

# Today's **Child**, Tomorrow's Healthier **Adult**

## Innovation Strategy





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Foreword

Opening words from Our Chair  
and Chief Executive

Alder Hey is a place  
of Outstanding Care,  
amazing people  
and world leading  
clinicians.

Its ambition goes beyond the day-to-day and the bounds of our hospital. This strategy will ensure that we solve the real-world problems Children and Young People face, providing solutions to create a healthier, fairer future for all children.

Our Health Campus for Children and Young People is more than a place – it is a destination of ideas, and ambition to do more to deliver real breakthroughs that change the lives of Children and Young People across the globe.

At the heart of Alder Hey is a commitment to innovate. We dare to think differently, to focus on the needs of Children and Young People to deliver the biggest impact in their lives. Daring Innovation drives our approach, we push the boundaries to crack the impossible – delivering on a world stage, working in partnership, to make the biggest difference and impact.

Our strategy is ambitious, and we will partner with those who share our vision to improve the lives of Children and Young People.



“

At our heart  
is a very  
modern magic

Associate Professor Iain Hennessey, Co-Founder of  
Alder Hey Innovation and Consultant Paediatric Surgeon



# Executive Summary

The impulse to innovate is born of a belief that life can be better. It is a restless and insistent force that has been at Alder Hey since day one.

Today, we are embarked on a new era of technology and transformation, and we intend to lead from the front. We are distinct from other hospital led innovation initiatives. Our unique selling point is that:

We are problem solvers. We fuse clinical understanding of the unmet needs of Children and Young People with our innovative culture and commercially focused innovation centre assets. We have the expertise to move at speed from problems to cutting edge solutions.

## 2030 Ambition: Today's Child, Tomorrow's Healthier Adult

Our strategy aims to solve the healthcare problems faced by Children and Young People, advancing child healthcare locally within our region and beyond. We're levelling the playing field in paediatric healthcare to enable a healthier future for all.

### Two overarching objectives shape our plan:

- 1. **Tackling Healthcare Inequalities** – solutions that create pre-emptive interventions and provide individualized care.
- 2. **Optimising Healthcare** – solutions that optimize healthcare delivery, releasing more time for care.

We'll create a sustainable model for innovation that will drive multi-million-pound revenues and game changing products with measurable benefits.

## Addressing the urgent needs of Children's Healthcare

Investing in the healthcare of our children and young people matters, because those who start behind tend to stay behind. It matters because childhood disadvantages impact later life. Innovation holds the key to a brighter future. Early intervention can significantly improve life chances, and by improving the health of children we will influence healthier lives of adults in the future.

There is an urgent need for innovation investment to advance the prevention and treatment of major health conditions (e.g. obesity, respiratory and mental ill health), to improve access to care and to progress carbon zero care and products.

This need is recognised at every level: local, national, and international. The pressure is on to make healthcare more accessible, stretch budgets further and unlock the transformative potential of digital, data and technology.

## A strong track record innovation

We are expert at taking the real-world problems that we see every day, and unleashing our creativity to find solutions. We combine our clinical know-how, the latest technology and our expertise in collaborative working to get solutions rapidly deployed.

Our case studies demonstrate our track record, and showcase how we place the interests of Children and Young People at the heart of our work.

## A proven approach, harnessing cutting edge technologies

We have a dual approach that unleashes an innovation culture, and has a laser-like commercial focus. We have a strong collaborative team and an innovation process that is a proven blueprint for results.

Our purpose-built Innovation Centre brings patients and experts together in optimal conditions for innovation. They work in four Technology Labs devoted to rapid prototyping, AI and Data, Simulation & User Experience, and Immersive Technologies.

Our vibrant development pipeline harnesses cutting edge technologies to bring innovative healthcare solutions. Two key product development areas that support our strategic objectives are:

- 1. **@nywhere™ hybrid health platform** which will enable a new hybrid of hospital and virtual models of care.
- 2. **AI, Big Data and Digital Biomarkers.** Here we use data and AI for prevention and individualised care.

We can't do this alone, so we will continue to build our thriving partnership ecosystem of collaborators, co-creators and investors.

## A sustainable model for innovation growth

Our financial strategy will generate significant revenue streams, creating a sustainable model for innovation growth. Our partnerships with industry and investors will deliver repeatable commercial models that are mutually beneficial.

## Summary

Innovation has been part of the Alder Hey way for over a century. Now we are entering a new era.

Today's Child Tomorrow's healthier adult will solve the real-world problems Children and Young People face, democratising cutting edge solutions that create a healthier, fairer future for all children.





What happens in childhood lasts a lifetime. Not receiving a fair and healthy start in life endangers a child’s future.

## 2030 Ambition and why it’s important

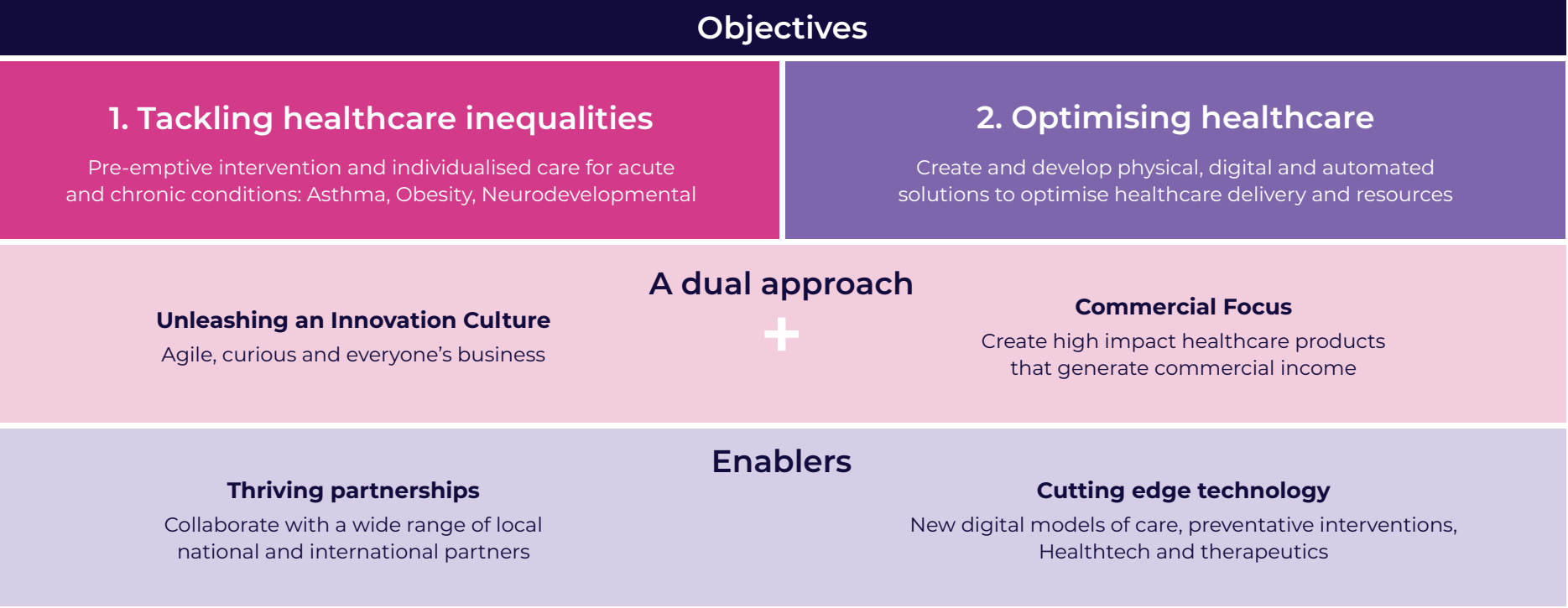
Today’s Child, Tomorrow’s Healthier Adult is a strategy that aims to meet the changing needs of our Children and Young People - revolutionising, democratising, and optimising healthcare delivery at Alder Hey and beyond.

