Scottish Ambulance Service New Clinical Response Model

Evaluation suggests new model accurately identifies patients in greatest need through emergency 999 calls

Background

The Scottish Ambulance Service (SAS) implemented the New Clinical Response Model (NCRM) for Emergency 999 Calls in November 2016.

The NCRM aims to save more lives by more accurately identifying patients with immediately life-threatening conditions, such as cardiac arrest; and to safely and more effectively send a matched resource first time to all patients based on their clinical need.

The model institutes a new, colour-coded system which categorises 999 calls in terms of need. Cases are coded purple, red, amber, yellow, and green, where purple cases are the most urgent, with patients having a risk of cardiac arrest above 10%.

Evaluation

The New Clinical Response Model (NCRM) appears to have achieved:

- Improved 30-day survival in patients with Immediate Life Threatening (ILT) conditions (purple coded cases) (Improved by 20% in 2017 and 10% in 2018)
- Improved accuracy in identifying patients with ILT conditions (purple coded cases)
- Stable response times for those with ILT conditions (purple coded cases).

The service responded to an increase of 121% in purple coded incidents and 648% increase in amber coded calls, and an overall increase in all incidents by 9% in January 2018 compared to January 2016.

- In response to 121% increase in ILT conditions/incidents, the research noted a resulting increase of 123% in resources arriving at the scene;
- The mean time taken for the between the call and the first resources at the scene at a purple coded incident was 8.98 minutes in 2018 compared to 8.58 minutes in 2016 (mean difference -0.4 minutes) but this was not statistically significant (p=0.311).

Key findings

- The NCRM can accurately identify patients who have the greatest need for services from SAS.
- The NCRM's identification and triage of patients into triage categories, although taking time for the call handler and dispatching system, can get the ambulance and its crew to patients with the greatest need and has improved the survival of those with immediate life threatening conditions. Those with lower acuity needs are responded to, but in a longer time period as is expected when using a priority based system (but with no apparent negative impact on survival).
- These conclusions are reached in the context of analysing aggregated data over three fairly short time-periods. Further research over a longer time frame, with longitudinal data on individual cases, would improve the evidence base for the NCRM.
- The data reveals varying levels of high demand on the ambulance service. January 2018 saw over 4000 more cases when compared to January 2016, an increase of 9%.

Analysis

A quantitative analysis was conducted comparing SAS data on response to 999 calls from a pre-NCRM implementation time period (January 2016) and a post-implementation time period (January 2017 and January 2018). NHS ISD linked additional data from the Unscheduled Care Data Mart (UCDM) to the SAS data. UCDM contains emergency department data (ED) and data from the National Records of Scotland (NRS) for mortality data.

Patients with ILT conditions (purple calls) would appear to be more accurately identified post-NCRM with a noticeable increase in patients coded with ILT conditions by 2018. The time to respond to ILT conditions was slightly longer (but not statistically significant).

Speed

Resource allocation was used to indicate speed of identification. The research found that resource allocation (and in turn response times) did not differ significantly between January 2016 (pre-NCRM) and January 2017 (post-NCRM introduction) for ILT (purple) calls.

However, there was a longer time to allocate resources (i.e. identify) purple calls in 2018 compared to 2016 and this was statistically significant. For all other colour codes, 2017 and 2018 resource allocation were also significantly slower than 2016 (except amber 2017 calls).

Accuracy

Comparing 2016 (pre-NCRM) and 2017 (post-NCRM introduction) outcomes data, the research found that sensitivity (correctly identifying a purple, ILT condition) was higher in 2017 compared to 2016, but specificity (correctly identifying a non-ILT condition) was lower in 2017. Overall accuracy (the likelihood of being correctly identified as either ILT or non-ILT) was not different between the two time points. Similar results were also seen for the cardiac arrest cases within the purple calls.

Survival

The number of lives saved in patients with ILT conditions in January 2016 (pre-NCRM) was 32, and in post-NCRM in January 2017 was 134 and in January 2018 was 182.

There seems to be a considerable (circa 20%) increase in survival for all patients with ILT conditions (purple calls) comparing January 2016 to January 2017, which is constant over time from time 0 (confirmed dead when the ambulance arrives at the scene) to 30 days post-call. When comparing January 2016 to January 2018 for the same group, survival also increased (circa 10%). Continued monitoring of these data is needed to identify how survival has been impacted by the NCRM over the longer-term.

Overall survival for all non-ILT codes (Red, Amber and Yellow) remain unchanged over the three time-periods. Further research on the impact of other health and social care outcomes (e.g. patient experience; readmission rates; quality of life) for patients is required to gain a fuller understanding the impact of the NCRM over the longer-term.

About this research

Impact of the Scottish Ambulance Service's New Clinical Response Model (NCRM) for 999 calls on survival rates

30-day survival probability for patients with immediate life threatening conditions
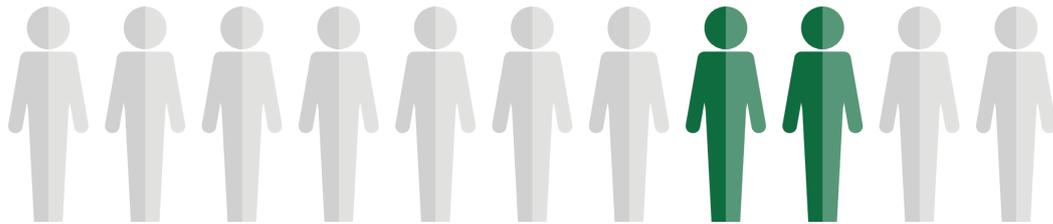
January 2016 (pre-NCRM)
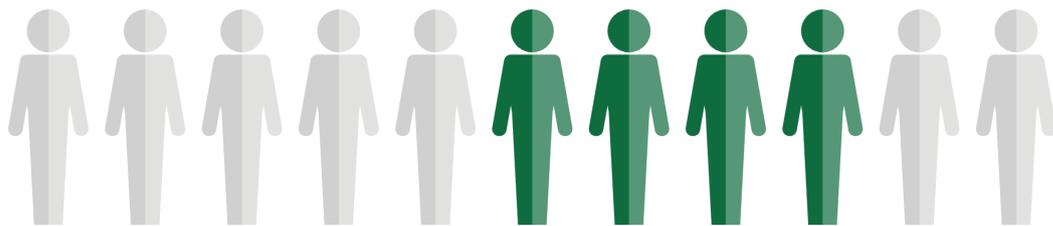
January 2017
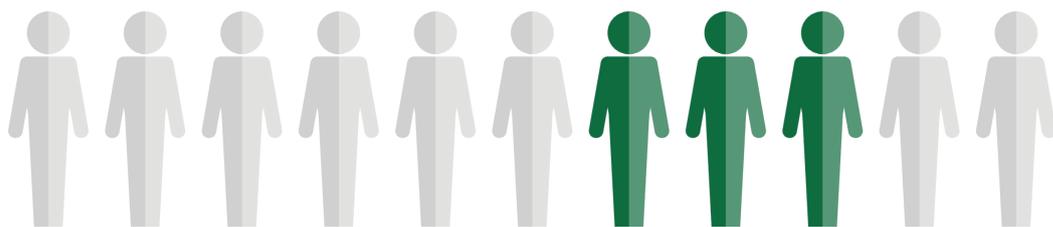
January 2018

NCRM introduced in November 2016

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