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# Could Dementia in the National Security Workforce Create a Security Threat?

**T**he U.S. government entrusts classified material to individuals who possess a security clearance (Department of Defense Manual [DoDM] 5200.01, 2013). But how do these trusted individuals remain good custodians of that classified information if they are impaired? Two trends might contribute to a new type of national security threat: (1) People are living longer, and (2) people are working later in life. As a result, the workforce might experience a higher prevalence of dementia than in past generations. Taken together, we believe that an increasing number of cleared personnel—that is, personnel who hold or have held security clearances—have or will have dementia.

Dementia is often an unfortunate consequence of abnormal aging. Increasing age is the greatest risk factor for developing dementia (Alzheimer's Association, undated-a). The U.S. population of adults ages 65 and older will double between 2000 and 2040 (U.S. Department of Health and Human Services, Administration for Community Living, 2018). In turn, an increase in the number of individuals with Alzheimer's disease and related dementias is expected to accompany this

demographic change (Langa, 2018). Longer life spans are associated with more time in the workforce, and people are retiring later (White, Burns, and Conlon, 2018). The same holds in higher echelons of government. Forty-five percent of the federal workforce is over the age of 50 (Partnership for Public Service, 2019), and the average age of members in the federal government’s Senior Executive Service in 2018 was 55 (FEDweek, 2020). Thus, increased dementia among government personnel could be a consequence of an aging workforce.

## Contextualizing This National Security Threat

This trend might be exacerbated in the national security and intelligence workforces because of the proportion

### Abbreviations

ADEA	Age Discrimination in Employment Act of 1967
CI	confidence interval
CISA	Cybersecurity & Infrastructure Security Agency
DoD	Department of Defense
DoDM	Department of Defense Manual
FTD	frontotemporal dementia
FY	fiscal year
IC	intelligence community
MCI	mild cognitive impairment
OPM	U.S. Office of Personnel Management
PPA	primary progressive aphasia
PTSD	posttraumatic stress disorder
SF	Standard Form
TBI	traumatic brain injury

of those career fields populated by military veterans. Since 2000, an estimated 366,000 service members have been diagnosed with a mild traumatic brain injury (TBI) (Health.mil, undated-a), which places them at increased risk for dementia (Barnes et al., 2018) and early-onset dementia (Kiraly and Kiraly, 2007; Osler et al., 2020).

Dementia is characterized by memory problems that might result in difficulty remembering new information, poor judgment, impulsivity, disorientation, and behavioral changes. (Alzheimer’s Association, undated-d). If these symptoms go unrecognized while an individual is responsible for safeguarding national security information, there is some risk that information could be compromised. Therefore, it is possible that individuals who hold or held a security clearance and handled classified material could become a security threat if they develop dementia.

To date, we are not aware of any publicly available research that has addressed the threat that dementia might present in the context of the national security and intelligence workforce. Although we did not review classified material, we browsed the obituaries of the Association of Foreign Intelligence Officer’s (AFIO’s) Weekly Intelligence Notes and found several instances of senior officials who died “of Alzheimer’s disease” or “of complications from Alzheimer’s disease” (AFIO, 2019; AFIO, 2021). We know of no national security threat incidents associated with dementia discussed in unclassified publicly available reports, but such an incident remains a possibility.

The exploratory research discussed in this Perspective was undertaken to frame the issue, highlight the factors involved in dementia becoming a risk to global and national security, and describe contributing risk factors; to

propose a framework to assess risk; and to guide further study of this potential threat.

## Trustworthiness

An insider threat is the potential for an individual to use their authorized access, intentionally or unintentionally, to harm their organization (Cybersecurity & Infrastructure Security Agency [CISA], undated-a). An individual who holds a Top Secret security clearance who develops dementia and unwittingly shares government secrets is an insider threat. Even if that individual is retired, such unwitting sharing of government secrets might pose a threat to national security. Dementia is just one health condition that could affect a person's behavior and personality changes. Other physical and mental health conditions also can affect trustworthiness, and those conditions, which might have a sudden or gradual onset, could be temporary (such as an adverse drug reaction) or permanent (such as a brain tumor or a stroke).<sup>1</sup>

We held informal discussions with four colleagues who are past and present officials from the intelligence community (IC) and the national security workforce to learn whether they encountered dementia as a human resources issue. When we presented this topic, it was typically received with much enthusiasm, and our colleagues responded with anecdotes about their experiences. However, their experiences were about employees who had

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<sup>1</sup> Tumors and strokes occurring in particular places in the brain may predispose someone to executive dysfunction, precipitating the risks of concern. Such manifestations are not the most common, but the diagnosed presence of a stroke or tumor should alert colleagues to the possibility of behavioral dysfunction.