We want to build on the foundations and track record we have created to date and democratise healthcare innovation globally. We have both an emotional and practical purpose.

That means reaching out beyond the physical boundaries of our hospital to tackle problems at their root. We’ll focus on early intervention and prevention as well as treatment. Future success will look very different to

today. We’ll be a Hospital without Walls – where our care approach is co-created with and experienced within our local community, and of relevance globally.

Our vision is ambitious and shaped by the unmet healthcare needs and challenges faced by our CYP (locally, nationally & internationally). Delivery of the strategy Today’s Child, Tomorrow’s Healthier Adult is well-timed given the necessity for emerging technological advancement of healthcare future models. Our daring approach combined with our appetite for harnessing cutting-edge technologies, positions Alder Hey at an advantage to pioneer new solutions that address the real-world problems facing healthcare delivery today.





# The Context and Rationale

Alder Hey’s strategic plan has the vision to deliver a ‘healthier future for Children and Young people’. This strategic vision frames the 2030 Innovation strategy: Today’s Child Tomorrows Healthier Adult.

Today’s Child Tomorrow’s Healthier Adult Innovation strategy supports Alder Hey’s overarching Strategic Research and Innovation Framework. The framework strives to grow and elevate Alder Hey’s discoveries and solutions so they are globally renowned, with measurable impact.

Today’s Child, Tomorrows Healthier Adult is powered by harnessing cutting edge technologies. Alder Hey has recognised digital maturity demonstrated by its achievement of HIMSS level 7. Alder Hey Innovation believes that by deploying synergistically with Digital and Data futures2 strategy we will unleash innovative health tech, digital platforms, data and AI to revolutionise and transform the way healthcare is delivered to Children and Young People.

**Children and Young People face pressing problems**  
Today’s Children and Young People face multiple challenges. Not least that of healthcare inequality. Healthcare inequalities are caused by environmental and societal factors such as poverty, housing, lack of employment and poor nutrition. These, combined with inequitable access to care, can lead to chronic illness throughout life, reducing, health, wellbeing, and life expectancy.

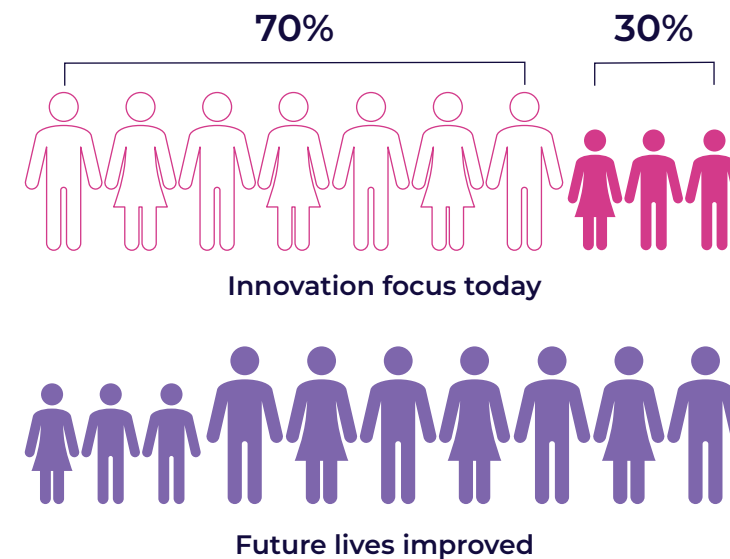
**Why investment in Children and Young People matters**

- Children who start behind tend to stay behind
- Early disadvantages impact later life
- Early intervention can significantly improve life chances

By improving the health of children, who make up 30% of the population today we’ll aspire to influence healthier lives of adults in the future.

But to date the paediatric research and development market has been very under invested. This case for change drives us.

The expert consensus is that there’s an urgent need for investment. It’s a clear call to action.



**‘Commit to give every child the best start in life... systematically address health inequalities.’**

2010 Marmot Review, Fair Society Healthy Lives

**‘Innovation is essential for the future of Child Health.’**

Royal College of Paediatrics and Child Health

**‘Increased capacity for research that is specific to innovation and technology.’**

Royal College of Paediatrics and Child Health, Vision for 2040

**The problems we see every day**  
The stark fact is that **36%** of Children and Young People in the Liverpool City Region live in deprivation, and health inequalities are widening. With low and falling inward investment there is an increased need for a focus on starting well and tackling inequalities.

- Evidence from within Cheshire and Merseyside and nationally and internationally makes a compelling case for focus in areas of:
- Respiratory – 1 in 11 children in the UK suffer with Asthma and in the LCR asthma patients are 15 times more likely to be admitted to A&E for a preventable asthma attack.
  - Obesity causes more lifelong health issues than any other condition, 20% 6yr olds are Obese in UK and 1 in 3 children in Liverpool do not have a healthy weight.
  - 16% of 5-16 year olds are suffering with mental ill-health. Over 50% mental health conditions develop before the age 14 yrs

Solving these unmet needs and challenges (faced locally, nationally and internationally) requires a shift towards prevention. This in turn increases the need for R&D and innovative technology to support screening, early detection, and ongoing monitoring.







“Poverty reduction and equitable public investment improves health outcomes and rising poverty and disinvestment has the opposite effect.”

Professor David Taylor Robinson,  
Public Health and Policy, Honorary  
Consultant in Child Public Health

# The Context and Rationale

## The impact of the environment

Climate and environmental factors also have a detrimental impact on the health and wellbeing of Children and Young People.

Major health benefits, and decreases in premature deaths, could be achieved by reductions in Green House Gas emissions, reduction in air pollution, better public transport, better ventilated housing, healthier diets and the development of net zero Health care systems<sup>1</sup>. This again points firmly at the need to think and work beyond our hospital walls.

There's an opportunity for Alder Hey to play a leading role in delivering transformative change and progress toward carbon zero care and product development.

## Need for digitally enabled optimisation

The Government's Build Back Better Health and Social care plan outlines preventive healthcare as a central principle and solution for delivering a sustainable NHS and levelling up for the Child of the North. Furthermore, the government paper "putting data, digital and tech at the heart of transforming the NHS" calls for encompassing and combining innovative technology, digital solutions, collation and utilisation of data to solve real-world healthcare needs. The NHS Long Term plan also calls for all local systems to offer a range of digital consultations, digitally enabled models of care and a range of self-management apps by 2023/24.

## The Local Landscape

As part of the Cheshire & Merseyside Integrated Care System, Alder Hey is aligned and committed to working in partnership to deliver the C&M aspiration which is also to address health inequalities. We will work in collaboration with the region to target efforts to develop health, social and environmental interventions to prevent and reduce the occurrence of ill-health and improve care and support for CYP with ongoing conditions.

Revolutionizing the current ways of working and models of care and moving the delivery of healthcare to a more preventative mindset will require novel and innovative ways to deliver healthcare.

