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# The Loyal Employee

THE JOURNAL 2023

**David Koff**

No Blame, No Shame - A New Quality Approach in Radiology With Peer Learning

**Ian Weissman, Maria Ortlieb**

Building a Culture of Well-Being for Clinicians Today Through Community and Leadership

**Iris Meyenburg-Altward**

Training with Simulation in Nursing Care

**Rachel Marie**

A Trifecta Approach to Reducing Healthcare Personnel Turnover

**Lilly Beyond**

Healing from Within: The Silent Revolt for Mental Fitness in Healthcare

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# Editorial



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## The Loyal Employee

It has long been acknowledged that the backbone of the healthcare system consists of a strong, caring and resilient workforce. Healthcare workers play a pivotal role in ensuring the success of a hospital and, more importantly, in providing the best possible care to patients.

However, in recent years, the healthcare workforce has faced significant challenges and pressures, leading to many quitting due to burnout, long hours, heavy patient caseloads, and personal health concerns.

The ongoing shortage of healthcare workers is a persistent issue that appears to be worsening. Hospitals and long-term care facilities continue to see older staff retire and others leave their positions. The outcomes are consistent – a shortage of healthcare services results in a decrease in the quality of healthcare.

To address this problem, sustainable investments in the healthcare workforce and improving working conditions are imperative. These measures are essential for retaining the health workforce and restoring their trust in the system. It is evident that we need a new and strategic approach to invest in the recruitment, retention and loyalty of healthcare workers.

In our latest cover story, “The Loyal Employee”, our contributors address critical questions that we must ask and strive to find solutions for: How can healthcare workers be retained? What strategies can increase their loyalty? How can healthcare organisations improve the lives of healthcare employees?

David Koff talks about how radiologists sometimes make errors and how peer learning could be a safe way to improve performance and benefit from each other’s errors. Ian Weissman and Maria Ortlieb discuss strategies for improving clinician well-being and staff retention.

Iris Meyenburg-Altwarz explores whether simulation could be a valuable tool for addressing the shortage of nurses in the healthcare sector and how it

can provide realistic and safe learning environments for nursing students and professionals.

Rachel Marie proposes a practical approach for managers to reduce turnover by combining a strong employer value proposition with effective employee onboarding, targeting the critical first year of employment. Lilly Beyond highlights the high price of neglecting employee mental fitness and discusses the path to lasting loyalty in the healthcare sector.

Jeff Richards talks about the expected shortfall of registered nurses by 2030 and highlights the need to attract young people to the profession in massive numbers and find the resources to educate and train them.

Susana Álvarez Gómez emphasises that health institutions are knowledge organisations whose *raison d’être* is patient care and how they must transition towards leadership capable of generating multidisciplinary and collaborative teams. Paul De Raeve and Jochen Bergs delve into the exodus of nurses, the ramifications of this on patient safety and quality of care and the need to keep experienced nurses in the nursing profession.

Sylvia Stocker thinks about robots and AI, their potential to become passionate employees and the potential of human-robot collaboration to empower employees and allow them to focus on meaningful tasks and personalised care. Frederico Sárágga, Wonchul Cha and Henrique Martins explore Metaverse applications and their potential usage in the medical field.

We hope you enjoy reading this issue and welcome any feedback.

Happy Reading!

A handwritten signature in black ink that reads "Steve Lieber". The signature is written in a cursive, flowing style.

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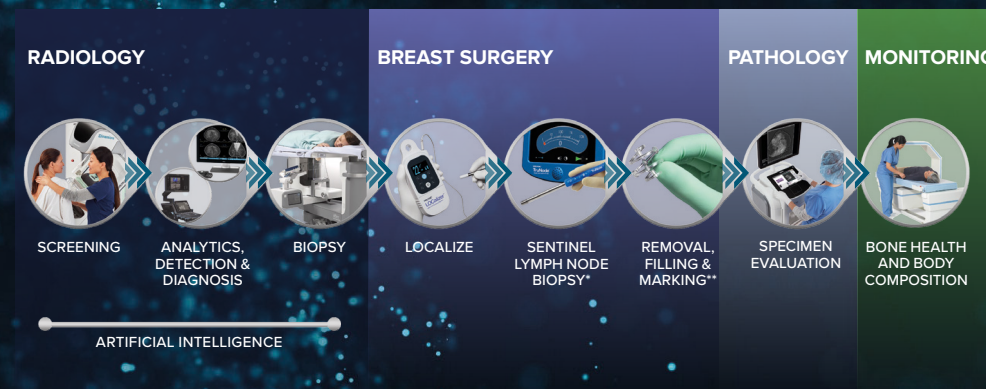
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## Łukasz Bieruta, SOFTDOTS



Łukasz Bieruta is the co-owner, Business Development Director and an IT Architect at SOFTDOTS. With an Executive MBA and a masterful grasp of industry dynamics, Łukasz has a proven track record of transforming operational delivery into profitable and innovative ventures. He is recognised for his visionary approach to team building, resource management, and project execution. His career is a beacon for aspiring IT leaders and a testament to the power of effective leadership in technology's ever-evolving landscape.

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## Paul De Raeve, Belgium



Paul De Raeve has been a registered nurse since 1984. He obtained a master's degree in nursing science at the Free University of Brussels, a master's degree in Statistics from the Catholic University of Brussels, and a PhD from the King's College University of London. Paul holds an Adjunct Professorship at the University of Hasselt since 2023. Paul was appointed staff manager at the Free University Hospital of Brussels, part-time delegated to the Belgium Ministry of Health and Environment. In 2002, Paul De Raeve was appointed General Secretary of the European Federation of Nurses Associations (EFN).

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Lilly is an award-winning ecosystem builder turned Mental Fitness Trainer for Executives, helping leaders stay sane and on top in challenging times. She is one of the first professional coaches in Europe to bring Stanford U's Positive Intelligence® to the EMEA region. Lilly has 15+ years of experience in Communication Design and Art Consulting, as well as a sought-after Creative Strategist and Emotional Intelligence Advisor. She is a Triple-Certified Business and executive Life Coach and a Strategic Internal Communication Advisor to leaders in Fortune 500 companies to scale-ups.

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## Susana Álvarez Gómez, Spain



Susana Álvarez Gómez is a health management professional with experience in management positions in public and private centres for the last 20 years. Susana is the Deputy Director for Public Procurement for Madrid Health Service in Madrid, Spain.

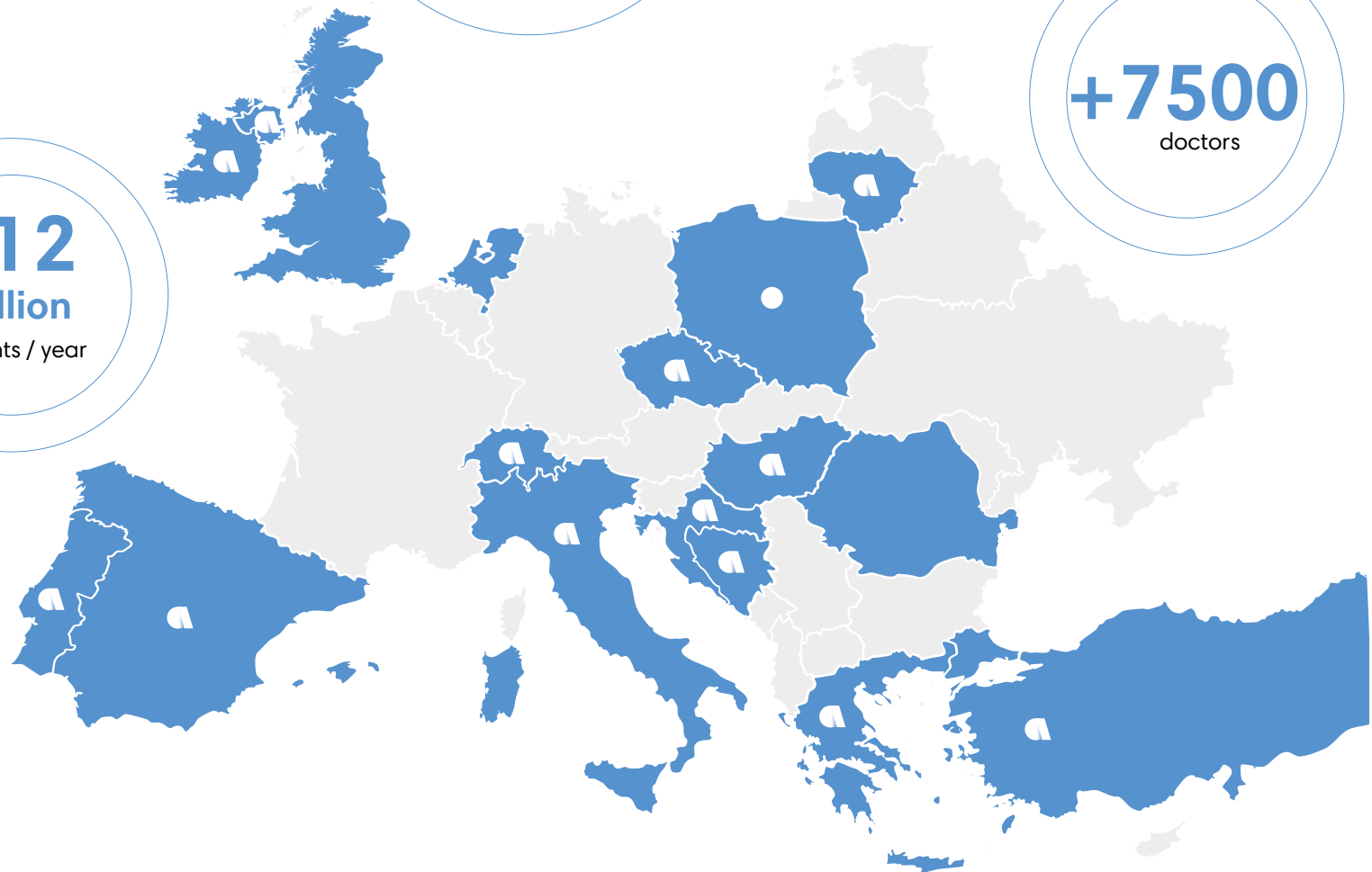
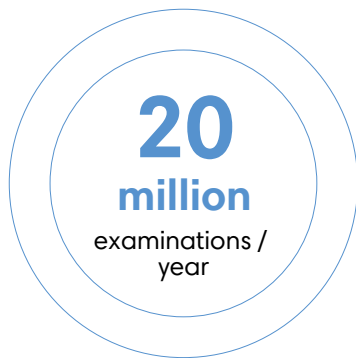
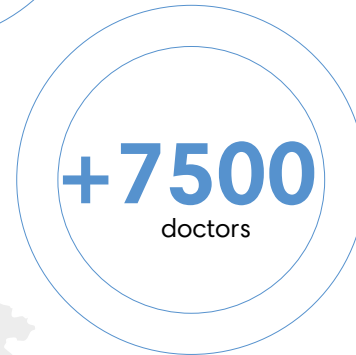
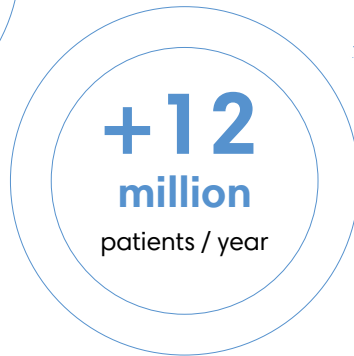
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David Koff is Professor Emeritus at McMaster University, past Chief and Chair of the Department of Radiology. He is the founder and director of MIIRCAM, the Medical Imaging Informatics Research Centre at McMaster, leading research projects on radiation risk, validation of technology and applications of Artificial Intelligence to medical imaging. Prof Koff is Chair of Canada Safe Imaging, part of the ISRQSA international radiation safety campaigns. He is a co-founder of RealTime Medical, a Canadian teleradiology and software company.

## Rachel Marie, USA



Rachel Marie, founder of The Optimized Office, is an Organisational Development Consultant based in Vancouver, Washington. Her approach to developing workplace processes is grounded in a belief in the transformative power of employer-employee partnerships. Her other roles include Business Manager for REAP, a multicultural youth leadership programme, and advisory services for Preppio Onboarding Software.

## Iris Meyenburg-Altwarz, Germany



Iris Meyenburg-Altwarz is a veteran expert in nursing education. Iris has been a consultant for numerous projects and is part of ENDA, WANS and STTI. After leaving her senior position at the Education & Training Academy at MHH (Germany), she now runs Com-P-Tense, an independent consultancy.

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## Jeff Richards, USA



Jeff Richards is the COO and Co-founder of SnapCare. His experience comes from high-level clinical and administrative roles at Grady in Atlanta, where he saw the nurse staffing problem up close and founded SnapCare to address those problems.

## Sylvia Stocker, Switzerland



Sylvia Stocker brings a wealth of experience in robotics, economics and performing arts. She is the Founder & CEO of ARABESQUE LLC, a Global Robotics & AI Thought Leader, and occasionally nominated for awards. At Arabesque, she provides consulting services to clients in human-centred automation. In her keynotes and expert articles, Sylvia speaks on robotics, AI and Happy People! Previously, she lived and worked successfully in New York, Paris, London and Barcelona.

## Ian Weissman, USA



Ian Weissman is a radiologist from Milwaukee, Wisconsin. He currently serves on the American College of Radiology's Council Steering Committee, the legislative/executive branch of the ACR. Dr Weissman holds several national leadership positions, such as the Chair of the American College of Radiology's Patient and Family-Centered Care Outreach Committee, and he is the immediate past president of the Wisconsin Radiological Society. He is the 2023 recipient of the Radiology Leadership Institute's Impact in Leadership Award for his national efforts to improve the well-being of his colleagues.

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## Frederico Sáragga, Portugal



Frederico is a medical student at Católica Medical School. He is interested in digital health, health management and medical innovation. Frederico is also curious about Metaverse-related technologies and AI in health education.

## Athina Vourtsis, Greece



Athina Vourtsis is the founder of Athena Medical, a private Breast Imaging and Women's Health Centre in Athens, Greece, where she is the Head of the Radiology department and Chief Scientific Advisor. She is also the Founding President of the Hellenic Breast Imaging Society. She has a special interest in supplemental screening methods and AI. Throughout her career, she has actively supported breast awareness programs. As a member of the Medical Advisory Board and European Liaison of DenseBreast-Info.org, she has been working on expanding DBI-s Educational Coalition into Europe.

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# Spotlight



# High-Resolution Digital PET/CT - uMI Vista at St. Orsola University Hospital

World-renowned St. Orsola University Hospital (Policlinico di Sant'Orsola) integrates the cutting-edge High-Resolution Digital PET/CT - uMI Vista from United Imaging into their comprehensive Medical Oncology Unit.



United Imaging Healthcare Europe proudly announces that world-renowned St. Orsola University Hospital (Policlinico di Sant'Orsola) has recently decided to integrate the cutting-edge High-Resolution Digital PET/CT - uMI Vista into their comprehensive Medical Oncology Unit.

Founded in 1592 as the first hospital in the city of Bologna, St. Orsola University Hospital is home to the Faculty of Medicine and Surgery of the University of Bologna, the oldest University in the World. This impressive institution, organised into nine departments, including 87 operative units, has gradually grown to become the largest district general hospital in Italy, with approximately 1515 beds and 6,807 employees. Every year, as many as 49,000 hospitalisations and 3,300,000 specialist external services are carried out. St. Orsola University Hospital has earned worldwide acclaim for its extensive expertise in the field of transplantology and oncology. In 2003, The Medical Oncology Operational Unit was recognised as the “European Center of Excellence” by the European Society of Medical Oncology (ESMO).





In addition to being a high-capacity treatment centre, St. Orsola University Hospital is a prolific research facility, employing a dedicated team of 1,076 researchers. The decision to rely on the uMI Vista, a state-of-the-art positron emission tomography-computed tomography, reflects St. Orsola University Hospital's dedication to offering patients the diagnostic process of the highest standard.

The uMI Vista digital PET-CT system is integrated with 24cm wide AFOV, the industry's finest LYSO crystal technology of 2.76x2.76mm with the unique combination of Integrated-Light-Guide PET detector technology and fine 303ps TOF performance. This system is equipped with a 160-slice CT system with the fastest rotation time of 0.3 seconds and isotropic resolution of 0.25mm, the best in the industry. This rich technology combination sets a completely new standard in molecular imaging. This system is also integrated with artificial intelligence deep learning reconstruction in PET imaging. The fine crystal technology results in high definition-functional images with exceptional anatomical structure differentiation and visualisation, and significant improvement in levels of diagnostic precision in the fields of oncology, neurology, and cardiology imaging.

The uMI Vista digital PET-CT leverages a range of technological advancements, all geared towards ensuring unprecedented imaging possibilities. The wider AFOV and AI-based DPR in PET results in a whole-body FDG PET-CT scan in 5 minutes with superior high-resolution image quality and accuracy.

With the remarkable 1024x1024 Reconstruction Matrix option in PET, this system results in high spatial resolution PET images by enabling the visualisation of small anatomical details and the detection of lesions as small as 2mm. This system is also equipped with the HYPER Iterative algorithm that improves signal-to-noise ratio and contrast recovery to aid lesion detectability and quantitative accuracy.

This uMI Vista is also integrated with the 70kV Scan Mode in CT, especially designed for paediatric, children and low BMI patients. This advanced feature enables a reduction in CT radiation dose while enhancing image contrast. The 70kV Scan Mode stands as a prime example of innovative technology that minimises patient radiation exposure, enhancing image contrast without compromising diagnostic quality. uMI Vista has been meticulously designed to meet the evolving needs of comprehensive treatment

centres. Its carefully planned modular structure ensures exceptional system reliability and serviceability, capable of seamlessly handling the high volume patient throughput.

