

## Lifelong Health and Wellbeing (LLHW) phase 2

Case for support proforma for Collaborative Development Network applications

### 1. Title of the proposal

WELLINE: WELL-BEING AND THE INDOOR ENVIRONMENT.

### 2. What are the principal aims and objectives of the Network?

We spend the majority of our lives indoors, from youth to old age. Indoor environments can play a major role in lifelong health and wellbeing, and while this proposal will mostly focus on how the indoor environment influences chronic disorders affecting the musculoskeletal, cardiopulmonary and nervous systems, amongst the most prevalent conditions found in the older population, we will embrace the concept of 'age friendliness' and the need to be preventive throughout life. These chronic conditions (e.g. degenerative joint disease, chronic obstructive pulmonary disease (COPD), heart disease, Parkinson's disease, etc.) can considerably affect the quality of life of individuals - in some cases from a relatively young age - be potentially life threatening, and place a significant burden on public health resources. The role of the indoor environment is important in these conditions: as these conditions worsen, mobility lessens and a greater amount of time is spent indoors. Whether the indoor environment plays a role in the initiation of these conditions is unclear. Stress due to poor housing may be associated with worse outcomes in cardiovascular disease while exposure to environmental tobacco smoke affects morbidity in COPD (Osman et al 2007; Osman et al 2008): exposure to damp/ mould increases the risk for some respiratory health outcomes (Fisk et al 2007). Since the 1960s, increased use of central heating has been responsible for a steady decline in excess winter deaths due to respiratory illness. Equally, many factors can influence patients with reduced mobility due to musculo-skeletal disease (MSD) such as stairs, stretching/reaching hazards and small toilets. Consequently, once such influences are determined, modifications to the indoor environment can be identified that may help in the management - and perhaps reduce the worsening - of these common conditions. Optimal indoor environments have huge potential not only to improve quality of life at any age but to prolong active, successful and healthy ageing by compressing morbidity. However, as we are faced with an increasingly long-lived population, these factors will become ever more important in the future and in particular as climate change affects the way we use indoor environments.

The mechanisms linking indoor environmental factors and health outcomes are complex and synergistic. In addition, sustainable development policies are resulting in substantial changes to indoor environments (e.g. greater air tightness in buildings), which in turn can cause challenges to health and well-being throughout the lifecourse (e.g. greater risk of respiratory problems). In order to unravel and address these mechanisms, a comprehensive conceptual framework is required that will facilitate the development of a strategy addressing the inextricable links between the environment and key chronic disorders. The DPSEEA model provides an opportunity to explore and map actions/interventions in the chain of causation, taking into account the relationships between Drivers, Pressures, State, Exposure, Effect, and Actions (WHO, 2004). This approach, modified to incorporate the context in which these factors operate, has been taken by the Scottish Government in developing the Scottish Framework for Environment and Health (Morris et al, 2006). To use this modified model effectively, the involvement of a multidisciplinary group of stakeholders is required. By adopting such a strategic framework, the proposed Network will identify indoor environmental factors that are major determinants over the life course of major health outcomes, with a particular focus on musculoskeletal, cardiopulmonary and neurological disorders arising in later life. In particular the Network will:

- Modify the DPSEEA model as explained for example in Morris et al. (2006), to include contextual influences on all aspects of the original model, and exposure effects.
- Using the modified DPSEEA model as a framework, produce maps of the links between lifelong indoor environmental factors and chronic disorders affecting musculoskeletal, cardiopulmonary and nervous systems in later life. These are the common degenerative diseases of older age which affect mobility and which have a great influence on life quality

with increasing age. The role of sustainable development – particularly the responses to Climate Change - will also be taken into account by considering the relevant driving forces and pressures in the mapping process. The indoor environment will be the main determinant considered in the mapping process. However, the impact of other important determinants (e.g. activity levels, socio-economic issues, etc.) will also be addressed.

- Identify key interventions with recommendations as to how these can be tackled.
- Produce an extended draft of a future collaborative research proposal.

By identifying the interactions between indoor environmental factors and key chronic diseases affecting the older population, this proposal will identify effective interventions on the indoor environment which could alleviate existing cardiopulmonary, musculoskeletal or neurological conditions in older people, and/or prevent the onset and/or mitigate progression of such conditions during the life course.

