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**MEME** Prof Nina Tirnitz-Parker and Prof Peter Leedman 21 August 2025

## Personalising liver cancer care - a collaborative effort

The Liver Cancer Collaborative (LCC) was established in 2020 to drive an integrated, multidisciplinary approach in Western Australia.



By Prof Nina Tirnitz-Parker AM and Prof Peter Leedman AO Co-Directors, Liver Cancer Collaborative

Liver cancer, of which the majority of cases are hepatocellular, is one of the fastest-growing causes of cancer-related death in Australia.

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Despite intensive research worldwide, progress has lagged behind that in many other cancers. This reflects the unique challenges of liver cancer.

It is highly heterogeneous, and the liver's ability to compensate for damage often masks symptoms until the disease is advanced. For many patients with late-stage disease treatment options are limited and often non-curative.

Survival rates remain poor, and there are still no established tools to reliably predict individual risk or determine which treatments are most likely to be effective.

A key reason is that the molecular basis of liver cancer is still not fully understood, as, in contrast to almost all other tumours, biopsy has not been routine to establish the diagnosis.

That gap is now being addressed through collaborative research efforts that bring clinicians, researchers, and data scientists together.

The Liver Cancer Collaborative (LCC) was established in 2020 to drive an integrated, multidisciplinary approach in Western Australia. Funded by several organisations, primarily the local Cancer Research Trust (CRT), the LCC links major hospitals,

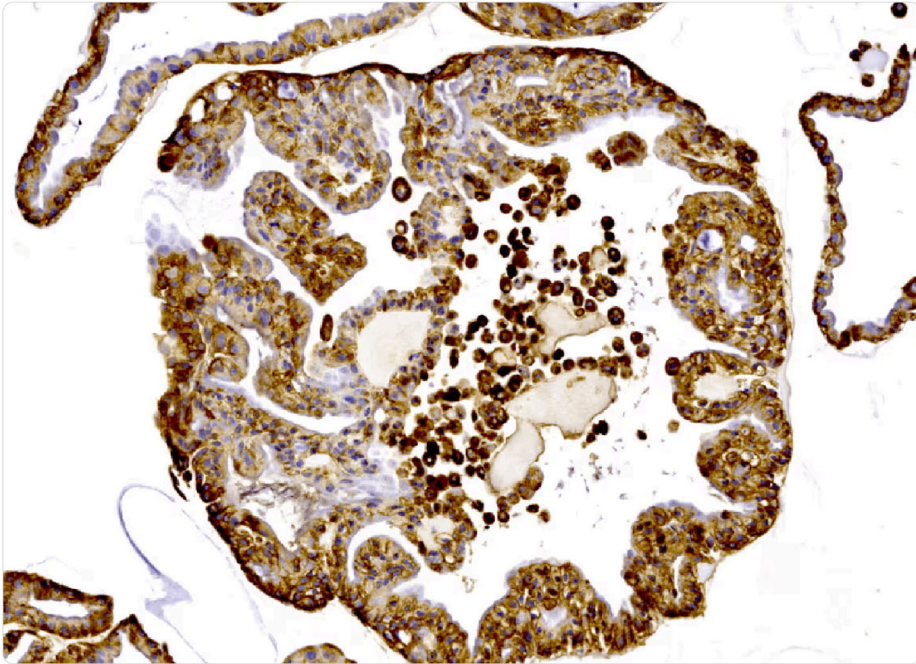
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universities, and research institutes across the state to improve outcomes for people at risk of, or living with, liver cancer.

By embedding research into clinical practice and working across disciplines, the LCC focuses on understanding how liver cancer develops, progresses in real time, and on discovering new therapeutics.

A key LCC strength is its longitudinal infrastructure, including an ethically governed clinical database and biobank.

These platforms support clinical information collections and matched biological samples from individuals with liver disease or liver cancer over time.



Human liver cancer organoid used for drug screening. Picture: Dr Nathan Main& Dr Ben Dwyer

Laboratory analyses are linked with clinical, pathology, and imaging data, together with advanced molecular genomic profiling, and are closely integrated with WA's public health system and the clinicians providing care.

The LCC is exploring why some tumours respond to certain therapies while others do not, the reasons some patients develop resistance, and markers that could help detect cancer earlier.

Laboratory models using patient tumour samples and patient-derived organoids have been developed to rapidly assess how individual cancers respond to treatments, aiming to support personalised decision-making in the future.

Parallel, efforts are underway to develop a blood-based test for earlier detection, particularly in high-risk groups, such as those with cirrhosis or chronic liver disease.

Alongside biological research, new digital and imaging tools are being explored. A mobile app is in development to help people with chronic liver disease track symptoms and prompt timely clinical review.

It also includes developing a tool to integrate all of the above data to assist clinicians with treatment selection.

Advanced imaging techniques are also being explored, including radiomics and artificial intelligence, which may enable earlier detection of disease-related changes not visible with standard methods.

The LCC's growing database links clinical, molecular, and imaging data to support the discovery of clinically relevant patterns.

The collaborative works closely with national and international experts who help ensure that the new tools developed in WA can be applied in a broader clinical context. The database is emerging as one of the most comprehensive of its kind.

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Ultimately, the goal is to shift the trajectory of liver cancer care through data-driven, patient-specific treatment.

By linking clinical insight with molecular and imaging-based understanding, and by capturing changes overtime within individual patients, the LCC is helping to move the field towards more precise and timely interventions.

Although many challenges remain, the collaborative provides the basis for improving surveillance in high-risk populations, supporting earlier and potentially curative interventions, and enabling better matching of therapies to the biology of each patient's disease.

The future of liver cancer care will depend on our ability to interpret complexity rather than simplify it.

Progress will come from working together across traditional boundaries and building systems that are both scientifically rigorous and clinically informative.

#### Key messages

- Liver cancer progress has lagged, demanding new solutions
  - Integrated research and care are driving personalised treatments
  - Collaboration is delivering tools for earlier detection and better outcomes
- Author competing interests - nil