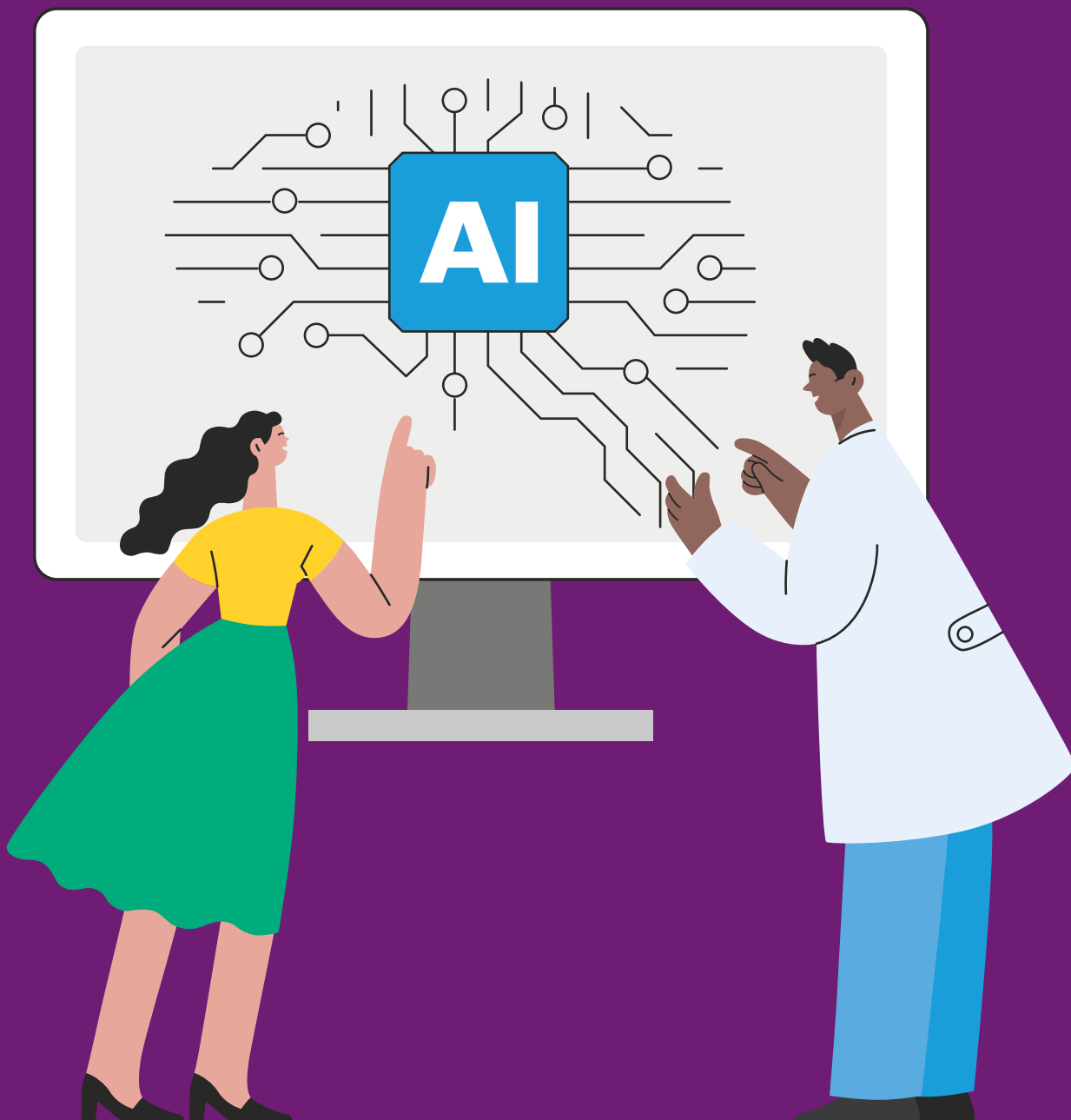


Data science and AI strategy



Contents

2 Why data science and AI matter to us

4 Our principles

5 Our areas of focus

9 Our enablers

Acknowledgements

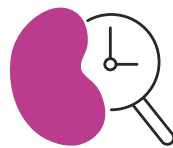
This strategy has been shaped collaboratively, drawing on the insights and expertise of patients, researchers, clinicians, and partners from the third sector. Kidney Research UK would like to sincerely thank everyone who has generously lent their time and expertise to supporting the development of this strategy.

