

With pleasure and pride I present to you iMERR's 2022 annual report. Since its foundation in 2014, iMERR made significant research achievements with both scientific and societal impact on health professions education. In 2022, we were happy to celebrate the successful defence of 2 PhD theses and the publication of 27 international peer-reviewed papers. Contributions coming from iMERR's research have been incorporated into the agenda of medical specialties associations and organizations concerned with the improvement of diagnosis in medicine. This speaks for their scientific value and has led our researchers to share their studies in scientific and professional meetings that gather educators, researchers and the leaders in the field worldwide.



Furthermore, our research contributed to current social debates around equity and diversity as it relates to the accessibility of higher education, and student wellbeing in relation to academic dismissal policies in the Netherlands. Our researchers actively participated in these discussions and met with policy makers and politicians, educational directors, students and other stakeholders to improve educational policies. Also at the local level, iMERR has contributed to educational innovations and evidence-informed education policies within Erasmus MC.

With a heavy heart, but through a great farewell symposium, we said goodbye to our founding Scientific Director Walter van den Broek. iMERR is very grateful to him for co-creating this institute and expressing the importance of evidence-based medical education within Erasmus MC and beyond. We are pleased that, despite his emeritus status, Walter continues to be actively involved in several projects.

As we enter the 10th year of iMERR, it is time for the next step. iMERR aims to further strengthen educational innovation and research within Erasmus MC and beyond. That is why we worked hard last year to move within the organization to create the appropriate environment. At the time of writing, iMERR is officially part of the Public Health department in Erasmus MC. Researchers of iMERR are now embedded in a department with very good research facilities, in which education and innovation of education exist in a well-organised way. Participation in the strong scientific community within this department will further support iMERR in the professionalization of the institute and individual researchers. I am very much looking forward to an intensive collaboration with our colleagues from the Public Health department on research as well as education.

I would like to express my thanks to everyone who has contributed to iMERR. I am looking forward to working with you and many other people to achieve future-oriented medical education by conducting research on education.

A handwritten signature in black ink, appearing to read 'AW', with a long horizontal line extending to the right.