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other health issues affecting their cognitive functioning and work performance, such as an adverse reaction to prescribed medications. Although no one among the small number of people we interviewed had direct experience with observing dementia in current or retired colleagues, our colleagues acknowledged that dementia could pose a security risk in any number of plausible scenarios—this motivated development of the framework discussed later in this Perspective.

## Dementia in an Aging Workforce

The U.S. population is aging. Life expectancy at birth in the United States has increased five years since 1980, from 73.7 to 78.7 (Law, 2020). As life expectancy increases, so does the average age of retirement and the time that people spend in the workforce. One in four adults over the age of 65 is still in the workforce, and this number is expected to increase in the coming years (Jaffe, 2019). According to a Pew Research Center analysis, in 2018, 29 percent of people ages 65 to 72 were working or looking for work (Fry, 2019).

The prevalence of dementia in Americans 65 and older in 2012 was 10.5 percent (standard error = 0.49 percent) (Hudomiet, Hurd, and Rohwedder, 2018). As of 2022, approximately 6.5 million Americans have Alzheimer's dementia (Alzheimer's Association, 2022), and it is predicted that by 2040, 9.1 million people ages 70 and older will have Alzheimer's disease or another dementia (Hurd et al., 2013).

### Prevalence, Signs, and Symptoms of Dementia

Alzheimer's disease and related dementias (hereafter *dementia*) are conditions that affect mostly adults in late life and are characterized by impairments in memory and other cognitive functions that are severe enough to disrupt functioning. In addition to Alzheimer's disease, other common causes of dementia include vascular dementia, Lewy body dementia, frontotemporal dementia (FTD), Parkinson's disease, and Huntington's disease. Mixed dementia is a combination of two or more types of dementias. Although there are many causes of dementia, this

Perspective focuses on the four most common causes of dementia—Alzheimer's disease, vascular dementia, Lewy body dementia, and frontotemporal dementia—which are summarized in Table 1.

### Alzheimer's Disease

Alzheimer's disease, the most common cause of late-life dementia, accounts for 60 percent to 80 percent of dementia cases (Alzheimer's Association, undated-b). Alzheimer's disease is an irreversible and progressive brain disorder that gradually affects memory, reasoning, thinking skills, and behavior. Because there is currently no disease-altering treatment for Alzheimer's disease, the number of people living with dementia worldwide is expected to reach 66 million by 2030 and 115 million by 2050 (Alzheimer's Disease International et al., 2013). For most people, Alzheimer's disease symptoms first appear between the mid-60s and the mid-70s.

One of the first signs of cognitive impairment in Alzheimer's disease, and the most common, is memory impairment. Early symptoms can sometimes include early declines in nonmemory domains, such as word-finding, visual or spatial issues, and impaired reasoning or judgment. As the disease progresses, it might lead to poor decisions, loss of spontaneity and initiative, repeating questions (because of short-term memory impairment), wandering, mood and personality changes, misplacing items, trouble with instrumental activities of daily living (such as paying bills), and anxiety or (rarely, and usually late in the disease) aggression (National Institute on Aging, 2017).

The causes of Alzheimer's disease are unknown, and the current theory is that it arises from a combination of genetic, environmental, and lifestyle factors. The stron-

