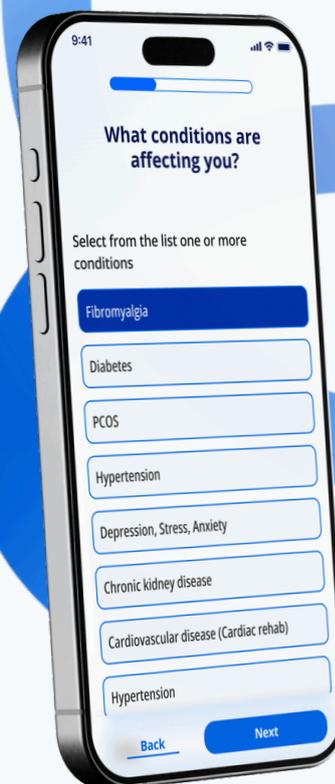chiron

Chiron Whitepaper

A Scalable, Evidence-Based Platform for Personalised Self-Management and Patient Activation Across Long-Term Conditions

Executive Summary

Chiron is an AI-powered, clinically validated self-management and patient activation platform designed to transform how long-term conditions are supported across health systems. By drawing on advanced analytics, behavioural science principles, and seamless clinical integration, Chiron delivers hyper-personalised recommendations that empower individuals to take control of their symptoms, reduce avoidable healthcare utilisation, and improve their overall wellbeing. Patient activation refers to the extent to which individuals have the knowledge, skills, confidence, and motivation to manage their own health and healthcare. It recognises that patients are not passive recipients of care, but active participants whose behaviours, decisions, and self-management capabilities significantly influence outcomes—particularly for long-term conditions. Higher levels of patient activation are associated with better engagement in evidence-based behaviours such as medication adherence, symptom monitoring, lifestyle modification, and appropriate use of healthcare services. As a result, patient activation is a critical determinant of both clinical outcomes and system efficiency: activated patients experience better quality of life and health outcomes while making more appropriate use of primary, community, and secondary care. For healthcare organisations facing rising demand and constrained capacity, improving patient activation represents a scalable, preventative approach that supports personalised care, reduces avoidable utilisation, and delivers sustainable improvements in value across the health system.

The Chiron platform aligns directly with NHS priorities around prevention, digital transformation, workforce efficiency, population health management, and reducing health inequalities. It offers a scalable, evidence-based approach suited to high-burden and underserved conditions such as fibromyalgia, IBS, and INOCA, while also supporting mainstream long-term conditions including hypertension, cholesterol management, and cardiovascular risk optimisation.

Chiron has been developed through a robust, multi-stage research and validation programme involving patients, clinicians, academic institutions, and NHS technical partners. Supported by a multidisciplinary Clinical Advisory Board and formal partnerships with universities including King's College London, Edinburgh Napier University, Warwick University, and Manchester Metropolitan University, Chiron brings together clinical credibility, scientific rigor, and real-world feasibility. Its NHS interoperability - validated in a funded feasibility study - makes Chiron uniquely ready for population-level deployment across ICBs.

The Challenge Facing Health Systems

Long-term conditions (LTCs) account for approximately 70% of NHS expenditure, placing immense strain on the system. Despite this, many high-burden LTCs - particularly those characterised by fluctuating symptoms, complex pain, or non-obstructive pathophysiology - remain poorly served by existing pathways. Their conditions typically involve a combination of autonomic, metabolic, psychological, and behavioural contributors, yet current pathways rarely provide integrated support. Conditions such as fibromyalgia, IBS, chronic chest pain/INOCA, and multimorbidity often fall into clinical "gaps," resulting in:

- fragmented care and lack of continuity
- insufficient clinical time
- repeated GP visits
- difficulty accessing specialist support and long waiting times
- reduced quality of life and increased stress

Meanwhile, conditions with established pathways - hypertension, dyslipidaemia, metabolic risk - suffer from poor adherence, low patient activation, and wide inequalities in outcomes.

ICBS MUST SIMULTANEOUSLY:

Reduce demand on overstretched services

Improve activation and self-management

Deliver prevention at scale

Support complex LTC populations

Connect digital tools into existing NHS workflows

Chiron was designed specifically to meet these challenges.

