



NHS

Leeds and York Partnership
NHS Foundation Trust

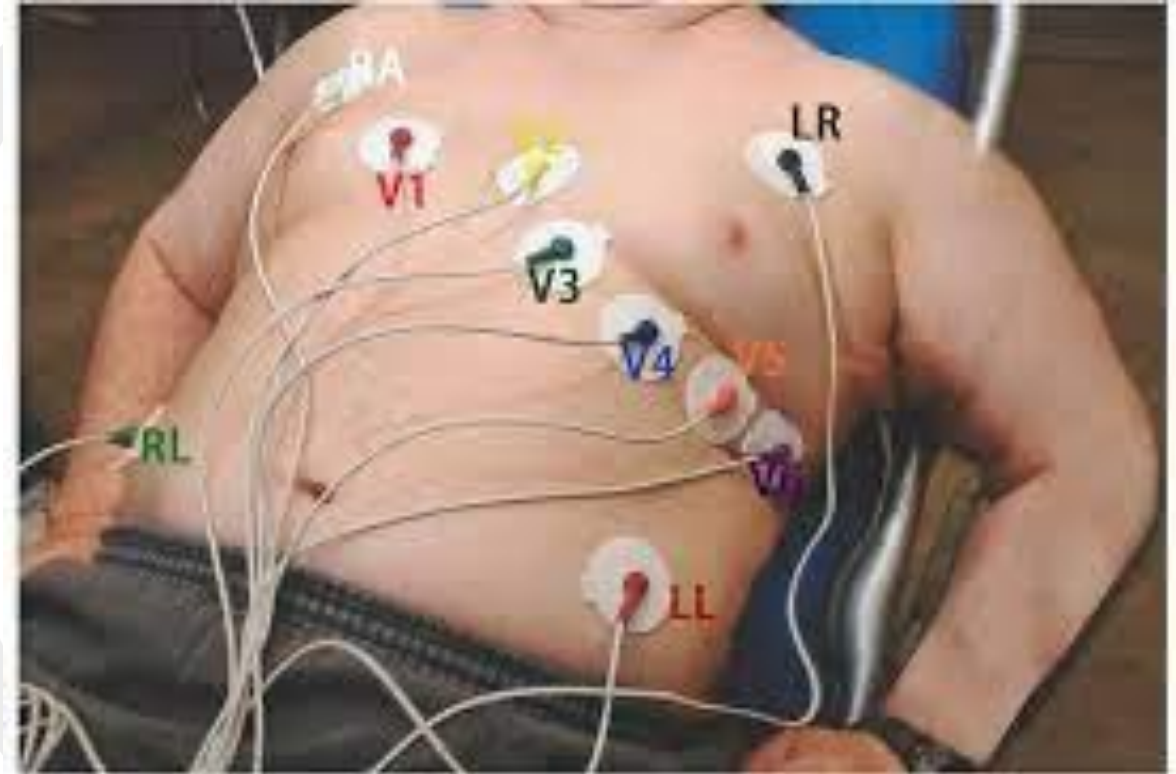
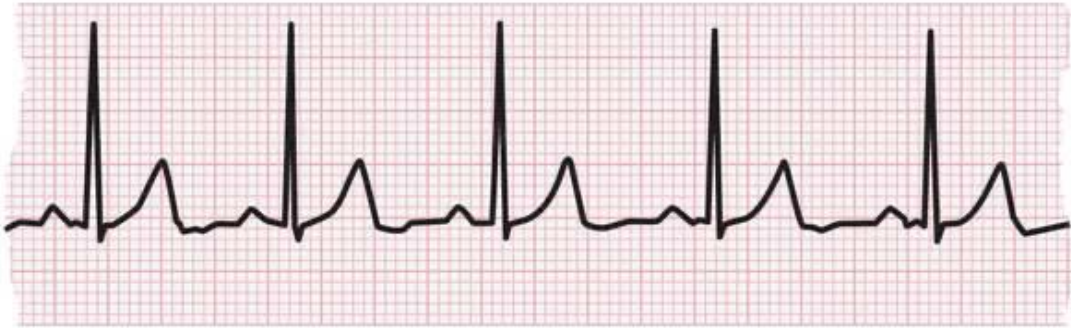
6 lead ECG Machines in Psychiatry