TABLE 1  
Causes of Dementias and Associated Symptoms

Cause of Dementia	Percentage of Dementia Cases	Early Symptoms	Later Symptoms
Alzheimer's	60–80	<ul style="list-style-type: none"> <li>• Memory problems, word retrieval, vision/spatial issues, impaired reasoning and judgment</li> </ul>	<ul style="list-style-type: none"> <li>• Sleep disturbance, agitation, delusions, hallucinations</li> </ul>
Lewy body	5–10	<ul style="list-style-type: none"> <li>• Changes in alertness, thinking, and reasoning; confusion that differs from one day to the next; slowness; gait imbalance; tremors, visual hallucinations; delusions, sleep disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• Memory problems</li> </ul>
Vascular	15 <sup>a</sup>	<ul style="list-style-type: none"> <li>• Problems with executive functioning, attention, and slowed thinking; might have focal weakness, sensory loss, language dysfunction depending on location of stroke</li> </ul>	<ul style="list-style-type: none"> <li>• Global and variable symptoms</li> </ul>
Frontotemporal (FTD)	2–5 <sup>b</sup>	<ul style="list-style-type: none"> <li>• Behavioral variant: executive dysfunction, apathy, lack of empathy, decreased judgment</li> <li>• Aphasic presentation: progressive loss of language function (primary progressive aphasia [PPA]).</li> </ul>	<ul style="list-style-type: none"> <li>• Further decline, eventual loss of functions</li> <li>• PPA, mutism</li> </ul>

SOURCE: Features information from Alzheimer's Association, undated-d; Alzheimer's Association, undated-b; National Institute on Aging, 2017);

<sup>a</sup> O'Brien and Thomas, 2015.

<sup>b</sup> Alzheimer's Society, 2020; Bang, Spina, and Miller, 2015.

gest risk factor for Alzheimer's disease is age; the number of people with Alzheimer's disease doubles about every four to five years after age 65. An estimated one-third of adults aged 85 and older might have Alzheimer's disease or another dementia (National Institute on Aging, 2019b). Most individuals with dementia have late-onset Alzheimer's disease, whereas less than 5 percent of all people living with Alzheimer's disease have early-onset Alzheimer's disease, which begins in one's 30s to mid-60s and results from mutations in one of three genes.

Other risk factors for Alzheimer's disease include lower educational attainment, depression, heart disease, stroke, high blood pressure, hyperlipidemia, posttraumatic stress disorder (PTSD), and metabolic conditions, such as diabe-

tes and obesity. Behavioral risk factors include a less nutritious diet, less physical activity, diminished social engagement, and less than the recommended amount of sleep.

### Vascular Dementia

Vascular dementia causes around 15 percent of dementia cases (O'Brien and Thomas, 2015). Vascular dementia incidence also rises with age, with risk of vascular dementia roughly doubling every 5.3 years (Gorelick et al., 2011). Compared with Alzheimer's disease, the cognitive signs and symptoms of vascular dementia are much more global and variable, depending on which part of the brain is affected. Vascular dementia can cause memory impairments, confusion, agitation, unsteady gait, apathy, and

declines in attention, information processing, and executive functioning, such as the ability to solve a problem, analyze a situation, develop a plan, and communicate that plan to others (O'Brien et al., 2003). Compared with Alzheimer's disease, for which memory problems are most prominent, vascular dementia is often distinguished by problems with executive functioning, attention, and slowed thinking (National Institute on Aging, 2017). Because of the link with vascular health, the onset of symptoms can be sudden, or they can progress and then wane over time.

Vascular dementia risk factors include increasing age, low education, female sex, late-life depression, and stroke-related and vascular risk factors, such as diabetes, obesity, history of heart attack, high blood pressure, high cholesterol, and smoking tobacco (Pendlebury and Rothwell, 2009). Sometimes, vascular dementia symptoms can occur following a series of strokes or mini strokes, but vascular dementia can also develop very gradually, similar to Alzheimer's disease. Vascular damage is also found in many cases of Alzheimer's disease, and this mixed dementia may manifest earlier than Alzheimer's disease alone (Jellinger and Attems, 2007; Franzblau et al., 2013).

### Lewy Body Dementia

Lewy body dementia, which accounts for around 5 percent to 10 percent of dementia cases, causes a progressive decline in mental abilities. Symptoms of Lewy body dementia include changes in alertness, thinking, and reasoning; confusion that varies from one day to the next; slowness; gait slowing and imbalance; tremors; visual hallucinations; delusions; and sleep disturbances. Memory loss is another symptom, but it is not a prominent symptom and might not be as marked as with Alzheimer's dementia

(Alzheimer's Association, undated-b). When Lewy body dementia symptoms are accompanied by more-marked memory deficits, Alzheimer's disease is frequently also diagnosed; about half of all subjects with Lewy body dementia also have Alzheimer's pathology (Donaghy and McKeith, 2014).

