JPND research

EU Joint Programme – Neurodegenerative Disease Research

Report on JPND Workshop on Public Health in Neurodegenerative Disease

Paris 21st June 2017

Table of Contents

This report is not intended to be a comprehensive summary, but is instead an overview of topics and views contributed by the experts who attended the workshop.

1. Workshop background and remit

The Joint Programme for Neurodegenerative Disease (JPND) Scientific Advisory Board has identified public health as an emerging area in neurodegenerative disease (ND) research, with relevance across the basic, clinical and health and social care domains. In addition, dementia has been recognised as a public health priority by the WHO and the G8 dementia summit declaration (2013). Currently, public health is under represented in the JPND Research Strategy.

The findings summarised in this report are the result of a JPND workshop that explored the development of public health in ND research in order to provide a view of the opportunities and challenges in the near and longer term. The workshop also examined the barriers and solutions involved in giving greater priority to public health research, particularly in areas such as prevention and risk-reduction which have recently become more prominent.

This report will be used by the JPND Scientific Advisory Board (SAB) in preparing the 2018 edition of the JPND Strategic Research and Innovation Agenda (SRIA), which will become a framework for future JPND investment in ND research.

Public health refers to organised measures to harness the best evidence on prevention, treatment and management of health conditions to optimise population health. It includes the integration of primary, secondary and tertiary prevention for policy, service and societal outcomes.

The emphasis in public health is upon interventions for health protection, health promotion and healthcare. These are all activities concerning the rational use of limited resources for the best possible health and wellbeing through the entire life course. Progress in achieving population health is dependent on translation into actions, interventions or behaviours at the individual level or change through policy and legislation at the population and societal level.

2. List of attendees

Name	Position/Affiliation
Charles Alessi	Senior Advisor Public Health England, Lead for Public Health England for Dementia, Chair of the National Association of Primary Care
Philippe Amouyel (*JPND MB Chair*)	Professor of Epidemiology and Public Health, Inserm, Lille, University, France/JPND Management Board Chair
Ettore Beghi	Head Laboratory of Neurological Disorders, Department of Neurosciences, IRCCS Mario Negri, Institute for Pharmacological Research, Milan Italy
Yoav Ben-Shlomo	Professor of Clinical Epidemiology, School of Social and Community Medicine, University of Bristol, UK
Michael Brainin	Head of the Department for Clinical Neuroscience and Preventive Medicine / Head of the Center for Neurosciences, Danube University KREMS, Austria
Rabih Chattat	Associate Professor, Department of Psychology, University of Bologna, Italy
Neerja Chowdhary	Technical Officer, Department of Mental Health and Substance Abuse, World Health Organization, Geneva, Switzerland
Adelina Comas-Herrera	Assistant Professorial Research Fellow, Personal Social Services Research Unit, London School of Economics and Political Science, UK
Ana Diaz	Project Officer, Alzheimer Europe, Luxembourg
Carole Dufouil	Research Director at Inserm Center UMR1219, co-director of VINTAGE team, France
Alexis Elbaz	Research Director at Inserm U1018 Centre for research in Epidemiology and Population Health, Villejuif, France
Tormod Fladby	Professor of Neurology - Division of Medicine and Laboratory Sciences - University of Oslo/ Department of Neurology at Akershus University Hospital, Norway
Thomas Gasser (*SAB Chair*)	Professor of Neurology and Director of the Department of Neurodegenerative Diseases at the Hertie-Institute for Clinical Brain Research at the University of Tübingen, Germany
Chris Gastmans	Professor of Medical Ethics and Head of the Centre for Biomedical Ethics and Law at the Faculty of Medicine, KU Leuven, Belgium
Arfan Ikram	Assistant Professor in Neuroepidemiology at the Erasmus MC, Rotterdam, The Netherlands
Anthea Innes	Coles-Medlock Director of the Salford Institute for Dementia, University of Salford, UK
Frank Jessen	Director of the Clinic for Psychiatry and Psychotherapy at University Hospital Cologne, Germany
Mika Kivimaki	Professor of Social Epidemiology, Department of Epidemiology and Public Health, University College London, UK
Seb Koehler	Alzheimer Center Limburg and Head Neuroepidemiology Group, School for Mental Health and Neuroscience, Maastricht University, The Netherlands
Alastair Leyland	Professor of Population Health Statistics and Associate Director MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, UK
Gill Livingston	Professor of Psychiatry of Older People, University College London, UK
Fiona Matthews	Group Leader, MRC Biostatistics Unit, University of Cambridge and Professor of Epidemiology, Newcastle University, UK
Rene Melis	Assistant Professor, epidemiologist, healthcare improvement science, Radboud University, Nijmegen, The Netherlands
Ninoslav Mimica	Professor of Psychiatry/President of Alzheimer Croatia, School of Medicine, University of Zagreb, University Psychiatric Hospital Vrapče, Croatia

Gail Mountain	Professor of Applied Dementia Research, School of Dementia Studies, University of Bradford, UK
Eamon O'Shea	Personal Professor in the School of Business & Economics and was inaugural Director of the Irish Centre for Social Gerontology, National University of Ireland Galway, Ireland
Jesús de Pedro Cuesta *(SAB Member)*	Head of the Department of Applied Epidemiology at the National Center for Epidemiology, Carlos III Institute of Health, Madrid, Spain
Magali Perquin	Epidemiology and Public Health Research Unit of Luxembourg Institute of Health Department of Population Health, Luxembourg
Marieke Perry	Senior researcher, Dept of Geriatric Medicine and Dept of Primary and Community Healthcare, Radboud University Medical Centre Nijmegen, The Netherlands
Edo Richard	Neurologist, Department of neurology at the Academic Medical Center, Amsterdam/Radboud University Medical Center, Nijmegen, The Netherlands
Steffi Riedel-Heller	MPH Director Institute of Social Medicine, Occupational Health and Public Health, University of Leipzig, Germany
Ian Robertson	Professor Emeritus, Co-Director, Global Brain Health Institute, Trinity College Dublin, Ireland
Alexandra Rodrigues	JPsustaiND/JPND Programme Consultant, Innovation Fund, Denmark
Martin Rossor (*SAB Vice-Chair*)	Professor of Clinical Neurology, National Hospital for Neurology and Neurosurgery London/NIHR National Director for Dementia Research, UK
Nikolaos Scarmeas	Associate Professor of Clinical Neurology, National and Kapodistrian University of Athens / Columbia University
Charles Scerri *(SAB Member)*	Senior Lecturer in Neuropathology and Neuropharmacology, University of Malta, General Secretary of the Malta Dementia Society
Sudha Seshadri,	Professor of Neurology, Boston University Alzheimer's Disease Center, United States.
Henning Tiemeier	Professor of Psychiatric Epidemiology, Department of Epidemiology, Erasmus MC, Rotterdam, The Netherlands
Jaakko Tuomilehto	Professor Emeritus of Public Health of the University of Helsinki, Finland
Marjolein de Vugt	Health psychologist/Co-head Alzheimer Center Limburg, Maastricht University, The Netherlands

JPND and partner organisations

Kate Adcock	JPND and Medical Research Council
Simon Fisher	JPND and Medical Research Council
Catherine Moody	JPND and Medical Research Council
Grace Kiser	JPND and Fondation Plan Alzheimer
Emilie Haignere	JPND and Inserm-Transfert
Melanie Varlet	Inserm

3. Introduction and overview of agenda

The full agenda for the meeting is provided in Annex 1. The workshop began with an introduction from Thomas Gasser (JPND Scientific Advisory Board Chair) followed by an overview of the activities of JPND from Philippe Amouyel (JPND Management Board Chair). There were three scene-setting presentations; the first of these covered the key findings of the JPND-supported Working Group: 21st Century EURODEM (Edo Richard). This was followed by talks on prevention and interventions (Gill Livingston) and a perspective on health economics and policy (Adelina Comas-Herrera). Slides for the presentations are provided in Annex 2.