The uMI Vista stands at the forefront of medical technology, seamlessly combining PET and CT technologies to deliver patients an unparalleled level of precision and safety in diagnostics. Furthermore, the uMI Vista provides support to medical professionals during molecular imaging, optimising workflow efficiency.

United Imaging Healthcare Europe is proud to announce a collaborative partnership with the internationally acclaimed St. Orsola University Hospital aimed at enhancing accessibility to cutting-edge molecular imaging services. This collaboration will positively impact the experiences of thousands of patients admitted to the hospital, who will now benefit from the ability to receive highly accurate diagnoses and, subsequently, tailored treatment plans, ensuring the highest quality of care.

### About United Imaging Healthcare

United Imaging Healthcare was founded in 2011 with a commitment to provide high-performance medical imaging products, radiotherapy equipment, life science instruments, and intelligent digital solutions to global customers. With a mission "To Bring Equal Healthcare for All" and a vision to "lead healthcare innovation", United Imaging is continuously devoted to creating more value for its customers and improving the accessibility of high-end medical equipment and services worldwide through close collaborations with hospitals, universities, research institutions, and industry partners.



# Implications of Breast Density on Cancer Screening



**ATHINA  
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Athina Vourtsis is the founder of Athena Medical, a Breast Imaging and Women's Health Centre in Athens, Greece, where she is the Head of the Radiology department and Chief Scientific Advisor. She is also the Founding President of the Hellenic Breast Imaging Society. Dr Vourtsis has shown special interest in supplemental screening methods and AI. Throughout her career, she has actively supported breast awareness programmes. As a member of the Medical Advisory Board and European Liaison of DenseBreast-Info.org, she has been working on expanding DBI's Educational Coalition into Europe.

## **What are the implications of breast density on cancer screening, and do you think it can impair the sensitivity of mammography?**

Having dense breasts is a normal condition that over 40% of women have after the age of 40. However, breast density has become a challenging topic for both women and radiologists. Various studies have shown that breast density reduces the sensitivity of mammography due to the masking effect of uncalcified breast cancer. Therefore, in women with dense breasts, a normal mammography report does not exclude the possibility that a tumoural tissue is not hidden within the radiopaque (white) on mammography dense breast tissue. Also, many studies have shown that cancers diagnosed in this group of women are at a higher grade, larger in size, and often present with symptoms, leading to an increase in the interval cancer rate compared to women with non-dense

breasts. In addition, breast density has been recognised as an independent risk factor for developing breast cancer. The denser the breast, the greater the risk. This explains why breast density has been integrated into many risk assessment models, playing an important role in shaping screening strategies.

## **How can breast screening be personalised for women with dense breasts?**

Significant changes need to be made to adopt personalised breast cancer screening in women with dense breasts. This may involve organisational changes in healthcare systems and clinical settings. Automated density software for reliable breast density assessment and the integration of risk prediction models are necessary for the adoption of risk-based screening and prevention counselling in a primary care setting. This will lead to more precise management regarding personalised risk-based screening. At the same

time, the accessibility to genetic counselling will provide opportunities to indicate related preventive measures and to determine the appropriate screening tests and at what age to begin. In addition, breast density is a modifiable risk factor that may need to be reassessed periodically. Essentially, the feasibility of implementing personalised screening in women with dense breasts may vary from country to country according to funding and the type of healthcare policies.

## **How do you think supplemental screening can be more effectively utilised keeping in mind the fact that there is a lack of consistent guidelines regarding this?**

Increased knowledge of breast density implications has created the need to investigate various options to revise the current screening guidelines and to evaluate the possibility of adopting a personalised



risk-based approach. Considering the benefits of supplemental screening in addition to mammography in women with dense breasts may aid in moving forward from a “one size fits all” strategy into the adoption of personalised screening for these women. Patient-increased awareness through various advocacy groups has played a fundamental role in educating women and influencing many educational organisations to issue position statements supporting supplemental screening for women with dense breasts. This transition has been a driving force for policymakers to comprehend the advancements of supplemental screening and to find resources to reshape screening strategies.

**What breast imaging techniques do you recommend facilitating early diagnosis in women?**

At our facility, we look at individual risk profiles and density using the Tyrer-Cuzick model to optimise personalised breast cancer screening for each woman separately. We have integrated tomosynthesis, and automated breast density volumetric assessment is used for more precise density measurement. In women with dense breasts, we perform supplemental automated breast ultrasound, and if there is any concern, a diagnostic hand-held breast ultrasound is followed during the same visit. The implementation of double reading of all tomosynthesis and automated breast ultrasound examinations has been adopted, and AI reading solutions are used for both systems. We have adopted the EUSOBI guidelines, and we recommend MRI in women with extremely dense breasts every two to

four years, whereas, in women who cannot tolerate MRI, contrast-enhanced mammography is offered. In women with >20% lifetime risk of breast cancer, MRI is considered, as well as in women with lobular carcinoma in situ or atypical hyperplasia. We also suggest annual screening MRI in addition to tomosynthesis in women with a personal history of breast cancer diagnosed by age 50 or with dense breasts.

**What measures can be undertaken to help women make an informed choice on screening methods?**

Most women in Europe do not have the choice to pursue supplemental screening independent of their healthcare providers or government-sponsored screening. Education and training of healthcare professionals may help in delivering clear and comprehensive information to women that will help them to make informed decisions. Understanding the benefits and risks of supplemental screening is essential in the informed decision-making process. DenseBreast-info.org (DBI), and subsequently DBI/Europe, was launched to educate women and healthcare professionals about the screening and risk implications of breast density and the effect of supplemental screening.

**Do you think breast cancer screening guidelines need to be reviewed/updated? What would you recommend in this regard?**

Currently, there is a lack of consistent European-wide guidelines, resulting in unequal access to

supplemental screening –with the potential for sub-standard care. However, recently, there has been a change in the paradigm of breast cancer screening in European women with extremely dense breasts. The results of the randomised DENSE trial published in the *New England Journal of Medicine* demonstrated that contrast-enhanced breast MRI identified another 16.5 cancers per 1000 women screened and that the interval cancer rate was reduced from 4.9/1000 to 0.8/1000 among women having supplemental MRI every other year, after negative mammography (Bakker et al. 2019). The results of this study have provided evidence supporting the EUSOBI recommendations, suggesting breast MRI every two to four years in women with extremely dense breasts, accounting for about 10% of the total screening population.

Additionally, further guidance is needed for screening women with heterogeneously dense breasts since they also have a high risk of masking effect of non-calcified cancer on mammography and of the higher incidence of interval cancer rate. However, widespread implantation of MRI in both women with extremely dense and heterogeneously dense breasts is unlikely with current resources and a lack of specialised technologists and radiologists on MRI in most healthcare systems widely throughout Europe. Therefore, at present, alternative approaches to personalised screening for women with dense breasts should be considered. Other feasible options are to replace 2D mammography with tomosynthesis and to apply supplemental automated or hand-held breast ultrasound. Both hand-held ultrasound and



automated breast ultrasound have been shown to improve breast cancer detection in women with dense breasts when added to mammography with an incremental CDR of 2.0-2.7 per 1000 women screened. Additionally, contrast-enhanced mammography has shown an incremental CDR equal to 10.7 per 1,000 women screened beyond 2D mammography (Berg et al. 2021). These results are promising, suggesting that contrast-enhanced mammography may be used as an alternative imaging tool for women who cannot tolerate breast MRI.

### **What role can Hologic play in increasing awareness and improving early cancer diagnosis? How can the Women's Health Index help?**

Hologic can play a key role in raising awareness and improving breast cancer detection by using the Global Women's Health Index network to inform women on the implications of breast density and to promote supplemental screening options according to women's risk profile. Women who get screening truly believe if they develop cancer, it will be found at an early stage.

Therefore, the benefits and potential risks of tomosynthesis and supplemental screening with ultrasound or MRI, as well as contrast-enhanced mammography, may thereby increase women's awareness, which may result in more effective and meaningful communication to reduce anxiety and to pursue supplemental examinations. The Global Women's Health Index has the potential to deliver information to women in the format of a questionnaire that will be clear and comprehensively presented based on the religion, ethnicity, education, and women's preferences for each country.

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# Cover Story

# No Blame, No Shame - A New Quality Approach in Radiology With Peer Learning

Radiologists make errors, and this is inevitable. Peer Learning is a safe way to improve the performance of the entire group of radiologists, benefitting from each other's errors in a spirit of Just Culture. The process is anonymous; there is no scoring, shame, or blame.



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## key points

- The overall prevalence of errors in radiology has not significantly changed since the 1960s.
- Radiologists are not aware of their blind spots or of the need to create a search pattern.
- Other factors contribute to the generation of errors, such as workplace interruptions, reader fatigue, volume overload or poor image quality.
- The radiology community needs an innovative system where the whole group can learn from individual mistakes in a safe and non-punitive way.
- The Canadian Association of Radiologists has recommended the cultural shift from peer review to peer learning in its Peer Learning Guide.

The overall prevalence of errors in radiology has not significantly changed since the 1960s. If we consider that the error rate is close to 2% and that one billion studies are performed worldwide annually, it means twenty million errors per year, which is considerable.

## Errors in Radiology

So, why do radiologists make mistakes? In a famous research study at Harvard University called *The Invisible Gorilla*, participants were presented with a short video in which six people passed basketballs around and were asked to count the number of passes by the people dressed in white. At some point, a gorilla appeared in the middle of the action. Half of the people watching the video missed the gorilla. The same experience was applied to radiology, and a gorilla was superimposed on the right superior quadrant of a chest CT image. Amazingly, 83% of participants missed the gorilla (Drew et al. 2013).

There are multiple reasons why we can miss a finding in radiology. The radiology interpretative process is a combination of two decision mechanisms, as described by Daniel Kahneman, the famous psychologist and Nobel Prize of Economics 2002 (Kahneman 2011):

- Fast, using heuristics or intuitive thought processes.
- Slow, analytical with a deliberate and rational approach to decision-making.

Some of the most common causes of errors are (Busby et al. 2018):

- Inattention blindness (42%): a finding is present on the image but is missed, maybe due to lack of context information, unexpected location, or nature of the finding.
- Satisfaction of search (22%): additional abnormalities are not identified after the first abnormality has been seen.

- Satisfaction of report (6%): perpetuating an impression from a previous report.
- Anchoring bias: radiologists won't change their opinion even if additional contrary information is provided.
- Lack of knowledge (3%): a finding is seen but attributed to the wrong cause.

In many cases, radiologists are not aware of their blind spots or of the need to create a search pattern. Other factors contribute to the generation of errors, such as workplace interruptions, reader fatigue, volume overload or poor image quality. Radiologists need help to overcome the limitations they face in their daily practice.

### The Airline Industry Example

Would you take a plane if you knew that there was a 1 or 2% risk that it may crash? I guess that you would be less tempted to travel and would consider other ways of transportation if possible. As we all know, the airline industry has achieved incredible results in improving air transportation safety to the point where it is one of the safest ways to travel.

But it has not been an easy task. According to a famous paper by David Larson et al. (2011) published in *Radiology*, a trigger event was the disaster of TWA flight 514, which crashed en route to Washington Dulles on December 1st, 1974, after a misunderstanding between the pilot and the air controller. The

pilot thought he was clear for landing and could start his descent when the controller only gave him the authorisation to land on runway 12 according to the flight plan, which stated that the descent should start a few miles away, after the Round Hill intersection. The pilot started the descent too early and crashed the plane on a hill 29 miles northwest of Dulles Inter-

The traditional Peer Review system has proven inefficient and even dangerous. Quality improvement needs to focus on “what, when and how” and not “who”

national. Soon after, other pilots reported the same misleading communication happened to them, but they landed safely as they made the appropriate correction.

This was when TWA decided to implement a safe registry collecting errors and near misses, with pilots

and controllers reporting voluntarily and safely their experiences without fear of blame, humiliation, or retribution. The registry is completely anonymous, and the participants cannot be identified. This is now the Aviation Safety Reporting System, where incidents are shared with the flying community, and everybody benefits from their experience.

### Quality Improvement in Radiology

How does it relate to radiology? Learning from the airline industry experience, the radiology community needed an innovative system where the whole group could learn from individual mistakes in a safe and non-punitive way.

The need to improve the quality of radiology reports was evidenced by the Cochrane report in 2011, after a large-scale review of two radiologists in British Columbia, Canada. (Cochrane 2011). Similar, highly publicised reviews in other provinces confirmed the need for improvement.

The retrospective peer review system created by the American College of Radiology to answer a requirement from the Joint Commission in the United States proved inefficient and, at some point, dangerous as it was perceived as punitive and detrimental to radiologists and patients. The system was not anonymous and would point to the poor performers. The grading system would easily lead to unfair targeting and punishment. The unintended result was radiologists trying to turn around the

system to avoid the consequences, which defeated the purpose of peer review.

It was opposed to the recommendation of Edwards Deming, the famous American mathematician who helped build the Japanese automotive industry after the Second World War. He revolutionised the concept of quality assurance, based at the time on measuring defects, identifying individuals producing more defects than others, punish or firing them. Instead, he stated that we must identify and correct the systemic barriers to a quality product and improve everybody's performance. We need to focus on "what, when and how" and not only "who" (Walton 1986).

### Peer Learning in a Spirit of Just Culture

Health Quality Ontario and, more recently, the Canadian Association of Radiologists, in its Peer Learning Guide, have recommended the cultural shift from peer review to peer learning (Torres et al. 2022).

So, what is peer learning? It is a continuous quality improvement (CQI) initiative focused on life-long learning based on the spirit of Just Culture, which states that "a fair and just culture improves patient safety by empowering employees to proactively monitor the workplace and participate in safety efforts in the work environment" (David Larson, RSNA Newsletter 18/02/2019, part 1 series on Just Culture). "Just Culture is steeped in the importance of patient safety and the acknowledgment that even experienced professionals make mistakes" (Just Culture: Balancing Accountability with Quality and Safety.

Using errors to create opportunities to learn instead of tracking errors - Jennifer Allyn, RSNA newsletter, 25/06/2019, part 3 series on Just Culture).

Peer learning promotes collaborative group learning, removes scoring and identifies errors by type and contributing factors, discussing why and how rather than who. The review is anonymous, with no fear of punishment or medicolegal consequences. The process is prospective, with errors identified and corrected before the report is distributed. Alternatively, it can be near time retrospective, with amendments issued in a short time window to prevent impact on patient management.

The airline industry has been leading the way in implementing a voluntary anonymous reporting system

The system is designed to develop a collaborative approach, increasing radiologist participation and engagement, with regular online rounds where discrepancies and great catches are presented, supported by literature, to promote a learning

culture where the group as a whole benefits from the acquired knowledge.

At the annual meeting of the Society for Imaging Informatics in Medicine in 2022, we presented the anonymous, prospective, and timed retrospective, multi-institutional cloud-based peer learning solution that we recently implemented at Hamilton Health Sciences and St Joseph Healthcare, deployed for a group of close to 80 radiologists and nuclear medicine physicians. Implemented with the support of senior administration, PACS/IT management and Privacy and Legal, the radiology quality leadership developed a robust governance structure and rigorous and unbiased processes to ensure a successful deployment.

The commercial solution we adopted has been developed based on years of experience with large-scale reviews of radiologists. The process is fully anonymised: not only are patients de-identified, but the radiologists' names are removed, and the reviewers do not know the name of the radiologists they are reviewing and vice versa. This ensures full confidentiality and non-discoverability. Cases are automatically attributed to radiologists functioning in the same subspecialty to ensure that the review is operated by peers. Sampling volumes are decided by the leadership, and we agreed on 2% of all cases. There is no scoring system; the radiologists are not ranked or evaluated. Discrepancies are categorised as major if there is a potential impact on patient care and minor if there is no impact; there is an option to recognise great catches. In case of discrepancy, the reviewer notifies the reporting radiologist, who can amend the report before it is communicated to the



referring physician, as the process is prospective. If disagreement persists, cases are brought to arbitration. All major discrepancies are reviewed anyway by the Quality Assurance lead.

The solution is cloud-based with a zero-footprint viewer, which allows us to add to the roster of radiologists working in small practices or remote community hospitals where they don't have the manpower required to implement peer learning. The adoption has been excellent, and radiologists have understood the value of peer learning and Just Culture. The attendance at the monthly peer learning rounds has been far beyond expectations.

## A successful Peer Learning implementation requires radiologist engagement and strong governance

### Conclusion

Errors will happen, and this is inevitable. We can decrease the rate of errors and their impact by implementing a quality culture where errors are communicated anonymously, without fear of blame or punishment in the best interest of all. The whole group benefits from each individual experience, and the overall quality improves. This is the goal of peer learning in a spirit of just culture.

### Conflict of Interest

None. ■

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# Building a Culture of Well-Being for Clinicians Today Through Community and Leadership



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This article discusses two key strategies for improving clinician well-being and ensuring staff retention in this issue devoted to supporting the loyal employee.

## key points

- The burnout epidemic continues to be a public health crisis that threatens the health of clinicians and the care of their patients.
- It is estimated that up to 47% of healthcare workers in the U.S. plan to leave their positions by 2025. This threatens to destabilise the country's healthcare system.
- In 2023, burnout continues to increase in all U.S. physician specialties.
- The two most impactful ways to improve well-being are by building a culture of community, culture and support and training and electing servant leaders to lead.
- To improve well-being, we need to work together with our respective organisations to create a positive work environment by sharing ideas and proposing solutions.

## Introduction

In the United States and around the world, the impact of clinician burnout is being observed on a daily basis. On October 4, 2023, in the U.S., 75,000 clinicians and support staff from Kaiser Permanente went on strike, the largest healthcare strike of workers in U.S. history (Kaye 2023). Clinicians and support staff in the U.K. went on strike on October 2, 2023, for the eighth time this past year (Saber 2023).

