by Sandra Steingraber, Ph.D.*

Here is a sign of our times: within the publishing world, a new nonfiction subgenre has emerged -- the Alzheimer's memoir. Among the first was Elegy for Iris, written by English literary critic John Bayley about his wife, the novelist Iris Murdoch. In both the book and the movie based on it, we see the famously brilliant Murdoch descend into a mental state in which, no longer able to dress or speak, she desires only to watch the famously simple children's show, Teletubbies. More recent are The House on Beartown Road: A Memoir of Learning and Forgetting by journalist Elizabeth Cohen, which was excerpted in People magazine, and The Story of My Father by best-selling novelist Sue Miller, which was profiled in Reader's Digest.[1]

And these include only the books in which the subject of the story is a former college professor. There are many, many others.

My own father is a former college professor, and he suffers from dementia. He now lives in a nursing home. This is hardly an unconventional situation -- half of all nursing home residents in the United States are demented[2] -- but the decision to place him there was an extraordinary one for our family. After fifty years of marriage, my father wanted to live out his days with my mother in the house that he had built for them both when she was a young bride; my mother was devoted to caring for him there, no matter what it took. And for several years after his diagnosis she did.

But then Dad became "delusional and combative," in the language of neurology. "Delusional" meant he came to believe my mother was having an affair. He grew suspicious when the phone rang. He followed her to the mailbox, shouting accusations. He prowled the house at night looking for the other man. He stood over her while she slept. "Combative" meant that he began to relive his experiences in Italy during World War II. It was a dangerous combination.

And so, my retired college professor father -- the man who introduced me to calculus and Rachel Carson, who planted an organic garden every spring, who took up the piano in his 40s, who loved to embroider, bake bread, and make candles, who had seat belts installed in the family car before they were standard-issue -- is now institutionalized in a facility from which he regularly attempts to escape and whose staff he periodically attempts to assault. He has quite literally become an imprisoned combatant, which was his biggest fear when, sixty years ago as a teenage soldier, he sailed into the Mediterranean on a warship.

In the Alzheimer's wing of the nursing home where he lives a detailed description of each resident is posted on the door to their room. It's a way of helping the patients remember where their beds are located. These biographies also remind my mother, my sister, and me that Dad is part of a much bigger tribe. The dementia-sufferers there include former teachers, former farmers, former entrepreneurs, former church ministers, former world travelers, former ballroom dancers. Each has a life history, a family, an identity.

And this small, rural nursing home is itself part of a larger collective story. In the United States, about 4.5 million people suffer from Alzheimer's disease, and another 1.5 million from other forms of dementia. Because the risk of developing a dementing illness rises sharply with age (ten percent of those over 65 years old are afflicted with Alzheimer's, while 40 percent of those over 85 are) and because the population itself is aging rapidly (the first baby boomers turn 65 in 2011), we are standing on the cusp of a slow-motion epidemic.[3,4] A disease for which there is no cure, Alzheimer's has already risen from the 12th leading cause of death to the 8th.[5] By the year 2050, 10-15 million Americans are projected to have Alzheimer's -- more than double the number we have now.[3,4]

The economic implications of these statistics are equally sobering. (And, as an accounting professor, my father would have found them compelling.) Alzheimer's patients live, on average, eight years after diagnosis. During this time, they require, on average, $213,000 in medical care. This makes Alzheimer's the third most expensive disease in the United States. (Cancer and heart disease still take the top two slots.)[3] Yes, someone has done the math: the current economic burden of Alzheimer's, in medical treatment costs alone, is about $100 billion each year.[3] One researcher has estimated that annual costs could rise to $700 billion by 2050.[4] These figures do not include the one-third of neurodegenerative dementias that are non-Alzheimer's in origin. The prevalence of Lewy-body dementia (which is the second most common form of dementia) and Parkinson's disease (which leads to dementia in one third of all cases) is also expected to increase sharply as the population ages.[6,7]

All these diseases are officially classified as "idiopathic disorders of unknown pathogenesis,"[7] which is another way of saying that no one knows what causes them. Thus, in addition to presenting overwhelming personal challenges to those afflicted and to their caregivers, neurodegenerative dementia brings with it four other miserable characteristics: it has no known cause; it has no known cure; it is becoming increasingly common; and it costs considerably more than an average home mortgage to care for each person diagnosed.

