Ethics framework for the use of wearable cameras in health

The use of wearable cameras in health research at the University of Oxford is well established. For example, we firstly received ethical approval for studies on travel behaviour in a group of adults in the U.K. *[SSD/CUREC1A/10-054, 16/07/2010]*, and then Jamaica *[SSD/CUREC1A/10-054, 13/05/2012]*. Subsequently this ethical approval was extended to include the study of sedentary behaviour in adults at the University of Oxford, Auckland University of Technology *[AUTEC 11/114, 25/05/2011]*, and the University of California, San Diego *[071243/ UCSD, 28/06/2011]*. There has been further approval for travel and nutrition behaviour of adolescent kids to review their own images at the University of Oxford *[SSD/CUREC1A/10-092, 08/11/2010]*. Ethical approval has also been granted for adults to review their dietary intake using wearable camera images *[SSD/CUREC1A/12-008, 15/02/2012]*. Further ethics approval has been granted for the use of wearable cameras in conjunction with accelerometers, followed up by a semi- structured interview informed by the camera images *[SSD/CUREC1A/13-262, 19/12/2013]*, and an extension to record participants' home energy consumption *[MS-IDREC-C1-2015-112]*. We have recently collected wearable camera data in an Oxford dialysis population for two separate studies *[14/EE/1094, NRES Committee East of England – Hatfield; and 16/SC/0343, South Central - Oxford C Research Ethics Committee]*.

Each study has helped further refine our understanding of conducting wearable camera research in an ethical and responsible manner. This has included a peer-reviewed article that shares an ethical guidance framework in the American Journal of Preventive Medicine in 2013. In particular our recent studies have given serious consideration to some key issues:

Third parties

We recognise that third parties may be photographed, knowingly or unknowingly, and will not have the opportunity to provide informed consent. In traditional methods, there would likely be a single image and those nearest to the photographer (so most prominent in the image) would have an understanding of being "photographed"; this is not the case for automated, wearable cameras. These third parties can include family members, cohabitants, friends, colleagues, co-workers, acquaintances, and individuals unknown to the participant. We will discuss how we deal with each below according to the specific issues surrounding privacy and autonomy.

Family members, cohabitants, and friends

Existing guidelines for visual research recognize that privacy includes reasonable expectations of where one will not be photographed unknowingly and this should be considered the case for third parties in their own home (British Sociological Assoc. 2006, Wiles et al 2008). Although it is not necessary to obtain written informed consent from all family members and cohabitants, our participants will be advised to seek their verbal permission prior to wearing an automated camera in the home. We will provide necessary information to help participants explain that images will be recorded, but securely stored and not disseminated. The privacy of friends and acquaintances will also be treated in the same manner. When prior verbal permission is not practical, verbal permission and explanations on first contact will respect their autonomy.

Colleagues and co-workers

Workplaces vary considerably in terms of number of employees, context, relationships with coworkers, and interaction with the public. Consequently, the appropriateness of a wearable camera will differ among workplaces (e.g., an office, shop, and hospital). The key issue is about respecting privacy, and each setting will be assessed by one of our research team before issuing devices. If study participant's occupation involves interaction with children (including teachers and other school workers), we will advise that parents should be informed about the research. Before wearing the device at work, participants will be advised to seek verbal permission from managers or supervisors, and should inform direct co-workers about the device. If requested by these individuals, the device should be removed. Individuals working with clients will be advised that the study is not appropriate for them.

Strangers and the general public

Existing guidelines state that when taking images of individuals and groups in public spaces, it is not practical or necessary to obtain informed consent unless the images are published or disseminated in such a way that they can be recognized (British Sociological Assoc. 2006, Wiles et al 2008). For example, consideration should be given to research in certain cultural settings in which photography is disapproved of or considered inappropriate (e.g., church communities). Therefore, participants will be verbally advised to remove devices if they find themselves recording strangers where privacy reasonably might be expected, such as gym changing rooms.

There is risk of burden or harm to the participant (from the principle of non-maleficence) when wearing devices in free-living situations. Possible scenarios include the following: the participant is questioned by (potentially hostile or suspicious) third parties who object to unsolicited image recording and the participant attracts threat to his or her safety or feels uncomfortable or threatened (e.g., walking home late at night). Therefore, we have prepared the participant with a simple statement explaining the study purpose and device and concluding with the offer to remove it to reduce participant and third party burden (see final section of appendix 5: Detailed Instructions on how to use wearable devices).

Some third parties will not know they have been photographed. This means that such research has parallels to covert research, which is subject to serious ethical and legal issues (British Sociological Assoc. 2006). However, the distinction is that research with automated wearable cameras is not directly about the third parties. Their anonymity will be preserved, and no image that identifies them will be published without their explicit consent (see appendix 8: ethical declaration for researchers viewing and annotating wearable camera images).

Finally we would like to stress that all researchers who come into contact with the images will be instructed appropriately in correct, ethical use of the data (see appendix 9). Researchers annotating image data will be reminded not to discuss the content with anyone outside of the team, to not identify anyone they recognise in the images, to store the images safely, and to be aware of how sensitive the data are.