Participant Information Sheet
(Fibricheck monitoring Group)

1. Study title

This is a research project to study the screening methods for detecting the most common heart rhythm disturbance called Atrial Fibrillation (AF).

The formal scientific title of the study is 'Application of machine learning algorithm to identify patients at highest risk of atrial fibrillation for targeted screening (AMLA-AF)'.

2. Invitation Paragraph

You are being invited to take part in a research study.

Before you decide if you want to take part in this study, it is important for you to understand why the research is being done and what it will involve.

Please take the time to read all of the information carefully. Ask a member of the research team if there is anything that is not clear or if you would like more information.

Take as much time as you need to decide whether or not you wish to take part.

If you agree to take part, you will be asked to fill out, sign and date a consent form and keep a copy with this information sheet, as a useful reference on the study and contact details.

Thank you for reading this information.

3. What is the purpose of the study?

Atrial fibrillation (AF) is the most common heart rhythm condition. Early treatment is important to prevent possible future complications of this heart rhythm such as strokes. We hope this study will allow us to detect AF earlier in people. Many people with AF do not have any symptoms so it can be difficult to pick up this condition.

The first aim is to test a machine learning algorithm designed to select people who may be at high risk of developing AF.

The second aim is to compare the use of different health technologies to detect AF.

To achieve these aims, we need you to:

1) Have a heart tracing recording called an electrocardiogram (ECG) using a smartphone and a device with two metal pads (AliveCor device), which we will provide.
2) If the ECG is normal, we will require you to have further heart rhythm monitoring using a smartphone application. We will provide you with a Fibricheck code to activate upon downloading the Fibricheck App on your own smartphone. With the App, you can take heart rhythm recordings at home using your smartphone. You will need to take twice daily recordings for 3 months.

4. Why have I been invited?

Your general practice has agreed to be involved in this study. They have run our machine learning algorithm through all their patient medical records. They have found that you may

be at risk of developing AF based on the algorithm.

We would like to see how accurate this algorithm is by monitoring your heart rhythm.

5. What are the conditions of taking part?

Similar to all scientific studies, our study has certain criteria that participants need to fulfil to take part.

To participate in this study, you need to:

- Be aged eighteen (18) or above
- Access to a smartphone or device

6. Do I have to take part?

It is completely up to you if you want to take part in the study or not.

If you decide to take part you are still free to stop participating in the study and withdraw at any time. In this case, your doctor may ask you why you want to withdraw but you do not have to give a reason. If you decide to withdraw during the study, the care that you receive will not be affected in any way.

If you agree to participate in the study, your GP will be informed that you agreed to take part.

7. What are possible benefits of taking part?

It is likely that there will be no direct benefit to you by taking part in this study. However, it is possible that this study could allow earlier detection of a heart rhythm problem (such as AF) if present at the time of monitoring and therefore, earlier treatment for this.

If you wish to take part in this study, you will be helping us to learn more about how to identify those at risk of developing AF.

8. What do I have to do?

You will be provided with a participant information sheet and have the opportunity to communicate with the research team.

You must be willing to be contacted by the research team to have different forms of rhythm monitoring.

We will also need your consent to access your paper and electronic medical records. We also may need information from your GP. This will be looked at by responsible individuals at your general practice, Chelsea and Westminster Hospital NHS Foundation Trust and other regulatory authorities where it is relevant to your taking part in this research.

You will continue to receive care from your GP as usual.

We can reimburse travel expenses as required.

9. What will happen to me if I take part?

Please read this section carefully for a step-by-step explanation of the study.

1) <u>Study information</u>
   You will be given full written and verbal information about the study at your meeting with the doctor, nurse or other qualified specialist.
   If you agree to take part in the study, you will be given a study identification (ID) code

and you will be asked to provide signed, written informed consent to take part in all of the study parts.
You will be asked to provide contact details and how you would like to be contacted.

