

## **Appendix - Evidence for Use of CT Brain Scans and Diagnostic Work-Up for People with Dementia**

There are no controlled trials evaluating the utility of routine CT brain scans in the diagnostic work-up of people with dementia.

There have been a number of case series, some of which are highly selected, evaluating the diagnostic yield of routine CT scans. These have shown reversible lesions in 2-10%<sup>[1,2,3]</sup>. This may fall to as low as 0.5% if there are no supporting clinical features<sup>[4]</sup>.

Evaluation of benefit is subject to a number of assumptions and inaccuracies: the prevalence of potentially reversible lesions, the consequences of intervening in a potentially reversible lesion (costs, complications and clinical improvement), the costs of diagnostic procedures, the costs incurred by false positive results, the costs of caring for people in whom a reversible lesion is missed. In addition the chance of Alzheimers disease being the cause of dementia increases with age<sup>[7]</sup>. This means the chance of detecting a reversible lesion decreases with age.

**For people with focal neurological signs, abnormalities of gait or history of trauma, seizures or fever, there is Grade 3 evidence supporting the use of routine CT brain scans<sup>[2,3,4,5 and 7]</sup>.**

This evidence also suggests considerable cost savings in these settings.

The cost benefit of performing routine CT brain scans in all people with dementia is less clear. The best analysis is found in Simon's work<sup>[4]</sup> which has used US costs from the 1980's. This has included the cost of a CT brain scan as being US\$300 and the cost of caring for a person in institutional care as US\$20,000 per year. Treatment costs were based on US Medicare reimbursement schedules. Prevalence figures, chances of actual reversibility in detected lesions and assumptions on life expectancy could be applied to the New Zealand situation.

Using this model, routine CT could be expected to detect between 1425 and 14930 additional surgically correctable cases at an extra cost of between US\$0 and US\$49 million per 100,000 persons scanned. This equates to a cost of US\$3,281 to US\$34,385 to result in benefit for one person. These figures need to be calculated using realistic contemporary New Zealand data as it is likely that CT brain scan costs have shown a relative decline over time while institutional care costs have shown a relative increase. This would result in lower costs per person benefited. Thus while the costs of routine scanning are likely to be greater than the savings, the cost per person needs to be weighed against the cost of other health interventions in New Zealand. The yield of routine CT brain scan will be lower in people without focal neurological signs, an insidious onset over years of the dementia, who are aged over 80 years.

**There is Grade 3 evidence to support routine CT brain scans in all people with dementia. This approach would probably result in a net cost in health expenditure but the actual financial costs need to be calculated in New Zealand terms.**

**There is Grade 3 evidence supporting CT scanning as being of no lesser benefit than MR scanning in detecting surgically correctable lesions<sup>[6]</sup>.**

### **Evidence for Use of Other Investigations in the Diagnostic Work-Up of People with Dementia**

This has not been as well studied as CT brain scans. Much of the evidence is based on consensus views with experts<sup>[5]</sup> or case series<sup>[2]</sup>.

**There is Grade 4 evidence to support the routine use of the following tests: complete blood count, plasma sodium, calcium, glucose, creatinine or urea, vitamin B12, liver function tests, thyroid function tests and syphilis serology.**

**There is Grade 5 evidence to support the use in selected cases of the following tests: ESR, red cell folate, HIV testing, chest x-ray, heavy metal screening, CSF analysis, EEG, MRI brain.**

**It should be emphasized that most reversible causes of dementia are due to medications, depression or metabolic abnormalities<sup>[2,8]</sup>.**

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### **References**

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