Alder Hey is uniquely positioned and ahead of its peers in the paediatric market to support regional and national policy for transformation and quality improvement through innovation. The specialist capability of the Innovation Centre may become a distinct resource that is utilised to drive system-wide technology driven transformation.

## The National Landscape

Several recently published papers and policies, released by central and regional government and the NHS England, all highlight the need to tackle inequalities, shift towards prevention and utilize innovation to change models of care and optimize the finite resources of the NHS.

The UK government is committed to encouraging and increasing investment in innovation across the sectors UK innovation strategy ([publishing.service.gov.uk](https://publishing.service.gov.uk)) with our own local Liverpool City Region Combined Authority target to increase R&D investment from 2.4 to 5% by 2030. The time is right for Alder Hey as a unique place-based health-led innovation asset in the city of Liverpool to support the innovation knowledge economy, enhancing productivity, bringing growth and prosperity to health and being part of the vision for the UK to be a global hub for innovation.

## International Landscape

Despite Children and Young People making up 30% of the patient population, investment into Paediatric medical technology is disproportionately low due to market size; for example, in US only around 1% of start-up investments are paediatric specific. We are probably one of the largest dedicated children's innovation facilities in the world, with 8 years of product development experience and we are a key opinion leader in children's health technologies. Alder Hey is ideally positioned, as a global collaborator in Paediatric innovation, to carve out a market opportunity that will be attractive for investors and commercialisation.

<sup>1</sup> The Lancet, Bridging the evidence gap to achieve a healthy, net zero future, Oct 2021



## Our Track Record and Strengths

The purpose of the Innovation Centre is to:

‘Solve the real-world problems children and young people face, providing solutions that create a healthier, fairer future for all children.’

The Alder Hey Innovation vision was inspired and founded by clinicians in 2014 during the birth of the new technology-enabled hospital, Alder Hey in the Park. Recognising its potential, Alder Hey has continued to support and invest in the innovation leadership team, resources, and the Innovation Centre, establishing innovation as a core pillar of the Alder Hey Strategy.

Today, we are one of the largest, dedicated, purpose-built healthcare innovation centres in the UK. We’ve built an impressive award-winning portfolio with tangible outputs that put us clearly ahead of our peers. The Alder Hey Innovation brand and our unique approach is nationally and internationally recognised.

Some of those successful deployed projects include:

### Children and Young People As One Mental Health Digital Platform

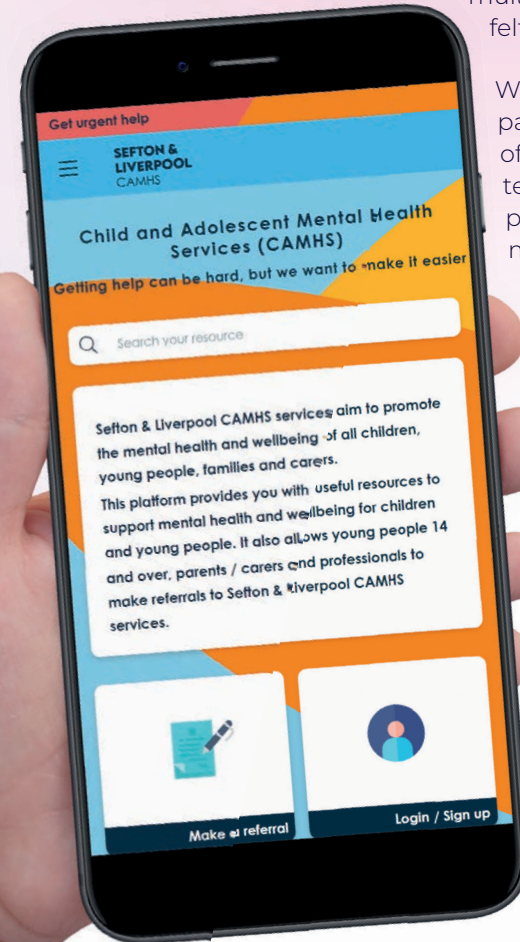
We listened to children, young people and their parents or carers who told us they struggled to negotiate the care system.

Their pain points ranged from accessing the support they needed, to connecting with multiple partner agencies, to the hassle of filling in multiple forms with duplicate information – they told us they often felt ‘lost in the system’.

We collaborated with Children and Young People and multiple partner agencies to design and then build them a single point of access to mental health services. Using a combination of technologies and making process adjustments we created a platform with access for all relevant information, integrating 13 mental health service providers, referrals, and resources to put our stakeholders back in control. Our Children and Young Peoples mental health forum “The Camhelions” were actively involved with the development and helped co-create the end solution with many of them stating they wished they had this platform when they first needed help.

The resulting innovation directly improved equity of access with a demonstrated increase in self referrals and over 1000 new visitors per month to the platform and self help resource pages. Of all referrals made to the service over 70% are now being made via the As One platform.

The platform also delivers healthcare optimisation benefits to the staff and mental health partners by reducing admin burden, releasing more time to care and improving staff experience. Currently in use in Liverpool and Sefton the As One platform is now being scoped for deployment across seven additional locations with interest from other Trusts nationally.



## Transparent Masks

With the onset of the pandemic and essential need to wear masks our Speech and Language therapy teams quickly realised how this was going to negatively impact the speech and development of those Children and Young people in their care.

Furthermore other clinicians across different specialties, observed that clinically approved masks created a barrier by removing a critical visual aid to communication. Not seeing the mouth restricts relationship building, trust and delivery of care.

Despite a wide range of transparent masks being available none of those on the market could be used in a clinical setting or met the real world daily requirements of our clinicians or children and young people. The solution we came up with was a new transparent, comfortable and medical grade mask. This is a success story on multiple levels. We went from concept to approval and production in ultra-fast time working with an industry partner who invested in the development of the mask to meet medical standards and large-scale production. Our distinct certified medical device will be able to dramatically improve the patient and staff communication experience. Furthermore, we’ve negotiated a licence deal and royalty on sales, meaning that this innovation will quickly deliver revenue that can be reinvested back into Alder Hey and ongoing innovation.

The Deputy Manager for the Cheshire & Merseyside Hearing Impairment Network patient users fed back that ‘They all feel that the visibility for lip patterns is great’. She herself said that the ‘Mask is easier to wear’.



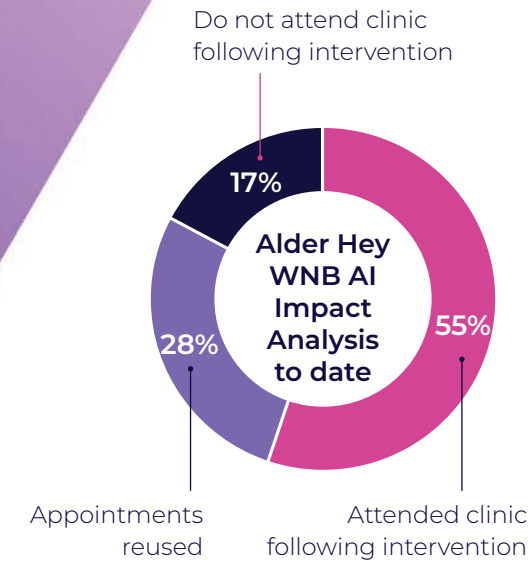


## Missed Appointments Artificial Intelligent Tool

At Alder Hey we observed that a high number of children were not brought to their outpatient appointments by their parents or carers, especially those from deprived areas (11.1% versus an average for England of 7.7%). We needed to understand the risk factors and reasons for non-attendance.