Why data science and AI matter to us.

Data science and artificial intelligence (AI) are central to the next chapter of kidney research. They will be key for us to deliver the ambitious goals we have set in our 2020–2030 'Leading transformation in kidney health' charity strategy, and they will remain essential long after 2030. This community-driven data science and AI strategy charts our path to 2031, laying the groundwork for a future shaped by continuous innovation.

Our challenges

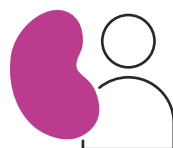
Kidney Research UK is committed to our urgent mission to end kidney disease. Achieving this means tackling a number of scientific and healthcare challenges.



Many people are diagnosed with kidney disease too late, which means they miss out on chances to prevent progression or receive early support. There are also not enough treatments available to slow down or stop kidney disease.



People with kidney disease often have other long-term conditions such as diabetes, heart disease, cancer, or high blood pressure. This makes their care more complicated.



Disparities in kidney health remain, with individuals from underserved communities facing a greater likelihood of developing kidney disease and experiencing poorer health outcomes as a result.



Rare kidney diseases put a disproportionate strain on both patients and the NHS. These conditions are often diagnosed late, care can be fragmented, and treatment options remain limited.

Supercharging research with data science and AI

Data science and AI can provide solutions to the kidney community's scientific challenges by enabling discovery, accelerating translation, and driving implementation across the entire research pathway. Careful application of these technologies can uncover disease mechanisms, enable earlier diagnosis, drive better outcomes for dialysis patients and transplant recipients, and guide the development and delivery of new treatments, including through data-driven clinical trials.

Kidney science is a uniquely quantitative discipline in medicine. This presents an exceptional opportunity for data science and AI methodologies to effectively tackle kidney research challenges and improve the lives of kidney patients.

Revolutionising patient care

Data science and AI can transform kidney care through earlier and more accurate identification of disease, improved risk stratification, and more personalised clinical decision-making. By leveraging richer and more representative datasets and advanced analytics, health systems can inform service planning and commissioning, and address inequalities to deliver faster, fairer, and better outcomes for all.

Scope

Data Science and AI are complex fields. For the purposes of this strategy, we will be focusing on the following scope:

Data science



Disciplines that aim to turn biological, patient and population data into insights that advance discovery, improve diagnosis and treatment,

and strengthen the delivery of care. Equally important to us are the foundational elements that make data science possible, including the collection, curation, and management of kidney data assets.