Burnout continues to increase on a yearly basis, and the numbers are concerning (Weissman et al. 2023). For example, according to the 2023 Medscape U.S. Physician Burnout and Depression Report, nearly 54% of radiologists reported being burned out, an increase from 49% in 2022 (Kane 2023). In 2019, 2020, 2021, and 2022,

AuntMinnie.com chronicled that the burnout of radiologists is the biggest threat to radiology in its annual edition of the Minnies Awards (AuntMinnie 2021). This worsening trend is true for most U.S. physician specialties, with 65% of Emergency Medicine physicians now reporting that they are burned out (Kane 2023).

Burnout has huge consequences not just for clinicians but for patients. First, we need clinicians to be well to provide excellent patient care. Second, clinicians continue to resign through the Great Resignation. More than five million workers have quit their jobs, sometimes their entire careers, since February 2021. The healthcare industry is the second largest industry that has been hit, reporting losses of 20% of the workforce over the past two years. Overall, healthcare employment is down by an estimated

500,000 workers (Poindexter 2022). Up to 47% of U.S. healthcare workers are estimated to leave their positions by 2025 (Kelly 2022). This threatens to destabilise the healthcare system in the U.S.

Like other medical specialties, radiology is experiencing widespread staffing shortages across multiple modalities and is struggling to maintain staffing levels and recruit new staff (Reeves 2022). The extent of the workforce shortage is a current public health crisis. Patients are also feeling the effects of the healthcare staffing shortages. In a recent patient survey conducted in the U.S. in 2023, separated by only three months, there was a 10% increase in Americans stating that they are being affected by staffing shortages, with 84% of patients saying that they are now experiencing delays in getting the healthcare they need (Thompson 2023).

So, what can we do to collectively improve well-being and maintain our critical healthcare workforce? Many factors have been studied, such as improving salary and benefits, electronic health records, and the efficiency of the practice environment as examples (Fishman et al. 2018). However, two fundamental principles for improving well-being have been found to be most effective through newly released research by the National Academy of Medicine and the U.S. Surgeon General (National Academy of Medicine 2019; Office of the U.S. Surgeon General 2022a; Office of the U.S. Surgeon General 2022b).

First, it is critical to build a culture of community, connection and support in the workplace. Healthcare workers need to feel that they work in a safe and secure environment. They need to feel that they are being socially supported and that they belong to a team. One example is a current initiative in radiology called peer learning (American College of Radiology). Peer learning is very different than

More than five million workers have quit their jobs, sometimes their entire careers, since February 2021

peer review. Peer review can feel threatening without much feedback or transparency. Peer review is approaching a colleague and telling them that they are valued and that you appreciate their hard work. You then share a clinical case of theirs that you read. This discussion is done in a safe, confidential and collaborative environment. You may share some articles on the subject that you found helpful.

Peer learning is also complimenting a colleague on a great clinical diagnosis on a case they read and thanking a colleague for their hard work. In other words, one is constantly building a culture of community, connection and support at work.

Second, when all the qualities of an organisation are studied, the single biggest driver of professional satisfaction (by far) is the behaviour of one's immediate supervisor (Shanafelt et al. 2015). Does one's immediate supervisor include, inform, inquire, develop, and recognise one? This leads to a type of leadership called servant leadership. Servant leaders are different than traditional leaders. Both types of leaders are very driven to meet the needs of their organisation, but servant leaders are also concerned with growing and developing their teams. Servant leaders see leadership as an opportunity to serve others. They listen. They recognise how important it is for employees to feel they matter at work. They engage workers in workplace decisions. They build a culture of gratitude and recognition. Servant leaders also recognise that it is important for employees to have the opportunity to learn, grow and accomplish goals. Servant leaders provide mentoring, and they value clear and reciprocal feedback. If one works for a servant leader, one is much less likely to burnout.

The bottom line is that as clinicians, we need to work with our respective organisations to create a positive work environment by sharing ideas and

proposing solutions. The work recently released by the National Academy of Medicine, which took over six years to develop after speaking to over 200 organisations, as well as the work from the U.S. Surgeon General, provides a rich source of data to now discuss with one's healthcare organisations.

One can now say to healthcare leaders that it doesn't make a difference what we individually feel about the importance of well-being. Our leading public health institutions are providing instructions on what we need to do. If we don't follow these critical recommendations now, we will continue to lose more clinicians to the great resignation, which will continue to adversely impact patient care.

Clinicians need to work together with their respective organisations to create a positive work environment by sharing ideas and proposing solutions

We must collectively work together now as a team to grow a culture of well-being for all of us by building a culture of community, connection and support and by training and electing servant leaders to lead us.

### Conflict of Interest

None. ■

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# Training with Simulation in Nursing Care

This article explores whether simulation could be a valuable tool for addressing the shortage of nurses in the healthcare sector and how it can provide realistic and safe learning environments for nursing students and professionals to practice their skills, gain confidence, and receive feedback.



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## key points

- Simulation-based learning is a pedagogical approach that allows students to practice work-related skills in a safe setting and to gain confidence in their performance.
- It involves careful planning, selection and design of realistic scenarios and feedback mechanisms.
- It is not a replacement for traditional instruction but a complementary tool that can enhance learning outcomes.
- Simulation-based learning does not primarily depend on the level of realism or fidelity of the simulation but on the alignment of the learning objectives and the simulation design.
- It also requires a shift from teacher-centred to learner-centred education, where the teacher acts as a facilitator rather than a transmitter of knowledge.
- Simulation-based learning is a relatively new field in nursing education, but it has great potential to improve the quality of nursing care and to motivate and accelerate the learning process of new staff.
- It can also empower patients and their relatives to cope better with their health conditions.

## Is There a Way to Improve Nursing Outcomes and Reduce Nursing Staff Shortages?

Nursing in Germany and Europe faces major challenges. The demand for qualified nursing care is steadily increasing as the population ages, and more and more people suffer from chronic diseases. At the same time, the length of stay of patients in hospitals has decreased, which increases the demands on nursing care. Professional nursing care is becoming more complex and requires high professional competence and flexibility. In addition, the diversity of nursing staff in the healthcare system is increasing, which requires intercultural competence and communication.

The rapidly increasing shortage of nursing staff requires different approaches and concepts to reduce the current and future demand with quality assurance. The following three levers can be effective here:

- Recruiting suitable personnel
- Developing technological products to support and assist
- Improving the processes in the healthcare system

Therefore, this article will pursue the following questions: Could simulation be a valuable tool for addressing the shortage of nurses in the healthcare sector? How can simulation provide realistic and safe learning environments for nursing students and professionals where they can practice their skills, gain confidence, and receive feedback?

## Definition and Types of Simulation

Simulation is a technique that uses realistic scenarios and equipment to mimic the real-world conditions and challenges people face. The kind of simulation or simulator depends on the previously defined goals



Figure 1: OSCE with manikin in a realistic patient environment and SP in the role of relative

and competencies the learners should achieve. According to Miller (Framework of Clinical Assessment), the learning pyramid is used for this purpose—the higher the desired level of competence, the more realistic it should be (Waxman 2010).

### Low-Fidelity Simulation

Low-fidelity (Lo-Fi) simulation is used to build knowledge. The simulations in this category will feel the least real to the learner. These can include static models and two-dimensional displays. These can also be task trainers designed for specific tasks or procedures such as IV arms or cardiopulmonary

resuscitation manikins.

### What is the purpose of low fidelity?

Lo-Fi prototyping is a quick and easy way to translate high-level design concepts into tangible and testable artefacts. The first and most important role of lo-fi prototypes is to check and test functionality rather than the visual appearance of the product.

### What are the disadvantages of LoFi?

The downsides of low-fidelity prototypes are that they have limited interactivity, lack realism, are hard to use for user feedback, are sometimes too basic to reflect

the user experience of the finished product, and can oversimplify complex issues.

### High-Fidelity Simulation

High-fidelity (Hi-Fi) simulation is a healthcare education methodology that involves the use of sophisticated life-like manikins in realistic patient environments (types of simulation). The top used scenarios in Hi-Fi simulations are:

- Hypo and hyperglycaemia
- Deteriorating patient
- Respiratory: distress, arrest, and pulmonary embolism
- End of Life: the dying patient
- Cardiovascular: myocardial infarction and cardiac arrest
- Sepsis and multiple organ dysfunction syndrome
- Fluid volume deficit: electrolyte imbalance of geriatric patients
- Congestive heart failure exacerbation
- Shock: anaphylactic, cardiogenic, neurogenic

### Standardised Patients

Standardised patients (SPs) are used for exams like OSCE. They follow strict and uniform guidelines to ensure consistency for trainees. This includes opening statements, answers and emotions (ASPE 2018). For communication training, SPs are more flexible and interactive. They can use their own

Advantages of Virtual Reality	Disadvantages of Virtual Reality
<p><b>Location:</b> Not limited by geographic location</p> <p><b>Time:</b> Allows for synchronous and asynchronous learning</p>	<p><b>Possible cognitive overload</b> Depending on the conception/implementation of the learning unit, the impressions in VR can be overwhelming for participants</p>
<p><b>Accessibility:</b> Users can practice in VR from anywhere</p>	<p><b>Simulator Sickness</b> Some VR participants report nausea, dizziness and disorientation</p>
<p><b>Personnel:</b> VR simulation is less human resource-intensive</p>	
<p><b>Assessment:</b> Allows for a unique first-person perspective in assessments</p> <p><b>Software:</b> VR software can be updated and changed easily</p>	<p><b>No uniform standards</b> There are currently no uniform standards Once you've decided on one system, you can't easily switch to another</p>
<p><b>Diversity:</b> VR allows for diversity in the simulated environment</p>	<p><b>Confinedness of the glasses</b> Some participants stumble or fall because they are no longer aware of the reality around them or they are confused by the VR</p>
<p><b>Learning Environment:</b> Environment, equipment and ergonomics can be customised</p>	

Table 1: Pros and Cons of Virtual Reality

biography and improvise. They also give feedback to trainees after the training (Schlegel 2015).

### AR/VR-Simulation

Augmented reality (AR) adds virtual content to the real world. Users see the virtual elements as part of the real space. AR can also use other senses besides vision. Virtual reality (VR) creates a simulated

experience that can be similar or different from reality. VR helps users empathise with others and understand their conditions, such as Alzheimer's.

### Gamified Simulation

A gamified simulation is a learning method that combines elements of games and simulations to increase the motivation, engagement and feedback of

the learners. In nursing education, a gamified simulation can help improve the clinical skills, critical thinking and decision-making of the students. A gamified simulation in healthcare can take various forms, such as virtual patients, interactive scenarios or digital games. The key dimensions of educational games are explained in Table 2.

### Advantages and Chances of Simulation

Simulation is a technique that mimics real-life scenarios using tools and technologies. It has many benefits and opportunities for nursing and patient education. For example:

- **Improved patient safety:** to reduce the risk of medical errors and improve patient outcomes.
- **Enhanced training:** provides healthcare professionals with a safe and controlled environment to practice their skills, gain experience, and improve their confidence and competence.
- **Cost-effective:** simulation can be a cost-effective way to train healthcare professionals, as it eliminates the need for expensive equipment and supplies.
- **Research opportunities:** to be used to research new treatments, procedures, and technologies.
- **Improved communication:** helps healthcare professionals to improve their communication skills and to improve teamwork and collaboration among healthcare professionals.

Simulation in patient education is another area

KIND OF DIMENSION	DESCRIPTION
<b>Fantasy</b>	<p>This dimension includes the environment, the plot and the characters that appear. Fantasy allows players to see things from different perspectives, adopt different roles, and identify with fictional characters</p> <p><b>Rules and objectives of the game</b></p> <p>Clarity of the rules and feedback regarding the progress made towards achieving the goal are important characteristics of didactically meaningful games</p>
<b>Sensory Stimuli</b>	<p>This describes visual and auditory stimuli that are part of the game. Initially, they enable or intensify the interactivity of a game</p> <p>A high degree of interactivity is important for success</p>
<b>Challenges and Risks</b>	<p>Challenge is related to risk. The goal is an optimal level of difficulty, which can be individually adjusted for each player</p>
<b>Curiosity</b>	<p>Curiosity arises when things are new or initially inexplicable, or when unexpected effects occur. Again, this is best accomplished through different levels that a player can reach</p>
<b>Control</b>	<p>Learners should have an active role, which requires exercising control</p>

Table 2: Key Dimensions of Educational Games

where it has several advantages. Here are some:

- **Improved patient outcomes:** helps patients to better understand their medical conditions and treatments.
- **Increased patient engagement:** helps patients to become more engaged in their own care.
- **Reduced anxiety:** helps patients to become more familiar with medical procedures and treatments, which can reduce anxiety and stress.
- **Improved patient satisfaction:** helps patients

to feel more confident.

### Challenges and Limitations

The cons of HiFi are the acquisition and maintenance costs and the inflexibility to change. Additionally, it is necessary to teach the facilitators and teachers and adapt their qualification profiles. The students often feel overconfident after the HiFi training, which could be an emerging risk in applying into practice.

### Examples of Best Practices of

## Simulation Design

To prepare for simulation training, you need to do a needs analysis, plan the learning objectives and outcomes, design the simulation format and case, and choose the appropriate realism level. The simulation consists of prebriefing, simulation, and debriefing/feedback. The moderator guides the student and evaluates the performance. The student also reflects on their own learning (INACSL Healthcare simulation).

## New Roles for Teachers and Mentors

Simulation training needs a skilled teacher/moderator who can facilitate learning, not just give information. The teacher/moderator should be trained in simulation moderation and help the participants reflect on their simulation experience. The teacher/moderator should ask questions in the debriefing, such as:

- Why did you act that way?
- What other options did you have?
- How can you do better next time?
- What difficulties did you encounter?

## Enough Theory - Let's Start with Examples

### Recruiting, Onboarding, New Jobs and Reintegration of Healthcare Professionals

Simulation is a useful tool for assessing and improving candidates' skills, knowledge and attitudes in a standardised way. It also helps them to adapt to new situations by trying different options and outcomes in a safe and fun environment. Simulation enhances learners' engagement, motivation



Phase	Purpose	Process	Example Script
<b>Fantasy</b>	Prepare students for simulation Set the tone	Provide info on the format Provide observation guide Review preceptor report	“Today, you will invite the standardised patient into the conference room at 6:00. You will have 15 minutes to complete...”
<b>Debrief: React</b>	Encourage participation/build rapport Allow learners to clear the air and save face	Use Delta-Plus process <sup>1</sup> with two questions to examine what worked and areas for improvement	“What went well?” “What would you do differently?”
<b>Debrief: Understand</b>	Uncover the ideas, thought processes and other factors that lead to a behaviour (student ‘frames’ ) Help the learner find ways to improve performance	Advocacy-Inquiry 1. Observe an event or result 2. Comment on the Observation. Advocate for your position 3. Explore the drivers behind students’ thinking (their ‘frames’*) and actions that they think lead to the observed event or result 4. Discover, with the students, ways to attend to issues that arose and ways to replicate positive results	5. You notice that the patient seemed to disengage when the team started listing their recommendations 6. “I noticed that Mr. Moorhouse crossed his arms and didn’t respond to many of the recommendations you suggested. To me, he seemed disengaged”. 7. “What do you think was happening to him?” “Do you think he disengaged?” “What was happening that contributed to this result?” 8. “I agree that it’s important to be clear about what the team recommends. I wonder how your team could approach recommendations to engage Mr. Moorhouse and to ensure clarity?”
<b>Wrap-Up</b>	Invite reflection on the experiences as a whole - solidify learning	Inquire about how students feel about the simulation as a whole and what learning they will take away	“How are you feeling about the scenario now?” “What’s the biggest thing you’ll take away from the simulation?”

**Table 3:** Debriefing using the advocacy-inquiry Method, adapted from the University of Alberta, Health Science Council 2007. Plus/Delta is a retrospective technique that challenges teams to use recent work to shape future processes.<sup>2</sup> Frames are in the mind of the student and facilitator. They include assumptions, feelings, goals, knowledge base, situational awareness and context.



Figure 2: Debriefing with a student after simulation

and confidence and supports team collaboration and communication.

### Compliance, Health and Safety Training

Simulation, especially gamified, boosts engagement and results in health and safety training. This topic needs regular instruction, but staff usually show low interest and perform poorly (Corporate eLearning Industry).

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### Theory/Practical Transfer/Circulation

Compared to traditional education and well-known simulation, there are more tools in gamified simulation that you should have a closer look at. For example, gamification for quizzes and feedback. Rolling out gamified quizzes is a great way to test your employees' skills and collect feedback through surveys. Also, gamification can create rewards and leaderboards to motivate employees to engage in training. Another very positive way is effective storytelling. Gamification can create engaging stories that help learners better understand and retain information and use them in their daily routines.

Gamified simulation offers helpful tools in addition to traditional education and simulation. For example, you can use gamification for quizzes, feedback, rewards, leaderboards and storytelling. These tools can help you test, motivate and teach your employees effectively.

### Education Patient/Relatives

Simulation can educate patients and relatives, increase their motivation, promote interaction and

empower them. Many start-ups have created tools for chronic and mental illnesses. For example, VR can treat phobias and post-traumatic stress disorder (PTSD) by exposing patients to fear in controlled doses (HealthCare-Technology).

### Conclusion

Simulation can enhance nursing education and practice by offering realistic and safe scenarios. Simulation can improve nursing skills, confidence, feedback, competence, and performance. Simulation can also lower the risk of errors and adverse events, which can harm patient safety and quality of care. Simulation can also promote intercultural competence and communication, which are vital for working in diverse teams and settings. Thus, simulation can support nursing care development in Germany and Europe, address the healthcare system challenges and have a positive effect on reducing the shortage of nursing staff.

