

Institution: Anglia Ruskin University		
Unit of Assessment: 24		
Title of case study: Improving Health of Homeless Through Exercise		
Period when the underpinning research was undertaken: 2017-March 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Dr Lee Smith	Role(s) (e.g. job title): Associate Professor in Physical Activity and Public Health; Director of the Cambridge Centre for Sport and Exercise Sciences	Period(s) employed by submitting HEI: June 2016-present
Period when the claimed impact occurred: 2018-December 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact (indicative maximum 100 words) <p>Smith's research demonstrated that promoting physical activity among vulnerable groups may aid the reduction of health disparities. These findings led to The Single Homeless Project, a London-based charity, to secure funding of £399,233 to run an exercise intervention designed by Smith. This intervention was adopted by a second homeless charity, the Purfleet Trust based in Norfolk, which is now a key stakeholder in a €2.8m Horizon 2020 project with Smith focussing on cancer prevention in the homeless. In both charities, the intervention improved health parameters, such as body composition, physical strength, and depressive symptoms, among homeless clients. Implementing this exercise initiative generated a total of four full-time jobs in the two charities. The exercise intervention developed was nominated for and won the London Sports Awards 2019.</p>		
2. Underpinning research (indicative maximum 500 words) <p>The underpinning body of research for this ICS predominantly utilised epidemiological, as well as meta-research, techniques, and demonstrates that regular participation in physical activity, as well as a reduction in sedentary time, and an improvement in physical functioning, is associated with positive mental and physical health.</p> <p>Smith's meta-review of lifestyle psychiatry concluded that there was evidence to support the use of physical activity in primary prevention and clinical treatment across a spectrum of mental disorders (Reference 1). Epidemiological analyses demonstrated that a high handgrip strength (a measure of physical functioning) was partially protective against depressive symptoms (Reference 2). Smith's meta-research analysis concluded that handgrip strength serves as a useful indicator for general health status. Specifically, handgrip strength is an effective indicator of early all-cause and cardiovascular mortality (Reference 3). Finally, his other epidemiological work demonstrated that some aspects of sedentary behaviour are associated with cognitive decline (Reference 4).</p> <p>Smith's research, which focused on the health of older adults who transitioned out of homelessness, found that individuals who were once homeless have poorer mental and physical health and are more likely to be physically inactive (Reference 5). This demonstrated that health disparities exist even after people transition out of homelessness.</p> <p>Altogether, Smith's research demonstrates that promoting physical activity, increasing physical functioning, and reducing sedentary time may improve mental and physical health for particularly vulnerable populations, such as the homeless community. The intervention that Dr Smith</p>		

designed to promote physical activity among the homeless community in response to his findings is described in Reference 6.

3. References to the research (indicative maximum of six references)

- 1) Firth, Joseph and Solmi, Marco and Wootton, Robyn and Vancampfort, Davy and Schuch, Felipe B. and Gilbody, Simon and Torous, John and Teasdale, Scott and Jackson, Sarah E. and **Smith, Lee** and Eaton, Melissa and Jacka, Felice and Veronese, Nicola and Marx, Wolfgang and Ashdown-Franks, Garcia and Siskind, Dan and Sarris, Jerome and Rosenbaum, Simon and Carvalho, Andre F. and Stubbs, Brendon (2020) A meta-review of "lifestyle psychiatry": the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry*, 19 (3). pp. 360-380. <https://doi.org/10.1002/wps.20773>
- 2) **Smith, Lee** and White, Stephanie and Stubbs, Brendon and Hu, Liang and Veronese, Nicola and Hamer, Mark and Gardner, Benjamin and Yang, Lin (2018) Depressive symptoms, handgrip strength, and weight status in US older adults. *Journal of Affective Disorders*, 238. pp. 305-310. <https://doi.org/10.1016/j.jad.2018.06.016>
- 3) Soysal, Pinar and Hurst, Christopher and Demurtas, Jacopo and Firth, Joseph and Reuben, Howden and Yang, Lin and Tully, Mark A. and Koyanagi, Ai and Ilie, Petre and López Sánchez, Guillermo F. and Schwingshackl, Lukas and Veronese, Nicola and **Smith, Lee** (2020) Handgrip Strength and Health Outcomes: Umbrella Review of Systematic Reviews with Meta-Analyses of Observational Studies. *Journal of Sport and Health Science*. ISSN 2213-2961. <https://doi.org/10.1016/j.jshs.2020.06.009>
- 4) Olanrewaju, Olawale and Koyanagi, Ai and Tully, Mark A. and Veronese, Nicola and **Smith, Lee** (2020) Sedentary behaviours and cognitive function among community dwelling adults aged 50+ years: Results from the Irish Longitudinal Study of Ageing. *Mental Health and Physical Activity*, 19. p. 100344. <https://doi.org/10.1016/j.mhpa.2020.100344>
- 5) **Smith, Lee** and Veronese, Nicola and López Sánchez, Guillermo F. and Moller, Eloise and Johnstone, James and Firth, Joseph and Grabovac, Igor and Yang, Lin and Soysal, Pinar and Jackson, Sarah E. (2019) Health behaviours and mental and physical health status in older adults with a history of homelessness: a cross-sectional population-based study in England. *BMJ Open*, 9 (6). e028003. <http://dx.doi.org/10.1136/bmjopen-2018-028003>
- 6) Stringer, Charlotte and Loosemore, Mike and Moller, Eloise and Jackson, Sarah E. and López Sánchez, Guillermo F. and Firth, Joseph and Johnstone, James and Stubbs, Brendon and Vancampfort, Davy and **Smith, Lee** (2019) Promoting physical activity in vulnerable adults "at risk" of homelessness: A Randomised Controlled Trial Protocol. *BMJ Open*, 9 (3). *BMJ Open* 2019;9: e026466. <http://dx.doi.org/10.1136/bmjopen-2018-026466>

