PhD project proposal – Accuracy and feasibility of increasing GP testing for dementia

1. Background to the study

Improved dementia diagnosis is a priority of the UK Government's National Dementia Challenge, as well as a key focus of the World Health Organisation and the G8. The Alzheimer's Society's recent report *Dementia 2014:Opportunity for change* (Alzheimer's Society, 2014) highlights the urgent need to create a diagnostic pathway which takes people fluently from first presentation to their GP through to memory clinics and long-term support mechanisms following a diagnosis. It is therefore crucial to address delays in the early stages in order to increase access to care and support for the individual and the people around them.

GPs are normally the first point of contact for patients and carers concerned about possible dementia, though general practice probably under-diagnoses the condition (Iliffe et al., 2009; Connolly et al., 2011). There are a number of possible reasons for this under-diagnosis. It is unclear which brief cognitive assessments for dementia would be easiest to use in primary care, and how accurate they are. The accuracy of many of the commonly-used brief cognitive assessments for dementia is imperfect, and many GPs report a lack of certainty in using assessment tools alongside concerns around the consequences of misdiagnosing dementia (Aminzadeh et al., 2012a, Bradford et al., 2009; Cahill et al., 2006; Iliffe et al., 2003; Koch & Iliffe, 2010; Sarkar et al., 2012;).

The current evidence base for using brief cognitive assessments is growing, and groups such as the Cochrane Dementia and Cognitive Improvements Group have conducted individual systematic reviews to explore the accuracy of brief cognitive assessments for dementia in a range of different settings. However, there is a lack of evidence on how these tests compare to each other and how GPs use them in practice. There is therefore a strong need to investigate how brief cognitive assessments for dementia are viewed in practice by the people who use them, and to identify the best assessments to use in primary care, in order to support a more effective route to dementia diagnosis.

2. Problem or issue to be investigated

The question "what is the impact of an early diagnosis of dementia and how can primary care support a more effective route to diagnosis?" emerged as research priority number 3 in the top ten research priorities identified by the 2012 Dementia Priority Setting Partnership between the James Lind Alliance and the Alzheimer's Society. In partnership with the Alzheimer's Society, the University of the Third Age and Peninsula Patient and Public Involvement Team we have conducted in-depth workshops to explore this question in further detail. Workshop members included Alzheimer's Society Research Network volunteers, members of the University of the Third Age, professionals specialising in knowledge mobilisation in dementia care, members of the Peninsula Patient and Public Involvement Team, and academic researchers specialising in neuroepidemiology. Issues identified in these workshops have contributed to the planning and design of this project grant application. Alongside research priority question number 3 originally identified in the 2012 Dementia Priority Setting Partnership, these lay-driven issues remain at the core of this proposal.

In building the evidence base, a number of Cochrane Reviews have explored the individual value of tests for dementia to general practitioners (Harrison et al., 2014), to secondary care units such as memory clinics (Quinn et al., 2013a), and in community screening (Fage et al., 2013; Quinn et al., 2013b) - or across a number of these settings (Aravalo-Rodriguez et al., 2013; Creavin et al., 2014; Davis et al., 2013; Hendry et al., 2014).

However, these Cochrane reviews have explored the diagnostic test accuracy of tests in isolation, and across a broad range of populations and settings. The suite of reviews and survey of GPs within this proposal will focus on the value of brief cognitive assessments for use within general practice where the majority of diagnostic attention is currently focussed. Rather than investigating the accuracy of these assessments in isolation, we will be comparing accuracy

across the different available tests to allow GPs to make a comparative judgement about which brief cognitive assessments to use for dementia in primary care.

3. <u>Hypothesis, aims and objectives</u>

The main aims of the proposed research are:

1. To determine current advice for GPs in using brief cognitive assessments for diagnosing dementia in primary care;
2. To identify which brief cognitive assessments are available to GPs for dementia diagnosis in primary care;
3. To explore which brief cognitive assessments are most accurate for GPs to use for dementia diagnosis in primary care;
4. To investigate how brief cognitive assessments are viewed in practice by GPs.

The key objectives will be to:

1. Provide list/inventory of brief cognitive assessments (Bca)
2. Provide summary of what current guidelines say about choice and timing of these assessments
3. Conduct a review of reviews ("Overview"/"umbrella review") of existing systematic reviews, particularly Cochrane reviews, summarising the accuracy of bca singly (esp as they would be used in primary care)
4. Conduct a targeted additional test accuracy systematic review to fill a gap identified by the overview (provisionally, accuracy of GP assessment without use of bca)
5. Perform a survey of GPs to identify issues of practicality and feasibility in using different bca's in primary care
6. Conduct a systematic review of comparative accuracy studies of bca. Focus on those bca which seem to be most accurate (based on overview) and practicable (based on survey, see 5)
7. Conduct in-depth interviews of GPs to explore issues arising from the survey, or the review of comparative accuracy studies