### Conflict of Interest

None. ■



# Unveiling Tomorrow: IT's Pioneering Role in Revitalising Healthcare

The integration of Information Technology (IT) in the healthcare sector is a beacon of transformation amidst modern challenges. This article illuminates the role of Artificial Intelligence (AI), Machine Learning (ML), Natural Language Processing (NLP), and low-code solutions in healthcare. By exploring real-world examples and statistics, we shed light on recent transformations and envisage the potential advancements in 2024, anticipating a shift towards more proactive healthcare models.



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## A Digital Awakening

The healthcare sector is navigating a digital renaissance fuelled by IT. Sophisticated algorithms, intuitive software, and agile low-code platforms are emerging as the vanguards orchestrating a more efficient, accessible, and personalised healthcare ecosystem.

## The Contemporary Canvas

Recent advancements have illustrated the monumental impact of IT in healthcare. AI and ML are streamlining diagnostic procedures

and bolstering predictive analytics, aiding in the management and diagnosis of diseases like kidney disorders. Similarly, NLP is enhancing the interaction between healthcare providers and electronic health record systems. The essence of low-code solutions is also gaining recognition, offering a swift, cost-effective avenue to develop tailored healthcare applications (Excellerate 2023; Acropolium 2023; Akveo Blog 2023).

In a significant stride, Microsoft introduced healthcare-centric data solutions in 2023, facilitating a unified data analysis platform. The deployment of Azure AI Health Insights, Azure

AI Health Bot, and Text Analytics via Azure AI Language is revolutionising data analytics, clinical workflows, and patient-physician interactions. For instance, the Dragon Ambient eXperience (DAX) Copilot system, utilising NLP, automates clinical documentation, allowing clinicians to focus more on patient care (Forbes 2023).

A December 2021 survey by health insurer Optum revealed that 85% of healthcare executives have an AI strategy, and almost half now employ this technology. The global AI in healthcare market size, valued at USD 15.4 billion in 2022, is projected to expand at a compound annual growth rate (CAGR)



of 37.5% from 2023 to 2030. Moreover, healthcare spending on AI software is anticipated to grow 40% in 2023, from \$4.4 billion in 2022 to nearly \$6.2 billion (AI Business 2023).

### The Horizon: 2024

As we approach 2024, the alliance between IT and healthcare is set to deepen. Anticipated

advancements include robust AI algorithms for early disease detection, low-code platforms enabling broader engagement in app development, and NLP further refining patient-provider communication.

### Recapitulating the Journey

The meld between IT and healthcare is a beacon of hope in delivering a patient-centric, efficient, and

innovative healthcare model. As we transition into a new year, the sector is ripe for further technological ingenuity, promising a healthcare domain that's not only responsive but also proactive in fostering well-being.

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# A Trifecta Approach to Reducing Healthcare Personnel Turnover

Healthcare industry labour shortages are a growing problem on a global scale, but managers have the power to effect change at the organisational level. This article proposes a practical approach for managers to reduce turnover by combining a strong employer value proposition with effective employee onboarding, targeting the critical first year of employment.



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## key points

- Healthcare labour shortages have reached a crisis point, forecasted to persist into the foreseeable future.
- The highest turnover rate in healthcare settings occurs in the first year of employment.
- Top factors influencing retention include autonomy, sense of belonging, purpose, caring colleagues, and feeling valued by management.
- The 6 Cs of onboarding is an employee onboarding framework scientifically proven to increase employee retention and engagement.
- Manager interaction has been shown to significantly impact employee retention and engagement.

## The Healthcare Labour Crisis

The healthcare sector has long faced labour shortages, but developments in recent years have heightened the crisis as the demand for labour increases amid a shrinking workforce. Some factors include an ageing population requiring more care, worker retirement, and widespread burnout. Forecasts of registered nurse shortages are particularly dire due to a lack of nursing faculty, which limits nursing programme enrolment.

The healthcare crisis is considered by many analysts to be an inevitable problem with no immediate solution. The American Association of Medical Colleges (AAMC) predicts a shortage of as many as 122,000 physicians by 2032 (AAMC 2019). The problem extends to global proportions, with the World Health Organization predicting

a shortfall of 15 million healthcare workers worldwide in 2030 (A Public Health Crisis 2023). As of 2022, the U.S. hospital turnover rate was 22.7%, and RN turnover was 22.5% (Colosi 2023).

Unlike a complex issue that can be resolved through strategic planning, labour shortages in healthcare are characterised by intricate interdependencies, varying perspectives, and a lack of a clear resolution on a large scale. Addressing this problem necessitates breaking it into manageable elements and seeking smaller-scale resolutions.

## A Practical Solution to a Manageable Problem

While factors contributing to global labour shortages are outside the control of healthcare

personnel, employee turnover at an organisational level is within the realm of influence. This is a distinct area of opportunity, given that the first year of employment in healthcare settings consistently accounts for the highest turnover percentage. Moreover, healthcare workers with less than one year of experience have the highest rates of hospital turnover (Colosi 2023).

Healthcare organisations are experimenting with a multitude of solutions to labour shortages, including restructuring benefits packages, wellness programmes, student loan repayment, bonuses, and more. While these strategies are essential, they are resource-intensive. Focusing on management interventions to reduce new hire turnover presents a cost-effective, immediate alternative. As the first line of communication during the employee onboarding stage, managers are in a position to directly reduce employee turnover during this critical first-year period.

### A Trifecta Approach

This article proposes a tri-fold approach, each aspect of which has been shown to effectively reduce employee turnover. They include a 6 Cs employee onboarding framework, heightened manager involvement, and a strong employee value proposition. This section will provide a brief overview of each of these functions before explaining how to implement this approach in the next section.

### Managers Make a Difference

Post-pandemic studies continually highlight the significant role managers play in shaping workplace

engagement, retention, and satisfaction. For instance, a Microsoft survey of 150K workers found active managerial participation in onboarding led to 3.5 times increased rate of new hire satisfaction (Work Trend Index 2021). SHRM cited another study where a staggering 70% variance in employee engagement

Healthcare organisations are experimenting with solutions to labour shortages, including restructuring benefits packages, wellness programmes, student loan repayment, bonuses, and more.

hinged on managerial interactions (Kosinski 2023). The common factors associated with these findings are associated with increased levels of employee confidence, clarity around roles, team bonding, and overall satisfaction. Employees want to feel valued, trusted, and heard by managers. When these qualities

are fulfilled, it translates to higher levels of employee productivity, engagement, and retention.

### The 6 Cs of Employee Onboarding

Developed and tested over more than two decades by Talya Bauer, PhD, the “6Cs of Onboarding” framework effectively integrates new hires into organisations. A structured onboarding process is linked to a 50% surge in new-hire productivity, with such employees 58% more likely to remain with the company in the past three years (Hirsch 2017). The 6 Cs include:

- **Compliance:** Covers legal and policy-related rules, ensuring new hires understand their obligations and company expectations.
- **Connection:** Prioritises relationship-building, fostering collaboration and lasting engagement between new hires and their teams.
- **Confidence:** Empowers new hires with the necessary tools and resources, enhancing their job satisfaction and productivity.
- **Checkbacks:** Emphasises regular feedback, underscoring a company’s commitment to employee input and trust-building.
- **Clarity:** Highlights clear role definitions and expectations, ensuring alignment in team goals and individual roles.
- **Culture:** Integrates new hires into the company’s values and traditions, emphasising alignment with organisational objectives.

## Employee Value Propositions

An employee value proposition (EVP) is an aspect of employer branding that conveys a proposition to attract and retain employees based on the value the organisation brings them. Gartner, a global business consultant and research firm, found that an effective EVP can decrease annual employee turnover by 69% (Gartner 2023).

The key word is “effective”. Post-pandemic research has pointed to an increased desire among employees for a more holistic value proposition. In addition to material offerings such as compensation and benefits, Professors Mark Mortensen and Amy Edmondson suggest it’s time to rethink EVP models by incorporating a more holistic value model (Mortensen and Edmondson 2023). They suggest a matrix of four interrelated factors:

- **Material offerings:** Traditional aspects of value such as compensation, benefits, flexible schedules, and quality of office space or work environment.
- **Opportunities to develop and grow:** Professional development such as job training and promotion opportunities.
- **Connection and community:** Being appreciated and valued by a larger community characterised by social relationships and mutual accountability.
- **Meaning and purpose:** The answer to the question, “Why do you do what you do?”

This matrix is remarkably similar to the top factors that Registered Nurses reported as having a high influence on staying in their position. The following list shows these factors as reported in a recent survey by McKinsey & Company (Berlin 2023):

- Feeling they do meaningful work (82%)
- Having trustworthy and caring teammates (69%)
- Safe environment (64%)
- Able to work autonomously (51%)
- A sense of belonging (61%)
- Feeling valued by their manager (57%)

These responses bear a similarity to many research findings on healthcare professional retention. However, the focus on registered nurses is relevant as they comprise one of the highest percentages of healthcare professional turnover (Colosi 2023).

While the Growth and Development quadrant of the EVP matrix is not represented in the list above, it is notable that development opportunities were a factor for 38% of respondents who decided to stay in their position. This is consistent with a pattern showing that healthcare workers tend to view their vocations as a calling, which may influence a focus on purpose over promotion.

## Actionable Steps for Immediate Impact

The blueprint for managers to increase employee retention rests on integrating a relevant EVP into an

effective onboarding process to win over employees in the critical first-year period.

The following preliminary steps help pave the way for the effective implementation of the trifecta approach:

### 1. Empower Managers to Take Action

One of the advantages of this approach is its scalability. A large organisation may take a year to fully develop and implement an entire strategy for employee retention that includes an EVP and onboarding plan. At the other end of the spectrum, an empowered manager can implement this approach in less than a month by applying the principles in a practical and “just in time” method.

### 2. Develop or Use an Existing Employee Value Proposition

At its most basic level, an EVP identifies elements of value the organisation provides the employee. These elements are most successful when they are unique and differentiated from competition. The EVP graphic in the previous section shows four elements of value.

Several resources on the internet make this process relatively simple to get started. Gathering employee feedback is a crucial aspect of determining the level of value your organisation provides and where gaps may lie. In the absence of internal data, research the healthcare sector within which your organisation operates to reveal values most associated with employee retention.

### 3. Incorporate the 6 Cs and EVP Into Employee Onboarding plan

After determining the elements of your organisation's EVP, review the employee onboarding process and identify how to incorporate those values at each stage of new hire integration. Simultaneously, ensure that each of the 6Cs of onboarding is present in the employee onboarding process. This step will be more effective with some additional research or the assistance of an onboarding expert. However, steps can be taken immediately to improve the existing process.

### Putting It In Practice

Below is a brief overview of the 6 Cs of onboarding emphasising the top six factors for RN employee retention, as referenced in the prior section. In an organisation where these factors are prevalent values among employees, they could be incorporated into the 6Cs of onboarding framework, as shown below. Otherwise, replace the EVPs below with the values employees report as highly important to employee satisfaction. Action items for implementation are included as a starting point but should be customised to each organisation based on the availability of time and resources.

#### 6C: Compliance

##### EVP: Desire for a safe working environment

In a recent survey, 42% of nurses indicated that not having a safe working environment was a very important factor in their decision to leave patient care (Berlin 2023). The compliance element of the onboarding

process is the starting point for organisational policies around safety. However, it extends beyond compliance and should be incorporated into safety training, preparation, and feedback.

##### Action Items for Implementation:

- Promptly complete mandatory regulatory safety training.
- Clearly outline who to contact for support or concerns regarding safety.

#### 6C: Connection

##### EVP: Desire for trustworthy and caring teammates

Building strong connections from day one can improve team cohesion and long-term engagement. Team connection is associated with reduced errors, higher productivity, and overall job satisfaction - not just in healthcare but across industries.

##### Action Items for Implementation:

- Assign a work buddy beginning on the first day of work.
- Provide multiple opportunities for team activities during the first months of onboarding.

#### 6C: Clarity

##### EVP: Desire to do meaningful work

Connect roles to meaningful work through transparency. Clear role definitions remove confusion and allow employees to see how their work fits into larger organisational objectives. This sense of purpose can be a powerful motivator for job satisfaction and retention.

##### Action Items for Implementation:

- Share case studies or personal stories that illustrate the impact of the new hire's role.
- Get to know the new hire's "why" behind their role and why they are called to it. Clarify how their role relates.

#### 6C: Culture

##### EVP: Desire a sense of belonging

A strong organisational culture isn't just a nice-to-have; it's a must-have for long-term employee retention. By incorporating cultural elements into the onboarding process, new hires can quickly align themselves with organisational values.

##### Action Items for Implementation:

- Regularly spotlight employee achievements.
- Involve new hires in corporate social responsibility activities.

#### 6C: Confidence

##### EVP: Desire to work autonomously.

Employees who feel empowered to make decisions and perform tasks without micromanagement are generally happier and more productive. Managers can set their teams up for autonomous success by providing the proper training and resources.

##### Action Items for Implementation:

- Provide comprehensive training.
- Offer ongoing resources for troubleshooting and problem-solving.



## 6C: Checkbacks

### EVP: Desire to feel valued by the manager

Effective two-way communication between managers and team members can significantly improve employee engagement. By regularly checking in, managers can promptly address concerns and make employees feel valued.

#### *Action Items for Implementation:*

- Implement a monthly feedback mechanism.
- Schedule quarterly one-on-one reviews.

Finally, flexible work schedules are rated high in importance across many healthcare personnel surveys. It was reported by 62% of respondents in the survey referenced above. This is not included in the framework presented here due to the limitations most managers would have in executing policy changes. However, it is a highly recommended factor to consider offering as part of an EVP.

### Conclusion

While the global healthcare labour shortage is anticipated to continue, actionable steps at the organisational

level can mitigate its impact. The first year of employment, marked by high turnover, is crucial for intervention. This article proposes a trifecta approach to boost retention and engagement: effective onboarding, proactive management, and a robust employee value proposition.

### Conflict of Interest

None. ■

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# Healing from Within: The Silent Revolt for Mental Fitness in Healthcare

Unmasking the high price of neglecting employee mental fitness and the path to lasting loyalty in the healthcare sector.



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## key points

- According to a survey by the World Health Organization, 45% of healthcare workers are grappling with symptoms of depression, anxiety, or burnout.
- Many healthcare workers are leaving their jobs, and some aren't showing up to work.
- The incentive for healthcare organisations to embrace mental fitness is paramount, and the evidence is undeniable.
- The incentive to do so is multi-fold. For healthcare organisations, it translates to reduced costs, enhanced employee retention and elevated quality of patient care.
- For healthcare professionals, it cultivates resilience, a sense of purpose, and a lifelong commitment to their profession.

In the heart of healthcare's complex landscape, where compassion intertwines with crisis, a silent revolution takes shape. It's a story that may lack big, fancy moments, but it's full of people who are determined to never give up. Today, we embark on a journey to unmask a hidden narrative, one concealed by heavy medical charts and the quiet secrets of stethoscopes. A conversation about the longevity of healthcare facilitators cannot be had without addressing the mental fitness required to thrive in high-pressure jobs. We uncover the hidden costs of its negligence and reveal its transformative power in cultivating unbreakable loyalty among healthcare professionals through enabling mental well-being.

## The Cost of Neglecting Employee Mental Fitness in Healthcare

Imagine bearing the weight of life and death daily, and yet, the heroes in white coats are often left to their own devices when it comes to their mental well-being. Recent statistics reveal a chilling reality – 45% of

healthcare workers are grappling with symptoms of depression, anxiety, or burnout, as per [a survey by the World Health Organization \(WHO\)](#). And this is no mere pandemic-induced anomaly; it's a glaring symptom of a deeper-rooted problem in the healthcare industry.

Here's the problem, plain and simple - lots of healthcare workers are leaving their jobs, and many aren't showing up to work. The numbers are staggering, and it's not just about money. Finding and training a new healthcare worker costs between \$50,000 to \$100,000 (Lindquist 2023). But even more importantly, patients lose trust, the quality of care drops, and our healthcare system gets shaky because of this.

## Mental Fitness: The Key to a Resilient Healthcare Workforce

In the heart of this crisis lies a solution - mental fitness. It's not just about surviving; it's about thriving. It encompasses accessing emotional intelligence and applying positive intelligence, which trains mental and

emotional resilience that is vital in a profession where emotions run deep and the stakes are higher than ever.

**Emotional Intelligence:** Healthcare professionals need to master the art of recognising, understanding, and managing emotions – their own and those of their patients. It’s not just a soft skill; it’s the linchpin that ensures they provide empathetic care and steer through the tempestuous sea of stress with fortitude.

**Positive Intelligence:** The power of positivity isn’t an empty mantra; it’s a concrete tool to fortify one’s resilience. A positive mindset isn’t just a ‘nice-to-have’ but a ‘must-have’ in a healthcare worker’s toolkit. Healthy Positivity breeds loyalty, not only within the team but also towards the organisations they serve.

The incentive for healthcare organisations to embrace mental fitness is paramount, and the evidence is undeniable. This is no longer an option; it’s a prescription. It involves:

- 1. Mental Health Programmes:** These programmes should become a cornerstone of healthcare institutions, including counselling, stress management, and coping strategies.
- 2. Education and Training:** Emotional and positive intelligence should be woven into the curriculum for healthcare professionals, just like clinical skills.

**Radical Transparency:** Kickstart with emotionally intelligent, transparent communication. Share the raw facts and rally your key players to dig deep for solutions.

**Learn or Lose:** Invest in skill-building opportunities. Let your key players thrive through ongoing learning and skill development.

**PQ-Energy Assessment:** Have your key players categorise their tasks based on the energy investment required. The aim is to harness Positive Intelligence to reduce stress and free up mental bandwidth for pressing matters.

**Decision Power:** Hand over the reins to inspire ownership and dedication. Empower key players with decision-making authority and trust them to make critical choices.

**Incentives that Speak Loud:** Make performance visible and rewards even louder. Acknowledge their exceptional work with incentives that scream “excellence.”

