

Digitalisation of Electrocardiograms (ECGs) at Barts Health Care NHS Trust: Service development from online requesting to delivering online ECGs at four large hospitals



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METHODS

In January 2021, a trust wide one month audit was performed to look at the utilisation of the paper based ECG system. Between January 2021 and January 2022, 1 established 70 Motara ECG machines that would integrate seamlessly into the Trust's Millennium EPR, ensuring that results automatically populate patients' record. This would enable electronic capture of all ECGs performed within the trust (including inpatient, outpatient and A&E). I setup and led a team across the trust to perform training on the Motara Carts (both formal training and creating videos on the Millennium system).

RESULTS

Trend-Line of completed activity of digital ECGs at all four Barts NHS Trust sites

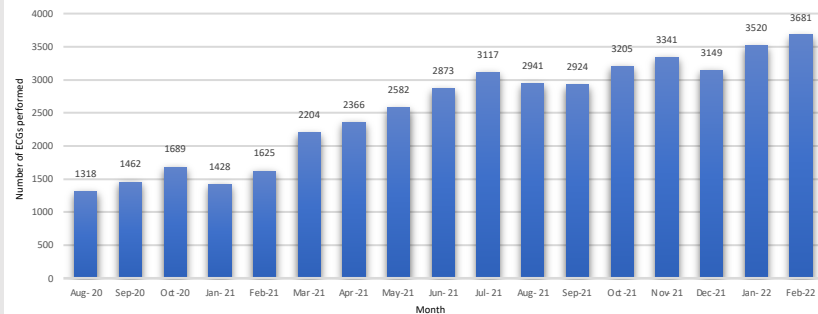


Figure 1: The graph above demonstrating the total number of Digital ECGs that have been completed every month (including Unsigned) for both inpatient, outpatient and A+E at all four Barts NHS Trust sites from August 2020 to February 2022

Flow chart and key considerations for completing the digitalisation of ECGs

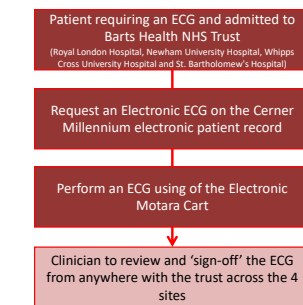


Figure 2: Flow chart of the process of digitalisation of ECGs

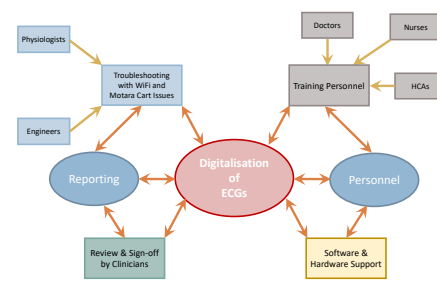


Figure 3: Key considerations

Introduction Being able to have immediate as well as remote access to a patient's electrocardiogram (ECG) in a single integrated digital record for each patient enables clinicians to initiate treatment for patients quicker, therefore improving outcomes. In addition, this improves efficiency for the team treating the patient and therefore improving patient flow and improving patient experiences. Barts Health NHS Trust performs around 48,000 ECGs every year across the four main sites (Royal London Hospital, Whipps Cross Hospital, Newham University Hospital and St. Bartholomew's Hospital). Integrating and digitalisation this process within our Cerner Millennium electronic patient record (EPR) would be the next step in the digital transformation journey, particularly during times of increased bed pressures from the COVID-19 Pandemic.

OBJECTIVES

- To assess the trust-wide utilisation of the current paper ECG system via a snapshot audit of paper ECGs performed on each ward within the 4 hospitals.
- Establish digitalisation of all ECGs performed within the trust using an integrated cardiology management system (Motara highly portable (WiFi enabled) and compact 12-lead Electrocardiograph machine) (Figure 2 and Figure 3).
- To provide training for all clinical staff (including nurses, HCPs and doctors) in requesting and performing ECGs via the Motara Cart ECG System)
- Start a process for all clinicians to review and 'sign off' electronic ECGs to improve the process of approving

Increase in digital ECG performance at the individual hospital sites within Barts NHS Trust

