![hn - predicting a healthier future]

Technical validation of HN Predict in NHS Greater Glasgow and Clyde (NHS GGC)

HN uses AI to predict people at risk of adverse health events, enabling healthcare providers to deliver evidence-based prevention.

By applying AI on routinely collected health data to identify patients at the onset of a rising health crisis, preventative healthcare resources can be allocated early and proactively at reduced cost, to improve health outcomes, save patients' lives and overcome health inequalities.

We use artificial intelligence to screen for high intensity users of unplanned hospital care and offer them a nurse-led Clinical Coaching Care programme, supported by digital tools. HN patients include all major population health priorities including heart failure, asthma, COPD, diabetes and mild mental health conditions.

What is AICC

(Figure 1- HN AICC process flow)

AICC bring together HN's highly acclaimed products into one simple yet highly impactful and fully managed service. AICC is a combination of HN Predict (AI screening), HN Proactive (scalable case management) and HN Clinical Coaching. It is delivered as a fully managed service for health systems and plans.

This model has been clinically evaluated in England in a randomised controlled trial (RCT) enrolling over 1,700 patients. The landmark clinical trial started in 2015 with findings published in the Emergency Medical Journal in 2023. The model has demonstrated significant reductions in avoidable non-elective hospital care consumption while improving quality of life for patients.

Using AI predictive models and providing support through nurse-led coaching, the national study was conducted across eight NHS hospital trusts and included patients identified at high risk of disease progression and emergency care. These patients were then either provided with standard NHS care or remote, telephone-based preventative clinical coaching, led by nurses. Follow-up checks over a period of two years revealed this method – AI screening followed by coaching - reduced deaths amongst older male patients, showing 46% fewer deaths for those aged over 75.
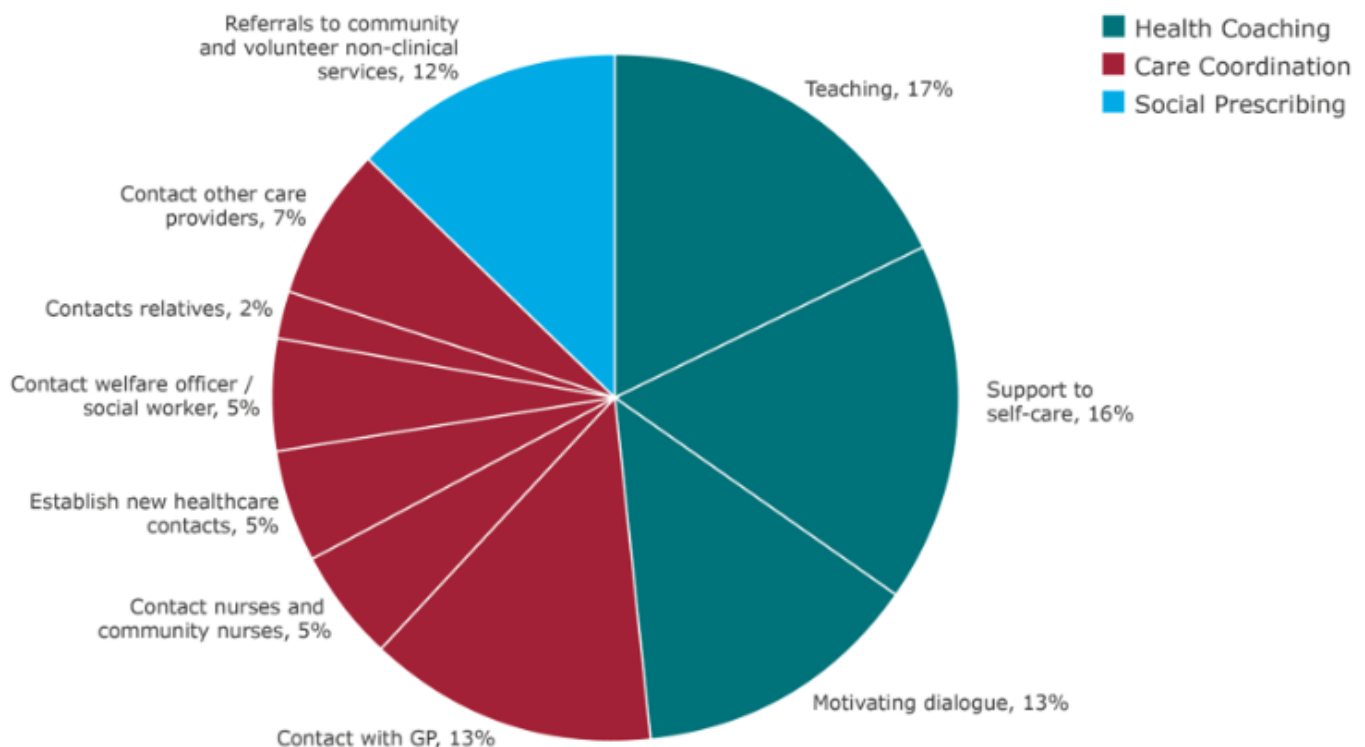
AICC in NHS Greater Glasgow and Clyde