Lewy body dementia occurs when abnormal aggregations of proteins become masses known as Lewy bodies (Mayo Clinic, 2021). Risk factors include age, male sex, family history of Lewy body dementia or Parkinson's disease, anxiety, and depression. People with Lewy body dementia are less likely than those without Lewy body dementia to have had cancer and to have used caffeine (Boot et al., 2013).

### Frontotemporal Dementia

Less prevalent but potentially creating noteworthy risk is FTD, which makes up about 2 percent of all dementias (Bang, Spina, and Miller, 2015; Olney, Spina, and Miller, 2017). FTD is the most common form of dementia in people younger than age 65 and might present with disinhibition (offensive behaviors), lack of empathy, and poor judgment and foresight (Bang, Spina, and Miller, 2015). The most common type of FTD is a behavioral variant that tends to occur in one's 50s and 60s that affects personality and behavior (Alzheimer's Association, undated-c). PPA, the second most common type of FTD, affects language (speaking, writing, and understanding). PPA is most likely to develop before age 65. Because FTD (1) develops earlier than other types of dementias, (2) is characterized by changes in conduct that could be misattributed to other causes, and (3) is rare, it can be difficult to recognize and diagnose.

## Select Risk Factors for Dementia

We cannot yet predict who will develop dementia despite a growing body of evidence on genetic markers and risk factors. One systematic review of nongenetic risk factors associated with both the onset and course of Alzheimer's dementia reported on such protective factors as certain types of medications, a Mediterranean diet, higher education, greater levels of physical and mental stimulation, and risk factors such as head injury (in males), increased age, diabetes mellitus, hormone levels, smoking, and low social engagement (Hersi et al., 2017). Genetic risk factors explain some of the variance in the onset of dementia (National Institute on Aging, 2019a). Environmental factors might also be associated with increased risk of developing dementia. Killin and colleagues (2016) analyzed 60 research papers and reported that exposure to air pollution, metals, pesticides, electric and magnetic fields, and low levels of vitamin D were all moderately associated with dementia.

Between 2000 and 2020, 434,618 service members were diagnosed with a traumatic brain injury, which is associated with an increased risk for mild cognitive impairment (MCI) diagnosis and earlier age of MCI diagnosis (Health.mil, undated-a). Service members are also at higher risk of PTSD than their civilian peers because of higher rates of exposure to traumatic events (e.g., combat). We highlight these risk factors because of the number of personnel in national security positions with prior military experience.

### Brain Injury

TBI happens when a sudden, external, physical assault causes damage to the brain, and it is among the most-common causes of disability in adults (Johns Hopkins

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Medicine, undated). It is also one of the signature wounds of the wars in Iraq and Afghanistan in the 2000s and 2010s. Numerous studies have suggested that tobacco use, obesity, diagnosis of PTSD, major depressive disorder, and TBI—even *mild TBI without loss of consciousness*—among veterans are associated with a significantly greater risk of developing dementia (Barnes et al., 2018; Byers and Yaffe, 2014; Rafferty et al., 2018; Snyder et al., 2018; Veitch et al., 2013; Vincent et al., 2014). A meta-analysis of 15 studies produced a pooled odds ratio of 1.58 (95 percent confidence interval [CI] 1.21 to 2.06), which indicated a greater history of brain injury in those with Alzheimer's disease (Fleminger et al., 2003).

### Posttraumatic Stress Disorder

PTSD is also a strong risk factor for the development of dementia. A systematic review aimed at quantifying this risk found among eight longitudinal studies a pooled hazard ratio of 1.61 percent (95 percent CI 1.43 to 1.81), meaning the risk for dementia is over one-and-one-half times higher for someone with PTSD than it is for some-

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Some research also suggests that those with higher reserve might be able to stave off underlying brain changes up to a certain threshold.

one without PTSD (Günak et al., 2020). Rates of PTSD in military personnel are varied and estimated to be around 4–17 percent (Richardson, Frueh, and Acierno, 2010); personnel who hold a security clearance with prior military service might be at increased risk of having PTSD relative to their peers without prior military service.