4. 21st Century EURODEM: from observations to interventions - Edo Richard

Dr Richard discussed the value of population-based longitudinal cohorts as the basis of informed decisions towards public health strategies in the prevention of dementia, covering key findings from the 21st Century EURODEM working group. The following points of interest were highlighted:

- An important distinction should be made between population-derived and population representative cohorts. The latter contains all risk groups within a population

- Cohorts should account for changing demographics and risk factors over time (e.g. education, migration, nutrition, lifestyle, drugs,) which can modify the composition of the population

- A life course perspective should be adopted, even within cohorts, considering changes in risk factors over early, mid and late life (and not simply to consider single risk factors in isolation)

- Knowledge of dementia pathophysiology in patients changes over time. In addition, our ability to measure these alternations changes with time as the technology to measure them improves (e.g. advances in cerebral spinal fluid/PET imaging) and diagnostic criteria change.

- Reports of dementia prevalence are inconsistent between studies. A Dutch study[1] found age-specific incidence of dementia has not declined over the last two decades, in contrast to the Cognitive Function and Ageing Studies (CFAS)[2] and Framingham studies[3]. See perspective from Larson and Langa 2017, *What's the "Take Home" from Research on Dementia Trends?*[4]

Dr Richard identified a number of key steps to move forward in this area:

- Optimise the use of current cohorts through pooling or repurposing. Information from a single cohort is unlikely to lead to an intervention trial with a high chance of success
- Assure adequate dementia ascertainment rate for the population being studied
- Establish new cohorts only when necessary and considering existing data sets and gaps
- Additional cohort studies are needed on under-represented populations e.g. low socio-economic groups (these groups are often at higher risk of dementia vs. wealthier groups)
- Richness of data in longitudinal cohort studies makes them excellent platforms for early stage or proof of concept trials.

---

[1] van Bussel et al. (2017) Dementia incidence trend over 1992-2014 in the Netherlands: Analysis of primary care data. *PLoS Med* 14(3): e1002235.

[2] Matthews et al., (2016) A two decade dementia incidence comparison from the Cognitive Function and Ageing Studies I and II. *Nat Commun*. 7:11398.

[3] Satizabal et al. (2016) Incidence of Dementia over Three Decades in the Framingham Heart Study. N Engl J Med 2016; 374:523-532

[4] Larson EB, Langa KM (2017) What's the "Take Home" from Research on Dementia Trends? *PLoS Med* 14(3): e1002236.

5. Prevention and interventions - Gill Livingston

Prof. Livingston provided a perspective on the prevention of dementia and outlined the current evidence for a range of interventions based on the recent Lancet Commission on Dementia Prevention, Intervention, and Care[5]. She indicated that work is needed to pull together new knowledge on risk factors and that further high quality evidence is required to evaluate the effectiveness of intervention strategies for dementia. The following points were highlighted:

- Incidence of dementia in many countries is decreasing however, the total number with dementia is increasing (*aging population*), this is a particular trend in developing countries[6]

- The reduced incidence of dementia is thought to be due to increasing brain cognitive reserve or reduced brain damage (e.g. oxidative stress) and inflammation

- Approaches to prevention need to be ambitious, since they are always preferential to treatment. Recent disappointing trials (e.g. preDiva, MAPT) suggest greater potential for either longer term interventions or interventions such as controlling blood pressure, continuing education and increasing exercise in high risk populations

- Additional research is required on less well-known dementia risk factors including hearing loss, social isolation/disengagement, pollution, sleep, alcohol and diet

- Dementia care should be individualised in terms of needs, resources, culture and environment. Also to protect and manage risk (*risk enablement*) and maximise capacity

- *Specific interventions discussed included:*
    - Cognitive training
    - Exercise and cognition
    - Capacity and risk management
    - Drugs (repurposing and drug discovery)
    - Case management (interventions by social worker/nurse)

- *Recommendations from the European Association of Palliative Care:*
    - Person centred care
    - Communication
    - Shared decision making (including carers)
    - Optimal treatment of symptoms
    - Advance planning and continuity of care
    - Psychosocial and spiritual support

Prof. Livingston identified a number of key questions for the field:

- At what severity of dementia do people die?
- What recognition is there among health professionals that mild to moderate dementia can be accompanied by comorbidities such as cardiovascular disease?
- What difference does having other conditions alongside dementia make to outcome and should treatment be individualised to take account of the different comorbidities?
- What interventions would be helpful? (e.g. help with navigating services, decision aids, recognition of pain, help with medication, tailored interventions).

---

[5] Livingston G, Sommerlad A, Orgeta V, et al. Dementia prevention, intervention, and care. Lancet 2017; published online July 20 .http://dx.doi.org/10.1016/ S0140-6736(17)31363-6

[6] Graph shown on the growth in numbers of people with dementia in high-income (HIC) and low- and middle-income countries (LMIC) from Prince et al., (2013) Alzheimer's & Dementia 9 (1), 63-75.e2

6. Perspective on health economics and policy - Adelina Comas-Herrera

Adelina Comas-Herrera highlighted key economic questions in relation to dementia interventions and care. This included asking, how can we afford to meet the future needs of people with dementia and their carers and what improvements are necessary to demonstrate the value of public health approaches. The following points of interest were noted:

- Identify ways of moderating or reducing dementia prevalence
- Make sure that we 'spend well' on care
- Ensure we have adequate care financing mechanisms

- Simulation models can be used to determine outcome and cost of dementia interventions together with insight into the consequences of implementing evidence based interventions (e.g. Modelling outcome and cost impacts of interventions for dementia - MODEM)

- *Do public health preventative strategies reduce care costs?*
    - Complex issue, as measures may result in increased life expectancy and postpone costs to later life (or even increase time living with dementia)
    - Positive value placed on postponing dementia may be more important than potential cost savings

- *Economic simulation models in dementia prevention programmes. Important aspects to model:*
    - Relationship between multiple risk factors and dementia
    - "Interactions" with other chronic conditions
    - Relationship between risk factors, chronic conditions and life expectancy
    - Relationship between needs and costs

- *Determinants of future dementia care costs include:*
    - Demographic changes
    - Changes in prevalence (by severity).
    - Availability of (and propensity to provide) unpaid care
    - Structure of the care system
    - Financing system: generosity of public finance
    - Relative price of care and other goods and services
    - Economic growth and other macroeconomic factors
    - Values and public expectations about the quality, range and level of care
    - Other factors? Quality/adaptability of housing, pensions

- *Economic incentives to change behaviour are necessary since many people underestimate risk and overestimate health behaviour. Aspects to consider include:*

    - *Intrinsic motivation:* personalised risk assessments, guidance, technological interventions to reach goals
    - *Extrinsic motivation*: Financial incentives, reputation feedback

- *In terms of risk minimisation and inequality:*

    - Dementia risk is not distributed equally across the population and risk factors are not independent of each other:

    - Are some groups accumulating *all* the risk and do these same groups also have fewer resources to deal with the consequences

- *Modelling the impact of risk reduction:*
    - *Randomized controlled trials (RCTs) of risk reduction interventions*. Typically "short" follow-ups, no studies yet showing a direct effect on dementia (only on cognitive performance). Long-term effects unknown
    - *Longitudinal datasets*: Can analyse health-related behaviours and cohort effects and estimate risk factor accumulation and the relationship between risk factors and dementia.

Conclusions:

- Improvements are needed to demonstrate the value of public health approaches to dementia
- We require better data and smarter approaches to filling data gaps within health economics
- Studies need to consider more than simply formal care service costs and include a wider appreciation of the impact on families and the value of old age/retirement.