2) Single-lead ECG
You will be invited for a first visit to have a 30 second heart tracing recording called an ECG (single- lead ECG). A smart device and an AliveCor device will be provided to you to take the recording. You will be asked to place two or more fingers on the metal pads of the AliveCor device. If AF is identified, you will be asked to arrange appointment with your GP for further management of your AF. We will not require any further monitoring.

Figure 1: Single lead ECG Recording

3) Photoplethysmography (PPG) recording using Fibricheck
If your first single- lead ECG shows no AF, we will invite you for further monitoring. You will be given a Fibricheck app to use on your own smartphone. We have included previous studies that have validated the App at the end of this information sheet which you may interested in reading about. We will provide you with a QR code to scan on your smartphone for the prescription of 3- month monitoring period. You will need to download the Fibricheck App on your own smartphone from the App store. You will then need to scan the QR code with the Fibricheck App. You will then be able to start making recordings by placing your finger on the camera light of your smartphone for 1 minute. Figure 2 demonstrates how to set the Fibricheck App on a smartphone and Figure 3 shows how to take a recording with the App. Our research team will train and show you how to set up the App. We will also show you how to make a recording. You will not be required to pay any fees or additional subscriptions to Fibricheck in order to use the App. Please ignore if any subscription options are provided.

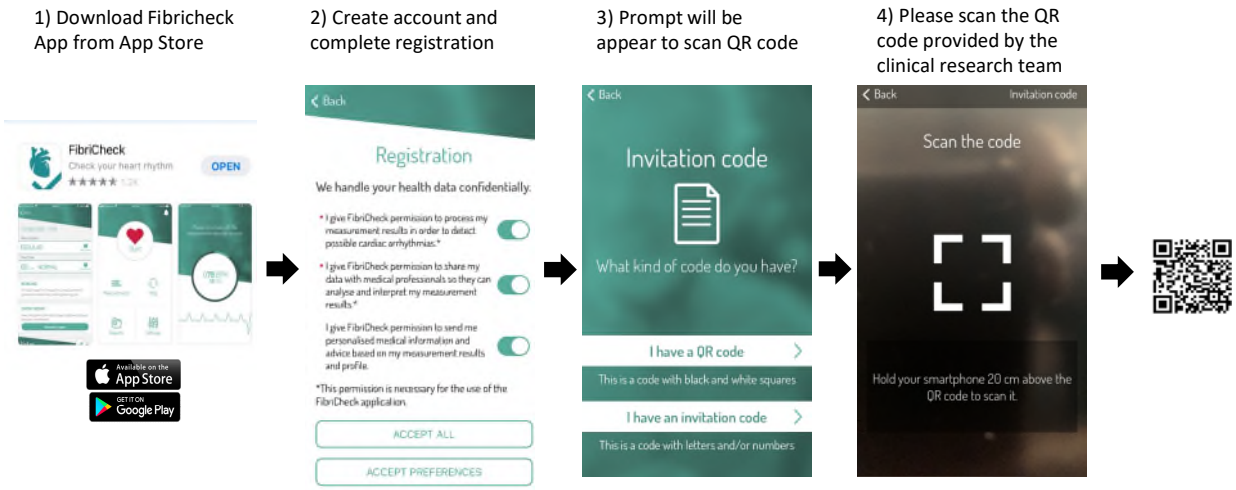

Figure 2: How to set up Fibricheck App on smartphone

Entering their pincode | *Clicking on the heart to start measurement* | *Placing their finger on the camera, measurement starts automatically* | *Annotating their symptoms* | *Real-time (limited) results*

Figure 3: How to take a recording using the Fibricheck App

The App uses your camera light to look at the pulse pressure signals from blood pressure pulses travelling along your arterial blood vessels which is called photoplethysmography. By doing this, it can pick up if there is an irregular pulse.
Once the 3-month monitoring period has completed, you will no longer be able to make any further recordings. If you would like to continue using the App after this period, you will have to pay a subscription.

