From the Department of Public Health Sciences
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# NOVEL METHODS FOR DOSE-RESPONSE META-ANALYSIS

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# NOVEL METHODS FOR DOSE-RESPONSE META-ANALYSIS

## THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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*“Dedication text.”*
—Author’s name, *Source*

# Abstract

My abstract:
In Paper I,
In Paper II,
In Paper III,
In Paper IV,
In Paper V,
In conclusion,

# List of publications

I. Alessio Crippa, and Nicola Orsini
**Multivariate dose–response meta-analysis: the dosresmeta R Package**
*Journal of Statistical Software, Code Snippets* 2016; 72(1), 1–15

II. Andrea Discacciati, Alessio Crippa, and Nicola Orsini
**Goodness of fit tools for dose–response meta-analysis of binary outcomes**
*Research Synthesis Methods* 2015

III. Alessio Crippa, Polyna Khudyakov, Molin Wang, Nicola Orsini, and Donna Spiegelman
**A new measure of between-studies heterogeneity in meta-analysis**
*Statistics in medicine* 2016; 35(21), 3661–75

IV. Alessio Crippa, Ilias Thomas, and Nicola Orsini
**A pointwise approach to dose-response meta-analysis of aggregated data**
*Manuscript* 2018

V. Alessio Crippa, Andrea Discacciati, Matteo Bottai, Alicja Wolk, and Nicola Orsini
**One-stage dose–response meta-analysis for aggregated data**
*Manuscript* 2018

The articles will be referred to in the text by their Roman numerals, and are reproduced in full at the end of the thesis.

# Related publications

- Alessio Crippa, Susanna C. Larsson, Andrea Discacciati, Alicja Wolk, and Nicola Orsini
  **Red and processed meat consumption and risk of bladder cancer: a dose–response meta-analysis of epidemiological studies**
  *European journal of nutrition* 2016, 1–13

- Andrea D. Smith, Alessio Crippa, James Woodcock, and Søren Brage
  **Physical activity and incident type 2 diabetes mellitus: a systematic review and dose–response meta-analysis of prospective cohort studies**
  *Diabetologia* 2016, 1–19

- Marco Vinceti, Tommaso Filippini, Alessio Crippa, Agnès de Sesmaisons, Lauren A. Wise, and Nicola Orsini
  **Meta-Analysis of Potassium Intake and the Risk of Stroke**
  *Journal of the American Heart Association* 2016, 5(10), e004210

- Alessio Crippa, and Nicola Orsini
  **Dose–response meta-analysis of differences in means**
  *BMC medical research methodology* 2016, 16(1), 91

- Emir Veledar, Alessio Crippa, Chukwuemeka U Osondu, Adnan Younus, and Khurram Nasir
  **Letter to Editor:?Ideal cardiovascular health metrics and risk of cardiovascular disease or mortality**
  *International journal of cardiology* 2016, 222, 737

- Alessio Crippa, Andrea Discacciati, Nicola Orsini, and Viktor Oskarsson
  **Letter: coffee consumption and gallstone disease—a cautionary note on the assignment of exposure values in dose–response meta-analyses**
  *Alimentary Pharmacology & Therapeutics* 2016, 43(1), 166-167

- Susanna C. Larsson, Alessio Crippa, Nicola Orsini, Alicja Wolk, and Karl Michaëlsson
  **Milk consumption and mortality from all causes, cardiovascular disease, and cancer: a systematic review and meta-analysis**
  *Nutrients* 2016, 7(9), 7749-7763

- Daniela Di Giuseppe, Alessio Crippa, Nicola Orsini, and Alicja Wolk
  **Fish consumption and risk of rheumatoid arthritis: a dose-response meta-analysis**

*Arthritis research & therapy* 2014, 16(5), 446

- Alessio Crippa, Andrea Discacciati, Susanna C. Larsson, Alicja Wolk, and Nicola Orsini
  **Coffee consumption and mortality from all causes, cardiovascular disease, and cancer: a dose–response meta-analysis**
  *American journal of epidemiology* 2014, 180(8), 763-775

# Contents

# List of abbreviations

| | |
|---|---|
| AIC | Akaike Information Criterion |
| CI | Confidence Interval |
| df | Degrees of Freedom |
| GLS | Generalized Least Squares |
| GRSS | Generalized Residual Sum of Squares |
| GTSS | Generalized Total Sum of Squares |
| FP2 | Second-degree Fractional Polynomials |
| HRR | Hazard Rate Ratio |
| IR | Incidence Rate |
| IRR | Incidence Rate Ratio |
| logRR | log–Relative Risk |
| MR | Mortality Rate |
| MRR | Mortality Rate Ratio |
| RCS | Restricted Cubic Splines |
| $R^2$ | Coefficient of Determination |
| RR | Relative Risk |
| WLS | Weighted Least Squares |

# Chapter 1

# Background

Write my background with subsections

# Chapter 2

# Introduction

Write my introduction

# Chapter 3

# Aims of the thesis

The overall aims of this thesis were to <>.

More specifically, the aims were:

- <>
- <>
- <>
- <>

# Chapter 4

# Materials and methods

Write materials and methods with subsections as in the background section

# Chapter 5

# Results

Write the results with subsections as in the background section

# Chapter 6

# Discussion

Write the discussion with subsections as in the background section

# Chapter 7

# Conclusions

Write summary of conclusions.

More specifically we conclude the following:

- <>
- <>
- <>
- <>

# Chapter 8

# Future research

Based on the conclusions presented in this thesis, future research includes:

- <>
- <>
- <>

# Appendix A

# Supplementary figures

Figures.

# Appendix B

# Supplementary tables

Tables.

# References


Crippa A, Discacciati A, Bottai M, Spiegelman D, Orsini N (2018a). "One-stage dose–response meta-analysis for aggregated data." *Manuscript*.

Crippa A, Khudyakov P, Wang M, Orsini N, Spiegelman D (2016). "A new measure of between-studies heterogeneity in meta-analysis." *Statistics in medicine*, **35**(21), 3661–3675.

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Crippa A, Thomas I, Orsini N (2018b). "A pointwise approach to dose-response meta-analysis of aggregated data." *Submitted*.

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