### Occupational Risk Factors

Several occupational factors have been linked with dementia risk. Mental work and higher complexity of work is protective against MCI, whereas high work strain increases risk for cognitive decline. Higher complexity of work might offer resilience to the biological processes of dementia (Andel et al., 2012; Boots et al., 2015; Huang et al., 2020). This is referred to as *brain reserve* (Fratiglioni and Wang, 2007), which confers an ability to withstand age-related changes in cognition and the dementia-related neuropathology without developing obvious symptoms or signs

of dementia. *Cognitive reserve* extends the brain reserve construct to include innate intelligence and acquired experience that might enable greater resilience to brain changes (Stern, 2002; Fratiglioni and Wang, 2007). Thus, individuals who engage in cognitively stimulating and intellectually challenging activities that accompany higher educational attainment or complex occupations might be able to stave off the onset of dementia longer, or even indefinitely, despite the underlying neuropathology of dementia in one's brain.

Individuals with access to Top Secret material have unique individual and work factors that might stave off dementia or help them disguise new cognitive impairment. In the IC, and in the national security workforce more broadly, it is likely that many professionals have high brain and cognitive reserve because of relatively high educational attainment (Legget et al., 2019), high socioeconomic status (Sattler et al., 2012), and years of engaging in cognitively complex work tasks, including retaining sensitive information. Some research also suggests that those with higher reserve might be able to stave off underlying brain changes up to a certain threshold, after which precipitating declines in cognitive abilities are somewhat more rapid, and mortality rates increase compared with rates among those without high reserve (Meng and D'Arcy, 2012; Mungas et al., 2018).

Following the “use it or lose it” notion that engagement in cognitively demanding activities helps to maintain cognitive functioning, retirement is associated with cognitive decline (Lee, Chi, and Palinkas, 2019; Xue et al., 2018). Some research has demonstrated that the risk of developing dementia is lower in those who retire later in life (Dufouil et al., 2014). Work often gives people a sense of purpose and social connection, which contribute to overall well-being.

## Mild Cognitive Impairment

MCI is characterized by greater-than-expected cognitive decline based on someone's age and other indicators (Gauthier et al., 2006). Early impairment is difficult to recognize and typically requires close interpersonal connection to identify. Importantly, MCI is characterized as an intermediate stage of cognitive impairment between healthy aging and dementia. It is often considered a transitional phase between the cognitive changes that occur during normal aging and the changes observed with dementia, although, importantly, not all cases of MCI progress to Alzheimer's disease, and some might progress to a different dementia. MCI can impair memory alone or, less commonly, other cognitive domains. Thus, there are several subtypes of MCI. Signs of memory-related MCI include losing things often, forgetting to go to events or appointments, and having trouble with word-finding compared with other people the same age. MCI is clinically characterized by self-reported or informant-reported cognitive complaints; objective cognitive impairment as determined by cognitive tests, yet preserved independence in functional activities; and no apparent dementia. In contrast to MCI, mild dementia involves more than one cognitive domain and causes impairments in daily living activities (Prince et al., 2016).

About eight in ten people with memory-related MCI go on to develop Alzheimer's disease, a higher rate than among those without memory-related MCI. The Sydney Memory and Ageing Study of 873 community-dwelling people found that those with MCI at the time of the baseline assessment had an odds ratio of 8.84 of developing dementia by the six-year follow-up assessment (Lipnicki et al., 2017). Although not everyone who has MCI devel-

ops Alzheimer's disease, early detection of MCI is key as it might be an early sign of dementia, and health care providers or other observers, such as family, friends, and colleagues, can be helpful in monitoring its progression.

## The Federal Workforce

Of the federal civilian nonpostal employee workforce population, 15 percent of all nonseasonal full-time permanent employees are retirement eligible, based on a combination of age and years of service. Of these employees, 57 percent are men and 43 percent are women, and 37 percent are a member of a minority group (U.S. Office of Personnel Management [OPM], 2017). In 2018, OPM data indicated that 1.5 in every ten federal employees are eligible to retire today, and that number was expected to double by 2023 to three in every ten federal employees (Katz, 2018).

The average age of retirement across the government workforce in fiscal year (FY) 2019 was 61.8, after an average length of service of 24.9 years (OPM, undated-b).<sup>2</sup> Likewise, the average age of retirement in the executive branch of the federal government in FY 2017 was also 61.8, according to an OPM report on trends in the average retirement age for the executive branch between FY 2015 and FY 2017, excluding contractors and contract employees and most intelligence agencies (OPM, 2018).

The FedScope database indicates that in September 2021, 5 percent of the federal workforce (116,742 out of 2,144,744) was over the age of 65, and 1 percent (22,354 of

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<sup>2</sup> The OPM data exclude active military personnel and contract employees.

