



News from Volpara Science

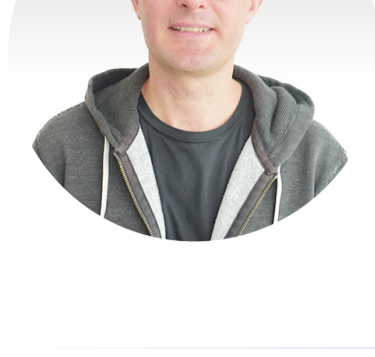
Volume 2: September/October 2021

Research Brief

Volpara's Research Brief is a regular update about the latest from Volpara Science and other industry leaders around the world.

This edition features many recent papers, Volpara's new milestone of 200 peer-reviewed papers, and an update on our commitment to patient advocacy and education.

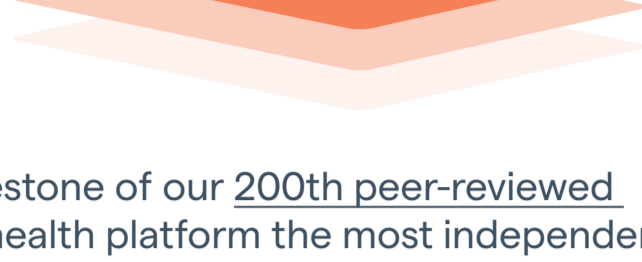
MEET A MEMBER OF OUR TEAM



Seymour Knowles-Barley, PhD
Senior Machine Learning Engineer (Wellington, NZ)

Seymour engages in a scientific, evidence-based approach to train state-of-the-art machine learning tools in order to improve Volpara products. Before Volpara, Seymour worked with deep learning AI for real-world imaging problems at Google, and for biological image analysis at Harvard University. Seymour holds a BSc (Hons) from the University of Canterbury, an MSc in bioinformatics and a PhD in neuroinformatics, both from the University of Edinburgh.

SPOTLIGHT STUDY



Volpara's 200th Peer-Reviewed Paper

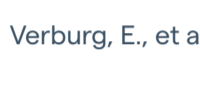
In October, Volpara achieved the milestone of our 200th peer-reviewed paper, making the Volpara AI breast health platform the most independently validated of its kind. This accomplishment showcases the company's dedication to building evidence-based solutions to improve breast cancer detection, risk assessment, and outcomes.

Deep learning for automated triaging of 4581 breast MRI examinations from the DENSE Trial

Many breast magnetic resonance imaging (MRI) exams are normal and accurately identifying these can reduce radiologist workload. A deep-learning (DL) model was developed to differentiate between breasts with lesions and without lesions on MRI. The model's feasibility as an automated triaging method was evaluated in a secondary analysis of data from the DENSE trial. The study found:

- Of the 4,581 MRI exams conducted in women with extremely dense breasts during the first screening round of the DENSE trial, 838 breasts had at least one lesion (77 of which were malignant) and 8,324 had no lesions.
- Set at 100% sensitivity for malignant lesions:
 - The DL model considered 90.7% of the MRI exams with lesions to be non-normal and would have triaged them to radiologic review.
 - The DL model considered 39.7% of the MRI exams without lesions to be normal and would have dismissed them without radiologic review.

Therefore, automated analysis of breast MRI exams in women with extremely dense breasts dismissed nearly 40% of normal exams without missing any cancers, showing the potential for radiologist workload reduction while maintaining cancer detection.

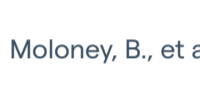


Verburg, E., et al. Radiol Breast Imaging. 2021. <https://doi.org/10.1148/radiol.2021203960>

BITE-SIZED STUDY SUMMARIES

Microwave imaging in breast cancer – results from the first-in-human clinical investigation of the Wavelia system

It has been suggested that Microwave Breast Imaging (MBI) could be an option to supplement mammography. As such, this study investigated the detection and localization of breast lesions with MBI, finding that the MBI system detected and localized the majority of breast lesions.



Moloney, B., et al. ScienceDirect. 2021. <https://doi.org/10.1016/j.acra.2021.06.012>

A deep learning approach to re-create raw full-field digital mammograms for breast density and texture analysis

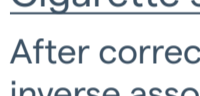
Raw images are often not stored. This study used deep learning to recreate raw images from presentation images, performing well overall and showing strong agreement in four image evaluation metrics, breast density, and the majority of 29 widely used texture features.



Shu, H., et al. Radiol Artif Intell. 2021. <https://pubs.rsna.org/doi/10.1148/ryai.2021200097>

Reducing false-positive screening MRI rate in women with extremely dense breasts using prediction models based on data from the DENSE Trial

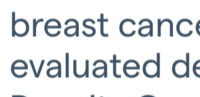
As part of the DENSE trial, this study showed that for those women with extremely dense breasts, false-positive rates in MRI and benign biopsy rates may decrease when prediction models based on clinical characteristics and MRI findings are used.



den Dekker, B., et al. Radiol Breast Imaging. 2021. <https://doi.org/10.1148/radiol.2021210325>

Cigarette smoking and mammographic breast density among Polish women

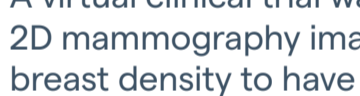
After correcting for potential confounding factors, this study found a significant, yet weak inverse association between the number of pack-years and volumetric breast density among the current smokers.