7. Priorities identified for public health in neurodegenerative disease research

Workshop participants were divided into break-out groups with different scientific backgrounds and asked to identify priority areas for public health in ND research. The following headings represent these priorities brought together with the key points covered by the groups and final discussion:

i) Are additional cohorts needed or do existing cohorts require repurposing?

- There is a need to improve the use of available data to maximise returns from population cohorts and registries
- Greater harmonisation of cognitive measures across countries is required, and this could be based on existing standards
- New cohorts are unlikely to be financially justifiable unless they are based predominantly on passive data acquisition (e.g. wearables). From a ND perspective, when established they should:
    - begin at very early ages (e.g. birth cohorts)
    - adopt a life course perspective
    - receive input from the ND research community to ensure that appropriate measures are collected
- Greater consideration of disease course variability between individuals and life-course exposures is needed to inform risk factors in relation to prognosis rather than prevention
- Improved methods are needed to identify risk factors for dementia/ND which are known to change over time and cohort studies should account for a substantial time gap (e.g. 20 years) between initial biomarker/risk factor exposure and assessment

- Researchers across all European countries should be encouraged to measure exposures and risk factors including the development of the appropriate methodologies

- Risk prediction models need to adopt a broad population basis rather than to be restrictive to a subset of the population. Risk prediction rules should be based on knowledge from cohorts that can inform the development of trials 5 to 15 years before the onset of dementia

- Studies should include estimates of mortality by age, gender and dementia severity to enable long-term modelling of the natural course of dementia. Estimates could be obtained from sharing mortality data from existing cohorts or by linking cohort studies to mortality registries.

ii) Obtaining additional information from cohorts

- *Representative studies/ cohorts in 'hard to reach groups':* To include studies of older black/minority ethnic groups and people living in socially deprived areas. The populations studied also need to include observations in developing and low and middle-income countries

- *Enrichment of existing cohorts:* Cohorts should utilise new technologies to collect passive data e.g. data collected involving methods without active involvement or awareness of the participants from smartphone/electronic devices and on shopping behaviours

- *Cohort repurposing:* Long follow-up studies examine many diseases but are often designed without a specific focus on ND and may miss the related outcome data. Relevant cohorts need to be identified and additional ND-specific measures included

- *Long follow-up times:* These need to be sufficiently long for appropriate outcomes to occur and to enable a better insight into resource use and quality of life in the later stages of dementia

- *New areas of development and refinements in the granularity of risk factors studied:* These include psychosocial factors, air quality, measures of education quality, cognitive reserve built up in early life, hearing loss, sleep and social isolation. Improvements are also needed in the scale of detail in the analysis of risk factors.

iii) Adoption of a broader disease approach, integrating knowledge from other disciplines

- A clearer understanding is needed of the different stages and duration of severity experienced by dementia/ND patients, including additional risk exposures (e.g. falls)

- Horizons should be broadened beyond focusing on a single disease and to consider the whole spectrum of ND including pathophysiological overlap and bidirectional interactions

- Insights can be gained from non-ND (e.g. epilepsy, macular degeneration, HIV, cancer, CVD) since conditions may manifest in analogous ways. Relevant natural experiments should be utilised (e.g. prevention of HIV-associated dementia or AD-like pathology in Down's syndrome)

- Researchers from disciplines outside the ND field should be engaged to broaden perspectives and to achieve a global outlook

- Adopt a wider disease focus which acknowledges that a spectrum of cognitive aging exists, with many people experiencing cognitive impairment in the absence of dementia

- Similarly, undertake research that involves multiscale modelling (e.g. across different temporal and spatial levels) of the complex interactions in the onset and progression of cognitive decline in association with ageing and comorbidities

iv) Patient and Public Involvement and ethical considerations

- Patient and Public Involvement (PPI) and engagement of people with dementia was recognized as important by JPND in 2014 as part of the assessment of proposals for joint projects. More emphasis should be placed on PPI and health and social care elements for dementia within study designs, including the decision-making processes facing patients and their carers

- PPI is becoming a topic of increased focus particularly for combating stigma.

- PPI input is required to add value to intertemporal choices[7] made in the context of dementia/ND. There is a tendency for people to discount the value of outcomes that are perceived as distant in time. This should also include consideration of the impact on families and more broadly the labour market/economy

- Commissioning studies on the effectiveness/impact of PPI and ethical issues surrounding engagement should be considered. For example, to what extent does PPI improve the outcomes of studies/science?

- Research is needed on the relationship between diagnosis and its impact on attitudes towards end of life care that is specific to persons with ND, including decisions and ethics relating to end of life decisions, sexuality, the use of physical restraints and issues connected to daily care.

v) Implementation

- *Behavioural science*: Identify and provide ‘*enablers*’ to convince individuals to implement behaviour changes including consideration of the concept of intrinsic and extrinsic motivation

- Implementation should take account of a range of factors including the setting and all of the healthcare needs of the individual

- Further research is needed to identify the primary targets for intervention. There is scope to explore different interventions such as changing retirement age and reducing social isolation.

vi) Communication

- Greater understanding is needed of the attitudes and perceptions of dementia/ND risk and how society prioritises dementia/ND compared to other diseases

- Consider use of the term ‘*brain health*’ as of key value in public health messaging to promote public engagement around understanding ND-related risk factors and health decline

- Improvements are needed in the consistency of public health communications related to prevention policies and to promote public confidence in health findings

---

[7] These are decisions influenced by the relative value that people assign to two or more payoffs at different points in time (e.g. the trade-off between current quality of life and life expectancy).

- Tackling dementia illiteracy and enhancing the training of health care professionals remains a priority, particularly in the areas of communication and patient engagement around diagnosis and risk/protective factors

- In terms of the social cultural context, the notion of stigma and the perception of dementia remain a barrier to effective communication

- Address the shortage of non-technical, dementia-friendly information specifically targeting patients, particularly those recruited for clinical trials

- Enhance medical student training in disease management, taking account of both medical and social models of disease.

vii) Compression of morbidity and the progression of dementia

- The '*compression of morbidity*' theory states that the burden of lifetime illness may be compressed into a shorter period before death, if the age of onset of disability or disease can be postponed[8]. This concept needs to be further considered for the management of late severe dementia. For example, what value should be placed on disability-free years considering the potential implications for quality of life with dementia in later life?
- There is a need to consider the course of dementia and its impact on life expectancy and cognitive impairment in later life. For example, it is unknown if those who develop dementia later, live for a longer or shorter time post diagnosis.

viii) Inequalities

- Public health should be about equality of access and further cohort studies are needed to study access to care on '*hard to reach groups' (referenced above in 7.ii. point 1)*

- Numerous vulnerable and neglected groups exist within the dementia population (e.g. minority ethnic groups, rural populations). Research is needed on vulnerability and the impact of inequalities over the population life course for groups identified as socially excluded, marginalised or neglected.

- Further work is needed on social health care and inequalities including social isolation and end of life care e.g. knowledge about the benefits of being in acute care hospital for end of life in comparison with other care options

- Inequalities and implementation should be considered in parallel, since interventions that require action at the level of the individual tend to increase inequalities, while population interventions (e.g. legislation or environmental change) may decrease inequalities.

- The role of gender and sex differences in disease risk and expression in dementia/ND is not well understood and requires further exploration.

ix) Others points of discussion for consideration

- Dementia research should be linked to wider concepts of health and society including factors that lead to the enhancement or impairment of cognition across lifespan (e.g. cognitive

---

[8] Fries JF, Bruce B, Chakravarty E. Compression of morbidity 1980-2011: a focused review of paradigms and progress. (2011) J Aging Res. 2011:261702

footprints[9]). This is important in view of fundamental technological advances and socio-economic changes (e.g. automation, driverless cars) and their influence on cognitive engagement across society.