**Work Their Way:** Flexibility isn’t a luxury; it’s a performance booster. Let them choose the work setup that lets them thrive.

**Mentor Mastery:** Pair them with mentors who’ve been through the trenches. They’ll learn from the best and supercharge their performance.

**Innovate to Dominate:** Welcome game-changing ideas. Cultivate a culture of innovation that propels key players to rise above the rest.

**Unity = Victory:** Foster a culture that’s built on unity, collaboration, and winning together. Their performance soars when they feel part of a winning team.

**Wellness Equals Resilience:** Arm them with stress-busting techniques and wellness programmes. A healthy, focused key player is an excellent key player.

Table 1: 10 Hacks to Inspire Your Key People to Excellence During Tough Times

**3. Supportive Work Environment:** Organisations should lead by example, nurturing a culture that values mental well-being ensuring that everyone feels safe and encouraged to speak openly.

**4. Regular Assessment:** Regular mental fitness check-ins are the only way to identify issues early and provide tailored interventions.

**5. Flexible Work Arrangements:** Flexibility is crucial for managing work-life balance, which is instrumental in preserving mental fitness.

### The Incentive for Mental Fitness

The incentive is multi-fold. For organisations, it translates to reduced costs and enhanced employee retention, not to mention an elevated quality of patient care. For [healthcare professionals](#), it's about cultivating resilience, a sense of purpose, and a lifelong commitment to their profession.

Patients are the ultimate beneficiaries of this revolution. An emotionally intelligent, positively attuned healthcare workforce not only improves patient satisfaction but also contributes to better health outcomes. As healthcare consumers, this is the kind of care we all aspire to receive.

Healing the healthcare workforce starts from within. The cost of neglecting employee mental fitness is colossal, not just in monetary terms but in terms of human lives and trust. Mental fitness, with its cornerstone of emotional intelligence and positive intelligence, is the key to building a resilient healthcare workforce

and fostering unwavering loyalty. The silent revolution is underway, and it's time for the world to take notice. Let's unmask the true heroes in healthcare and honour their relentless spirit in building a healthier, stronger, and more compassionate healthcare system.

### Conflict of Interest

None. ■

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# Keeping Nurses in Their Job

Frontline nurses in the EU have been profoundly affected by the repercussions of the COVID-19 pandemic. Consequently, there has been a massive exodus of frontline nurses, which has far-reaching implications for the healthcare system. This shortage of nurses has resulted in compromised patient safety and quality of care. It is essential to keep experienced nurses in the nursing profession. Failing to retain frontline nurses in the nursing workforce will render the EU and Europe ill-prepared for the years ahead.



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### key points

- The COVID-19 pandemic has highlighted the need for adequate preparedness in the face of health crises.
- From 2020 to 2022, the pandemic caused significant disruption, leading to various challenges in the nursing workforce.
- Nurses were required to work overtime, part-time workers were asked to work full-time, and leaves were cancelled or postponed. Nursing students were assigned tasks beyond their training.
- The shortage of general care nurses in general wards resulted from the reallocation and reskilling of nurses to meet the critical needs in intensive care units that were overwhelmed by COVID-19 patients. To bridge these gaps, non-qualified workers and nursing students were mobilised.

### Safe Staffing Levels as Basis for a Resilient Healthcare System

To ensure timely and accessible healthcare for European citizens, efforts must be made to increase the availability of qualified professional nurses. (De Raeve 2021) The European Pillar of Social Rights and [Directive 2013/55/EU](#) promotes this goal. The EU Institutions, including the European Commission, the European Parliament, and the Council of Ministers, should mandate Member States to invest in building a resilient nursing workforce. This can be achieved by implementing safe staffing levels and educating and training enough domestic nurses in line with Directive 2013/55/EU.

Maintaining optimal staffing levels is crucial for public health and patient safety. (De Raeve 2023). More needs to

be done at the EU level to protect front-line nurses, ensure quality and safety, and secure access to healthcare services. (De Raeve et al. 2023) Efforts should be made to improve data collection on the nursing workforce through enhanced collaboration between the OECD, the European Commission, and WHO-Europe. (De Raeve et al. 2021 a) Waiting until 2028 for improved data definitions is not a viable option for better pandemic preparedness. (De Raeve et al. 2021 b)

### Strategies for Ensuring Safe Staffing Levels in Nursing

It is crucial to invest in retention programmes from the early stages to address the exodus of highly skilled nurses and retain these professionals. Education plays a significant

role in strengthening the nursing profession, encompassing both basic education and continuous professional development (CPD) through lifelong learning (LLL).

While ethical recruitment of nurses from abroad is often seen as a solution to domestic nurse shortages, it should not be relied upon as the sole approach. All countries, including the Philippines, Pakistan, India, and Africa, require their nurses during global health crises. Member States should implement ethical recruitment policies aligned with the WHO Global Code of Practice on the International Recruitment of Health Personnel, as endorsed by [WHO Europe's Tallinn Charter in 2008](#). Therefore, prioritising effective nurse retention should be a key focus in nursing workforce strategies. Retaining scarce and highly skilled staff is more efficient and cost-effective than continually replacing them. Post-pandemic policies aimed at improving nurse retention should emphasise professional autonomy, participation in decision-making, effective supervision and mentorship, reduced workloads, safe staffing levels, support for nurses' health and well-being, and better compensation for their efforts. Additionally, expanding the capacity of domestic nurse education systems and implementing advanced practice roles are important steps forward.

Investing in mentorship programmes for nursing students is crucial to prevent high dropout rates. Despite a decline in the number of students in EU nursing education programmes in 2023 compared to 2019, there remains significant interest among young individuals in pursuing a nursing career.

Policy initiatives should prioritise support for nursing students to successfully complete their education.

LLL and CPD are pivotal in shaping a sustainable future for the healthcare sector. Insufficient investment in these areas deprives the healthcare

It is crucial to invest in retention programmes from the early stages to address the exodus of highly skilled nurses

workforce of essential skills necessary to meet the increasing demands and complexities of patient care. To address workforce shortages, the retention crisis of frontline nurses, and the challenges posed by rising workloads, inadequate remuneration, and unattractive working conditions, it is imperative to prioritise opportunities for nurses to engage in digital and green upskilling and reskilling. By placing a strong emphasis on the physical and mental well-being of the workforce, upskilling and reskilling initiatives can cultivate a future-ready healthcare workforce, contributing to the modernisation, upgrade, and greening of the healthcare sector.

Digital and green upskilling and reskilling initiatives are indispensable in empowering nurses to actively participate in the digital and green transition within the health and care ecosystem. Through initiatives like the [Pact for Skills](#) and the [BeWell EU Project](#), the nursing workforce can gain a comprehensive understanding of digital and green solutions, thereby enhancing their digital literacy. This, in turn, enables nurses to optimise their time and daily work organisation, reduce administrative burdens, improve record-keeping, make evidence-based decisions, increase patient engagement, address health inequalities, and enhance cost efficiency in healthcare systems. As resilient and sustainable healthcare systems continue to evolve, digital and green skills will play an increasingly critical role in improving people's healthcare experience, driving technological and sustainable innovation, and creating better working conditions for the healthcare workforce.

### Stop Violence Against Nurses

Violence against nurses has grown into epidemic proportions during the COVID-19 pandemic. Therefore, EFN members believe that national and EU initiatives to support women should consider severe prison sentences and legal sanctions against perpetrators of violence. (De Raeve et al., 2023) Although the EU Victims' Rights Directive ([EC 2012/29/EU](#)) and strategy ([EC COM/2020/258](#)) offer better protection from violence and harassment, the European and international institutions should look at the achievements to date alongside current risks and discuss the next steps forwards in strategic cooperation

between EU institutions and member states, international organisations, NGOs, and researchers in combatting gender-based violence. Nurses must be protected and supported through the development of policies, initiatives, and legislation at the national and European levels. Given the severity of the situation, inaction could lead to irreplicable damage to the nursing workforce, with more frontline nurses leaving the nursing profession.

### Conclusion

Increased workloads during and after the COVID-19 pandemic, disproportionate and unattractive remuneration, difficult working conditions, and impact on the mental and physical health and well-being of the

Inaction could lead to irreplicable damage to the nursing workforce, with more frontline nurses leaving the nursing profession

nursing workforce led to an exodus of frontline nurses. Therefore, the EU institutions should immediately focus on developing EU legislation to improve the recruitment and retention of domestically educated nurses. Improving retention of nurses and the attractiveness of nursing as a career by providing fair pay and better conditions of employment. It is essential to keep experienced nurses in the nursing profession. Failing to retain frontline nurses in the nursing workforce will render the EU and Europe ill-prepared for the years ahead.

### Conflict of Interest

None. ■

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# The Necessary Multidisciplinary for Common Health Achievements

Health institutions are knowledge organisations whose *raison d'être* is patient care, i.e. prevention, diagnosis, treatment and rehabilitation. Scientific advances, epidemiological changes and social demand require a new way of doing things in healthcare organisations. Therefore, we need to move towards transformational, empathetic, forward-looking, communicative, reliable leadership capable of generating multidisciplinary and collaborative teams.



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## key points

- Strong primary care is associated with better population health, lower rates of unnecessary hospitalisations and relatively less socio-economic inequality.
- Good hospitals are effective, efficient, equitable, of high quality and have to be well managed.
- Healthcare organisations must guarantee continuity of care, introduce management and governance models that rationalise resources, simplify processes, carry out integrated management of clinical information and strive for efficiency.

## Multidisciplinary Improves Health Organisations

Many of us believe that managing a healthcare centre, particularly a hospital, is the most complex organisation and, therefore, not an easy task. One of the reasons, perhaps the main one that justifies this statement, is that the staff working in healthcare centres are made up of professionals who continually make decisions without the need for supervision.

They are highly trained professionals in their various disciplines whose decisions are complex because of their impact on others. I am referring to healthcare professionals, especially physicians, whose actions are made on others. For this reason, many of us would argue that there is nothing more

difficult than leading people who make their own decisions, decisions that are the very reason for the organisation itself.

The mission of healthcare organisations is to meet the health needs of the population, which means preventing, diagnosing, treating and rehabilitating the patients who need it. From the 1970s onwards, when the so-called “oil crisis” occurred, different countries analysed their health systems and came to the conclusion that they absorbed a large number of economic resources and that there was no linear relationship between health indicators, especially life expectancy at birth and infant mortality, and health expenditure. Until then, 80-90% of health resources were concentrated in hospitals, but only 5% of the population’s health problems were absorbed by hospitals.



WHO recommendations at the Alma-Ata Congress in 1978 suggested changing this hospital centralism and moving towards simpler formulas, such as primary care centres. In this sense, strong primary care is associated with better population health, lower rates of unnecessary hospitalisations and relatively less socio-economic inequality in health perception (Kringos et al. 2013).

On the other hand, up to that time, hospitals were run by people who lacked management training, although in the case of Spain, they were supported by the so-called “Junta Facultativa”, composed of doctors who were heads of clinical services. This crisis led to the need to professionalise the management teams since hospitals have workforces of thousands of employees and very high budgets. Thus, multidisciplinary teams, including non-medical and non-nursing professionals, began to be formed for decision-making in the hospital organisation. Management teams began to include economists, lawyers, engineers, and computer scientists. But this is not enough, and we must move forward by including other professions, such as psychologists, pedagogues, documentalists, and sociologists, in order to improve the difficult task of managing a large company of extraordinary complexity and multiple tasks, such as a hospital.

Despite the incorporation of these new professionals, several problems remain common in many countries. These include the rapid and continuous increase in healthcare spending due to the introduction of increasingly sophisticated new technology and unstoppable advances in new treatments, the unnecessary or inappropriate use of healthcare

services, the lack of personalised treatment, long waiting lists and delays in accessing healthcare services, the high variability in clinical activity, the lack of coordination within the hospital itself and also between different levels of healthcare, the lack of coordination within the hospital itself and also between different levels of healthcare, the high variability in clinical activity, the lack of coordination within the hospital itself and also between the different levels

The hospital's activities are fully decentralised and must therefore be planned by objectives, audited by results, and management delegated

of healthcare, the difficulties in accessing healthcare services, the high social demand in a population with longer life expectancy and life expectancy, more ageing and more chronic pathology. And none of these problems is easy to solve. Precisely for all these reasons, it is necessary to professionalise healthcare management.

Hospitals are necessary, but good hospitals are effective, efficient, equitable, of high quality and

have to be well managed. To manage is to decide and to achieve objectives, which must be calculated, planned, quantified and have a responsible person in charge. It is not an easy task, and for this reason, I highlight the disciplines necessary for good management:

1. Knowledge of the facts (for which adequate information is required).
2. Determination of objectives.
3. Provision of means (personal, material, architectural, economic...).
4. Establishment of a functional structure through the implementation of an organisational chart that contemplates the relationships and responsibilities between people.
5. Selection and motivation of staff (we cannot ignore the fact that the satisfaction of patients and their relatives is closely related to the satisfaction of the professionals).
6. Evaluation to be aware of deviations and not lose sight of the main objective, which is to care for patients in the best conditions, with the best resources, at the right time, by the right professional, all while maintaining quality, safety, effectiveness and efficiency for the sustainability of the organisation.

As a result, the hospital's activities are fully decentralised and must therefore be planned by objectives, audited by results, and management delegated. Thus, heads of department, whether clinical or not, must act as true managers of their depart-

ment, as they are able to recognise the work done by their staff, provide them with opportunities for professional development, coordinate horizontally, ensure the minimum essential training in management, and frame the particular activity of the department within the general activity of the hospital, with common objectives.

However, we should not forget some of the characteristics of hospitals that can lead to poor management: exhaustion of middle management, lack of clear objectives, lack of diligence in problem-solving, little or no reaction to deviations or excessive need for coordination, dilution of responsibilities, self-defence, so-called “no-man’s zones”, power struggles or insecurities.

To avoid these problems, we can recall the four actions proposed by Peter Drucker (The Practice of Management 1954):

1. Decentralisation: Drucker was a pioneer when he spoke of the need to decentralise decision-making in companies. In his opinion, this issue is fundamental for the growth and strengthening of companies because it is easier for small groups to be aware of their importance and their contribution to the overall objectives of an organisation.
2. Establishing objectives: This is based on the need for the management of any organisation to set out a series of global goals or objectives as well as the determination of the “guidelines” and the “breakdown” and general planning of the “path” necessary to achieve them.

3. Self-governance of the company: Drucker believed that employees should take responsibility for the management of the organisation.

Transformation is not possible without the professionals who are the main asset of healthcare organisations

4. Focus on opportunities: Drucker stated that it is necessary to focus on opportunities because they allow organisations to grow and develop.

To make further progress in improving hospital operations, the healthcare model must be opened up along the following lines:

1. Include in the decision-making process those other professionals who usually lead activities of a non-healthcare nature but who are essential for the proper functioning of the organisation. I am referring to all those professionals who guarantee the appropriate structure of the hospital, the maintenance of the healthcare facilities and

equipment, its energy sustainability, its environmental commitment and its commitment to reducing the carbon footprint, the supply chain of healthcare material, the hotel services such as catering, cleaning and laundry. It will also be necessary to include professionals in economic management and public procurement in decision-making because their activity and decisions condition the sustainability of the centre.

2. Incorporate professionals whose activity directly impacts patients and their families, such as mental health professionals (including psychologists), palliative care professionals, social workers, physiotherapists, and occupational therapists, among others, whose demand from patients is increasing.
3. To facilitate the participation of professionals in the management of the health centre by informing them of the centre’s plans and objectives, integrating them as key people in the smooth running of the centre, whose activity, responsibility and professionalism have a direct impact on achieving effective, efficient, equitable and quality care, which is the ultimate objective of any health centre.
4. The patient must have a voice, and in this respect, they are beginning to be experienced, and not only in the field of clinical research. While the patient is the “centre” of the healthcare system, they must also be able to be the “manager” of his or her illness.

5. Encourage the clinician to participate more and more in management and ensure that all the agents involved, both health and non-health, are aware of the hospital, which facilitates the adoption of shared decision-making and co-responsibility in the use of resources.
6. Communication and the creation of trust must be fostered by healthcare leaders, which, together with interprofessional training and the creation of common spaces, will make appropriate and sustainable care possible over time.
7. Progress in improving information to patients is fundamental in training through health education programmes, especially for patients with chronic pathologies.
8. Provide development opportunities for workers, either through formal or informal training, to learn new tools and develop skills. In this sense, the advance of digital technologies applied to healthcare is unstoppable. The British National Institute for Health and Clinical Excellence (NICE) categorises them into [three main groups](#)
  - a. Those that facilitate the management of a health system or service, such as digital medical records, electronic prescriptions or computerised hospital management systems;
  - b. Those designed to transmit information and facilitate communication;
  - c. Those that act on a person's health.

Web platforms, telemedicine, virtual consultations and PPPs are clear examples of how it is possible for health professionals and patients to communicate, share information, prevent, diagnose and treat diseases, and manage epidemiological, socio-economic and human mobility data, to name but a few.

9. Occupying good positions in the rankings that order countries by the efficiency of their healthcare system, whether in the classic annual Bloomberg report or more academic research (Gavurova et al. 2021), should not relax us. There is always room for improvement.
10. Develop transformational leadership that is empathetic, forward-looking, communicative, reliable, and capable of generating multidisciplinary and collaborative teams. Transformation is not possible without the professionals who are the main asset of healthcare organisations. It is essential to advance in new roles, competencies and responsibilities.

## Conclusion

Healthcare organisations must guarantee continuity of care, introduce management and governance models that rationalise resources, simplify processes, carry out integrated management of clinical information and strive for efficiency, all adapted to the new epidemiological paradigm and technological progress, which requires new professional roles, and adaptation to social demand in terms of health.

