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Response to the Health, Social Care and Sport Committee on the Dementia Inquiry, to inform the oral evidence session on the 25th January

Date: 18 January 2017

Version: 1

Thank you for the opportunity to provide information in advance of the evidence session to the Health, Social Care and Sport Committee's scrutiny of the Welsh Government's draft Strategy 'Together for a Dementia Friendly Wales'. Public Health Wales welcomes this opportunity to contribute to this important agenda.

Due to the short timescale for responding, we have given our general views on the draft strategy, with additional detail being given in some specific areas.

We will be providing a more detailed response to the Welsh Government consultation of the Strategy (due by April 3rd), and would be happy to send the Committee a copy of this response in due course.

We would like to highlight that we have only provided a limited response due to having less than 4 working days to respond to this important inquiry and would like this to be considered by the Committee when launching future inquiries.

1. In general, the document would benefit from more specificity regarding delivery – both in relation to *who* will be delivering and *what* they will be delivering. There are also two specific omissions as follows;

1.1 Case identification, assessment & diagnosis. On page 22 it is not made explicit that a diagnosis rate of 51% (compared with those expected to have the condition) is the lowest rate in the UK, far lower than Northern Ireland and Scotland (c 90%). Subsequently there should be a commitment to specific annual targets to improve the rate of case identification and diagnosis.

On page 20 '*Health Boards and Local Authorities to ensure appropriate case finding*' should be explicitly linked to page 44 'the Welsh Government Directed Enhanced Service (DES)' to better incentivise GPs. The DES incentive is for GPs to better support people in nursing and care homes and in doing so they are more likely to identify cases.

1.2 The provision of psychological / behavioural training to staff to improve management of behaviours that staff find 'challenging'. This is particularly in managing behaviour in the provision of personal care – which is a core nursing skill. Current training is patchy, very limited and not systematic. There is a need for an all Wales approach that follows an evidenced based training approach.

2. On page 39 the proposed key action is '*to increase the number of hospital settings that are dementia supportive*'..... and on page 40 '*Acute hospital pathways should reflect the growing proportion of people with dementia accessing acute care*'. The central issue that is not referenced is that staff need regular specialist training in how to reduce distress and aggression in older people's services generally, and inpatient services & nursing homes specifically.
3. Dementia Services consistently have the highest incidence of aggressive incidents of any clinical population and there is a wealth of clinical evidence about reducing challenging behaviour in dementia that is specific to this condition. The presentation in **Appendix 1**, will form the main content of British Psychological Society (BPS) guidance (pending publication summer 2017) and includes some of the evidence and references.
4. The recommendation of an all Wales approach, to Bradford University Dementia Care Mapping, for both Physical and Mental Health inpatient wards. Only one Health Board (Betsi Cadwaladr) has capacity for this in Mental Health Services at present.

5. There is a need to support the population to adopt healthy lifestyles, particularly in midlife. This includes risk factors to dementia including smoking, obesity (risk for diabetes in particular), poor nutrition, and alcohol and other substances. There is also some evidence of the impact of social isolation on cognitive functioning, and on mental wellbeing more generally, which will impact on dementia risk. There should be a systems approach to minimising the risk factors, which at a population level will help to avoid (or at least delay) the onset of dementia, as well as a range of other chronic conditions.
6. **Appendix 2** shows a paper 'Dementia – Early Intervention and Prevention' produced by North Wales Public Health Team; this includes recommendations and provides further evidence on the points in paragraph 5 above, as well as on the following:
- groups in the population which are at a higher risk of developing dementia e.g. people with a learning disability – particularly Down's Syndrome - or people who have existing mild cognitive impairment
 - the importance of early diagnosis and support, but in the context of ethical considerations for each individual
 - the importance of supporting informal carers
 - wider determinants and community action e.g. supporting dementia friendly communities, lifelong housing etc.

7. Appendices

Appendix 1

Bespoke Training Presentation



Appendix 1 Dementia
Inquiry.pptx

Appendix 2

Public Health Improvement and Dementia



Appendix 2
Dementia Inquiry v1 (

Bespoke Training

Reducing Distress and Aggression in Older People's Services

Written by Kate Ross and Gary Firkins

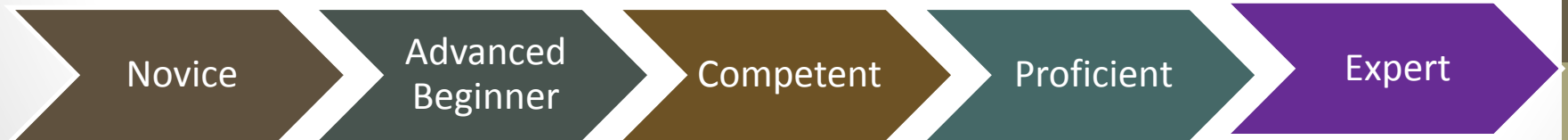
A combination of psychological approaches to
challenging behaviour in dementia and best practice in
the use of holding skills

WHY?

- Combining knowledge bases to achieve highly specialised skills training



- **Because ... dementia care nursing is the most demanding nursing there is – we demand a combination of general nursing skills and psychiatric nursing skills and knowledge and understanding of neurological impairment**



Is This a Problem?

- For us, it was a major problem. We were having regular psychiatric emergencies and injury to staff and patients. On one 12-bedded unit, we had more than **150** incidents of physical aggression reported in a single year.
- Dementia Services consistently have the highest incidence of aggressive incidents of any clinical population
- There is a wealth of clinical evidence about reducing challenging behaviour in dementia that is specific to this condition

Why is dementia different?

- It is **extremely stressful** to have dementia. Challenging behaviour in dementia is about people having to problem solve on their feet and trying to escape fearful situations
- **Constant Insecurity** - always being caught unawares and having to think on your feet, always having to make the best sense you can of the information you've got before you without any background to it, always being anxious that you might get separated from the people who are most important to you, living on your wits, not being able to put emotional hurt into perspective, being at a disadvantage

“When you know your history, then you know where you’re coming from. Then you wouldn’t have to ask me, who the heck do you think I am?”

Bob Marley

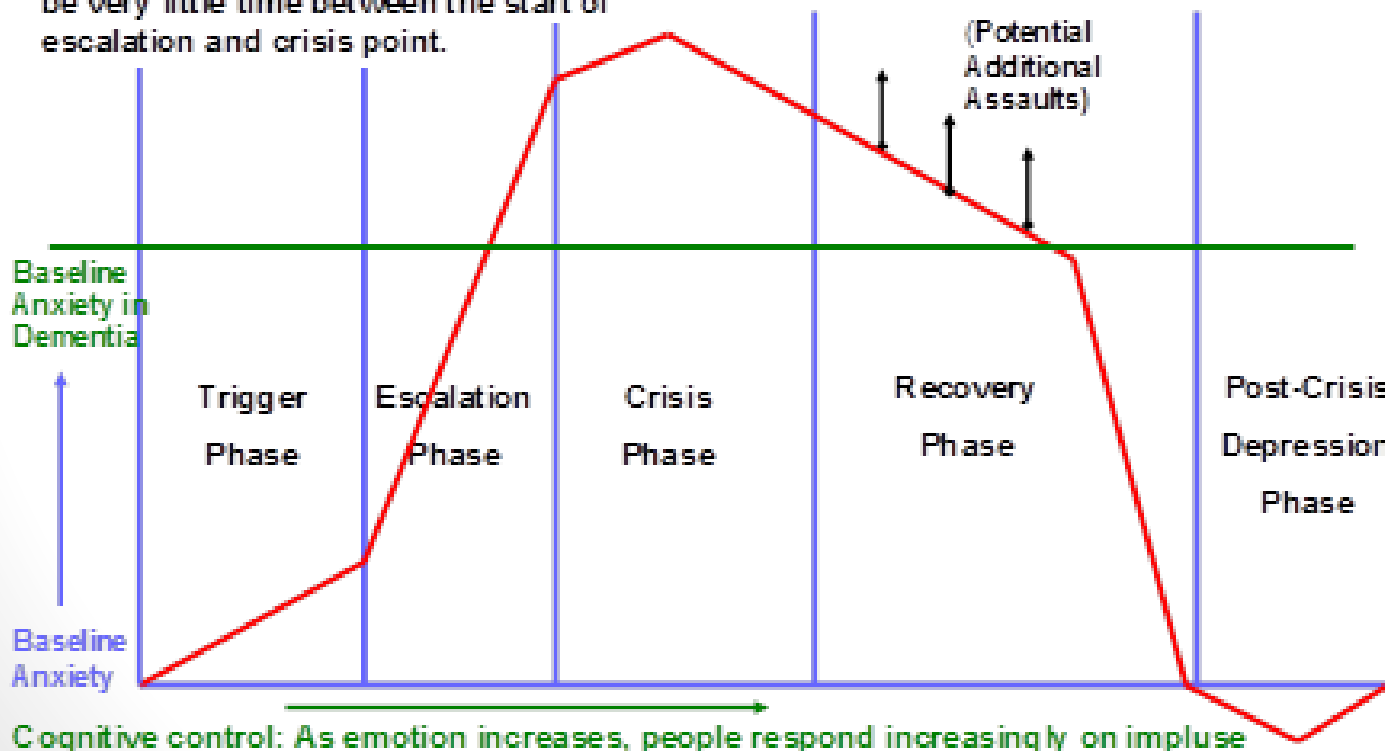


Challenging Behaviour is Ordinary Behaviour in Trying Circumstances

Typical Assault Cycle
(Adapted from Kaplan and Wheeler 1983)

Aggressive / Challenging / Violent Behaviour

People with dementia often have a high baseline level of anxiety so there may be very little time between the start of escalation and crisis point.



Risk Factors for Aggression

- Poor communication skills
- Misinterpretation of others' behaviour/ feeling threatened by others
- Noisy and over-crowded or chaotic environments
- Need for help with intimate personal care
- Disorientation and confusion
- Disinhibition
- Over sedation

- People with dementia often find others' behaviour challenging. What are WE doing that could be seen as out of character or unusual?
- By far the highest incidence of aggression in Older People's Services occurs during personal care

How to Reduce Aggression?

- Improve reporting – identify the hotspots, both in terms of clinical areas and in terms of function and place within each clinical area
- Improve aggression management – training targeted at personal care and for use with people who are frail, hotspot training, individual consultancy
- Train staff in **PREVENTION**



Dealing with Aggression

- Very often predictable
- Most medication is fairly ineffective and carries significant risks
- The recommended and most effective form of intervention is functional analysis – identifying and adapting to the individual triggers

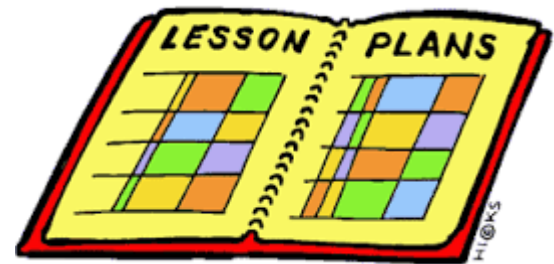


Staff

- Staff perception of own ability to cope much more critical than actual severity of challenging behaviour being presented
- Possible to enhance staff coping (relationship with patient's family, opportunity to relate to patients as individuals, knowledge of life history, opportunity to deliver person-centred care, perception of behaviour as related to the dementia not a personality trait, encouragement to take time to engage with the patient rather than complete the task, optimism, sympathy)
- Good evidence for efficacy of staff training
- Lets smile!

What?

- **National guidelines on dementia and challenging behaviour**
- **Information on strategies to reduce the risk of aggression**
- **Skills training around approaching and communicating with people with different types of neurological damage**
- **Experiential learning about being a care recipient**
- **Training in the non-abusive application of learning theory**
- **Skills training on holding people safely who have stiff joints and low bone density**
- **A focus on managing behaviour during personal care which is the most high risk activity**

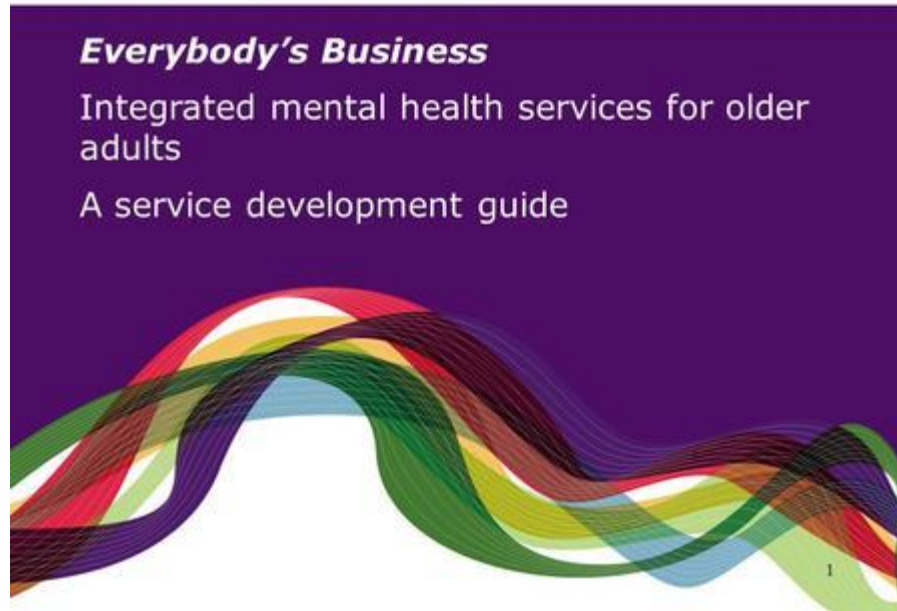


Main Topics

- Overview of recent NICE guidance on management of behaviour in dementia
- Understanding the stressors that increase aggression in dementia
- Setting up the care environment to minimise those stressors
- Styles of communication and matching the level of communication to the need of the patient
- Setting up care delivery to minimise stressors
- Functional analysis of behaviour and making accurate observations
- Assessing the comparative risks of different styles of management – knowing when nothing is the right thing to do