AI

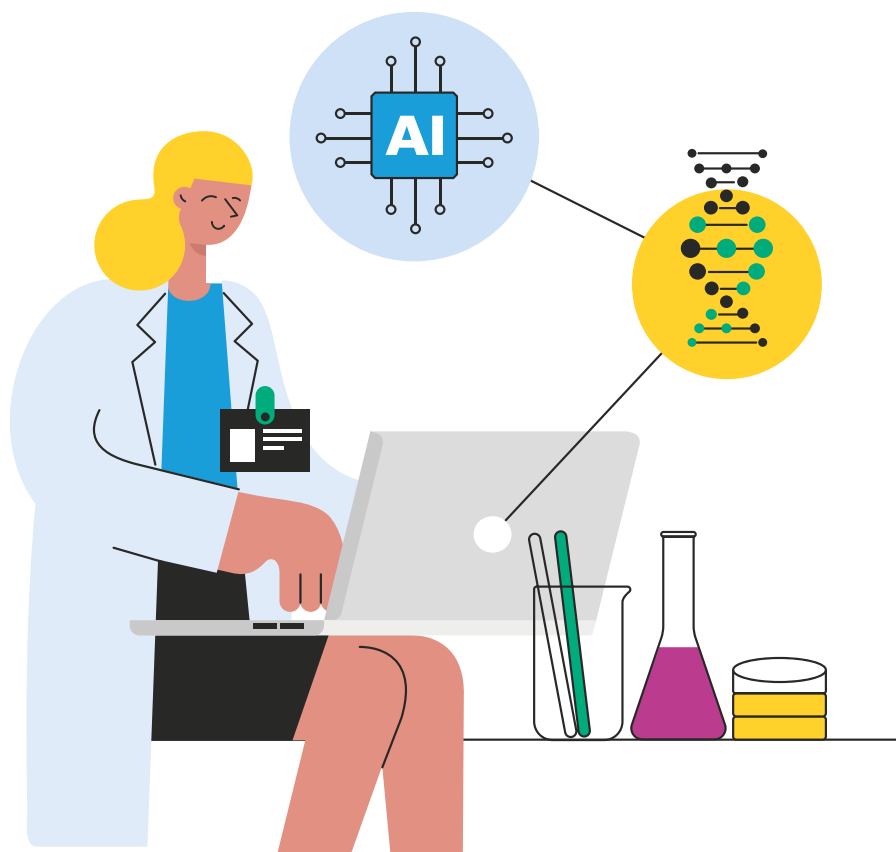


Computational approaches (including machine learning, pattern-recognition, and predictive models) that analyse large-scale

biological, genomic, and clinical data to generate insights for discovery, diagnosis, and treatment. While we recognise that AI also has broader potential to support kidney patients (for example, through digital support tools), these applications remain outside the direct scope of this strategy.

Our mission

Kidney Research UK is committed to building a world-leading, ethical data science and AI ecosystem that drives discovery, revolutionises kidney care, and delivers better patient outcomes. By 2031, we will strengthen the national kidney data infrastructure to power high-impact research, foster a thriving data science and AI community, and champion NHS-wide innovation for equitable improvements in kidney health. We will make data science and AI a thread that runs through everything we do, supercharging the research we fund and strengthening our case as we advocate for the kidney community.



Our principles.

Our principles underscore how we think about data science and AI in research and healthcare delivery. They matter to our patients, our researchers, and to us. Every action we take to achieve our goals will prioritise ethical approaches and a focus on fighting health inequity for kidney patients.

Ethics

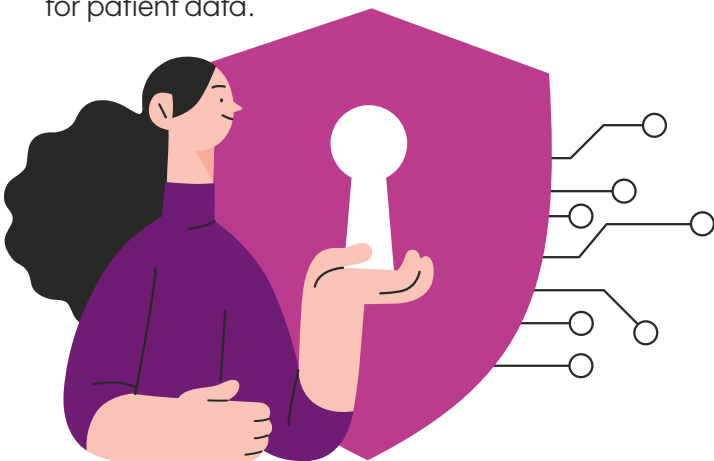
We will uphold the highest ethical standards in all our data science and AI work. We understand that with rapidly evolving technology come evolving ethical frameworks, and we will engage with our patients, researchers, clinicians, and other partners. We will advocate for:

- **Transparency and consent on how patient data is used**, who accesses it, how it's safeguarded, and who has oversight of AI models, including promoting open-source solutions where appropriate.
- **Responsible use of AI** with human oversight to avoid misuse, clear safeguards to avoid spreading bias, environmental sustainability in how models are deployed, and transparency over tools employed in research and in decision pathways. We will ensure AI never replaces the human component in patient care.
- **Robust governance and ethical data partnerships**, avoiding unethical use, ensuring secure storage, and relying on sector-wide regulatory frameworks to maintain a 'safe space' for patient data.

