

# Completion of ECGs on patients admitted to four acute general adult mental health wards

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## INTRODUCTION

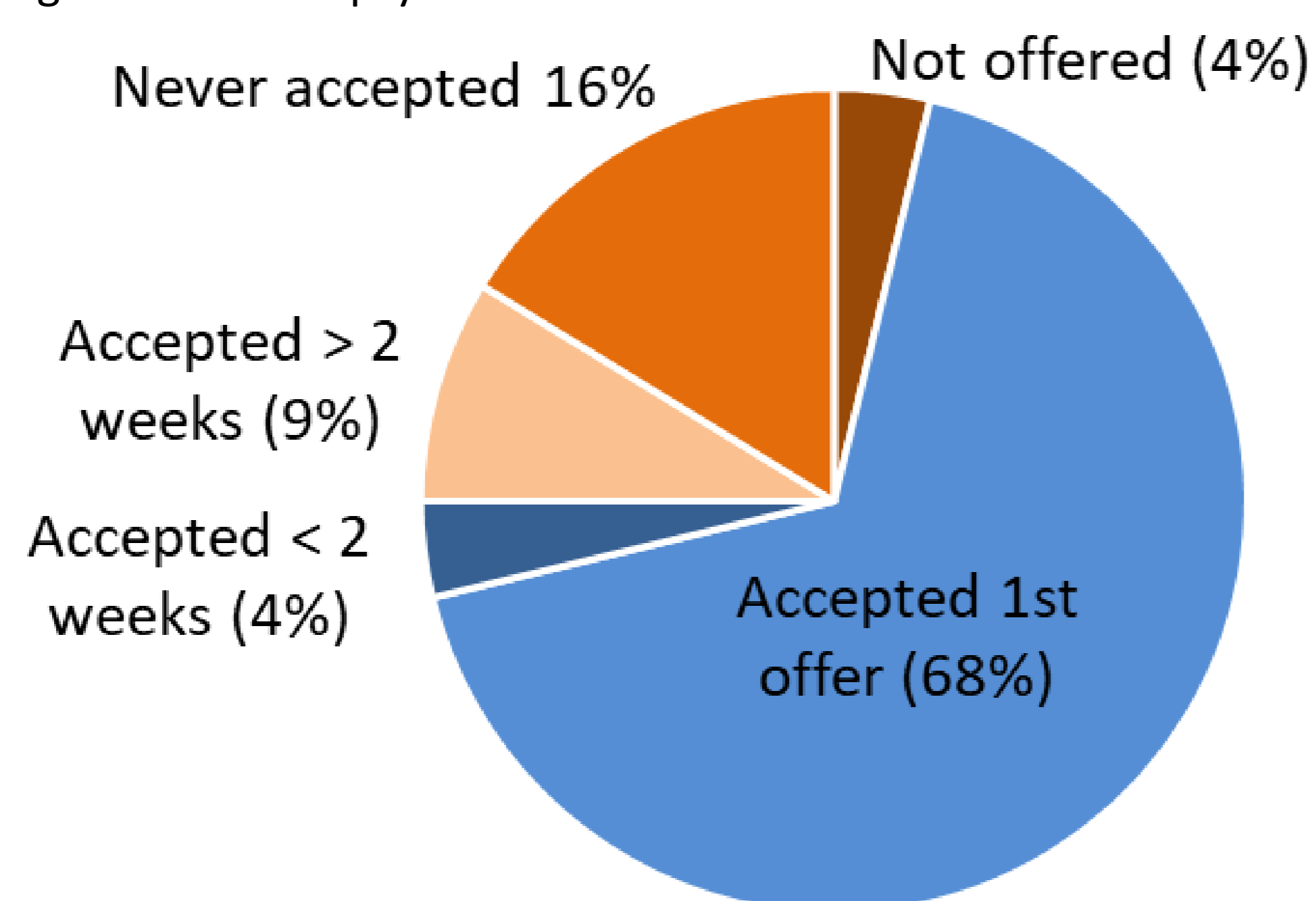
- The admission ECG is critically important, due to the increased risk of cardiovascular disease in patients with severe mental illness, and because several psychiatric medications of significant clinical value can prolong the QT interval, predisposing a patient to a cardiac arrhythmia
- This audit assessed the proportion of patients admitted to four acute general adult psychiatry wards that had an ECG offered/conducted within a range of time periods relative to their admission date
- Based on the results of this audit, we have proposed a pilot of a simple, handheld, 6-lead ECG device, for patients who persistently refuse traditional 12-lead ECGs

