

## **Promoting electrically-assisted cycling in people with Type 2 Diabetes: A randomised pilot study**

**Key Words:** Electric bikes, e-bikes, physical activity, cardiorespiratory fitness, type 2 diabetes

**Lead:** Jessica Bourne

### **Background:**

The health benefits of exercise for individuals with type 2 diabetes mellitus (T2DM) are well known. Despite this, most individuals with T2DM are less active than healthy individuals. With the increasing prevalence of T2DM there is a need to develop interventions that can foster independent physical activity at a tolerable intensity that is high enough to evoke positive health outcomes. Cycling is a behaviour that can improve fitness and metabolic health, but is challenging for people with type 2 diabetes to adopt. Electrically assisted bicycles (e-bikes) have been highlighted as a way to overcome some of the commonly reported barriers to cycling. E-bikes provide electrical assistance when the rider is pedalling, enabling the user to maintain speed with less effort. This assistance may provide motivation for novice cyclists and increase the likelihood that these individuals will cycle in the future. In turn, increased e-bike use may serve to displace other modes of transportation. E-bikes may thus provide a behaviourally sustainable way to increase physical activity which is of sufficient intensity to increase fitness and improve cardiometabolic risk factors in people with type 2 diabetes.

### **Aims & Objectives:**

The primary aim of this research is to explore the impact of a 12-week e-biking intervention on cardiorespiratory fitness and other health outcomes. In addition, this research will explore whether the provision of an e-bike displaces motorized transportation use. Barriers and facilitators to e-biking will be explored at the end of the intervention

### **Method:**

Recruitment will take place through GP database searches with eligible participants being sent invitation slips. In addition information will be disseminated to Diabetes Support Groups in Bristol and the Diabetes and Nutrition Service.

After consenting and confirming eligibility participants will be randomized into one of two conditions; 1) e-biking intervention or 2) waitlist control. The waitlist control will receive no treatment.

Following baseline testing participants in the e-biking intervention will receive e-bike training and mechanical skills training. Bristol based charity Life Cycle UK will perform the cycle training, mechanical training and instructor led group rides throughout the intervention. E-bikes will be

provided to participants for 12-weeks. After 12-weeks all participants will return for post-programme assessment.

**Outcome measures:**

Primary outcome: Cardiorespiratory fitness

Secondary outcomes: Body composition, quality of life, cardiometabolic outcomes, physical activity behaviour, travel behaviour

Tertiary outcomes: Examination of the potential mediators of behaviour change through qualitative interviews – knowledge, motivation, self-efficacy and social support.

In addition, data regarding consenting process, attendance levels, compliance and loss to follow-up will be collected to examine the feasibility of protocol