- Research is needed to understand the effect of cognitively enriched environments on cognitive reserve through life course (e.g. educational experiences across generations) and its impact on the compression of the disability and cognitive decline associated with dementia

- An understanding of the impact of personalised healthcare within a heterogeneous population is required. Methods will need to be developed for the implementation of personalised medicine within a public health context

- Economic incentives were identified as a priority area in the context of research to underpin the development of enablers to promote behaviour change and further understand attitudes to risk

- Greater consideration should be given to research involving individuals with dementia outside the formal care system. Research is required on innovations to improve access to formal care to reduce the unmet needs of people with dementia and their informal caregivers

- Enhance our understanding of the interplay of other health factors, for example the potential involvement of infections and environmental levels of heavy metals (e.g. lead, mercury and manganese) in neurodegeneration

- Expand our understanding of the molecular mechanisms involved in the ability of individuals to resist perturbations leading to cognitive decline (cognitive resilience) and to explore its potential value for translation into predictive and therapeutic tools for dementia prevention.

---

[9] Rossor M, Knapp M. Can we model a cognitive footprint of interventions and policies to help to meet the global challenge of dementia? (2015) Lancet, 386 (9997) 1008-10.

8. Summary

The workshop covered a range of issues and a number of common themes emerged which included:

- Optimise and improve the utilisation of data from current cohorts and where possible repurpose or enrich existing cohorts with ND-specific measures

- Equality of access to care, prevention and education should be promoted when formulating public health strategies and studies on cohort diversity should be expanded to include '*hard to reach groups*' and under-represented populations

- Additional research on newly identified risk factors is essential, together with improvements in the methods used to determine the impact of these factors throughout life course

- A broader ND perspective should be adopted by gaining insights from overlapping diseases, other disciplines and embracing the wider concepts of health and society

- The consistency and confidence in public health communication needs to be improved, including a greater understanding of attitudes to risk and how society prioritises dementia

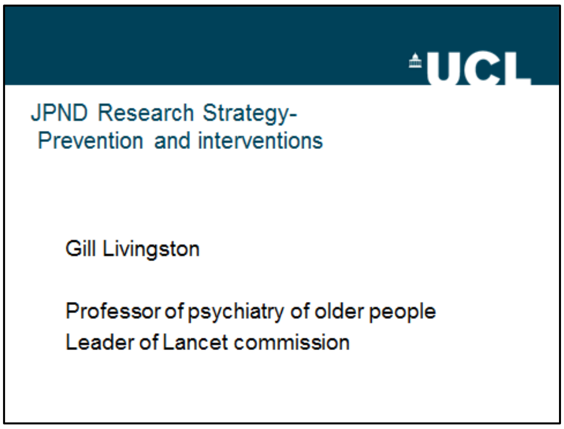
- Greater emphasis is needed on PPI, to understand what outcomes are most important to patients and carers including the issues relating to the complexity of the decision-making e.g. end-of-life care and other ethically sensitive issues.

Annex 1 - Workshop agenda

Time	Item	Note
9:30-10:00am	Registration and morning tea/coffee	
10:00am	Welcome remarks and introduction	Chair: Thomas Gasser
10:05am	Goals of JPND and update on activities	Philippe Amouyel
10:20am	21st Century EURODEM: Key findings and future directions	Edo Richard
10:40am	Perspective on health and social considerations	Gill Livingston
11:00am	Perspective on health economics and policy	Adelina Comas
11:20am	Morning Break	
11:40am	Introduction to break-out groups	Simon Fisher
11:45am	*Sub-group breakouts - Identifying Research Priority Areas* Participants split into 4 sub-groups. The same topics/questions will be explored by each group.	Parallel discussion groups
13:15pm	Lunch	
14:00pm	Summary reports from sub-groups (15 mins per group including Q&A)	Rapporteur of each group
15:15pm	Afternoon Break	
15:30pm	Discussion to decide key recommendations and identify priorities for action	Chair: Martin Rossor
16:25pm	Closing remarks	Thomas Gasser
16:30pm	End of meeting	

Annex 2 - Presentation slides

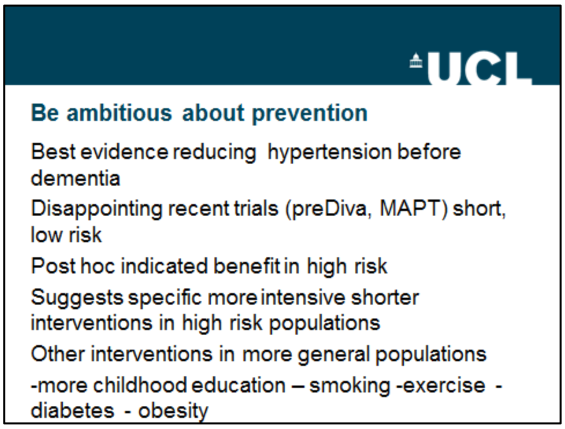
JPND Research Strategy - Prevention and interventions - Gill Livingston



JPND Research Strategy-
Prevention and interventions

Gill Livingston

Professor of psychiatry of older people
Leader of Lancet commission



Be ambitious about prevention

Best evidence reducing hypertension before dementia

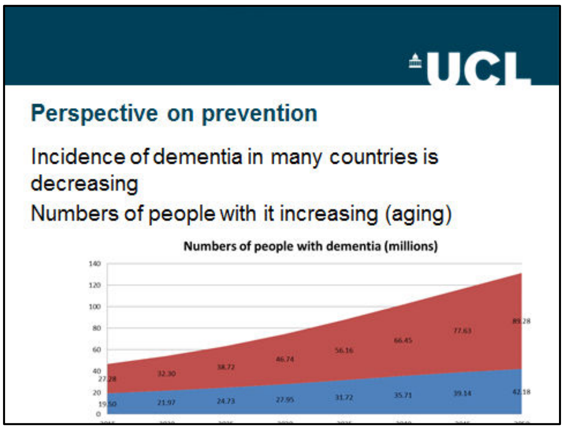
Disappointing recent trials (preDiva, MAPT) short, low risk

Post hoc indicated benefit in high risk

Suggests specific more intensive shorter interventions in high risk populations

Other interventions in more general populations

-more childhood education – smoking -exercise - diabetes - obesity

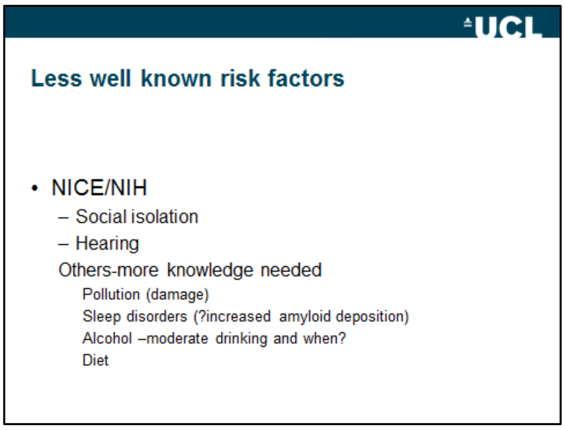


Perspective on prevention

Incidence of dementia in many countries is decreasing

Numbers of people with it increasing (aging)

Numbers of people with dementia (millions)

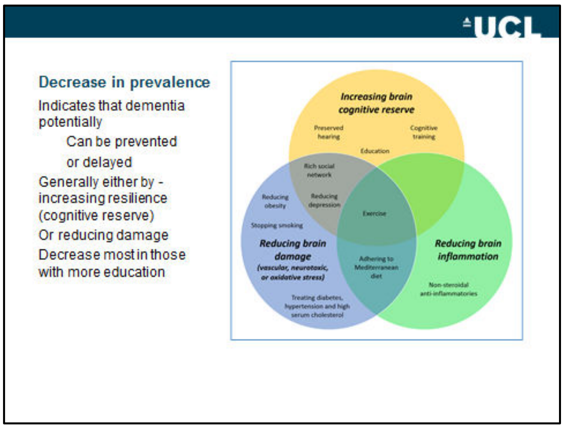


Less well known risk factors

- NICE/NIH
  - Social isolation
  - Hearing

  Others-more knowledge needed

    Pollution (damage)
    Sleep disorders (?increased amyloid deposition)
    Alcohol –moderate drinking and when?
    Diet



