the test set, 351 were prescribed with a UTI-related antibiotic during their respective encounters. With the fixed threshold, our model was able to correctly classify 59.0% (207/351) as negative amongst those who did not require an antibiotic.

Conclusions In this study, we develop and evaluate a machine learning model for predicting positive urine cultures which is associated with UTI amongst outpatients using a real-world dataset. Our results demonstrate that the optimized model has the potential to decrease false positives and as a result minimize unnecessary antibiotic prescription. In future work, we are interested in further improving the model by leveraging temporal sequences of the input features, extensively fine-tuning hyperparameters of the model, and decreasing the performance gap across different patient subgroups. While our study uses a dataset collected in a single cohort, the results can be translated into other settings via external validation or by simply fine-tuning the model. Overall, our novel application is of high relevance to the clinical informatics community considering the global threat of antibiotic resistance, especially in the context of managing urinary tract infections.

11 WOUBOT AND TRUST4HEALTH; PREDICTIVE PERSONALISED AI TOOLS FOR FRONT LINE CLINICIANS

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Objective Integrating technological innovation in clinical big data from Nine Health Global (NHG) and data science Woubot is a prototype precognitive system for community & wound clinics. Focusing on leg ulcers, Woubot will produce recommendations from several thousand possible treatment combinations. Working with suppliers to the National Wound Care Strategy Programme, the project will create a suite of automated software tools with a user-friendly mobile application designed by doctors and nurses for their own use within the NHS. This will generate a personalised care pathway for each patient via a series of recommendations. TRUST4Health will apply the technology to other diseases.

Methods We undertook a feasibility study to test artificially intelligent software on data from Cegedim Thin and the NHS Community Data set. We combined know how from our A.I. diagnostic system Diagbot co-produced with a Chinese partner for grass roots doctors in China and applied data science techniques creating a new AI prototype system. With a consortium led by the Royal College of Surgeons in Ireland (RCSI) we have applied for Horizon 2022 EU government funding to build on the work in wounds and to apply the methods to 3 other vascular clinical diseases stroke, heart failure and dementia . Woubot will use artificial intelligence (AI) to identify people likely to develop chronic leg wounds and manage their preventative care. In those that already have leg wounds, such as diabetic foot ulcers, the software will help to ensure that evidence of effective treatment is turned into simple steps which are available quickly and easily to front-line staff. Our AI software will rapidly sift through millions of data items in secure NHS facilities. This will enable recommendations to be generated via a mobile app. A suite of software tools will generate a personalised care pathway with a series of recommendations for use in the NHS. Most of this care will be delivered by nurses and other healthcare professionals in clinics and the community. Prescriptions, whether for exercise, other lifestyle changes, medication or dressings, will be individualised for each patient based on their history and biological makeup and linked to the latest clinical evidence. We will also use image software to monitor progress easily and accurately.

Results We built a secure platform hosted by UK Cloud (Nine Health Community Interest Company is an NHS research data organisation)using wound data sourced from Cegedim Thin and the NHS Community Data set (NHS Humber Foundation Teaching Trust) using patient pseudonymised data sources (which have gone through the double de-identification process). Data was reviewed by a statistical expert to exclude bias and included a national sample from primary care and a local sample from Hull and East Riding where the demographic includes both inner city, city and rural and a diverse range of nationalities including black, ethnic and minority groups aged 19–80. We collated and analysed around 2000 comprehensive patient records of those with hard to heal wounds (diabetic foot ulcer and venous leg ulcer) across a 2-year period. A raft of modifiable predictive factors such as Vitamin B12 levels, the impact of BMI on healing were identified and analysed. Isolating the key measures enabled the prediction of time from developing diabetes to developing a foot ulcer and then the ability to predict time to an amputation. These results if validated by further research such as the Horizon 2022 EU Trustworthy A.I. project referred to above would enable targeted management to prevent these sequelae. We have developed clinical algorithms based on the national wound guidelines produced by the NWCSP for some parts of the patient pathway

e.g., initial assessment including red flags. We now need to validate via clinical trials and automate processes, combining existing data collected by the National Minimum Wound Assessment Data Set, our data sets and others @ NHS digital https://digital.nhs.uk/ HES, CSDS and other international data.

Conclusion Woubot https://fundingawards.nihr.ac.uk/award/AI_AWARD01723 has started to identify people likely to develop chronic leg wounds and suggested predictive factors which may prevent amputation and death. The automated identification of these factors will in the next phase enable management of their preventative care. In those that already have leg wounds, such as diabetic foot ulcers, the software will help to ensure that evidence of effective treatment is turned into simple steps which are available quickly to front-line staff. Dressing analysis (size and type over time) suggests a good proxy measure for wound healing. In the next phase recommendations for personalised care will be generated via a mobile app. The software will generate a personalised care pathway with a series of recommendations for use in the NHS. Most of this care will be delivered by nurses and other healthcare professionals in clinics and the community.

Prescriptions, whether for exercise, other lifestyle changes, medication or dressings, will be individualised for each patient based on their history and biological makeup and linked to the latest clinical evidence. The clinician chooses whether or not to accept the recommendations and records their decision.

