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Update from the ReIMAGINE Prostate Cancer Screening Study NCT04063566: Inviting Men for Prostate Cancer Screening Using Magnetic Resonance Imaging

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The ReIMAGINE Prostate Cancer Screening study will evaluate the feasibility of magnetic resonance imaging (MRI) as a potential screening investigation for prostate cancer, a leading cause of cancer-specific death in the UK [1]. The disease is often asymptomatic in its early stages and presents a significant diagnostic challenge. We remain heavily reliant

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Ethics statement ReIMAGINE Prostate Cancer Screening has regulatory approval from the London–Stanmore Regional Ethics Committee of the UK Health Research Authority (reference 19/LO/1129).

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upon opportunistic prostate-specific antigen (PSA) blood testing and clinical examination to inform referral to secondary care and are yet to establish an effective prostate cancer screening strategy in the UK.

PSA levels are not a reliable indicator of prostate cancer and may lead to overdetection of clinically unimportant disease and can miss clinically significant cancer [2,3]. Several large population-based screening studies have failed to show a reliable impact of PSA-informed screening on overall prostate cancer–specific mortality, but the ERSPC study suggests a significant benefit from screening in the longer term, as the numbers needed to screen to avert one death fall over time [4–7]. Multiparametric MRI (mpMRI) is now established as the cornerstone of localised prostate cancer diagnosis in the UK [8]. mpMRI detects almost all clinically important cancers and is associated with a high negative predictive value (NPV). A significant proportion of men with a raised PSA can safely avoid biopsy following a triage MRI [9]. The aim of the ReIMAGINE Screening study is to explore whether the precision of diagnostic MRI can be applied to the screening setting.

ReIMAGINE Prostate Cancer Screening is a UK ethics approved (19/LO/1129) single-centre prospective feasibility study inviting men aged 50–75 yr with no history of prostate cancer diagnosis to undergo prostate cancer screening using PSA and MRI. The study is funded by the UK Medical Research Council and Cancer Research UK.

The primary endpoints of the study are the acceptance rate for invitations to screening prostate MRI, the prevalence of MRI-defined suspicious lesions among men accepting a screening invitation, and the presence of cancer for those men undergoing biopsy as a result of their MRI findings. Secondary outcomes include the proportion of men ineligible because of prior prostate cancer diagnoses and the number of participants who screen negative on PSA density and/or MRI.

The study was designed in collaboration with general practitioners (GPs) and members of the public who have been affected by or have experience of prostate cancer. Potential participants were identified via partner GP practices acting as participant identification centres and were invited at random in batches of 50–100 men to enrol in the study until 300 participants were recruited.

After giving informed written consent, each participant received a PSA blood test and 3-Tesla research MRI consisting of axial T2-weighted (T2W) imaging, diffusion-weighted imaging (DWI), and research-specific T2 exploratory MRI sequences with a total scan time of <20 min. Exploratory research sequences (multiecho T2W) were used to derive luminal water fraction maps [10]. Clinical sequences (biparametric T2W axial turbo spin echo and DWI using a high b value of 2000 s/mm^2) were used to determine screen status.

A screen-positive result is defined as either a clinically significant lesion on biparametric MRI (reported by two independent radiologists blinded to clinical data, including PSA) or PSA density ≥0.12 ng/mL/cm^3 (using MRI-derived prostate volume). A third blinded radiologist is used when the first two reporters disagree on the presence of a clinically significant lesion. Exploratory sequences will be analysed retrospectively. All screen-positive participants will be encouraged to undergo further standard-of-care investigations.

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Resultant clinical data will be collected in line with the study protocol. The study design is outlined in Figure 1.

Enrolment is now complete. A total of 309 participants were recruited between November 2019 and December 2020. Six participants were withdrawn. Study MRI reporting allowed for nondiagnostic images on DWI as with usual practice (eg, rectal gas). However, owing to select incidents of nondiagnostic images on DWI due to machine failure, the study team aligned the management of individual participants with the standard of care, but replaced the data in the study by recruiting additional men over the original target of 300. In total, 303 participants received a study MRI. Study activity was stopped between March and August 2020 because of the COVID-19 pandemic. Data collection to inform primary outcomes is ongoing.

In conclusion, ReIMAGINE Screening is a single-centre feasibility study assessing the feasibility of biparametric MRI as a screening tool for prostate cancer. Study outcomes will inform the design of a multicentre UK screening study, and take us a step towards a more accurate, and less harmful, prostate cancer screening approach.