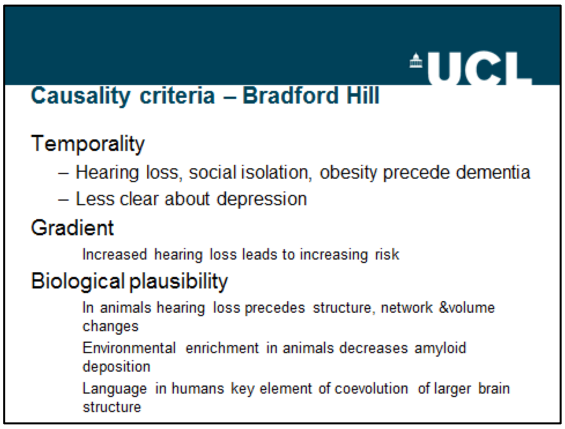
Decrease in prevalence

Indicates that dementia potentially
Can be prevented
or delayed

Generally either by - increasing resilience (cognitive reserve)

Or reducing damage

Decrease most in those with more education



Causality criteria – Bradford Hill

Temporality
- Hearing loss, social isolation, obesity precede dementia
- Less clear about depression

Gradient

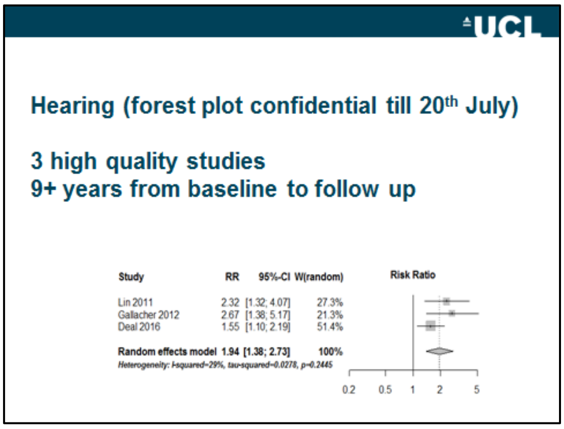
Increased hearing loss leads to increasing risk

Biological plausibility

In animals hearing loss precedes structure, network &volume changes

Environmental enrichment in animals decreases amyloid deposition

Language in humans key element of coevolution of larger brain structure

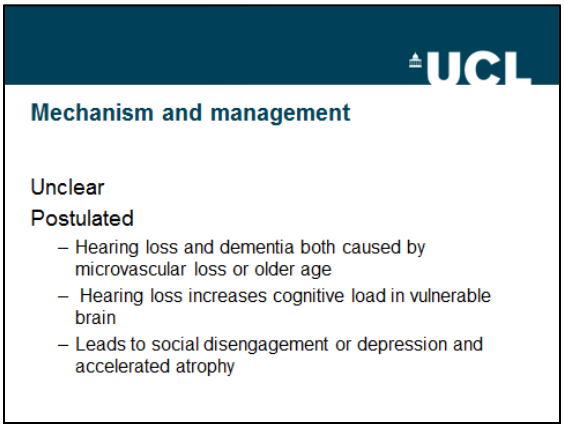


Hearing (forest plot confidential till 20th July)

3 high quality studies
9+ years from baseline to follow up

Study	RR	95%-CI	W(random)
Lin 2011	2.32	[1.32; 4.07]	27.3%
Gallacher 2012	2.67	[1.38; 5.17]	21.3%
Deal 2016	1.55	[1.10; 2.19]	51.4%
Random effects model	**1.94**	**[1.38; 2.73]**	**100%**

Heterogeneity: I-squared=29%, tau-squared=0.0278, p=0.2445

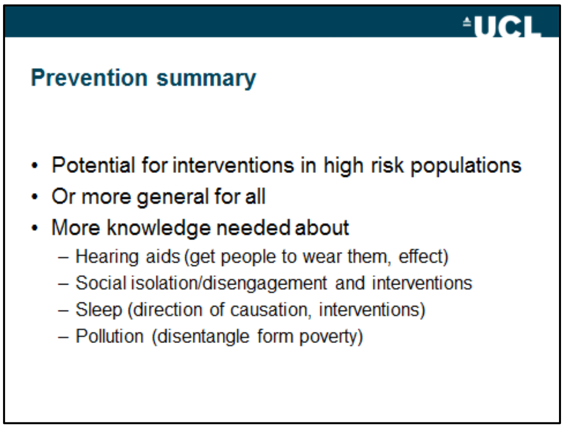


Mechanism and management

Unclear

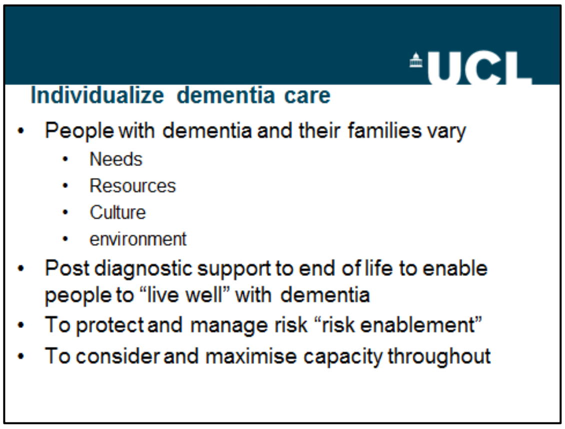
Postulated

- Hearing loss and dementia both caused by microvascular loss or older age
- Hearing loss increases cognitive load in vulnerable brain
- Leads to social disengagement or depression and accelerated atrophy



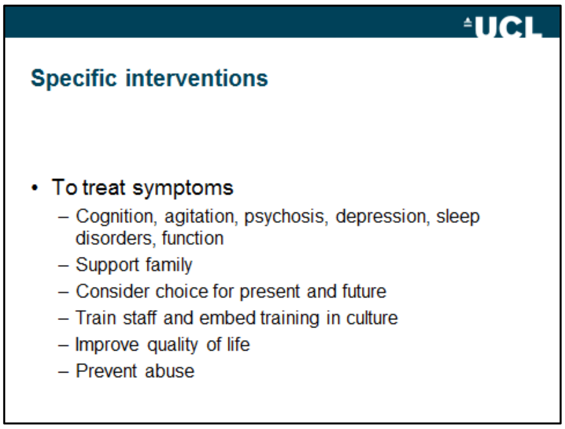
Prevention summary

- Potential for interventions in high risk populations
- Or more general for all
- More knowledge needed about
  - Hearing aids (get people to wear them, effect)
  - Social isolation/disengagement and interventions
  - Sleep (direction of causation, interventions)
  - Pollution (disentangle form poverty)



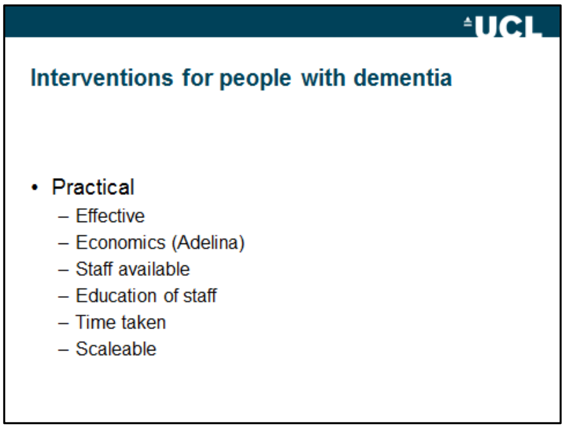
Individualize dementia care

- People with dementia and their families vary
  - Needs
  - Resources
  - Culture
  - environment
- Post diagnostic support to end of life to enable people to “live well” with dementia
- To protect and manage risk “risk enablement”
- To consider and maximise capacity throughout



