UNIVERSITY OF CANBERRA

MOBILE HEALTH:

EMPOWERING PEOPLE WITH TYPE 2 DIABETES USING DIGITAL TOOLS

SUMMARY REPORT

NEWS & MEDIA RESEARCH CENTRE

MOBILE HEALTH:

EMPOWERING PEOPLE WITH TYPE 2 DIABETES USING DIGITAL TOOLS

SUMMARY REPORT

DIABETES – A GROWING PROBLEM

Diabetes is a major health problem, and one that is a significant burden on the health system. According to the World Health Organization, the number of diabetes patients worldwide will have reached 366 million by 2030[1]. In Australia, diabetes is the sixth leading cause of death and the death rate continues to rise[2]. In the last 15 years it has doubled, and Diabetes Australia estimates that around 1.7 million Australians have diabetes, with 500,000 of those unware of their condition.

Sadly, 280 Australians develop diabetes every day. Diabetes can increase the risk of heart disease, stroke, blindness, kidney failure and amputation. Furthermore, it is estimated that the total annual cost impact of diabetes in Australia is $14.6 billion dollars.

MANAGING DIABETES IN THE COMMUNITY

Type 2 diabetes results from the body's ineffective use of insulin and/or inability to produce insulin, and accounts for approximately 90% of all diabetes diagnoses. Simple lifestyle changes such as maintaining an optimal body weight, engaging in physical activity and adopting a healthy diet are essential to the management of Type 2 diabetes.

However, each of these activities requires substantial commitment by someone living with diabetes. Self-management of an illness requires a considerable level of knowledge, discipline and self-regulation. For this reason, prescribed activities are not solely determined by medical factors. Characteristics of successful patients include accountability, motivation for change and active participation. Peer support and community resources are also effective methods of engaging patients.

The mHealth pilot program ***Mobile health: Empowering people with type 2 diabetes using digital tools*** was designed around the recognition that ongoing lifestyle modification is a continuing effort, beyond just the consultation with medical professionals. It is about everyday choices and feeling empowered and informed about the decisions that can improve health outcomes.

When people are visiting with a medical professional, it is a short appointment available to get important advice and encouragement – the mHealth program was about expanding that window – so that a form of support, information and communication could be ongoing, helping patients make better everyday choices.

This program promotes, integrates and supports effective use of mobile devices as management tools that encourage and facilitate active participation in self-care. It advances a population-based strategy for managing and reducing the impact of diabetes and presents opportunities for pre-diabetes management.

[1] Diabetes Fact Sheet. Geneva: World Health Organization, 2014. www.who.int/mediacentre/factsheets/fs312/en/

[2] Causes of Death, Australia, 2011 Canberra: Australian Bureau of Statistics, 2013. www.abs.gov.au/ausstats/abs@.nsf/Lookup/3303.0Chapter42011

MOBILE HEALTH

This program tackled the challenges of long term management among diabetes patients, with an exploratory mHealth pilot program that invited 28 patients to use iPads to help manage their health condition over 10 months. The first step of the mHealth project was for the University of Canberra to work with National ICT Australia (NICTA), the ANU Medical School, Canberra Hospital, Ochre Health and the ACT GP Super Clinic to consider what would be most effective in helping support those living with type 2 diabetes.

A co-design workshop was convened, and practitioner participants agreed that a trial program should allow patients sufficient autonomy and encourage them to try new tools independently. Rather than implementing a highly structured intervention, discussions at the workshop suggested an 'exploratory' program, where patients were invited to engage in various digital activities relating to their health management. Sufficient digital literacy training and technical support were suggested, on the assumption that it would be more likely to induce behavioural changes among diabetes patients in the long term.