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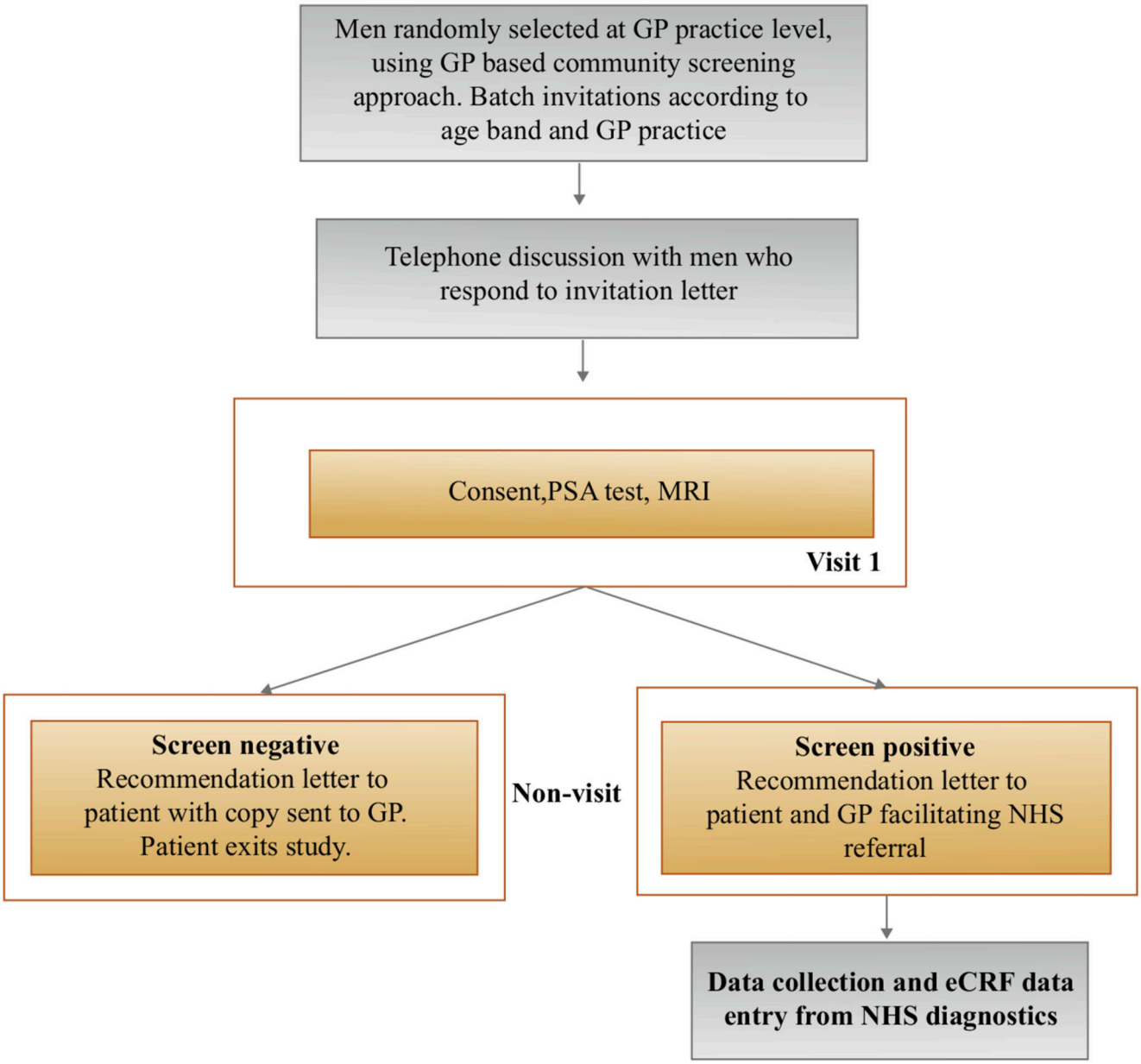

Fig. 1.

ReIMAGINE Prostate Cancer Screening: Study Design. ReIMAGINE Screening is recruiting eligible men from partner general practitioner (GP) surgeries. Each participant will receive a prostate specific antigen (PSA) blood test and a research MRI of the prostate consisting of biparametric clinical sequences (axial T2-weighted and diffusion-weighted acquisitions) and research-specific sequences. Clinical sequences will be used to determine screen status within the study. A screen-positive result is defined as a suspicious lesion on biparametric MRI or PSA density of ≥0.12 ng/mL/cm^3 using MRI-derived prostate volume. All screen-positive participants will be invited to undergo standard-of-care prostate cancer

investigations. MRI = magnetic resonance imaging; NHS = National Health Service; eCRF = electronic case report form.

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