Everybody's Business

CSIP Care Services Improvement Partnership



- “The ward environment should reflect the fact that although this is a clinical area, it is also the patient’s home for a variable period of time”
- **What makes a place homely?**
- **How do you recognise the function of different places?**

January 17

Body Language

Your body language gives away your general attitude

- Breath out and drop your shoulders
- Smile and speak with kindness
- Don't loom! (or appear out of nowhere)



Specialist nursing

- Immediate reduction of arousal using music therapy or singing, snoezlen, exercise, simulated presence and bird song but only during the activity
- Good evidence of effectiveness of massage and cognitive stimulation therapy
- Good evidence for effectiveness of alternative bathing techniques
- Strong evidence for effectiveness of behavioural management

Promoting Calm

Incidence of aggression in different care homes varies widely. Low incidence associated with:

- Seeing aggression as a natural response to being over-whelmed by demand
- A mutually respectful relationship with clients
- Encouraging the use of retained skills
- Offering prompts and appropriate help
- Looking for individual solutions rather than standard procedures
- Regular clinical supervision
- Permission and encouragement to innovate
- Permission and encouragement to take as long as is needed
- A sense of unity and common purpose in the staff team
- Being confident in the knowledge base relating to dementia and aggression and to ethical boundaries
- Seeing the process of engaging the client as the focus of care rather than the specific task

Functional Analysis

Antecedants	Behaviour	Consequences

- Frequency charts
- ABC charts
- Time Sampling

- Remember that mood, facial expression, general level of activity may all give useful information as well as specific behaviours

- Also, speech is a behaviour – listen to what people say

- Functional Analysis seeks to uncover what the person can't tell us – what they are trying to achieve, what they are thinking and feeling, what associations they are making – you need a psychologist to help with formal functional analysis

Approaching People: experiment 1

- In threes
- Get one person to be a patient sitting in a chair
- Try going up to them from in front, to one side, behind
- Try standing by them or crouching down
- What feels most comfortable for the patient?
- Now swap round and see if you all like the same things
- Now try it blindfold or with one eye covered

Eating Experiment 1

- Eat with your non dominant hand and your eyes closed
- Be fed by someone who feeds you in silence
- Be fed by someone who is talking to someone else
- Be fed with something without knowing what it is
- Experiment with how fast you like to be fed and how much you like on the spoon



Outcomes?

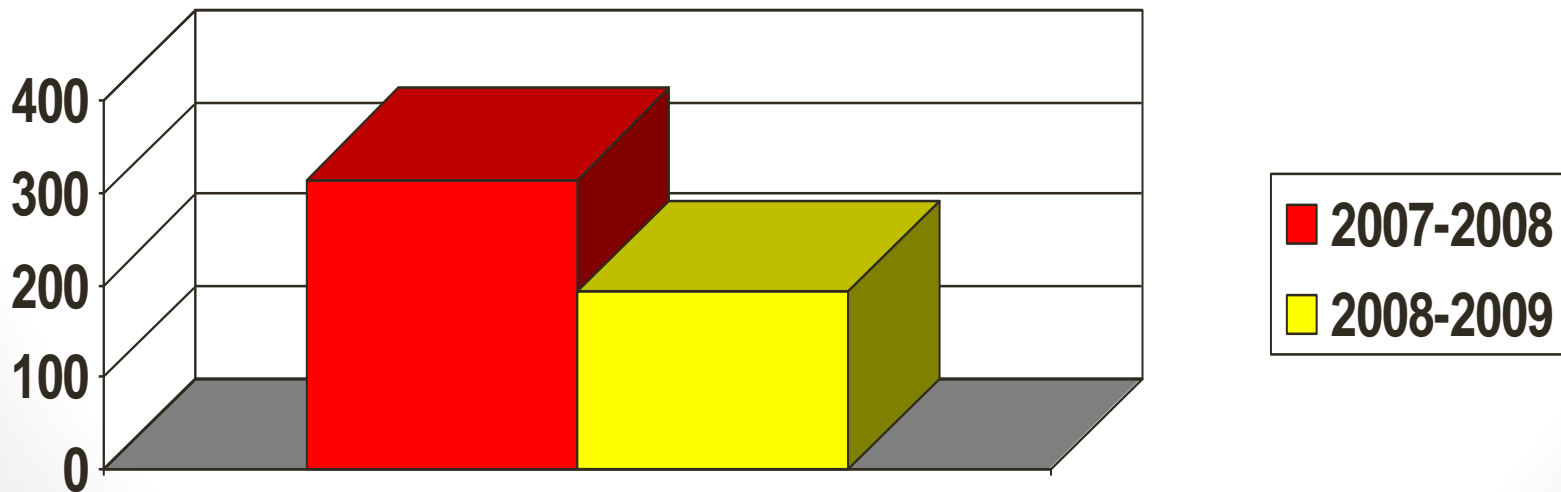


- **Huge increase in staff confidence**
- **Sustained reduction in staff sick leave**
- **Commended by the Health and Safety Executive when they visited**
- **Precisely matches the best practice recommendations of NICE**
- **The only dementia-specific training that HCSWs receive**



Number of reported physical assaults (patient to staff & patient to patient) for 12 month period April 2008 to March 2009 & comparable figures for 12 month period April 2007 to March 2008

- 315 reported incidents for period April 2007 to March 2008
- 192 reported incidents for period April 2008 to March 2009
- 123 fewer incidents in 2008-2009 compared to corresponding period 2007-2008 which represents a significant reduction of 39%
- Number of incidents has continued to reduce
- 60% reduction in injury arising from assault



Embedding Training

- **Part of an integrated approach to reducing risk involving security officer and formal audit to ensure efficacy**
- **Supported by train the trainer events**
- **Supported by complex case discussion from psychology**
- **Supported by hot-spot training from training department for individual patients**



The Eiffel Tower - from April 1888 to May 1889



The British
Psychological Society
Promoting excellence in psychology



Division of
Clinical Psychology

Psychological Best Practice in Older People's Inpatient Services

November 2016

Dr Kate Ross

Local Beginnings: The Stafford Project



Grounded
Theory

Action Research

Solution
Focused
Therapy

Objectives

1. To develop the psychological mindedness of the local staff group
2. To adapt the structures and mechanisms of the ward to improve the patient journey/ care pathway
3. To improve multi-disciplinary working
4. To reduce length of stay



The Journey: research or management?

- **Grounded Theory Method (GT)** is a systematic methodology in social sciences involving the construction of theory through the analysis of data
- The aim of grounded theory is: *'to generate or discover a theory'* (Glaser and Strauss, 1967)

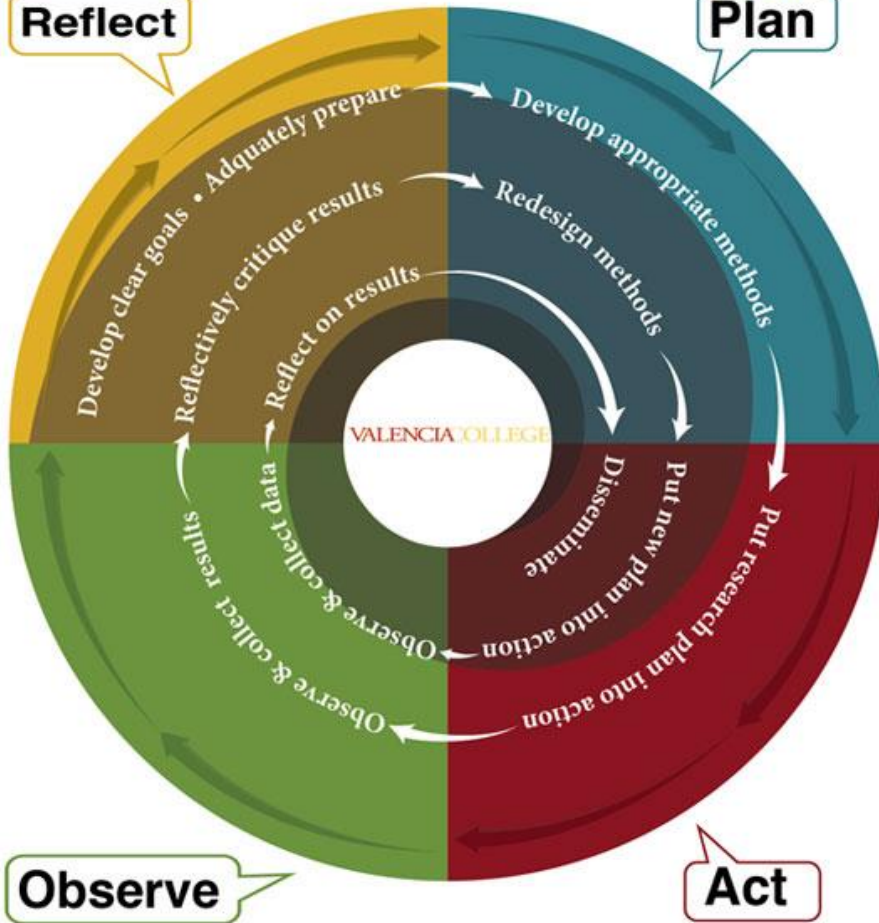


Cycle of Action Research



Reflect

Plan



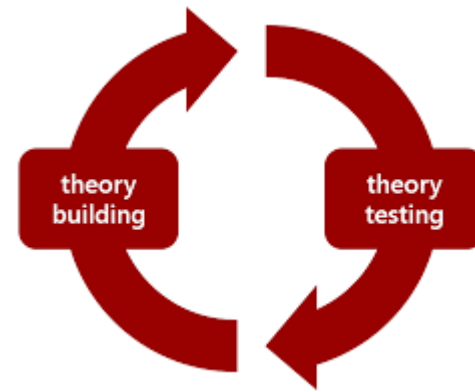
Observe

Act

Action Research

- A problem solving approach to research based on a series of iterative trials to pilot and refine change
- Denscombe (2010) : action research's purpose is to solve a particular problem and to produce guidelines for best practice

How do you start?



When moving towards a change it is necessary to develop a vision that will be the pillar to success in focusing the right strategies towards the change. It must be easy to communicate to others, attainable, understandable and something that is a shared vision with the stakeholders. It needs to determine the values that are central to change and clarify how the future will be different from the past.

Visions are necessary for people to make a goal and to make decisions in the right direction efficiently. A vision should capture the heart and mind of the individuals involved especially those in the leadership role. This will set the stage for the change and give people an understanding of a potentially complex system. It provides a focus that inspires and guides action.

Brief Solution Focused Therapy

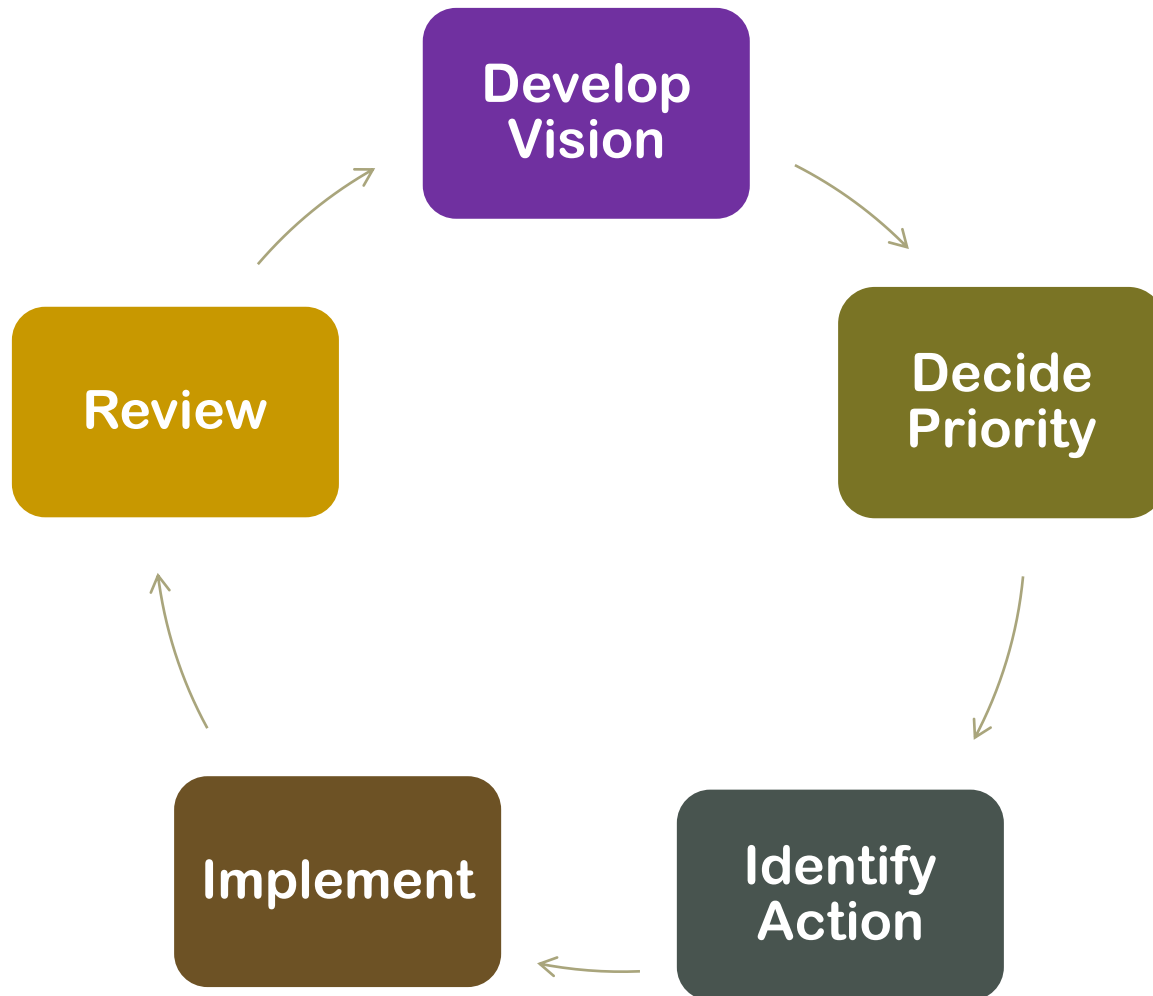
On a scale of 1-10, how good are things now?