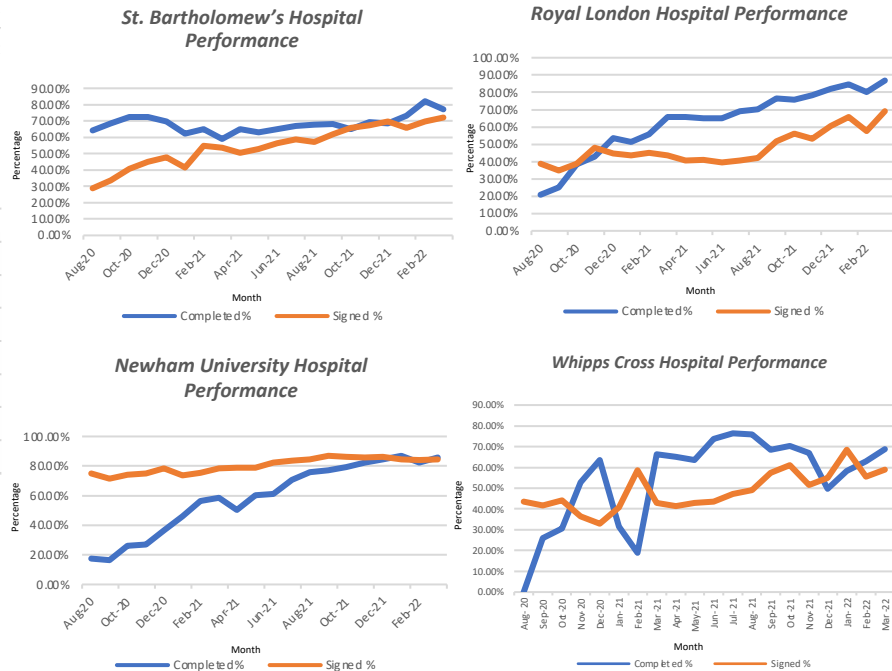


Figure 4: Breakdown of the performance of Digital ECGs that have been completed (including Unsigned) vs signed for both Inpatient Outpatient and A+E at all four Barts Trust (A) St. Bartholomew's Hospital, (B) Royal London Hospital, (C) Newham University Hospital and (D) Whipps Cross Hospital

Results. We found that 68% of ECGs were being performed on paper throughout the trust in January 2020. Through implementation of 70 Motara carts (WiFi enabled) across the 4 hospital sites there was a gradual increase in the use of electronic ECGs being performed. By the end of January 2022 after a re-audit (Figure 5), 80% of all ECGs were performed using the Motara ECG machines across the 4 hospital sites (Figure 1 & Figure 4).

There was also a gradual increase in the number of ECGs being reviewed and 'signed' by clinicians across the 4 hospital sites (Figure 4). This study has proven to result in a significant decrease in the use of paper ECGs, improved time from performing an ECG to it being reviewed and enabling remote review of ECGs across the whole of Barts Health NHS Trust and therefore improving patient flow.

CONCLUSIONS

The digitalisation of ECGs using the new workflows (and end-to-end process) have enabled staff to quickly order and performed ECGs throughout the trust. In addition, all ECGs can be reviewed immediately on any trust computer from within the EPR system. This has reduced delays in patient management as well as improved flow of patients from all areas of clinical care and also reduced the amount of paper being used enhancing our journey towards a paper-free trust.

Re-Audit at 4 sites

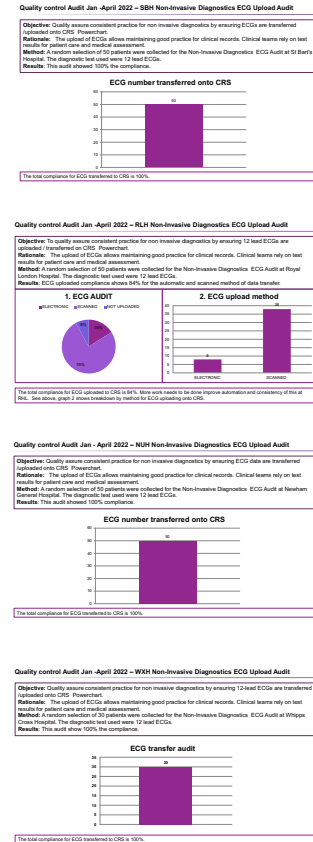


Figure 5: Re-Audit data from all four Barts Trust (A) St. Bartholomew's Hospital, (B) Royal London Hospital, (C) Newham University Hospital and (D) Whipps Cross Hospital



"Every ECG – A Digital ECG"