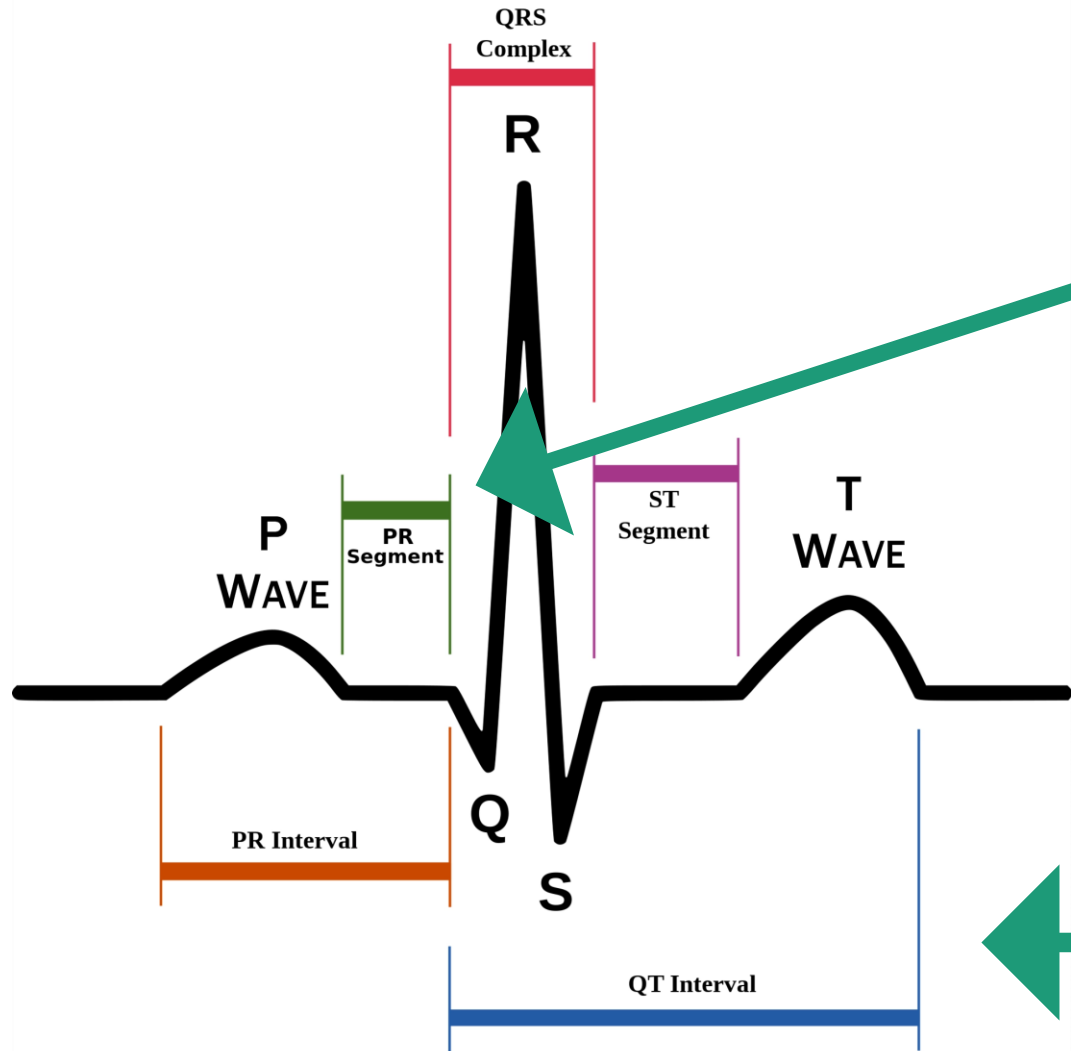
The good, the bad and the unreadable

Actively shaping the future of Mental Health Care



What is an ECG and why are psychiatrists interested in them?





Acetylcholinesterase inhibitors

Antipsychotics*



Where do we do ECGs?

- Inpatient wards.
- Outpatient clinics.
- Memory clinics.



So what's the problem?

- Service users don't like them.
- Psychiatrists don't like doing or interpreting them.
- Impractical.
- Expensive.

Prove it



Inpatient ECG Audit

- 7 trusts, 25 wards, 529 patients.
- 63% got and ECG in 24hours.
- 18% never got an ECG.
- Numbers lower in those taking antipsychotics.

Correspondence

The future of ECG monitoring – can psychiatry take the ‘lead’?


Electrocardiogram (ECG) monitoring is an essential part of safe prescribing in psychiatry, especially when a patient is admitted to an acute in-patient ward in England. Any psychiatrist who has worked on such a ward will appreciate the challenges that come with completing this ‘simple’ investigation.

Despite it being almost 100 years since Willem Einthoven was awarded the Nobel prize ‘for the discovery of the mechanism of the electrocardiogram’ and almost 70 years since the American Heart Association published their recommendation for standardisation of 12-lead electrocardiogram, there have been few recent practical changes in the way ECGs are obtained in UK clinical practice.

Although 12-lead ECG machines have become smaller and more advanced, patients are still required to expose their chests; allow for all ten physical leads to be attached, often using uncomfortable or irritating stickers and clips; and lie still for several seconds while a reading is taken.

We recently completed a regional service evaluation across Yorkshire and the Humber examining ECG compliance on adult, older adult and forensic wards. Our data, gathered

Improving compliance with ECG monitoring, particularly those prescribed pro-arrhythmic drugs, is a patient safety priority. Educating patients and mental health professionals about the need for ECGs is important, but reducing the intrusiveness and increasing the accessibility of ECG monitoring is called for. Technological advancements are being embraced in other areas of psychiatric practice; why not extend this to ECG monitoring? The advent of handheld ECG machines could be a solution to ensure all patients receive high-quality safe healthcare. These devices are yet to be approved in the UK for measuring QTc, but early validation work seems positive.

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Eimear Devlin, ST4 Older Adults Psychiatry, Leeds and York Partnership NHS Foundation Trust, UK

Declaration of interest

None

References



Qualitative analysis of results demonstrated that the most common reasons for not having an ECG completed were 'patient-related factors'. Where a specific reason was given, the most common were 'aggressive, agitated, anxious, paranoid' (159 of 257; 62%). ECGs can appear threatening and intrusive; clothes on the upper body need to be removed, body hair may need to be shaved and the chest leads can look frightening. When someone is already distressed, this fear is likely to be exaggerated. Anxiety, past physical and sexual abuse, or gender identity concerns may further exacerbate this.