Economic impact of patient activation on cost and utilisation

Patient activation is consistently associated with meaningful reductions in healthcare utilisation and cost, particularly for people with long-term conditions. In cost analyses from large delivery systems, patients with the lowest activation have been found to incur **~21% higher costs** than those with the highest activation, even after adjustment for demographics and clinical factors - suggesting that activation level is an economically material driver of demand and spending. (commonwealthfund.org, Hibberd et al).

Reducing primary and secondary care utilisation

In NHS-linked data, higher self-management capability/activation is associated with lower use across urgent and routine services. The Health Foundation's analysis (patients with long-term conditions) found that those most able to manage their health (highest PAM level) had:

- 38% fewer emergency admissions
- 32% fewer A&E attendances
- 18% fewer GP appointments

compared with those least able to manage their health.

The same analysis also reported 1**9% fewer outpatient appointments** and **41% shorter elective length of stay** among the most able group—indicating benefits across both urgent and planned care pathways (Health Foundation).

At a population level, this difference in utilisation can translate into significant system-wide impact. The Health Foundation estimated that if patients currently least able to manage their conditions were supported to manage as well as those most able, this could equate to **~333,000 - 436,000 fewer emergency admissions per year and ~504,000 - 690,000 fewer A&E attendances per year** in England (modelled extrapolation) (Health Foundation).

Evidence across studies and settings

A 2022 systematic review and meta-analysis (nine observational studies; >150,000 participants) found that high activation was associated with a 31% lower risk of hospitalisation (RR 0.69) and a 24% lower risk of ED attendance (RR 0.76) versus lower activation—supporting the consistency of the relationship across settings and populations. (PubMed) In England, analysis using electronic patient records also shows a clear gradient: as PAM scores increase, GP consultations generally decrease, and the probability of A&E attendance falls (reported as approximately a 1.4% absolute decrease in A&E visit probability per 10-point PAM increase in the cited study). (PubMed Central).

Quality of life and clinical metrics
(and why this matters economically)

The economic effect is strengthened by the clinical and quality-of-life improvements associated with activation. Longitudinal evidence from large health systems shows that higher activation is linked to better health behaviours and multiple improved clinical indicators, alongside lower costs in subsequent years - suggesting that activation is not merely a service-use phenomenon, but a mechanism that can improve outcomes that drive cost (e.g., risk-factor control, symptom stability, and adherence) (PubMed).

Illustrative economic impact of improving patient activation in 10,000 adults with long-term conditions (annual impact)

CARE SETTING	BASELINE ANNUAL ACTIVITY (ILLUSTRATIVE)	REDUCTION ASSOCIATED WITH HIGH PATIENT ACTIVATION*	ACTIVITY AVOIDED PER YEAR	INDICATIVE UNIT COST**	INDICATIVE ANNUAL SAVING
Emergency admissions	1,000 admissions	−38%	380 admissions	£1,600–£3,000 per admission	£608k – £1.14m
A&E attendances (non-admitted)	3,000 attendances	−32%	960 attendances	£173–£563 per attendance	£166k – £540k
GP appointments	60,000 appointments	−18%	10,800 appointments	~£37 per consultation	~£400k
Outpatient appointments	20,000 appointments	−19%	3,800 appointments	£120–£160 per appointment	£456k – £608k
Total (illustrative range)	—	—	—	—	~£1.63m – £2.69m per year

* Reduction percentages derived from NHS-linked analyses comparing lowest vs highest patient activation (PAM Level 1 vs Level 4).
** Unit costs are indicative national averages; local tariffs and reference costs should be used for formal business cases.

Even under conservative assumptions, improving patient activation in a 10,000-person long-term condition cohort is associated with **£1.6m - £2.7m in annual avoidable activity costs**, primarily driven by reductions in emergency admissions, A&E use, and high-volume primary care demand - while also improving patient-reported outcomes and clinical stability.

