Guidelines for Writing a PhD Thesis

*Leaflet - updated on 10/5/2016*

Note: These recommendations were last reviewed on 21 April 2016 in the Doctorate Committee for Medicine and reflect the current informal consensus among its members.

A further revision and adjustment is planned, subject to coordination with the AG LFC (Working Group on the Longitudinal Research Curriculum) and the joint Doctorate Committee for Dr rer nat. et al.

Higher-level rules take precedence over all recommendations. In particular, the Doctoral Degree Regulations in their current form and the rules of good scientific practice at the University of Oldenburg are to be applied. ([1](#_bookmark0))

# Form

The thesis may be submitted cumulatively or de novo.

## Language

The thesis must be written in German or English. Before submission, it must be copyread carefully to correct errors. Flaws in the use of language (grammar, spelling, wording, punctuation) may lead to its rejection by the Doctorate Committee.

## Length

The manuscript should not be shorter than 50 pages and no longer than 100, including the table of contents, summary, acknowledgments and references, but excluding any attachments.

In the case of cumulative work, in addition to the publications originally submitted, a presentation of about 30 pages is expected, detailing the work of the PhD candidate in question.

## Layout

In addition to the formal requirements of the Doctoral Degree Regulations, the following recommendations apply:

* Common fonts, e.g. Arial, text aligned to the left;
* Font size (in the body of the text): at least 10, at most 12; line spacing 1.5;
* Paper size A4; page margins on all sides at least 2 cm;
* Page numbers in Arabic numerals in the body of the text; the front matter and appendices may be numbered separately in Arabic or Roman numerals.

### Tables

Tables must be comprehensible without much explanation. They are to be provided with titles and numbered throughout. Titles are to be placed above the table concerned. Tables necessary for the understanding of the thesis are to be placed in the main body of the book and must be referenced in the text. Additional tables may be included in an attachment and will not be considered in the assessment of the thesis.

### Figures

Figures must also be numbered. Captions are to be attached below the figure. The figures should also be included in the text if this is technically feasible, that is to say, they must be in the main body of the thesis. All figures must be referenced in the text (i.e. not be purely decorative elements).

If images are taken from other sources, any required permissions for their use must be obtained before submission (copyright). A corresponding note is to be attached below the figure and, if necessary, detailed in the list of figures.

Make sure that no titles, labels or captions are missing, including those of any axes or other details shown. The information required includes:

* Units of displayed values (e.g. on the x and y axis)
* The number of measurements or subjects included in the figure
* When providing p-values: the exact value and underlying test
* When displaying dispersion measures or error bars, indicate what is shown

## List of publications

For the bibliography, the use of reference management software as provided by the University is recommended. All generally accessible literature cited should be fully and consistently listed at the end of the thesis according to a format common in the biomedical literature. ([2](#_bookmark1)) The Vancouver format is recommended. See the examples below. ([3](#_bookmark2), [4](#_bookmark3))

The URL and date of access of internet sites must be specified. Published abstracts and forthcoming publications are to be included in the list of publications. Personal messages, internal notes and unpublished manuscripts (e.g. ‘submitted’ or ‘in progress’) are not included in the list of publications. They may be cited in the text (e.g. as a ‘personal communication’) but are not considered equivalent sources.

## Cumulative work

For cumulative work the following applies additionally:

* The work was published in a scientific journal as original work (German, Dutch or English) and has undergone a process of peer review. The work is only acceptable if there was the possibility of rejection by the publisher.
* Periodicals are accepted as scientific journals if they are listed in *Medline* or have been approved by the AWMF (the Association of Scientific Medical Societies in Germany) as additionally relevant journals. ([5](#_bookmark4))
* For articles in other languages, a certified translation must be provided.
* The doctoral candidate is the first author of the publication. In the case of shared first authorship, the candidate’s contribution must be identified.

# Structuring the Work

The following components of the thesis are recommended (for binding rules see the Doctoral Degree Regulations, Section 4 (2)):

* + Title page according to the required model
  + Table of contents (down to the second or third level)
  + Introduction
  + Methods
  + Results
  + Discussion
  + Conclusion
  + Summary in German and English
    - *Deutsch*, English
  + List of publications
  + Annexes, e.g.
    - Detailed table of contents
    - List of tables, list of figures
    - Additional material
    - Acknowledgements and thanks

## Pointers on the various sections:

Reporting standards for the writing of a scientific paper, including easy-to-use checklists, are widely available. See: [www.equator-network.org](http://www.equator-network.org/) (Table 1).([4](#_bookmark3))

All information required by the checklist should be inserted in the indicated section of the thesis, if applicable. It is recommended to attach the respective checklist.