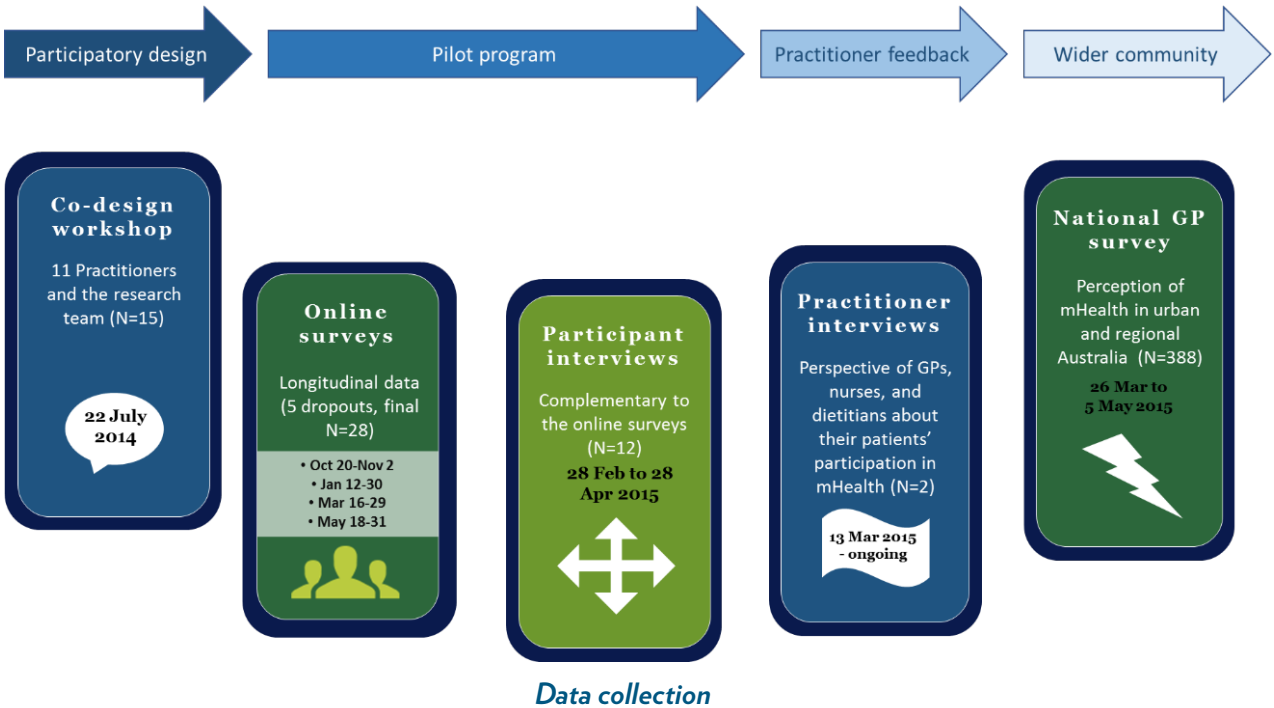
Three key areas that needed to be addressed to facilitate successful outcomes for mHealth programs were identified:

- motivating patients to record their health metrics using a mobile device and to use authorative health information;
- facilitating patients' empowerment through their use of a mobile device for self-management, thus giving them a sense of autonomy and ownership; and
- seamless integration into the existing healthcare delivery system.

To that end, mobile tablet devices (iPads) with appropriate applications were provided to patients recruited at the GP Super Clinic (Bruce). Internet equipped tablets were considered appropriate due to their straightforward software, their 'always on' nature, portability, usability and screen size. Apps covering the key areas of blood glucose, exercise, diabetes information, diet and community were installed on the supplied devices.

Providing a digital literacy support system was a unique element of this program. Digital training was offered to participants as part of the pilot program. Both structured group and on-demand individual training were provided by a professional trainer at the Clinic.

While participants were encouraged to use the mHealth apps and attend training sessions, they were not mandatory. This was to observe how participants adjust to a mHealth program at their own pace in their daily routines, so that a more sustainable mHealth program could be developed through the outcomes of the program.



Both qualitative and quantitative methods were adopted to observe the behavioural changes that occurred during the pilot program. By collecting both qualitative and quantitative data, the team was able to gather sufficient data regarding both health management and digital literacy outcomes.

Participants were also surveyed throughout the program. In addition a national GP survey was also undertaken to better understand adoption and potential of technology use in primary care more broadly.

> ***"The iPad is like someone looking over your shoulder and checking your progress. Someone to answer to. Especially the Glucose Wiz. I find that I can get answers to all my questions by visiting the appropriate internet sites...Since I have been eating healthier and using the apps my weight has reduced over 10kg"***
>
> **- Program participant**

KEY FINDINGS

The program identified the strong need for training support in acquiring digital literacy. It was necessary not only for technical learning but also to build the confidence of novice users. Furthermore, it was noted that continuous training and support is essential, as well as individual lessons. Ultimately, digital engagement requires long term learning and repeated exposure. Importantly, different types of users need different programs, as they learn at a different pace and have different needs.

Typologies of use were identified, depending on the different levels of digital engagement and health behaviour exhibited by the participants. This included:

> ***"I have been keeping more faithful records of my activities and nutrition, my weight has dropped a bit, and while my blood glucose levels have not yet attained that perfection I aim for, the trend is in the right direction"***
>
> **– Program participant**

- ***Active uses:*** Some of the participants were actively engaged in recording, tracking and observing aggregate data. Through visualised and integrated data, they were able to appreciate the value of their own 'small data'. They wanted to learn more about technologies and become more sophisticated users of digital devices.
- ***Functional uses:*** Learning new technologies were not a major motivation to participate in the program. These users either already had sufficient skills or acquired the ability to use the apps for effective self-management. The ease of access to mobile devices was a crucial element for functional uses.
- ***Limited uses:*** Some of the participants used the device minimally and for specific purposes.