What about memory clinics?

- Survey.
- 305 memory clinic workers.
- Nationwide.

Cardiac monitoring in memory clinics: national survey of UK practice

George Crowther,^{1,2}  Noura Ahmed,³  Deepa Kasa,¹ Zoe Goff,¹  Muzahir H. Tayebjee³

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¹Leeds and York Partnership NHS Foundation Trust, UK; ²University of Leeds, UK; ³Leeds Teaching Hospitals NHS Trust, UK

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Aims and method People diagnosed with dementia are often started on acetylcholinesterase inhibitors (AChEIs). As AChEIs can be associated with cardiac side-effects, an electrocardiogram (ECG) is sometimes requested before treatment. Previous work has suggested there is little consensus as to when or how ECGs should be obtained. This can create inconsistent practice, with patient safety, economic and practical repercussions. We surveyed 305 UK memory clinic practitioners about prescribing practice.

Results More than 84% of respondents completed a pulse and cardiac history before prescribing AChEIs. Opinion was divided as to who should fund and conduct ECGs. It was believed that obtaining an ECG causes patients inconvenience and delays treatment. Despite regularly interpreting ECGs, 76% of respondents did not update this clinical skill regularly.

ORIGINAL PAPER

• 96% did ECGs. Cardiac monitoring in memory clinics: national survey of UK practice

George Crowther,^{1,2} Noura Ahmed,³ Deepa Kasa,¹ Zoe Goff,¹ Muzahir H. Tayebjee³

• 33% did ECGs on everyone.

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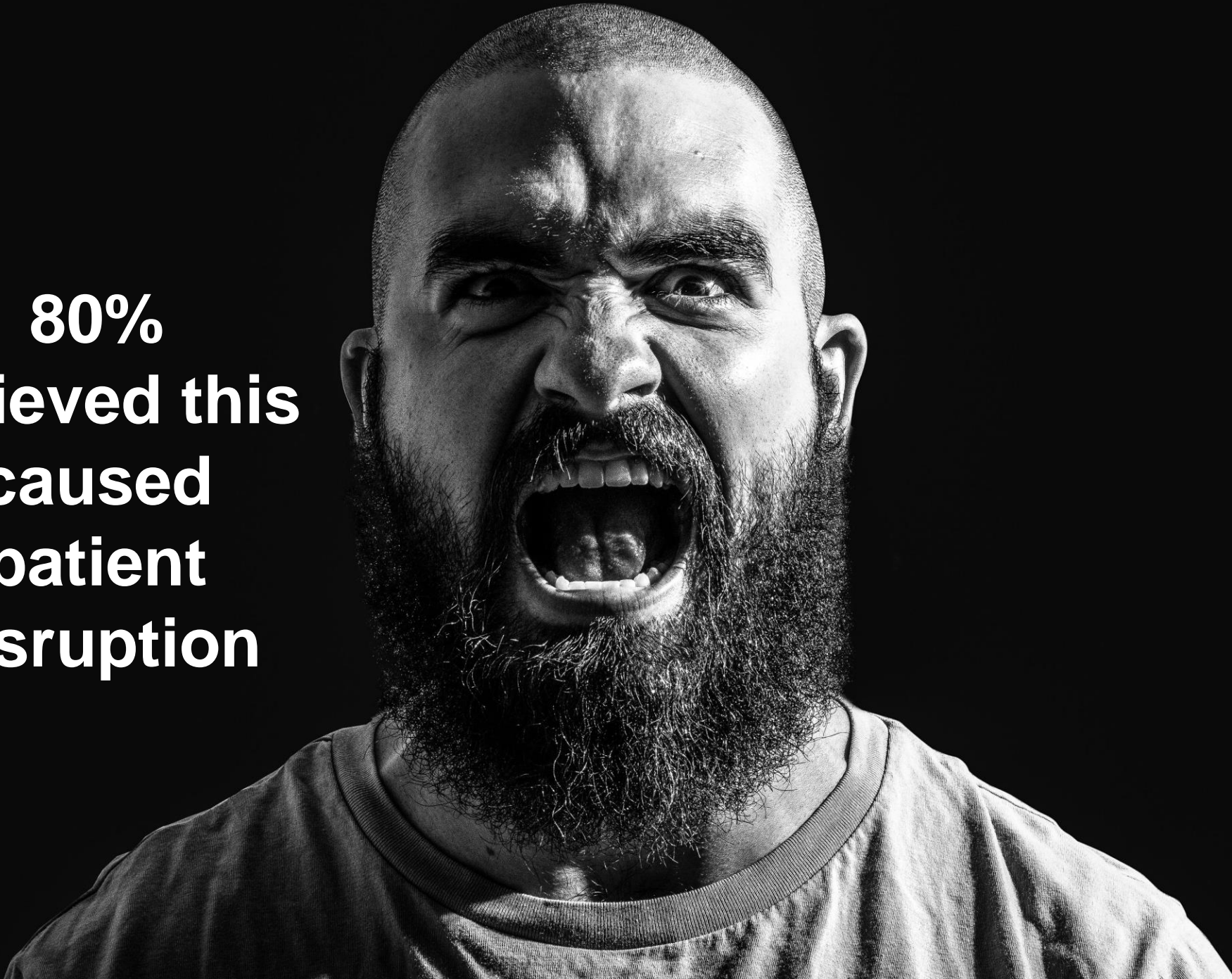
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• <25% had facilities to do ECGs themselves or funded the ECGs

84% of respondents who conducted ECGs believed obtaining the test caused treatment delays.

