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

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@MODEMProject

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LSE
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
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?
Interventions, costs and outcomes:

Interventions of interest

- **Risk-reduction** (e.g. lifestyle, nutrition, exercise etc.) and prevention (e.g. falls)
- **Treatments** (e.g. medications, cognitive stimulation therapy)
- **Care and support arrangements** (e.g. home care, telecare, respite, case management, acute care, end-of-life care)
- **Carer-focused arrangements** (e.g. carer training and support)

Costs and outcomes

- All resource impacts (health, social care and other), including resources of people with dementia, families and communities.
- Quality of life, clinical and lifestyle effects, for people with dementia and carers.
**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.
Systemic mapping of the literature

• **Systematic mapping** of empirical evaluations of interventions to:
  – Prevent or delay dementia onset
  – Reduce symptom severity
  – Improve the quality of life of people with dementia & carers
• **Review of previously published systematic reviews**
• **Own reviews** of areas in which we have identified gaps
• The review informs the **choice of interventions** that we are modelling
• **Mapping of value in its own right:**
  – Identification of gaps in evidence
  – Implications of different research methods for use of evidence for modelling
  – Publicly available via the MODEM Dementia Evidence Toolkit
Data collection:

• Cohort of **300 dyads**: people living with dementia and carers.
• 100 each with mild, moderate and severe dementia, clinical population from Sussex.
• Interviewed at **baseline and 52 week follow-up**.
• Questions: different measures of need, care use and outcomes, enabling researchers to **cross-walk across different measures and studies**.
• Detailed questions on **use of care services** by people with dementia and **provision of unpaid care**.
MODEM suite of models:

- **Dynamic micro-simulation** projection model on disabling consequences of dementia (Newcastle)

- **Care pathways models** of how interventions impact on the use of services and costs (LSE)

- **Life-time costs model** of the overall costs of the care pathway for an intervention (LSE)

- **Macro-simulation** projection model of long-term care need and costs (LSE)
PSSRU macro-simulation model will produce projections of:

- future numbers of people with dementia or cognitive impairment
- future numbers by severity of disability (interval needs)
- long-term care, including unpaid care and formal services
- associated public expenditure and wider costs

under variant assumptions about trends in:

- mortality rates by age and gender
- rates of dementia, cognitive impairment and disability
- supply of unpaid care, eg by daughters and sons
- patterns of care services, eg between home and residential care
- unit costs of care, eg cost of an hour’s home care
Interventions models

• A suite of different models for different interventions, to examine their impact on service use, costs and quality of life

• Different interventions require different types of models, because of
  – differences in duration of intervention and duration of effect
  – differences in available data and evidence
Macro-simulation model: bringing it all together

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

Baseline based on current care packages, with use of interventions modelling 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 and costs and outcomes: estimated through interventions modelling

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

Person with dementia outcomes

Unpaid carer outcomes
Life-time costs model

• This model divides the median duration of dementia – 4.5 years – by severity of cognitive impairment and type of care

• Average costs of care by funding source, derived from trials’ data, are attached to each month of care

• The lifetime estimate of care costs is around £200k, before any discounting, including health, social care and unpaid care.