Andrea Woltman
Director iMERR

International peer-reviewed publications

1. Mamede S, Schmidt HG. Deliberate reflection and clinical reasoning: Founding ideas and empirical findings. *Med Educ.* 2023 Jan;57(1):76-85. doi: 10.1111/medu.14863. Epub 2022 Jul 18.
2. van Sassen CGM, van den Berg PJ, Mamede S, Knol L, Eikens-Jansen MP, van den Broek WW, Bindels PJE, Zwaan L. Identifying and prioritizing educational content from a malpractice claims database for clinical reasoning education in the vocational training of general practitioners. *Adv Health Sci Educ.* 2022: Dec 19. (online ahead of print)
3. Staal J, Zegers R, Caljouw-Vos J, Mamede S, Zwaan L. Impact of diagnostic checklists on the interpretation of normal and abnormal electrocardiograms. *Diagnosis.* 2022;9 (online ahead of print).
4. Mamede S. Challenges and opportunities for the development of medical education research. *Arq Bras Cardiol.* 2022;119(5 suppl 1):1-3.
5. Staal J, Hooftman J, Gunput STG, Mamede S, Frens MA, Van den Broek WW, Alsma J, Zwaan L. Effect on diagnostic accuracy of cognitive reasoning tools for the workplace setting: systematic review and meta-analysis. *BMJ Qual Saf.* 2022 Dec;31(12):899-910. doi: 10.1136/bmjqs-2022-014865. Epub 2022.
6. Schmidt HG, Mamede S. Improving diagnostic decision support through deliberate reflection: a proposal. *Diagnosis (Berl).* 2022 Aug 25. doi: 10.1515/dx-2022-0062. Epub ahead of print. PMID: 36000188.
7. Tio RA, Carvalho Filho MA, de Menezes Mota MF, Santanchè A, Mamede S. The Effect of Information Presentation Order on Residents' Diagnostic Accuracy of Online Simulated Patients With Chest Pain. *J Grad Med Educ.* 2022 Aug;14(4):475-481. doi: 10.4300/JGME-D-21-01053.1.
8. Torre D, Chamberland M, Mamede S. Implementation of three knowledge-oriented instructional strategies to teach clinical reasoning: Self-explanation, a concept mapping exercise, and deliberate reflection: AMEE Guide No. 150. *Med Teach.* 2022 Aug 7:1-9. doi: 10.1080/0142159X.2022.2105200. Epub ahead of print.
9. Kuhn J, Mamede S, van den Berg P, Zwaan L, van Peet P, Bindels P, van Gog T. Learning deliberate reflection in medical diagnosis: does learning-by-teaching help? *Adv Health Sci Educ Theory Pract.* 2022 Aug 1. doi: 10.1007/s10459-022-10138-2. Epub ahead of print.
10. Kuhn J, van den Berg P, Mamede S, Zwaan L, Bindels P, van Gog T. Improving medical residents' self-assessment of their diagnostic accuracy: does feedback help? *Adv Health Sci Educ Theory Pract.* 2022 Mar;27(1):189-200. doi: 10.1007/s10459-021-10080-9. Epub 2021 Nov 5.
11. Alajaji M, Saleh N, AlKhulaif AH, Mamede S, Rotgans JI, Sukkarieh H, AlHarbi N, Magzoub ME, Schmidt HG. Failure to demonstrate effects of interruptions on diagnostic reasoning: three experiments. *BMC Med Educ.* 2022 Mar 16;22(1):182. doi: 10.1186/s12909-022-03212-1.
12. Broks VMA, Stegers-Jager KM, Van der Waal J, Van den Broek WW, Woltman AM. Medical students' crisis-induced stress and the association with social support. *PLoS One* 17(12):e0278577, 2022. doi: 10.1371/journal.pone.0278577.
13. Baartmans, MC., Hooftman, J., Zwaan, L., Van Schoten, SM., Erwich, JHM., Wagner, C., What Can We Learn From In-Depth Analysis of Human Errors Resulting in Diagnostic Errors in the Emergency Department: An Analysis of Serious Adverse Event Reports. *J Patient Saf.* 2022 Dec 1;18(8):e1135-e1141. doi: 10.1097/PTS.0000000000001007.
14. Rosner, BJ., Zwaan, L., Olson, A., Imagining the future of diagnostic performance feedback, *Diagnosis*, 2022, doi.org/10.1515/dx-2022-0055
15. Waechter, J., Allen, J., Lee, CH., Zwaan, L., Development and Pilot Testing of a Data-Rich Clinical Reasoning Training and Assessment Tool, *Acad Med*, 97(10) 2022, p1484-1488.
16. Sibbald, M., Zwaan, L., Yilmaz, Y., Lal, S., Incorporating artificial intelligence in medical diagnosis: A case for an invisible and (un)disruptive approach. *J. Eval Cli Prac.* 2022. doi.org/10.1111/jep.13730
17. Staal, J., Speelman, M., Brand, R., Alsma, J., Zwaan, L., Does a suggested diagnosis in a general practitioners' referral question impact diagnostic reasoning: an experimental study, *BMC Med Ed*, 2022, 22, 256. doi.org/10.1186/s12909-022-03325-7.
18. Sallay, V., Martos, T., Lucza, L, Weiland A, Stegers-Jager KM, Vermeir P, Mariman ANMM, Csabai M. Medical educators' experiences on medically unexplained symptoms and intercultural