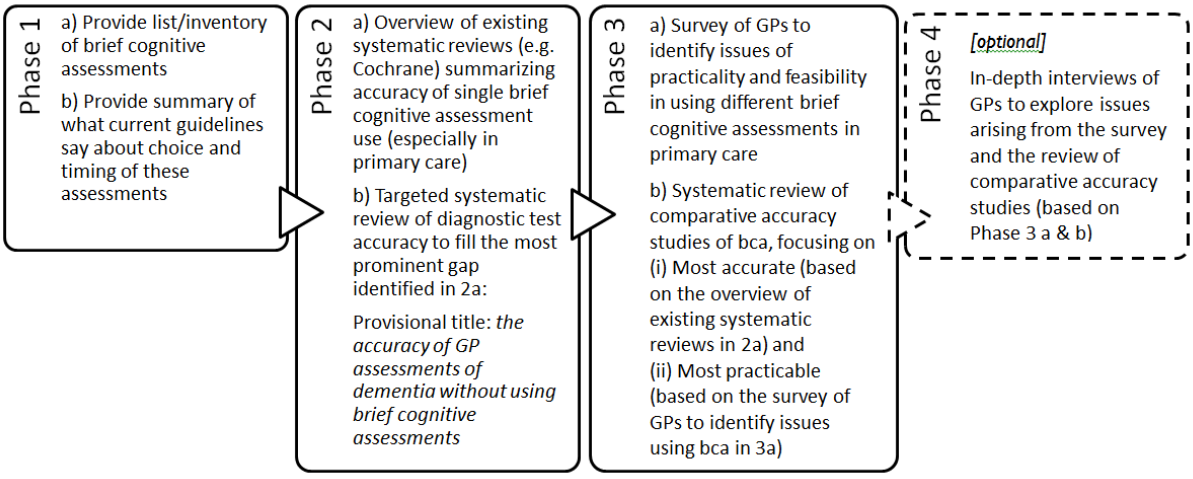

Figure 1. Phases of the proposed research project

4. <u>Proposed methodology</u>

We will be conducting three systematic reviews, a survey and semi-structured interviews of GPs in order to explore the data from a starting point of the evidence base through to the clinical reality of how brief cognitive assessments

are viewed in practice by the people who use them. The proposed research moves through four distinct phases as illustrated in Figure 1 above, and a project timetable is attached at the end of this document.

Phase One

The first phase of research will provide a list of the validated brief cognitive assessments for dementia currently available for GPs to use in primary care, in addition to a summary of current guideline advice on the choice and timing of brief cognitive assessments for dementia. These data will be identified through a focused search conducted by our information specialist, plus additional targeted searches conducted by researchers of the main guideline producers (such as international and national health bodies, charities, research institutes and clinician's organizations).

Phase Two

The second phase will involve two systematic reviews. A review of reviews (or "overview"/ "umbrella review") of existing systematic reviews, including Cochrane reviews, will summarise the accuracy of individual brief cognitive assessments particularly as they would be used in primary care. Systematic review protocols detailing each search strategy will be published on the International Prospective Register of Systematic Reviews (PROSPERO) before each review begins. Data collected will be systematic review evidence. Systematic reviews will be conducted via standardised methods as laid out by the Cochrane Collaboration in the Cochrane Handbook for Diagnostic Test Accuracy Reviews (Deeks et al. 2013), conducting quality assessment according to QUADAS-2 and using the PRISMA reporting framework.

Within phase two, a targeted systematic review of test accuracy will be conducted in order to build on gaps in evidence found within the review of reviews; provisionally, this may be to investigate the accuracy of GP assessment *without* the use of brief cognitive assessments. This would add to the evidence base for the additional value of brief cognitive assessments and reduce existing uncertainties.

Phase Three

The third phase of research focuses in on the clinical reality through a survey of GPs. Throughout the project (and particularly pertinent for this research phase) we will be drawing on local expertise in primary care and general practice – most particularly from Professor Willie Hamilton, Professor of Primary Care Diagnostics at the University of Exeter Medical School. We will carry out a pilot survey of GPs via the Contact, Help, Advice and Information Network (CHAIN), a voluntary online international network for people working in health and social care, using the GP special interest filter. Following the pilot phase, we will conduct a large scale survey of GPs via doctors.net.uk, using 'online surfing points' incentives and early access to a summary report from phases one and two as contribution towards continuing professional development, with one reminder in order to secure the greatest response rate. The maximum potential sample size will be limited to 58,596 members registered under the 'General Practice' label. Respondents will need to be fluent English speakers, registered with the GMC and actively practicing as a GP or GP locum within the UK. The questionnaire will take approximately 15 minutes to complete and will be primarily quantitative, using Likert-style scales and yes/no/don't know selections. Free text open questions will also be included in order to capture qualitative attitude data. The questions will relate to GP attitudes towards the utility and accuracy of individual named brief cognitive assessments (identified in phase 2), individual preferences for tests, how tests are selected, perceived barriers and facilitators to using the tests, and perceived harms and benefits to the patient and the clinician. These questions will be developed through phases one and two and refined through the piloting phase.The exact content of the GP survey will not be finalised until phases one and two and pilot testing are complete, although demographic data relating to clinical experience, professional membership and personal details will be collected. Participants will also be asked if they would like to take part in the semi—structured interviews at Phase 4, and individual identifiers will be stored separately. Data from questionnaires will be anonymised and descriptive statistics will be use to summarise survey responses via Microsoft Excel. Reporting of survey-based research will be in line with recommendations made by Kelly and colleagues (Kelly et al., 2003).