**80%
believed this
caused
patient
disruption**



Extra appointments

GP/Hospital: 61%
Memory clinic: 34%





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Prove it



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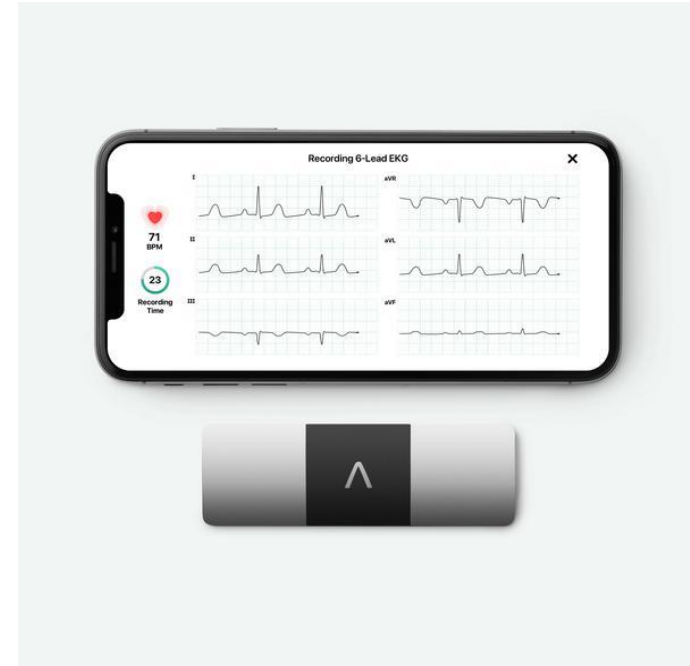
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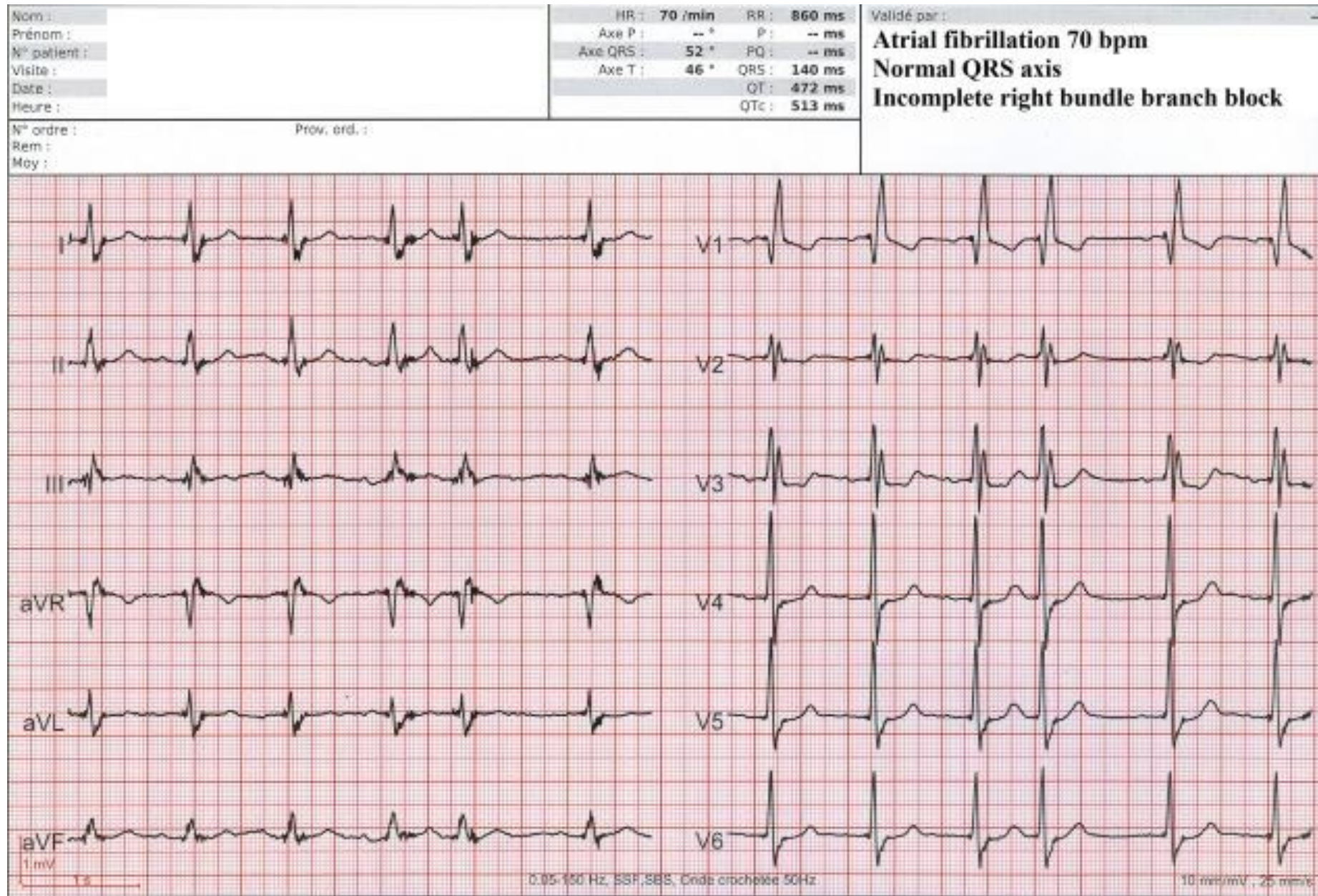