- communication—an expert focus group study. *BMC Med Educ* 2022;310. doi.org/10.1186/s12909-022-03275-0.
19. Van Andel CEE, Born MPh, Van den Broek WW, Stegers-Jager KM. Do norms unintentionally increase stereotypical expressions? A randomized controlled trial. *Med Educ* 2022;56(3):331-338.
 20. Born MPh*, Stegers-Jager KM*, Van Andel CEE. Inferring signs from purposeful samples: The role of context in competency assessment. *Med Educ* 2022;56(1):117-126. (*shared 1st authorship). Invited review paper.
 21. Van Andel CEE, Born MPh, Van den Broek WW, Stegers-Jager KM. Student ethnicity predicts social learning experiences, self-regulatory focus and grades. *Med Educ* 2022;56(2):211-219.
 22. Kickert R, Meeuwisse M, Stegers-Jager KM, Prinzie P, Arends LR. Curricular fit perspective on motivation in higher education. *High Educ* 2022;83(4):729-745.
 23. Baum AU, Hart A, Elsherif, MM, Ilchovska ZG, Moreau D, Dokovova M, LaPlume AA, Krautter K, & Staal J. Research without borders: how to identify and overcome potential pitfalls in international large-team online research projects. *SAGE Research Methods: Doing Research Online (SAGE Research Methods Cases)*. <https://doi.org/10.4135/9781529602074>
 24. Dijkstra, K., Pekaar, K., Hooftman, J., & Osch, Y. van. (2022). The Role of Photographs and Time Lag on Positivity Ratings of Vacation and Weekend Memories. *Journal of Psychological Research*, 4(1), 27–35. <https://doi.org/10.30564/jpr.v4i1.4131>
 25. Faber, T. J., Dankbaar, M. E., Kickert, R., van den Broek, W. W., & van Merriënboer, J. J. (2022). Identifying indicators to guide adaptive scaffolding in games. *Learning and Instruction*, 83, 101666.
 26. van Peppen, L., Faber, T. J., Erasmus, V., & Dankbaar, M. E. (2022). Teamwork Training With a Multiplayer Game in Health Care: Content Analysis of the Teamwork Principles Applied. *JMIR Serious Games*, 10(4), e38009.
 27. Kalfsveld, L., Hoek, K., Bethlehem, C., van der Kuy, H., van den Broek, W. W., Versmissen, J., & van Rosse, F. (2022). How would final-year medical students perform if their skill-based prescription assessment was real life? *British Journal of Clinical Pharmacology*, 88(12), 5202-5217.

National publications

1. Steenman S, Stegers-Jager K, Cleutjens K. Is selecteren een medicijn dat niet werkt? *Th&ma* 2022;4:36-41
2. Report: Monitor Zorggerelateerde Schade 2019. Dossieronderzoek bij overleden patienten in Nederlandse ziekenhuizen. Chapter 'Zorggerelateerde schade in het diagnostisch proces' (L Zwaan, J Hooftman), NIVEL/APH, Utrecht/Amsterdam, 2022.

PhD graduations

1. Telma Kremer. Title of the project: Students' Emotions and Learning in Medical Education. Graduation: November 1st, 2022.
2. Chantal van Andel: Title of project: Clinical Grade Differences Between Ethnic Minority and Majority Students: Institutional-, assessor-, and student-related factors. Graduation: April 12th 2022.

Invited research lectures

1. Guest lecture S. Mamede. *Teaching and Learning of Clinical Reasoning and Decision Making* Charité Berlin Dieter Scheffner Fach Coloquium. Berlin, Germany, June 6, 2022.
2. Key note address S. Mamede. *Instructional Approaches for the Teaching of Clinical Reasoning*. II Brazilian Clinical Reasoning Congress. Londrina, Brazil, July 30, 2022.
3. Invited lecture L. Zwaan, the 'Julia Berg lecture' on diagnostic error, in memory of Julia Berg. Minneapolis, USA, October 20, 2022
4. Key note address S. Mamede. *Why do we need to renew the teaching of clinical reasoning*. EXPOESP Symposium (Fortaleza, Brazil). November 11, 2022.
5. Invited presentation L. Zwaan: University Medical Center Utrecht. *Diagnostic error in medicine, a Safety-II approach*. November 22, 2022
6. Guest lecture S. Mamede. *Reflection in medical diagnosis: Insights from research on clinical reasoning*. College of Anaesthesiologists of Ireland Symposium and Planning Workshop on Reflective Practice. Dublin, Ireland, December 15, 2022.
7. Invited keynote presentation L. Zwaan. *Understanding diagnostic reasoning and diagnostic error in medicine*. Swedish National conference on diagnostic error. Stockholm, Sweden, November 29, 2022.
8. Invited grand rounds lecture L. Zwaan, Johns Hopkins University medical center, department of Medicine. *'The Psychology of Diagnostic Reasoning in Medicine*.