What would need to change to move one point along the scale?

- Atheoretical
- Allows the recipient to define their own vision of better or improved
- Allows the recipient to set the priorities for change
- Designed for individual therapy but I've used it with staff groups before
- Depends on repeatedly measuring the groups progress towards a pre-agreed goal

What would your ideal solution be?

Key processes



Initial Vision

- A menu of ideas for activity for patients to choose from
- Spaces for people to read and paint
- Better visual access to all areas so no-one at the end of the corridor
- Therapeutic environment, wet rooms, games rooms
- All tasks become therapy
- More structure for staff and patients
- Joint nursing and psychology groups
- Time to involve patients, more 1:1 time
- Care planning
- Patients involved with running the ward and doing tasks
- Use therapy skills
- Patients involved with every step of their journey
- A week in advance visible on a board
- Good physical health care
- People to be able to do more – a kitchen
- An activity for morning and evening every day
- Availability of computers and leisure equipment
- Model of assessment, intervene, review, discharge ... that relates to stages not dates ... so we can discuss where people think they are and follow their progress through
- Motivational care plans to encourage people to use the skills they've got
- Help from psychology to get things organised and structured
- We keep people longer than we should because of housing, social needs and family dynamics
- Reflective practice groups
- Formulation sessions
- A structured day

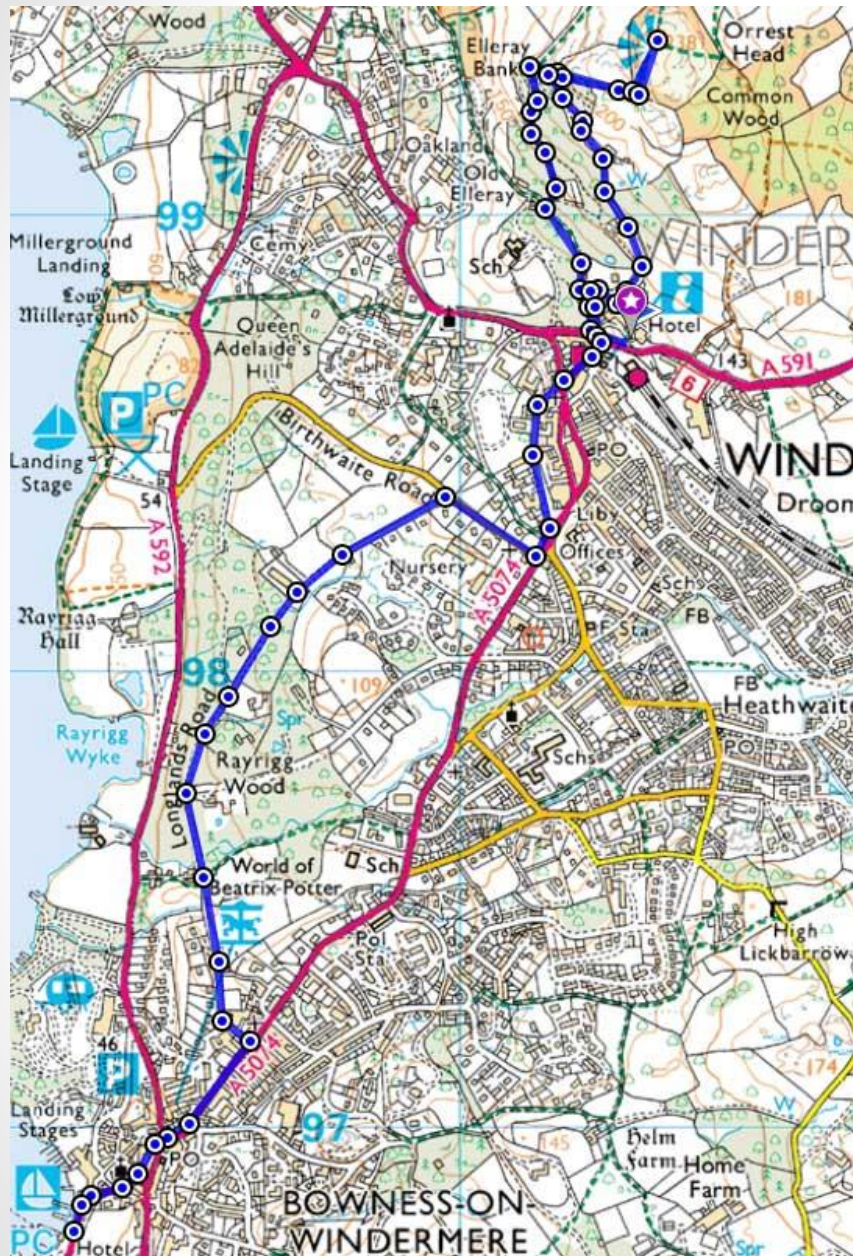
SMART?

- Absolutely not – and it doesn't need to be
- Detailed and inclusive
- On a scale of 1-10, ward judged themselves a 6
- They set a realistic target of 8.9
- And their confidence of achieving it was 7.9

Guiding principles

All care is therapy

All people are of value



Outcomes

To Start With:

- On a scale of 1-10, ward judged themselves a **6.0** for quality of care.
- They set a realistic target of **8.9**

12 Months Later

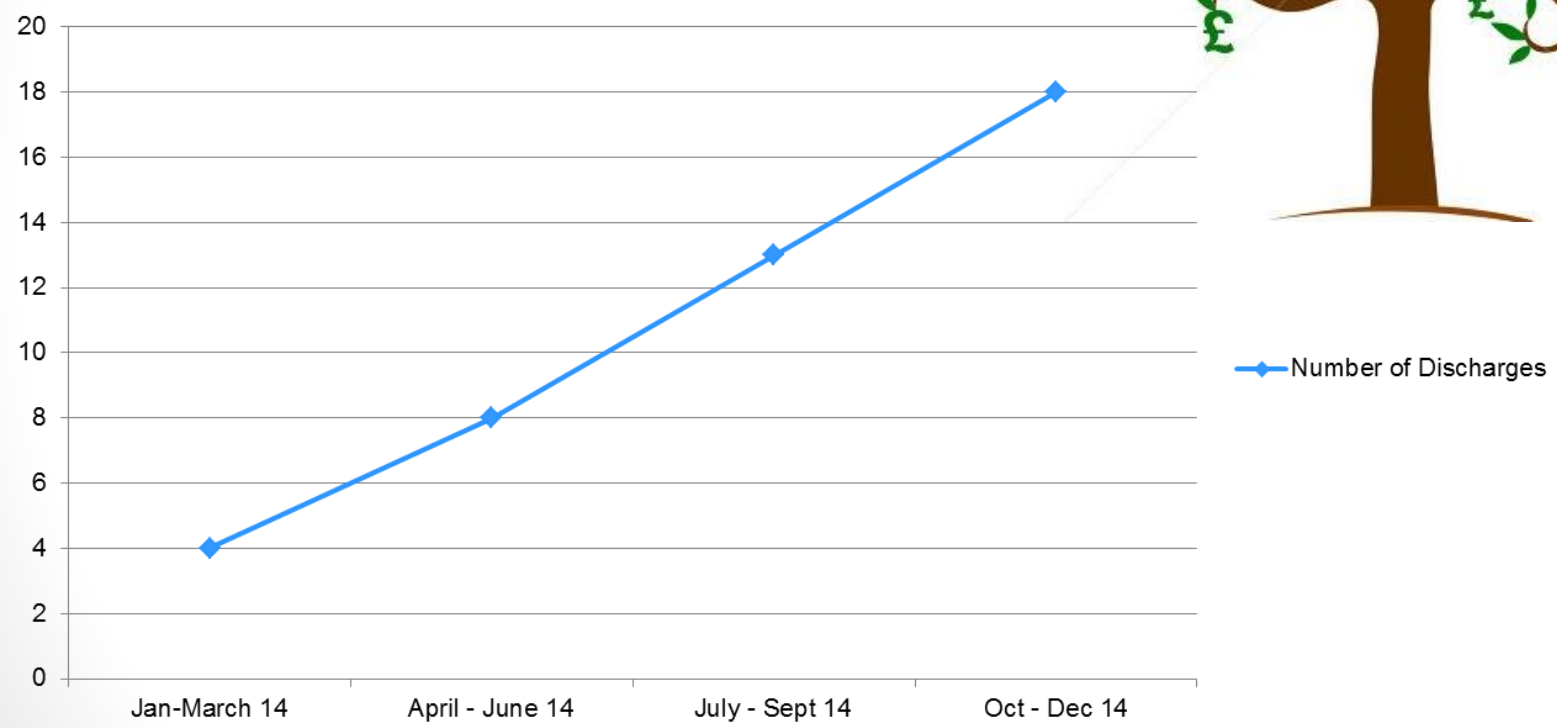
- Overall quality of care **8.8**
- Staff relationships with patients 8.4
- Multidisciplinary working 8.2
- Monitoring of people's progress 8.2
- Staff relationships with carers 7.9
- Confidence of staff team 7.6
- Care for people with dementia 7.4
- Care for people who are highly anxious 7.2
- Patient-led goal setting 6.9
- Interventions reflect patients own priorities 6.7



And Greater Efficiency!



Number of Discharges per Quarter



Theory derived



The process of creating a vision that is used in brief solution-focused therapy can be used in organisational change to help groups of staff define and agree their own ambitions for a service. In this way, change is created from the bottom-up, the people doing the job generate the solutions, and resistance is very low.

Spreading the Message



PLEASE COMMENT

WHAT DO YOU NEED FROM INPATIENT GUIDANCE? Please add your comments - if you run out of space, add post-its

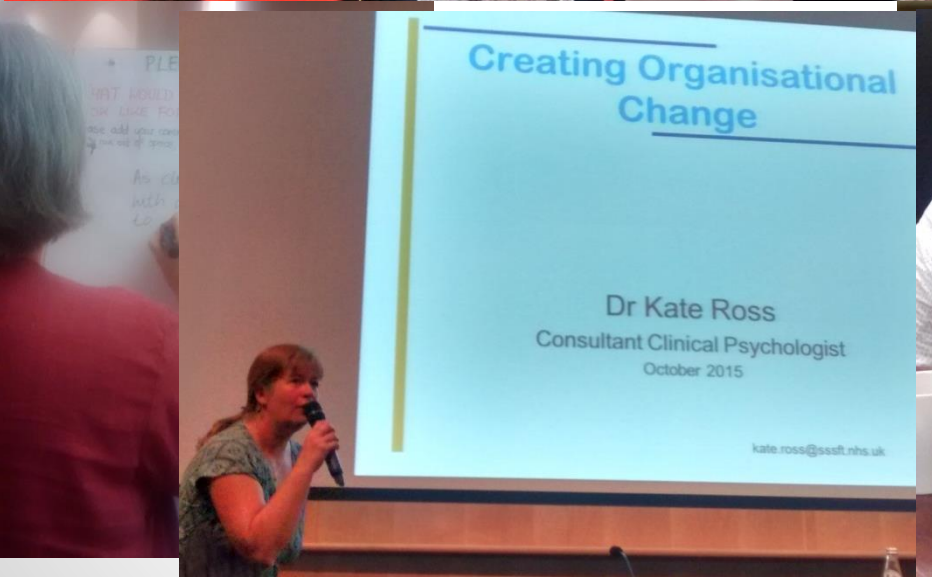
DESIGNATION OF NON-PSYCHOLOGISTS
How to condense complex/changing formulations for all to read
E-to-ONE, COUPLE & FAMILY THERAPY
How to be effective in very limited time

Understand Need to give understanding of Context + changing context
Organisational Staff + good Teams + Team Processes

What will theoretical models might contribute - Prolonged F.T., Narrative, CAT etc... systematic etc →
'Stories' of Success + what goes wrong/what doesn't help good to happen?
Barriers to good + how to overcome them.
Recommend as to No. of visits per ward/patient/department

GUIDELINES ON NEUROPSYCHOLOGICAL ASSESSMENT: WHEN, WHO, LEGAL IMPLICATIONS
Embedding psychology in + amongst teams
END OF LIFE/PALLIATIVE CARE & PSYCHOLOGY

The evidence-base underpinning inpatient work/
Clear guides on effective MDT work (interventions)
Summary of key policies/agendas to cite in order to push clinical/quality agendas forward!