Finally, a key finding was that mHealth must be embedded in patients' everyday lives, as well as in the broader healthcare context. These tools cannot be provided in isolation and should be embedded in all uses of mobile devices. This in many respects mirrors the requirements of those living with diabetes, where lifestyle changes require constant vigilance.

KEY STATISTICS

The program highlighted a number of key points. Firstly, training can significantly improve digital skills. After seven months, 90% of the participants were using their iPads more than once a day. This contrasts sharply with the statistics at the beginning of the program, where 32% indicated they had never used an iPad before, and a further 29% had very limited experience. When asked if they were confident enough to use the iPad at the end of the pilot program every participant answered yes.

The program also showed that training improves not only digital skills, but the ability to use digital tools for health management. For example, at the time of sign-up, only 46% searched online for information but at the end of the study, 82% used the internet to obtain information about diabetes management. The majority of training participants (90%) felt that the iPad helped manage their diabetes. In contrast, only 44.4% of those who did not participate in the training felt that the iPad helped them.

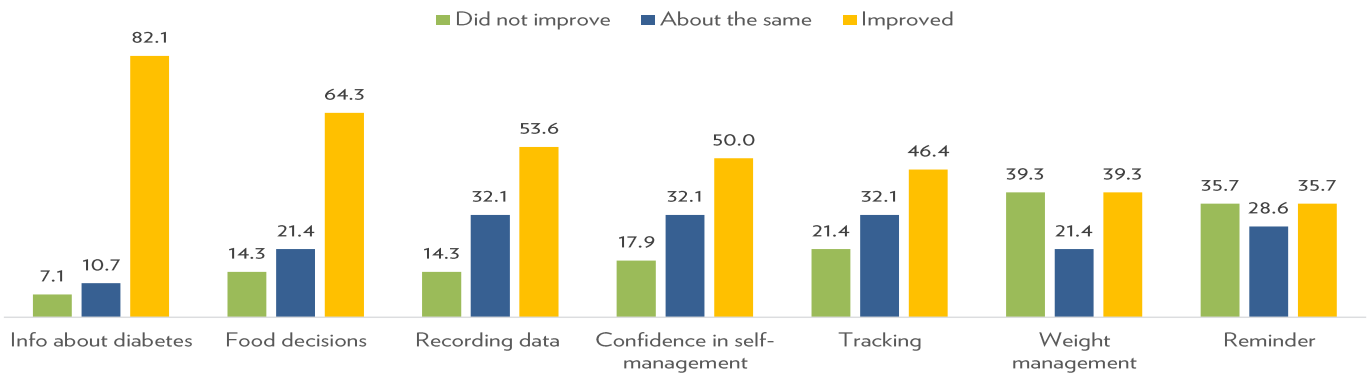
Most of participants perceived that their diabetes conditions had been improved during the program. After nine months, 61% said they experienced an improvement in their disease and had gained confidence through the mHealth study.

> ***"The iPad has significantly improved the management of my diabetes. Information is recorded daily and is an important resource for my record-keeping"***
>
> **– Program participant**

In addition, 75% of the participants stated that they gained more confidence with food choices, particularly because of the portability of the device when making food selections. About 32% of the participants experienced an increase in satisfaction of exercise plans. iPads encouraged greater access to official information, with 86% accessing information from ACT Health during the first 5 months of the program.

The top uses of the iPad for diabetes management were to regularly monitor themselves, acquire knowledge and resources, and to use as an aid to change lifestyle.

The study also highlighted, surprisingly, that age is not a significant barrier, with 82% of participants 50 years or older.



Areas of improvement (after 9 months)

POTENTIAL FOR IMPROVED OUTCOMES

Introducing new technologies into type 2 diabetes patients' care is a complex process that involves various dimensions of health conditions, self-management and digital literacy. For those who are not experienced in digital technologies, adjusting to a new device adds to the challenge.

Many self-management programs that utilise digital technologies often lack the provision of technical support and assume participants will be able to figure out the best uses of the technology. For a sustainable engagement with mHealth tools, continuous digital literacy programs and technical support are both crucial elements.

We have found that gaining confidence as well as the perception of social support was crucial in improving patient engagement

Want further training after program

57%

Improved digital skills

93%

The pilot program highlighted that it is possible to embed an iPad into the everyday context of patients, so that they can adjust to the device and apps at their own pace. The program demonstrated that patients can feel better supported and empowered to manage their diabetes in the community, feel more connected to others with diabetes, and make lifestyle improvements.

Participants were able to better track their progress, and indeed many reported using the iPad and their 'on screen' results to better inform discussions with their GPs. In two cases patients used their iPads to source information that revealed that they had previously undiagnosed conditions, which they brought to the attention of their GPs. More broadly, the participants gained valuable digital skills, in many cases where none existed previously.

