Board of examiners

Prof. dr. apr. Heleen van der Sijs
Department of Pharmacy
Research Group Medication Optimization and Safety
Erasmus MC Rotterdam

Dr. apr. Sander Borgsteede
Research and Science Manager
Health Base Foundation

Prof. dr. Steven Droogmans
Department of Cardiology
Research Group Centre for Cardiovascular Diseases
UZ Brussel/Vrije Universiteit Brussel

Prof. dr. Gerlant van Berlaer
Department of Emergency Medicine
Research Group on Emergency and Disaster Medicine
UZ Brussel/Vrije Universiteit Brussel

Prof. dr. apr. Eline Tommelein
Department of Pharmaceutical and Pharmacological Sciences
Research Group Experimental Pharmacology
Vrije Universiteit Brussel

Prof. dr. Dimitri De Bundel, Chair
Department of Pharmaceutical and Pharmacological Sciences
Research Group Experimental Pharmacology
Vrije Universiteit Brussel

Prof. dr. apr. Pieter Cornu, promoter
Research Group Clinical Pharmacology & Clinical Pharmacy
Vrije Universiteit Brussel

Prof. dr. Alain G. Dupont, co-promoter
Research Group Clinical Pharmacology & Clinical Pharmacy
Vrije Universiteit Brussel

VRIJE UNIVERSITEIT BRUSSEL

PhD in Pharmaceutical Sciences
2021-2022

INVITATION to the Public defence of

Katoo MUYLLE

To obtain the academic degree of

'DOCTOR OF PHARMACEUTICAL SCIENCES'

Improving patient safety through health information technology: focus on drug-drug interactions and drug allergies

The defence will take place on

Wednesday, 31 August 2022 at 5 p.m.

In Auditorium Piet Brouwer
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

and can be followed online, accessible through the following link**:**

https://gf.vub.ac.be/redirects/PhD_defense_Katoo_Muylle.php

Summary of the dissertation

Primum non nocere, or above all, do no harm! Nevertheless, patient harm as a result of unsafe medical care is a major cause of global disease burden, comparable to tuberculosis, malaria and multiple sclerosis. Health information technology (IT) can improve patient safety and clinical outcomes with most focus on electronic health records and clinical decision support systems (CDSS). CDSS are health IT applications that combine clinical knowledge with patient information to support clinicians at appropriate times in decision making, often by presenting safety alerts. These applications have predominantly achieved positive results, but there are important areas of improvement. In this thesis, we focused on CDSS for drug-drug interaction screening and on allergy documentation in electronic health records as an essential building block for CDSS for drug allergy screening.

We evaluated an optimized CDSS for drug-drug interaction screening in two retrospective pre-post cohort studies. Because drug-drug interactions with risk of QT prolongation posed a high alert burden with often low clinical relevance, we developed and validated multivariable prediction models for QT drug-drug interactions using both classical statistical and machine learning techniques. Next, based on literature review, discussions with end users and software experts, results from a survey study and a usability study, a novel coded allergy documentation module was implemented in the electronic health record of the UZ Brussel. Finally, the changing regulatory framework for CDSS in the United States of America and Europe was discussed in a viewpoint paper.

Curriculum Vitae

Katoo Muylle graduated as pharmacist and MSc in Drug Development in June 2017 at the Vrije Universiteit Brussel. During the final master year, Katoo followed a Program in Translational Medicine organized by the Institute for Interdisciplinary Innovation in healthcare of the Université Libre de Bruxelles, for which she received the Best Student Award. Inspired by this interdisciplinary program, she started a PhD in medical informatics in the research group Clinical Pharmacology and Clinical Pharmacy under supervision of prof. dr. apr. Pieter Cornu and prof. dr. Alain Dupont. In January 2019, she received a competitive research grant from the Vrije Universiteit Brussel and in November 2019, she received a research grant from the Research Foundation Flanders. During her PhD, Katoo also enrolled in the Master of Epidemiology with an elective track in clinical epidemiology at the University of Antwerp. In June 2021, she graduated summa cum laude as an epidemiologist.

Katoo has five published first-author peer-reviewed articles and has another three first-author research articles in submission. This work was presented at several international conferences. Katoo also tutored 18 bachelor theses and 5 master theses in Pharmaceutical Sciences and was responsible for the practical courses in Pharmacoepidemiology and eHealth. Since 2019, she also gives a guest lecture on translational medicine and research waste in the course Drug Discovery and Development for master students in Pharmaceutical and Biomedical Sciences at the Vrije Universiteit Brussel. In June 2022, Katoo started a new position as Real World Evidence Associate at AstraZeneca BeLux.