We used the expertise of our data scientists within our award winning inhouse AIHQ, utilising their dedicated machine learning capability to develop a paediatric specific novel algorithm. This predictive model has shown to have an 80% level of accuracy. This means that we now have the ability to calculate the likelihood of whether a child will come to their appointment or not, and so make an early intervention. The impact has been tangible.

In a pilot for 34 patients in general paediatrics at Alder Hey the intervention included a direct call from the consultant clinicians to the patients and families. This resulted in 55% of the cohort attending their appointments and 28% of other appointments being reallocated. Saving £3452.40 for the Trust just in this pilot of 34 patients.

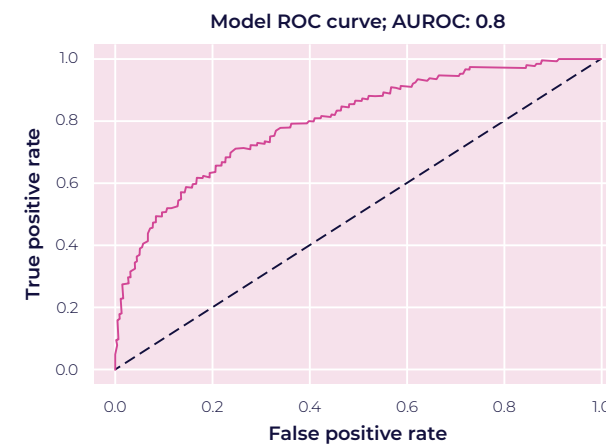


We were able to reallocate clinician time from released appointments and reduced the waiting list, and in so doing delivered a critical healthcare optimisation

The current cost to the NHS of missed appointments is currently **£1 billion**, (£120 per appointment).

We addressed a persistent healthcare inequality by reducing missed appointments through pre-emptive clinician intervention. This is an early example of where we demonstrated how our award winning AIHQ took a problem to solution, having impact and making the hospital more efficient.

We're now planning the AI model to be released to 10 other Paediatric Trusts so that they too can reap the benefit.



## 3D Printing Embedded Within a Hospital Setting

Alder Hey has been an early adopter of 3D printing and is one of a few centres globally with an embedded 3D capability.

Our clinicians started utilising 3D prints for rare and very complex surgery. Our team were quick to spot the potential of 3D printing as a way to visualize and simulate procedures across multiple specialties including cardiac, spinal, oncology and orthopaedic and have utilized over 400 prints to date..

We've been able to integrate 3D printing into our clinical practise with the 3D Life prints team located within our innovation centre, making them immediately accessible to clinicians and the clinical needs.

We've deployed the technique in life-saving surgery. The impact is remarkable. As an example, we were able to improve life chances for one patient who was referred to Alder Hey with an inoperable tumour The 3D model enabled enhanced inter team communication and simulated planning and therefore successfully remove 95% of the tumour.







Our Dual Approach

We want to accelerate, elevate and sustain the deployment of innovative solutions into everyday use, revolutionising healthcare delivery by creating an exemplar for innovation in healthcare, and creating positive impact for CYP. We will have a dual approach to accomplish this:

- 1 /

We will unleash an innovative culture

By allowing our people to unleash their curiosity, entrepreneurialism, and problem-solving potential. We will create a culture that leans naturally into innovation and a future which will deliver sustainable benefits for our organisation, and the Children and Young People that we treat
- 2 /

We will be commercially focused

We'll build a portfolio of solutions that are commercially viable so our strategy can be monetized. This commercial focus will enable us to be financially sustainable.

Our Operating Model

10 point plan to operationalise the strategy

To deliver against our strategic objectives and execute our dual approach requires us to deploy an operational style and model that is defined in our 10 point plan:

- 1 /

A synergistic healthcare innovation ecosystem based on our co-located clinical services and innovation centre. This will be available to academics and investors to co-create within our ecosystem.
- 2 /

A no boundaries innovation culture that thrives on being open and which is problem driven.
- 3 /

The 'Rights of the Child' at the heart of how we work.
- 4 /

Models to promote and incentivise intrapreneurs within Alder Hey
- 5 /

Strategic alignment of innovation to Corporate Strategy and business functions; Research, Digital, Quality Improvement.
- 6 /

A streamlined route to commercialisation through appropriate governance and use of vehicles such as spin-outs and licence deals.
- 7 /

Our professional brand that portrays us globally as an investable innovation business.
- 8 /

The foundations for growth and expansion into a dedicated co-located technology discovery centre with industry partners.
- 9 /

The promotion of the importance of levelling up and investing in Paediatric R&D.
- 10 /

A daring to innovate approach. We are confident and bold: unafraid to go where others are reluctant to venture.



# Our Operating Model

The success of the innovation strategy will be dependent on ensuring the correct ingredients are in place:

## Culture – a no boundaries culture of innovation

We believe innovation is a way of working, a way of thinking: a collective stance that is embedded in the culture of Alder Hey.

The Innovation Centre and its robust processes and governance provide a safe environment, encouraging all the staff in Alder Hey to be innovators, intrapreneurs and entrepreneurs.

Innovation relies heavily on diversity: different groups with varying lenses and expert knowledge who bring fresh ways of thinking to the table. We encourage this cross-pollination across all of Alder Hey and amongst the project teams including Clinical Research, Improvement, Transformation Quality, The Academy, International Child Health, and Digital to make the most of our close physical proximity and raise the bar in innovation.

Our collaboration with the Alder Hey Digital Team will ensure our Children and Young people get rapid access to our newly developed products and solution by promoting an 'Innovation at Scale' deployment method with seamless handover from innovation incubation to digital business as usual.

Innovation at Alder Hey is incentivised and rewarded so that we drive the culture forward and instill across the board, that Innovation is everyone's business.

In short, our culture is one of agility, diversity and problem solving.

## The ingredients for success

### Culture

A culture embedded throughout Alder Hey which is encouraged and rewarded

### Place

Collaborate with a wide range of local, national and international partners

### People

A strong collaborative team

### Process

A repeatable model for delivering results

## Place – environment for problem solving

Innovation needs the right conditions to thrive, and The Innovation Centre has been designed to provide an environment to foster this: here diverse people and teams come together in one space to incubate ideas, share skills and spark together.

The Innovation Centre is a purpose built 1000m2 space, distinct from the rest of the hospital but with close proximity to clinical experts, which allows for easy interaction and connection between patients, clinicians, engineers, academics and MedTech experts. This is a place designed to orchestrate serendipity, connections, creativity and lateral problem solving.

## Our four Technology labs

### 1. The rapid prototyping centre

The Rapid Prototyping Centre uses design and early fabrication equipment to create physical device prototyping. The benefit of this is being able to move quickly from concept to solution.

**2. AI and Data lab:** The Digital and AI prototyping lab allows us to create synthetic data sets and safe environments to test AI algorithms fast. Prototyping digital user interfaces, data sets/solutions and their integration to hospital systems is an area of focus and growth for Alder Hey.

**3. Simulation/User experience Lab:** Clinical teams work within the simulation and user experience labs to test new ways of working and to get early stakeholder engagement.

**4. Immersive Lab:** The immersive technologies lab creates realistic environments that allow acclimatization to new concepts and technologies.

