

Senne Vleminckx

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SUMMARY

PhD researcher and registered nurse with extensive clinical experience in emergency and intensive care settings, specialising in the intersection of nursing science and data analytics. Experienced in applying advanced statistical modelling, machine learning, and data science techniques to healthcare workforce optimisation and patient outcomes research. Combines clinical expertise with proficiency in Python, SQL, and statistical modelling to drive evidence-based improvements in nursing practice and healthcare delivery.

EXPERIENCE

PhD fellow University of Antwerp; Oct 2022 – present

Balanced Care Teams: A Systems Approach to Nursing Workforce Design. From Conceptual Framework to Empirical Validation and Practice Translation.

- Using available data to develop a new holistic framework for describing team composition.
- Adding new elements like heterogeneity, stability and structured collaboration.
- Developed a new metric to calculate the stability of interaction patterns from an individual's perspective, both within the meta-team and sub-teams.

Junior Researcher (Project Lead) University of Antwerp; Oct 2019 – Oct 2022

Balanced Nursing Teams (BNuT)-project – A tool designed to integrate existing hospital data, scale, and combine it with 360-degree survey, presenting the results in clear, responsive graphs.

- Designed and validated a 360-degree nursing team survey
- Co-developed the back-end data architecture for the BNuT platform
- Led the procurement process and contract negotiations with a software development firm
- Coordinated collaboration between academic researchers and external IT developers
- Managed integration of multi-hospital administrative data, including coordination with a data-integration firm and compliance with data protection and ethics requirements
- Presented the project to venture capitalists and stakeholders to explore funding opportunities

Emergency Nurse Ziekenhuis Netwerk Antwerpen; Oct 2019 – May 2022

Urban Emergency Room with daily >110 patients

- COVID-19 pandemic preparedness
- Prehospital Experience

Tertiary Medical ICU

- Pursued alongside the Master in Nursing and Midwifery; led an improvement project (master's thesis) that reduced the incidence of catheter-related infections by 80%.

Emergency Nurse University Hospital Leuven; Jul 2015 – Feb 2016

Tertiary Emergency Room

PUBLICATIONS

Peer-reviewed articles

Van de Weyer, G., **Vleminckx, S.**, Haegdorens, F., Hilderson, D., and Franck, E. (2026). "Self-confidence and anxiety in clinical decision-making among nursing students during high-fidelity simulation training: a longitudinal study". (IF = 2.8).

Vleminckx, S., Van Bogaert, P., De Keyser, W., and Haegdorens, F. (Aug. 2026). "From Concept to Practice: Lessons From the Balanced Nursing Teams Decision-Support System". In: *JMIR Nursing* 9. (IF = 4.0), e92417. ISSN: 2562-7600. DOI: 10.2196/92417.

Haegdorens, F., Slootmans, S., **Vleminckx, S.**, Van Bogaert, P., and Franck, E. (2025). "Turnover and Intention to Leave Among Belgian Healthcare Workers After COVID-19: A Two-Year Longitudinal Cohort Study". In: *Journal of Advanced Nursing*. (IF = 3.4). DOI: 10.1111/jan.16925 [Citations: 2].

Vleminckx, S., Sevenans, A., Bouchatta, M., Verbeeck, I., Franck, E., and Haegdorens, F. (2025). "Multiple job holding and its influencing factors among Belgian nurses: A cross-sectional study". In: *Health Policy* 155. (IF = 3.4), p. 105288. DOI: 10.1016/j.healthpol.2025.105288 [Citations: 3].

Vleminckx, S., Van Bogaert, P., Daneels, K., Proost, A., Sarens, S., and Haegdorens, F. (May 2024). "Strategies and Interventions to Support Quality Outcomes in the Home Care Setting: A Longitudinal Multilevel Study". In: *Journal of Nursing Administration* 54.5. (IF = 1.9), pp. 278–285. DOI: 10.1097/NNA.0000000000001424 [Citations: 1].

Vleminckx, S., Van Bogaert, P., De Meulenaere, K., Willem, L., and Haegdorens, F. (2024). "Factors influencing the formation of balanced care teams: the organisation, performance, and perception of nursing care teams and the link with patient outcomes: a systematic scoping review". In: *BMC Health Services Research* 24.1. (IF = 3.0), p. 1129. DOI: 10.1186/s12913-024-11625-5 [Citations: 9].

Manuscripts under review

Vleminckx, S., De Meulenaere, K., Van Bogaert, P., Abrams, S., Willem, L., and Haegdorens, F. (2025). "Beyond staffing ratios: How team demographic diversity and stability affect patient safety and staff sustainability in a multi-country study". *International Journal of Nursing Studies* (IF = 7.1).