Business Case to DCP

Create evidence	Deliver CPD	increase Profile of Psychology
<ul style="list-style-type: none">• Survey• Workshop• Examples of good practice• Filmed interviews• Web resources• Artwork	<ul style="list-style-type: none">• Conference• Training materials• CPD events• Student and trainee placements• Evidence-based guidance	<ul style="list-style-type: none">• Links with AIMS and other stakeholders• Availability of formal guidance demonstrating benefit of psychology and psychological approaches

On the National Stage

- Poster Presentation in Westminster ... May 16
- Presentation to AIMS July 2016
- Establishment of Facebook page and twitter account and e-mail network
- Establishment of dropbox of images and evidence
- Creation of videos of good practice
- Funding to produce of Good Practice Guidance

Current Project

Developing Psychological Best Practice in Inpatient Services for Older People

OBJECTIVE: Increase the clinically relevant evidence base relating to older adult inpatient services and produce good practice guidance for clinicians.

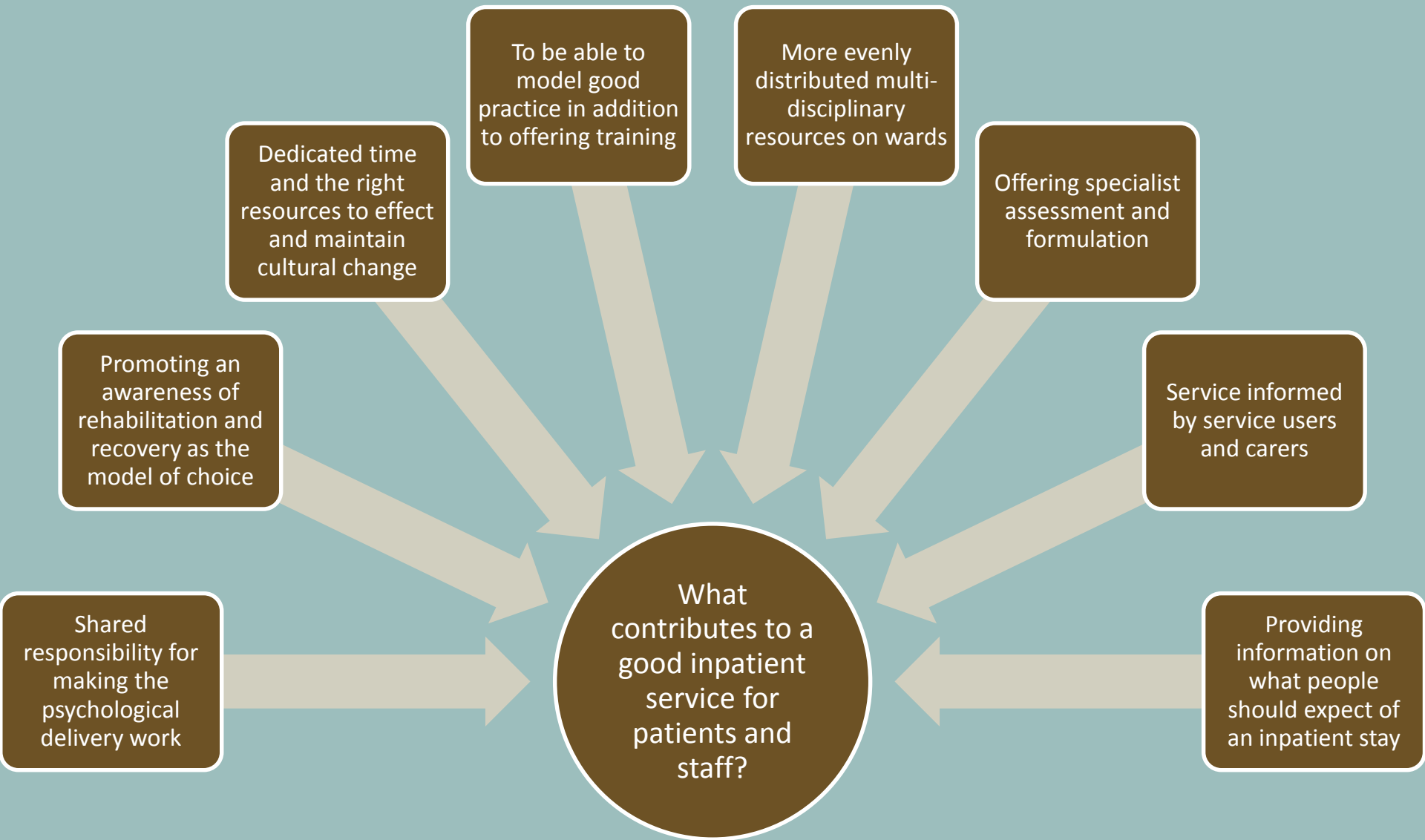
Image from a hospital in Cheltenham where patients leave each other messages of hope – a message in a bottle

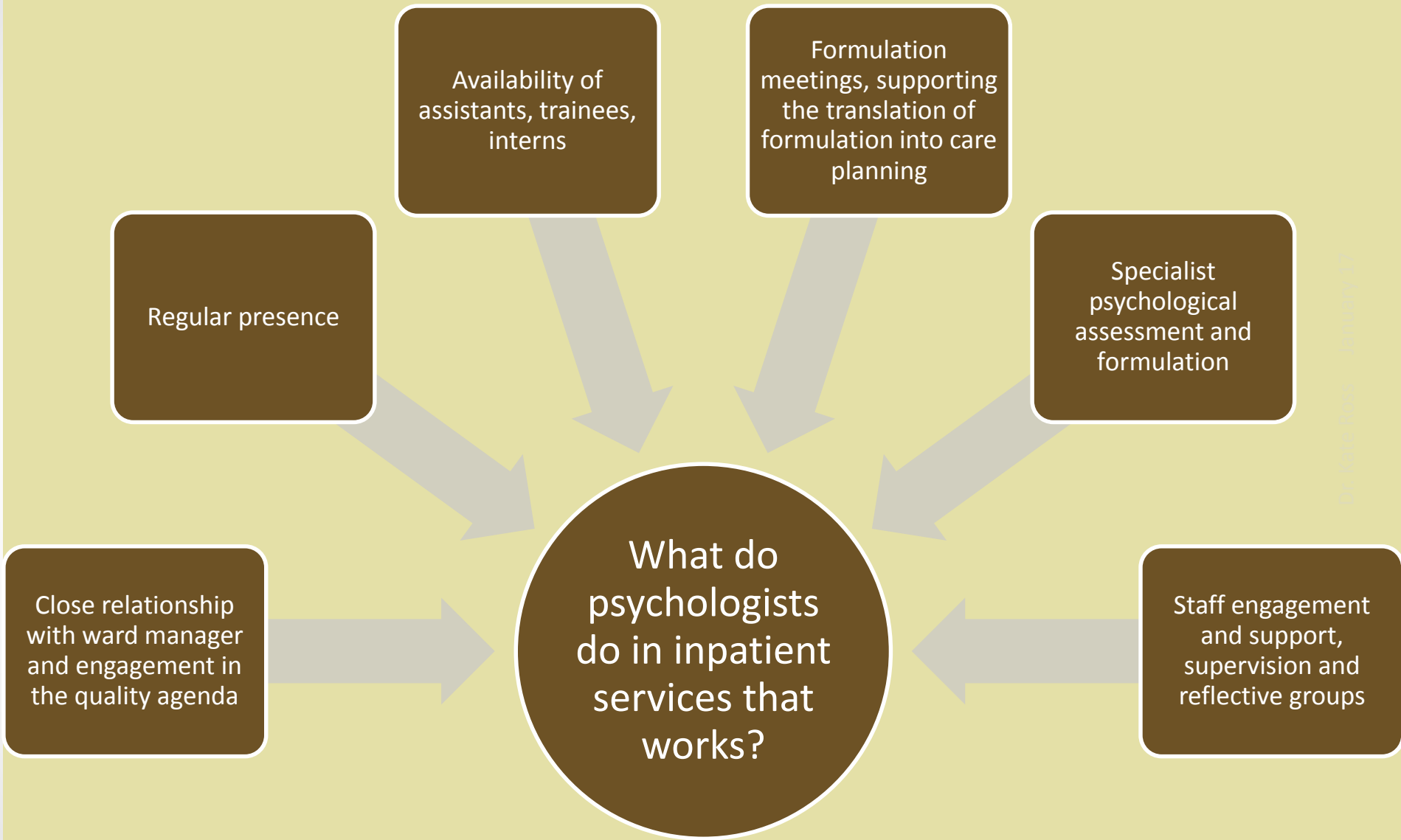


Other National Developments

- **FPOP is working with AIMS to make a definite recommendation around psychology resourcing for inpatient wards. A work in progress but we are recommending a minimum of 2½ days a week so that the psychologist can be a proper member of the ward team.**







Reflective Practice groups & team based formulation sessions

CONTENT

- Longitudinal formulation (understanding of the importance of life story)
- Shaping of care plans
- Developing new narratives
- Understanding from a systemic perspective

PROCESS

East Lancashire

- Weekly MDT meetings focusing on 1 SU
- Uses 5Ps model for formulation (predisposing, precipitating, presenting, perpetuating, protective)

Staffordshire and Shropshire

- Weekly MDT meeting focusing on 1 SU
- Uses Laidlaw's age-adapted CBT model. Discussed with SU post-meeting and integrated into proforma for admission planning

Pennine Care

- Proforma with prompts to help access each component - core beliefs & Padesky's hot-cross bun to delineate aspects within presentation
- Discussed & developed with SU post-meeting & integrated into written communications

Leicestershire

- Uses model of Schwartz rounds (in addition to formulation groups)

Somerset

- Newcastle model

Birmingham & Solihull

- Newcastle model, 5Ps & CBT model

Cardiff & Vale

- Run by 2 Clinical Psychologists, formulation fed back into ward round

Greater Manchester

- Assistant Psychologist develops formulation for each person admitted (meeting with carers, behavioural obs charts, notes review)
- Behavioural management plan follows person on discharge

Reflective Practice groups & team based formulation sessions

OUTCOMES

Staff report changes in their own practice:

- Greater psychological understanding
- Improved recovery focused care
- Compassionate therapeutic alliance
- Increased staff confidence
- Improved ability to provide a consistent approach
- Positive management of complex problems.

Measured reductions in:

- Average length of stay
- Readmission rates
- Harm and falls during admission

Currently in the Process of Writing Guidance

- Aiming for publication June 2017
- Chapter Structure:
 - Introduction
 1. Key Aims – what is your core purpose
 2. Therapeutic Engagement
 3. Formulation
 4. Communication
 5. Cultural Change
 6. Patient Journey
 7. Avoiding Psychological Harm
 8. Tips from the Coal Face



Found Poetry

It may seem like a change in any policy is rare
But subtle little changes increase the quality of care
Because there's more than just pay in which we find rewards
You've got to consider elements of psychologically minded
wards
And although patients being angry and confused is awful
We're here to help the team be more compassionate and
thoughtful



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North Wales Public Health Team

Dementia: Prevention and Early Intervention

Author: Dafydd Gwynne, Principal Practitioner

Date: 22nd February, 2012

Version: 1

Publication/ Distribution:

Public - Internet

Review Date: N/A

Purpose and Summary of Document:

Dementia presents a significant public health concern. Any interventions that could reduce the burden of the condition by preventing or delaying its onset could not only provide health and well-being benefits to the person with dementia, but to society in terms of reduced carer responsibility and improved productivity, and also the public purse in terms of reduced health and social care costs. This is especially pertinent with regards to an increasing population of older people projected for North Wales.

This report outlines the current evidence relating to prevention of and early intervention in dementia amongst older people, and an overview of the resulting economic impact.

Work Plan reference: North Wales Dementia Planning Group

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1 Executive Summary, Conclusions and Recommendations

This report outlines the current evidence available relating to prevention, early intervention, and costs of late onset dementia. It is limited to these areas, and therefore doesn't consider other aspects or themes of dementia care in detail, for example integrating health and social care, promoting independence, carer support, impact on social and personal relationships, managing challenging behaviour, and managing advanced dementia.

Dementia presents a significant public health concern; overall, 10% of deaths in men over 65 years, and 15% of deaths in women over 65 years, are attributable to it. Dementia prevalence roughly doubles every 5 years from the age of 65 onwards⁽¹⁾. It has been recently estimated that dementia costs the UK £23bn a year, presenting a greater cost than cancer (£12 billion per year) and heart disease (£8 billion per year) combined⁽²⁾. Most of this cost, £12.4 billion per year, is met by unpaid carers, with the rest made up of Social Care costs (£9 billion), health care (£1.2 billion) and productivity losses (£29 million). Population projections estimate an increase of 68% in the number of people with dementia in Wales between 2011-2030 (specifically 88% for males, and 57% for females)⁽³⁾. Delaying the onset of dementia by five years would halve the number of UK deaths due to the disease to 30,000 a year⁽⁴⁾.

The strength of evidence around dementia prevention is currently not strong. Much more research work is required, but it is apparent that it is a theme currently receiving significant academic attention. However, the evidence that is available suggests that the most promising approach to reducing the prevalence of all forms of dementia is a more general promotion of healthy lifestyles, particularly for those in mid-life. It has been estimated that by promoting and adopting healthy lifestyles in middle age, an individual's risk of developing dementia could be reduced by approximately 20%⁽⁵⁾.

The evidence also highlights the value of early intervention and diagnosis, as up to two thirds of people and their families are living with dementia unaware of its existence⁽⁶⁾. Early intervention, both pharmacological and non-pharmacological, can help to slow the progress of dementia and its symptoms. It can also help to better prepare individuals and their families for the future of living with the condition. However, early diagnosis does carry ethical implications, and consideration needs to be given to ability to consent and the potential benefit and harm for each individual case.