## METHODS

- A random sample of 80 patients admitted to four acute adult mental health wards in Nottinghamshire during 2019 (20 patients per ward) were obtained from the Trust's Health Informatics team
- Electronic patient records were reviewed to assess, for each patient, when an ECG was first offered, when an ECG was first accepted, patient age, sex, primary diagnosis, and psychotropic medications
- The RCPsych Standards for Acute Inpatient Services for Working Age Adults 6<sup>th</sup> Edition sets a standard of 100% for completion of ECGs within 24 hours, though this is not present in the current 7<sup>th</sup> Edition
- In this audit, criteria were pragmatically set as: **1. percentage of patients having been offered an ECG within 48 hours of admission (standard of 100%)** and **2. percentage of patients having an ECG conducted within 2 weeks of admission (standard of 90%)**

## RESULTS – PATIENT UPTAKE OF ECG

- As noted above, 4% of patients were not offered an ECG during their inpatient stay
- 68% were offered an ECG and accepted their first offer; a further 4% accepted within 2 weeks
- Thus, 72% of patients had an ECG conducted within 2 weeks of admission (standard was 90%)**
- 9% of patients accepted an ECG later than two weeks
- 16% of patients (i.e., 1 in 6) persistently refused an ECG throughout their inpatient stay
- Four of these patients were taking haloperidol, one zuclopenthixol, one clozapine, and four were taking other second-generation antipsychotics



## IMPROVING ECG UPTAKE IN PATIENTS ADMITTED TO ACUTE MENTAL HEALTH WARDS

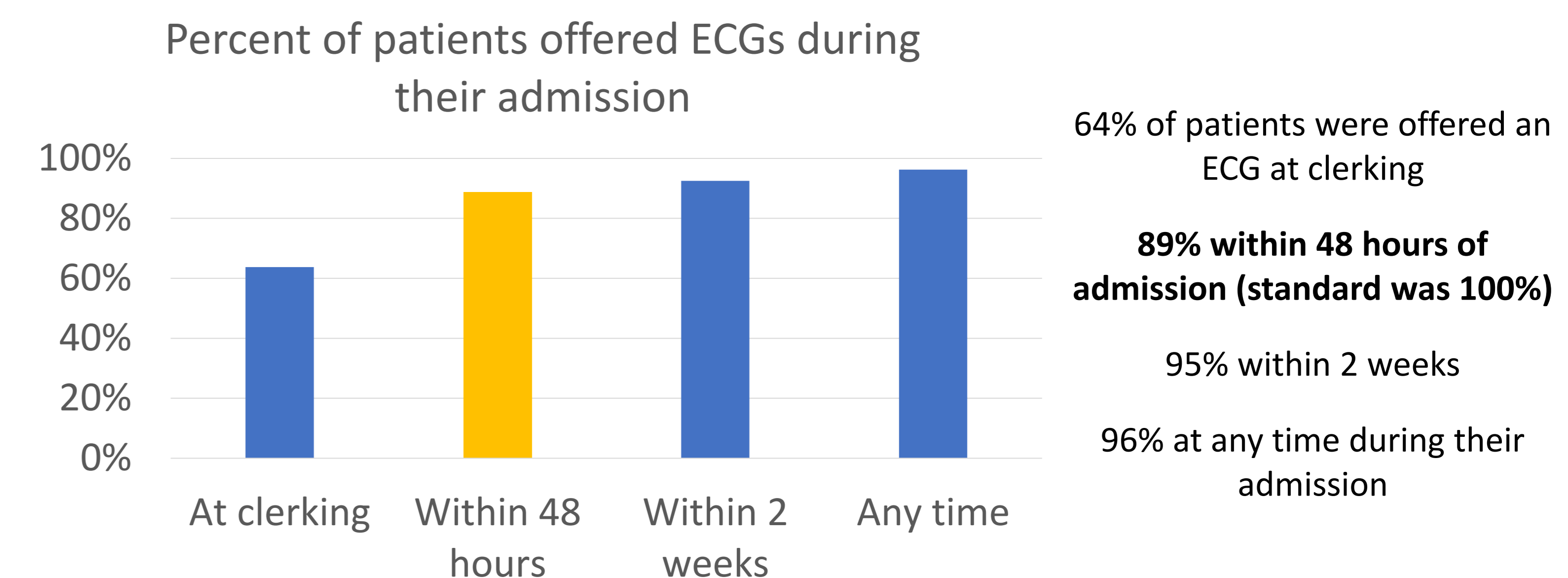
- We have produced a Standard Operating Procedure (SOP) for the delivery of handheld 6-lead ECGs using the AliveCor KardiaMobile 6L handheld ECG device for inpatients who refuse 12-lead ECGs
- The KardiaMobile 6L is a small, rectangular device with 2 electrodes on top, on which the patient places a thumb/finger of each hand, and 1 electrode on the bottom, which rests on the left knee/ankle
- The device obtains 6-lead (limb lead) recordings, which are viewed on a compatible smartphone or tablet and can be sent from/to a secure email address for printing or uploading to patient records
- From these recordings, a clinician can assess cardiac rhythm and estimate key electrical parameters such as the PR interval, QRS duration and QT/QTc interval. At present, these require manual calculation
- The device has an extensive supporting research base, FDA approval in the USA, and it was the subject of a positive NICE Medtech innovation briefing (<https://www.nice.org.uk/advice/mib35>)
- It is available on the NHS Supply Chain, having been part of an NHS Innovation Accelerator with the goal of increasing use in NHS services including GP practices and acute trusts, primarily to detect and monitor atrial fibrillation (<https://nhsaccelerator.com/alivecor-kardia-mobile-ecg>)



