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WELLINE Workshop II: Summary

'The Indoor Environment and Chronic Disorders of the Musculoskeletal and Nervous Systems across the Life Course'

Skipton House, Department of Health, London, 25 November 2009

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WELLINE WORKSHOP 2: THE INDOOR ENVIRONMENT AND CHRONIC DISORDERS OF THE MUSCULOSKELETAL AND NERVOUS SYSTEMS ACROSS THE LIFE COURSE

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WORKSHOP SUMMARY

Introduction

Caring for an increasingly aged population carries with it an intense resource requirement; it is therefore important to try to keep individuals *out* of care. This may be partly achieved by addressing the factors that influence health throughout the life-course, and eliminating, ameliorating or mitigating those that have adverse impacts while enhancing those that have positive influences on health.

For most health conditions there is an element of genetic predisposition combined with exposure to environmental factor(s) that result in the causation and/or worsening of the disease. The home environment can be extremely relevant in this context, not least because it is where people spend an increasingly large proportion of time as they age. This workshop investigated, using the modified DPSEEA approach[1], possible linkages between the home and two specific health conditions affecting older people – musculoskeletal disorders such as arthritis, and disorders of the nervous system, such as stroke. The workshop (see programme at Annex 1) included contributions from both experts and patients/helpers.

The environment may affect health in a number of ways throughout the life-course, including impacts on disease causation (initiation), incremental worsening of symptoms and/or more sudden exacerbation of symptoms. This workshop focused principally on the worsening and exacerbation of symptoms, but there is a wider context, not directly considered in this exercise, that includes impacts during early life (including therefore the school environment) and mid-life (including the work environment) that may affect disease causation. The manner in which home (and other) conditions influence disease *causation* through the life-course can be considered a knowledge gap that needs to be addressed.

As well as plotting linkages through application of the modified DPSEEA model (see Annex 2 and the report from the first workshop) the analysis undertaken during the workshop was aimed at identifying possible actions and principal gaps in knowledge. A key objective was to determine what individuals can do for themselves, or have done, in their own home. Notes captured during the meeting are presented in Annex 3.

In addition to formulating one or more key research questions, an anticipated outcome from the WELLINE project is the formulation of an answer to the question: "What is the ideal indoor housing condition for these groups of patients?" i.e. production of a statement of best practice.

Background

We are in a new public health era characterised by complexity, where potentially 'everything matters', which has led to the concept of *ecological public health*. This embraces biological complexity, ecological complexity of society, the subjective world of human experience, and the world of culture. To begin to handle this it is

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[1] Morris G, Beck S, Hanlon P, Robertson R. Getting strategic about environment and health. Public Health 2006; 120(10):889-903

important to adopt a common approach – situational modelling with an emphasis on outcome; hence the development of the DPSEEA model, which usefully also facilitates engagement of stakeholders.

The principal musculo-skeletal condition considered at the workshop was degenerative joint disease, principally osteoarthritis which affects the joints (e.g. hips and knees) and also the spine. This group of conditions also includes gout, degenerative disc disease (slipped discs), chronic muscular pain (e.g. fibrositis) and tendonitis (e.g. tennis elbow). Musculo-skeletal disease is the second highest world-wide cause of lost working days, and problems associated with joint and bone degeneration increase with increasing age. The other major degenerative joint disease is rheumatoid arthritis, a systemic inflammatory condition that mostly affects hands/fingers (and therefore grip) but may also affect the larger joints (knees, hips etc). It can start at any age; the juvenile form, which starts in childhood, being known as Still's disease. Many of these conditions can make even a small obstacle, such as a step, a major problem and impediment. With regard to causation, osteoarthritis is connected with age, weight and injury, although in many cases the process is not clear and the role of environmental factors is not known. Rheumatoid disease is an autoimmune condition with many other tissues likely to be involved and again no known environmental causes, although environmental conditions such as temperature (especially cold) can affect experience of the disease.