HN worked in partnership with NHS Glasgow and Clyde over a 24-month period, implementing artificial intelligence to analyse the distribution and concentration of unplanned hospital care in Greater Glasgow and Clyde. Examining the demographics and use of secondary care services among adults who are frequent users at Greater Glasgow and Clyde hospitals and to help inform data-driven screening and interventions designed to reduce the demand for unplanned care.

HN's analysis of high intensity users in Glasgow showed that all emergency admissions were consumed by 17.6% of the population. Of these admissions, the top 5% consumers of unplanned hospital care were identified.

Their average age was 61 years and most common conditions were COPD, CHF, and diabetes. The patients were highly transient over time: 85% of those in the 5% most high consuming group in one year leave the group and went to more normal healthcare consumption in the next.

HN's AI patient screening & identification model validation on Glasgow city dataset found 8 out of 10 patients can be identified. The nurse-led support leading to self-care, empowering patients showed a reduced risk of hospitalisations.

Referrals to community and volunteer non-clinical services, 12%

Teaching, 17%

Contact other care providers, 7%

Contacts relatives, 2%

Contact welfare officer / social worker, 5%

Establish new healthcare contacts, 5%

Contact nurses and community nurses, 5%

Contact with GP, 13%

Motivating dialogue, 13%

Support to self-care, 16%

Health Coaching
Care Coordination
Social Prescribing

(Figure 2- Nurse-led, supported self-care to empower patient's and reduce risk of hospitalisations.)

Summary of Greater Glasgow and Clyde analysis

Our analysis of hospital data for the GG&C region shows that high users are responsible for between 81-84% of annual unplanned bed days and 55-57% of annual unplanned admissions. High users are more likely to be admitted after an ED attendance and had a longer length of stay.

Our definition of "frequent users" differs from other studies. We looked at unplanned bed days rather than just ED visits yearly. This captures the costliest burden on the NHS - patients attending ED then requiring hospitalisation. Identifying these patients early can prevent crises, reducing costs and freeing resources.

Our findings confirm other research on frequent user demographics. These patients were disproportionately older, lived in deprived areas, and had complex chronic conditions. This aligns with Glasgow's health profile. We observed more female frequent users. This mirrors Greater Glasgow's higher percentage of women.

Our analysis showed conditions like renal disease, dementia, and COPD were far more prevalent among frequent users versus the general population. Top hospital visit reasons demonstrated poor control of these chronic illnesses.

Younger users showed differing condition patterns, indicating interventions should be tailored by age. Though most users were over 69, relationships between conditions and age require consideration in care design.

Only 10-25% remained frequent users the next year. Around 3% stayed in the cohort annually. Similar regression trends are seen elsewhere. This shifting population highlights the need for predictive, data-driven models to identify rising risk patients for early intervention.

Conclusion

In summary, data-driven prediction and prevention could improve outcomes while freeing hospital capacity. The development and implementation of such alternative clinical pathways to Emergency Care are pivotal also for freeing up hospital resources and capacity going forward.

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