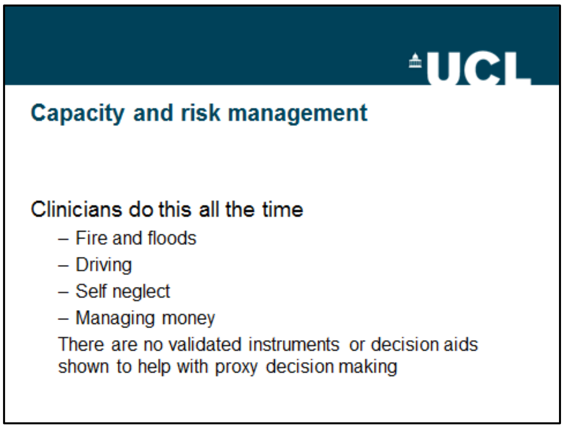
Specific interventions

- To treat symptoms
  - Cognition, agitation, psychosis, depression, sleep disorders, function
  - Support family
  - Consider choice for present and future
  - Train staff and embed training in culture
  - Improve quality of life
  - Prevent abuse



Interventions for people with dementia

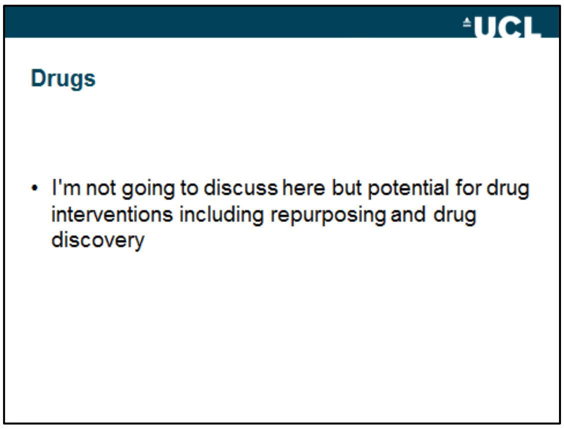
- Practical
  - Effective
  - Economics (Adelina)
  - Staff available
  - Education of staff
  - Time taken
  - Scaleable



Capacity and risk management

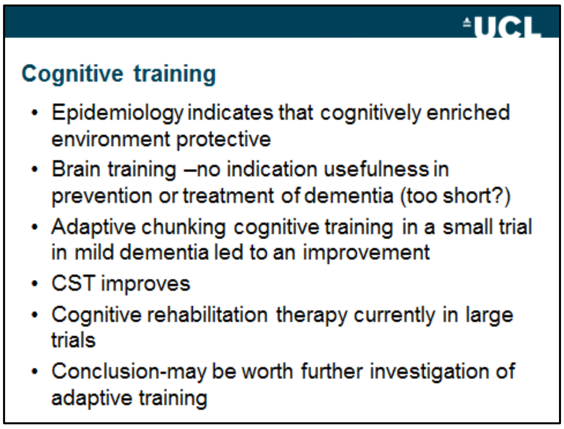
Clinicians do this all the time
- Fire and floods
- Driving
- Self neglect
- Managing money

There are no validated instruments or decision aids shown to help with proxy decision making



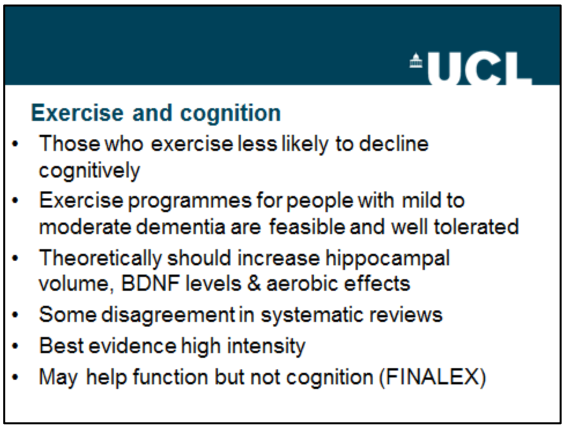
Drugs

- I'm not going to discuss here but potential for drug interventions including repurposing and drug discovery



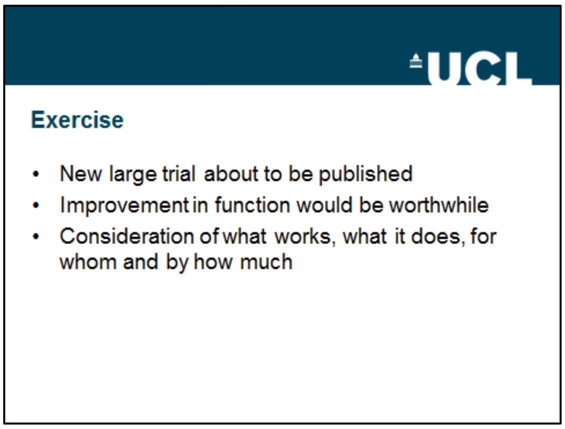
Cognitive training

- Epidemiology indicates that cognitively enriched environment protective
- Brain training –no indication usefulness in prevention or treatment of dementia (too short?)
- Adaptive chunking cognitive training in a small trial in mild dementia led to an improvement
- CST improves
- Cognitive rehabilitation therapy currently in large trials
- Conclusion-may be worth further investigation of adaptive training



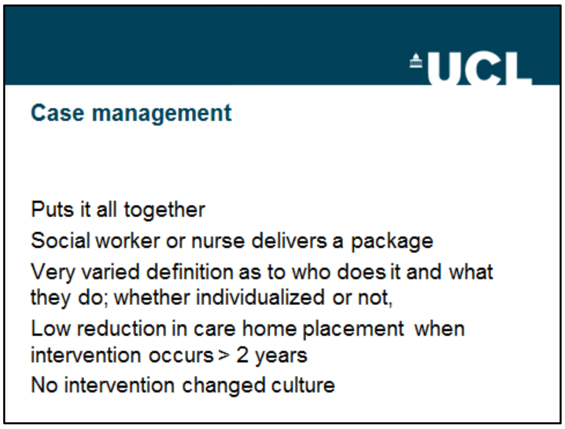
Exercise and cognition

- Those who exercise less likely to decline cognitively
- Exercise programmes for people with mild to moderate dementia are feasible and well tolerated
- Theoretically should increase hippocampal volume, BDNF levels & aerobic effects
- Some disagreement in systematic reviews
- Best evidence high intensity
- May help function but not cognition (FINALEX)



Exercise

- New large trial about to be published
- Improvement in function would be worthwhile
- Consideration of what works, what it does, for whom and by how much



Case management

Puts it all together

Social worker or nurse delivers a package

Very varied definition as to who does it and what they do; whether individualized or not,

Low reduction in care home placement when intervention occurs > 2 years

No intervention changed culture

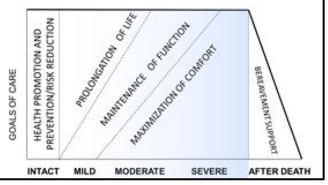
Need for more research

Lack of high quality effectiveness and cost effective evidence
What is it
Does it need 2 years
Who can deliver it

Recommendations European Association of Palliative Care

Person-centred care; communication, shared decision-making (includes carers); optimal treatment of symptoms, provide comfort; set care goals, advance planning; continuity of care; psychosocial and spiritual support;