Above: an example tracing of lead II (generally regarded as the most important lead for calculating QT/QTc interval) recorded with the KardiaMobile 6L device

## RESULTS – SAMPLE CHARACTERISTICS AND % OF PATIENTS BEING OFFERED AN ECG

- 38 patients across two acute adult male wards and 42 patients across two acute adult female wards
- Ages ranged from 19 to 65 years, with a mean  $\pm$  SD of  $40.0 \pm 13.3$  years
- 39 patients (49%) had a diagnosis of a psychotic illness



- Reasons for patients refusing ECGs, where these were provided, included anxiety around the apparatus or procedure, not wanting to remove clothing, not wanting physical contact, as well as suspiciousness or not wanting to engage with healthcare staff
- Patients who refused an ECG for two weeks or more were more likely to have a primary diagnosis of a psychotic illness (70%) than patients who accepted an ECG within two weeks of admission (37%;  $\chi^2(1) = 6.565, p = 0.010$ ). There were no significant differences in age or sex between those who refused an ECG for two weeks or more and those that accepted an ECG within two weeks

## DISCUSSION

- 89% of patients were offered an ECG within 48 hours of admission, below the standard of 100%. Reasons for this need to be explored. However, reasons for not offering ECGs at clerking were available in many cases. These included: patient agitation, aggression, suspiciousness of staff, patient sleeping or wanting to rest (1/3 of admissions to these wards occur between 9pm-6am)
- The vast majority of patients (96%) were offered an ECG at some point during their admission
- Despite this, 1 in 6 patients refused an ECG throughout their inpatient stay
- In total, 1 in 4 patients refused an ECG for at least two weeks
- Reasons for refusal were understandable in the context of a patient's illness & reasons for admission
- There is currently no alternative way to obtain information on important cardiac conduction parameters, particularly QT interval, for patients who refuse 12-lead ECGs

- As part of a pilot, doctors working on the wards that were the subject of this audit are able to offer handheld 6-lead ECGs to patients who refuse traditional 12-lead ECGs
- So far, 10 patients have been offered 6-lead ECGs and 7 of these have accepted; for 6 patients a good quality recording was obtained (due to agitation, one patient was unable to hold the device still for long enough on their ankle and declined to try a different position)
- Recordings took a mean of 10 minutes to conduct, and clinicians rated the process as very easy in 5/6 cases and somewhat easy in the remaining case
- Three patients who had experienced a 12-lead ECG previously strongly preferred the handheld ECG, 5/6 patients would definitely recommend the device to others

## NEXT STEPS

Whilst a 6-lead handheld ECG does not provide the full range of information in a 12-lead ECG, it is able to record valuable information around cardiac conduction and electrical intervals

At present, limiting more general use is the need for manual calculation of electrical intervals (the SOP includes a widely accepted means of calculating these manually)

We continue to gather pilot data on clinician usability & patient acceptability for patients that refuse 12-lead ECGs (and thus for whom there is currently no alternative means of obtaining an ECG)

We plan to re-audit ECG completion on the targeted wards to examine whether availability of this option for patients who refuse 12-lead ECGs improves ECG completion rates