### **3. Describe the multi-disciplinary collaborations and partnerships involved in the Network**

The Applicants and Collaborators comprise a group of multidisciplinary stakeholders, with expertise in: environmental, respiratory and cardiovascular medicine (Prof Ayres, PI); climatic physiology (Prof Goodwin, Co-Applicant); public health policy (Mrs Myers, Co-Applicant); healthy and sustainable buildings (Dr Ucci, Co-Applicant); exposure assessment, environmental and occupational medicine (Dr Semple); building services engineering and building physics (Prof Loveday); indoor air quality (Dr Crump); intelligent buildings, workplace and productivity (Prof Clements Croome); environmental toxicology and chemical risk assessment (Dr Harrison); outdoor pollution and atmospheric chemistry (Dr Carslaw); social and spatial patterning of health (Dr Ellaway); public health research and policy (Ms Haw); Climate Change and building design (Dr Mylona). We will also invite to the workshops a range of experts within these broad areas including a life course epidemiologist and Prof. George Morris and Dr Sheila Beck (Scottish Government) whose expertise with DPSEEA will be invaluable. We will involve older people within the workshops (through Help the Aged) to ensure user involvement in the project.

The Applicants will contribute to the strategic direction of the research, to the definition of the workshops' structure, and to the writing of the final report and associated scientific papers. The Collaborators will contribute by attending the workshop, and by facilitating the dissemination of the project activities. This proposal will encourage the development of strategic partnerships between: a) experts from the academic community; b) policy makers responsible for public health and building regulations (respectively: Dr Newport from the Department of Health and Dr Bromley from the Department of Communities and Local Government); c) older people representatives such as the Charity Help the Aged, working to improve the lives of older people through research, campaigning and fundraising; and d) the Chartered Institution of Building Services Engineers (CIBSE), responsible for delivering sustainable engineering solutions for the indoor environment. All these agencies have agreed to be involved in the project.

### **4. Summarise the programme of activities proposed**

At the core of this project there will be 3 multidisciplinary workshops. In particular, 2 one-day workshops will address lifelong indoor environmental factors and health outcomes, with a particular focus on the chronic disorders affecting musculoskeletal, cardiopulmonary and nervous systems in later life. In these we aim to begin mapping of key areas onto the DPSEEA model and identify further work to be done outside the workshops in refining the models. Each one-day workshop will include short presentations, break out groups and full group discussions. The results from the 2 one-day workshops will then be summarised and revised, to be utilised as a starting point for a third 2-day final summary workshop. This will: a) improve the DPSEEA maps with the information gained from the interim work, b) identify key interventions; c) outline ideas for a research proposal. Each workshop will be preceded by a planning meeting and data gathering for feeding the DPSEEA maps, and followed by a debriefing meeting and summary report writing. It is anticipated that each workshop will be attended by approximately 25 stakeholders including the Applicants, relevant Collaborators and additional relevant experts. In summary, this project will comprise five phases: 1) Initial data gathering and workshop organising; 2) Workshops 1 and 2; 3) Interim data gathering and modification of draft DPSEEA maps; 4) Summary workshop; 5) Report writing. Apart from the summary reports arising from each workshop, the following will be delivered by the end of the proposed project: a) a final

report summarising all the findings, and indicate areas for key interventions; b) an extended draft of a research proposal to be submitted to the next LLHW call; c) at least one paper for submission to a peer-reviewed journal. A website will also be created at the beginning of the project.

In order to deliver all of the above, the Applicants will require funding to dedicate 2 hours per week to the project. We have requested a nominal salary contribution for each of the co-applicants but the hours contributed by each to the project will not be cash limited being sufficient to achieve the aims of the proposed initiative. Funds are also requested to cover 3 hours per week of administrative support (£2180), to coordinate Network activities and arrange the workshops. In addition, the services of Dr Paul Harrison – an experienced consultant and former Director of the Institute of Environment and Health – are required to: 1) gather and prepare scientific material ahead of each workshop; 2) prepare a draft of summary conclusions at the end of each workshop; 3) assist in drafting the final project report. This will therefore require an input of 15 days from Dr Harrison (at £450 per day). It is anticipated that each workshop will be attended by 25 participants, and that a total of £24,000 is needed to cover travel and subsistence costs for the 2 one-day workshops (£220 per person per workshop) and the final two-day workshop (£520 per person). Also, in order to coordinate activities, additional project meetings are required, for which £2,000 is needed to cover travel and subsistence. A further sum of £500 is needed to cover dissemination materials such as delegate packs, Network brochures and website administration.

## **5. Timetable of proposed activities**

Upon funding approval, an initial project meeting will take place in June 2009, to plan and coordinate activities. The first workshop (on musculoskeletal and neurological disorders) will take place in September 2009. The second workshop (on cardiopulmonary disorders) will take place in November 2009. This will be followed by the two-day final summary workshop, taking place in February 2010. Each workshop will be preceded and followed by appropriate planning and debriefing meetings. In addition, following the final workshop, extra meetings will be held to draft and complete: the final report, the draft proposal, and a paper for peer review publication summarising the findings of the process and the identified research needs.