82% **Will continue to use iPad for diabetes management after program**

61% **Gained confidence in iPad skills through mHealth program**

WAY FORWARD AND POLICY CONSIDERATIONS

Ultimately, this program demonstrates that mHealth can provide a mechanism to empower and form healthier disease management habits within motivated patient groups, and can have boarder psycho-social benefits. For patients it can improve self-management of type 2 diabetes, and create a stronger sense of responsibility when managing their health.

This also fits within current policy considerations around better management of chronic disease at a community level; stemming the burden of disease progression on the health and hospital system as our population ages; and has potential to benefit coordinated primary care efforts. Furthermore, equipping patients with the ability to engage in health management and record keeping in a digital form creates a pathway to broader eHealth engagement.

Such a program is also cost effective. In the case of devices being provided to patients, the cost was approximately $1,600 per person. The cost falls considerably if participants bring their own device, down to $240 per person. Over a longer period improved management would also be expected to save funds through reduced complications, consultations and hospital admissions. Therefore this program can be seen as a cost effective intervention.

The next step is to realise the wider rollout of this mHealth program, including and working with relevant organizations who may be able to provide a 'digital hub' for training sites, and with other GP Super Clinics and primary care sites across Australia to identify individuals who may benefit.

Considering the increased use and near ubiquity of smart phones and tablet devices, the potential for scaling up is significant. Ongoing refinement of the qualitative and quantitative data will also allow policy makers to understand the additional benefits of interventions like this, including the cost savings generated to the primary and acute care sectors.

OBJECTIVES OF A WIDER PROGRAM

- **Design, implement and evaluate a program of self-management of diabetes using mobile technology**
- **Create an educative digital support program to foster digital engagement in diabetes self-management in a complex healthcare setting**
- **Continue to determine how mobile digital engagement can increase a person's sense of control and responsibility of their health**
- **Produce an effective model for incorporating mobile digital engagement into self-management**

RESEARCH TEAM

Dr Sora Park (Project Leader) is Associate Professor in Communication at the News & Media Research Centre, University of Canberra.

Dr Sally Burford is Associate Professor in Knowledge and Information Studies at the News & Media Research Centre, University of Canberra.

Dr Leif Hanlen is the Technology and eHealth Business Team Director at the National Information Communication Technology Australia (NICTA).

Dr Paul Dugdale is Associate Professor of Public Health at the Australian National University's (ANU) Medical school, Director of the ANU Centre for Health Stewardship and Director of Chronic Disease Management for ACT Health.

Dr Chris Nolan is the Director of the ACT Diabetes Services based at Canberra Hospital, and a Professor of Endocrinology at the ANU Medical School.

Dr Paresh Dawda is a General Practitioner, Senior Research Fellow at the Australian Primary Health Care Research Institute (APHCRI). He is ACT Medical Director at Ochre Health and Adjunct Associate Professor, University of Canberra.

John Burns is Chief Operating Officer at Vetpartners Australia and an Adjunct Professor of the University of Canberra.

Digital Trainer: **Adrian Constance**.

Research Associates: **Morris Carpenter, Jee Young Lee, Luke Toy**.

This project was supported by the Australian Capital Territory Strategic Opportunities Funding Program:
Mobile digital communication and health management: A mHealth pilot program at the ACT GP Super Clinic (2014-2015).

Contact: Project Leader Sora Park sora.park@canberra.edu.au 02-6201-5423

More information on the mHealth pilot program can be found at www.canberra.edu.au/ research/faculty-research-centres/nmrc/research/mobile-digital-communication-and-health-management

ABOUT THE NEWS & MEDIA RESEARCH CENTRE

The News and Media Research Centre (N&MRC) at the University of Canberra investigates the evolution of media, content and communication and the impact of online and mobile systems.

N&MRC researchers and doctoral students conduct both critical and applied projects with partners and institutions in Australia and internationally. Our core themes are:

Digital Networks and Cultures
Health and Medicine
Policy and Governance
State of the News Media.

N&MRC conducts the *Digital News Survey: Australia* in collaboration with the Reuters Institute for the Study of Journalism at the University of Oxford, and hosts the Communication and Media section of *Australian Policy Online*, the essential resource for policy research.

The high quality of communication and media research at University of Canberra was ranked at world standard by the most recent *Excellence in Research for Australia* evaluation. We welcome enquiries regarding industry research collaborations, and from prospective PhD and Honours students.

News & Media Research Centre
Faculty of Arts & Design
UNIVERSITY OF CANBERRA
@NewsMediaRC
vimeo.com/nmrc
www.canberra.edu.au/nmrrc

NEWS & MEDIA
RESEARCH CENTRE

UNIVERSITY OF CANBERRA
FACULTY OF ARTS & DESIGN