Societal impact: Presentations

1. Netherlands: diversity by lottery? Keynote lecture at TASO and Sutton Trust Conference on Fair admissions beyond Post-qualification admissions. UK. January 2022. (K Stegers-Jager)
2. Cijfers als toelatingmethode: diversiteit en percepties van kandidaten (S Fikrat-Wevers). NVMO Werkgroep Selectie. April 2022
3. Workshop: Een diversiteit aan methoden. De rol van verschillende toelatingmethoden en context in hun invloed op diversiteit (S Fikrat-Wevers and KM Stegers-Jager). Universiteiten van Nederland. May 2022.
4. Selectie en diversiteit. Wat zijn de geleerde lessen? Keynote lecture Learning Community Universiteiten van Nederland. May 2022. (K Stegers-Jager)
5. What are the risks in the diagnostic process for the laboratory field? An analysis of serious adverse event reports and voluntary incident reports (L Zwaan). Laboratory group Den Haag. October 2022.
6. Toegankelijkheid: ongelijkheid in beoordeling van studenten. Werkconferentie Diversiteit en inclusie in de initiële medische opleidingen; op weg naar inclusieve en rijke curricula. Radboudumc, October 2022. (K Stegers-Jager)
7. Hoe selectie kan bijdragen aan inclusieve zorg (S Fikrat-Wevers). D66 members of House of Representatives (Tweede Kamer), The Hague. November 2022
8. Hoe selectie kan bijdragen aan inclusieve zorg (S Fikrat-Wevers). Gemeenschappelijke Vergadering of Erasmus MC, Rotterdam. November 2022
9. How selection can contribute to inclusive healthcare (S Fikrat-Wevers). Amsterdam United, Amsterdam. November 2022
10. Kandidaatpercepties van selectiemethoden: argumentaties en subgroepverschillen. Webinar for CoMaster (S Fikrat-Wevers), Amsterdam. December 2022

Societal Impact: Interviews and dissemination to general public

1. Interview/film for a popular science e-book (litvideobooks.com/intelligence) that featured our deliberate reflection research (S Mamede)
2. Interview (S Fikrat-Wevers): Kansengelijkheid toegenomen na invoering selectie; wat gaan we eraan doen? M Bakker. ScienceGuide 2022 <https://www.scienceguide.nl/2022/04/kansengelijkheid-toegenomen-na-invoering-selectie-wat-gaan-we-eraan-doen/>

Societal impact: Education policy

1. Adaptation assessment policy, 4-eyes principle in assessment Bachelor essay, Bachelor in Medicine program Erasmus MC (AM Woltman, VMA Broks)
2. Innovation selection policy (AM Woltman, KM Stegers-Jager), Bachelor in Medicine program Erasmus MC, Rotterdam.
3. Advice Academic Dismissal policy Bachelor in Medicine program (AM Woltman), Erasmus MC, Rotterdam.
4. Advice on new (programmatic) assessment policy for the master curriculum Erasmus MC (K Stegers-Jager)

Awards and recognition

The Johns Hopkins Project Med Ed 'Must Reads' Team selected the article titled 'Deliberate reflection and clinical reasoning: Founding ideas and empirical findings', by Mamede & Schmidt, as a 'must read' paper among all medical education publications coming out in the previous period.