



WELLINE, Workshop III: 9th Feb 2010

Indoor Environment and Chronic Disorders across the Life Course

SUMMARY OF WELLINE WORKSHOPS 1 AND 2

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WELLINE WORKSHOP 1

THE INDOOR ENVIRONMENT AND DISORDERS OF THE RESPIRATORY AND CARDIOVASCULAR SYSTEMS

University of Birmingham, 23 September 2009

Chronic lung diseases

Asthma

- Occurs in around 15% of children and 6% of adults
- Main symptoms are breathlessness, wheeziness and cough (with or without sputum)
- Patients with chronic asthma often have persistent breathlessness which can severely limit mobility.

Chronic obstructive pulmonary disease (COPD)

- Affects about 10% of the UK population over the age of 40
- The only chronic disease which is increasing globally
- Largely due to cigarette smoking
- Main symptoms are breathlessness on effort and coughing sputum
- In the late stages of the disease, breathlessness occurs at rest which is severely incapacitating.

Chronic heart diseases

Coronary heart disease (angina and heart attack)

- About 5% of people aged 55 to 64, and about 11% of those aged 65 to 74, have or have had angina.
- Each year there are around 240,000 admissions to hospital for angina or heart attack.
- Symptoms (chest pain) occur on exertion and are usually relieved with rest.
- Angina attacks vary in frequency and duration.

Heart failure

- Occurs in around 1% of people aged under 65, in around 6% of those aged 75 to 84 and around 17% of those aged 85 and over.
- Over 106,000 admissions to hospital annually.
- The main symptoms are breathlessness, tiredness, reduced exercise capacity, fluid retention, with swelling of the feet and ankles.
- In the later stages of the disease, breathlessness may occur at rest which is severely incapacitating.

Workshop Findings

- Although the focus was on the domestic (home) environment, it was acknowledged that care homes and communal indoor environments (public buildings) are also relevant. It was considered that outputs from this exercise should include *very practical guidance*, for example for builders.
- Important identified sources of background information were the report on 'Health and Safety Risk Drivers' and also the Health and Housing Safety Rating System (HHSRS). It was recognised that the published COMEAP guidance on indoor air quality was relevant.
- Lists of relevant dwelling characteristics and priority topics for further discussion and analysis were produced.

Dwelling Characteristics

In considering how aspects of the home might influence COPD and CVD, the following dwelling characteristics were identified as being of potential importance:

- **Presence of stairs**
- **Heating systems amenable to control**
- **Building layout and ergonomics – including room, corridor and door size, toilet accessibility and storage/appliance reachability**
- **Communications**
- **Openable bedroom windows**
- Thermal efficiency (temperature)
- Ventilation (dwelling specific or building specific for multiple occupancy buildings)
- Moisture control and mould growth
- Indoor pollution from combustion products, consumer products and building products
- Presence of natural light
- Noise

[Those in bold were considered to be specifically relevant to dwellings of individuals with COPD or CVD].

Priority Topics

Topics identified as being of particular interest or importance were:

- **Building structure and design: presence of stairs, location of toilets, building modifications**
- **Factors for primary prevention: damp and cold housing, temperature extremes**
- **The health endpoints of breathlessness and dizziness**
- Factors causing incremental worsening of conditions: smoking, environmental tobacco smoke (ETS), occupational exposures
- Volatile organic compounds
- Exacerbation/destabilisation of condition: COPD, CVD (cold), climbing stairs, moving between rooms

[Those shown in bold were considered further through application of DPSEEA]

Further analysis of a number of selected DPSEEA 'states' led to a number of recommended actions and identified gaps in knowledge.

Actions and Knowledge Gaps

Dwelling not suitable for life-long living

Actions

- Appropriate adaptation of the house;
- Move to other more suitable housing;
- Enforcement of the Housing Act 2004 and implementation of the Housing Health and Safety Rating System.

Knowledge Gaps

- Whether the National House Condition Survey contains or enables links with relevant health data;
- Informational need relating to compatible space resolution within buildings;
- Need for a definition of the ideal living environment for people with COPD/CVD – i.e. a statement of best practice;
- Lack of knowledge of the nature and impact of modifications made after dwellings are built.

Presence of stairs

Actions

- Have help with the stairs;
- Install a stair-lift;
- Reorganise the house and/or living arrangements to eliminate or reduce the use of the stairs;
- Obtain grants (or loans or equity releases) to make appropriate modifications.

Inability to heat the dwelling adequately

Actions

- Installation of insulation (grants may be available);
- Application of building standards;
- Policy initiatives tackling fuel poverty (improving insulation and heating).