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The risk that an individual becomes a national security threat because of dementia symptoms depends on many factors, such as the nature of the classified information they hold, for how long the unauthorized disclosure of that information could cause damage (including serious or exceptionally grave damage), and whether the individual is targeted by an adversary.

the 2,144,744) of the workforce was over the age of 65 with a length of service of 35 years or more (OPM, undated-a).

### **The Intelligence, Security, and Defense Sectors**

In the U.S. national security and intelligence workforce of both government and contract employees, personnel with knowledge of sensitive information who experience dementia symptoms such as forgetfulness, poor judgment, and impulsivity could pose a serious threat to national security. Post-9/11 service members are likely to be retiring soon in large numbers, after 20 years of military service, and many are expected to join the federal workforce, bringing a security clearance with them to their new government or security contractor jobs. Because many of them suffered mild TBI and exposure to traumatic experiences, they are at

increased risk for development of dementia and potentially earlier onset of dementia.

In FY 2019, when the U.S. population was approximately 329 million, the total number of contractors and government personnel who held a security clearance was 4,243,937 (1.3 percent of the U.S. population), a 4.2-percent increase in the number of clearance holders from FY 2018. Of all clearance holders, 33 percent maintained a Top Secret–level clearance (National Counterintelligence and Security Center, 2020).

With 20 to 30 years of postservice employment available to many, and life expectancies pushing to 80 years, the percentage of Americans at any given time who have or have had access to classified information could be as high as 23 percent. For instance, if someone joins the military at age 18 and retires after 20 years of military service at age 38, they

might have approximately 24 years of postservice life before they reach average retirement age. We expect that efforts to hire those with a security clearance, and efforts to support the hiring of veterans, have led to a large number of individuals with past military service who maintain a clearance in their postservice employment. Although we are not aware of public data reporting the size of the veteran population with a security clearance in the federal workforce, this population is worth taking note of because many veterans are at higher risk for development of early cognitive impairment (LoBue et al., 2016), and post-military service careers in intelligence or other security-related agencies are common. In FY 2016, military veterans made up 31 percent of the federal workforce (Chamberlain, 2018).

## A Risk Framework

The risk that an individual becomes a national security threat because of dementia symptoms depends on many factors, such as the nature of the classified information they hold, for how long the unauthorized disclosure of that information could cause damage (including serious or exceptionally grave damage), and whether the individual is targeted by an adversary to obtain that information. We frame these factors as components of risk.

## Components of Risk

Risk has been specified as a combination of likelihood and potential impacts (Montibeller, Franco, and Carreras, 2020). *Likelihood* includes vulnerabilities and threats; *impacts* reflect the severity and consequences based on the value of the assets. Risk typically includes three elements:

assets, threat, and vulnerability (National Institute of Standards and Technology, 2012). An *asset* is what needs to be protected. A *threat* is what needs to be protected against. A *vulnerability* is some weakness or gap in protections that can be exploited to gain access to an asset. In the scenario we are concerned about, the asset is the confidential information retained by the individual; the vulnerability is the individual's cognitive status, as well as their support system that protects them or fails to do so; and the threat is someone taking advantage of the individual's vulnerability and other personal or situational elements to obtain that classified material.

Each of these elements is influenced by a variety of factors. Assets exist along a continuum of harm, which typically decreases over time as the relevance of classified material becomes obsolete. The potential seriousness or gravity of damage of unauthorized disclosure of Confidential, Secret, and Top Secret information and the amount of time for which it requires protection make up the value of an asset (Obama, 2010). As described previously, an individual's vulnerability to developing dementia and compromising assets is based on multiple individual factors, such as demographics, health status, social support, lifestyle, and behaviors. An individual's vulnerability is also based on their employment experiences, such as their workplace or working conditions, their employment status, their amount of exposure to classified material, and the nature of the classified material.