In addition, the literature also promotes the key role played by carers of those with dementia; prevention and early intervention is also important here. Service commissioners need to consider carer needs in all service planning, in order to support them to maintain their caring role whilst

maximising health and well-being outcomes for themselves and those for which they provide care. This will also help to avoid or delay admission of those with dementia to care settings, thereby reducing the pressure on health and social care services.

As more evidence comes to light, Public Health professionals, in collaboration with academic bodies, the voluntary sector, and health and social care services in particular, should seek to strengthen the evidence base for implementation of effective interventions. Due to the health gain and economic impact on the population across the life course, addressing the impact of dementia should remain high on the Public Health and partnership agenda.

Recommendations:

- 1 In supporting the planning and commissioning of dementia services, Public Health Wales should advocate for a strong emphasis on implementing evidence-based preventative and early interventions.
- 2 Public Health Wales should highlight the links between dementia prevention and other Local Public Health Strategic Framework priority areas, such as tobacco control, obesity, alcohol, and mental well-being.
- 3 Lifestyle intervention and risk reduction should be prioritised for adults aged 40-64; this will have added health gain benefits over and above those of reducing the risk of dementia, and will therefore likely be more cost-effective.
- 4 Promote access to social activities for older people, in community and residential settings e.g. AgeWell Centres, Over 50s Clubs or Walking Groups.
- 5 Identify the specific needs of people with a Learning Disability, especially individuals who have Down's syndrome. This may involve additional training across health and social services to raise awareness of early onset dementia amongst this population; promote access to the annual health checks for people with a learning Disability; and, to highlight the specialist support that is available to reduce the impact of a diagnosis of dementia on the individual and family members/carers.
- 6 Highlight role of frontline health and social care staff in identifying dementia symptoms and timely referral to specialist diagnostics, such as memory clinics, to facilitate formal diagnosis. Ethical issues regarding early diagnosis and consent should be carefully considered on an individual basis. Service commissioners may need to consider training needs of GPs and primary care teams, specifically in relation to dementia, and generally for older people's mental health.

- 7 The risk for individuals with Mild Cognitive Impairment in particular should be highlighted, whilst standardising the process of providing regular assessment via the memory clinics across BCUHB, supported by the Dementia Advisors when in post.
- 8 Those undertaking health checks for other high-risk groups, for example those who have had a stroke and those with neurological conditions such as Parkinson's disease, should also be aware of the possibility of dementia.
- 9 Promote the role of family members in identifying potential symptoms of dementia in older people, and their early involvement in planning future care needs of relatives who have an official diagnosis.
- 10 Service commissioners need to consider the specific needs of informal carers of people with dementia. Improving access to services such as educational support programmes, stress management, and cognitive behavioural therapy have been shown to have positive outcomes for the carer and to delay the institutionalisation of the person with dementia. It is important to continue to recognise the ongoing role of third sector agencies in supporting carers, in addition to those with dementia.
- 11 Early intervention in dementia does help secure more positive outcomes. For people with mild-moderate dementia, there is evidence of effectiveness for pharmacological (such as acetylcholinesterase inhibitors) and non-pharmacological (such as group cognitive stimulation programmes) interventions – further detail is provided in this report. Securing improved access to these should be considered by health and social care service commissioners, promoted via the specialist Memory Clinics, and supported by primary care.
- 12 Research work on the implementation of preventative or early intervention dementia interventions needs to consider the economic impact, in addition to any other primary outcomes measures. Public Health Wales and Besti Cadwaladr University Health Board should aim to maximise regional opportunities to engage in academic fora, in order to ascertain what recent evidence may be applicable in Wales.

2 Introduction

2.1 Purpose of this report

This report should be considered as part of the Public Health Wales evidence provided to support the work of the North Wales Dementia Planning Group. It builds on the comprehensive report by the National Public Health Service for Wales in 2008⁽⁷⁾ which provided a model and mapping of future dementia prevalence and service implications in Wales.

This report outlines the current evidence available relating to prevention and early intervention of late onset dementia i.e. dementia that is diagnosed in individuals at or over the age of 65 years. Early onset of dementia can also occur, but is much less common under 65 years of age, accounting for 2.2% of all people with dementia in the UK; interestingly the figure for BME groups is 6.1%⁽⁴⁾.

This report also outlines the most recent costs associated with dementia care and, although currently limited, the cost-effectiveness evidence regarding preventative interventions.

2.2 Methodology

Due to time constraints, literature searches were conducted within PubMed, OVID, and Google Scholar for systematic reviews using the search terms "dementia, prevention, early intervention". The search also included identifying the most recent evidence from the Cochrane Database, NICE Guidelines, and leading Dementia and Alzheimer's Charities.

Leading academics in cognitive science from Bangor University's School of Psychology were also consulted, in order to ascertain the most relevant current papers that should be considered in the review.

2.3 Impact of Dementia

Dementia presents a significant public health concern. It is a debilitating condition which describes a collection of symptoms, including a decline in memory, reasoning and communication skills, and a gradual loss of skills needed to carry out daily activities⁽⁴⁾. It is therefore not a natural part of ageing, and is caused by a variety of diseases which affect people in different ways. In terms of the dementia sub-types, a 30 year study in Sweden on 524 individuals with clinically diagnosed dementia identified Alzheimer's disease in 42.0% of the cases, vascular dementia in 23.7%, dementia of combined Alzheimer and vascular pathology in 21.6%, and

frontotemporal dementia in 4.0% of the patients. The remaining 8.8% of the patients had other dementia disorders, including combinations other than combined Alzheimer and vascular pathology⁽⁸⁾.

In comparison, the current NICE Guidelines⁽⁹⁾ suggest that Alzheimer's disease accounts for around 60% of all dementia cases, and other common causes in older people include cerebrovascular disease (vascular dementia) and dementia with Lewy bodies (DLB) (accounting for 15–20% of cases each). Numerous other causes exist, including other degenerative diseases (for example, Huntington's disease), prion diseases (Creutzfeldt-Jakob Disease), HIV dementia and several toxic and metabolic disorders (such as alcohol-related dementia). Dementia also develops in between 30–70% of people with Parkinson's disease, depending on duration and age; the distinction between Parkinson's disease dementia (PDD) and DLB lies in the relationship between motor and cognitive impairment. If dementia precedes, or occurs within 12 months of, motor disorder, DLB is diagnosed; otherwise the convention is to use the term PDD⁽⁹⁾.

The distribution of subtypes is different in men and women. Alzheimer's disease is more common in women (67% in women compared with 55% in men), while vascular dementia and mixed dementias account for 31% of all cases in men and just 25% in women. Among those with late onset dementia, 55.4% have mild dementia, 32.1% have moderate dementia and 12.5% have severe dementia⁽⁴⁾.

People with Down's syndrome are at risk of developing Alzheimer's Disease about 30–40 years earlier than the rest of the population, although lifetime risk may not be different⁽¹⁰⁾. The prevalence of dementia in people with learning disabilities without Down's syndrome is generally two or three times that expected in people over 65⁽¹¹⁾.

Dementia is more prevalent in people aged over 65, and prevalence roughly doubles every 5 years from this age onwards⁽¹⁾. This is highlighted in Table 1 below. Population projections estimate an increase of 68% in the number of people with dementia in Wales between 2011–2030 (specifically 88% for males, and 57% for females)⁽³⁾. These projections are summarised in Appendix 1.

Table 1. Rates for men and women with dementia in the 65 and over population⁽³⁾

Age range	Males	Females
	%	%
65-69	1.5	1.0
70-74	3.1	2.4
75-79	5.1	6.5
80-84	10.2	13.3
85+	19.5	25.0

The proportion of deaths attributable to dementia increases steadily from 2% at age 65 to a peak of 18% at age 85–89 in men, and from 1% at age 65 to a peak of 23% at age 85–89 in women. Overall, 10% of deaths in men over 65 years, and 15% of deaths in women over 65 years, are attributable to dementia. Delaying the onset of dementia by five years would halve the number of UK deaths due to the disease to 30,000 a year⁽⁴⁾.

2.4 Economic Impact

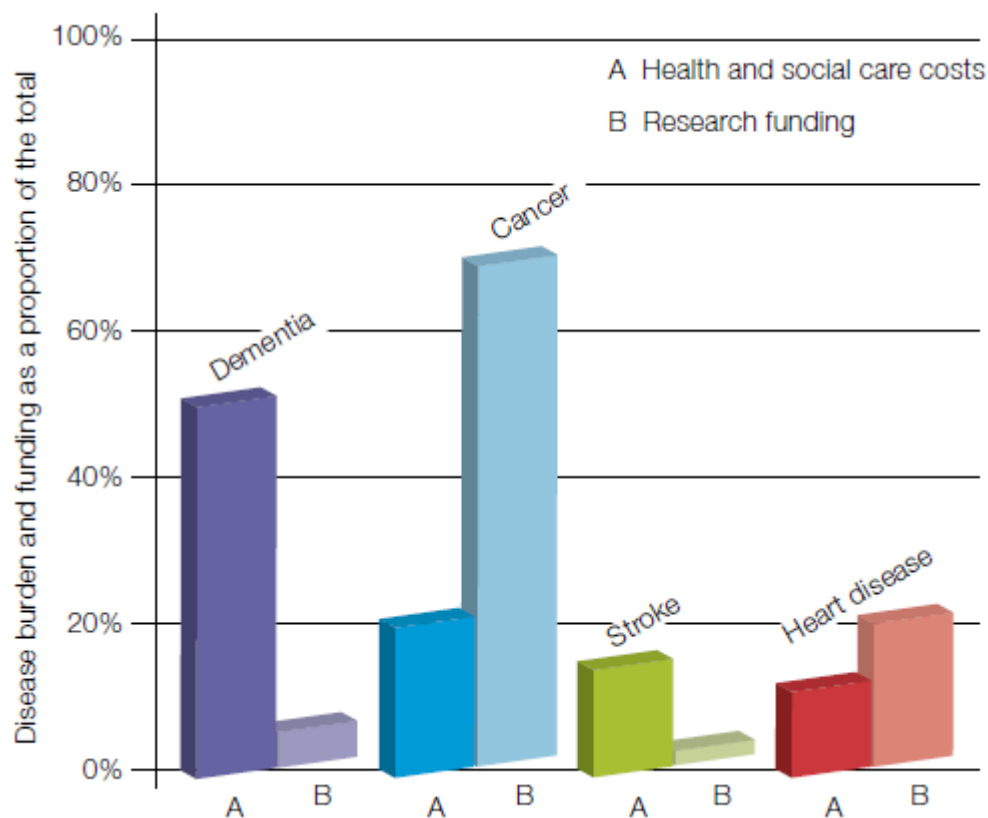
It has been recently estimated that dementia costs the UK £23bn a year, presenting a greater cost than cancer (£12 billion per year) and heart disease (£8 billion per year) combined⁽²⁾. Most of this cost, £12.4 billion per year, is met by unpaid carers, with the rest made up of Social Care costs (£9 billion), health care (£1.2 billion) and productivity losses (£29 million). Considering the projected increase of 74% in dementia prevalence in Wales by 2030, if the same increase were to be applied to the total UK costs, this would mean an annual UK cost for dementia of over £40bn by 2030.

The authors of the same report estimate that each dementia patient costs the economy £27,647 per year, which is more than the UK median salary (£24,700). In contrast, patients with cancer cost £5,999, stroke £4,770 and heart disease £3,455 per year. This finding is supported by a recent European study that found, using slightly different costing parameters, that each person with dementia cost society €22,194 per annum⁽¹²⁾. Appendix 2 highlights economic projections for total health and residential care expenditure Australia, from 2002-2062⁽¹³⁾, which suggests how dementia is projected to move from the 8th highest in the rankings of %

health and residential aged care expenditure in 2002/3, to the 3rd by 2032/3, and the highest ranking by 2062/3, in relation to other conditions.

Also highlighted in the UK study⁽²⁾ is the difference in government and charity funding to support research into dementia, in comparison to other health conditions, suggesting that for each person with dementia £61 is spent on research, compared to £295 for those with cancer; this is highlighted in Figure 1 below.

Figure 1: Health and social care costs and research funding by disease⁽²⁾



An American study found a significant difference in medical costs associated with different types of dementia suggesting that, compared with control patients without dementia, annual medical costs for Vascular Dementia patients were substantially higher (US\$10,545) than costs for patients with Alzheimer's disease (US\$3748)⁽¹⁴⁾. Although Vascular Dementia patients accounted for only 6% of all dementia patients identified in the health plan, they had substantially higher prevalence rates for 10 cardiovascular conditions compared with Alzheimer's disease patients and controls. They concluded that the higher costs for dementia patients relative to controls were largely attributable to higher inpatient costs.

3 Prevention and Early Intervention

3.1 Risk Factors

Section 3 will focus on identifying risk factors, preventative & early interventions for the most prominent forms of dementia, namely Alzheimer's disease, Vascular Dementia, and a mixture of both. The current NICE guidelines suggest that earlier identification of dementia may allow secondary prevention interventions, as well as early mobilisation of support and resources⁽⁹⁾.

A useful method of categorizing risk factors for dementia has been proposed as identifying factors that are, and are not, modifiable⁽⁹⁾. Non-modifiable risk factors for dementia in general and Alzheimer's in particular include:

- advancing age
- genotype
- female gender
- having a learning disability, particularly Down's Syndrome.

Established risk factors that are (or are potentially) modifiable / preventable include:

- hypertension,
- excessive alcohol consumption,
- diabetes,
- depression
- head injury.

Although the evidence is not so strong, other modifiable (or potentially modifiable) risk factors that may impact on the risk of dementia include:

- obesity,
- raised homocysteine levels
- raised cholesterol levels.