We cannot forget that hospitals are organisations capable of creating, acquiring, interpreting, transferring, retaining knowledge, and intentionally modifying their behaviour so that the new knowledge acquired and new reflections are reflected in practice.

Those of us in healthcare have one constant: to do what is best for patients, and to do this, we must encourage multidisciplinary and collaborative work. We are committed to quality, safety, effectiveness, efficiency and relevance of care for patients.

## Conflict of Interest

None. ■

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# Passion-Driven Employees Thanks to Robots and AI

In today's evolving workplace, robots and AI are reshaping jobs. While job displacement concerns exist, there's a remarkable aspect: the potential for passionate employees. Automation of repetitive tasks not only enhances efficiency but also boosts job satisfaction. The benefits include positive interactions, happy employees, and more personalised care. Challenges include readiness for change and clear objectives. Human-robot collaboration empowers employees, allowing them to focus on meaningful tasks.



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## key points

- Robots and AI are transforming the workplace by automating repetitive tasks, freeing employees to focus on more creative and fulfilling aspects of their jobs.
- Statistics show exponential growth in robotics and AI, particularly in healthcare. As automation unlocks hidden passions, it transforms work into a source of fulfilment, driving innovation and success.
- The benefits of automation are not only empowered humans but also augmented efficiency.
- Automation allows employees to explore and pursue their passions within the workplace, leading to greater job satisfaction and innovation.
- Robots and AI alleviate labour shortages, streamline everyday tasks, and positively impact factors such as positive human-machine interaction.
- Contrary to the doom-and-gloom narratives surrounding automation, robots and AI are poised to unleash a wave of passion-driven employees in the workplace.

## How Automation Can Transform People

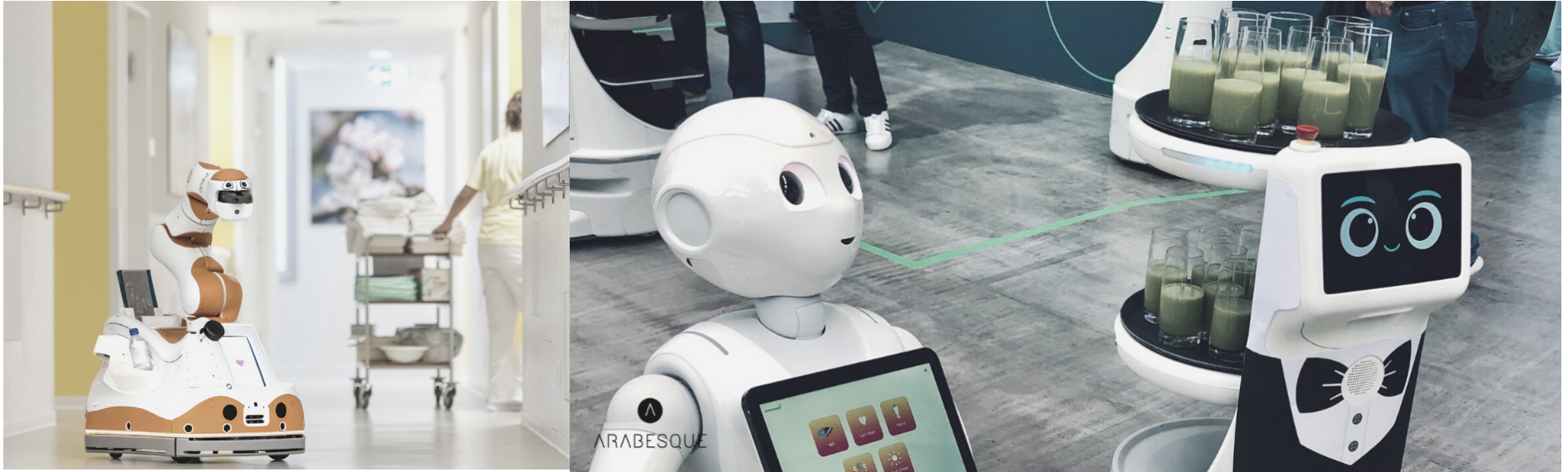
In today's rapidly evolving workplace, the integration of robotics and artificial intelligence (AI) has sparked numerous discussions about their impact on jobs and the workforce. While concerns about job displacement are often discussed, there is an intriguing and less explored aspect of this technological revolution: the potential for passion-driven employees. Contrary to the belief that machines will replace human workers entirely, robots and AI can contribute to a more passionate, engaged, and fulfilled workforce. This article delves into how this transformation is occurring and what it means for the future of work.

## Automating Repetitive Tasks

Robots and AI are revolutionising the workplace by taking over simple, repetitive tasks. These tasks, often characterised by monotony, can be a major source of employee disengagement and dissatisfaction. By automating these duties, employees have the opportunity to focus on more creative, fulfilling, and intellectually stimulating aspects of their jobs.

## Benefits

Robots and AI can empower humans by augmenting their capabilities and, thus, their quality of life. Not only that, but they are also typically alleviating labour shortages, making jobs more attractive and streamlining everyday tasks.



### Soft Factors

As robots and AI become more integrated into the workforce, the soft factors come to the forefront:

- positive human-machine interaction
- happy employees
- happy customers, which will reflect on the employees.
- more time for personalised patient care
- higher job satisfaction and fewer burnouts

The key to successful automation with robotics and artificial intelligence is a human-centred approach. We will talk about this later in the article.

### Efficiency Factors

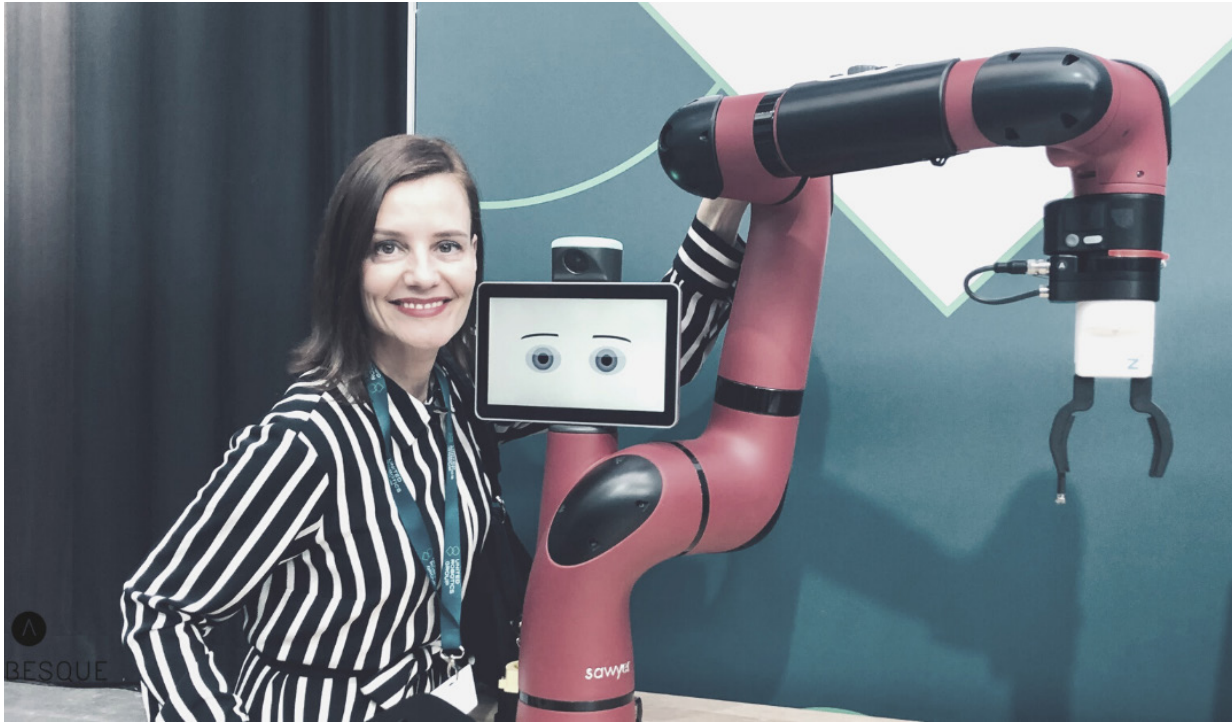
In general, robots and AI enhance staff efficiency. Some of the factors are:

- reduced workload by automated routine tasks
- effective processes
- better and more informative analysis
- the ability to apply more artificial intelligence to make processes even more effective.
- RaaS, robot as a service, for a cost-effective, agile planning of automation
- job profiles with more interesting tasks, better-utilised skills and consequently, a greater benefit for the company.

In patient care, for example, robots handle routine tasks such as activation, logistics or reporting, leaving healthcare staff more time for patients, innovation and quality control. This shift from routine tasks to higher-value activities enhances job satisfaction and taps into employees' passions for innovation and creativity.

### Enhancing Decision-Making

AI algorithms are becoming increasingly adept at analysing vast amounts of data and providing valuable insights. This capability is transforming decision-making processes across various industries, including the healthcare industry. Instead of spending hours sifting through data, employees can rely on AI-driven analytics to inform their choices. This shift allows employees to focus on different aspects of their roles,



using their judgment, expertise, and creativity to make informed decisions. It has the potential to improve the quality of care, increase efficiency and reduce costs in healthcare with robotics and AI.

## Challenges

In the ongoing transformation of our workplaces, automation and the collaboration of human and machine have become defining features of this new era. However, this journey is not without its intricacies and obstacles. As we delve into the dynamic landscape of automation, it becomes evident that

the harmonious coexistence of humans and robots brings forth a set of challenges that necessitate keen attention and strategic solutions. These challenges are not to be viewed as roadblocks but rather as opportunities for growth and innovation and they are:

- People must be ready and open to change.
- A positive mindset, passion and a sense of purpose are prerequisites for growth.
- A clear objective for the use of robotics and AI.
- A well-designed human-centred interaction.

- In-depth information and training for the staff is mandatory.
- An awareness of the application purpose of the different types of robots, for example logistics, social interaction, cleaning, and therapy.

## Human-Robot Collaboration

Robots are working hand-in-hand with people. How so? These robots are not industrial robots but service robots. Service robots are designed to work alongside humans, complementing their skills and capabilities.

They don't replace humans. They simply allow us to focus on more meaningful and higher-value tasks by automating the simple and repetitive ones.

This collaborative approach allows employees to focus on the aspects of their jobs that require human intuition, empathy, and creativity while delegating repetitive and physically demanding tasks to robots. It fosters a sense of teamwork between humans and machines, making work more enjoyable and purpose-driven.

Healthcare organisations are using robots, some of them AI-enabled, to improve the efficiency of all kinds of processes, such as:

- efficient visitor guidance
- optimisation of hospital supply management & logistics
- health education and adherence: social robots ensure patients understand their health conditions and maintain their medication schedules, thus enhancing treatment effectiveness.



valued at \$11 billion in 2021, is projected to be worth \$187 billion in 2030. That massive increase means we will likely see considerable changes in how medical providers, hospitals, pharmaceutical and biotechnology companies, and others in the health-care industry operate.

### Unlocking Hidden Passions

As robots and AI handle routine tasks and assist with decision-making, employees have more time to explore and pursue their passions within the workplace. Whether it's simply spending more time with patients, delving into a new project, volunteering for cross-functional teams, or engaging in community initiatives, employees are finding new ways to express themselves and connect with their work on a deeper level.

### Conclusion

Contrary to the doom-and-gloom narratives surrounding automation, robots and AI are poised to unleash a wave of passion-driven employees in the workplace. Technology is transforming the nature of work by automating repetitive tasks, enhancing decision-making, promoting human-robot collaboration, and unlocking hidden passions. As organisations embrace these changes, they will find that passionate, engaged employees are more productive and more likely to drive innovation and success. Even in the very challenging healthcare sector, a goal could be to create a love brand and a place where people love to work.

### Conflict of Interest

None. ■

- rehabilitation aid: these robots facilitate physical and cognitive therapeutic activities, aiding patient recovery.
- boosting patient morale: social robots engage and comfort patients and uplift their spirits.
- administrative workflow: For example, doctors and other clinicians can dictate notes hands-free, giving them more face-to-face time with patients. AI computer-assisted documentation can provide clinicians with suggestions that keep medical records as thorough as possible. In the meanwhile, the AI-enabled robots also accompany the clinicians spatially.

- safer surgeries: AI-enabled robots can work around sensitive organs and tissues, reducing blood loss, infection risk and post-surgery pain.  
See how this [robot inspires senior citizens](#) in an elderly home, which transformed the staff and the elderly.

### Statistics

Robotics, especially service robotics, as well as AI, are in exponential growth. The International Federation of Robotics (IFR) released the [World Robotics Report 2023](#), with insights into service robotics. According to Statista, the AI healthcare market,

# Responding to the Nursing Crisis: Surfing a Tsunami in the U.S., Smooth Sailing in Europe

The expected shortfall of registered nurses by 2030 highlights the need to attract young people to the profession in massive numbers and then find the resources to educate and train them. The platform model is one resource that can help achieve this necessary goal—while addressing needs in the present.



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## key points

- The nursing crisis is a disastrous collision of demographic shifts, training gaps, and rising dissatisfaction within the profession.
- In the U.S., more than 275,000 additional nurses are needed from 2020 to 2030. In the U.K., the projected shortfall is 140,000.
- A platform staffing model connects qualified nurses to the facilities that need them most.
- Deploying the platform staffing model would allow healthcare leaders to tackle issues of uneven access and clinical mismatch head-on.

Nurse shortages can only be solved by training and hiring more nurses. Yet, at the height of the pandemic in the United States, a public-private approach to nurse recruiting, vetting, and payment managed to ease shortages across the country. In the U.S., it took COVID-19 for the government to fully back this approach. However, it could be implemented immediately in health systems that are already accustomed to public-private collaboration.

A platform staffing model connects qualified nurses to the facilities that need them most—and then handles the credentialing, validates the clinical match between the nurse and the site, and pays the nurses directly after the shift. The details of any one platform are less important than the trustworthiness of the governance; same-day

pay is a major satisfier for nurses in the U.S., but the model could be sustained without it. Trust is vital because the success of the platform depends on a critical mass of people signing up, with the number of successful placements mirroring the number of participants. Especially in healthcare, the reliability of the infrastructure and the soundness of the protocols must be clear to all.

## Proof of Concept

In the U.S., the viability of the platform staffing model has been proven by market metrics: the pioneer of this approach is currently the fastest-growing company in the country. More importantly, in the healthcare context, the company has been certified by the accrediting body, the Joint Commission, three times since its inception in 2017, with



zero requirements for improvement each time. This evaluation process hinged on credentialing: the reliability of the technology allowing nurses to upload their credentials securely and the ability of qualified professionals to access and review those credentials. Where traditional staffing approaches might intake faxed credentials or sometimes even hard copies, the platform converts digital credentials into scrollable PDF packets that reviewers can navigate via thumbnail. Homing in on the necessary information more quickly reduces delays associated with this stage of nurse recruitment. However, the Joint Commission and other regulatory bodies may be less interested in the speed it enables than in its effect on quality and safety. The technology not only dramatically simplifies compliance for the hospitals, but it dramatically empowers regulators by paving the way for continuous, digital compliance monitoring.

In the U.K. and European context, streamlining the staffing process may not be a market imperative, nor is business growth the most relevant sign of success. But with the Royal College of Nursing's director for England warning that the nursing shortfall will have an [apocalyptic impact](#) on patient care, finding ways to connect properly credentialed nurses to sites in need is critical.

In the U.S., it was the apocalypse of the pandemic that proved the flaws in traditional staffing practices. Non tech-enabled legacy staffing companies use manual, labour intensive processes that are slow and expensive. These legacy companies tend to

limit transparency for both prospective employers and employees based on market considerations—but the agencies themselves, too, could only see the employers they were contracted with. State-based variations in licensure requirements were another obstacle to effective staffing. Particularly, onerous licensure standards could stand between a facility in need and a willing nurse just a few miles across the state line.

## Nurse users cite flexibility and control over their schedule as the model's main benefits

The U.S. government tackled several of these obstacles during the pandemic. They lifted certain licensure requirements and backstopped state health systems with federal emergency dollars. This government support effectively transformed a siloed, market-based healthcare system into a broad public-private partnership, at least for a time. And with the government essentially acting as a single-payer, the most efficient path they found for getting nurses where they were needed most was this platform model.

## Adapting the Model

NHS's energetic international recruitment is a positive step toward meeting the U.K.'s demand for nurses. However, [researchers argue](#) that it comes nowhere near a complete solution. Nor, they point out, "does it ensure that nurses are recruited to the areas and types of care where the need is greatest." Deploying the platform staffing model via NHS would give healthcare leaders the ability to tackle issues of uneven access and clinical mismatch head-on. For example, in the U.S., all vacancies are listed, then nurses search those positions by acuity, location, and pay. Their credentials and experience must match the acuity level and specialty in each posting, a match that is confirmed with a proprietary matching algorithm. (This avoids a common problem with traditional staffing, where recruiters without clinical experience would vet nurse resumé's, often mistakenly, and send them to jobs beyond their acuity level.) Beyond the aspect of the clinical match, however, there are no other constraints on what American nurses see. However, if the government is administering the platform, it can weigh or highlight certain positions based on other priorities, like access or need.

Certain aspects of the model would necessarily carry over no matter where it was implemented: social media- and geo-targeted advertising to potential participants, self-service credentialing, a constantly updated and searchable database, and clinical match assurance. The question of same-day payment would need to be addressed if the model were adapted

for a European context. In the U.S., this feature is a major satisfier for platform participants. The nurses are happier for obvious reasons, but the hospitals also benefit from keeping their payroll better updated and their bottom line accurate. Still, after a moderate compensation threshold has been met, nurse users cite flexibility and control over their schedule as the model's main benefits. NHS leaders could decide whether or not to deploy this feature.