Following the above results in the area of hard to heal wounds we shared these with the Royal College of Surgeons in Northern Ireland and an expert consortium of data scientists and clinicians which has led to our submission to develop trustworthy clinical

A.I. tools for front line clinicians in stroke, heart failure and vascular dementia. For the first time if successful we intend to explore the common causal factors across all 4 disease areas and create a unique synthetic/augmented data resource for the UK and Europe.

12 USABILITY AND ACCEPTABILITY OF WEARABLE TECHNOLOGY IN THE EARLY DETECTION OF DEMENTIA

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Objective Digital technology is transforming health and social care. Digital technologies, which includes smartphones and wearables, can be used to predict, diagnose, monitor, and/or develop treatments for different diseases. These technologies also have the potential to detect markers of neurodegenerative diseases at a much early stage than is currently possible.

The Early Detection of Neurodegeneration (EDoN) initiative aims to use digital technologies to detect preclinical dementia, with aspirations to validate a digital toolkit for clinical practice. To enhance its development, we aimed to assess the usability and acceptability of the EDoN toolkit in people with cognitive impairments and their careers.

Methods Various UK-based networks such as Join dementia research were used to recruit participants.

The EDoN toolkit, which includes a smartwatch (Fitbit Charge 4),

EEG headband (Dreem 3), and two smartphone applications (Longevity and Mezurio), was sent to each participant. University ethical approval was obtained (2135/12893/2020). Written and video guides were provided to support participants' when using the toolkit. Participants' initial perspectives of the toolkit and experiences of the setup process were explored through an initial interview, conducted approximately three days after receiving the devices. Follow-up interviews were conducted two weeks later to explore the acceptability and usability of the toolkit. NVivo enabled the thematic analysis of the interview transcripts. Emerging themes were discussed and refined by the research group.

Results Sixteen semi-structured interviews were conducted with nine participants, at two-time points. Four participants had mild cognitive impairment, two had frontotemporal dementia, one had Alzheimer's disease and two were carers.

Key themes were identified and centre around usability, acceptability, and inequity. Sub-themes within usability included the utility of the toolkit, experiences of setting up the devices, comfort of the wearables, and preference towards the written guides over the video guides, especially amongst those 'who don't like technology' (P3) and 'prefer instruction booklets rather than go backward and forwards online'(P1). In terms of acceptability, participants appeared to show a greater acceptance for familiar devices (e.g., previously worn a fitbit) and an initial hesitancy for the EEG Headband as it looked 'cumbersome'(P3). They described the importance of understanding how the device worked and obtaining feedback for 'personal interest' (P4), and raised fears around the implications of a high score in practice, with their 'driving license being taken'(P3) . Various inequities of the toolkit were uncovered such as a lack of accessibility to compatible phones and Wi-Fi connection, 'sore patches' (P6) caused by the wearables amongst individuals with dermatological issues, and digital exclusion regarding poor digital literacy and the view that technology is 'alien'(P6).

Conclusion These results highlight that the EDoN toolkit was usable amongst only some individuals with cognitive impairments and their carers. Feedback on product acceptability and usability will be fed back to developers to help improve the different devices. Future work is needed to increase the inclusivity of the EDoN toolkit to support health equity and to reduce the stigma surrounding dementia.

Part II: ePosters

Winner of Best ePoster

13 THEMATIC REVIEW OF MEDICATION-RELATED INCIDENTS AT A MAJOR TEACHING HOSPITAL AND THE POTENTIAL MITIGATION OF THESE INCIDENTS WITH ELECTRONIC PRESCRIBING AND MEDICINES ADMINISTRATION

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Objective To describe the frequency of the different types of harmful medication related incidents reported from one NHS Trust. To then assess whether the likelihood of these incidents occurring would have been reduced by a specific ePMA system, Nervecentre.

Methods Two researchers retrospectively reviewed 387 medication related incidents reported to DATIX, a national reporting system, between September 2020 and August 2021 at Nottingham University Hospitals NHS Trust.

The incidents only involved hospital inpatients and had to be associated with patient harm. Descriptive statistics were used to describe the frequencies and percentages of incidents per type of medication-related error, degree of harm, hospital division and specialty. Incidents were classified based on the extent to which Nervecentre could have reduced the likelihood of the incident occurring.

The actions from this review were adopted into project planning, risk management and deployment planning with a view to repeating the review pre-deployment.

Results Administration incidents were commonly reported (179 incidents, 46.3%), with the Prescribing, Pharmacy and Discharge categories containing fewer incidents. Hospital divisions reported similar frequencies of incidents, with more variation observed between specialties. While most incidents were not likely to be impacted by ePMA (243 incidents, 63.1%), Nervecentre could have reduced the likelihood of 72 incidents (18.6%).

Configuration and development to the system had the potential to reduce the likelihood of a further 29 (7.2%) and 43 (11.1%) incidents, respectively. Analysis of harm suggested that the likelihood of approximately 1 in 5 moderate harm incidents could have been reduced by Nervecentre (without configuration).

Conclusion Implementation of Nervecentre would likely be an effective intervention to reduce many types of harmful medication-related incidents at this Trust. Alternative interventions are required to mitigate errors that would not be impacted by ePMA systems.