The Chiron Solution

Chiron provides an intelligent, adaptive self-management platform that continuously learns from each user's symptoms, behaviours, environment, and biometric patterns. Chiron is patient-led but clinician connected.
It combines:

- **AI-driven personalised intervention recommendations** (physical activity, nutrition, psychosocial support, pacing, sleep strategies, stress regulation, medication adherence)

- **N-of-1 AI-driven analytics** to determine which interventions truly work for each individual, includes predictive analytics and impact of medication +self-care combined

- **modal data analysis**: Integration with PROMs, wearables, medication data, and EHR data

- **behavioural science-based motivation** and engagement strategies

- clinically governed content/interventions aligned to NICE guidance and latest evidence

- **real-time insights and monitoring** that inform both patients and clinicians
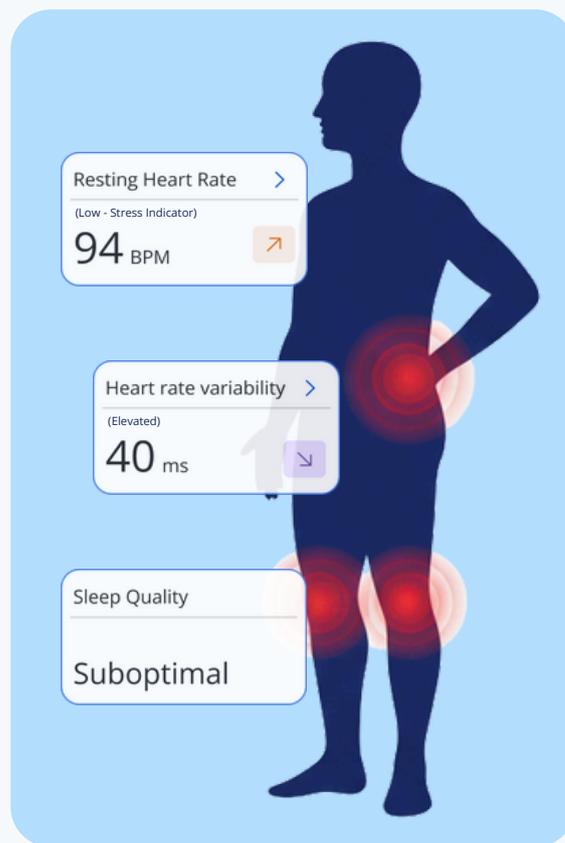
Chiron's unique strength is its ability to tailor the dose, timing, and type of intervention for each person - whether improving pacing strategies for fibromyalgia, stabilising flare patterns in IBS, supporting autonomic regulation for INOCA, or optimising lifestyle contributions to blood pressure and cholesterol control. We use predictive and adaptive analytics to drive micro-changes (or Just In Time Adaptive Interventions) to the user's programme to sustain engagement. This comes from continuous real-time analysis of user data, cross correlated against patient reported outcomes and also environmental/external influences e.g. Poor sleep + anxiety + increasing pain scores would drive a change to the user's personalised plan Chiron can track and promote adherence of any physician prescribed drugs and monitor the interaction of medication alongside self-care interventions to truly optimise patient outcomes in line with clinical guidelines
The platform fits into existing clinical workflows, integrates with NHS infrastructure, and complements PCN, community, and specialist services.
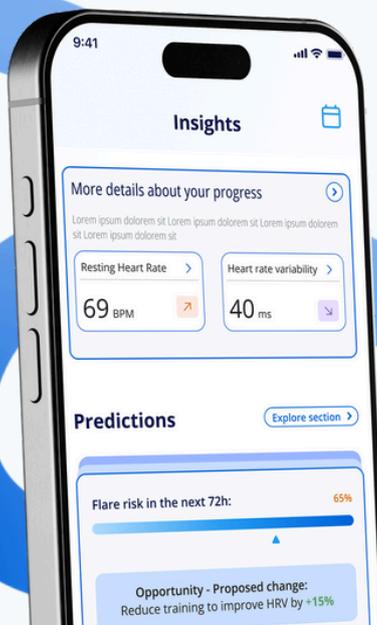
Alignment with NHS Priorities

Chiron maps directly onto key NHS strategic areas:

A. NHS Prevention & Population Health Management

- Reduces modifiable CVD risk
- Supports lifestyle optimisation
- Targets underserved conditions with high utilisation

B. Digital Transformation & Interoperability

- Integrates with NHS Login, MESH (coming soon), Patients Know Best, FHIR interoperable
- Low friction implementation – patient-led intelligent self-management pathway integrates into existing clinical workflows and systems
- DTAC-aligned security and governance
- Creates a repeatable deployment model across PCNs, ICBs, acute trusts.