What is the solution?

Handheld ECG
(KardiaMobile)



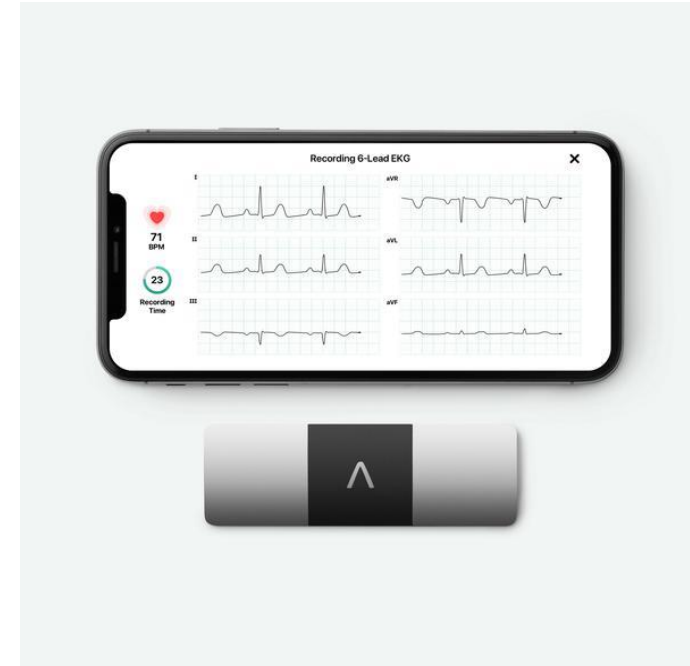
Courtesy of AliveCor





Does it measure QTc (and PR) as accurately as a 12 lead device?

Handheld ECG (KardiaMobile)



Courtesy of AliveCor



Study design

**New Technology vs
Gold standard**

Target population

Sensitivity

Specificity

False Positive

False Negatives



Numbers and setting

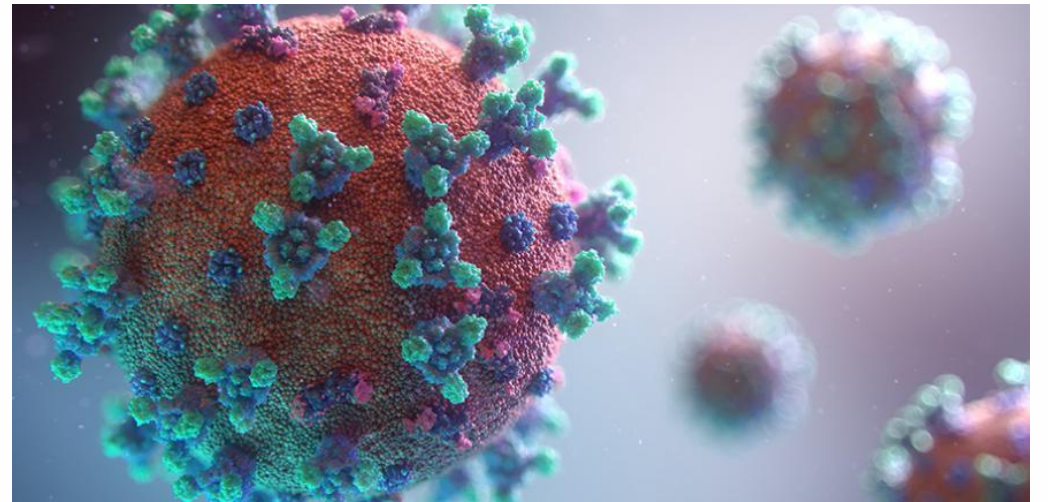
**20ms acceptable
difference**

500 patients.