In addition, a recent systematic review of evidence on potential risk factors and interventions for Alzheimer's disease and Cognitive Decline⁽¹⁾ presents a similar list of risk factors (summarised in Appendix 3). The NICE guidance⁽⁹⁾ also notes that risk factors for vascular dementia overlap with Alzheimer's disease and include age, vascular risk factors (stroke, hypertension, diabetes and smoking) and apoE4 genotype. This assessment is also reflected in a recent study on controlling vascular risk factors, which suggests that it is increasingly recognized that many

vascular risk factors seem to also be risk factors for Alzheimer's disease⁽¹⁵⁾. Thus the customary clear distinction between vascular and degenerative dementia may no longer be tenable. The authors add that a new concept is emerging that Alzheimer's disease and Vascular dementia are not necessarily two entirely separate entities; rather they could be viewed as part of a spectrum of dementias ranging from predominantly vascular to predominantly plaques and tangles (classic degenerative or Alzheimer's dementia) with many if not most cases a mix of both.

3.2 Dementia Prevention

The strength of evidence around dementia prevention is currently limited. Risk factors for developing dementia are well known, but studies targeting a reduction in these risk factors haven't yet shown a corresponding decrease in those people developing dementia. To date, prospective randomised controlled trials have not clearly demonstrated that modification of risk factors leads to a reduction in dementia rates⁽⁹⁾.

However, the evidence that is available suggests that the best current advice to prevent dementia includes advocating healthy lifestyles ^(1;9;16-20), specifically:

- Stopping smoking
- Reduced alcohol intake (although low-moderate intake seems to have mild protective factor)
- Healthy diet (evidence not so strong) – nutrient rich, Mediterranean-style, high vegetable intake
- Physical Activity – regular physical activity, especially intensive activity, even into older age; impact on mental well-being and stress reduction; reducing midlife obesity
- Social activity – people more likely to engage in cognitive and physically stimulating activities; impact on mental and physical wellbeing; benefit of 'cognitive reserve' (combination of the benefits of education, occupation, and mental activities); reducing risk of depression; developing supportive social networks for those at risk of dementia and their families. Promoting 'Social Capital' i.e. the quantity and quality of social interaction, amongst older people will become increasingly significant, considering the projected increase in the number of older people who may be socially isolated in North Wales (Appendix 3 provides predictions on the number of people aged 65+ living alone in North Wales; the average increase from 2011-2030 being 43%).

The evidence seems to suggest that maintaining or adopting these lifestyle changes is especially important in mid-life⁽⁵⁾ i.e. from 40-64 years of age, as risk factors for not only dementia, but numerous other

cardiovascular, metabolic, and respiratory diseases and cancers can be significantly reduced during these years before moving into older age. In addition, the current NICE guidelines⁽⁹⁾ suggest that for middle-aged and older people, primary health care services should review and treat vascular and other risk factors for dementia, such as smoking, excessive alcohol use, obesity, diabetes, hypertension and raised cholesterol levels. A recent BMJ Clinical Evidence report⁽⁵⁾ suggested that by tackling the lifestyle risk factors in middle age, an individual's risk of developing dementia could be reduced by approximately 20%.

In terms of non-lifestyle preventative interventions, the evidence suggests that cognitive training can be beneficial in reducing the risk factors for developing cognitive impairment.

The evidence for pharmacological and non-pharmacological secondary preventative interventions i.e. when dementia has been diagnosed, is summarised in section 3.4.

3.3 Early diagnosis and intervention

The World Alzheimer Report 2011⁽²¹⁾ highlights a surprising lack of research conducted into the effect of the timing of dementia diagnosis upon subsequent disease course and outcomes for the person with dementia and their carers. The report reflects on the recommendations of the Dementia Study Group of the Italian Neurological Society, which support early diagnosis on the grounds that it allows timely intervention against the causes of reversible dementias, the start of therapies that can slow disease progression, attention to medical co-morbidity, and support to people with dementia and their families. Other benefits of early diagnosis and intervention include⁽²¹⁾:

1. Relief gained from better understanding – validation of concerns, and a framework for understanding the origin and nature of symptoms
2. Maximising decision-making autonomy – the chance to make important decisions about the future while still retaining mental capacity
3. Access to services – timely access to medical and preventative care, advice and support, all of which require a diagnosis
4. Risk reduction – safety at home, driving assessments, anticipating and avoiding adverse effects of medication
5. Planning for the future – early retirement, financial planning, safety and security issues

6. Avoiding or reducing future costs – chiefly through delaying or avoiding transition into a care home
7. Diagnosis as a human right – both to have access to an accurate diagnosis, and to be informed of it, or not, according to preference

The issue of preference of receiving a diagnosis, especially an early diagnosis, carries significant ethical implications. Although there are clear advantages to early identification of memory problems as highlighted above, careful consideration will be required with each individual case as to the potential benefit and harm of disclosing a diagnosis, as the evidence currently available does not clearly advocate a preferred approach.

In terms of dementia screening, the current evidence does not support general population screening⁽⁹⁾. Rather, the most effective method of early intervention, after considering the ethical issues raised above, is to ensure that the person concerned with potential MCI, memory problems, or dementia symptoms is seen by their GP as soon as possible. The current NICE Guidelines⁽⁹⁾ provide detailed recommendations as to the assessment process GPs should take to diagnose dementia or memory related problems in older people. However, in North Wales the investment in and development of specialist memory clinics (detailed on the next page) has resulted in these being the preferred location for such assessments. Therefore, in North Wales the role for primary care, and GPs in particular, should be to screen potential MCI or dementia cases, and to refer to the closest memory clinic for further specialist assessment. GPs also have an important role in identifying other possible causes of MCI or dementia and co-morbidities, such as:

- Depression: this can affect 20–30% of people who have dementia, and about 20% have anxiety⁽²²⁾. Psychosis (often delusions of persecution) and agitation/aggression also often accompany dementia. Each of these needs to be assessed and treated independent of the underlying dementia⁽²³⁾.
- Hypertension and other vascular risk factors
- Lifestyle check
- Medication review in order to identify and minimise use of drugs, including over the counter medication, that may adversely affect cognitive functioning

In this context, there is a clear important role for family members and carers. We know that the services they provide are invaluable, for both those that they care for, and the public purse. As the impact of dementia grows over the coming years, family members will have an increasingly important role to play in dementia prevention and early intervention.

As highlighted in the recent Department of Health Dementia Awareness Campaign⁽⁶⁾, family members can help to spot the early signs of dementia

in their older relatives. Stating that up to two thirds of dementia cases goes undiagnosed, the campaign suggests that people should speak to their GP if they, or someone they know, begin to exhibit certain signs of dementia, including:

- Difficulty remembering recent events, but not events that occurred long ago.
- Difficulty following conversations or TV programmes.
- Keep forgetting the names of friends or common objects.
- They keep repeating things they've already said, or have difficulty remembering what they were saying.
- They have difficulty with thinking and reasoning.
- They have mood changes, such as feeling anxious, depressed or angry about their memory loss.
- They feel confused in familiar environments.
- They hear that other people have started to notice and comment on their memory loss.

Memory clinics have a key role to play in the early identification and diagnosis of dementia⁽²¹⁾. In the UK, the introduction of a new community-based memory service saw an estimated 63% increase in diagnoses by specialist services over a two year period, with 77% of referrals to the new memory service comprising those in the early stages of dementia, or with subjective impairment only⁽²⁴⁾.

Across North Wales, there are Memory Clinics in each area, taking referrals from primary care and working on standards set out in the 1000 Lives plus document 'Improving Dementia Care'⁽²⁵⁾. The clinics complete an assessment, share the results of the assessment with the patient and the family (if agreed by the patient), and should also provide information and advice and signpost to other services. The BCUHB plans for the forthcoming appointments of Dementia Advisors in each area should support this process, in addition to promoting early intervention and initiating dementia medication, where appropriate.

Mild cognitive impairment (MCI) has been defined as a syndrome of cognitive decline, greater than expected for an individuals' age and education level, which does not interfere notably with activities of daily living⁽⁹⁾. Brain pathologies that lead to dementia all start well in advance of the onset of clinical signs and symptoms⁽²¹⁾. MCI is not a diagnosis of dementia of any type, although it may lead to dementia in some cases as approximately 50% of people with MCI later develop dementia; therefore, primary healthcare staff should consider referring people who show signs of mild MCI for assessment by memory assessment services to aid early identification of dementia. Current notable practice in North Wales includes offering people with MCI regular (usually annual) appointments to monitor any further change, thereby facilitating early intervention in those deemed at being at higher risk.

Once dementia has been diagnosed, health and social care staff should aim to promote and maintain independence, including mobility⁽⁹⁾. This should be reflected in care plans that should aim to maximise independent activity, address activities of daily living, adapt and develop skills, thereby minimising the need for support.

3.4 Pharmacological and Non-Pharmacological Interventions for People Diagnosed with Dementia

The evidence on effectiveness of pharmacological interventions for dementia is mixed. Evidence from the most recent NICE Guidelines⁽⁹⁾ on pharmacological interventions for cognitive symptoms in people with Alzheimer's, non-Alzheimer's dementia and MCI are summarised below:

a.) Pharmacological interventions for the cognitive symptoms of Alzheimer's disease

The three acetylcholinesterase (AChE) inhibitors donepezil, galantamine and rivastigmine are recommended as options for managing mild to moderate Alzheimer's disease. Memantine is recommended as an option for managing Alzheimer's disease for people with moderate Alzheimer's disease who are intolerant of, or have a contraindication to, AChE inhibitors or who have severe Alzheimer's disease.

All above drugs should be administered according to the following summarised treatment conditions – please refer to the NICE guidelines for the full list of conditions:

- Only specialists in the care of patients with dementia should initiate treatment. Carers' views on the patient's condition at baseline and follow-up should be sought.
- Treatment should be continued only when it is considered to be having a worthwhile effect on cognitive, global, functional or behavioural symptoms.
- Patients who continue on treatment should be reviewed regularly using appropriate tools and by an appropriate specialist team
- If prescribing an AChE inhibitor (donepezil, galantamine or rivastigmine), treatment should normally be started with the drug with the lowest acquisition cost. However, an alternative AChE inhibitor could be prescribed if it is considered appropriate
- When using assessment scales to determine the severity of Alzheimer's disease, healthcare professionals should take into

account any physical, sensory or learning disabilities, or communication difficulties that could affect the results and make any adjustments they consider appropriate

- When assessing the severity of Alzheimer's disease and the need for treatment, healthcare professionals should not rely solely on cognition scores in circumstances in which it would be inappropriate to do so, such as because of the patient's learning difficulties or other disabilities, linguistic, language or other communication difficulties, or level of education
- For people with learning disabilities, tools used to assess the severity of dementia should be sensitive to their level of competence.

b.) Pharmacological interventions for the cognitive symptoms of non-Alzheimer dementias and MCI

For people with vascular dementia, acetylcholinesterase inhibitors and memantine should not be prescribed for the treatment of cognitive decline, except as part of properly constructed clinical studies. For people with MCI, acetylcholinesterase inhibitors should not be prescribed, except as part of properly constructed clinical studies.

A recent thorough systematic review of evidence on potential risk factors and interventions for Alzheimer's disease and Cognitive Decline⁽¹⁾ presents similar conclusions, namely that there is a lack of strong evidence and high quality trials to confidently assess their association with the conditions. The authors conclude that further research is required prior to be able to make recommendations on interventions. The findings are summarised in Appendix 4.

The most recent evidence from the Cochrane reviews⁽¹⁷⁾ are summarised in Appendix 5. Again, the evidence for effectiveness in preventing or improving symptoms in Alzheimer's disease, dementia in general or cognitive impairment is not strong for most interventions; the authors again suggest the need for more robust research.

c.) Non Pharmacological Interventions

Early stage dementia: Some evidence for support groups for people with mild-moderate dementia of all types such as structured group cognitive stimulation programmes (for quality of life and depression), behavioural treatment (for depression) and cognitive rehabilitation (for goal performance, satisfaction and subjective memory impairment) may be helpful^(9;21).

For behaviour that challenges in people with dementia: Should be offered an assessment at an early opportunity to establish likely factors that may generate, aggravate or improve the challenging behaviour. The assessment should consider: the person's physical health, depression, undetected pain or discomfort, side effects of medication, religious or cultural needs, psychosocial factors, physical environment, behavioural and functional analysis. Care staff and carers can then develop and review an individually tailored care plan that will help to address the behaviour that challenges.

3.5 Supporting Carers

A key function to consider in the dementia prevention and early intervention agenda is providing support for carers. If carer breakdown occurs, or family members are not prepared for a caring role and all the life changes that are implicit with it, outcomes for individuals with dementia are inevitably worsened and usually involve admission to a care setting. The Alzheimer's Society highlights research which suggests that carers of people with dementia experience greater strain and distress than carers of other older people⁽²⁶⁾. There are also clear implications for this in terms of the financial impact on health and social care services, considering the projected increase in dementia prevalence over the next 20-30 years.

There is strong evidence that caregiver education, training and support interventions promotes carer mood and helps to delay the institutionalisation of the person with dementia⁽²¹⁾. The most recent NICE-SCIE Dementia Guidelines suggest that interventions involving training or stress management, or involving the person with dementia alongside the carer, appeared to have the largest effect on the carer's psychological health and well-being. The guidelines also suggest recommends that carers have access to a range of psychological therapies, such as cognitive behavioural therapy.

