Cambridge Cognition welcomes the Draft National Plan to Address Alzheimer's disease. In response to the request for comments relating to Strategy 2.b 'ensure timely and accurate diagnosis', and action 2.B.2, 'identify and disseminate appropriate assessment tools', the Committee is invited to consider a computerized solution; and the following is submitted:

- In the context of an annual wellness check and also in the context of early diagnostic assessment, the careful choice of an appropriate cognitive test is imperative. Many cognitive instruments do not measure with adequate sensitivity the changes in episodic memory that are the characteristic feature of early in course Alzheimer's disease and Mild Cognitive Impairment.

- Cognitive assessments should be sensitive to the changes that occur at the early stages of dementia, norm-referenced, culturally unbiased, easy-to-use and standardized in administration. One example of such a test is the CANTAB Paired Associates Learning (PAL) test, a non-verbal, visuospatial measure of cued episodic memory.

- Computerized assessments are a vital part of the future of cognitive testing. CANTAB PAL, a test presented on touch screen, is being used in leading scientific and clinical institutions worldwide and by major pharmaceutical companies in their clinical research. This widespread use has resulted in over 70 peer-reviewed publications in dementia. Across a number of studies, the PAL test shows very high levels of sensitivity and specificity in differentiating mild Alzheimer's disease from healthy aging and clinical depression. Furthermore, impaired performance on the PAL test has been shown to predict rate of subsequent cognitive decline in patients with MCI (Swainson et al., 2001; Blackwell et al 2004, 2005; Mitchell et al., 2009; Egarhazi et al 2007; Chandler et al 2008) and in community dwelling samples of older adults (de Jager et al., 2002, 2005). Performance on the PAL test has also been shown to be associated with CSF amyloid beta:tau levels (Barnett et al., 2011).

- Beyond its scientific credibility, any test used in a primary care setting must be easy to use, fast and reliable. Ideally, the same test should also be appropriate for use within the context of a comprehensive diagnostic work-up.

- Experience gained from the deployment of CANTAB PAL in over 1000 centres has shown that the elderly find the touch screen presentation intuitive and easy to interact with, accommodating a broader range of motor function than other computerized interfaces or even pencil and paper tests.

- The wide availability of iPad and other similar devices enables CANTAB PAL to be made available to mainstream healthcare for the first time. This form of the test, known as CANTABmobile, is particularly well suited for use in primary care settings. By using adaptive methodology, the test is completed within 5-7 mins.

- CANTABmobile offers key benefits in being both language invariant and culturally neutral. The test instructions are automatically administered using a voiceover in the language selected onscreen. Currently 18 language options are available within the test, including American English and Latin American Spanish. This facility reduces the cost of translation services and ensures patients are assessed quickly regardless of their language. The voiceover and automated stimulus presentation also enables full standardization in test delivery, allowing non-specialist health care professionals to administer the test, again reducing costs and improving quality.

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- The test takes 5-7 minutes, and automatically finishes if the patient fails at a given level, avoiding patient distress, and ensuring efficient use of time. The results are automatically scored comparing performance against a database of more than 4000 adults, fully adjusting for age, education and gender. The test instantly produces a single page report which clearly indicates the suggested action using a simple traffic light system. The report can be immediately emailed, printed or saved as a pdf.

- The CANTABmobile test platform also includes computerised rating scales for depression and activities of daily living, fulfilling the criteria for other aspects of the wellness check, reducing risk of misclassification due to depression. The outputs for these are similarly included in the physician report.

- Furthermore, CANTABmobile allows monitoring patients over time (Fowler et al 1995, 1997, 2002), and also anonymized data collation across systems, achieving the aim of facilitating public health outcomes research.

- CANTABmobile has been developed for primary care physicians alongside a partner product covering a multi-domain toolkit designed for specialists.

In summary, CANTABmobile delivers a high level of scientific rigor and patient/practitioner convenience. Furthermore, the computerized format enables many additional and desirable features. Embracing computerized solutions, both in primary and specialist services, will enable effective early detection of memory loss and provide an expedient route to diagnosis and intervention.

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