Wearable Devices for reducing Drug Related Deaths
Brief results from two recent studies

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AIMS - To work co-productively with individuals in prison and service users in a hostel who have opioid use disorders.

To test the acceptability and practicality of wearing the device..

To refine the wearables in view of the results from the co –production work with individuals in prison establishments and in a homeless hostel based in Belfast.

To assess whether the data recorded on the device can be successfully transferred from the device to a backend service in the cloud.

CO PRODUCTION WORK

The team undertook co-production work with a group previously active opioid users in two local prisons and in a voluntary sector homeless hostel for people who use drugs (PWUD).

The study included four focus groups in total. Two were conducted face-to-face in a prison setting, whilst another was carried out face-to-face with service users who reside in a hostel in Belfast.

WEARABLES STAGE - We assessed the feasibility of 'wearing' the device within a sample of hostel residents. The six individuals were asked to wear the device whilst in the hostel whilst under the supervision of the researchers for six evenings

Study One ctd

FINDINGS-WEARABLES

Study

One

After all the data was retrieved for the feasibility study, an initial data exploration study was conducted with a local analysis tool kit (Python). The plots showed both heart rate and SPo2 readings for each user on different dates and times throughout the data collection phase.

From those plots, we are confident to conclude that it is feasible to use a commercial wearable device for monitoring opioid users' biomarkers remotely. The data acquisition and transfer process will not be a barrier for such studies going forward.

Study One – Co production

IDEAS FOR CHANGE (consensus from co production)

Slim, adjustable strap due to potential weight loss ; No re- sale value ; Waterproof ; Audible alarm on the device ; GPS only activated when there are signs of OD; No link to smart phone as this would be affordable or realistic ; Data housed in private server , No to commercial products

The most common concern noted by the service users was in relation to the use of GPS. All respondents (n=16) were concerned about the GPS system within the device and it's potential to track their everyday movements

"I just wouldn't like the tracker, I don't know...I think that's dangerous... would it be tracking you all the time or just when you have an overdose?..."

The fact that the users could not always depend on their peers to help them should they overdose was the main reason why they considered the device to be particularly beneficial.

I'll tell you why this is a brilliant idea, cause if everyone panics and runs off and is willing to leave ya, at least the device will alert someone that you're in trouble...my friend, who overdosed there in the public toilets, if she had one of them on her, someone could've tended to her but now she's dead.

Sample

Edinburgh

Nine participants were involved in data collection from January 15th to January 25th, totalling 32 person-nights. Of the participants, eight were men and one was a woman. The age range spanned from 27 to 53 years, with most not having major health conditions. However, some reported experiencing anxiety or depression, and one participant had high blood pressure. The participants used various drugs, including heroin, cocaine, methadone, cannabis, and street warfarin. The combination of heroin and cocaine was the most frequently described drugs used.

Belfast

- Ten participants wore the devices over five nights in December 2023 (usually from 8pm to 10am on the following morning. This provided 25 episodes of data collection. The age range of the sample was 21 to 34 years. Self-report data indicated that 3 people were using heroin during the fieldwork phase, whilst 7 participants were injecting cocaine mixed with other drugs, for example street benzos and gabapentin.

Results- Study 2- brief overview

The innovative aspects of the project, particularly in the development of the AI model and reduction of false alarms, are notable.

The AI model represents a significant advancement in using wearable data for overdose detection.

This is particularly crucial in the context of drug overdose detection, where individual physiological responses can vary significantly.

- One of the key breakthroughs is the model's ability to reduce false alarms.

- By reducing false alarms, the system gain's reliability, ensuring that interventions are targeted and timely.

- This aspect of the work not only improves the efficiency of the system but also builds trust among users and caregivers, which is critical for its long-term success and adoption.

Notable result from Study Two

Nine participants in a hostel in Scotland wore the smartwatch overnight whilst in the hostel, over six nights. Participants' ages ranged from 27-53 years. Cocaine use was reported by eight participants, heroin by six and cannabis by two.
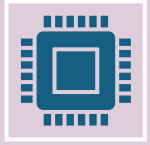
The smart-watch recorded heart rate data that was anonymised and transferred via wifi to a server at Manchester Metropolitan University. There was an observation of heart rate dropping below 40bpm in six cases.

Regular combined use of heroin and cocaine is increasingly common in the drug using population. In the final quarter of 2023, cocaine was the most reported substance in Belfast for the first time within needle exchanges[1] and similarly in Scotland where drug deaths are the highest in the UK there are increased reports of cocaine use to needle exchanges .

Cocaine, a stimulant, increases heart rate and blood pressure in the short term due to the peripheral release of noradrenaline. Therefore, the observation that our participants had such low resting overnight pulse was surprising.
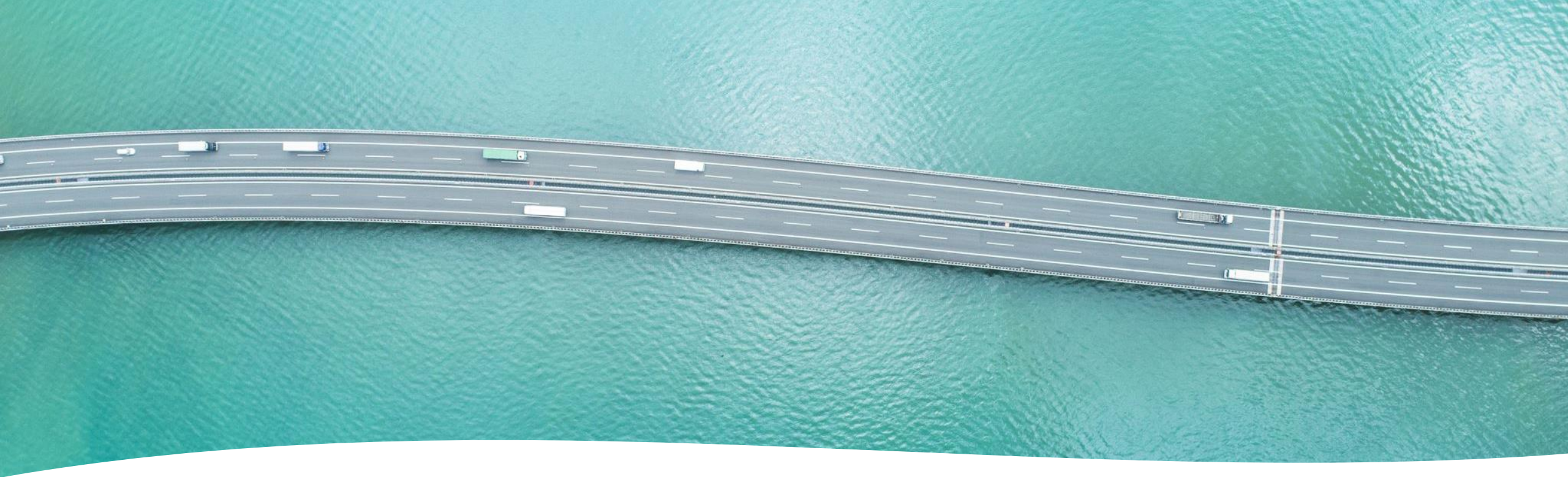
Thanks for listening

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