4) <u>Irregular pulse recording</u>
The Fibricheck company will make the research team aware of any irregular pulse results on a daily basis. The results can also be reviewed by the research team at any time through the secure cloud server.

If an irregular pulse is identified, you will be invited to come into West Middlesex

University Hospital to have a single-lead ECG, standard 12-lead ECG or 24hr ECG monitor to look for AF. If AF is identified from this, we will refer you to your general practice or ambulatory emergency care to consider if you are suitable to start a blood thinner (anticoagulation) to prevent future strokes.

If an irregular pulse notification appears following a recording, you will be invited for a single-lead ECG, standard 12-lead ECG or 24-hr ECG monitor to look for AF.

Figure 2: PPG recording

10. What are the risks and side effects of taking part?

We anticipate there are no significant risks or chances of experiencing any side effects.

11. What happens when the research stops?

Throughout and after the study, you will continue to receive care from your GP and other healthcare professionals responsible for your care.

If you withdraw from the study before the end of the monitoring period, or lose your ability to give consent during the study, you will be withdrawn from the study.

If you lose your ability to consent for monitoring or withdraw from the study for whatever reason, the data that has already been collected will be used for analysis.
No personal information will be used in analysis.

12. What if new information becomes available?

Sometimes during the research study, new information becomes available which affects the study. If this occurs, we will inform you and discuss with you whether you wish to continue with the study. If you decide to withdraw from the study, your anonymised data that has already been collected will be used for analysis but no more data will be collected from that point in time. If you decide to continue with the study, you will be asked to sign an updated consent form. Also, on receiving new information, your research team may consider it to be in your best interest to withdraw you from the study. You research team will explain the reasons if this occurs.

If during the course of the study, for whatever circumstances, you are no longer able to provide consent to continue taking part in the study, your ongoing participation in the study will cease immediately from that point in time. Any identifiable data already collected with your consent would be retained and used in the study. However, no further data would be collected or any other research procedures carried out on you thereafter.

You will continue to receive the normal standard clinical care during your participation in this study and also after.

13. What if something goes wrong?

It is very unlikely that you will come to any significant harm if you choose to take part in this study.

If you are harmed due to someone's negligence, then you may have grounds for legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator (Dr Sadia Khan). The normal National Health Service mechanisms are also available to you.

If you are still not satisfied with the response, you may contact the West Middlesex University Hospital PALS team, Tel: 020 8321 6261; email: wmpals@chelwest.nhs.uk.

14. What will happen to the results of the research study?

The results of this research will be offered for publication in recognised medical journals but you will not be identified in any report or publication. We will be able to let you know about the results at the end of the study.

15. Who is organising and funding the research?

The study is being organised by the members of the research team who are paid by Chelsea and Westminster Hospital NHS Foundation Trust. The study is part of an educational study and therefore the research data may be used as part of an educational project.

The study is funded by CW+ Charity (Chelsea and Westminster Hospital NHS Foundation Trust) and Bristol Myers Squibb Pharmaceuticals Ltd.

16. Who has reviewed this study?

The London- Bloomsbury Research Ethics Committee have reviewed and approved the study.

17. Data protection and patient confidentiality: GDPR transparency and legal statements

Chelsea and Westminster Hospital NHS Foundation Trust is the sponsor for this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Chelsea and Westminster Hospital NHS Foundation Trust will keep your personal data for:

- 10 years after the study has finishes in relation to data subject consent forms.
- 10 years after the study has completed n relation to primary research data.

We will need to use information from you and your medical records for this research project. This information will include your name, age and contact details. People will use this information to do the research or to check your records to make sure the research is being done properly. People who do not need know who you are will not be able to see your name or contact details. Your data will have a code number instead. We will keep all information about you safe and secure.

Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

LEGAL BASIS

We use personally identifiable information to conduct research to improve health, care and services. As a publicly- funded organisation, we have to ensure that it is in the public interest when we use personally -identifiable information from people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use

your data in ways needed to conduct and analyse the research study.
Health and care research should serve the public interest, which means that we demonstrate that our research serves the interests of society. We do this by following UK Policy Framework for Health and Social Care Research.