Janssens, N., Van den Berghe, S., Goossens, E., Vanden Wyngaert, K., **Vleminckx, S.**, Vyverman, L., Van Wilder, L., and De Smedt, D. (2026). "Psychometric validation of the Flemish version of the Transition Readiness Assessment Questionnaire (TRAQ 6.0) in young people with chronic conditions". (IF = 3.5).

Antonino, L., Goossens, E., Olmen, J. van, Verhulst, S., **Vleminckx, S.**, Van Hoorenbeeck, K., and Antwerp Pediatric Asthma Network Consortium (2025). “Reducing delays in systemic corticosteroid administration in children with asthma: Impact of implementing a multi-center evidence-based clinical pathway—A quasi-experimental study”. (IF = 2.8).

Slootmans, S., Van Bogaert, P., **Vleminckx, S.**, and Franck, E. (2025). “Development and Validation of an Instrument to Assess Nursing Team Contexts and Competencies regarding Continuous Quality Improvement Culture”. (IF = 3.1).

Vleminckx, S., De Meulenaere, K., Haegdorens, F., Van Bogaert, P., and Willem, L. (2025). “The Structured Collaboration Index: A methodological approach for measuring collaboration intensity in multi-team systems”. Small Group Research (IF = 1.9).

Manuscripts in preparation

Averens, T., **Vleminckx, S.**, Haegdorens, F., and Franck, E. (2026). “Development and Validation of the NA MAPS: the Nurse Autonomy-Multidimensions And Practice Levels Scale”.

Arntz, A., **Vleminckx, S.**, Mareen, H., and Haegdorens, F. (2025). “The Effect of Lighting Conditions on Video-Assessed Clinical Deterioration compared to Live Observations Using NIPDS: A Pilot Study”.

Datasets & other research outputs

Vleminckx, S., De Meulenaere, K., Van Bogaert, P., Abrams, S., Willem, L., and Haegdorens, F. (2026). *Beyond staffing ratios: a multi-country observational study linking nursing team composition with patient and staff outcomes*. Dataset. DOI: 10.17632/bbv9bb7rgw.2. URL: <https://doi.org/10.17632/bbv9bb7rgw.2>.

Massaer, M., Van Damme, R., Franck, E., Timmermans, O., and **Vleminckx, S.** (2026). *Quantifying the Risk of Perinatal Depression Associated with a History of Depressive Episodes: A Systematic Review and Meta-Analysis Using Prediction Intervals*. PROSPERO registration CRD420261323894. Systematic review protocol. URL: <https://www.crd.york.ac.uk/PROSPERO/view/CRD420261323894>.

EDUCATION

Formal Education

2026	PhD in Medical Science at UAntwerpen
2019	Master in Nursing & Midwifery at UAntwerpen
2015	Bachelor in Intensive and Emergency Care at Hogeschool UCLL
2014	Bachelor in Nursing at Hogeschool UCLL

Research Stay

2025 – present	Visiting Researcher at Erasmus MC – DataHub, Rotterdam Focus: Machine learning applications for ICU patient acuity assessment and resource allocation; collaboration with data science team on algorithms for optimising critical care decision-making
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Additional Education

2026 (planned)	ESSA Summer School 2026: Introduction to Agent Based Modelling at The James Hutton Institute
2025	Summer School on Bayesian Optimization at UHasselt
2025	Summer School on Epidemiological Modelling & Health Economics at UAntwerpen
2024	Introduction to AI and Machine Learning for Biomedical Research at VAIA
2021–2024	Python & Datascience: Inference Specialist at CodeCademy (self-study)
2023	Micro Organizational Behaviour at KU Leuven

2022	Leadership in Nursing Excellence summer school at UAntwerpen
2022	High Performance Computing introductory course at UAntwerpen
2021	Deep Dive into Business at Antwerp Management School

TEACHING & SUPERVISION

Teaching

2022 – present	Advanced Statistics — Master's level course, University of Antwerp
2024 – present	Introductory lecture on Artificial Intelligence in Healthcare — Master's level course on Academic Development, University of Antwerp
2024 – present	Statistical Consultant — Centre for Research and Innovation in Care (CRIC)

Student Supervision

Master in Nursing and Midwifery, University of Antwerp:

2022 – 2023	Michielsens, A.: "De ligduur van patiënten op spoedgevallen: een verkennende studie naar voorspellende factoren"
2023 – 2024	Neyens, L.: "Decision support tijdens triage op spoedgevallen: Ontwikkeling van een machine learning model voor patiënten allocatie en interventies"
2024 – 2025	Van Oorschot, C.: "Factoren geassocieerd met absenteïsme bij zorgpersoneel in een Belgisch ziekenhuisnetwerk: een cross-sectioneel onderzoek"
2024 – 2025	De Schrijver, C.: "Ontwikkeling van een meetinstrument voor data gedreven besluitvorming bij (adjunct-) leidinggevendenden uit de Vlaamse gezondheidszorg – een gemodificeerde Delphi-studie met pilootonderzoek"
2025 – 2026	Jansen, J.: "Ontwikkeling en validatie van een kennistest voor competenties in basisprincipes van artificiële intelligentie bij verpleegkundigen en studenten verpleegkunde: een cross-sectionele studie"
2025 – 2026	Dijckmans, E.: "Ontwikkeling en validatie van een kennistest voor competenties omtrent artificiële intelligentie in de gezondheidszorg bij artsen en studenten geneeskunde: een cross-sectionele studie"
2025 – 2026	Installé, S.: "Datagedreven leiderschap in Vlaamse ziekenhuizen, zijn leidinggevendenden mee?"
2025 – 2026	Arntz, A.: "The Effect of Lighting Conditions on Video-Assessed Clinical Deterioration compared to Live Observations Using NIPDS: A Pilot Study"

Master in Applied Economic Sciences: Business Administration, University of Antwerp:

2021 – 2022	Van Reusel, C.: "Software spin-off: Opstelling marketing plan en business model canvas"
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Master in Organisation and Management, University of Antwerp:

2024 – 2025	Goos, M. & Vanuffelen, Z.: "Opvolging pre-implementatieproces van BNuT binnen AZ Klinka"
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PhD Supervision:

2025 – present	Mentor (Begeleider) — E. Claes: "Optimalisatie van Spoedgevallenzorg via Datagedreven Beslissingen"
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CONFERENCES

Care4 Congress, Antwerp (2024)	Factors Influencing the Formation of Balanced Care Teams (<i>Poster presentation</i>)
CRiC Symposium, Antwerp (2024)	Development of a novel metric to quantify collaboration intensity in multiteam systems (<i>Invited speaker</i>)
EIASM Congress, Barcelona (2024)	Development of a novel metric to quantify collaboration intensity in multiteam systems (<i>Oral presentation</i>)
ICN Congress, Helsinki (2025)	Understanding the Influencing Factors for Multiple Job Holding in Nursing (<i>Poster presentation</i>)
CRiC Symposium, Antwerp (2025)	Development of a Retrieval Augmented Generation system for handling student questions (<i>Invited speaker</i>)
BVVS, online symposium (2025)	Artificial Intelligence applications in nursing research (<i>Invited keynote speaker</i>)

SKILLS

Statistical Modelling	Factor Analysis, Regression Analysis, Bayesian Regression, Regularised Regression, Survival Analysis, Multi-Level Modelling, Uncertainty Quantification
Data Science	Data Analysis, Data Engineering, Random Forest
Programming	Python (pandas, NumPy, scikit-learn, PyMC/NumPyro, BoTorch, Trieste, Mesa), PostgreSQL, R (basic), SPSS, Git/GitHub, Streamlit
Research Tools	Qualtrics (survey design), ReviewManager (systematic reviews), High-Performance Computing (VSC cluster)
Healthcare Expertise	Nursing workforce analytics, Team composition metrics, Emergency and ICU clinical experience
Soft Skills	Project Management, Teaching (Advanced Statistics, Data Science in Healthcare), Supervising MSc students, Scientific Writing, Stakeholder Engagement

PROJECTS

BNuT – Balanced Nursing Teams Platform app.bnut.eu

Co-developed a web application for centralising and visualising nursing data across healthcare institutions, integrating survey and administrative data into interactive dashboards to support evidence-based decision making.

RAG-based Student Query System

Developed a Retrieval-Augmented Generation (RAG) system that provides automated responses to student queries using internal university documents (regulations, procedures), improving efficiency and student support.

Citation Verification Tool

Built an automated academic integrity tool that validates citations in student papers, supporting grading processes and ensuring reference accuracy.

ABM Dashboard Prototype

Designed an interactive dashboard for real-time visualisation of agent-based model outputs and policy scenario comparisons, supporting methodological framework development in healthcare policy optimisation.

PEER REVIEW

Journals (2024–2026): International Journal of Nursing Studies Advances (1), BMC Nursing (6), International Nursing Review (3), Journal of Advanced Nursing, Nursing Outlook, Journal of Happiness Studies, BMC Medical Education.

Verified reviews: ORCID / Web of Science Reviewer Recognition

Policy (2025): External expert, “Pilot study on a new payment system for home nursing” (Van den Heede et al.).