Locally, the Welsh Alzheimer's Society in North Wales has been delivering a 5-week dementia carer's education programme package. The packages are commissioned on a Local Authority basis, but are not core or continually funded. In addition, some Local Authorities don't provide the specialist dementia carer training, as the carers are offered more generic carer education packages. The evaluation of a programme held in south Denbighshire in 2009, costing approximately £3600, suggested that the 12 carers who attended rated the sessions as either good or excellent in terms of content, delivery, quality of information, and applicability for their own circumstances. They also commented on the value of the social contact with other carers in similar situations and the fact that transport and respite costs were reimbursed. In terms of improving future education programmes, they suggested that input from specialist

dementia medical professionals around dementia progression and stages would be valuable.

Currently, most carer referrals to the Alzheimer's Society are from health and social care professionals, and tend to be for carers who are in crisis. The Society suggests that:

- there is an unmet need for training, with more focus required to support newly identified carers i.e. to avoid crisis
- inform local and regional health and social care commissioning processes to secure ongoing educational packages
- closer links with the packages and support from memory clinics e.g. support provided prior to discharge from memory clinics
- need to consider enhanced training for GPs and other frontline primary care staff in relation to dementia and older people's mental health in general
- strengthen links with the regional dementia advisors when in post

3.6 Cost effectiveness of dementia prevention interventions

In a recent presentation to an All-Wales Dementia Prevention Workshop hosted by Bangor University's Psychology department⁽²⁷⁾, it was emphasised that there was little evidence on specific cost effectiveness of interventions for dementia. The author concluded that:

- EuroCoDE study⁽¹²⁾ recognised challenges in generating robust evidence on effect of dementia prevention
- Future studies needed to consider issues around uptake and context when attempting to draw conclusions around cost-effectiveness
- Many potential population level actions have an economic case based on complementary physical and mental health benefit; therefore, looking at the economic benefits of preventing dementia could strengthen case for some public health interventions
- The least known about the economic case relates to cognitive training & stimulation

Appendix 1 – All Wales and North Wales Local Authority Population Estimates to have Dementia 2011-2030

Wales local authority populations estimated to have dementia, 2011-2030, males and females aged 65 and over

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

												Estimate	
Wales*		2011		2015		2020		2025		2030			
		Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)		
Males	65-69	82,182	1,233 (1164 - 1301)	95,128	1,427 (1353 - 1500)	86,177	1,293 (1223 - 1363)	89,715	1,346 (1274 - 1417)	99,730	1,496		
	70-74	63,833	1,979 (1893 - 2063)	72,244	2,240 (2148 - 2331)	87,525	2,713 (2613 - 2814)	79,844	2,475 (2379 - 2571)	83,482	2,588		
	75-79	49,131	2,506 (2410 - 2601)	54,302	2,769 (2669 - 2870)	63,252	3,226 (3117 - 3334)	77,386	3,947 (3827 - 4067)	71,158	3,629		
	80-84	33,247	3,391 (3283 - 3499)	37,149	3,789 (3675 - 3904)	43,674	4,455 (4331 - 4579)	51,999	5,304 (5169 - 5439)	64,349	6,564		
	85+	26,401	5,148 (5022 - 5274)	31,025	6,050 (5913 - 6187)	39,357	7,675 (7521 - 7829)	50,585	9,864 (9669 - 10059)	64,488	12,575		
Sub-Total Males			14,257									Sub-Total M	26,852
												%diff from 2011	88
Females	65-69	86,733	867 (810 - 925)	100,063	1,001 (939 - 1062)	92,118	921 (862 - 980)	96,680	967 (906 - 1027)	108,771	1,088		
	70-74	70,624	1,695 (1615 - 1775)	79,025	1,897 (1812 - 1981)	94,732	2,274 (2161 - 2386)	87,649	2,104 (2015 - 2192)	92,293	2,215		
	75-79	58,874	3,827 (3710 - 3944)	62,751	4,079 (3958 - 4200)	71,786	4,666 (4531 - 4796)	86,667	5,633 (5491 - 5776)	80,734	5,248		
	80-84	47,116	6,266 (6122 - 6411)	48,182	6,408 (6262 - 6554)	53,389	7,101 (6947 - 7254)	62,150	8,266 (8100 - 8432)	75,736	10,073		
	85+	52,468	13,117 (12923 - 13311)	55,393	13,848 (13645 - 14048)	61,444	15,361 (15151 - 15571)	71,971	17,993 (17765 - 18220)	87,651	21,913		
Sub-Total Female			25,773									Sub-Total F	40,536
												%diff from 2011	57
Total M+F 2011			40,029									Total M+F 2030	67,388
												%diff from 2011	68

*Populations for Wales calculated by totalling the local authority populations

Isle of Anglesey		Estimated counts											
		2011		2015		2020		2025		2030			
	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	
Males	65-69	2,500	(26 - 49)	2,590	(27 - 51)	2,351	35 (24 - 47)	2,336	35 (24 - 47)	2,418	36 (25 - 48)		
	70-74	1,824	(42 - 71)	2,218	(53 - 85)	2,405	75 (58 - 91)	2,201	68 (52 - 84)	2,198	68 (52 - 84)		
	75-79	1,302	(51 - 82)	1,571	(63 - 97)	1,948	99 (80 - 118)	2,133	109 (89 - 129)	1,967	100 (81 - 119)		
	80-84	867	(71 - 106)	941	(78 - 114)	1,258	128 (107 - 149)	1,600	163 (140 - 187)	1,772	181 (156 - 206)		
	85+	665	(110 - 150)	828	(139 - 184)	1,041	203 (178 - 228)	1,439	281 (251 - 310)	1,962	383 (348 - 417)		
	65-69	2,466	(15 - 34)	2,890	(18 - 39)	2,430	24 (15 - 34)	2,495	25 (15 - 35)	2,661	27 (17 - 37)		
	70-74	1,949	(34 - 60)	2,231	(39 - 68)	2,739	66 (50 - 81)	2,315	56 (41 - 70)	2,383	57 (43 - 72)		
75-79	1,500	(79 - 116)	1,701	(91 - 131)	2,019	131 (110 - 153)	2,497	162 (138 - 186)	2,124	138 (116 - 160)			
80-84	1,231	(140 - 187)	1,206	(137 - 183)	1,452	193 (168 - 218)	1,753	233 (205 - 261)	2,188	291 (260 - 322)			
85+	1,327	(301 - 363)	1,458	(332 - 397)	1,596	399 (365 - 433)	1,943	486 (448 - 523)	2,453	613 (571 - 655)			

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

												Estimated counts	
Gwynedd		2011		2015		2020		2025		2030			
		Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)		
Males	65-		(41 -		(47 -								
	69	3,662	55 (69)	4,134	62 (77)	3,537	53 (39 - 67)	3,516	53 (39 - 67)	3,940	59 (44 - 74)		
	70-		(65 -		(76 -								
	74	2,663	83 (100)	3,069	95 (114)	3,754	116 (137)	3,233	100 (120)	3,228	100 (119)		
	75-		(88 -		(96 -								
	79	2,107	107 (127)	2,278	116 (137)	2,667	136 (158)	3,295	168 (193)	2,863	146 (169)		
	80-		(130 -		(142 -								
84	1,505	153 (176)	1,626	166 (190)	1,850	189 (214)	2,213	226 (254)	2,762	282 (313)			
85+	1,080	211 (185 - 236)	1,298	253 (225 - 281)	1,626	317 (286 - 348)	2,041	398 (363 - 433)	2,587	504 (465 - 544)			
Females	65-		(25 -		(29 -								
	69	3,643	36 (48)	4,106	41 (54)	3,543	35 (24 - 47)	3,730	37 (25 - 49)	3,925	39 (27 - 51)		
	70-		(56 -		(63 -								
	74	3,022	73 (89)	3,328	80 (97)	3,836	92 (111)	3,319	80 (62 - 97)	3,507	84 (102)		
	75-		(141 -		(149 -								
	79	2,551	166 (190)	2,669	173 (198)	3,014	196 (222)	3,502	228 (256)	3,045	198 (225)		
	80-		(261 -		(252 -								
84	2,195	292 (323)	2,122	282 (313)	2,267	301 (333)	2,604	346 (380)	3,058	407 (444)			
85+	2,242	561 (520 - 601)	2,393	598 (557 - 640)	2,566	641 (598 - 684)	2,898	724 (679 - 770)	3,465	866 (816 - 916)			

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

Conwy		2011		2015		2020		2025		2030			
		Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)
Males	65-		(41 -		(48 -								
	69	3,703	56 70)	4,220	63 79)	3,799	57 (42 - 72)	4,044	61 (46 - 76)	4,349	65 (50 - 81)		
	70-		(73 -		(84 -								
	74	2,935	91 109)	3,345	104 123)	3,986	124 (102 - 145)	3,616	112 (92 - 133)	3,862	120 (99 - 141)		
	75-		(105 -		(109 -								
	79	2,490	127 148)	2,574	131 153)	2,996	153 (129 - 176)	3,596	183 (158 - 209)	3,289	168 (143 - 192)		
	80-		(153 -		(171 -								
84	1,738	177 202)	1,933	197 223)	2,130	217 (190 - 245)	2,528	258 (228 - 288)	3,063	312 (280 - 345)			
85+	1,432	279 (250 - 309)	1,686	329 (297 - 361)	2,121	414 (378 - 449)	2,607	508 (469 - 548)	3,257	635 (591 - 679)			
Females	65-		(27 -		(31 -								
	69	3,956	40 52)	4,414	44 57)	4,077	41 (28 - 53)	4,352	44 (31 - 56)	4,865	49 (35 - 62)		
	70-		(67 -		(71 -								
	74	3,512	84 102)	3,727	89 108)	4,255	102 (83 - 122)	3,950	95 (76 - 114)	4,226	101 (82 - 121)		
	75-		(165 -		(179 -								
	79	2,934	191 217)	3,179	207 234)	3,412	222 (194 - 250)	3,920	255 (225 - 285)	3,664	238 (209 - 267)		
	80-		(287 -		(290 -								
84	2,402	319 352)	2,428	323 356)	2,741	365 (330 - 399)	2,988	397 (361 - 434)	3,465	461 (422 - 500)			
85+	2,670	667 (624 - 711)	2,789	697 (652 - 742)	3,046	761 (715 - 808)	3,585	896 (845 - 947)	4,220	1,055 (1000 - 1110)			

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

Estimated
counts

Denbighshire		2011		2015		2020		2025		2030			
	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)			
Males	65-69	3,001	(32 - 58)	3,715	(41 - 70)	3,286	(36 - 63)	3,347	50	(36 - 64)	3,938	59	(44 - 74)
	70-74	2,493	(60 - 94)	2,801	(69 - 105)	3,531	(89 - 130)	3,148	98	(79 - 117)	3,216	100	(80 - 119)
	75-79	1,811	(74 - 111)	2,111	(88 - 127)	2,497	(106 - 149)	3,172	162	(137 - 186)	2,851	145	(122 - 168)
	80-84	1,212	(103 - 144)	1,394	(120 - 164)	1,704	(149 - 198)	2,055	210	(183 - 237)	2,641	269	(239 - 300)
	85+	1,020	(174 - 224)	1,178	(203 - 256)	1,531	(268 - 329)	2,035	397	(362 - 432)	2,643	515	(475 - 555)
	65-69	3,186	(21 - 43)	3,806	(26 - 50)	3,645	(25 - 48)	3,602	36	(24 - 48)	4,292	43	(30 - 56)
	70-74	2,710	(49 - 81)	2,950	(55 - 87)	3,660	(70 - 106)	3,523	85	(67 - 102)	3,491	84	(66 - 102)
	75-79	2,096	(114 - 158)	2,444	(135 - 183)	2,715	(151 - 202)	3,387	220	(192 - 248)	3,280	213	(186 - 241)
80-84	1,794	(210 - 267)	1,716	(201 - 256)	2,129	(252 - 314)	2,398	319	(286 - 352)	3,017	401	(365 - 438)	
85+	2,261	(525 - 606)	2,339	(544 - 626)	2,438	(568 - 651)	2,943	736	(690 - 782)	3,573	893	(842 - 944)	

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

Flintshire		2011		2015		2020		2025		2030		Sufferers (95% CI)	
		Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)
Males	65-69	4,168	63 (47 - 78)	4,916	74 (57 - 90)	4,160	62 (47 - 78)	4,378	66 (50 - 81)	5,101	77 (60 - 94)		
	70-74	3,327	103 (84 - 123)	3,705	115 (94 - 136)	4,514	140 (117 - 163)	3,846	119 (98 - 140)	4,069	126 (104 - 148)		
	75-79	2,276	116 (95 - 137)	2,768	141 (118 - 164)	3,236	165 (141 - 190)	3,985	203 (176 - 230)	3,419	174 (149 - 200)		
	80-84	1,497	153 (130 - 176)	1,676	171 (147 - 195)	2,211	225 (198 - 253)	2,643	270 (239 - 300)	3,298	336 (302 - 370)		
	85+	1,123	219 (193 - 245)	1,389	271 (242 - 300)	1,806	352 (319 - 385)	2,516	491 (452 - 530)	3,315	646 (602 - 691)		
	65-69	4,413	44 (31 - 57)	5,147	51 (37 - 65)	4,546	45 (32 - 59)	4,641	46 (33 - 60)	5,561	56 (41 - 70)		
	70-74	3,545	85 (67 - 103)	3,944	95 (76 - 113)	4,833	116 (95 - 137)	4,290	103 (83 - 123)	4,395	105 (86 - 125)		
	75-79	2,644	172 (147 - 197)	3,072	200 (173 - 226)	3,547	231 (202 - 259)	4,379	285 (253 - 317)	3,914	254 (224 - 285)		
80-84	2,013	268 (238 - 298)	2,135	284 (253 - 315)	2,584	344 (310 - 377)	3,038	404 (367 - 441)	3,791	504 (463 - 545)			
85+	2,140	535 (496 - 574)	2,296	574 (533 - 615)	2,650	662 (619 - 706)	3,323	831 (782 - 880)	4,187	1,047 (992 - 1102)			