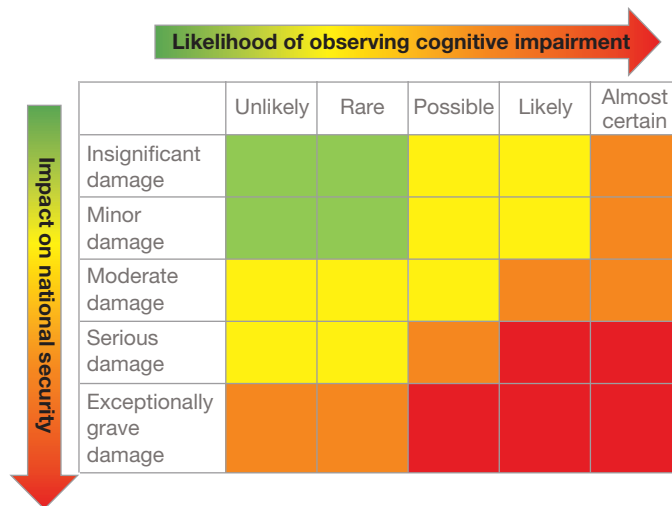
## Risk Matrix

A risk matrix is a tool used by practitioners to illustrate the dimensional relationship between variables (Bao et al.,

2017). It offers a way to visualize the interplay between the risk, or likelihood, of an event happening and the potential impact of the event should it occur. Here, a risk matrix offers a framework by which to identify those who might be at greatest risk of inadvertent disclosure of classified knowledge and information about those individuals that would be useful in developing mitigation strategies. It offers a framework for thinking about the severity of a threat and about mitigation strategies, from low likelihood, low-impact threats (green) to high likelihood, high-impact threats (red).

We developed the matrix to categorize the likelihood of a cleared individual divulging information along a range from unlikely to almost certain (Figure 1). The primary factors that determine the likelihood are the severity of the dementia symptoms and the period during which the employee is vulnerable to divulging information. We categorize the impact of the information being divulged, or the damage, ranging from insignificant to exceptionally grave. The factors that determine the level of impact are the level of clearance and what we call the half-life of secrets, which is how long the material could be harmful to national security (Swire, 2015). The top left corner of the matrix, where the impact of any cleared information being divulged is insignificant and the probability of the individual sharing cleared information is unlikely, shows a very low-risk situation. The bottom right corner, where the impact would be grave and the likelihood very high, indicates extreme risk. It is those highest-risk situations that concern us the most and warrant further discussion about potential solutions. It is neither sensible nor feasible to monitor and assess all personnel who hold a security clearance for cognitive impairment between retirement and death. Thus, a more-

FIGURE 1  
Likelihood by Impact Risk Matrix



realistic approach would be to identify those who might be at greatest risk of inadvertent disclosure of classified knowledge and to develop mitigation strategies to prevent such disclosure.

An example of a benign, nonthreatening, situation is a retirement-eligible employee of a national intelligence agency who obtains sensitive information that is only sensitive for a short period before it is declassified. That individual is in the very early stages of experiencing cognitive impairment with occasional forgetfulness. They compensate for that forgetfulness by writing everything in a notebook. But they never forget to lock up the notebook because they have a reminder to themselves on their office door. An example of a more-concerning scenario is a 79-year-old retired senior intelligence official who rou-

tinely accessed and was involved in covert surveillance and other missions and is now experiencing moderate symptoms of dementia and talking more than ever before about their past to their children and other people at their nursing home. Each scenario warrants different mitigation and response strategies, and several topics and trade-offs must be considered in developing those strategies.

### Time: Half-Life of Secrets

Classified information often remains classified long after a national security or intelligence officer leaves the national security workforce. Depending on the sensitivity of the intelligence or national security information, it can remain classified for years, even decades, beyond the time an official serves in government. Automatic declassification occurs 25 years after classification, unless exempted (Obama, 2010). Something classified learned at an early point in one's career might still be classified long after one has retired, putting at risk of disclosure programs and accesses that might have taken years for the IC and the national security community to build. The more sensitive a piece of information is, the longer it might remain classified; for example, the existence of a source of intelligence within a foreign government, personal identifying information of intelligence officers, and specific methods of access to information are information that might never be declassified.

What is not specified in our risk matrix is the role of safeguards (i.e., preventive practices). Safeguards are in place to protect assets against threats. Key safeguards in this domain include securing access to sensitive information, vetting the individuals permitted to access, and

recurring security awareness and insider threat training for employees who hold a security clearance (DoDM 5200.01, 2013).