Figure. Dementia progression and suggested prioritising of care goals



End of life

- Dementia shortens life, even after controlling for age and multi-morbidity.
- A third of older people expected to die with dementia
- Often not considered to be life limiting
- Most literature is about people dying with severe dementia
- Clearly dementia does not prevent people from dying with other diseases

Key challenges

- At what severity of dementia do people die?
- What recognition is there among health professionals of comorbid mild to moderate dementia?
- What difference does having comorbid dementia make to outcome? Should treatment be different.
- What interventions would be helpful
  - Information
  - Help with navigating services
  - Decision aids
  - Pain
  - Help with medication

Perspective on Health Economics and Policy - Adelina Comas-Herrera

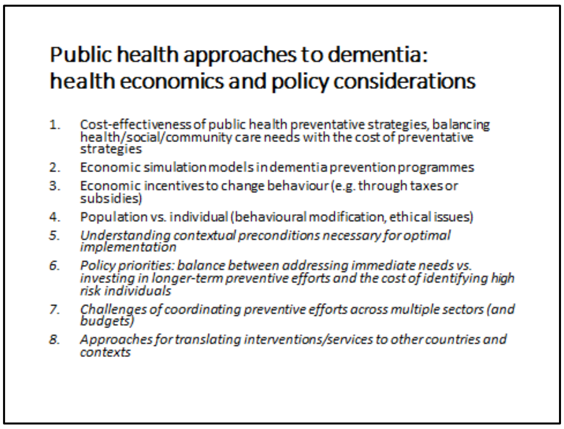
Perspective on Health Economics and Policy

JPND Workshop on Public Health in Neurodegenerative Disease,
Paris, 21st June 2017

Adelina Comas-Herrera
Personal Social Services Research Unit (PSSRU)
London School of Economics and Political Science
a.comas@lse.ac.uk
@adelinacohe

Acknowledgements:

The opinions, comments and interpretations of all the material presented here do not reflect the views of my current and former co-authors and research funders.

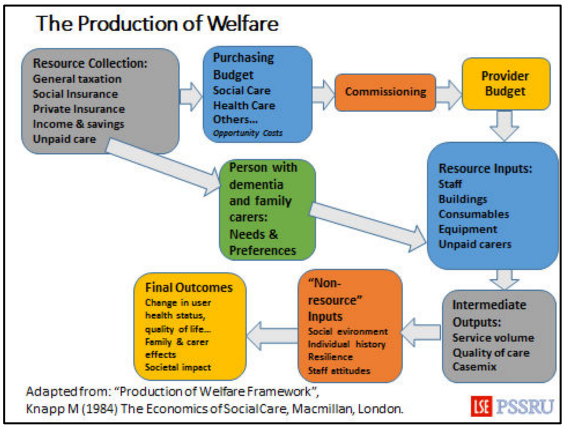


Public health approaches to dementia: health economics and policy considerations

1. Cost-effectiveness of public health preventative strategies, balancing health/social/community care needs with the cost of preventative strategies
2. Economic simulation models in dementia prevention programmes
3. Economic incentives to change behaviour (e.g. through taxes or subsidies)
4. Population vs. individual (behavioural modification, ethical issues)
5. *Understanding contextual preconditions necessary for optimal implementation*
6. *Policy priorities: balance between addressing immediate needs vs. investing in longer-term preventive efforts and the cost of identifying high risk individuals*
7. *Challenges of coordinating preventive efforts across multiple sectors (and budgets)*
8. *Approaches for translating interventions/services to other countries and contexts*

Economics and dementia care

It's about much more than costs:



The Production of Welfare

Resource Collection:
General taxation
Social Insurance
Private Insurance
Income & savings
Unpaid care

Purchasing Budget
Social Care
Health Care
Others…
Opportunity Costs

Commissioning

Provider Budget

Person with dementia and family carers:
Needs & Preferences

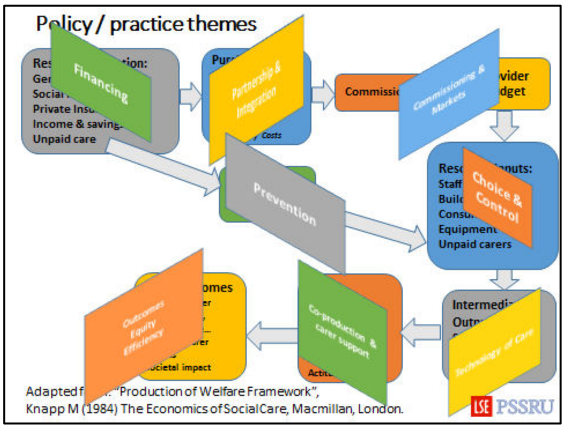
Resource Inputs:
Staff
Buildings
Consumables
Equipment
Unpaid carers

Intermediate Outputs:
Service volume
Quality of care
Casemix

"Non-resource" Inputs
Social evironment
Individual history
Resilience
Staff attitudes

Final Outcomes
Change in user health status, quality of life…
Family & carer effects
Societal impact

Adapted from: "Production of Welfare Framework",
Knapp M (1984) The Economics of Social Care, Macmillan, London.



Policy / practice themes

Adapted f… "Production of Welfare Framework",
Knapp M (1984) The Economics of Social Care, Macmillan, London.

Key economic questions in dementia care:

LSE PSSRU

How can we afford to meet the future needs of people with dementia and their carers?

1. Finding ways of moderating (or decreasing?) the future numbers of people affected by dementia
2. Make sure that we "spend well" on care
3. Ensure we have adequate care financing mechanisms

LSE PSSRU

Working to address some of these questions:

LSE PSSRU

MODEM

A comprehensive approach to modelling outcome and costs impacts of interventions for dementia

2014-2018
@MODEMProject

Improving Dementia Care ESRC-NIHR · Economic & Social Research Council · NHS National Institute for Health Research · LSE PSSRU

A collaborative study:

LSE (PSSRU)
- Martin Knapp
- Adelina Comas-Herrera
- Raphael Wittenberg
- Bayo Adelaja
- Margaret Dangoor
- Josie Dixon
- Bo Hu
- Daniel Lombard
- Klara Lorenz (PhD student)
- David McDaid
- A-La Park
- Sanna Read
- Amritpal Rehill

LSE (Social Policy Department)
- Emily Grundy

Southampton University
- Ann Bowling
- Jitka Pikhartova

Newcastle University
- Carol Jagger
- Andrew Kingston

Sussex University
- Sube Banerjee
- Nicolas Farina

International Longevity Centre-UK
- Sally-Marie Bamford
- Sally Greengross

Improving Dementia Care ESRC-NIHR · Economic & Social Research Council · NHS National Institute for Health Research

Research questions:

1. How many people with dementia will there be over the period to 2040; and what will be the costs of their treatment, care and support *under present arrangements*?
2. How do those costs *vary* with the characteristics and circumstances of people with dementia and their carers?
3. How could future costs change (in level and distribution) if *evidence-based interventions were more widely implemented*?

Improving Dementia Care ESRC-NIHR · Economic & Social Research Council · NHS National Institute for Health Research · LSE PSSRU

MODEM Components

Engagement with people with dementia, carers, other stakeholders.

Systematic Mapping of the Literature of effective and cost-effective interventions for people with dementia and carers (available via the *MODEM Dementia Evidence Toolkit*).

Collection new data, analyses of data from trials and large surveys.

Experiential evidence from people with dementia & carers

Suite of simulation models to estimate:

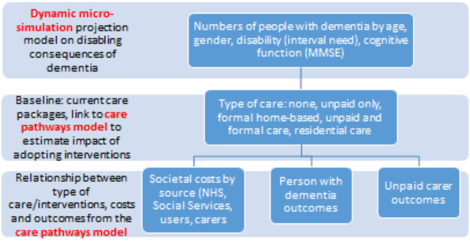
- N of people with dementia over the period to 2040
- family or other unpaid support available to them
- costs of services and unpaid support.
- **Impact of a wider roll-out** of evidence-based interventions on outcomes, costs, patterns of expenditure

A Legacy model to make local projections of needs for care and support, outcomes and costs.