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

Estimated
counts

Wrexham		2011		2015		2020		2025		2030			
		Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)	Population	Sufferers (95% CI)		
Males	65-69	3,741	56 (42 - 71)	4,276	64 (49 - 80)	3,709	56 (41 - 70)	3,753	56 (42 - 71)	4,410	66 (50 - 82)		
	70-74	2,661	82 (65 - 100)	3,233	100 (81 - 120)	3,928	122 (100 - 143)	3,426	106 (86 - 126)	3,481	108 (88 - 128)		
	75-79	1,967	100 (81 - 119)	2,245	114 (94 - 135)	2,853	145 (122 - 169)	3,496	178 (153 - 204)	3,074	157 (133 - 181)		
	80-84	1,342	137 (115 - 159)	1,468	150 (127 - 173)	1,790	183 (157 - 208)	2,325	237 (209 - 266)	2,880	294 (262 - 326)		
	85+	1,016	198 (173 - 223)	1,270	248 (220 - 275)	1,634	319 (287 - 350)	2,149	419 (383 - 455)	2,902	566 (524 - 608)		
	65-69	3,633	36 (25 - 48)	4,359	44 (31 - 56)	4,168	42 (29 - 54)	4,295	43 (30 - 56)	4,673	47 (33 - 60)		
	70-74	2,939	71 (54 - 87)	3,346	80 (63 - 98)	4,148	100 (80 - 119)	3,986	96 (77 - 115)	4,121	99 (80 - 118)		
75-79	2,412	157 (133 - 180)	2,590	168 (144 - 193)	3,047	198 (171 - 225)	3,804	247 (217 - 277)	3,681	239 (210 - 269)			
80-84	1,912	254 (225 - 283)	1,990	265 (235 - 294)	2,217	295 (263 - 326)	2,649	352 (318 - 387)	3,340	444 (406 - 483)			
85+	2,255	564 (523 - 604)	2,352	588 (547 - 629)	2,634	658 (615 - 702)	3,104	776 (729 - 823)	3,831	958 (905 - 1010)			

Produced by Public Health Wales Observatory, data from Daffodil (WAG) / 2008 LA Population Projections (WAG)

Appendix 2: Dementia as a % of total health and residential care expenditure in Australia⁽¹³⁾**Table 3.3: Dementia health and residential aged care (RAC) expenditure projections, relative to other conditions and total (2006-07 dollars)**

Condition	2002-03			2032-33			Increase 2002-03 to 2032-33	2062-63		
	\$m	% total	Rank	\$m	% total	Rank		\$m	% total	Rank
Dementia	3,847	4.5%	8	17,837	7.2%	3	364%	82,703	11.0%	1
Respiratory	7,188	8.5%	2	21,947	8.9%	2	205%	67,010	8.9%	2
Digestive	4,877	5.7%	6	16,488	6.7%	4	238%	55,742	7.4%	3
Cardiovascular	9,329	11.0%	1	22,559	9.2%	1	142%	54,551	7.3%	4
Diabetes	1,607	1.9%	16	8,610	3.5%	12	436%	46,131	6.2%	5
Musculoskeletal	4,411	5.2%	7	14,234	5.8%	7	223%	45,932	6.1%	6
Dental	5,888	6.9%	4	14,925	6.1%	5	153%	37,832	5.0%	7
Genitourinary	3,678	4.3%	9	10,857	4.4%	9	195%	32,049	4.3%	8
Injuries	6,650	7.8%	3	14,353	5.8%	6	116%	30,979	4.1%	9
Sense disorders	2,636	3.1%	11	8,859	3.6%	11	236%	29,773	4.0%	10
Cancer	3,487	4.1%	10	10,112	4.1%	10	190%	29,324	3.9%	11
Mental	5,147	6.1%	5	12,109	4.9%	8	135%	28,488	3.8%	12
Skin	2,373	2.8%	13	7,767	3.2%	13	227%	25,422	3.4%	13
Endocrine, nutritional & metabolic	2,584	3.0%	12	6,395	2.6%	14	147%	15,827	2.1%	14
Infectious	1,890	2.2%	15	4,673	1.9%	15	147%	11,554	1.5%	15
Other neurological	557	0.7%	18	2,325	0.9%	17	317%	9,705	1.3%	16
Maternal	2,150	2.5%	14	3,953	1.6%	16	84%	7,268	1.0%	17

Appendix 3**Number of people aged 65 and over predicted to be living alone, North Wales, 2011-2030**

	<i>2011</i>	<i>2015</i>	<i>2020</i>	<i>2025</i>	<i>2030</i>	<i>% Change 2011-2030</i>
North Wales	63,828	71,154	77,409	83,697	91,463	43.3
Isle of Anglesey	7,064	7,955	8,656	9,316	9,962	41.0
Gwynedd	11,204	12,206	12,890	13,636	14,524	29.6
Conwy	12,633	13,713	14,692	15,846	17,230	36.4
Denbighshire	9,822	11,051	12,239	13,342	14,846	51.2
Flintshire	12,274	13,984	15,341	16,658	18,471	50.5
Wrexham	10,831	12,246	13,591	14,899	16,430	51.7

Source: Welsh Government Statistical Directorate (Daffodil)

Figures are taken from the Living in Wales survey 2008.

Appendix 4.

1. Summary of findings on potential risk factors and interventions for Alzheimer's Disease⁽¹⁾

Direction of association	Factors	Level of evidence†
Increased risk	APOE e4 genotype Conjugated equine estrogen with methyl progesterone*	Moderate
	Some non-steroidal anti-inflammatory drugs* Depressive disorder Diabetes mellitus Hyperlipidemia in mid-life Traumatic brain injury in males Pesticide exposure Never married, less social support Current tobacco use	Low
Decreased risk	Mediterranean diet Folic acid HMG-CoA reductase inhibitors (statins) Higher levels of education Light to moderate alcohol intake Cognitively engaging activities Physical activity, particularly high levels	Low
No association	Ginkgo biloba*	High
	Vitamin E* Cholinesterase inhibitors*	Moderate
	Anti-hypertensive medication* Conjugated equine estrogen Omega-3 fatty acids* Vitamins B12, C, beta-carotene Homocysteine Hypertension Obesity Metabolic syndrome Early childhood factors Occupational level Lead	Low
Inadequate evidence to assess association	Saturated fat intake Fruit and vegetable intake Trace metals High caloric intake Memantine Sleep apnea Anxiety disorders	(Not applicable)

	Resiliency Non-cognitive, non-physical leisure activities Agent Orange, Gulf War Syndrome Solvents, aluminum Genetic factors other than APOE	
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* Data from observational studies and RCTs.

Abbreviations: APOE = apolipoprotein E gene; APOE e4 = epsilon 4 allele of the apolipoprotein E gene; HMG-CoA = 3-hydroxy-3-methylglutaryl-coenzyme A; RCTs = randomized controlled trials

‡GRADE criteria (see Methods section)

2. Summary of findings on potential risk factors and interventions for cognitive decline⁽¹⁾

Direction of association	Factors	Level of evidence‡
Increased risk	APOE e4 genotype Low plasma selenium Depressive disorder Diabetes mellitus Metabolic syndrome Current tobacco use	Low
	Cognitive training*	High
Decreased risk	Vegetable intake Mediterranean diet Omega-3 fatty acids* Physical activity* Non-cognitive, non-physical leisure activities	Low
	Vitamin C, Vitamin E, beta-carotene supplements* Conjugated equine estrogen* HMG-CoA reductase inhibitors (statins)*	High
No association	Aspirin* Dehydroepiandrosterone* Cholinesterase inhibitors* Multivitamin supplement* Vitamins B6, B12 and folic acid supplements*	Moderate
	Alcohol intake Non-steroidal anti-inflammatory drugs*† Anti-hypertensive medication* Homocysteine Hyperlipidemia Anxiety disorders Hypertension	Low

	Obesity Early childhood factors Higher levels of education Social network, social supports	
Inadequate evidence to assess association	Trace metals Fat intake High caloric intake Gingko biloba* Memantine Sleep apnea Resiliency Occupational level Traumatic brain injury Toxic environmental exposures Agent Orange, Gulf War Syndrome Genetic factors other than APOE	(Not applicable)

*Data from observational studies and RCTs.

† Not associated with decreased risk but may be associated with increased risk.

Abbreviations: APOE = apolipoprotein E gene; APOE e4 = epsilon 4 allele of the apolipoprotein E gene; HMG-CoA = 3-hydroxy-3-methylglutaryl-coenzyme A; RCTs = randomized controlled trials

‡ GRADE criteria (see Methods section)

Appendix 5: Summary of current evidence from the Cochrane Dementia and Cognitive Impairment Group⁽¹⁷⁾

Intervention	No/limited/insufficient evidence of effectiveness	Some evidence of effectiveness	Clear evidence of effectiveness	Additional Information
Memory Training*,**		√		The results suggest that cognitive interventions do lead to performance improvements and that the size of the effects differs for different kinds of memory skills in healthy older adults and people with mild cognitive impairment. In particular, immediate and delayed verbal recall improved significantly through training compared to a no-treatment control condition but the improvements observed did not exceed the improvement in the active control conditions.
Treatment or Control of Type II Diabetes*,**	√			There is no convincing evidence relating type or intensity of diabetic treatment to the prevention or management of cognitive impairment in Type II diabetes.

Blood Pressure Lowering**	√			There is no convincing evidence from the trials identified that blood pressure lowering in late-life prevents the development of dementia or cognitive impairment in hypertensive patients with no apparent prior cerebrovascular disease. However, for several reasons, including the differing methodologies of the trials, the number of drop-outs from the trials, and active treatment of subjects in the control groups, we were unable to assess definitively the effectiveness of antihypertensive treatments for preventing cognitive impairment and dementia in people with no evidence of previous cerebrovascular disease.
Omega 3**	√			Available clinical studies comparing the occurrence of Alzheimer's disease between elderly persons with different levels of dietary omega 3 PUFA intake, suggest that risk of Alzheimer's disease is significantly reduced among those with higher levels of fish and omega 3 PUFA consumption. However, because these studies are not randomized trials, they provide insufficient evidence to recommend dietary and supplemental omega 3 PUFA for the explicit purpose of dementia prevention

Statins**	√			There is good evidence from RCTs that statins given in late life to individuals at risk of vascular disease have no effect in preventing AD or dementia.
Donepezil*	√			There is little evidence that donepezil improved cognitive function, and no evidence that donepezil delays progression to AD, but it was associated with significant side effects. There is no evidence to support the use of donepezil for patients with MCI
Galantamine for Alzheimer's*			√	Galantamine improves global and cognitive symptoms at doses of 16 mg/day or greater, in people with mild to moderate Alzheimer's disease, for at least 6 months. Longer term use of galantamine has not been assessed in a controlled fashion. Galantamine use in MCI is not recommended
Galantamine for Vascular Dementia*	√			No consistent evidence of efficacy of galantamine in vascular cognitive impairment.
Ginkgo Biloba*	√			The evidence that Ginkgo biloba has predictable and clinically significant benefit for people with dementia or cognitive impairment is inconsistent and unreliable

Lecithin*	√			Evidence from randomized trials does not support the use of lecithin in the treatment of patients with dementia
Melatonin*		√		The analyses did not support the use of melatonin for treatment of cognitive impairment associated with dementia. Meta-analysis of psychopathologic behavior scale scores suggested that melatonin may be effective in treating these dementia-related disturbances
Nicergoline*		√		Nicergoline may improve cognition and behavioural function of people with mild to moderate dementia; however, This drug has not been evaluated using current diagnostic categories such as MCI or in association with therapeutic agents of different nature such as cholinesterase or antioxidant drugs
Piracetam**	√			Evidence for the efficacy of piracetam for dementia or cognitive impairment is inadequate for clinical use but sufficient to justify further research

Procaine*	√			There is some evidence from older studies that procaine preparations might improve memory in persons without cognitive impairment. However, the clear evidence of side effects suggests that the risks might outweigh the benefits. In the light of this, the strong marketing claims for procaine preparations should be withdrawn until trials of adequate size, duration and quality have been conducted
Vinpocetine*	√			Insufficient evidence of benefits of vinpocetine for people with dementia
Folic Acid & Vitamin B12*,**	√			The small number of studies which have been done provide no consistent evidence either way that folic acid, with or without vitamin B12, has a beneficial effect on cognitive function of unselected healthy or cognitively impaired older people
Vitamin B12*	√			Evidence of any efficacy of vitamin B12 in improving the cognitive function of people with dementia and low serum B12 levels is insufficient
Vitamin B6*,**	√			No evidence of benefit from vitamin B6 supplementation on mood or cognition of older people with normal vitamin B6 status or with vitamin B6 deficiency

Vitamin E for Alzheimer's*	√			No evidence of the efficacy of vitamin E for people suffering from Alzheimer's disease (AD) and mild cognitive impairment (MCI)
Dehydroepiandrosterone (DHEA)**	√			No current evidence for an improvement in memory or other aspects of cognitive function of non-demented older people following DHEA supplement
HRT**	√			There is good evidence that estrogen or combined estrogen and progestagen therapy does not protect against a decline in overall cognitive functioning of older postmenopausal women with normal intellectual ability

***Evidence for people who are cognitively impaired**

****Evidence for people who aren't cognitively impaired**

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