## Co-creation partnerships expansion

As our innovation activity grows, we hope to expand through partnership, co-creation and co-location. We will look to expand our science and technology footprint on the Alder Hey campus with Industry, Investors and Academia which presents an ideal way to expand our space and our work.





# People – Unleashing our Talent

The Innovation Team is a group of dedicated multidisciplinary professionals with expertise in healthcare, open innovation methodology, industry partnerships and clinical insight.

The team's skill set maps our approach: an end-to-end process from ideation, through design, to in-hospital and clinic use and ultimately beyond to commercialisation.

Skills and capabilities span expert clinical talent, technical development, innovation, engineering, design, research, project management and business support.

The team has grown from a single, part-time clinical founder in 2014 to a team of over 30 FTE today and crucially now has a senior management team which

brings together expertise and experience across the NHS and industry in programme management, operations, commercial partnerships and legal.

**Nurturing tomorrow's innovators**

Innovation careers in the hospital-based sector are new and we are pioneering the creation of new roles, developing progressive job descriptions and talent management pathways for entry level innovation apprenticeships, graduate trainee schemes and clinical fellowships.

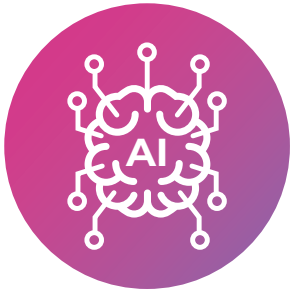
We know our work is only as strong as our team and that it is incumbent on us to develop and nurture the teams' skills as well as bringing brilliant new, diverse and creative minds to the table.

Our ambition is to become an employer of choice with a distinct culture for innovation and rewarding career paths for clinical and operational routes. We will always ensure too that we build the strongest team through best practice for equality, diversity and inclusivity.



# Organisational Model

The Innovation team is organised into three central groups, each with specialist expertise, specific jobs and talent management opportunities. Each group works closely together, and we take a multidisciplinary team approach for each project:



## AIHQ

**Technical development and delivery**

A team of leading data scientists, Robotic Process Automation (RPA) and Power App developers responsible for managing data and creating new AI algorithms, power apps and RPA processes.

Key focus areas include Artificial Intelligence (AI), Health Informatics, Population Science, Data and Automation.



## Launchpad

**Pipeline Incubator**

A team of innovation experts working to scope problems, scout solutions and project manage the process. The innovation consultants, (including our graduate trainee health entrepreneurs), wrap around the clinical and operational teams in the hospital, identifying the needs and challenges, searching for new technical solutions and working with partners to support the co-creation of new health technologies.

The team includes innovation consultants, graduate trainees, apprentices and operational teams, all at different stages of their career developing with training and experience in our unique open innovation methods.



## Growth Unit

**Commercial and business development**

A team working to protect intellectual Property (IP) and legal contracting. This includes commercial expertise/deal architecture, legal IP and business development.

This group will grow in line with product development sales and expansion of industry partner and investment opportunities.

In addition, Alder Hey Clinical Research Facility (CRF) is a state-of-the-art unit that delivers 'first in child trials' with an array of industry partners. The CRF team of experts can support health-tech evaluation, trials and in silico data studies.



# Process – Systematic Agile Method

Our strategy is fuelled by a bespoke open innovation system, to rapidly identify real-world problems and bring the right partners together to solve those problems with innovative technology.

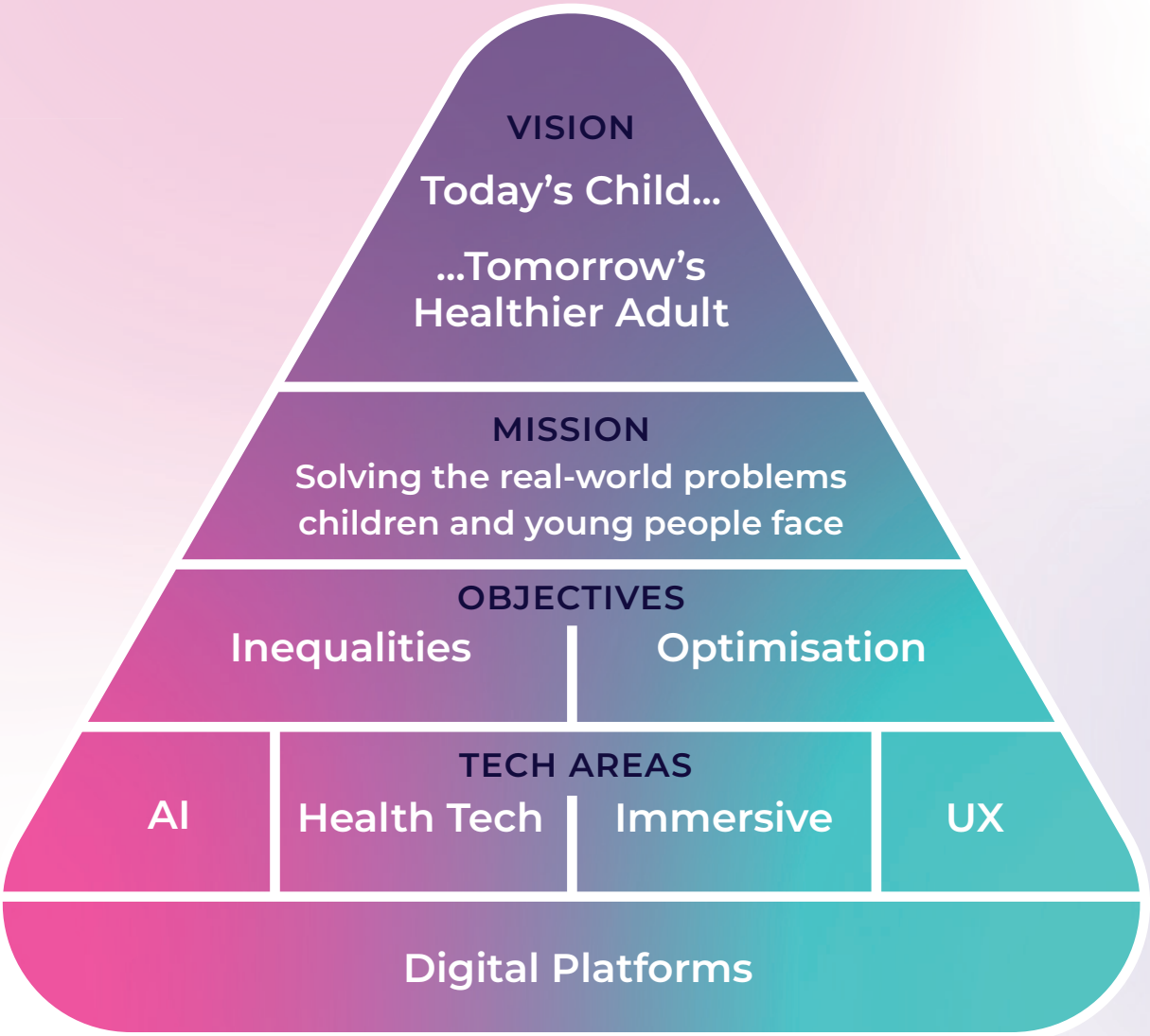
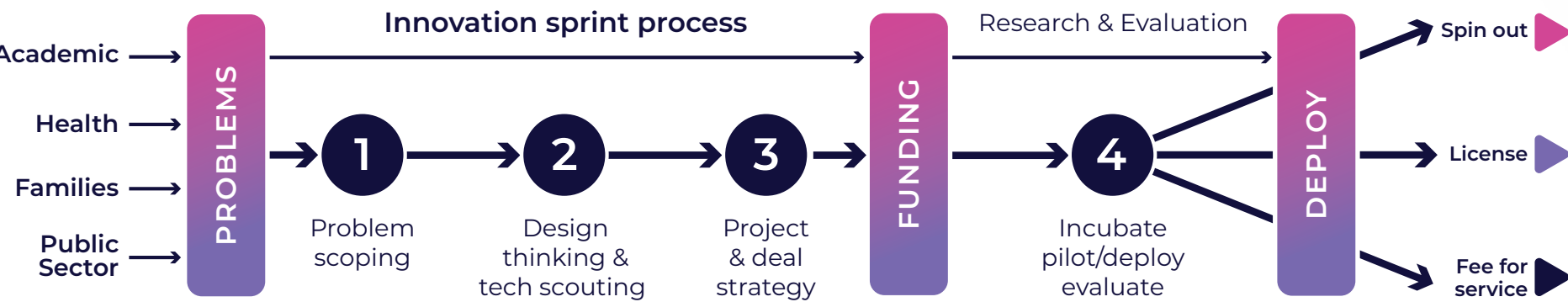
Our process is already proving extremely successful as our partnership ecosystem – comprising large corporates, SMEs, higher education institutes, Children and Young People and Government – continues to grow and support our journey.

