

Health Prototyping Centre



Augmented reality use in pathology workflow

CASE STUDY

An initiative between eHealth NSW, Health Infrastructure, HealthShare NSW and NSW Health Pathology.

Client name NSW Health Pathology

Location NSW, statewide

Product/service delivered

An evaluation of Microsoft HoloLens 2 mixed reality headset use in pathology workflows

Key benefits of using the Health Prototyping Centre

- -Provides a dedicated space, including a range of clinical simulation suites and equipment replicating common pathology, acute care, and home care settings
- Allows teams to focus on problem solving away from everyday working environments
- -Enables the easy simulation of workflows
- -Provides a team of technical and design experts to support the evaluation
- -Supplies tools and technology to support the development of prototypes
- -Includes replication of the NSW Health technology stack to support integration and functional testing
- -Supports the recruitment of test users for projects – both patients and clinicians



The challenge

Anatomical pathology examines tissue and cells from people to diagnose various diseases, including cancer. Anatomical pathologists provide diagnoses and clinical advice that allow doctors to make decisions about the best care and treatment for their patients. This includes monitoring the patient's response to treatment and progress.

Anatomical pathology is a critical medical speciality that is facing some challenges and opportunities, including:

- global shortage of highly specialised anatomical pathologists
- increasing demand for anatomical pathology services with advances such as personalised medicine
- increasing use of emerging digital pathology technologies.

The process of examining tissue and cells is lengthy and highly specialised.

Many of the early steps in the process, such as cut up (which involves examining, assessing and cutting the sample into smaller sections that, after further processing, are examined under a microscope by the anatomical pathologist), are performed by a registrar or an anatomical pathology technician in a laboratory. Sometimes, if the case is complicated, the registrar or the anatomical pathology technician may need expert guidance of a senior anatomical pathologist.

Currently, senior anatomical pathologists can provide expert guidance by:

- communicating through voice calls
- sending photos via secure email
- physically travelling to the lab.



The plan

NSW Health Pathology wanted to explore virtual reality (VR) or augmented reality (AR) technology to enable telepathology (practicing pathology from a distance). This would allow anatomical pathologists to dial into the laboratory regardless of their geographical location.

The Microsoft HoloLens 2 device was identified as a potential tool to enable telepathology. This device lets you view objects virtually when worn and interact with them via voice commands or touch.

The Health Prototyping Centre was used to evaluate the suitability of the Microsoft HoloLens 2 device to support the delivery of anatomical pathology diagnostic services. The objective was to allow clinical and laboratory staff to experience the technology first-hand across a range of use cases. The primary use case was a registrar or anatomical pathology technician wearing the HoloLens 2 in a laboratory with a pathology sample or organ in front of them, with an experienced anatomical pathologist dialling into the HoloLens 2 and guiding them via Microsoft Teams.

The anatomical pathologist was able to direct the registrar or anatomical pathology technician in real-time by:

- providing voice direction
- drawing arrows and lines on the model to indicate cut start points and direction.

This was simulated using plasticine models instead of real organs.

The HoloLens 2 would also allow the registrar or anatomical pathology technician to place scans and other patient information in virtual space around their bench. These documents, visible through the headset, can then be easily referenced throughout the procedure.



"The HPC provided us with the perfect space to test emerging technologies like an augmented reality headset to solve current challenges for service delivery and pain points for staff working in anatomical pathology. The space and the new technology also allowed us to consider the new possibilities that could be created for future service designs."

> Dr Alexander Garrett, Service Designer, NSW Health Pathology



"Although the solution may not be fit for purpose in its current state, we have a great opportunity to build on this technology to support the delivery of our statewide anatomical pathology service and the emergence of digital anatomical pathology."

Martin Canova, Director, Strategy & Transformation, NSW Health Pathology



"It was a great experience to learn and explore how new technologies can be integrated into the profession of anatomical pathology. It's exciting to see how current technologies can be enhanced to better meet the needs of the profession."

> Raviteja Kannekanti, Anatomical Pathology Trainee, NSW Health Pathology

The outcome

Prototyping the HoloLens 2 technology provided NSW Health Pathology with multiple benefits.

It helped the team test if it could support telepathology for anatomical pathology. It also allowed them to consider what a full implementation could look like.

The testers (anatomical pathologists and laboratory staff) were optimistic about the potential impact of this technology on their workflow. They also saw an opportunity to improve access to pathology services for people living in regional and rural communities.

Testers indicated the fit and weight of the device was comfortable enough to be worn for long periods.

Next steps include testing within real labs right across the state.

The benefits

Using the Health Prototyping Centre to conduct testing of the new technology provided the following benefits:

- Hands-on experience for clinicians and laboratory staff with emerging VR and AR technology
- Testing of technology and network limitations, such as impact of low internet bandwidth
- Confirmation of technology integration with existing systems, such as Microsoft Teams.





To find out more about the Health Prototyping Centre and how your project can access its facilities contact <u>ehnsw-hpc@health.nsw.gov.au</u>