Clearly, then, addressing the question of dementia's causality should be a national priority. Some medical researchers are indeed working feverishly to understand the genesis of dementia, and, while their efforts have not yet taken on the coordinated urgency that has characterized, say, the atomic bomb program in the 1940s or the space program in the 1960s, there are signs of an emerging new framework for inquiry.

In May 2003, the Mount Sinai School Center for Children's Health and the Environment organized an important conference at the New York Academy of Medicine entitled "Early Environmental Origins of Neurodegenerative Disease
in Later Life."[8] In Rachel's #777, we will take a close look at the evidence for an environmental connection to Alzheimer's and Parkinson's disease. Here we will examine the conceptual rationale for pursuing early-life environmental links to late-life dementias, as presented at this groundbreaking conference.

The chain of logic goes as follows. First, inheritance alone appears to play little direct role in the risk of developing dementia. (Heredity explains only five percent of Parkinson's disease, for example.[9]) This means we need to look toward the environment, possibly in concert with genetics and lifestyle factors, to understand dementia's root causes.

Second, many neurodegenerative diseases are thought to arise through a series of stages that require many years or even many decades to progress. The cascade of neuronal changes leading to Alzheimer's may already be evident in one's 20s or 30s.[10] This means toxic exposures early in life -- even prenatal exposures -- may be more relevant to late-life dementias than equivalent exposures encountered later.[5]

Third, many cognitive disorders known to be caused by exposure to toxic chemicals have decades-long latent effects. Dupont workers exposed to high levels of lead on the job showed more rapid cognitive declines during their retirements than coworkers exposed to lower lead levels, even though neither group had been exposed to any lead for many decades to progress. The cascade of neuronal changes through a series of stages that require many years or even several decades to become evident.

Fourth, animal studies show that early-life exposures to certain neurotoxic chemicals can create subtle but permanent changes in the brain that produce no functional deficits until the effects of these "silent toxicities" are unmasked by later challenges.[12] This means early-life exposures to neurotoxic chemicals can enhance susceptibility to late-life exposures.

Fifth, neurotoxic chemicals, in the form of pesticides, persistent organochlorines, and heavy metals, are widely distributed in the U.S. environment.[5]

Sixth, human studies of non-dementing illnesses show that certain factors encountered early in life can predispose an individual to the development of disease in their elder years. For example, studies in England show that babies born small because they were denied adequate nutrition in the womb develop into adults who are, in advanced age, at higher risk of hypertension, stroke, diabetes, and breast or prostate cancer. The results of these studies suggest that infants are "programmed" by environmental insults that take place at a critical period of development in ways that have lifelong consequences. This idea is known as the Barker Hypothesis.[13] In Rachel's #777, we shall explore the relevance of the Barker Hypothesis for Alzheimer's and Parkinson's Disease.

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Unless otherwise noted, all citations refer to presentations made at the Mt. Sinai School of Medicine conference, "Early Environmental Origins of Neurodegenerative Disease in Later Life: Research and Risk Assessment" (New York Academy of Medicine, May 16, 2003). Conference proceedings are currently in preparation for publication.


[8] Co-organizers of the conference were the International Longevity Center, the Bachmann-Strauss Dystonia and Parkinson Foundation, and the Children's Environmental Health Network.

[9] C. Warren Olanow, M.D., Mt. Sinai School of Medicine, "New Research in Parkinson's Disease."

[10] John Morrison, Ph.D., Mt. Sinai School of Medicine, "Neurobiology of Aging and Dementia,"

[11] Andrew Todd, Ph.D., Mt. Sinai School of Medicine, "Lead and Loss of Cognition."


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