As regards neurological disease affecting either the central or peripheral nervous systems, the most common cause of adult disability is stroke. This one condition alone consumes 5% of the total NHS budget. 80% of cases are due to thrombosis of a cerebral artery causing irreversible brain damage, the remaining 20% being due to cerebral haemorrhage as a result of arterial rupture. About a third of stroke patients suffer psychological illness (depression) and there are many other negative outcomes involving mood, activity levels and higher mental and bodily functions. There are no identified or likely environmental causative factors, although the risk of stroke seems higher during cold weather. Another significant neurological disease affecting large numbers of people is Parkinson's disease, a condition due to loss of a key neuro-transmitter (dopamine) in the brain and which is characterised by tremor, muscular rigidity and restricted or impaired movement. Treatment is largely by drugs but is variably effective. Other neurological disorders that can impair movement are the peripheral neuropathies, metabolic nervous disease and multiple sclerosis, a largely progressive condition that can affect both motor and sensory function as well as mental state. Little research has been performed on how the environment (or its modification) impacts on disability or quality of life in relation to these diseases.

The structure of this second workshop broadly followed the lines of the first, centred on the use of the modified DPSEEA method to develop areas of relevance and importance involving all workshop attendees.

Key Issues developed in the initial phase of the workshop

The principal issue for individuals suffering from musculoskeletal or neurological conditions was considered *a priori* to be *impaired mobility*, and in this connection the following dwelling characteristics were identified as being important[*]:

- **Presence of stairs and steps**

- **Building configuration, layout and ergonomics – including size of doorways and internal passages; bathroom/toilet size, design and accessibility; furniture/equipment/appliance 'reachability'; and positioning and design of switches and handles**

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[*] Those shown in bold are considered to be especially relevant to wheelchair users.

- **Access to the outside**

- **Floor coverings**

- **Avoidance of trip hazards, unwieldy furniture and general 'clutter'**

- Lighting

- Room temperature

In addition, the following topics and issues were identified as being of particular interest and/or importance:

- Psychological health and wellbeing

- Incontinence

- Falls (causes and consequences; i.e. both 'exposures' and 'effects')

- Dexterity

- Personal, social and economic circumstances

- Personal hygiene

- Vision (impaired)

- Workplace transition

- Ambulation

- Cognition

- Sensory loss

- Swallowing/Speech/Language

- Transport environment

- The multiplying effects of co-morbidities

The contexts of personal affluence (e.g. ability to pay for carers), social support and relationships were acknowledged to be important. It was noted that there is often a problem in ascertaining well-being in individuals who cannot communicate well (due to a stroke, for example), and there are varied impacts of age on the consequences of disability.

The stroke patient attending the workshop identified incontinence as a major impediment and talked about the particular importance of modifications to the bathroom/toilet, and the necessity of an open plan layout with no stairs. She also pointed out the importance of living in an area where carers will want to live.

DPSEEA Analysis

Taking into account the likelihood of identifying research gaps and or actions relevant to the objectives of WELLINE, the workshop delegates decided to investigate further, through application of the modified DPSEEA model, issues relating to *temperature* (both high and low) and *mental health and wellbeing*, as detailed below. The rationale for not progressing issues around mobility was that there was a considerable body of information in this area and that relatively unexplored areas would be more likely to produce productive areas for research.

<u>Low Temperatures</u>

The DPSEEA *State* of 'cold temperatures' was defined as a dwelling with room temperatures of 15°C or less. Spikes of cold temperature at or below 15°C, or more prolonged exposures to temperatures below 18°C, were considered to be the associated *Exposures*.

The principle *Drivers* for the state of cold temperatures were identified to be both building related (thermal inefficiency of the housing stock, the Housing Act 2004, retro-fitting of central heating, the design of heating systems and controls, and the (suboptimal) placement of heating controls) and relating to personal characteristics (knowledge and behaviour in relation to the regulation of the heating system, and beliefs about the optimal temperature of the home). The cost of fuel and greater frequency of cold snaps due to climate change were thought to be additional possible drivers.

The identified *Actions* that could be taken to address these drivers were retrofitting (and/or improving) insulation and improving the affordability of and investment in such initiatives, improving the ergonomics of heating controls and providing multiple and/or mobile controls, providing heating allowances under the benefits system, and educating occupants on home temperature and its control and providing risk-based information and advice.

The main *Pressures* causing the state of cold temperatures to exist were considered to be (poor) thermal inefficiency of housing and (low) level of heating in the home.

A possible *Action* identified to address heating in the home was the installation/application of community heating systems.