The second part of phase three will involve a systematic review of comparative accuracy reviews of brief cognitive assessments in dementia, focussing on the most accurate assessments (based on data from the review of reviews in phase two) and the most practicable (based on results of the GP survey to identify issues using brief cognitive assessments in the first part of phase three). For each review included in the comparative review, a standard set of data will be extracted by the applicant using a tailored data extraction form that will be piloted on a subsample of studies before undertaking full data extraction. Quality appraisal will be conducting using QUADAS-2 quality assessment tool (Whiting, 2011).

Direct comparisons of the most accurate reviews applicable to the population of interest (people presenting with risk factors aged 65 years and over in the ambulatory primary care setting) will be conducted, with quantitative synthesis conducted as appropriate taking heterogeneity and review quality into account. For each study included in the comparative review, data extraction and quality appraisal will be conducted as above. The DTA framework for the analysis of a single test will be applied and the data extracted from each study into a 2x2 table, showing the binary test results cross-classified with the binary reference standard. Data will be entered from the included studies (True Positive, False Negative, False Positive, and True Negative) into RevMan to calculate sensitivity, specificity and their 95% confidence intervals. Individual study results will also be presented graphically by plotting estimates of sensitivity and specificity in both a forest plot and receiver operating characteristic (ROC) space. Meta-analyses will be carried out if appropriate using the Stata software under the frequentist framework, and using WinBUGS software to fit models under the Bayesian framework. Results will be reported either from the HSROC model or the bivariate model, whichever is most appropriate (Macaskill et al., 2010).

Phase Four

Finally, Phase four will involve in-depth interviews with GPs to explore issues arising from the survey and the review of comparative accuracy studies (based on findings from Phase three). We will conduct interviews until thematic saturation is reached, which is expected to be between 10 and 15 interviewees. If we have insufficient numbers of self-identified participants from the survey stage, we will use our local clinical networks including the PCRN as well as the CHAIN network to secure further participants, who will be compensated for their time at standard NHS rates. The purpose of the semi-structured interview is to obtain more detail and background information on GP attitudes towards brief cognitive assessments for dementia. The research conducted in Phase three will inform topics of questions within the interview, but will, for example, address the contexts and factors relating to assessment selection and use as well as perceptions around harms and benefits to patient, carer and GP. Digital records of interviews and written documents will be stored securely in line with University of Exeter data management regulations, and thematic analysis will be used to extract themes and details from transcribed interview materials. Ongoing discussions within the research team regarding content of data will take place and contribute to the development, testing and refinement of the analytical framework within which themes are developed. The reporting of qualitative research will follow the recommendations in the Consolidated Criteria for Reporting Qualitative Research checklist for interviews (Tong et al., 2007).

This final stage is not central to the entire programme of research, and so in Figure 1 is represented with a dotted line. The research team will take a pragmatic view on the feasibility of this work following completion of Phases one and two, and if time does not allow within the time remaining for the PhD project, this phase of the research will be retained for a future post-doctoral research project and will form the foundation of ongoing funding applications on this basis.

5. <u>Relevance/significance</u>

Research outputs will be published in high impact peer-reviewed publications such as the Lancet and BMJ, covering:

1. An inventory of brief cognitive assessments alongside a summary of what current guidelines say about choice and timing of these assessments;

2. Overview of existing systematic reviews (e.g. Cochrane) summarizing accuracy of single brief cognitive assessment use (especially in primary care);

3. Targeted systematic review of diagnostic test accuracy to fill the most prominent gap identified in item 2 above;

4. Survey of GPs to identify issues of practicality and feasibility in using different brief cognitive assessments in primary care;

5. Systematic review of comparative accuracy studies of brief cognitive assessments, focusing on (i) most accurate (based on the overview of existing systematic reviews in item 2) and (ii) most practicable (based on the survey of GPs to identify issues using brief cognitive assessments in #4)

6. In-depth interviews of GPs to explore issues arising from the survey and the review of comparative accuracy studies (based on items 5 and 6).

We will present findings at the Royal College of GPs Annual Conference, Cochrane Colloquium and Alzheimer's Association International conferences. Research articles, peer-reviewed publications and conference materials will be promoted on social media (Twitter, Research Gate and blogs) via individual and institutional routes.

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