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From brain science to brain based medicine

Brain dysfunctions may be our economy's most expensive problem with treatment of dementia costing 100 billion dollars [1], addiction 130 billion [2], obesity 117 billion [3], crime and violence 110 billion [4] and management of all other neuropsychiatric conditions costs approximately 70 billion [5]. All of these diseases are the driving force behind the explosion in total medical expenditures. Brain dysfunction leading to morbidity and mortality is not only a global health and financial issue; but may soon cripple America's economy [6].

A new 21st Century medicine can be designed so that the brain's functional state can be analyzed simply in a physician's office, the same way the heart's state is analyzed through diagnostic testing [7].

For example, Alzheimer's disease and all dementia disorders [8], the end result of all brain dysfunction, is approaching epidemic proportions [9]. By age 85, 50% of the population will have the disease [9,10]. As current trends and statistics indicate, 50% of Americans become partially or completely senile (including early stage cognitive impairments) by the age of 80, all will be senile if we live to 120 years of age [9], crushing the dreams of life extension.

The Mini mental status exam (MMSE), the most commonly used office based "quick assessment" of an individuals' cognitive status, misses 65% of patients with impaired or borderline memory, as found on the Wechsler Memory Scale (WMS III) [9]. A meta-analysis of a standard paper and pencil test also concluded that positive predictive values identify dementia only 40% of the time. Furthermore, WMS-III may assign a normal memory to a patient who once had superior memory but whose skills have now deteriorated to average, again missing early dementia. The P300, therefore, identifies the early dementia in patients that MMSE and WMS-III fail to detect and may be even more effective when combined with attention deficit disorder assessment [9].

Cerebral dysfunction, as measured by P300, is dynamically related to an even wider number of neurological, psychological, medical and developmental problems faced in general medical practices.

Notably, P300 measurements are modifiable. A number of studies have associated drug treatments and other neurotransmitter changes with subsequent improvements of P300 latency and voltage, i.e., serotoninergic, gabaergic, glutaminergic, cholinergic, dopaminergic, noradrenergic and neurosteroids [9]. In addition, electrical therapies, diet and nutrients may affect P300 variables, raising the possibility of a wide variety of early evidence-based intervention strategies [9]. Like an EKG P300 has medical monitoring and repeat testing value in the clinical setting.

We hypothesize a public health paradigm shift wherein a society will know its own P300 results like it knows its cholesterol level and physicians will work to modify and improve patient's clinical course based on this parameter [9,10].

This new technology including P300 and QEEG that was once sold for nearly 1 million dollars can now be sold to doctors for less than $10,000 as a laptop windows-based program equipped with a data-base of control groups and a test that once took an hour can now be done in just 10 min [9]. As the new EKG of the head today, P300, if utilized extensively in the realm of primary care, would lead the way to a revolutionary brain health and disease paradigm.

References

[1] Statistics: About Alzheimer's Disease. Alzheimer's Disease and Related Disorders Association, Inc. All Rights Reserved 8/03; 2003.

[2] Drug Policy Information Clearinghouse Fact Sheet. ONDCP. March 2003. Available from: www.whitehousedrugpolicy.gov.

0306-9877/$ - see front matter
doi:10.1016/j.mehy.2004.05.012

[3] Thompson D. Overweight and obesity threaten US health gains. Communities can help address the problem, surgeon general says. (For Immediate Release), HHS News. US Department of Health and Human Services. December 2001. Available from: www.surgeongeneral.gov/news/pressreleases/pr_obesity.htm.
[4] Key Crime & Justice Facts at a glance. US Department of Justice, Bureau of Justice Statistics. Available from: www.ojp.usdoj.gov/bjs/glance.htm.
[5] Health Care Expenditures. Mental Health Parity Report. The Louis de la Forte Mental Health Institute University of South Florida; March 1997. Available from: www.fmhi.usf.edu/parity/parityreport/expenditures.html.
[6] Faubner J. Huge Increase in Alzheimer's seen. Milwaukee J Sentinel (Wisconsin) 2003 (August 19): p. A1.
[7] Harben K. MMWR Press Release. More than 60% of heart disease deaths in 1999 were "sudden" and nearly half happened outside of hospital. CDC, National Center for Chronic Disease Prevention. February 15, 2002.
[8] Donchin E, Miller GA, Farwell LA. The endogenous components of the event-related potential – a diagnostic tool. Prog Brain Res 1986;70:87–102.
[9] Blum K, Braverman ER. P300 (Latency) event-related potential: an accurate predictor of memory impairment. Clin EEG 2003;34(3).
[10] Feil D, Marmon T, Unutzer J. Cognitive impairment, chronic medical illness, and risk of mortality in an elderly cohort. Am J Geriatr Psychiatry 2003; 11(5): 551–60.

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