### Lighter Lift, Faster Improvement

The pandemic forced the U.S. to invest in a new approach to nurse allocation. In the U.K. and Europe, that approach could be implemented with a much lighter lift, and its benefits could be amplified more easily as well.

The nursing crisis is a disastrous collision of demographic shifts, training gaps, and rising dissatisfaction

within the profession. Having all of a nation's nursing staff visible in a single database—which they are participating in entirely voluntarily—would reveal gaps in specialties or licenses that could then be addressed through reskilling initiatives, changes to compensation, and other strategies. The U.S. platform is currently piloting ways to train more ICU nurses, as that gap is both hugely costly and a direct threat to patient safety. The NHS could launch similar pilots based on its most urgent needs.

The U.S. Bureau of Labor Statistics projects that [more than 275,000 additional nurses are needed from 2020 to 2030](#). In the U.K., the projected shortfall is 140,000. Both countries will need to attract young people to the profession in massive numbers and then find the resources to educate and train them. The platform model is one resource that will help them achieve that necessary goal—while addressing needs in the present.

### Conflict of Interest

None. ■

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# Digitalisation



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# Stepping Stones for Healthcare Metaverse – An Overview of AR and VR Applications

How can we start the journey of the medical Metaverse? Before clinical application and saving lives, one should expose themselves to this still-strange technology. This paper explores publicly available applications with potential. This study aims to list and describe Metaverse applications that are currently assessable and have potential usage in the medical field. Providers collaboration, medical visualisation, and wellness were considered when defining the medical usage scenarios. When determining multiple candidates, we chose the one with easy accessibility to give readers the best chance to experience the technology.

## key points

- The concept of Metaverse is seductive, but due to the nature of the technology involved, it is very hard to demonstrate with words, and the best thing for health professionals and managers is to start trying out metaverse-related technologies to better grasp its potential.
- There are some key concepts which are useful to understand Metaverse-related technologies (MRT): Augmented Reality, Virtual Reality, Mixed Reality, Avatars in videoconferencing solutions and Avatars in social media and for interactive platforms.
- MRTs are being used in health for multiple purposes. While such a review is off-scope, this paper aims to present easy-to-reach, experimental solutions that can better ground the discussions, perspectives, early projects, and pilots of their use in healthcare.
- A set of MRT applications, its review considering healthcare and medical education and how to easily find them is provided in this paper.
- The shorter route to achieving Metahealth or healthcare Metaverse is to understand the limitations and real potential of simple, easy-to-test solutions to help set in motion healthcare-specific testing and experimentation at scale.
- Health managers, educators and professionals have a role in making the healthcare Metaverse real, which starts by understanding its present reality and experimenting with the thrill of today's real precursors of such future virtuality.

## Introduction

“Healthcare will move to the Metaverse! Metaverse, digital patients, in silico clinical trials...” and similar statements were commonly heard in late 2021 and 2022. Now, the hype is fading. ChatGPT and its competitors took the front stage in the often-illusory hope of quick fixes to failing or underperforming health systems. The good news is that this leaves space for serious reflection and solid work on building this virtual world.

The term “Metaverse” is formed by combining the prefix “meta,” denoting transcendence, with the word “universe.” It describes a massive virtual environment linked to the physical world, in which users interact through digital avatars (Lee et al. 2021). Two years ago, there was a notable surge

in the discussion and exploration of the Metaverse concept, generating much interest among the scientific community and the public. Numerous research papers have been authored to explore the prospective applications of the Metaverse and its underlying technologies, such as AR, VR, and MR within the context of healthcare (Iwanaga et al. 2023; Moro 2023; Petrigna and Musemeci 2022; Kye et al. 2021).

The COVID-19 pandemic has also boosted the Metaverse hype because it prompted a rapid shift in digital usage patterns, particularly promoting two trends: telehealth and the value of individualisation (Vargo et al. 2021). These two by-products of the pandemic are here to stay in different ways despite some health systems' resistance and some drawback movements observable in some countries. During the lockdown, there has been a notable shift towards virtual platforms for collaboration and interactions. This transition has been observed across various sectors, including business, education, and healthcare, leading to the implementation of novel workflow dynamics (Schumacher 2022). The contemporary landscape is witnessing the emergence and advancement of [virtual productivity platforms](#), hybrid working and learning places, and public services. In recent times, there has been a growing trend towards integrating our daily lives and endeavours into the world of digital platforms.

The current deflation of [optimistic projections](#) regarding the Metaverse can be attributed to the unmet need for development in the areas that make the Metaverse a reality. A few examples are Displays,

Haptics, Batteries, Computer Vision and required multipurpose advanced artificial intelligence (AI). The ongoing development of such technologies is necessary for creating such a virtual world. Furthermore, only when these technologies are barely noticeable extensions of human beings, ubiquitously available and, in some cases, sufficiently miniaturised, will a seamless transition to metalife be possible.

Hence, we ask: what is the current state of the Metaverse? And how is that in relation to hopes of its use and positive impacts on health? And finally, how should health professionals and managers prepare or work towards a Metahealth scenario?

## Related Work and Motivation

Currently, the Metaverse is accessible through a limited range of platforms, predominantly utilising VR, AR, and MR technologies. However, it has not yet achieved a comprehensive and fully digitised replication of the physical world. The concept of the Metaverse requires an interaction between the two realities (Kye et al. 2021). Four types of Metaverse have been defined (Davis et al. 2009):

1. Augmented Reality – the creation of a smart environment using location-based technologies.
2. Lifelogging – collecting data from people (through wearables).
3. Mirror World – a digital world that is a “reflection” of the real world.

4. Virtual Reality – a digital world built with avatars that represent the user.

These types have been developing independently and at a different pace. The most advanced are AR and VR, which in combination are often referred to as Mixed Reality (MR). The innovation behind the Metaverse as a collective sociotechnical construct is the new and further advanced combinations of these.

We have compiled a comprehensive evaluation of currently accessible applications that could provide users with a glimpse into the nature and experience of the Metaverse. In the process of app selection for review, our attention was directed towards applications that possess potential for health professionals, managers, and educational institutions in the future. This study aims to identify and examine applications that exemplify the current condition and future prospects of the metaverse.

Moreover, it is worth noting that the Metaverse is a complex notion that is challenging to demonstrate without hands-on involvement with these technologies. Consequently, we have taken care to exclusively choose applications that are readily accessible and frequently utilised. Our objective is to ensure that individuals with the requisite equipment or platform have the opportunity to personally experience these applications.

The primary objective of this study is to provide an analysis of the current state of the Metaverse and its subjective elements. In an era characterised by escalating healthcare costs, there is a growing trend

toward the use of preventive measures and digital health. Additionally, it is important to note that various lifestyle factors play a significant role in the development of numerous diseases, such as diabetes, obesity, and heart conditions. This realisation presents a novel opportunity to enhance public health education and promote healthier habits, ultimately reducing healthcare expenditures and alleviating the financial burden on global healthcare systems. This is what the current literature has envisioned for the Metaverse.

However, the Metaverse remains a theoretical construct that is yet to be realised in practice, as the necessary technologies for its implementation are still being developed. Several platforms and applications that integrate VR, AR, and MR technologies offer a first insight into the potential of the metaverse. Demonstrating AR, VR, and MR is challenging without first-hand experience. This paper will attempt to provide a comprehensive description of the aforementioned technologies. However, we highly recommend everyone to personally experience them.

The primary objective of this article is to provide tangible illustrations of the present-day manifestations of the Metaverse and give concrete examples of apps anyone equipped with the right gear can try.

## Methods

As a first step, we established a set of selection criteria for choosing apps that could serve the purpose of our study. For app selection, we looked for the following criteria:

- **Innovation and representatives:** One understands that the app should be a new way to do something from the real world in VR or AR. Furthermore, we selected apps that could be representatives of a whole app category (such as fitness or education) since we did not want to include very similar apps. Lastly, these apps also include a functionality or option that distinguishes them from other apps with the same intended purpose.
- **Connection to real-world practice:** Another point is to ensure these apps enhance or make for a better experience than their out-of-metaverse competitors. In other words, these apps allow the user to do something he/she otherwise would do in the real world but with a more immersive, engaging, and fresh perspective.
- **Customisation and avatars:** A fundamental building block of the Metaverse is avatars and worlds that persist whenever you log in to the Metaverse (a concept known as lifelogging and digital twins). In the selection process, we ensured that these apps allow for at least one of these, differentiating them from other digital solutions.
- **Potential impact on Healthcare:** It was important for us that these apps have a real-world impact on patient engagement and education.

After selecting eight apps, we used an instrument of comparative analysis to review them. The selected apps were: i) Spatial; ii) Horizon Workrooms; iii)

YouTube VR; iv) Tripp; v) Awake Heart; vi) Complete Anatomy; vii) Supernatural; viii) Holo Anatomy

## Review of Applications

The eight applications are presented in detail as follows:

**Spatial** (demo available here - <https://www.spatial.io/>)

Category - App Platform

Platform - PC, Mobile & Meta Quest

### Description and Purpose

Spatial is an innovative Metaverse application designed to empower creators and businesses to build immersive virtual venues that facilitate sharing culture, experiences, and creative endeavours. One of Spatial's standout features is its commitment to empowering users to unleash their creativity. It is a versatile canvas for users to share a wide array of

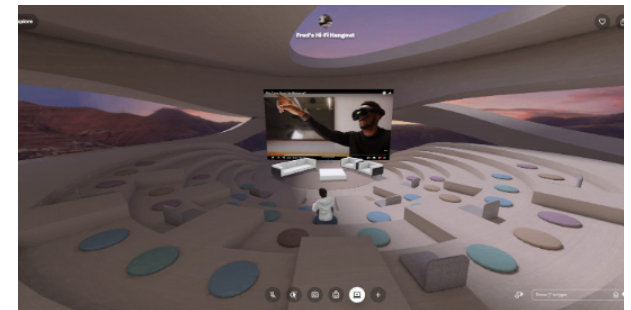


Figure 1. Screenshot of a personal conference room in Spatial. Source: Authors

content, develop a thriving community, and market creative works and products. By enabling such multifaceted interactions, Spatial aligns itself with the core principles of the Metaverse, where digital spaces serve as hubs for collaboration and expression.

Another noteworthy functionality is its ability to facilitate the development of 3D environments or objects that can be minted as NFTs (Non-Fungible Tokens). This feature is pivotal as it allows users to take their virtual creations to the next level by turning them into unique, tradable assets. By embracing the NFT trend, Spatial taps into the broader Metaverse trend of digital asset ownership and exchange. Furthermore, the app facilitates commerce by enabling users to sell or rent the 3D environments they create, opening economic opportunities within the Metaverse ecosystem.

Furthermore, Spatial distinguishes itself through its advanced world customisation options and avatar capabilities. Users can tailor their virtual environments to suit their vision, fostering a more immersive and personalised experience. Additionally, the app offers diverse avatar choices, enhancing user identity expression within the Metaverse.

Lastly, another strength of Spatial is its multi-platform accessibility, supporting PC, mobile devices, and Meta Quest head mount displays (HMD). This broad availability ensures that users can access and contribute to the Metaverse from various devices, making it more inclusive and adaptable to varying technological environments.

Key take-away and innovative features:

- Empowering Creativity
- 3D Environment Creation, NFT Minting and Commerce
- Advanced World Customisation and Avatars:
- Multi-Platform Accessibility:

Spatial is a Metaverse application that embodies the core principles of creativity, community, and commerce. Its 3D environment creation, NFT minting capabilities, advanced customisation options and multi-platform accessibility position it as a noteworthy player in the Metaverse landscape. As the Metaverse continues to evolve, Spatial is an important tool for health professionals to know and explore the future possibilities of the Metaverse landscape.

**Horizon Workrooms** (demo available here - <https://workrooms.workplace.com/signup/>)

Category – Productivity

Platform - Meta Quest (PC compatible)

### Description and Purpose

Horizon Workrooms, developed by Meta, is a virtual office platform offering an immersive collaborative work environment that aims to answer the evolving needs of modern work environments. At its core, Horizon Workrooms transforms the concept of a traditional office into an immersive virtual environment. It provides teams with a unique space for collaborative

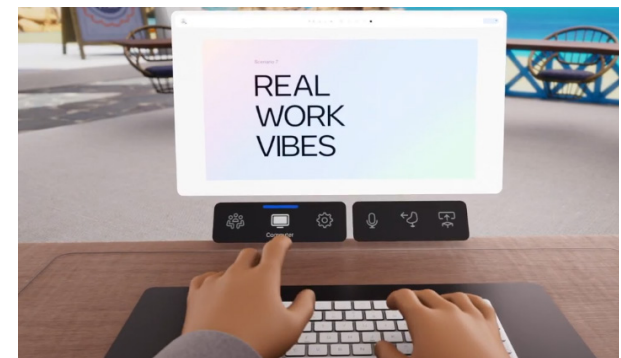


Figure 2&3. Screenshot of a meeting room while using white-board functionality (left); Screenshot of personal workspace (right). Source: <https://forwork.meta.com/horizon-workrooms/>

work, bridging the gap between physical and digital worlds. The app's compatibility with the Meta Quest

headset ensures that users have access to a high-quality, immersive experience. Additionally, its PC compatibility extends its reach to those who prefer 2D screens, making it inclusive and adaptable to various hardware configurations.

Moreover, the app facilitates various aspects of collaboration, including team meetings, brainstorming sessions, and idea generation. Through spatial audio, lifelike avatars, and interactive whiteboards, Horizon Workrooms enhances the quality of communication and engagement, fostering a sense of presence often missing in traditional video conferencing tools. Furthermore, users can seamlessly share documents, presentations, and 3D models within the virtual workspace. This capability allows for real-time collaboration and feedback.

Finally, the app also excels in overcoming geographical barriers, enabling seamless collaboration among teams regardless of their physical locations, which is especially valuable in the context of remote work and distributed teams. Moreover, it effectively addresses the needs of the evolving workplace landscape, accommodating hybrid office models and telework arrangements and offering a versatile solution for organisations navigating the transition between physical and virtual workspaces.

Key take-away and innovative features:

- Immersive Virtual Office
- Enhanced Collaboration
- Hybrid Office and Telework Capabilities

Horizon Workrooms by Meta reimagines the way teams collaborate and work together. Offering an immersive virtual office environment enhances collaboration, productivity, and engagement, regardless of geographical distance. Its compatibility with both Meta Quest headsets and 2D screens, along with its responsiveness to the changing dynamics of hybrid work, makes it a valuable tool for health organisations and health managers seeking to harness the potential of the Metaverse for their workspaces. As the workplace continues to evolve, Horizon Workrooms represents a significant step toward the future of work and collaboration.

**YouTube VR** (demo available here - <https://vr.youtube.com> )

Category – Entertainment and Education

Platform - Any VR Headset

### Description and Purpose

YouTube is becoming a more prominent tool in the educational scene. YouTube VR is an application that brings the world of video education and online tutorials into the immersive realm of virtual reality. YouTube VR revolutionises the viewing experience by presenting content in an immersive 360-degree virtual reality format, enabling users to actively engage with videos. This departure from passive observation empowers users to fully explore and immerse themselves in digital experiences. Additionally, the app offers user-friendly 360 video creation tools, democratising content creation and enabling users to share their distinctive perspectives within the Metaverse, fostering creativity and individual expression.

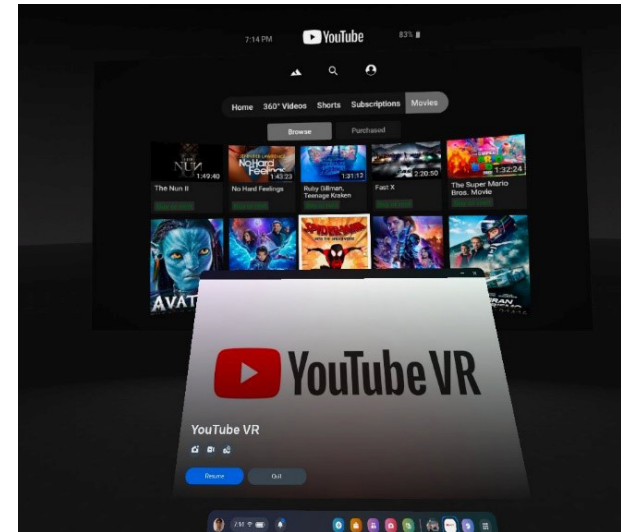


Figure 4. Screenshot inside YouTube VR with Meta Quest Menu open. Source: Authors

The app becomes a virtual classroom, offering educational institutions and learners a platform to engage in 360-degree educational content. This interactive learning experience can enhance comprehension and retention, making it a valuable tool for immersive education.

Lastly, YouTube VR's compatibility with any VR headset ensures accessibility for many users. This inclusivity expands the app's reach, making immersive content and interactive experiences available to a broad audience.

Key take-away and innovative features:

- 360-degree Videos and User-Friendly Video



#### Creation Tools:

- Immersive and Interactive Education:
- Multi-Platform Accessibility:

YouTube VR represents a remarkable evolution of entertainment within the Metaverse. Its ability to

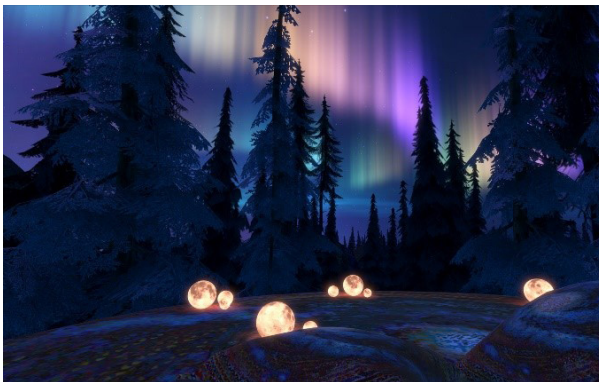


Figure 5,6. Screenshots of two different guide meditation scenarios. Source: [https://www.youtube.com/watch?v=leUMwq7FMz4&t=93s&ab\\_channel=MetaQuest](https://www.youtube.com/watch?v=leUMwq7FMz4&t=93s&ab_channel=MetaQuest)

deliver immersive and interactive learning experiences sets it apart in the educational category. By offering user-friendly 360 video creation tools, the app empowers users to consume and actively shape their Metaverse experiences. Its compatibility with various VR headsets underscores its commitment to accessibility and inclusivity. As the Metaverse continues to evolve, YouTube VR plays a pivotal role in defining the future of immersive entertainment and education.

