research Programme can be part of a PhD thesis.

2.4 Work that cannot be approved

Work that has been assessed for previously completed exams or degrees may not be accepted for assessment unless the work is included as a smaller part of a thesis that consists of multiple interrelated works. Data, analyses or methods from previous degrees may nevertheless be used as the basis for the work on the PhD project.

Published articles may not be accepted as part of the thesis if they at the time of admission are older than five (5) years from the date of publishing. Dispensation from this requirement may be made in very extraordinary circumstances.

The thesis can only be submitted for assessment at one higher education institution, cf. § 11.3.

3. Guidelines for the synopsis

3.1 Introduction

The synopsis shall include a presentation of the results and contain an in-depth and up-to-date discussion of the articles as a whole, demonstrating scientific maturity at an international PhD level.

3.2 General format requirements

3.2.1 Scope

The synopsis should be **40-70 pages** long, exclusive of the reference list and actual articles.

3.2.2 Format

Use font: Times New Roman, font size: 13 and line spacing: 1.5. **A template for the PhD thesis** can be found at the University of Bergen's websites¹.

3.2.3 Language

It is essential to keep all text concise. It is recommended that the candidate proofreads the text several times, removing any unnecessary words and phrases. Abbreviations can make the text more difficult to read and less accessible to readers who may not have up-to-date knowledge of the field. Abbreviations should therefore be kept to a minimum and restricted to well-established concepts.

3.3 Structure of the synopsis

The synopsis should be structured as follows:

3.3.1 The title of the thesis

The title of the thesis must be specific, concise and comprehensive. It should contain important keywords. (The title is used for indexing purposes and its format is important in relation to traceability in library databases.)

3.3.2 List of abbreviations

The synopsis must include a list of all abbreviations used in the thesis.

3.3.3 Scientific environment

This is where you write the name of the faculty(-ies)/department(s)/ centre(s) /research group(s) /research school involved in the study.

3.3.4 Acknowledgements

This section is used to acknowledge and thank persons, groups, sources of funding etc. Be generous! (This could also be placed before "References".)

3.3.5 Summary (abstract)

Maximum 1 page where a short summary of the content of the study is presented: background, objective/purpose, materials/methods, results, conclusion and consequences.

3.3.6 List of articles (Note: Not relevant for monographs)

The synopsis must contain a list of all articles that are included in the thesis. The list should include all authors for each article, the title of the article and publication where the article has been published (if applicable).

3.3.7 Introduction to the synopsis

The introduction to the synopsis shall describe the background to the research work, what the research work is based upon, and shall introduce the fundamental issues discussed in the thesis. The literature review must be detailed and present leading knowledge and

¹ http://kapd.h.uib.no/profilmanual//03Tjenester/e_03aa2_Doktorgrader.html

research while remaining focused on the subject in question, and with a firm basis in relevant original works/publications. The introduction should have an academic and contemporary context and may mention past studies of importance. It may also contain an evaluation of factors considered to be highly relevant or less relevant, with more detailed information provided on this evaluation in the actual thesis. The use of figures/illustrations improves the quality, making it more interesting. The date on which the author completed his/her study of literature shall be specified.

3.3.8 Objective/purpose of the study

The overall objective of the study must be presented clearly and concisely with a high degree of linguistic precision, and categorised into main goal and secondary goals.

3.3.9 Materials and methods

The presentation of materials and methods must be clearly described and should include relevant details. It is advantageous to refer to methods which have already been published/documented. A critical evaluation of the choice of methods and techniques (methodological considerations), should be included, if they are not mentioned in the discussion. This applies irrespective of whether quantitative or qualitative methods are utilised. Ethical evaluations shall comply with international standards and necessary approvals shall also be mentioned (for example, in relation to the Norwegian Health Research Act and other relevant legislation and regulations).

3.3.10 Results

The results can be described article by article or as a whole. It is advantageous to highlight the description of the most relevant/important finds and observations.

3.3.11 Discussion

The discussion shall contain a critical evaluation of the author's own academic choices and results. Moreover, the author should describe both strengths and weaknesses of the methods utilised and the results achieved, while referring to existing knowledge. This section shall also highlight the dominant leitmotif in the thesis. The findings shall be discussed in sequence, with the most important finding presented first. It is permitted to provide detail on and, if necessary, correct issues which have not been highlighted in the articles and which may not be mentioned in the articles. If appropriate, the sections for Results and Discussion may be combined instead of forming two separate sections.

3.3.12 Conclusion

The conclusion shall contain a recap of the most important results and a description of how these highlight and respond to the goals set (main goal and any secondary goals) for the work.

3.3.13 Future perspectives

New know-how frequently emerges which generates new problems and opportunities. The section on future perspectives should contain a description of how the work on the thesis forms the basis for continued work in the field of research. The author may also state here whether he/she feels the results of the thesis should promote a change of opinion on a

specific issue, be it national or international. Should the findings in the thesis result in amended procedures or new concepts?

3.3.14 Literature list/References

The literature list should be complete and the PhD candidate must have read all sources listed. The full title of reference works should be listed here. It is advantageous to list the references in the same order as in the text, so that reference number 1 is the first reference mentioned in the text. The list of references should be formatted as is normal in periodicals. We recommend use of a programme for reference management, such as EndNote or Reference Manager. The reference list must include all sources used for material, figures and tables.