Alder Hey is an advocate of the UNICEF 'Rights of the Child'. Our delivery plan of Today's Child Tomorrows Healthier Adult pledges to adopt the Child Rights-based approach which includes the 7 principles as part of our process and methodology. That's why our user centred design thinking method involves

Children and Young People in the scoping of the problem, and design thinking of the solution, and includes them at the centre of our work. We will also work with families to ensure digital accessibility and inclusion is at the heart of our process.

We employ a systematic methodology and stage gate process to validate all projects coming through the pipeline - a process which ensures we can monetise our work and ultimately become a sustainable entity.

The prioritisation criteria we adhere to ensures a sustainable and manageable programme with several routes to market once opportunities have been identified. These may include; licences, spin outs, joint venture, sales commission, or fee for service.



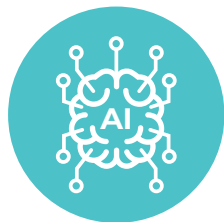
Programme Structure



# Harnessing Cutting Edge Technology

We will harness cutting-edge technology from across our partner ecosystem to solve the unmet needs and challenges of Children and Young People. We're focusing on 5 of the most impactful emerging technologies, all predicted to deliver advancement in healthcare clinical practice over the next 5 –10 years.

Digital innovation, particularly data and AI, will change the way we think about and deliver healthcare. There are already many applications in screening and diagnosis, augmented decision making and optimization we can build on.



## 1. Pre-emptive Artificial Intelligence & data using digital bio-markers

Detection, screening, prevention and pre-emptive intervention using Artificial Intelligent technology and algorithms to identify targets for intervention. In addition, AI medical devices will provide risk stratified mitigation and augmented clinical decision support tools to optimize safety.



## 2. Digital platforms

Patient and clinical care is delivered in a hybrid world, both physical and virtual, to create a hospital without walls. It is connected by an Internet of Medical Things and self-management prescribing, connecting therapeutic devices, self-care resources and gathering data for preventative interventions and individualized care.



## 3. User Experience Child Wow factor

User interfaces and experiences are developed for and with Children and Young People to ensure magical experiences that support compliance and better patient outcomes.



## 4. HealthTech and Digital therapeutics

Chronic and acute condition management, screening & diagnostics utilising MedTech sensors, wearables, ingestible, implantable, and portable devices



## 5. Immersive

Applications for advanced visualization, super high-definition imaging and augmented reality technologies to support pre-operate planning and consent, surgical procedures, education, delivery of care for physical and cognitive therapies.

**These 5 technology areas are complementary, interoperable, and synergistic. We'll harness them to meet our two key strategic objectives: to reduce healthcare inequalities and optimise healthcare.**

## Future Roadmap and Product Development Areas

We believe the future of healthcare lies in hospitals without walls. The care we deliver will be individualised and extend beyond the physical boundaries of our location into the community using digital health and therapeutic platforms and artificial intelligence.

Inventive application of these technologies by people who truly understand the problems will enable us to break down traditional barriers for patients when accessing care and personal health information, and when receiving therapies and seeking education.





# Product Development Area 1

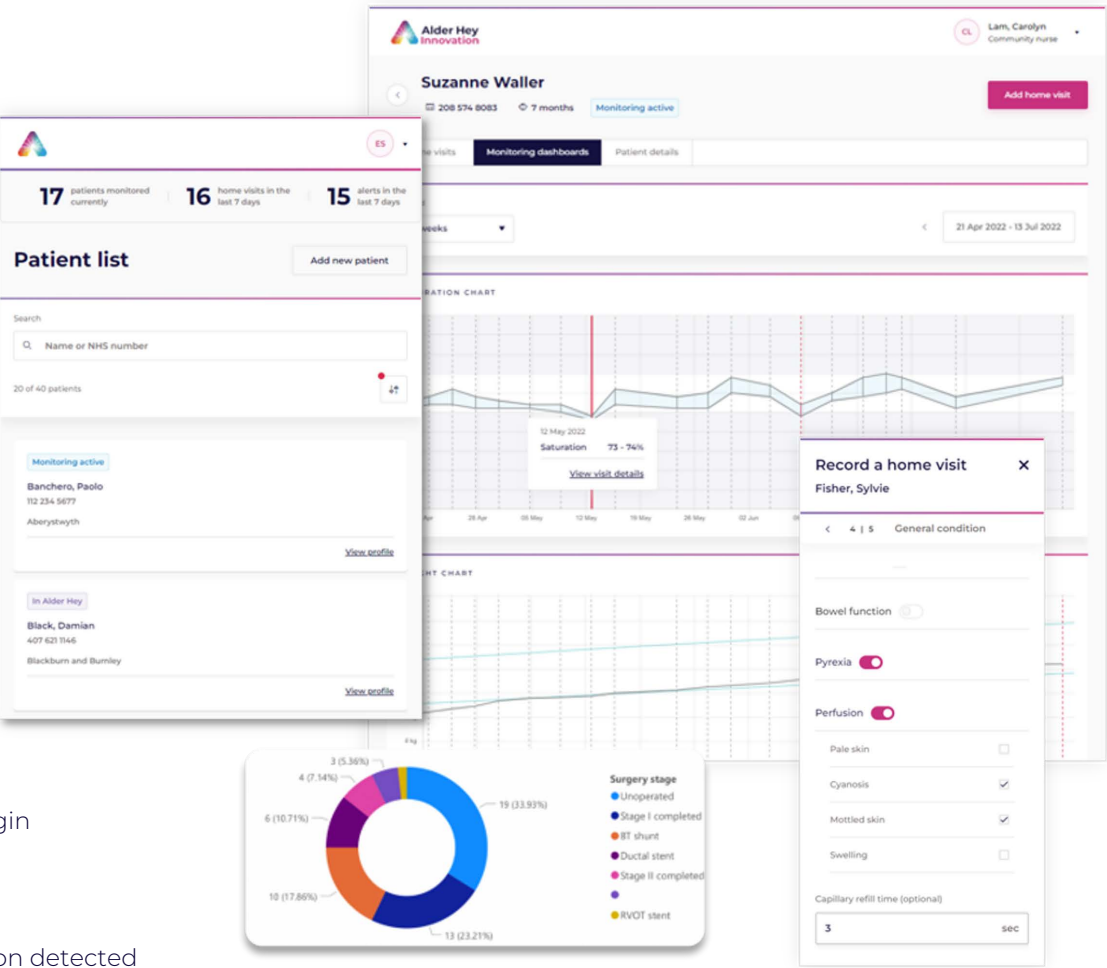
## Little Hearts At Home

A life enhancing, clinically validated, collaborative remote monitoring platform. Connecting congenital heart patients in the community with their clinical teams. Reducing time in hospital and anxiety of families, through data driven personalised care.