SHARING YOUR INFORMATION WITH OTHERS:
For the purposes referred to in this privacy notice and relying on the bases for processing as set out above, we will share your personal data with certain third parties.
Other Trust employees, agents, contactors and service providers (for example suppliers of printing and mailing services, email communication services or web services, or suppliers who help us carry out any of the activities describes above.) Our third-party service providers are required to enter into data processing agreements with us. We only permit them to process your personal data for specified purposes and in accordance with our policies.

WHAT ARE YOUR CHOICES ABOUT HOW YOUR INFORMATION IS USED?
You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have.
We need to manage your records in specific ways for the research to be reliable. This means that we won't be able to let you see or change the data we hold about you.
If you agree to take part in this study, you will have the option to take part in future research using your data saved from this study.

WHERE CAN YOU FIND OUT MORE ABOUT HOW YOUR INFORMATION IS USED
You can find out more about how we use your information at www.hra.nhs.uk/information-about-patients/ or by contacting is from the details provided.

COMPLAINT
If you wish to raise a complaint on how we have handled your personal data, please contact Chelsea and Westminster NHS Foundation Trust's Data Protection Officer via email at DPO.Chelwest@nhs.net. via telephone 020 3315 3428.

If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful you can complain to the Information Commissioner's Office (ICO).

The ICO does recommend that you see to resolve matters with the data controller (us) first before involving the regulator.

18. Previous studies validating the use of the Fibricheck App

We have included a few studies below that have validated the use of this App. You can also review further studies at the following website: https://www.fibricheck.com/clinical-studies/

A) *Proesmans T et al. Mobile Phone–Based Use of the Photoplethysmography Technique to Detect Atrial Fibrillation in Primary Care: Diagnostic Accuracy Study of the FibriCheck App. JMIR, 2019*.

Background: Mobile phone apps using photoplethysmography (PPG) technology through their built-in camera are becoming an attractive alternative for atrial fibrillation (AF) screening because of their low cost, convenience, and broad accessibility. However, some important questions concerning their diagnostic accuracy remain to be

answered.

Objective: This study tested the diagnostic accuracy of the FibriCheck AF algorithm for the detection of AF on the basis of mobile phone PPG and single-lead electrocardiography (ECG) signals.

Methods: A convenience sample of patients aged 65 years and above, with or without a known history of AF, was recruited from 17 primary care facilities. Patients with an active pacemaker rhythm were excluded. A PPG signal was obtained with the rear camera of an iPhone 5S. Simultaneously, a single-lead ECG was registered using a dermal patch with a wireless connection to the same mobile phone. PPG and single-lead ECG signals were analyzed using the FibriCheck AF algorithm. At the same time, a 12-lead ECG was obtained and interpreted offline by independent cardiologists to determine the presence of AF.

Results: A total of 45.7% (102/223) subjects were having AF. PPG signal quality was sufficient for analysis in 93% and single-lead ECG quality was sufficient in 94% of the participants. After removing insufficient quality measurements, the sensitivity and specificity were 96% (95% CI 89%-99%) and 97% (95% CI 91%-99%) for the PPG signal versus 95% (95% CI 88%-98%) and 97% (95% CI 91%-99%) for the single-lead ECG, respectively. False-positive results were mainly because of premature ectopic beats. PPG and single-lead ECG techniques yielded adequate signal quality in 196 subjects and a similar diagnosis in 98.0% (192/196) subjects.

Conclusions: The FibriCheck AF algorithm can accurately detect AF on the basis of mobile phone PPG and single-lead ECG signals in a primary care convenience sample.

Summary: The detection of AF using Fibricheck App and single lead electrocardiogram (ECG) was similar in patients from primary care facilities.

