

**Specialisation – Master's in Biomedical Sciences**

# Epidemiology



## **Explore different aspects of epidemiology, from patient and population research to shaping public health**

The BMS Master's has seven specialisations to choose from. Each specialisation contains a number of courses that reflect its central topics and methodology. Epidemiology is the cornerstone of public health and medical research, fundamental in understanding the distribution and determinants of health and disease in human populations. This specialization delves deep into various health domains, from infectious diseases to cancer to chronic conditions like diabetes and hypertension. In this program, you'll gain a comprehensive skill set to conduct patient- and population-based research. This includes study design, data collection, statistical analysis, and the interpretation and dissemination of results.

### **Specialisation Coordinator**

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**Radboud University**



**Radboudumc**  
university medical center

## Courses within this specialization (1/2)

W36 = September, W40 = October, W44 = November,

A = Monday/Tuesday contact hours, time for self study or exam (final week) on Wednesdays,

B = Thursday/Friday contact hours, time for self study on Wednesdays.

Period	Code	Course
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W36-A MED-BMS77 **Design of applied medical research**

In this introductory course of the Epidemiology specialization, students acquire skills for designing valid and efficient applied medical research studies. They will delve into defining health problems, crafting relevant research questions, and selecting appropriate study designs and research methods. Both observational and intervention study designs will be explored, as well as several alternative approaches. Additionally, students learn to sample and recruit study subjects while understanding causality models. They will critically assess published health-related research, and delve into the history of applied medical research, discussing landmark studies and the contributions of historical clinical researchers.

Period	Code	Course
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W36-B MED-BMS78 **Modern methods of data collection**

In this course, students will develop the skills and knowledge needed for quantitative health-related research by using effective data collection. They will learn to methodically choose and apply data collection techniques, considering factors such as accessibility, data quality, and efficiency. Students will access data from various sources, including health registers, public databases, and big data. Additionally, students will gain proficiency in data management, addressing privacy concerns, and evaluating the impact of non-response, missing data, variability, and measurement error. The course will also cover data reduction and cluster analysis for intensive longitudinal data, emphasizing data visualization.

Period	Code	Course
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W40-A MED-BMS47 **Biomarkers in population-based research**

In this course, students will explore the use of biomarkers in population-based health research. They will learn to identify appropriate biomarkers for a wide range of health-related research questions spanning from exposure to disease. With a strong focus on sample collection, handling, and storage, students will gain practical skills to ensure the validity and efficiency of biomarker measurements. Ethical considerations and privacy aspects in biological sample management will also be addressed. Additionally, students will understand the theoretical and practical elements of laboratory techniques relevant to biomarker research.

## Courses within this specialization (2/2)

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Period	Code	Course
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W40-B    MED-BMS61    **Statistical modelling in medical research**

This course equips students with the skills for performing multivariable statistical analyses in the context of medical scientific research. Students will learn how to choose the appropriate statistical technique for analyzing data, apply multivariable regression analyses, and interpret the results effectively. Whether it's exploring associations between variables or predicting patient outcomes, this course provides the knowledge and practical skills required for advanced multivariable analysis methods, essential for medical research.

Period	Code	Course
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W44-A    MED-BMS81    **Applied medical research and society**

In this course students will learn how to connect their medical research to the real world. It focuses on bridging the gap between research and the people it impacts, whether they are patients, citizens, or policy makers. Students will gain the skills to choose appropriate ways to communicate scientific information effectively. Additionally, students will delve into decision-making, understanding the evidence behind prevention programs, calculating impact measures, and building prediction models that can be used in clinical practice or public health. They'll also explore the involvement of various stakeholders, including health policy organizations, patients, and citizens in their research.

Period	Code	Course
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W44-B    MED-BMS59    **Prediction models and machine learning**

In this course, students will be introduced to the world of prediction models. They'll start by understanding the differences between etiological and predictive research and explore how regression and machine learning techniques relate to one another. Students will learn how to select the right machine learning strategy to tackle scientific questions and apply these techniques to develop, train, and validate prediction models in the context of biomedical research. The course will cover essential topics, including the interpretation of predictive performance measures and the prevention of overfitting and underfitting issues.

## Internship testimonial (1)

### Drug-resistant tuberculosis

I did my internship in Bandung, Indonesia, where I worked with data collected of drug-resistant TB patients treated at Hasan Sadikin, a public hospital in Bandung. You will develop a new skill set as you encounter very different challenges than you would in a research setting in the Netherlands.

What I loved most:

- Working in an international team
- Living in a different country and a different culture
- You learn a lot about things that are not necessarily research related but that are very valuable
- Meeting very lovely and kind people



Hasan Sadikin Hospital  
Bandung, Indonesia

## Internship testimonial (2)

### Adverse vaccine effects in pregnancy

I did my Master internship at The Netherlands Pharmacovigilance Centre Lareb at the department of 'Moeders van Morgen'. I investigated the differences in frequent adverse events after the first Pfizer/Moderna COVID-19 vaccination between pregnant and non-pregnant women. This was my first internship outside of Radboud in which I learned a lot about the organisation and felt part of the team. I also learned about successfully combining two large datasets (one with data on pregnant women and the other with data on non-pregnant women)



Dutch  
Pharmacovigilance  
Centre Lareb,  
Department 'Moeders  
van Morgen'  
Den Bosch, the  
Netherlands