**Tripp** (demo available here - [https://www.oculus.com/deeplink/?action=view&path=app/2173576192720129&ref=oculus\\_desktop](https://www.oculus.com/deeplink/?action=view&path=app/2173576192720129&ref=oculus_desktop) )

Category - Lifestyle

Platform - Mobile, Meta Quest, & PlayStation VR

#### Description and Purpose

Tripp is a multifaceted wellness and meditation application that enhances traditional mindfulness practices. The app intends to enhance mental well-being and creativity within the Metaverse. Tripp is a comprehensive wellness companion with an extensive library of guided meditations and breathing exercises to guide users toward mental clarity, relaxation, and emotional balance. Notably, it integrates research-supported visuals meticulously designed to induce relaxation and enhance emotional well-being, elevating the meditation experience by providing an immersive and impactful visual dimension.

Furthermore, the app empowers users to tailor their meditation sessions to their specific requirements. With options to customise the virtual world,

select a spiritual guide, choose a preferred voice, and adjust the duration of the experience. Tripp extends its reach to address critical issues in mental health and sleep disorders. The app's guided meditations and visual experiences are valuable tools for individuals seeking relief from stress, anxiety, and sleep-related challenges. Its therapeutic potential in these areas underscores its relevance and applicability within the Metaverse.

The last of Tripp's strengths is its availability on multiple platforms, including mobile devices, Meta Quest, and PlayStation VR. This versatility ensures users can access its wellness resources and meditation practices conveniently, regardless of their preferred device.

Key take-away and innovative features:

- Guided Meditations and Breathing Exercises in VR
- Customisable Meditation Sessions
- Mental Health and Sleep Disorders

Tripp is a wellness and meditation app within the Metaverse. By addressing mental health issues and sleep disorders, this application takes a significant step in addressing the concerns of loneliness and depression in the contemporary digital era. Furthermore, its cross-platform accessibility enhances inclusivity and convenience. As the Metaverse increasingly incorporates a holistic approach to well-being, Tripp presents a valuable avenue for individuals to seek relaxation, foster connections, and stimulate creativity within the

continually evolving digital landscape.

**Awake Heart** (demo available here - <https://www.microsoft.com/en-us/p/awake-heart/9nvm1kvsrrlt?activetab=pivot:overviewtab>)

Category – Educational

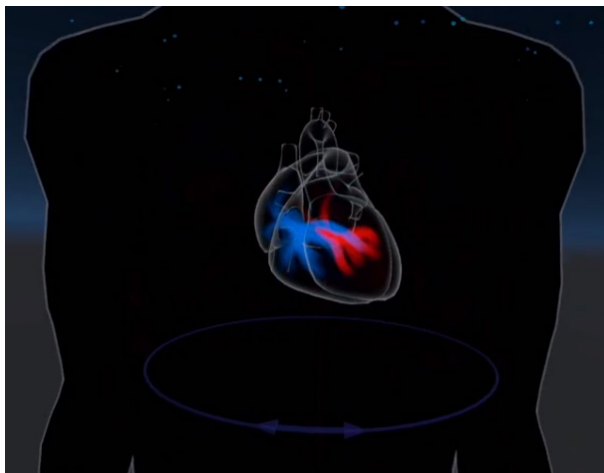
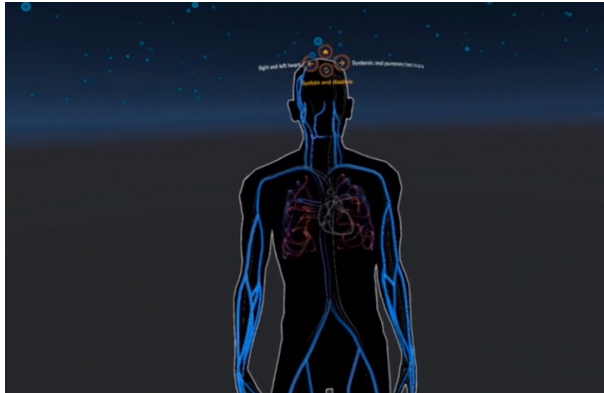


Figure 7.8. Screenshots of a heart physiology lesson in Awake Heart. Source: <https://vimeo.com/649427724>

Platform - Microsoft HoloLens (AR)

### Description and Purpose

Awake Heart is an educational application that ushers users into the realm of immersive and spatial learning. Awake Heart leverages holographic technology to enhance the study of anatomy and physiology, offering a new dimension to education and training within the Metaverse.

Awake Heart offers users an immersive learning experience by providing detailed holographic anatomic models that allow hands-on exploration of human anatomy and physiology. This engaging approach fosters comprehension and retention, making it a valuable educational tool for learners and institutions, transcending traditional textbook methods.

Moreover, Awake Heart also offers users a way to assess their knowledge through comprehensive exams. This feature helps learners gauge their proficiency and reinforces the educational experience by providing feedback and insights into their progress. Awake Heart prepares healthcare professionals and students for real-world hospital procedures and situations by enabling users to participate in clinical simulations. This practical training component is invaluable for new professionals seeking to build their confidence and skills and for health institutions to get new professionals up to speed. Awake Heart's choice of platform, Microsoft HoloLens, aligns with its commitment to mixed-reality educational experiences and offers an ideal environment for spatial learning.

Key take-away and innovative features:

- Engaging Learning Experience
- Comprehensive Exams
- Clinical Simulations Beyond Traditional Education

Awake Heart is an educational application that leverages holographic technology to revolutionise the study of anatomy and physiology. Offering clinical simulations in an immersive environment bridges the gap between education and real-world practice, particularly for healthcare professionals. As the Metaverse continues to evolve, Awake Heart sets a high standard for immersive and effective education within this digital landscape.

**Complete Anatomy** (demo available here - <https://3d4medical.com/>)

Category - Educational

Platform – PC and Mobile (AR)

### Description and Purpose

Complete Anatomy offers users an immersive and spatial learning experience through high-definition 3D virtual anatomic models that allow for in-depth exploration of human biology, surpassing the constraints of traditional textbooks. Capitalising on the three-dimensional nature of anatomy and physiology, the app provides an intuitive and comprehensive understanding of the subject matter, transcending traditional 2D representations. The app covers a wide spectrum of educational content, including anatomy, physiology, and pathology. Furthermore, Complete Anatomy offers alternative ways to visualise the body, such as X-rays, CT scans, and MRI scans, enhancing the user's ability

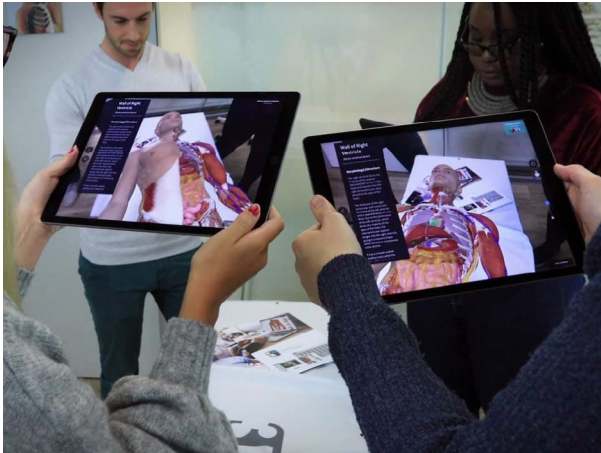


Figure 9,10. Screenshots of students using AR mode on Complete Anatomy App for iPad (left) Screenshot of a human skull on a table through AR mode (right). Source: <https://3d4medical.com/support/complete-anatomy/ar>

to grasp complex medical concepts.

Furthermore, among all the standout features of Complete Anatomy is its inclusion of step-by-step

surgical procedures. Users can gain practical insights into surgical techniques. This hands-on approach to learning enhances comprehension and confidence. The app is available on both PC and mobile platforms, but its AR component is only available on mobile.

Key take-away and innovative features:

- Immersive 3D Anatomic Models
- Multifaceted Learning
- Step-by-Step Surgical Procedures

Complete Anatomy is an educational application for studying human anatomy and related fields within the Metaverse. Its immersive anatomic models, diverse learning content, and practical surgical procedures make it an interesting resource for learners and medical professionals. As the Metaverse continues to evolve, Complete Anatomy exemplifies the potential for immersive and comprehensive education within this digital frontier.

**Supernatural** (demo available here - <https://www.getsupernatural.com/signup/>)

Category - Fitness

Platform - Meta Quest (VR)

### Description and Purpose

Supernatural represents a fusion of fitness and VR technology, offering users a path to physical well-being and happiness. Supernatural offers users an immersive fitness experience in a virtual world where dynamic boxing, aerobic, and full-body cardio workouts occur in captivating digital landscapes. These



Figure 11,12. Example of a workout using Meta Quest. Outside perspective (left) and the actor's perspective inside the VR Headset (right). Source: <https://www.getsupernatural.com>

classes breathe excitement into exercise routines, alleviating the monotony of traditional workouts. Additionally, the app prioritises holistic well-being by incorporating guided meditation and recovery exercises

following vigorous fitness sessions, aligning with its commitment to both physical and mental health, leaving users feeling physically refreshed and mentally revitalised after each session.

One of Supernatural's standout features is its commitment to fitness instruction. Users get to interact with live-action coaches who meet them face-to-face in virtual reality. This personal and immersive approach allows for real-time guidance, motivation, and correction, creating a guided and safe fitness experience.

Finally, the Supernatural app improves physical health and unites users by letting them connect, share achievements, and help one another. Social interactions inspire healthy workout routines. The app's primary objective is to improve physical health and happiness by offering a variety of intense workouts, professional advice, and a deep feeling of a fitness community. Promoting holistic well-being and joy is the overall goal.

Key take-away and innovative features:

- Engaging Fitness and Recovery Classes in VR
- Learning from the Experts
- Building Healthy Routines and Community Engagement

Supernatural is a fitness application within the Metaverse, integrating immersive VR technology with physical exercise and well-being. Its captivating fitness classes, expert coaching, and emphasis on community engagement create a holistic fitness experience that transcends traditional workout routines. As the Metaverse continues to evolve, Supernatural

paves the way for a healthier and happier digital future.

**Holo Anatomy** (demo available here - <https://www.microsoft.com/en-us/p/holoanatomy/9nblggh4ntd3?activetab=pivot:overviewtab>)

Category - Educational

Platform - Microsoft HoloLens (AR)

### Description and Purpose

Holo Anatomy is an educational application that uses the AR technology from Microsoft HoloLens to offer users a way to learn and engage with human anatomy. Holo Anatomy offers users an immersive and spatial learning experience for studying human anatomy. By leveraging holographic technology, the app facilitates 3D visualisation, allowing users to delve into human anatomy with enhanced depth perception and understanding. This immersive approach not only aids in understanding but also enhances memory retention.

Furthermore, Holo Anatomy's most important feature is its "Lecturer Mode." Educators and instructors can teach in this mode while interacting with the holographic model. This feature empowers educators to conduct immersive anatomy lessons, making the learning process more engaging and interactive. It transforms traditional lectures into dynamic and participatory experiences.

Lastly, Holo Anatomy facilitates collaborative learning through shared sessions featuring synchronised visual fields, allowing users to explore and discuss anatomical structures in real-time. This collaborative environment enhances engagement

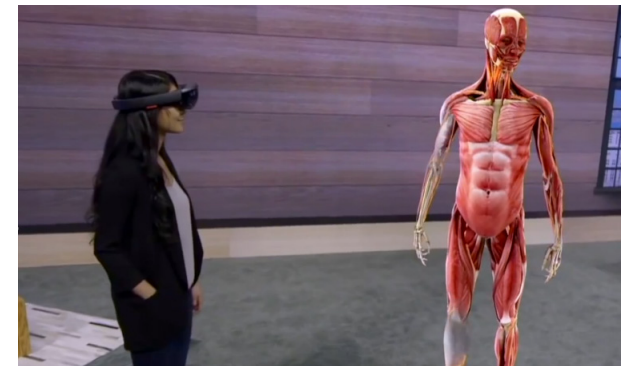
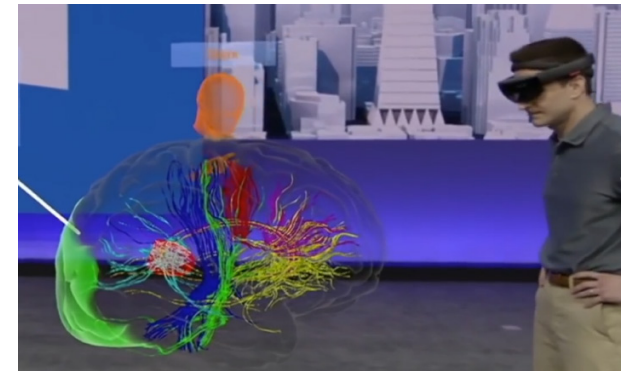


Figure 13,14. Students' perspective of a collaborative anatomy session using the AR solution Holo Anatomy. Source: [https://www.youtube.com/watch?v=h4M6BTYRIKQ&ab\\_channel=CaseWesternReserveUniversity](https://www.youtube.com/watch?v=h4M6BTYRIKQ&ab_channel=CaseWesternReserveUniversity)

and creates opportunities for peer-to-peer learning and in-depth discussions about anatomical structures, functions, and clinical applications. This emphasis on collaboration fosters critical thinking and a deeper understanding of anatomy beyond individual learning.

Key take-away and innovative features:

- Immersive and Spatial Learning
- Lecturer Mode for Interactive Teaching

	Advantages	Disadvantages
<b>AR</b>	<ul style="list-style-type: none"> <li>• Less motion sickness</li> <li>• Capacity to perceive surroundings</li> <li>• Enhanced field of vision</li> <li>• Better for collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Low resolution</li> <li>• No controllers, only gestures</li> <li>• Heavy headset</li> </ul>
<b>VR</b>	<ul style="list-style-type: none"> <li>• Better resolution</li> <li>• More immersive</li> <li>• Better for remote work</li> </ul>	<ul style="list-style-type: none"> <li>• Motion sickness</li> <li>• Difficult interaction with real-world</li> <li>• Heavy headset</li> </ul>

Table 1: AR and VR – Advantages and Disadvantages. Source: Authors

- Collaborative Exploration

Holo Anatomy is an educational application for the study of human anatomy. Its immersive and spatial learning features, collaborative exploration, and

interactive teaching options set it apart. Promoting collaborative discussion and engagement exemplifies the potential of the Metaverse to enhance the way we teach and learn complex subjects.

### Discussion, Future Prospects and Health Management and Education Implications

When reviewing the users’ experience for each of the apps, we came across advantages and disadvantages that were common throughout most apps that use the same technology. We related these to the use of either AR or VR and summarised them in Table 1.

The technologies necessary for the realisation of the Metaverse are presently in developmental stages. They are not all real yet to allow the virtual world many easily write about. Their reality still has distance from the real world for now but glimpses into “the Metaverse” can be accessed exclusively through existing platforms like Spatial, Meta, and, in the near future, Apple, since they recently announced the launch of “Apple Vision,” a mixed reality headset.

The term Metaverse refers to a distinct digital realm that exists in parallel to the physical world. The current state of technology does not currently allow for a realisation of this kind of virtuality. The creation of the Metaverse in the future hinges upon the integration and compatibility of several technologies, including but not limited to AR, VR, MR, haptics, hand/eye tracking, sensors, computer vision,

perceptual science, avatars, graphics, networks and clouds, blockchain, robotics, user interactivity and artificial intelligence (AI). And these are only some of the Metaverse enablers.

We urge the scientific community to conduct further research on these technological advancements that enable the creation of the Metaverse. Prominent technology companies such as Meta and Apple have allocated significant resources towards the development of the Metaverse. Notably, Facebook even changed its name to “Meta”. Can this effectively reach a wide audience? Right now, the Metaverse is confined within the platform that allows users to explore it. The headset you have determines what digital ecosystem you are in. Is this the start of many parallel digital worlds like the “Metaverse”, “Appleverse,” and even “Googleverse”? Of not one but many “digital singularities”?

Finally, it is quite likely that these technologies will be significant tools in healthcare. Thus, we emphasise the importance of staying well-informed about them to cultivate competency as a healthcare professional or provider in the upcoming years. As we have done for hundreds of years in the medical field, testing and experimenting with existing tools is the best way to prepare and lead the way into their usage and appropriate usage in health. The reality of virtuality for our patients is needed to deal with mental illness, dementia, anxiety, chronic pain, distance counselling for victims that wish to remain anonymous and many other conditions where the real suffering of humans can be ameliorated if not made to disappear. Health managers,

educators and professionals have a role in making the healthcare Metaverse real, which starts by understanding its present reality and experimenting with its thrill.

## Conflict of Interest

None. ■

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### Apps and developers:

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Horizon Workrooms - <https://about.fb.com/news/2021/08/introducing-horizon-workrooms-remote-collaboration-reimagined/>

YouTube VR - <https://www.youtube.com/channel/UCZuqhhs6NWbgTzMuM09WKDQ>

Tripp - <https://www.tripp.com/>

Awake Heart - <https://www.awake.health/apps>

Complete Anatomy - <https://3d4medical.com>

Supernatural - <https://www.getsupernatural.com>

HoloAnatomy - <https://case.edu/holoanatomy/>



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