The principle *Effects* arising from the state of low temperature were considered to be thrombotic stroke, myocardial infarction, increased joint pain, elevated blood pressure and increased risk of falls.

The *Contexts* for these effects were:

- age-related changes in behaviour and physiology and the slower perception of temperature changes, which in turn affects thermal behavioural response;

- the habit of 'frugality' associated with the particular age cohort that lived through the second world war;

- the use and (lack of) knowledge of heating systems;

- behaviours associated with going out into the cold, sleeping in cold rooms with the windows open, and wearing (or not wearing) warm clothing;

- the presence of underlying health conditions;

- socioeconomic factors (e.g. cost concerns and fuel poverty);

- weight/obesity, which is a risk factor for osteoarthritis;

- social isolation;

- deprivation/poverty;

- interactive effects between cold exposure and ETS/particulate exposure.

Specific identified *Actions* relating to these contexts were the application of social marketing and education, including the provision of advice on going out in the cold and the need to wear appropriate clothing (scarves, hats, gloves, etc.), and the issuing of cold weather alerts by the Meteorological Office.

A number of *Gaps* in knowledge (or recommendations for research) were identified, namely:

- evaluating the effectiveness of heating allowances and of the ergonomic siting of heating controls or multiple/mobile controls;

- assessing how cold impacts on occupant behaviour;

- investigating how cold specifically affects the pathology of stroke and myocardial infarction;

- investigating the relationship between cold temperatures and falls and how age-related changes in thermal behaviour and use/knowledge of heating systems affect stroke and myocardial infarction;

- whether there is an interaction between the effects of cold and exposure to ETS/particulate matter (which can also have adverse effects on the circulatory system), and if so what the nature of any such interaction is.

High Temperatures

The issue of high temperatures was associated with the DPSEEA *States* of over-warm dwellings, high humidity and reduced air movement, and hot radiators. The fundamental *Exposures* (in the UK) were considered to be prolonged exposure to temperatures in excess of 24°C or acute exposure to more than 30°C; also hot radiators (with the risk of burns) and the rate of change of temperature (timescales of exposure).

Actions that might be taken to address the identified states were the provision of shading and ventilation.

Identified *Drivers* that affect high temperatures in dwellings were:

- heat-waves associated with daytime temperatures of over 30°C in London, for example, and night-time temperatures not falling below 20°C;

- (low) thermal capacity of the building;

- security concerns resulting in windows being kept closed, or the simple inability to open windows;

- heat sources within the home;

- air-tightness of the building;

- solar gain of housing and the (lack of) provision of solar shading.

Identified *Actions* to address these drivers included planting trees closer to the house to provide shading and education regarding the existence/availability of solar shading (blinds, etc.).

The main *Pressure* was considered to be the radiant temperature of rooms.

Principal *Effects* were considered to be dehydration leading to stroke, cardiovascular strain leading to increased heart rate and reduced blood flow to the heart, less physical activity, and burns (from hot radiators).

The *Context* for these effects were:

- (reduced) levels of mobility;

- behavioural aspects including lethargy and (in)appropriate clothing;

- impacts on function resulting in an inability to open windows and remove bed clothes, for example;

- underlying morbidities including for example Parkinson's disease, which may affect the ability to perceive heat status;

- social isolation.

The identified *Gaps* in knowledge (or recommendations for research) related to endothelial activation by heat, the interaction between heat, cardiovascular/stroke pathology and behaviour, and interactions between heat and morbidity levels.

Mental Health and Wellbeing

The principal *State* identified as being linked to mental health and wellbeing was a home that facilitates control and self-determination. The associated *Exposure* was considered to be the ability to live independently and be able to control living conditions.

An *Action* identified with this state was to guard against 'learned helplessness' (i.e. coming to rely on outside help instead of pursuing self-reliance).

Identified *Drivers* were:

- socioeconomic factors (e.g. the ability to pay);

- knowledge and behaviour in the use of available products and services;

- the situation in which Disabled Facilities Grants (DFG), the grants system in general, occupational therapy services and other organisations or individuals dispensing assistance tend to make judgements on need and eligibility and are limited in what they can provide.

Possible *Actions* linked to these drivers were provision of grants, and access to trusted advisers.