4. Details of the impact (indicative maximum 750 words)

Smith's research and intervention protocol has impacted on the improvement of physical and mental health for over 1,000 homeless people and the creation of jobs (n=4), in two charities. Moreover, his research has resulted in successful charity applications for funding for The Single Homeless Project (£399,233) and in November 2020 the securing of a Horizon 2020 grant, to develop and implement a new cancer prevention and care pathway for the homeless, for €2.8 million working with The Purfleet Trust as a key stakeholder.

The findings from Smith's research were read by The Single Homeless Project (SHP) and subsequently used as evidence in a successful funding application to Sport England to the value of £399,233, (Source 1) for an exercise/sedentary behaviour reduction intervention to improve the mental and physical health among the homeless and those at risk of becoming homeless in central London. The target beneficiaries were known to be suffering from mental illness and drug and / or alcohol dependency. Smith then worked on the development, delivery and evaluation of this intervention; the protocol paper of the intervention was published in *BMJ Open* (Reference 6

above). Briefly, the intervention has been undertaken across 24 London boroughs. Participants attended one exercise class per week over a period of 12 months. All exercise sessions were designed to be run by qualified fitness instructors or sport coaches. All sessions were designed to cater for the participants' needs after conversations with participants and charity leaders at the start and throughout the intervention. Each participant attended the same centre and there was only one type of exercise class at each centre each week. Examples of exercise classes run include yoga, tai chi, aerobics, dance and self-defence/boxing. Each session lasted approximately 2 hours and consisted of the following:

- A 30-minute introduction, which allows participants to enjoy refreshments and socialise.
- A physical activity session lasting a minimum of 30 min.
- Lunch.

The protocol paper was subsequently read by the homeless charity The Purfleet Trust in King's Lynn, Norfolk who contacted Dr Smith to implement this intervention to their homeless clients. As a result, Dr Smith developed the delivery and evaluation of the intervention established at The Purfleet Trust.

Impact generated via Single Homeless Project

As a direct result of the successful Sport England funding bid, three full-time jobs were created at SHP to deliver the intervention (Sources 1 and 7). Homeless clients, who have gone through the intervention (~1000 clients to date), have experienced significant positive impact on their behaviour and health. Evaluation results show that:

- 87% of participants were still active after 12 months, demonstrating sustainability.
- 75% of participants improved mental health outcomes (such as reduced depressive symptoms).
- Of the clients who were underweight, 80% gained weight through the intervention, with approximately two thirds reaching a healthy body mass index (BMI).
- Of the clients who were overweight, 27% lost over 10lbs or more.
- Average handgrip strength improved by 2kg in 12 months, demonstrating an improvement in physical functioning.
- The majority of participants' blood pressure improved from hypertensive to a normal range. (Source 3).

As a direct consequence of the success of this intervention, SHP decided to expand the intervention to all its 7,000 clients. Indeed, SHP secured an additional funding of £7,000 from Transport for London to provide bicycles for homeless patrons to improve their physical activity levels. Dr Smith assisted the charity in writing their application (Source 1), which was based on his research in relation to active travel, physical activity and health. Finally, the implemented exercise intervention was nominated for and won the Physical Activity for Health Award at the London Sports Awards, a showpiece event that recognises the best of grassroots physical activity and sport across London, in 2019. (Source 4).

Impact generated via The Purfleet Trust

To date, 56 out of the 60-estimated homeless population in King's Lynn have signed up for the exercise programme. Evaluation results showed that (i) after 3 months of intervention those who were overweight experienced an average reduction in body fat of 3%, with an average corresponding increase of 3% in lean muscle mass, and (ii) there have been improvements observed in other measures of function, such as an average increase in flexibility of 8cm, as measured by the sit and reach (Source 10). As a direct result of the successful intervention, one full-time job has been created at the Purfleet Trust to deliver the exercise intervention and ensure changes remain sustainable over longer terms (Sources 7, 8, 9).

5. Sources to corroborate the impact (indicative maximum of 10 references)

- 1) Testimony from SHP
- 2) Testimony from four SHP clients
- 3) Evaluation Report of the impact of the intervention on the mental and physical health of the SHP patrons as well as behavioural and positive outcomes
- 4) Testimony from London Sports Awards organisers and web report of nominees
- 5) Job descriptions from SHP and Purfleet Trust
- 6) Testimony from Purfleet Trust stakeholders
- 7) Testimony from Purfleet Trust clients
- 8) Evaluation Report of the impact of the intervention on the mental and physical health of the Purfleet Trust patrons as well as behavioural and positive outcomes.