C. Workforce Optimisation & Demand Reduction

- Reduces unnecessary GP and secondary care attendances
- Provides structured self-management support at scale
- Improves patient activation and adherence

D. Health Inequalities

- Personalised interventions that can be accessed by anyone, at anytime
- Community-level insights for ICB prevention and outreach

E. Community-Based Care & ICS Integration

Chiron supports integrated neighbourhood teams by extending support beyond clinical settings, enabling continuity between primary, community, and secondary care.

Evidence Base

Chiron has undergone an extensive research and validation journey:

Stage 1 – Survey & Market Validation (n = 1062)
A national survey delivered with UK Fibromyalgia demonstrated overwhelming unmet need: 77% of respondents reported difficulty accessing existing care, 77% said they would use Chiron, and 63% wanted to co-design. The results validated both need and appetite for a digital self-management platform.

Stage 2 – Patient and Clinician Interviews
In-depth qualitative interviews revealed striking gaps in continuity and personalised support, shaping both content design and engagement strategy.

Stage 3 – Non-App Prototype Pilot
A simple WhatsApp-based prototype showed extremely high engagement and early improvements in wellbeing, proving strong user motivation even before a formal app existed.

Stage 4 – Behavioural Science Integration
A behavioural psychologist shaped tone, motivational design, and engagement loops. Workshops strengthened accessibility, adherence, and user experience.

Stage 5 – Recommender Prototype Test (n = 167)
89% rated recommendations as relevant, and 96% reported a positive experience - strong validation for AI-driven personalisation.

Stage 6 – Clinical, Literature & Regulatory Review
Comprehensive review of NICE and international guidance informed safety, clinical validity, and regulatory alignment. A roadmap for UKCA/CE marking was developed with oversight from the Clinical Advisory Board.

Stage 7 – MVP Beta Test (n = 100)
A four-week live test generated more than 300,000 data points. Outcomes included a 31% improvement in wellbeing scores and 89% user recommendation rate.

Stage 8 – Recommender Expansion (>1000 users)
Validation using real-world and synthetic datasets demonstrated predictive accuracy (R^2 = 0.71), 87% clinician alignment, 92% user satisfaction, and subgroup bias <3%.

Stage 9 – Innovate UK NHS Feasibility Study (n = 300+)
In partnership with Patients Know Best (PKB), Chiron is proving its ability to extract EHR data into Chiron's algorithms and push data back into NHS systems using FHIR standards. The study also evaluates economic outcomes such as GP appointment impact, HrQoL improvements, and changes in referral patterns.

- **Automated extraction of EHR data** to power Chiron's algorithms
- **FHIR-compliant push-back** of structured data to NHS systems
- **Workflow integration across multiple PCNs**
- **Economic modelling** of impact on GP visits, HRQoL, and secondary care referrals

Outcome: A repeatable, scalable NHS deployment model with full interoperability.

Stage 10 – INOCA Study
A clinical study with the International Heart Spasms Alliance (IHSA) exploring personalised self-management, symptom stabilisation, and CVD risk optimisation in a high-need population with limited pathway support. Outcome: Expands evidence base into cardiology and autonomic dysregulation.

Clinical Governance and Academic Partnerships

Chiron's clinical governance framework is overseen by a multidisciplinary Clinical Advisory Board covering a broad range of clinical specialties (including Physicians, Clinical Psychologist, NHS dietitian, Physiotherapist, behavioural science, epidemiologist) and academic scientists.

Academic partnerships reinforce methodological rigor and ensure credibility. Our collaborations with King's College London, Edinburgh Napier University, Warwick University, and Manchester Metropolitan University enable access to research expertise, clinical datasets, and independent evaluation. MMU is funding a three-year PhD programme focused on AI personalisation models within Chiron.

Conditions Supported

Chiron supports a broad range of needs:

High-need underserved conditions:

- Fibromyalgia
- IBS and functional GI disorders
- INOCA / ANOCA
- CFS/ME
- Long COVID symptom clusters

These conditions have no consistent digital pathway and place major demand on GP and secondary care services.