Attention was drawn to 'First Stop', which provides information on housing and available products/services to support independent living, and to the fact that new advice lines are to be launched in Spring 2010. It was

also recommended that appropriate products and devices (gadgets) should be included in the retrofitting of housing, and that such products (e.g. programmable lighting) should be normalised in houses to provide 'lifetime homes' (as well as appropriate planning for possible future wheelchair access).

The main *Pressures* identified were the fitting of appropriate products during build and the retrofitting of such products in older houses.

> The associated *Action* was to give individuals a grant with the choice (within set parameters) of how to spend it to create a 'smart home'.

The principal *Effect* is psychological wellbeing which exists within the *Context* of individual function and the ability to control products/devices, socioeconomic status and product affordability, family/living circumstances, attitudes to disability (i.e. the desire to overcome problems or submit to them), expectations and aspirations with respect to function and age, and social interactions and links.

A suggested *Gap* was the identification of possible unintended consequences and negative impacts on other occupants of installing equipment (e.g. a stair lift) intended as a home improvement.

In a separate exercise, a number of dwelling characteristics and features were identified that might on one hand degrade, and on the other hand promote, mental health and wellbeing (MH&WB). Those factors considered to degrade MH&WB were:

- lack of (or impaired) access to rooms, negatively impacting on the ability to engage in everyday family life;

- (for individuals suffering incontinence) accessibility and cleanliness of toilet facilities - reference was made here to 'Toto' automatic self-cleaning toilet systems which are considered by some to provide benefit and convenience, but it is not known if any formal research has been conducted on this.

The factors considered to promote MH&WB were:

- having space to entertain and engage in social activity;

- access to the outside for both social mixing and exposure to sunlight;

- services (e.g. shops) close to the home with easy access to the local community;

- windows of an appropriate height to both let light in and see out from (the importance of being able to see green space was raised);

- the ability to be able to control living conditions (notably heating and lighting); appropriate interior colour schemes (to raise mood);

- good security, such as locking windows and door security systems;

- access to telecommunications and personal alarms;

- adequate mobility aids, such as appropriately designed Zimmer frames;

- home design that is tailored for people with dementia;

- good lighting - especially important for individuals suffering sight loss or impairment. It is necessary to provide high levels of light with an appropriate spectrum, giving good contrast without sparkle or glare. Light is known to affect mood; blue end light impacts the endocrine system and hence influences sleep patterns and consequently possibly the aging process itself and onset of dementia. Night lighting is important to aid night-time mobility and help prevent falls.

CONCLUSIONS

In considering possible associations between the indoor environment and disorders of the musculoskeletal and nervous systems in an aging population, the identified priority topics were:

- mobility and associated dwelling characteristics (building structure and design, presence of steps and stairs, etc.);

- high temperature;

- low temperature;

- mental health and wellbeing.

High and low temperatures and mental health and wellbeing were selected for further analysis, mostly on the basis of the likelihood of identifying novel actions and research opportunities for further exploration in the context of the WELLINE project.

The following recommended actions and gaps in knowledge were identified:

Low temperatures

Actions:

- Retrofitting (and/or improving) insulation, and improving the affordability of and investment in home insulation
- Improving the ergonomics of heating controls and providing multiple and/or mobile controls
- Providing heating allowances under the benefits system
- Application of social marketing and education, including the provision of advice on going out in the cold and the need to wear appropriate clothing (scarves, hats, gloves, etc.)
- Educating occupants on home temperature and its control, and providing risk-based information and advice
- Installation/application of community heating systems
- The issuing of cold weather alerts by the Meteorological Office

Knowledge Gaps:

- Evaluation of the effectiveness of heating allowances
- Evaluation of the impact of the ergonomic siting of heating controls or multiple/mobile controls
- Assessment of how cold impacts on occupant behaviour
- Investigation of how cold specifically affects the pathology of stroke and myocardial infarction

- Investigation of the relationship between cold temperatures and falls
- Investigation of how age-related changes in thermal behaviour affect stroke and myocardial infarction
- Investigation of how age-related changes in use/knowledge of heating systems affect stroke and myocardial infarction
- Investigation of interactions between the effects of cold and exposure to ETS/particulate matter

High temperatures

Actions:

- Provision of shading, for example by planting trees close to the house
- Education regarding the existence/availability of solar shading (shutters, blinds, etc.)
- Provision of appropriate/improved ventilation

Knowledge Gaps:

- Investigation of endothelial activation by heat
- Investigation of the interaction between heat, cardiovascular/stroke pathology and behaviour
- Investigation of interactions between heat and morbidity

Mental health and well-being

Actions:

- Guard against 'learned helplessness'
- Give individuals a grant with the choice (within set parameters) of how to spend it to create a 'smart home'
- Provide access to trusted advisers
- Include appropriate products and devices when retrofitting housing, and normalise such products in new houses to provide 'lifetime homes'

Knowledge Gap:

- Identification of possible unintended consequences and negative impacts on other occupants of installing equipment intended to improve the home environment

ANNEX 1: WORKSHOP PROGRAMME

WORKSHOP 2 (25th November, Skipton House, London)

Indoor Environment and Chronic Disorders of the Musculoskeletal and Nervous Systems

8.30-9.00 Registration

Part 1: Introduction and Background

9.00-9.05 Jon Ayres

Introduction on Aims of the Project

9.05-9.25 George Morris and Sheila Beck

Introduction to the DPSEEA model

Part 2: Introduction on musculoskeletal/nervous systems and the indoor environment

9.25-9.30 Jon Ayres
Overview of chronic disorders affecting the musculoskeletal system system, with a focus on the possible interaction on indoor environment and potential for prevention/mitigation.

9.30-9.45 Patient with arthritis on his/her experience of the condition [Cancelled]

10.20-10.30 Tom Walsh
Overview of chronic disorders affecting the nervous system, with a focus on the possible interaction on indoor environment and potential for prevention/mitigation.

10.30-10.40 Stroke sufferer on his/her experience of the condition

10.40-11.15 Coffee break

Part 3: DPSEEA mapping

11.15-12.15 Workshop on DPSEEA mapping for respiratory system and the indoor environment

12.15-13.30 Lunch

13.30-14.30 Workshop on DPSEEA mapping for cardiovascular system and the indoor environment

14.30-15.00 Coffee break

Part 4: Summary and the Next Steps

15.00-16.00 Summary, conclusions, next steps

ANNEX 2: THE MODIFIED DPSEEA MODEL

In Scotland, the Good Places, Better Health[1] policy recognised the need to make better connections between health and the physical environments in which people live, work, are educated, and take their leisure. The first phase of this new approach is to frame problems, gather intelligence and analyse relationships. In order to do this, a model has been identified and modified[2], which allows structured cross-sectoral discussion and reporting of the issues and current actions or those which could be considered in the future.

The model, (DPSEEA – which is an acronym of the elements within the model (described below)) was first conceived for work by the World Health Organisation[3;4] to develop indicators for a European environment and health initiative. DPSEEA provides a simple structure to consider the ways in which specific elements in the environment impact on health; the ways in which these environments are generated; and actions which can be taken to address the results chain which ends with health outcome(s). In addition the modified model (modified DPSEEA) considers the issues which determine whether people are exposed to particular environmental factors and whether these exposures subsequently lead to health effects (the contexts). The model has proved a useful tool in engaging people from a wide range of backgrounds in common discussion of the issues and in providing structured feedback on those discussions.