**Inpatients and
outpatients**



Numbers and setting





Numbers and setting





Results

1015 Cardiology Patients

**Strong correlations between QT
and QTc**

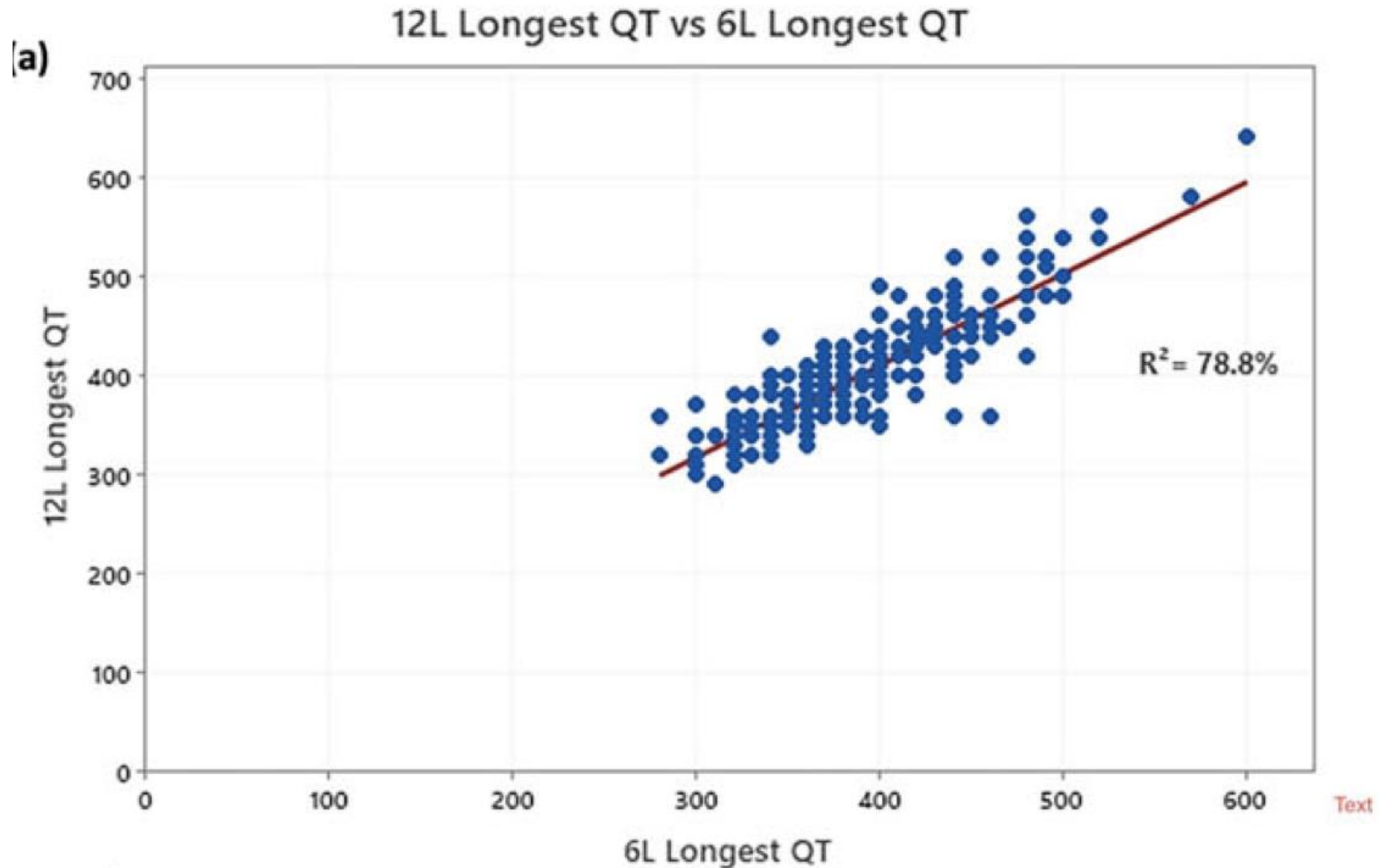
AUC >0.8

Clinical validation and evaluation of a novel six-lead handheld electrocardiogram recorder compared to the 12-lead electrocardiogram in unselected cardiology patients (EVALECG Cardio)

Mohammad Azram¹, Noura Ahmed^{1,2}, Lucy Leese¹, Matthew Brigham¹, Robert Bowes¹, Stephen B. Wheatcroft^{1,2}, Marcus Ngantcha³, Berthold Stegemann⁴, George Crowther⁵, and Muzahir H. Tayebjee  ^{1,2*}