Little Hearts at Home is a **web based platform** for community nurses and parents to record patient observations. Patients are monitored with clinical parameters according to individualised conditions set by medical guidelines and evidence.

Clinical teams are **alerted automatically** if patients breach their set parameters in a Community Nurse visit.

The provided dashboard displays patient information to enable tracking of improvements and deteriorations. Clinicians then have the required data in their pocket to make timely interventions should the need arise, creating a **new proactive and preventative model of care** for these vulnerable infants



- **Collaboration platform** - platform data integration supporting complex condition management and real time data for intervention
- **Engaging user interface** - Clinical and Patient Portals, secure NHS approved login
- **End-to-end connection** connecting patients, hospitals and community teams
- **Patient records and trends** - allowing pre-emptive review if gradual deterioration detected

- **Data collection to support continuous service improvement** in line with Futures
- **Reduced cost of care** - 50% reduction in emergency admissions with savings of £102K per patient
- Simple and **single point of access for effective user interface.**

The platform provides opportunities for expansion in other specialty areas and we are currently scoping possible effective collaboration areas.

In addition to this, Little Hearts At Home has recently been granted funding to develop a parent portal to further support the existing interface.





## Product Development Area 2

### AI, Big Data and Digital Biomarker

Our second development area uses data and AI for prevention and individualised care. It furthers both of our strategic objectives (tackling inequalities in care and healthcare optimization).

We are using existing data sources from Alder Hey and surrounding systems with AI algorithms to augment decision making and/or reduce admin burden. This matters because it frees up more time for care. Through our work with the @nywhere digital platform programme we will also gather new high-quality unique patient data and digital bio markers to enable AI driven interventions, more personalized care and to create unique research opportunities.

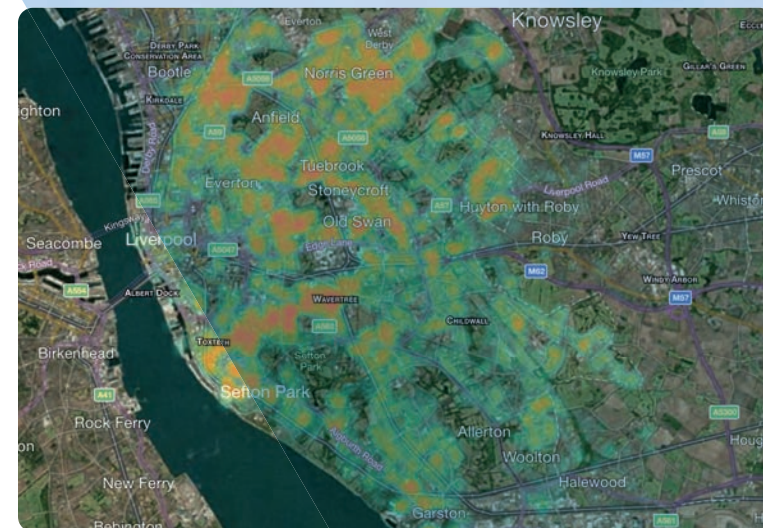
#### Ongoing work we will build on includes:

- Using vital signs data for prediction of deterioration and sepsis
- Digital twinning of patient physiology in PICU to identify digital biomarkers for prediction of deterioration
- AI for optimization of the outpatient's appointments, identify likelihood of Was Not Brought and intervention to tackle inequalities
- Lab to Life Centre, a big data collation for respiratory research and individualized and pre-emptive interventions
- Digitization and automation of workflows for optimization of HR processes and referral and booking processes.

### Future (Years 4 and Beyond)

We aspire to be visionaries of technology in healthcare and will continue to look to the horizon for new and emerging technologies that present possibilities to positively impact healthcare.

Our strong strategic links with academia and industry provide access to skills, capabilities and insight – and through this there is immense potential to solve highly complex challenges through High Performance Computing, Quantum Computing, Metaverse, Advanced Manufacturing and Robotics and Surface Science.





# Our Outputs

## Financial Overview

Our goal is to accelerate and grow the scope and size of our innovation centre, pioneering many cutting-edge discoveries and globally recognised breakthrough products into healthcare. This financial strategy sets out our plans for solid growth in revenue generated and the reporting of a profit position over the 10-year period.

## Sustainability

Our goal is to become a financially sustainable commercially focused centre of excellence that invests back into the ongoing innovation and solution development.

Our financial strategy has three component parts;

- 1

**We will attract significant external investment** into the innovation program (public, private equity, philanthropic)
- 2

**We will monetize the product pipeline** utilizing several routes to commercialization
- 3

**We will deploy innovative solutions** that optimize Alder Hey and realize benefits (cash and non-cash releasing). Including solutions that are greener, safer and a more efficient use of resources.

Today's Child Tomorrow's Healthier Adult has a dual and novel approach for a hospital-led Innovation Centre. The business style of the Innovation Centre is progressive as it traverses the public sector mindset of the NHS financial regime with a commercial edge of industry profit centre approaches. We will set the business blueprint for hospital led Innovation Centres.

### Activities will include:

1.

**Maximizing** Alder Hey's value (data and know how) and Trademark through robust negotiation of business to business deals and contracts
2.

**Re-position** Alder Hey Innovation Centre as an attractive investment opportunity through showcasing our products under development, professional skills, and agility
3.

**Professionally campaign** the pressing need for public investment into Paediatric healthcare innovation, promoting our strategic vision for Today's Child, Tomorrow's Healthier Adult.

# 2030 Goals

## Our ambition is to:

- Achieve a four-fold increase in product and solution development
- Report multi-million pound annual revenues
- Develop one global breakthrough product (e.g. App, platform, AI model) that has measurable health and wellbeing impact
- Attract material multi-million pound external investment which we will multiply
- Demonstrate a measurable improvement to the financial sustainability and efficiency at Alder Hey by a two-fold return on investment.

## Benefits Realisation – Optimization Return on Investment

In addition to attracting external investment and monetization, our financial strategy will unlock a significant return on investment in the form of cash and non-cash releasing healthcare optimization savings. The solutions developed and deployed by the Innovation Centre – for example intelligent automation or artificial intelligence models to augment practice – will aim to identify more efficient and effective processes reducing administrative burden, streamlining practice and releasing more time to care.