The modified DPSEEA has been provided as a diagram below (Figure 1), which gives the details of how the acronym is formed (the first letter of each element is underlined, starting at the top of the diagram).
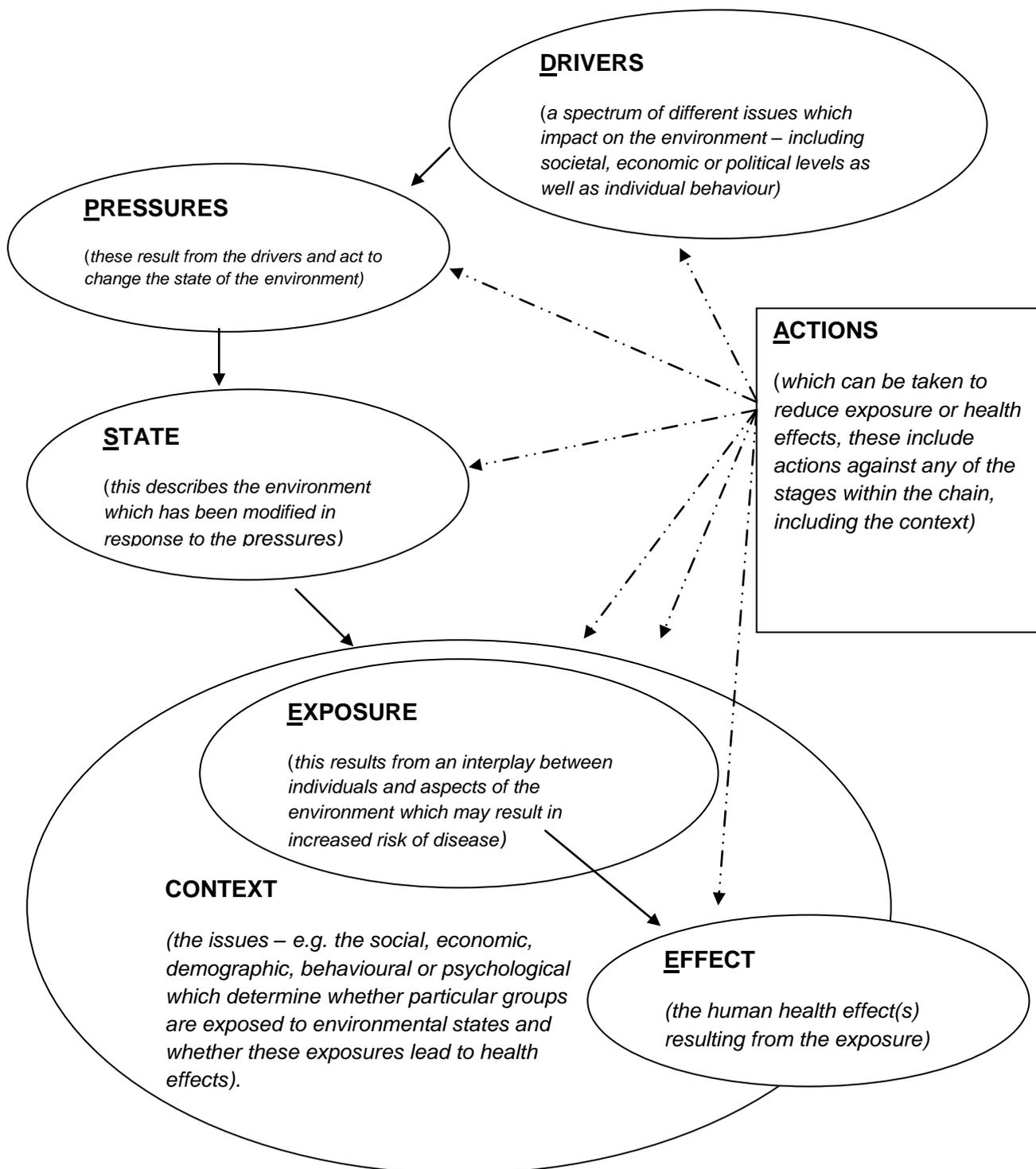
The model can be read from any starting point. Starting from health effect, it considers the environmental exposures that may influence such an effect, and the contexts which determine exposure and the risk of an observable health effect. From there it considers the environmental states which lead to such exposures, the man made pressures on environments leading to such states and the social, political, economic, commercial, fiscal and other human activities which lead to these pressures. All points on the chain are then considered for possible action.

There is often no one single environmental factor which leads uniquely to a single health effect, and the model is often branched, with multiple chains leading to a number of different health impacts. Thus an action which has been envisaged to impact on one health state may result in impacts on a number of other health states or issues (some of which may be positive and others negative). DPSEEA modelling will establish the former, and the latter will be explored by other programmes within the Good Places, Better Health implementation.

Reference List

(1) Scottish Government. Good Places Better Health. http://www scotland gov.uk/Publications/2008/12/11090318/0
(2) Morris G, Beck S, Hanlon P, Robertson R. Getting strategic about environment and health. Public Health 2006; 120(10):889-903.
(3) WHO. Development of environment and health indicators for European Union Countries: results of a pilot study. http://www euro who int/eprise/main/WHO/Progs/EHI/Methodology/20040602_1 [2004 [cited 2004 Dec. 6]];
(4) WHO. Environmental health indicators for Europe: a pilot indicator-based report. www euro who int/document/eehc/ebakdoc04 pdf [2004 [cited 2004 Dec. 7]].

