



**ACMD**  
Aikenhead Centre  
for Medical Discovery

# **A breakthrough approach to chronic disease**





The ACMD model brings specialist teams together based on skill sets and expertise to translate projects with clinical application and impact.

## The Aikenhead Centre for Medical Discovery (ACMD) is Australia's first hospital-based biomedical engineering research and training hub.

Chronic diseases are the leading cause of disability, death and reduced quality of life in Australia now and for the foreseeable future. These conditions increase in severity with age, causing pain, disability, social isolation and placing enormous pressure on existing health services.

The ACMD drives the creation of a greater number of new clinical screening procedures and treatments, allowing the human body to be therapeutically re-engineered or repaired – resulting in improved health outcomes.

The ACMD has the capability to address six of the nine National Health priorities:

1. Arthritis and musculoskeletal conditions
2. Cancer
3. Cardiovascular conditions
4. Diabetes
5. Mental health
6. Dementia

### OUR FOCUS

The ACMD is prioritising three key areas of translational research: **Smart devices, bionics and implantables**  
Combining biology and engineering to create devices that monitor, functionally replace, or enhance parts of the body, such as the MINDER, a breakthrough seizure monitoring device.

#### Regenerative medicine

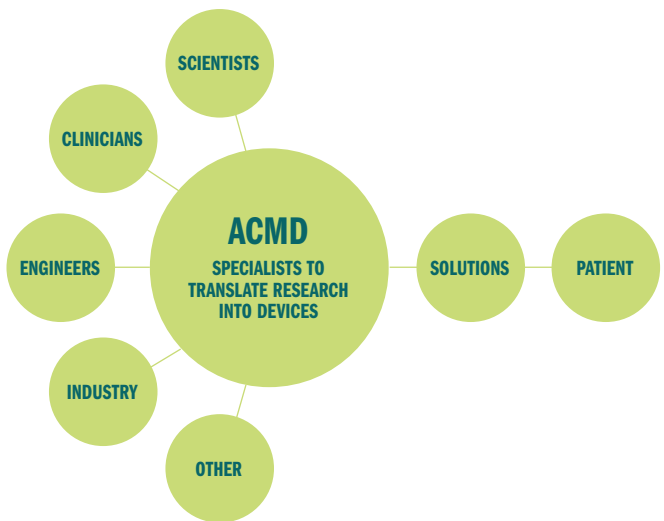
Approaches that repair, replace or regrow damaged or diseased cells, organs or tissues. This includes the generation of therapeutic stem cells, tissue engineering and the development of artificial organs.