## **6. What is the proposed management structure of the Network?**

The Principal Investigator (Prof Jon Ayres) will be responsible for the overall technical and financial management of the project, also ensuring that milestones and deliverables are met on time. Prof Ayres has a strong research track record on the health effects of indoor and outdoor air pollution using epidemiological and human challenge approaches. He has considerable experience of chairing a network of experts, being Chairman of DEFRA's Advisory Committee on Pesticides, and of the Dept. of Health's Committee on the Medical Effects of Air Pollutants (COMEAP). Prof Ayres will be assisted in the management of the Network and its research activities by the other Co-Applicants and an administrator. All the resources required for this Network will be managed by the lead institution (University of Birmingham).

## **7. Describe the potential impact of this work**

The proposed Network and associated activities will provide a catalyst for research on the lifelong links between indoor environments and health – particularly chronic musculoskeletal, cardiopulmonary and neurological disorders. The proposal will result in vital stakeholder engagement and new multidisciplinary research by: a) facilitating communication between stakeholders; b) increasing the awareness of multifactorial interactions across several disciplines; and c) creating strategic “maps” (based on the modified DPSEEA model) on the interactions between health and lifelong indoor environmental factors, which will also help identify and develop effective interventions for improved health and quality of life in later life. Furthermore, the proposed research will result in at least one research proposal which will be submitted to the next phase of LLHW. The involvement of policy makers in the Network will also result in policy development and opportunities for the funding of future ageing-relevant research. The Scottish initiative on Health and Environment (Equally Well, launched December 2008) has taken a similar approach to environmental influences on health but focuses specifically on children's health. They have used the DPSEEA model in helping develop their ideas and RERAD (Rural and Environment Research and Analysis Directorate) has funded the EDPHiS project (Prof Ayres being a co-PI) which specifically uses DPSEEA to define influences on mental and respiratory health in children. This approach has therefore already been seen to be influential in policy development in the UK.

## **8. What is the added value of the Network over and above existing activities of the applicants and collaborators?**

This proposal focuses on the interactions between lifelong exposure to indoor environments, sustainable development and key chronic disorders affecting musculoskeletal, cardiopulmonary and nervous systems in later life. The proposed Network will for the first time bring together an extensive group of users, experts and other stakeholders to tackle this research area: from environmental experts, to designers and engineers, policy makers and charities. The Applicants and Collaborators are experts in their respective research areas, and this proposal will provide a unique opportunity for an in-depth cross-fertilisation of knowledge and ideas. The Applicants and most Collaborators are members of the UK Indoor Environments Group (UKIEG) - a multidisciplinary group, set up in 2003 to provide a focus for UK activity concerned with improving indoor environments for people. The UKIEG is a non-profit initiative with no dedicated funding without the resources to fully integrate the wide range of stakeholders, and the necessary scientific/social disciplines to address this research area in depth. However, it provides a conduit for the results from this work and will be utilised in the dissemination strategy (see Part 10).

## **9. Who will be the beneficiaries of the proposed research?**

By addressing the interactions between lifelong indoor environmental factors and chronic musculoskeletal, cardiopulmonary and neurological disorders in later life, and by identifying effective interventions for this problem area, the research will benefit: a) Government Departments – aiding understanding for allocation of resources and reduction of NHS costs by reducing or compressing morbidity; b) academics - identification of research priorities; c) charities - providing improved and targeted information for both older people and the general population. Ultimately, this research will benefit the population as a whole, by addressing a crucial public health issue: how to ensure that lifelong indoor environmental factors (and related changes due to sustainable development and climate change) do not exacerbate or cause chronic disorders of the musculoskeletal, cardiopulmonary or nervous systems in later life.

## **10. Dissemination/Knowledge transfer**

Within our KT process the initial dissemination route will be via the proposed series of workshops, which will initiate discussions amongst key stakeholders including older people, academic experts, medics, health and indoor environment policy co-ordinators and charitable organisations. Our network will develop a governance model for the delivery of research results/findings into tangible benefits. The project will also interface with other relevant research initiatives; for example, members from the Heimsta (Health and Environment Integrated Methodology and Toolbox for Scenarios Assessment) and EDPHiS (Environmental Determinants of Public Health in Scotland) will be involved, which will be key for input into the final report and for dissemination to related areas. A website will be created to: showcase the project, provide a vehicle for dissemination of information and present links to and from stakeholder websites for general public and stakeholder use. A final electronic report will be produced which will be widely distributed to target audiences via the website and through the network. It is anticipated that the project will also result in at least 1 publication for a peer-reviewed journal. In addition, the results will be disseminated via the UK Indoor Environments Group (UKIEG) at its annual Conference. Targeted dissemination of the report - plus press releases written specifically for stakeholder publications and media health correspondents - will provide the opportunity for key messages emanating from the report / peer reviewed article to be accessed by a wide audience.

## **References**

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