Figure 1 The modified DPSEEA model

DRIVERS

(*a spectrum of different issues which impact on the environment – including societal, economic or political levels as well as individual behaviour)*

PRESSURES

(*these result from the drivers and act to change the state of the environment)*

ACTIONS

(*which can be taken to reduce exposure or health effects, these include actions against any of the stages within the chain, including the context)*

STATE

(*this describes the environment which has been modified in response to the pressures)*

EXPOSURE

(*this results from an interplay between individuals and aspects of the environment which may result in increased risk of disease)*

CONTEXT

(the issues – e.g. the social, economic, demographic, behavioural or psychological which determine whether particular groups are exposed to environmental states and whether these exposures lead to health effects).

EFFECT

(the human health effect(s) resulting from the exposure)

ANNEX 3: FLIPCHART NOTES AND CHARTS

<u>FLIPCHART 1</u>

ISSUES AND ASPECTS RELATING TO MOBILITY

Elevation/'Reachability' – especially for wheelchair users

Stairs and steps

Doorways

Access to the outside

Configuration and layout

Positioning (e.g. doors, light switches and sockets) - especially for wheelchair users

Lighting

Door handles / door furniture

Floor coverings

Furniture size / Clutter

Trip hazards

Access to bathroom/toilet

Design/size/layout of bathroom/toilet

Room temperature [*People in cold homes take more exercise and go out more. Why? (research gap). Colder conditions (<15°C) lead to increased risk of falls*]

FLIPCHART 2

PRIORITISED BRAINSTORM LIST OF TOPICS AND ISSUES [NUMBER OF VOTES˜]

Mobility (e.g. relating to traumatic injury, stroke, degenerative joint disease) [15]

Psychological health and wellbeing [14]

Incontinence [5]

Falls (cause and consequence) [4]

Dexterity [3]

Personal circumstances (socio-economic status/relationships/culture/social support) [3]

Personal hygiene [2]

Vision [1]

Workplace transition [1]

Ambulation

Cognition

Sensory loss

Swallowing/speech/language

Transport environment

Multiplying effects of co-morbidities

˜ None, unless otherwise indicated. All delegates were allowed three votes.

ISSUE: LOW TEMPERATURE

DRIVERS	ACTIONS	GAPS
Thermal inefficiency of housing stock– building regulations/historical/commercial	Retrofit or improve insulation; Improve affordability/investment	
Housing Act 2004 – controls heating and lighting		
Behaviour/knowledge: regulation of heating system		
Beliefs about optimal temperature of home	Education and information dissemination (risk based)	
Commercial: design of heating systems and controls		
Retro-fitting of central heating		
Cost of fuel	Heating allowances (benefit system)	Evaluation of effectiveness
Placement of controls (in dwelling)	Provide multiple/mobile controls; ergonomic siting of heating controls	Evaluation of effectiveness
Climate change: greater frequency of cold snaps		

PRESSURES

Thermal inefficiency of housing		
Level of heating in home	Community heating systems	

STATE

Cold temperatures – Rooms 15°C or less

EXPOSURE

Spike of cold ≤15°C or prolonged ≤18°C		How does cold impact on behaviour?

EFFECT

Stroke (thrombotic)/Myocardial infarction		Knowledge of effects on pathology
Increased joint pain		
Raised blood pressure		
Increased risk of falls		What is the nature of the relationship?