MODEM suite of models:

1. Macro-simulation projection model of long-term care need and costs (LSE)
2. Dynamic micro-simulation projection model, PACSim, estimating the disabling consequences of dementia (Newcastle)
3. Dementia care pathways model: maps the current care pathways, used to model how interventions impact on the use of services and costs (LSE)

The MODEM suite of models



Dynamic micro-simulation projection model on disabling consequences of dementia

Numbers of people with dementia by age, gender, disability (interval need), cognitive function (MMSE)

Baseline: current care packages, link to **care pathways model** to estimate impact of adopting interventions

Type of care: none, unpaid only, formal home-based, unpaid and formal care, residential care

Relationship between type of care/interventions, costs and outcomes from the **care pathways model**

Societal costs by source (NHS, Social Services, users, carers

Person with dementia outcomes

Unpaid carer outcomes

1. Cost-effectiveness of public health preventative strategies: balancing health/ social/ community care needs with the cost of preventative strategies

Do public health preventative strategies reduce care costs?

The answer is not as simple as it seems:

- Most risk reduction strategies are also likely to result in increased life expectancy:
  - the costs could simply be postponed… or could even increase if people live longer with dementia.
- However most people would place a positive value on postponing dementia:
  - perhaps we need to focus more on the value of extra years of life free of dementia (and other disabilities) than on potential cost savings?

Economic simulation models in dementia prevention programmes

Simulating the impact of risk-reduction

- Simple models are likely to give the wrong answers
- We need to model:
  - Relationship between multiple risk factors and dementia
  - "Interactions" with other chronic conditions
  - Relationship between risk factors, chronic conditions and life expectancy
  - Relationship between needs and costs

LSE PSSRU

Population Ageing & Care Simulation (PACSim)

Aims to model:

- The health and associated care needs of the English population from 2014 for the coming decades
- The impact of interventions for risk factor reduction, disease prevention and treatments that slow down progression to disease and disability with a particular emphasis on interventions for dementia

MODEM modelling outcome and cost impacts of interventions for dementia

Improving Dementia Care ESRC-NIHR

Newcastle University

Carol Jagger
carol.jagger@ncl.ac.uk
Andrew Kingston
andrew.kingston@ncl.ac.uk

PACSim Outline

Understanding Society THE UK HOUSEHOLD LONGITUDINAL STUDY + ELSA English Longitudinal Study of Ageing + CFAS Cognitive Function & Ageing Study

Survival
ONS 2014 population projections

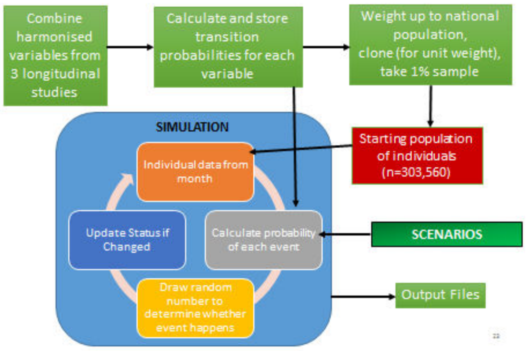
Sociodemographic factors
Age, sex, education, marital status, occupation

Lifestyle factors
Smoking, physical activity, BMI

Morbidity
Cognitive impairment, CVD, hypertension, diabetes, arthritis, stroke, visual impairment, hearing impairment, respiratory disease, cancer, depression

Dependency
High (requires 24 hr care)
Medium (requires care daily)
Low (requires care < daily)
Independent

PACSim: Simulation step



Combine harmonised variables from 3 longitudinal studies

Calculate and store transition probabilities for each variable

Weight up to national population, clone (for unit weight), take 1% sample

Starting population of individuals (n=303,560)

SIMULATION

Individual data from month

Calculate probability of each event

Draw random number to determine whether event happens

Update Status if Changed

SCENARIOS

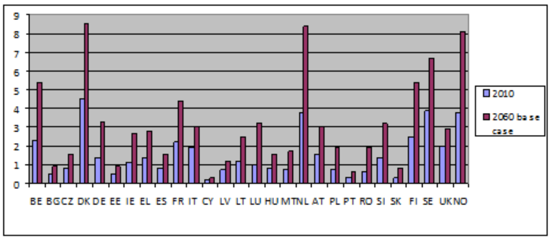
Output Files

Relationship between needs and costs: Determinants of future dementia care costs

- Demographic changes.
- Changes in prevalence (by severity).
- Availability (and propensity to provide) unpaid care.
- Structure of the care system.
- Financing system: generosity of public finance
- Relative price of care and other goods and services.
- Economic growth and other macroeconomic factors.
- Values and public expectations about the quality, range and level of care.
- Other factors? Quality/adaptability of housing, pensions…

LSE PSSRU

Public spending on LTC as % of GDP, 2010-2060. Base case scenario

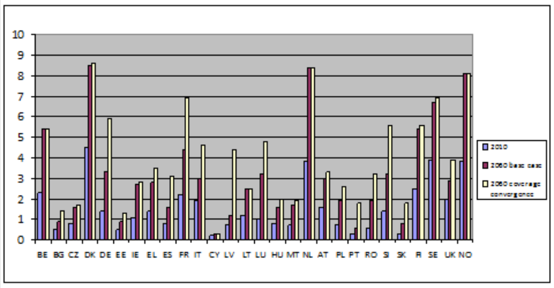


Source: The 2012 Ageing Report: Economic and budgetary projections for the EU27 Member States (2010-2060). European Commission.

Adelina Comas-Herrera

LSE PSSRU

**Public spending on LTC as % of GDP, 2010-2060.
Base case and Coverage Convergence scenario.**



Source: The 2012 Ageing Report: Economic and budgetary projections for the EU27 Member States (2010-2060). European Commission.

Adelina Comas-Herrera

3. Economic incentives to change behaviour (e.g. through taxes or subsidies)

We are beginning to know what reduces risk: how about changing people's behaviour?

- We have an intrinsic motivation to be fit and healthy, but many of us:
  - Underestimate our risk
  - Overestimate our health behaviour
- Tools:
  - Intrinsic motivation: personalised risk assessments, guidance… reaching goals (technology)
  - Extrinsic motivation via financial incentives (cost-effectiveness?) or even using altruism

Risk minimisation and inequality

- The risks of dementia are not distributed equally among the population.
- The risks are not independent of each other: are some people accumulating all the risk?
- Are those who are accumulating the risk also those with less resources to deal with the consequences of dementia?

Modelling the impact of risk reduction: completing the data puzzle

- RCTs of risk reduction interventions
  - typically "short" follow-ups, no studies yet showing a DIRECT effect on dementia (only on cognitive performance)
  - Long-term effects?
- Longitudinal datasets:
  - Early to mid to "latish" life: we can analyse health-related behaviours and cohort effects and estimate risk factor accumulation.
  - Later life datasets: we can analyse relationship between risk factors and dementia (e.g. CFAS)

To conclude:

- We can do much better than we've done so far on demonstrating the value of public health approaches to dementia
- We need better data, smart approaches to completing data puzzles and a cautious approach
- But, most importantly, we need to move away from looking only at formal care service costs:
  - Wider impact of families
  - The real "opportunity costs" of having dementia: We give up work to enjoy retirement, giving up a wage in exchange for leisure, this shows we attach a value to a "good old age"

Thank you!

Any further thoughts and questions, please feel free to email:
a.comas@lse.ac.uk