Health equity

Tackling health inequities is a key priority for the kidney research community. Minority ethnic communities, people living in areas of high socioeconomic deprivation, older adults, children with rare kidney diseases, and those living in geographically isolated areas are all affected by systemic kidney health inequities. We recognise that data science and AI have both the potential to help tackle as well as dramatically deepen inequities and we are committed to ensuring the work we support delivers a positive and equitable impact for kidney patients. We will advocate for:

- **Trusted infrastructure that features rich, representative data** so that advances and discoveries are relevant and benefit everyone. Data on patients from underserved groups is scarcer and often less comprehensive, meaning individuals from these communities are not as fully characterised within existing datasets. True equity in data science and AI-driven health research can only be achieved when researchers have access to data that includes meaningful information about all communities.
- **Proactive approaches to ensuring AI does not amplify existing inequalities**, by prioritising use of representative datasets, tackling barriers to participation; building trust and coproducing research and AI tools with diverse patient communities through continuous dialogue.
- **Research using data science and AI to address structural inequities in kidney health**, including earlier identification of CKD, equitable access to trials, and regional disparities in healthcare delivery.



Our areas of focus.

Infrastructure

By 2031, we will have worked with our partners to strengthen and connect key UK kidney data assets to create a more discoverable, accessible, and usable data infrastructure for researchers.

Data science and AI research can only be as powerful as the research infrastructure that enables it (including registries, research-ready datasets, data sharing platforms, networks and more). We have heard from the kidney community that the current infrastructure is often an obstacle to impactful kidney research. We will capitalise on our existing investment into infrastructure initiatives such as the Kidney Data Science Catalyst and the Kidney Health Data Science Network and pave the way for high-quality data science and AI research through high-quality infrastructure. We will:

Enhance researcher access to kidney healthcare and research data

We will help create the conditions that make it easier for researchers across the UK to find and use the key data needed to drive progress in kidney science and care. Ensuring fit-for-purpose data infrastructure that captures information about diverse patient populations, reduces friction between datasets, and breaks down silos will help enable kidney research. We will champion efficient and responsible access to broader NHS datasets, helping to build a richer, more inclusive ecosystem that drives impactful kidney research for all.

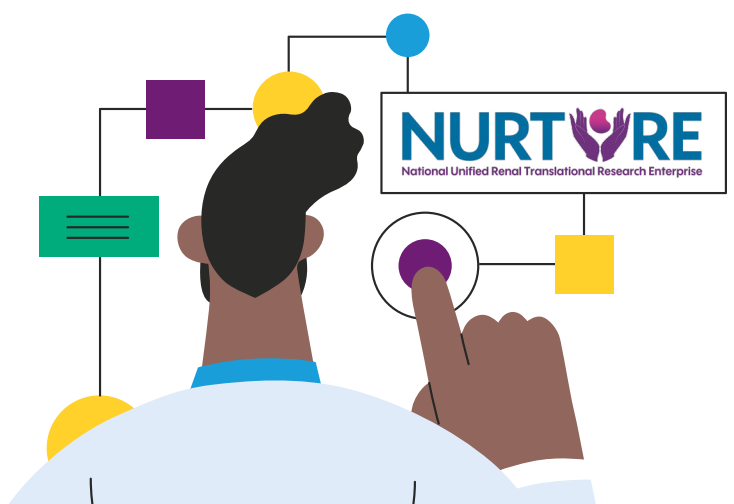
Advance a high-reuse kidney data ecosystem

We will work with the community to shape and promote shared standards that make kidney research and healthcare data easier to understand, combine and reuse, including for AI use.

High-quality data and metadata are essential to a robust research ecosystem: without widely adopted community standards, the field remains exposed to the well-recognised 'rubbish in, rubbish out' risk. Through clear expectations on data and metadata standards, sharing and reuse, and by backing reuse-focused research, we will help build a culture of continuous open-data generation, where valuable data underlies cumulative scientific progress and continues to drive impact long after it was first created.