CONTEXT

Age: Changing behaviour and physiology

Age: Slower perception of temperature change - thermal behaviour		How does this affect stroke/myocardial infarction?
Age cohort: Frugality habit		
Behaviour: Use/knowledge of heating systems		How does this affect stroke/myocardial infarction?
Behaviour: Going out into the cold	Social marketing: Advice on going out in the cold and appropriate clothing (scarves, hats, gloves)	
	Cold weather alerts (Met Office)	
Behaviour: Sleeping in cold rooms with windows open		
Behaviour: Wearing warm clothing	Social marketing/education	
Underlying health conditions		
Socio-economic factors – cost concerns; fuel poverty		
Weight/obesity (risk factor for osteoarthritis)		
Interactions with ETS/particle exposure		What is/is there such an interaction?
Social isolation		
Deprivation/Poverty		

FLIPCHART 4

ISSUE: HIGH TEMPERATURE

DRIVERS	ACTIONS	GAPS
Heat-wave (Climate/weather) – e.g. over 30°C in London	Plant trees close to house	
Temperatures at night not falling below 20°C		
Thermal capacity of house		
Security concerns (closed windows)		
Unable to open windows		
Heat sources within home		
Air-tightness of housing		
(Lack of) Provision of solar shading	Education regarding existence/availability of blinds, etc.	
Solar gain of housing		

PRESSURES

Radiant temperature of rooms		

STATE

Over-warm dwellings	Provide shading	
High humidity and reduced air movement	Provide ventilation	
Hot radiators		

EXPOSURE (in UK)

Prolonged exposure to ≥24°C; acute exposure to ≥30°C		
Burn risks		
Rate of change/timescales of exposure		

EFFECT

Dehydration leading to stroke		Endothelial activation effects of heat
Cardiovascular strain leading to increased heart rate and reduced blood flow to heart		Interaction between heat, pathology and behaviour

Less physical activity

Burns (from radiators)

CONTEXT

Mobility levels

Behaviour: Lethargy

Function: Ability to open windows/remove
bed clothes

Underlying morbidity levels   Interactions with heat

Behaviour: Clothing

Social isolation

Health status: Parkinson's disease – ability
to perceive heat status

ISSUE: MENTAL HEALTH AND WELLBEING (MH&WB) – Environmental characteristics relevant to the population groups of interest

FACTORS DEGRADING MH&WB	FACTORS PROMOTING MH&WB
Lack of access to rooms – impacts on ability to engage in everyday family life	Space to entertain / Social activity
Incontinence – accessibility of toilet facilities; cleanliness of toilet facilities (reference to 'Toto' self-cleaning toilets)	Access to outside of home – to see others / for exposure to natural sunlight
	Windows of a suitable height to see out (preferably green space) and let light in
	Ability to control living conditions (heating/lighting)
	Colour (affects mood)
	Lighting, especially for individuals suffering sight loss (also affects mood): Need high levels of light without sparkle or glare, good contrast (corners not curves) and an appropriate spectrum (affects warm/cool appearance). Blue end light is effective on endocrine system which in turn influences sleep patterns and thus possibly the ageing process and dementia.
	Homes designed for individuals with dementia
	Night lighting – to aid mobility and prevent falls
	Good security in housing – door entry system; locking windows
	Access to telecommunications
	Access to personal alarms
	Adequate and appropriate mobility aids in the home – e.g. appropriately designed Zimmer frames
	Services surrounding the home and access to community – e.g. village for the elderly with shops, etc.

ISSUE: MENTAL HEALTH AND WELLBEING (MH&WB)

DRIVERS	ACTIONS	GAPS
Socioeconomic factors – ability to pay	Provide grants	
Behaviour/knowledge of available products and services	'First Stop' provides information on housing with available products/services to support independent living	
	New advice lines to be launched in Spring 2010	
	Need access to trusted advisers	
DFG/grants system/occupational therapy services (and others) judge need and/or eligibility and are limited to what is 'on the list'	Appropriate products/gadgets should be included in retrofitting of housing in respect of climate change	
	Normalise such products and gadgets (e.g. programming of lighting) in houses to provide 'Lifetime homes' with wheelchair access through planning gain	

PRESSURES

Retrofitting of products	Give individuals grant with choice of how to spend to create a 'smart home', but with a level of control within set parameters	
Fitting of products during build		

STATE

Home which facilitates control and self determination with respect to health and wellbeing (e.g. with Toto toilets)	Guard against 'learned helplessness'	Unintended consequences – e.g. stair lifts impeding use of stairs by others

EXPOSURE

Ability to live independently and control living conditions

EFFECT

Psychological wellbeing

CONTEXT

Individual function: Ability to control
products

Socioeconomic: Affordability

Family/living circumstances

Attitude to disability

Expectations/aspirations with respect to
function and age

Social interactions and links