Conditions with established pathways:

- Hypertension – includes integrated QRISK3
- Dyslipidaemia
- CVD prevention
- Stress, sleep, and metabolic risk behaviours
- Mental health comorbidities (anxiety, depression, stress)
- Many others

Value Proposition for Healthcare Systems

Chiron delivers measurable system-wide benefits:

- Reduced avoidable demand by stabilising symptoms and empowering self-management: Fewer unnecessary GP visits, reduced secondary care demand, reduced admissions
- Improved patient activation, adherence, and wellbeing
- Support for ICS prevention objectives and health inequalities – Chiron can tailor the approach according to health system local priorities
- Integration with NHS systems for seamless workflow alignment
- Real-time insights and remote monitoring that support clinicians and population health management

Chiron can help **ICBs meet strategic priorities**

- Prevention
- Inequalities
- Digital transformation
- Community-based care
- Workforce optimisation

Deployment Model

Chiron can be deployed through:

- **ICB-wide patient activation and self-management programmes**
- **PCN-level services for high-need conditions**
- **Specialist service augmentation (e.g., cardiology, gastroenterology, pain services)**
- **Waiting-list optimisation and discharge support pathways**

Deployments typically begin with a targeted cohort - such as fibromyalgia, IBS, INOCA, or hypertension - before scaling across the system.

Conclusion

Chiron introduces a new model of personalised, data-driven, patient-led care. By uniting behavioural science, AI-powered personalisation, multi-modal data, and seamless NHS interoperability, it enables proactive, scalable support for people with long-term conditions while easing demand on clinical teams.

As a clinically governed and evidence-based platform, Chiron addresses one of the NHS's most persistent challenges: helping patients manage complex, fluctuating conditions more effectively and reducing avoidable pressure on services.

Underpinned by strong academic partnerships, comprehensive validation studies, and proven NHS technical integration, Chiron is well positioned to help ICBs, PCNs, and healthcare providers transform outcomes at both individual and population level.
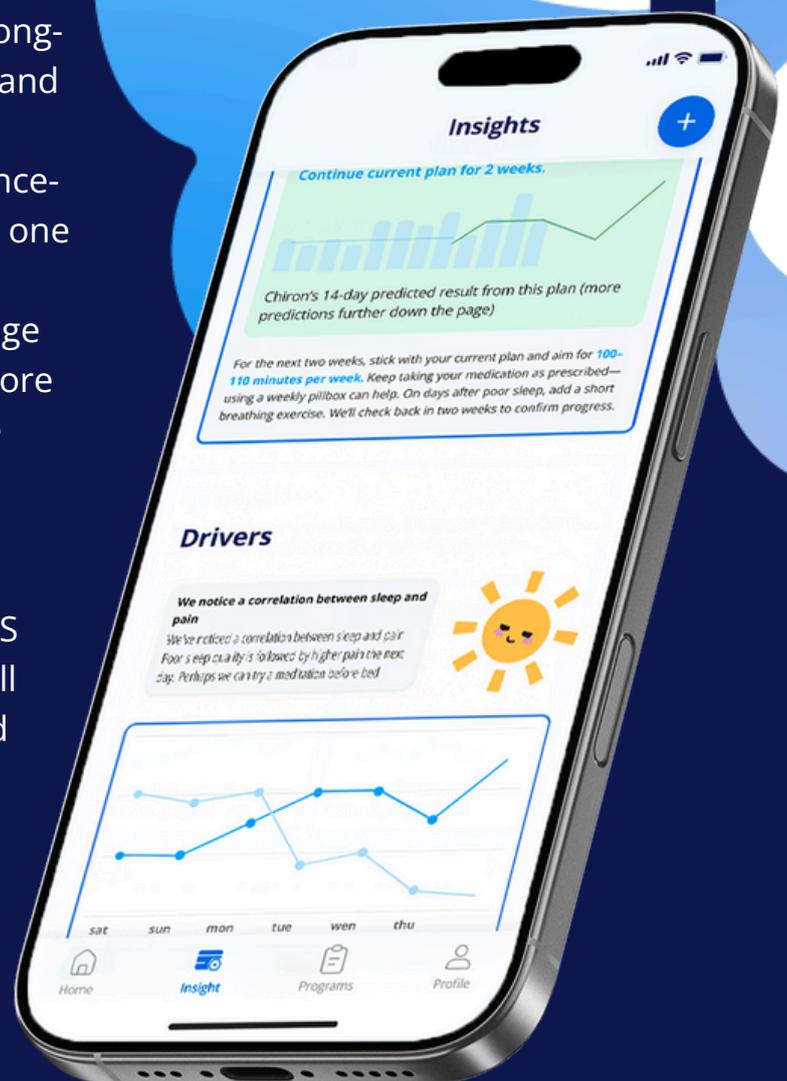
For further information, please contact:

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