#### Precision health, participatory medicine and digital health

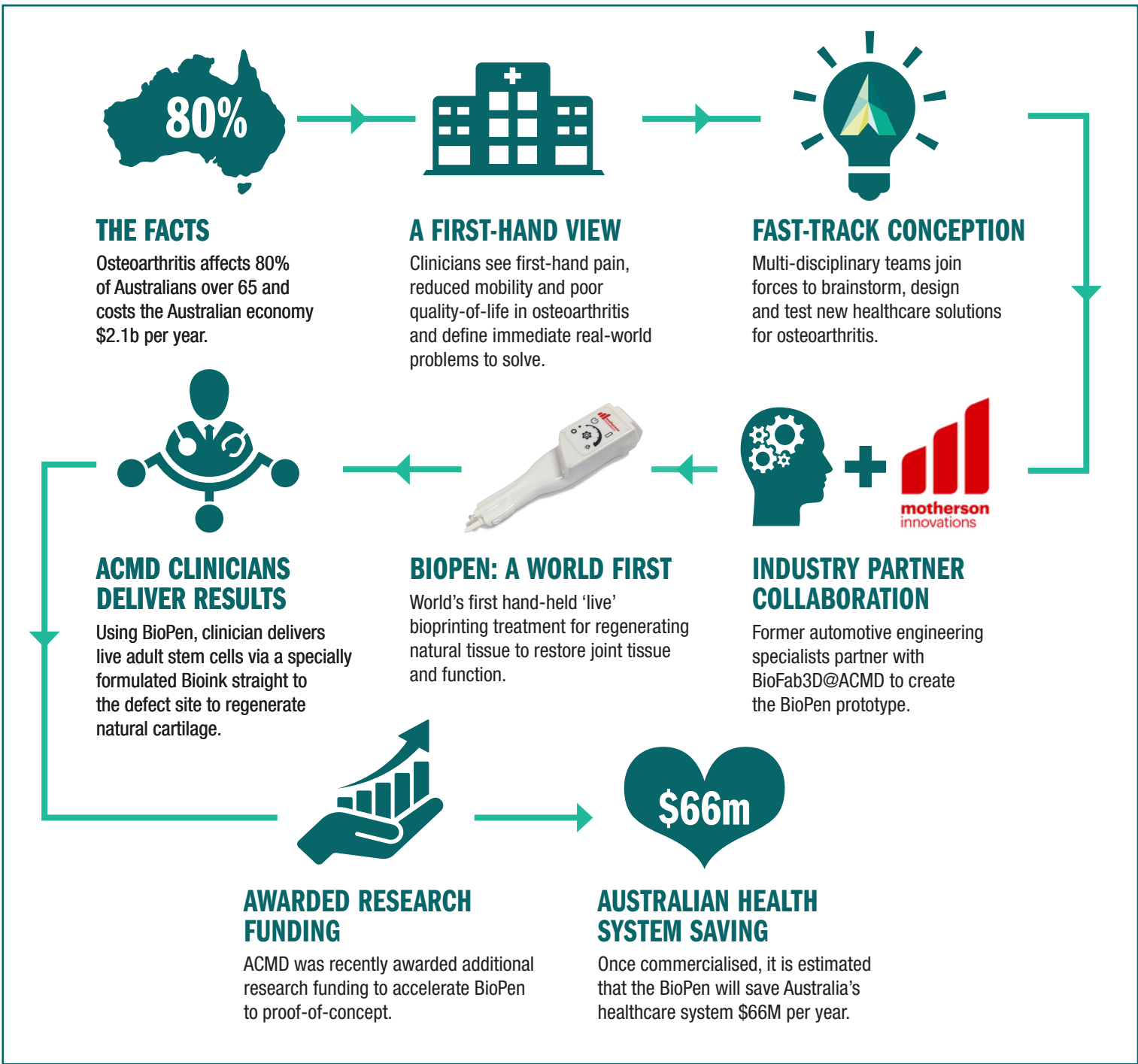
Precision health considers individual differences in a patient's characteristics, such as genes, environment and lifestyle. Customised diagnoses targeted and less invasive treatment pathways make care more effective and potentially less expensive.

### THE ACMD MODEL

Our model brings specialist teams together based on skill sets and expertise to translate projects with clinical application and impact.



Teams of ACMD experts deliver breakthroughs. The diagram below tracks the journey and the results for treating osteoarthritis.



Nick Callinan and Brenda Shanahan, Chair of the ACMD Steering Committee, review the orthopaedic robot during a visit to the BioFab3D, a facility of ACMD.

Projects are already underway at ACMD. The results will make a real difference to patients' lives.

### PREVENTING JOINT REPLACEMENT WITH BIOPEN

Our researchers are preventing the onset of osteoarthritis in patients by using 3D technology to print live adult stem cells. The BioPen will repair damaged cartilage and save joints.

Surgeons have used the 3D printer pen filled with stem cells and ink to 'draw' new cartilage into damaged knees. The stem cell 'ink' is in the form of a hydrogel, which allows cells to become cartilage.

*BioFab3D@ACMD Partners:* St Vincent's Hospital Melbourne (SVHM), University of Melbourne (UoM), University of Wollongong (UoW), RMIT, and Swinburne.

### STOPPING EPILEPSY IN ITS TRACKS

About 50 million people worldwide have epilepsy (WHO). The estimated direct cost of epilepsy is up to \$32,000 and indirect costs are up to \$5,016 per patient (based on a US study).

Our researchers have developed a world-first implant dubbed 'Fitbit for the brain' which can predict epileptic seizures.

The MINDER (Minimally Invasive Neural Diagnostic Event Recorder) is a device fitted under the scalp skin which records brainwaves. These data are stored on a mobile phone app and used to alert epilepsy sufferers of the likelihood of a seizure.

*ACMD Partners:* Bionics Institute, SVHM and UoM. Cochlear (non ACMD partner).