B) *Grieten L et al. Evaluating smartphone based photoplethysmography as a screening solution for atrial fibrillation: a digital tool to detect AF? JACC, 2017.*

Objective: Opportunistic screening for Atrial Fibrillation (AF) is proven to be important and effective in identifying cases of untreated, frequently asymptomatic AF. This work focuses on the performance evaluation of using a smartphone application FibriCheck as a screening tool during the week of the heart rhythm (WHR).

Methods: Participants presented themselves voluntarily at the screening sites (AZ Delta, Roeselare or Ziekenhuis Oost-Limburg, Genk) during the WHR. Screening was done using sequential measurements a single lead ECG device (AliveCor, 30 seconds) and a software only smartphone application based on photoplethysmography (PPG) (FibriCheck, 60 seconds). AliveCor measurements were performed by placing both hands on two electrodes while the FibriCheck requires to place the finger on the smartphone camera. Additionally, demographic and background questionnaires were obtained. If one of the screening technologies indicated an irregular rhythm a 12-lead ECG was taken for verification by the cardiologist on site.

Results: In total 1056 participants were screened, 41% was male. The overall mean age was 59±15 years with a mean BMI of 26±10. In total 31% had no risk factors for AF, 34% had 1 risk factor, 19% had 2 risk factors and 16% had two or more risk factors. The screening resulted in the identification of 8 AF cases, 1026 regular sinus rhythms and 22 irregular rhythms (bigeminy, trigeminy, supraventricular arrhythmia). The AF cases had a CHADS2-VASc score of 3±1.18. The AliveCor application had a sensitivity of 100% and specificity of 99.6% for the detection of atrial fibrillation, while the FibriCheck application had a sensitivity of 100% and a specificity of 95.8% for the detection of atrial fibrillation. Overall quality of the FibriCheck and AliveCor

measurements was automatically determined and was unreadable/unusable in 2.9% and 3.8% of the cases respectively. These cases required an additional measurement to obtain a diagnosis. No correlation was found between the cases with bad quality measurements for both measurement techniques.
Conclusion: The obtained results indicate that detection of pulse intervals based on PPG is a sensitive and accurate screening tool for the detection of atrial fibrillation and has a high level of agreement with the results obtained using the single lead ECG. The use of a smartphone-only application could unlock the potential of digital screening and support case finding of atrial fibrillation in selected population at risk for atrial fibrillation.
Summary: The detection of AF using Fibricheck App and single lead electrocardiogram (ECG) [Alivecor] was similar amongst these volunteer subjects.

C) *Beerten S et al. A Heart Rate Monitoring App (FibriCheck) for Atrial Fibrillation in General Practice: Pilot Usability Study, JMIR Form Res, 2021.*

Methods: Four general practices across Flanders provided patient data for the study. Inclusion criteria for participants were aged 65 or older and a CHARGE-AF score of at least 10%. We excluded patients with known AF or a pacemaker. Participants were asked to measure at least twice a day with FibriCheck (for at least 14 days). They were provided the 36-Item Short Form Survey (SF-36) questionnaire both before and after the study, as well as different surveys concerning their user experience and general perception of technology.
Results: There were 92 participants (36 women and 56 men). The study population was relatively homogenous concerning risk factors and medication use at baseline. During the study period, 5/86 (6%) participants were found to have AF (6 dropouts). The average study period was 23 days and the average number of measurements per day was 2.1. Patient compliance was variable, but high. On the whole, there were no appreciable changes in quality of life. The overall user experience and satisfaction were very high.
Conclusions: FibriCheck is a relatively easy-to-use smartphone app to complement AF screening in primary care. Its implementation in this setting is certainly achievable, and one can expect high rates of patient compliance. Based on these results, a planned cluster randomized trial will be going ahead.
Summary: This study showed that four general practices found the Fibricheck App easy to use over at least a 14-day period twice a day.

CONTACT US FOR FURTHER INFORMATION
Should you have any further questions about the study, or in case of an emergency please contact:

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Thank you for reading this information leaflet. Please feel free to contact us if you require further information or clarification.

Please keep this copy of the information sheet and a signed consent form.