Knowledge Gaps

- Whether physiological responses are primarily to changes in body temperature or air temperatures *per se*;
- Profiles of thermal exposure;
- Impact of cold homes on behaviour (e.g. going out);
- Effects of climate change on older people;
- How temperature affects individuals with specific diseases.

Inadequate ventilation / Poor indoor air quality (IAQ)

Actions

- Control of VOC emissions from products (as in France, for example);
- Education and passing of information between residents;
- Building control mechanisms;
- Production of a 'House Handbook'.

Knowledge Gaps

- Health impacts (effects and mechanisms) of VOCs;
- Health impacts of air movement (rather than air exchange rate);
- Personal exposures within a building;
- Health impacts of high CO₂ levels;
- Ventilation levels (rather than air tightness) in individual houses;
- Age related behaviours such as opening of windows;
- The different ventilation rules/guidance in England, Scotland and Wales;
- House condition reports (in Scotland) prepared on the sale of a house.

Natural light levels

Knowledge Gaps

- The impact of quality of life and Vitamin D deficiency on the progression of chronic disease and general mobility.

Layout and Ergonomics

Actions

- Building control requirements;
- Provision of building adaptation grants;
- Moving house to a more appropriately designed dwelling.

Knowledge Gaps

- Systematic review of evidence required.

Internal and external communications

Actions

- Installation of appropriate alarm systems

Knowledge Gaps

- Systematic review of evidence required.

Noise levels

Knowledge Gaps

- Individual noise exposure levels and subjective noise thresholds.

WELLINE WORKSHOP 2

THE INDOOR ENVIRONMENT AND CHRONIC DISORDERS OF THE MUSCULOSKELETAL AND NERVOUS SYSTEMS

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

Musculo-skeletal disease:

Degenerative joint disease

- **Osteoarthritis**
 - affects the joints and the spine
 - can also affect nerves emanating from the spine (causing sciatica)
 - problems associated with joint and bone degeneration increase with increasing age
- **Rheumatoid arthritis**, a systemic inflammatory condition that mostly (but not uniquely) affects hands/fingers - and therefore grip - and can strike at any age.
- Both these conditions can make even a small obstacle, such as a step, a major problem and impediment.

Neurological disease

- **Stroke** - the most common cause of adult neurological disability.
 - consumes 5% of the total NHS budget.
 - 80% of cases are due to thrombosis of a cerebral artery, the remaining 20% being due to cerebral haemorrhage
- About a third of stroke patients suffer psychological illness (depression)
 - many other negative outcomes involving mood, activity level and brain and body function.
- **Parkinson's disease**
 - characterised by tremor and restricted or impaired movement.

Key Issues

The principal issue for individuals suffering from musculoskeletal or neurological conditions was considered 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**
- **Access to the outside**
- **Floor coverings**
- **Avoidance of trip hazards, unwieldy furniture and general ‘clutter’**
- Lighting
- Room temperature

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

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

Workshop Analysis

- 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 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*

selected for further analysis

Recommended actions and gaps in knowledge

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
- 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 underlying morbidity levels

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

SUMMARY OF IDENTIFIED KNOWLEDGE GAPS

Chronic respiratory and cardiovascular disease

- Whether the National House Condition Survey contains or enables links with relevant health data;
- Informational need relating to compatible space resolution within buildings;
- Need for a definition of the ideal living environment for people with COPD/CVD – i.e. a statement of best practice;
- Lack of knowledge of the nature and impact of modifications made after dwellings are built.
- Whether physiological responses are primarily to changes in body temperature or air temperatures *per se*;
- Profiles of thermal exposure;

- Impact of cold homes on behaviour (e.g. going out);
- Effects of climate change on older people;
- How temperature affects individuals with specific diseases
- Health impacts (effects and mechanisms) of VOCs;
- Health impacts of air movement (rather than air exchange rate);
- Personal exposures within a building;
- Health impacts of high CO₂ levels;
- Ventilation levels (rather than air tightness) in individual houses;
- Age related behaviours such as opening of windows;
- The different ventilation rules/guidance in England, Scotland and Wales;

- House condition reports (in Scotland) prepared on the sale of a house.
- The impact of quality of life and Vitamin D deficiency on the progression of chronic disease and general mobility.
- Systematic review of evidence required on impacts of building design, layout and ergonomics
- Systematic review of evidence required on impacts of external and internal communications
- Individual noise exposure levels and subjective noise thresholds.

Musculo-skeletal and neurological conditions

- 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
- Investigation of endothelial activation by heat
- Investigation of the interaction between heat, cardiovascular/stroke pathology and behaviour
- Investigation of interactions between heat and underlying morbidity levels
- Identification of possible unintended consequences and negative impacts on other occupants of installing equipment intended to improve the home environment



Discussion

Thank You