Grow NURTuRE into a kidney data powerhouse

Over the past 10 years, we have worked with our industrial and academic partners to develop NURTuRE (the National Unified Renal Translational Research Enterprise). NURTuRE is a world-unique resource providing access to high quality samples and rich healthcare and multiomic data to enable and accelerate kidney science. We will broaden the reach, relevance and user base of NURTuRE so it becomes a go-to resource for researchers in the UK and beyond. By supporting its growth into new kidney conditions and enriching its datasets through deep multiomic characterisation of kidney patient cohorts, we will fuel discoveries that benefit the whole community.



Research and impact

By 2031, we will have delivered a world leading kidney data science and AI research programme that accelerates our strategic goals to prevent kidney disease, protect kidney health, and treat kidney patients.

We will ensure high-quality data science and AI support the research we fund across our whole portfolio, from discovery to patient impact. We will accelerate our strategic goals by funding outstanding data science and AI-enabled research that improves the lives of kidney patients. Specifically, we will support:

Research across the whole spectrum of data science, from omics to population data

Our approach spans integrating biological and clinical datasets, modelling complexity in disease pathways and outcomes, analysing multiomic signals, using real-world health records to inform trials, and applying AI to support earlier detection and better decision making. We acknowledge that data alone does not always tell the full story and we will push for multidisciplinary approaches to understanding kidney disease and kidney care.

Research that responds to the community priorities in kidney data science and AI

We will listen to the kidney research community to set dynamic data science and AI research priorities across discovery and translational research that help us better understand, protect, prevent and treat kidney disease, with a strategic focus on health equity and multiple long-term conditions. We will champion emerging methods, including digital twins, agentic research, federated learning, multiomics integration, and advanced statistical and mechanistic modelling, to drive innovation and deepen our understanding of kidney disease pathways.



Research that accelerates clinical trials and translation into patient care

We will invest in research that harnesses data science and AI to make clinical trials faster, smarter, and more inclusive. This means supporting work that uses real-world evidence and routine clinical data to inform trial design, improve patient recruitment and retention, and match the right treatments to the right patients. We will also back research that accelerates the implementation of trial findings into routine NHS care, ensuring that evidence reaches patients equitably, including those from underserved communities who have historically been excluded from research.

Training and community

By 2031, we will have built a diverse, thriving, and sustainable kidney data science and AI community, drawing on diverse expertise to secure the future of kidney research.

The people who drive our research day in and day out are key to achieving meaningful impact. To reach our goals, we need a strong kidney data science and AI community that brings together experts from different disciplines and supports clear, sustainable pathways for long-term careers in kidney data science and AI.