Peplorńska B., et al. Int J Occup Med Environ Health. 2021. doi: 10.13075/ijomeh.1896.01832. Epub ahead of print.

Deep learning predicts interval and screening-detected cancer from screening mammograms – A case-control study in 6369 women

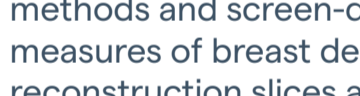
A DL model was developed to predict the risk of interval and screen-detected breast cancer. The DL model combined with clinical risk factors predicted screen-detected breast cancer better than the clinical risk factors alone, and was consistent across evaluated density measures (visual BI-RADS, volumetric breast density and Volpara Density Grades). However, all of the breast density measures provided better prediction of interval cancers compared to the DL model alone and similar performance to the DL model plus breast density.



Zhu, X., et al. Radiol Breast Imaging. 2021. <https://doi.org/10.1148/radiol.2021203758>

Effect of glandularity on the detection of simulated cancers in planar, tomosynthesis and synthetic

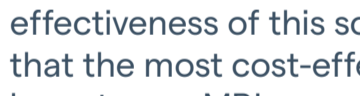
A virtual clinical trial was held to compare lesion detection between 2D, 3D, and synthetic 2D mammography image types at different breast glandularities. The findings showed breast density to have a small effect on calcification detection, with a larger calcification size being required for a detection using synthetic 2D. The minimum detectable mass lesion size significantly increased with increasing density for all image types.



Mackenzie, A., et al. Med Phys. 2021. doi: 10.1002/mp.15216. Epub ahead of print.

Fully automated volumetric breast density estimation from digital breast tomosynthesis

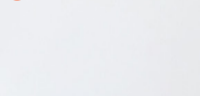
This study compared the associations between several fully-automated breast density methods and screen-detected, invasive breast cancer risk. For percent and absolute measures of breast density, volumetric breast density percent estimates from DBT reconstruction slices and Volpara's dense volume estimates had the strongest associations with breast cancer risk, respectively.



Gastouniotti, A., et al. Radiology. 2021. doi: 10.1148/radiol.2021210190. Epub ahead of print.

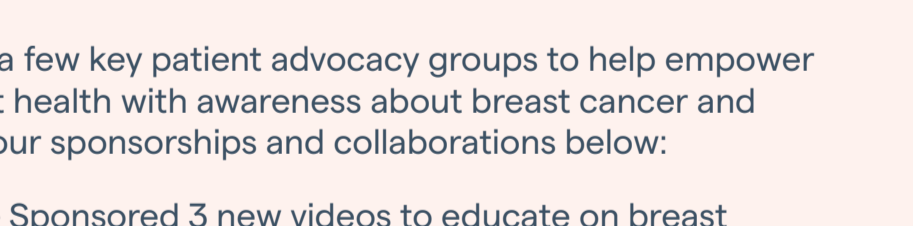
Cost-effectiveness of magnetic resonance imaging screening for women with extremely dense breast tissue

The DENSE trial showed that additional MRI screening in women with extremely dense breasts resulted in a substantial reduction in interval cancers, however the cost effectiveness of this screening strategy was unknown. Microsimulation modelling showed that the most cost-effective strategy for 50-75 year old women with extremely dense breasts was MRI screening alone every four years, but that MRI screening at 2-3 year intervals can be considered cost-effective also.



Geuzinge, HA., et al. JNCI. 2021. <https://doi.org/10.1093/jnci/djab119>

EMPOWERING PATIENTS



This October, Volpara partnered with a few key patient advocacy groups to help empower patients to take charge of their breast health with awareness about breast cancer and high breast density risk. Learn about our sponsorships and collaborations below:

Brem Foundation to Defeat Cancer – Sponsored 3 new videos to educate on breast density, risk assessment for young women, and questions to ask a doctor about breast care

DenseBreast-info – Participation in International #BreastDensityDay social media day

Know Your Lemons – Sponsored blog and social media posts educating about breast density

My Density Matters – Sponsored Tweet Chat to help women learn how to find out their breast density

OTHER SCIENCE-RELATED NEWS

[Researchers around the world comment on working with Volpara](#)

[Engaging Women with Enhanced Mammography Letters, Radiology Today Magazine](#)

[Volpara launches Volpara Density Profile™ and new patient website](#)

[Volpara Chief Scientific Officer discusses cancer risk assessment in DI Europe](#)

[Volpara partners with Riverain Technologies](#)

[Volpara begins collaboration with RevealDx](#)

[Rezolut adopts Volpara technology](#)

[Study reviews pilot of online, personalized breast cancer risk assessment tool](#)

[Study reviews application of Rasch measurement framework to mammography positioning data](#)

If you would like to discuss using Volpara's software for your personalized breast care or early detection research, please contact research@volparahealth.com and we'll be in touch!