## Strategic Deliverables

Our two strategic objectives of tackling healthcare inequalities and optimising healthcare describe the ambition and goals of Today's Child, Tomorrow's Healthier Adult. The six strategic deliverables of the strategy by 2030 are to:

- 1 / Unleash innovation culture by giving anybody at Alder Hey the right conditions to innovate
- 2 / Establish an Innovation knowledge economy and ecosystem with industry and academic partners creating skills jobs and new businesses in Liverpool City Region
- 3 / Deploy one Alder Hey product (inc app, platform or AI) that is globally adopted which delivers child health and well being impact
- 4 / Reduce the variation in CYP outcomes across chronic conditions (Mental Health, respiratory, obesity and neuro-developmental)
- 5 / Be a financially sustainable business that is able to re-invest
- 6 / Deploy solutions that provide healthcare optimisation benefits (health economics (efficiency) and (experience) of a 2:1 return on investment

This strategy is ambitious and requires several critical ingredients to ensure success; unleashing innovation culture at Alder Hey to relentlessly solve real-world problems, with commercial focus powered by partnerships.

The successful accomplishment of these six key deliverables will ensure that Alder Hey achieves its vision to democratize healthcare and provide all of today's children and young people with the opportunity to be tomorrow's healthier adults.

## Marketing and Communications

The delivery of this strategy is contingent on the correct positioning of the Alder Hey Innovation Brand at a regional and global level. We have worked with a brand development expert to create a brand that is strong, relevant and recognized for innovation – to ensure inward investment and commercial success is achieved.

To deliver our Vision we will need to adopt a commercial Marketing and Communications Strategy. This will focus on Innovation in partnership and the “business to business” relationships that will help deliver our goals.

A professional, external agency will be brought in to ensure we operate in the space our audiences work in, that we understand the needs of our partners and communicate effectively with them. This will ensure we gain global recognition to meet our inward investment and commercial goals.

**An outline marketing and communication plan will include:**

1. **Digital and Creative.** Launch new brand assets. New re-branded website design and build, digital content, brochures, social media and online promotion, video and film, merchandise and assets
2. **Communications.** A focused 36 month programme of campaign design, development and execution, digital marketing, public relations, social media, media buying, partnership development, events and brand activation
3. **Publication.** International medical and technology journals, magazines, articles, white papers, newsletters and advertising
4. **Thought Leadership.** International conferences, host events, key note, awards and interviews. Contribution to policy and national guidance and standards
5. **Networks.** Board and advisory positions e.g. member at International Paediatric Innovation Consortium. Membership of centres of excellence.



“

With relentless Innovation, we can change how we deliver healthcare... we can improve the quality and equality of care locally and globally.... and we can have a more sustainable health system and contribute to economic growth’

Associate Professor Rafael Guerrero, Co-Founder of the Innovation Centre, Consultant Congenital Cardiac Surgeon and Clinical Director Cardiac Services



## Conclusion

Innovation has been part of the Alder Hey way for over a century, but now we are entering a new era where innovation will be essential for sustained healthcare delivery that improves life chances.

We are restless to tackle healthcare inequalities and optimise healthcare, this is because of our compelling emotional purpose - children who start behind tend to stay behind - but early intervention can significantly improve life chances.

This 2030 innovation strategy 'Today's Child, Tomorrow's Healthier Adult' will help to solve those problems. Our partnership ecosystem will revolutionise healthcare locally, and advance healthcare nationally and globally.

### The answer is our unique selling point:

We are problem solvers. We fuse unrivalled clinical understanding of the unmet needs of Children and Young People with our innovative culture and commercially focused innovation centre assets. We have the expertise to move at speed from problems to solutions.

This strategy is not only about how Alder Hey Innovation Centre unleashes and disseminates innovation for the benefit of all the Children and Young People. It also provides a blueprint for successfully balancing the public sector service needs whilst creating a sustainable commercial model for innovation.

Today's Child Tomorrow's healthier adult will solve the real-world problems Children and Young People face, democratising cutting edge solutions that create a healthier, fairer future for all children.



# Appendices

## Appendix 1 - References

1. A year of COVID-19 in the North: Regional inequalities in health and economic outcomes – Northern Health Science Alliance (Sept 2021)
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8. <https://www.champspublichealth.com/wp-content/uploads/2021/07/David-Taylor-Robinson.pdf>
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10. <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf>
11. UK Innovation Strategy: leading the future by creating it (accessible webpage) - GOV.UK (www.gov.uk)

## Appendix 2 - Glossary

- AI** – Artificial Intelligence
- AR** – Augmented Reality (Overlayed onto Real Life Image)
- CAHMS** – Children and Adolescent Mental Health Services.
- CCG** – Clinical Commissioning Groups
- Co-create** – Creation of something between two or more party's
- CYP** – Children and Young People
- Democratise** – make (something) accessible to everyone
- Device Agnostic** – Works over multiple devices interchangeably
- Digital biomarkers** – Digital biomarkers are defined as objective, quantifiable physiological and behavioural data that are collected and measured by means of digital devices such as portables, wearables, implantables, or digestibles. The data collected are typically used to explain, influence, and/or predict health-related outcomes
- Digital Therapeutics** – Digital Therapy via a online platform or application
- Edge computing** – Edge computing is a form of computing that is done on site or near a particular data source, minimizing the need for data to be processed in a remote data centre
- Entrepreneur** – An entrepreneur creates new businesses, takes on most risk and enjoys most reward. Plays key role in economy, using skills and initiative necessary to anticipate needs and bring good new ideas to market
- Healthcare inequalities** – Health inequalities are avoidable, unfair and systematic differences in health between different groups of people

- HEI** – Higher Education Institute
- ICS** – Integrated care systems are new partnerships between the organisations that meet health and care needs across an area, to coordinate services and to plan in a way that improves population health and reduces inequalities between different groups.
- Immersive** – An application that is providing, involving, or characterized by deep absorption or immersion in something
- Intervention** – The action or process of intervening In something.
- Intrapreneur** – An employee who develops innovative ideas or projects within an organisation. May not face the outsized risks or reap the outsized rewards of an entrepreneur. However, has access to resources and capabilities of an established organisation
- MedTech** – Medical Technology
- Metaverse** – A virtual-reality space in which users can interact with a computer-generated environment and other users which is focused on a social connection between party's
- Monetisation** – The action or process of earning revenue from an asset, business etc
- Neurodevelopmental** – The development of the nervous system, or neural development, or neurodevelopment, refers to the processes that generate, shape, and reshape the nervous system of animals, from the earliest stages of embryonic development to adulthood
- Open Innovation** – A business management model for innovation that promotes collaboration with people and organizations outside the company. It is a term used to promote an information age mindset toward innovation that runs counter to the secrecy and silo mentality of traditional corporate research labs
- Personalised/Individualised care** - Care Tailored towards the patient
- PICU** – Paediatric Intensive Care Unit
- Prototyping** – a test of a product prior to launch, not the official product just a prototype unit/s
- Psychological safety** – Psychological safety is being able to show and employ one's self without fear of negative consequences of self-image, status or career
- RPA** – Robotic Process Automation. Automating Process's via a piece of digital software
- SME** - Small and medium-sized enterprises (SMEs) are non-subsiidiary, independent firms which employ fewer than a given number of employees. The most frequent upper limit designating an SME is 250 employees, as in the European Union
- Sprint** – a set period of time during which specific tasks must be completed
- UX** – User Experience
- Visualisation** – Being able to see something with your own eyes
- VR** – Virtual Reality
- WNB** – Was Not Brought (Adult trusts use Did Not Attend, but as a paediatric trust we use the term Was Not Brought as it is up to the parent / carer / guardian to bring the patient to the hospital)
- XR** – The overall term for all Mixed-reality areas (AR,VR,MR)