TESTIMONY OF

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Regarding

Research & Prevention: Early Diagnostics, Current Treatments & Future Advancements in Alzheimer's Disease

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1. Introduction

I am a Cognitive and Behavioral Neurologist and as an academic neurologist, I have three main missions: patient care, research and education. My entire clinical practice involves seeing patients with a concern for their cognition. We have a comprehensive Memory and Cognitive Disorders Clinic here at Penn State Hershey and I see patients in concert with a neuropsychologist and a social worker. My research is clinical in nature and focused on identifying risk factors for cognitive dysfunction in normal aging, Alzheimer's disease, and Parkinson's disease. From an educational standpoint, we train medical students and residents about disorders that cause cognitive impairment.

2. What the disease looks like

One of the challenges in treating patients with Alzheimer's disease is making a correct diagnosis. There are many different causes of "dementia" which is a term that denotes that a person has had a decline in their cognition that impairs the way they live their life. Alzheimer's disease is the most common cause of dementia, but not the only one.

The manifestations of Alzheimer's disease depend on how advanced the disease is. We now realize that for people with Alzheimer's disease, they have mild memory problems for many years prior to the official diagnosis of Alzheimer's disease. At first, the patient and family often blame a person's memory problems on their age, but as time progresses, it can affect their ability to make decisions. Once we as clinicians can identify memory problems on testing, we can give that person a diagnosis of mild cognitive impairment. Many, but not all patients with mild cognitive impairment will progress to develop Alzheimer's disease. Some patients also develop depression or anxiety as part of this prodromal phase.

Once a person progresses to the point they can be diagnosed with Alzheimer's disease, by definition the disease has impaired their ability to manage their own life. They often are unable to keep track of appointments, can no longer manage their finances, and sometimes cannot navigate well enough to drive. As the disease progresses, they can also develop behavioral problems including agitation, wandering, or delusions. In the final stages of the illness, their movement can be affected and they often are totally dependent on others. This stage is particularly hard on caregivers and often requires placement.

I would like to make a point about the stress caring for a loved one with Alzheimer's disease causes for caregivers. Caring for someone with Alzheimer's disease is one of the most stressful things a person may be asked to do and has been linked not only to depression but also shortened lifespan. At some point during the illness almost all patients with Alzheimer's disease lose the ability to recognize they have a problem with their cognition and most of our treatment is aimed at improving the life of the caregiver.

3. What can be done for persons with the disease?

At this point, there is no proven method to prevent Alzheimer's disease. However, over the past several years, many studies have found lifestyles that are associated with a lower risk of cognitive dysfunction, dementia and Alzheimer's disease. These include factors such as not smoking, maintaining physical activity, increasing social engagement, following healthy diets, and maintaining cognitive activity.

By far the strongest risk factor for Alzheimer's disease is age. Some studies have found that of people who live into their 90's, 40 percent or more will have Alzheimer's disease. In addition, we know that a family history of Alzheimer's disease and diabetes are risk factors for Alzheimer's disease.

Presently, our treatment for Alzheimer's disease involves two classes of medications, the cholinesterase inhibitors and memantine (Namenda®). There are three different cholinesterase inhibitors: donepezil (Aricept®), rivastigmine (Exelon®), and galantamine (Razadyne®). These medications work by modulating different neurotransmitters the brain uses for memory and other cognitive processes. These

medications have been found to improve the cognitive function of patients with Alzheimer's disease. They may also help to reduce the behavioral problems, improve overall function, and delay need for nursing home placement.

4. What can we expect in terms of hopeful research outcomes for the near future?

This is an exciting time for research in the field of cognition and dementia. Over the past year there have been several advancements in our understanding of the process that occurs as part of Alzheimer's disease, and in other causes of dementia, including frontotemporal dementia and dementia with Lewy bodies. These advances will allow us to develop more specific treatments for these diseases.

There are many medications and non medication treatment trials underway. Many of the medications in trials presently are disease specific and are aimed at slowing down or stopping the disease process itself. In addition, many researchers are trying to identify other risks for Alzheimer's disease and if there are medications or lifestyle changes that can reduce the risk of Alzheimer's disease.

Over the past several years there have also been several research groups developing tests that will allow us to diagnose Alzheimer's disease and other causes of dementia more accurately. This will be important if and when we develop disease specific treatments.

Our research here at Penn State Hershey is focused on three goals: 1) to help understand the brain behavior relationships involved in cognition; 2) to help understand what causes the different disorders that affect cognition and how to treat them; and 3) to help understand the natural processes that occur with aging that adversely affect cognition and identify methods to attenuate these changes. We have ongoing studies studying patients along the spectrum of cognitive dysfunction from normal changes with aging to people with Alzheimer's disease, Parkinson's disease, and frontotemporal dementia.

It is hard to prognosticate on when a major advance will be found for the prevention, diagnosis or treatment of Alzheimer's disease, but we are extremely hopeful about a major advance soon, given the major advancements in our understanding of Alzheimer's disease, ways to diagnose Alzheimer's disease, and the number of treatments currently in trials.