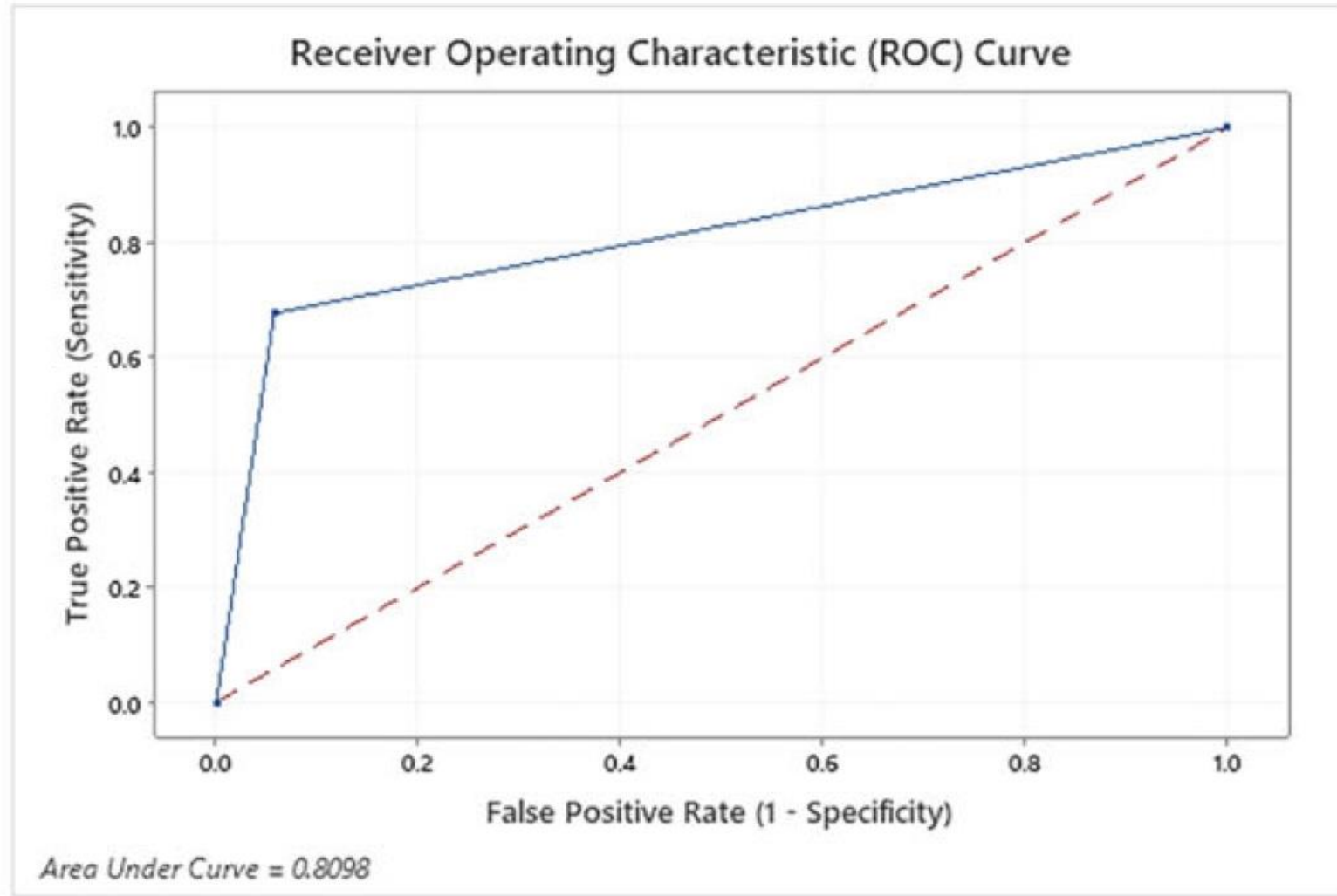


Linear Regression





ROC Curve





But what about our
patients in psychiatry?

- Recruited 178
- ROC, AUC > 0.8
- But....
- Low numbers.
- Few outliers.





But what about our
patients in psychiatry?

- Recruited 178
- ROC, AUC > 0.8
- But....
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- Few outliers.

**When analysed by
a cardiologist**



Re-analysis

- Psychometric properties in the hands of a psychiatrist.
- Interrater reliability.
- Intradisciplinary reliability.



**What has been
going on
elsewhere?**

**NHS X –
purchasing
devices**

**TEWV investing
in >100 devices**

**Approved in the
USA, FDA**



**Still no one has
answered the
question... is it
safe in the
hands of a
psychiatrist?**



Study design

- Online Test.
- Free lecture afterwards.
- 10 ECGs; 5 6l, 5 12L
- 1 minute each.
- All attendees were prescribers.

- Normal Sinus Rhythm – Good quality
- Normal Sinus Rhythm - poor quality.
- Atrial Fibrillation.
- Long QTc.
- Complete heart block.



Questions?

- Confidence in interpretation.
- Training updates?

- ECG quality?
- Normal or not?
- Diagnosis?
- Would you prescribe an antipsychotic?
- Would you prescribe and acetylcholinesterase inhibitor?

EDUCATION AND TRAINING

What training should psychiatrists have to interpret six- and 12-lead electrocardiograms?

George Crowther,^{1,2}  Mani S. Krishnan,³ Jonathan Richardson,⁴ Robert Bowes,⁵ Andrew Fitzpatrick,⁵ Muzahir H. Tayebjee⁵

BJPsych Bulletin (2023) Page 1 of 5, doi:10.1192/bjb.2022.87

¹Leeds and York Partnership NHS Foundation Trust, UK; ²University of Leeds, UK; ³Tees, Esk and Wear NHS Foundation Trust, UK; ⁴Tyne and Wear NHS Foundation Trust, UK; ⁵Leeds General Infirmary, UK

Correspondence to George Crowther (Hssgcr@leeds.ac.uk)

To monitor for drug-related cardiac arrhythmias, psychiatrists regularly perform and interpret 12-lead (12L) and, increasingly often, six-lead (6L) electrocardiograms (ECGs). It is not known how training on this complex skill is updated or how well psychiatrists can interpret relevant arrhythmias on either device.

We conducted an online survey and ECG interpretation test of cardiac rhythms relevant to psychiatrists.

A total of 183 prescribers took part; 75% did not regularly update their ECG

EDUCATION AND TRAINING

- **163 people from 27 trusts.**
- **48% felt underconfident interpreting ECGs.**

What training should psychiatrists have to interpret six- and 12-lead electrocardiograms?