Table 1: Reporting guidelines for main types of studies ([6](#_bookmark5))

|  |  |
| --- | --- |
| **Type of study** | **Reporting standard** |
| [**Animal pre-clinical studies**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=animal-pre-clinical-research&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s=%2B) | [ARRIVE](http://www.equator-network.org/reporting-guidelines/improving-bioscience-research-reporting-the-arrive-guidelines-for-reporting-animal-research/) |
| [**Diagnostic / prognostic studies**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=diagnostic-prognostic-studies&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s) | [STARD](http://www.equator-network.org/reporting-guidelines/stard/) |
| [**Economic evaluations**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=economic-evaluations&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s=%2B) | CHEERS |
| **Health informatics** | STARE-HI |
| [**Observational studies**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=observational-studies&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s=%2B&amp;eq_guidelines_study_design_sub_cat=0) | [STROBE](http://www.equator-network.org/reporting-guidelines/strobe/) |
| [**Qualitative research**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=qualitative-research&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s) | [SRQR](http://www.equator-network.org/reporting-guidelines/srqr/) |
| [**Quality improvement studies**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=quality-improvement-studies&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s=%2B) | [SQUIRE](http://www.equator-network.org/reporting-guidelines/squire/) |
| [**Randomised trials**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=experimental-studies&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s) | [CONSORT](http://www.equator-network.org/reporting-guidelines/consort/) |
| [**Systematic reviews**](http://www.equator-network.org/?post_type=eq_guidelines&amp;eq_guidelines_study_design=systematic-reviews-and-meta-analyses&amp;eq_guidelines_clinical_specialty=0&amp;eq_guidelines_report_section=0&amp;s=%2B) | [PRISMA](http://www.equator-network.org/reporting-guidelines/prisma/) |

### Table of contents

A table of contents (extending to at least 2 levels, at the most 3) is mandatory. It is helpful to create this automatically in a way that enables hyperlinks in a PDF format. In addition, a list of figures and a list of tables may be useful. A list of figures is required especially if sources need to be acknowledged, as in the case of externally obtained photographs.

### Introduction

In the introduction, the substantive and methodological context of the work should be presented in a way that makes it possible for a non-specialist with medical knowledge to understand why the work is being undertaken, and why in this particular way (background and rationale). Furthermore, the introduction must clearly lay out the problem definition and purpose of the work.

As much as possible, citations should be chosen advisedly (not at random). For example, when discussing therapies, the author should consider referring to current surveys of the relevant literature and guidelines for medical practitioners.

The focus should be on the issues that are relevant for the thesis. For instance, it makes no sense to describe in full detail, as a textbook would, the underlying clinical picture.

The introduction should account for no more than 20% of the total text. At the end of the introduction, the objective of the thesis should be explicitly stated.

### Methodology section

In principle, methods should be presented in such a way that ideally the study is in large part replicable. At the least, it must enable the reader to assess the reliability of the results. See the relevant reporting standards for an indication of the information that needs to be included in the methodology section.

At the least, information is required on the design of the study, the nature and origins of the material used and the recruitment of the participants (criteria for inclusion and exclusion, selection mechanisms), the statistical and measurement methods and the evaluation methods used. In addition, information on the ethical and animal welfare impact assessment and, for clinical studies, the registration number is required.

Important dependent and intervening variables should be defined in a comprehensible way. Information on the validity, accuracy and reliability of the measurement methods used is also required.

Regarding the statistical methods (if used) and their reporting, reference is made to standard introductory textbooks and series, such as *Statistics at Square One* by T D V Swinscow, made available for its authors by the *British Medical Journal* (<http://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one>) ([7](#_bookmark6)). (Note: Links to these and other resources are also available on the PhD page of School VI’s internet site).

A careful and comprehensible data description is expected. However, not every measurement or observation has to be accompanied by a statistical test.([8](#_bookmark7), [9](#_bookmark8)) You need to examine whether the use of analytical statistics is appropriate, especially for small numbers of cases, for instance in laboratory-based experiments and, in general, in exploratory studies. It goes without saying that the concepts used must be well understood and verifiable

as far as standard methods are concerned (as found in the cited source). Avoid calculating multiple p-values. Where statistical significance needs to be tested, you should indicate which statistical test was used.

If more complex methods have been carried out, e.g. by a biometrician, this can and must be clearly referenced. However, you should then describe the methods in such a way that the goal of the calculations and the interpretation of the expected results become clear. If you did not carry out the evaluation yourself, state this clearly.

You must specify the software used.

### Results section

Here, the thesis must also comply with the requirements of published guidelines (reporting standards) for the type of study concerned. It must also indicate when the study was conducted.

It must be clear and comprehensible how many measurements or participants were included in the results. If you report dropouts or losses in the follow up, you need to explain why they occurred. For this purpose, presentation by flowchart can be helpful. Flowcharts should be considered a standard requirement for comparative clinical studies and meta-analyses (see CONSORT and PRISMA statements).

If you find it useful to include the results of statistical tests, you should in each case indicate the exact p-value and preferably also the test statistic, both for ‘negative’ and for ‘positive’ results. In the age of high-performance PCs, you should no longer cut figures short, using symbols such as \*, \*\* or ‘ns’. Ask yourself how many decimal places are appropriate.

Consider the use of suitable tables and figures (see above). When inserting graphs, consider the number of measurement points. For example, for a small number of measurements, a scatter plot may be better than a box plot. Today it is also no longer appropriate to use ‘dynamite’ plunger plots and indications such as ‘+/-’, especially without reference to what is being shown.([10](#_bookmark9))

### Discussion

The following components are expected in the discussion. Also see the reporting standards for information on specific types of studies:

* A short evaluative summary of the main results
* Interpretation of relevant results compared with those of other researchers
* Critical discussion of the results with regard to the possibility of random and systematic errors
* Conclusion
* Implications for further research
* Implications for application (e.g. in clinics and public health centres)

### Word of thanks and acknowledgment of other contributors

Beyond personal words of thanks (optional), all persons who contributed to the work must be named, including details of the work incorporated. This can also be specified separately, e.g. in tabular form.

# Bibliographical references

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