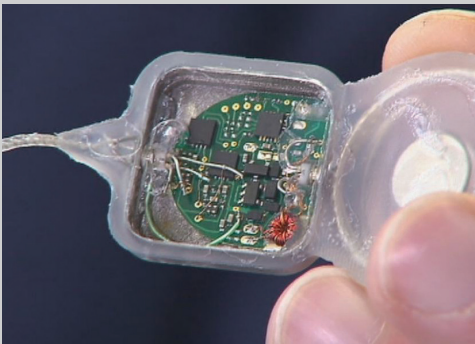
### CUSTOMISED, PERSONALISED ADVANCED LIMB RECONSTRUCTION PROGRAM

This project combines advanced manufacturing (3D printing), robotic surgery to create tailored implants for patients undergoing surgery for bone cancer or severe trauma.

While patients are having their cancer removed in the operating theatre, in the next room an implant is being custom-printed to precisely fill the space left after the removal of the diseased bone. This enables the delivery of a personalised implant in a timely fashion, allowing surgeons to remove the cancer and repair the patient's bone in a single operation.

This project is being conducted with the Innovative Manufacturing Cooperative Research Centre. (IMCRC) located in the Melbourne CBD.

*ACMD Partners:* SVHM, UoM, RMIT and Stryker. University of Technology Sydney (non ACMD partner).





# Delivering the best patient outcomes

Professor & Neurosurgeon, Mark Cook (left) with Natalie (right), a patient whose epilepsy is now under control thanks to the development of a new device that makes delivering treatment more effective.

The ACMD brings academic and clinical experts together with industry partners to develop innovative solutions for chronic diseases. This unique collaborative approach not only ensures an efficient and successful path to commercialisation, but ultimately delivers the best clinical outcomes for those who need it most – the patients.

## COLLABORATION

- Specialist, world-class experts
- Clinical/Technology and Engineering/Industry
- Diverse backgrounds
- International

## TRANSLATION

- Multi-disciplinary approach
- Fast-track solutions
- Delivering patient outcomes

## TREATMENT OF CHRONIC DISEASE

## COMMERCIALISATION

- Business acumen
- Commercial imperative focus
- Efficient commercialisation pathway

**“WHILE PATIENTS ARE HAVING THEIR CANCER REMOVED IN THE OPERATING THEATRE, IN THE NEXT ROOM, WE ARE CUSTOM PRINTING AN IMPLANT TO PRECISELY FILL THE SPACE LEFT AFTER REMOVAL OF THE DISEASED BONE.”**

Professor Peter Choong  
Hugh Devine Professor Of Surgery  
St Vincent's Hospital Melbourne

# A partnership like no other

**ACMD is a health innovation hub fusing medicine, engineering, technology and industry to yield powerful economic, patient and healthcare outcomes that benefit the whole community.**

The first commercial opportunities generated within ACMD have come from the development of medical devices, which have a shorter time to commercialisation than pharmaceutical products. Working together with industry partners enables this fast-track solution.

ACMD's discoveries and research capabilities are fostering new bio-engineering industries in Victoria. New companies creating innovative products are being spawned. We're employing the next generation of workers, students and graduates.

Internationally, we are renowned as the premier location for patient-specific, precision treatments enabled by combining engineering and medicine – from the cellular level, to complete limbs and organs.



The proposed new building for the Aikenhead Centre for Medical Discovery



**ACMD**  
Aikenhead Centre  
for Medical Discovery



Our partners joined forces to leverage our strengths in healthcare and medical research. ACMD removes the barriers to collaboration and resource sharing, while accelerating clinical translation through a more targeted and tailored research focus.

The proposed ACMD site will have a high-profile location on the corner of Nicholson St and Victoria Parade, on the campus of St Vincent's Hospital Melbourne.

For further information, please contact:

Lyn Amy, CEO  
St Vincent's Health Australia Foundation  
Ground Floor, Rear 55 Victoria Parade,  
Fitzroy, Victoria 3065

T: 03 9231 3465  
E: [lyn.amy@svha.org.au](mailto:lyn.amy@svha.org.au)

[www.stvfoundation.org.au](http://www.stvfoundation.org.au)

## Supported by St Vincent's Health Australia

St Vincent's Health Australia is Australia's largest not-for-profit health and aged care provider. SVHA has been providing compassionate healthcare in Australia since 1857, when the Sisters of Charity set up their first hospital in Sydney under the vision of their Founder, Mary Aikenhead.