George Crowther,^{1,2} Mani S. Krishnan,³ Jonathan Richardson,⁴ Robert Bowes,⁵ Andrew Fitzpatrick,⁵ Muzahir H. Tayebjee⁵

- **75% did not update ECG training.**

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Normal ECGs

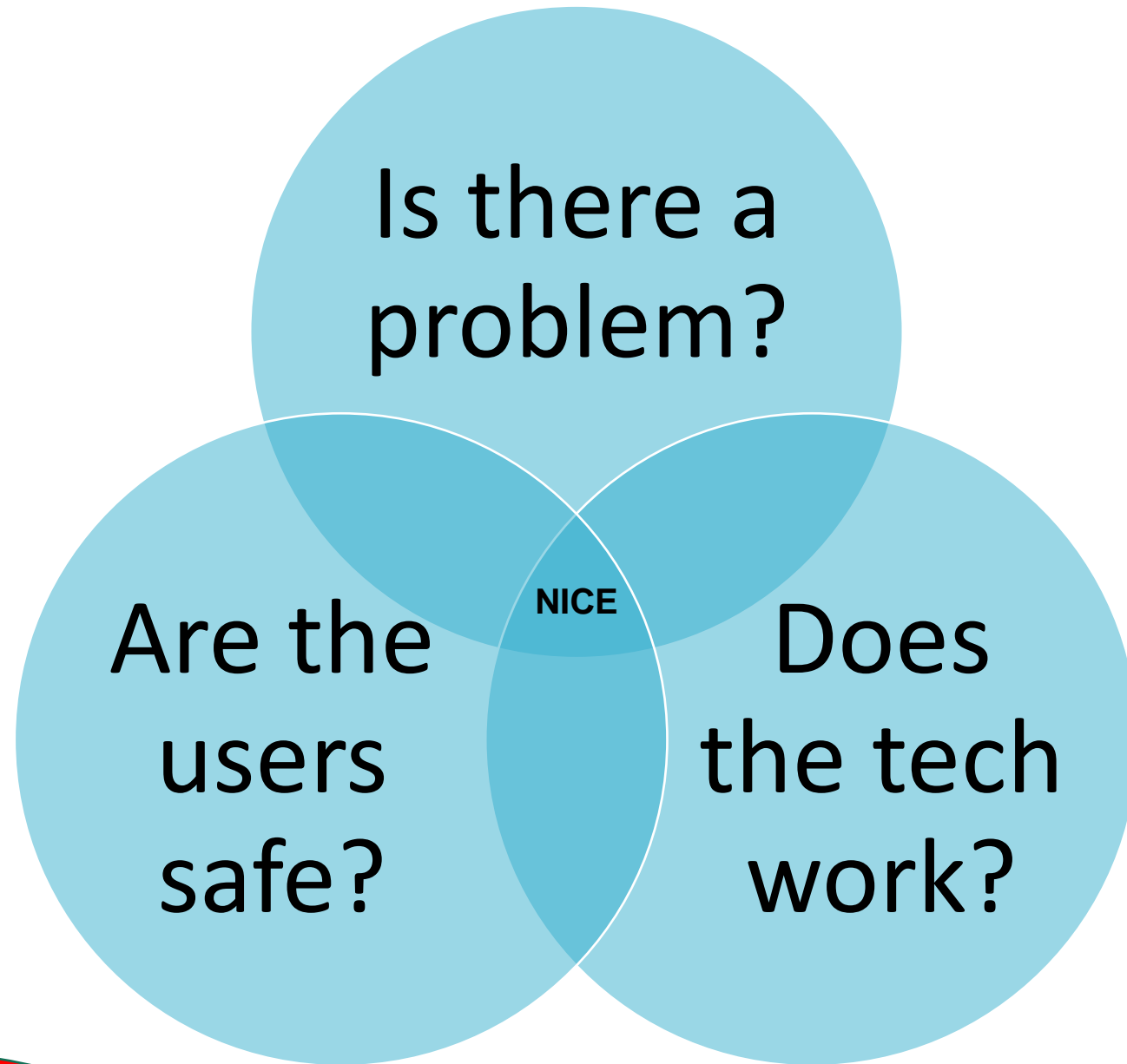
- **Good quality : 81% (6L) and 63% (12L) recognised normal sinus rhythm.**
- **Poor quality: 11% (12L) and 15% (6L) identified that the traces were normal.**
- **Resulting impact on prescribing decisions:**
 - 92% (12L) and 62% (6L) of respondents withheld antipsychotics.
 - 91% (12L) and 61% (6L) withheld AChIs.



Abnormal ECGs

Diagnostic accuracy was low with both 6L and 12L traces.

- 85% (12L) and 88% (6L) of respondents incorrectly withheld antipsychotics in the presence of atrial fibrillation.
- 15% (12L) and 17% (6L) prescribed antipsychotics in the presence of QTc >540.
- 7% (12L) and 13% (6L) prescribed AChEIs in cases of complete heart block.





KardiaMobile 6L for measuring QT interval in people having antipsychotic medication

- Clear potential benefits.
- Economic benefits.
- Potential risks – over diagnosing.
- Need more evidence in a population with mental illness.
- Need more evidence in the hands of a psychiatrist.



So what's next?

- Re analysis and publish.
- Collaborate – industry and trusts.
- Grant funding.



Thank you.