Expand training pathways that open more routes into kidney data science and AI

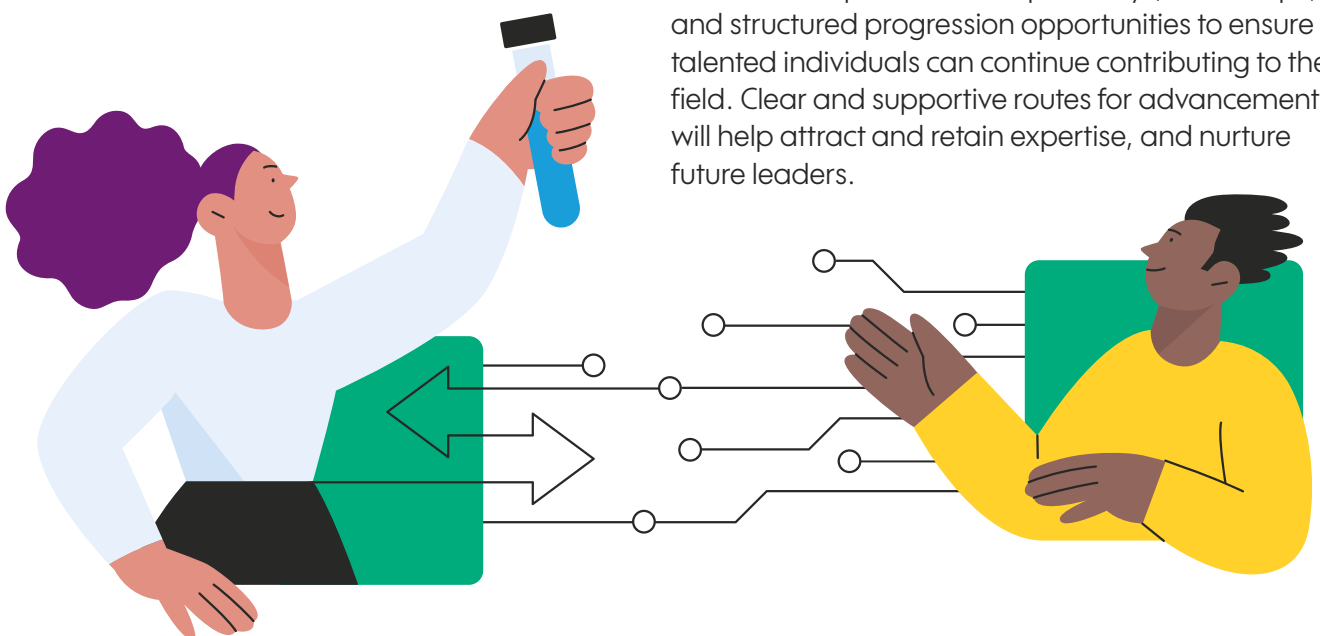
We will build a diverse portfolio of opportunities to help researchers at all career stages develop strong kidney data science and AI skills. This will include dedicated pathways for researchers to forge a career in kidney data science and AI, support for kidney researchers and clinicians to upskill, and opportunities for data scientists and AI researchers to work in kidney science. Broadening entry points and reducing barriers will build a larger, more confident workforce equipped to drive innovation in kidney research and care.

Spark multidisciplinary collaboration by creating shared spaces and programmes that bring people together

We will support joint grant schemes and community initiatives that foster collaboration between clinicians, researchers, data scientists, AI experts, and other specialists. By embedding multidisciplinary teamwork in the projects we fund and proactively encouraging the adoption of data science and AI methods throughout our portfolio, we will drive innovation and accelerate progress in kidney research and care.

Strengthen long-term career development so data scientists can build meaningful, sustained careers in kidney research

We will champion retention pathways, fellowships, and structured progression opportunities to ensure talented individuals can continue contributing to the field. Clear and supportive routes for advancement will help attract and retain expertise, and nurture future leaders.



Healthcare optimisation

By 2031, we will have driven the improvement of kidney care by using connected data systems that are designed around patients. Through data science and AI, we will support prevention, earlier diagnosis, protection from progression, and improved treatments for all.

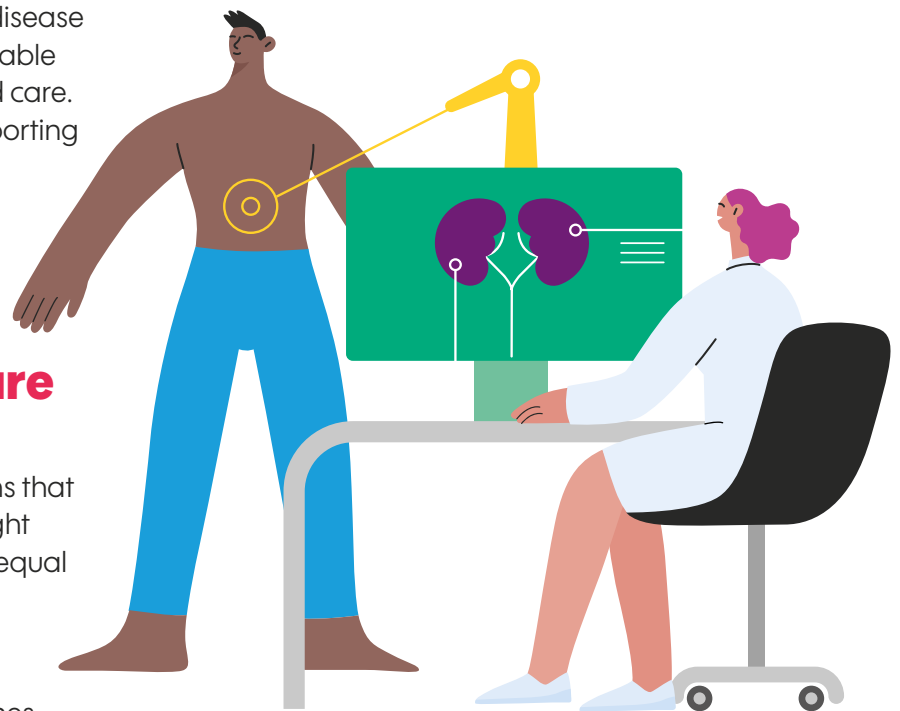
Developing better treatments for kidney disease only delivers impact if health systems are able to translate breakthroughs into real-world care. Data science and AI will be critical in supporting improved kidney care pathways, smarter decision-making, and more efficient use of NHS resources. We will:

Drive an AI-powered revolution in kidney care

We will drive the development and implementation of AI-enabled innovations that identify risk at an earlier stage and highlight where patients face access barriers or unequal outcomes, helping health systems target intervention to the patients who need it most and supporting decisions at the patient level. We will fight for AI approaches that are transparent, inclusive, and patient-centred, ensuring new technologies benefit everyone living with kidney disease.

Use data science to understand kidney healthcare

We will use data to build a clearer picture of kidney healthcare in the UK, helping us understand patient journeys, pinpoint system-level inequalities, and highlight critical 'pinch points' across care pathways. We will work with NHS partners to strengthen insights into service capacity and unmet needs, enabling innovation and accelerating the translation of evidence into practice. These approaches will build a robust evidence base to accelerate system-wide change and improvement in kidney care.



Champion data-driven, integrated kidney service models

We will advocate for system-level, data-enabled kidney service models that join up primary, community, and secondary care to support service planning, commissioning, and pathway redesign. By driving the optimisation of real-world kidney care, we can support earlier intervention, more consistent delivery of evidence-based care, and improved outcomes for kidney patients across the UK. We understand that data science methods alone are not enough to deliver evidence-based healthcare for kidney patients, and that real-world progress will ultimately be driven by meaningful engagement with healthcare systems at every level.

Our enablers.

These four enablers underpin everything in this strategy. They cut across all our areas of focus and represent the core functions through which Kidney Research UK will drive change. Without excellence in these areas, our ambitions for 2031 will remain ambitious. Together, they are how we deliver on every commitment in this strategy.

Fund excellence

We will fund infrastructure, research, and training opportunities across the kidney data science and AI space. We will work with the research and clinical communities to define the most pressing challenges in kidney research and care where data and AI can make a difference. We will fund high-impact activity that makes a real difference for kidney patients across the UK. We will also ensure we have the expertise and processes needed to identify and support the most promising opportunities, so that forward-thinking proposals can be assessed rigorously and fairly.

Broker partnerships

We will act as a catalyst for ethically grounded, trusted partnerships that connect charities, industry, tech companies, the NHS, and research institutions to enable collaboration, accelerate research, drive system change, and bring benefits to patients sooner.

We will work with organisations and companies at the cutting edge of data science and AI methods development, bringing these advances into kidney research. To do this effectively, we will continue building internal expertise and relationships that allow us to engage as credible, informed partners in conversations around data governance, innovation, and implementation.

Advocate for patients

We will continue to advocate for kidney patients in the rapidly evolving field of data science and AI. We will champion transparent communication about how patient data is used, strengthen research coproduction with diverse patient communities, and work to remove barriers to participation in research and trials. Will maintain an open dialogue with patient communities and the public, ensuring their priorities and lived experience shape our work as the field evolves.

Influence policy

We will keep on making the case for kidney disease to be a priority in system level reforms, improving national, regional and local data linkage and promoting balanced approaches to data sharing governance. We will turn data into evidence that is impossible to ignore, strengthening our advocacy and speeding up change for kidney patients.



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**kidney disease
ends here.**