### Security Vetting Procedures

National security personnel vetting procedures are designed to evaluate the trustworthiness and eligibility of an employee to have access to classified government secrets. A 2017 Executive Order introduced a new personnel vetting approach to review backgrounds *at any time* to determine continued eligibility to hold a security clearance (Obama, 2017). Continuous vetting is in the process of being rolled out and will be implemented across all executive departments and agencies as a standard procedure in what is referred to as Trusted Workforce 2.0 (Defense Counterintelligence and Security Agency, undated). For a summary of select literature on the personnel vetting process, see Stebbins et al., 2019. The continuous vetting systems will replace the old five- to ten-year reinvestigation requirement. Instead of mandatory reinvestigations and repetition of the background and adjudicative process, continuous vetting systems use automatic data checks to routinely assess a clearance holder's trustworthiness and eligibility (Defense Counterintelligence and Security Agency, undated). Despite these changes to the vetting process, the Standard Form 86 (SF-86; the application to hold a national security position) has not been revised to include additional health assessments or attestations related to dementia. Both the Standard Form 85 (SF-85; the application for public trust positions) and the SF-86 assess psychological and emotional health conditions and treatment seeking, indicating that proactive management of mental health is

encouraged and that most mental health conditions do not affect eligibility for security clearance.

The Office of the Director of National Intelligence (ODNI) Security Executive Agent-4 (SEAD-4) is the adjudicative guideline governing eligibility for access to classified material; the SEAD-4 is “the single, common adjudicative criteria for all covered individuals who require initial or continued eligibility for access to classified information or eligibility to hold a sensitive position” (Security Executive Agent Directive 4, 2017, p. 1). It offers guidance on behaviors and circumstances that elicit concern and conditions that could mitigate that concern, although it also does not explicitly address dementia (Security Executive Agent Directive 4, 2017).

### A Lifelong Commitment

Individuals who are granted a security clearance agree not to *ever* disclose classified information by signing the Standard Form 312 (SF-312) nondisclosure agreement, a lifelong agreement between the trusted individual and the United States. When an individual leaves or no longer needs access to an organization, they receive a security debriefing reminding them of their lifelong responsibilities (Code of Federal Regulations, Title 32, Section 2001.80[d][2]). For example, individuals who held a Top Secret clearance who want to publish national security–related material in the public domain long after they retire are still required to have a security review of that material prior to any publication.

The continuous vetting of personnel is key to identifying new suspect behavior. However, we are unaware of vetting procedures that occur after a cleared employee leaves the workplace. Under the current system, a security clearance expires after two years of inactivity, but there does not

appear to be any monitoring process for individuals who still have classified information in their cognizance but are no longer in a cleared government/contract position or no longer hold a clearance.

## A Risk-Based Approach to Research and Intervention

Further efforts to quantify risk and evaluate existing mitigation strategies are needed to determine the appropriate next steps and whether the development of new mitigation strategies is needed. Newly retired cohorts who regularly accessed Top Secret material might present the largest potential threat; these recent retirees are greater in number and have knowledge of more currently classified material than do long-retired security personnel. Older cohorts who engaged in clandestine operations or covert actions during their time of service are less likely to have knowledge that could still pose a grave threat to national security after 20 years or more; however, these long-retired individuals have a higher likelihood of having severe dementia. Although substantial safeguards are in place to ensure the trustworthiness and continued eligibility of those permitted to access classified material, none of the practices are designed to identify or predict which individuals might develop dementia.

### Responsible Agencies

Both policymaking and research to improve security clearance policies and procedures are carried out in many agencies, and coordination among them to pursue this line of research will be important. For instance, the insider threat deterrence community consists of several partners, includ-

ing the ODNI's National Counterintelligence and Security Center; the Defense Human Resources Activity, which oversees the Defense Personnel and Security Research Center; and the National Insider Threat Task Force. The Department of Homeland Security houses CISA, which relies on an insider threat mitigation framework with four key steps: define, detect and identify, assess, and manage (CISA, undated-b). The Performance Accountability Council is an interagency council responsible for coordinating both vetting of personnel and cross-agency priorities for its primary member agencies: Office of Management and Budget, ODNI, OPM, the U.S. Department of Defense (DoD), and many supporting departments and agencies across the government (ODNI, undated).

## Research to Quantify Risk

There are specific challenges to recognizing dementia. For instance, the individual might not be in treatment; early symptoms might be hard to detect; family members might recognize early symptoms but are not typically asked to provide input during the security review process; or the individual might be retired. The dynamics associated with a study of dementia in personnel who hold a security clearance are complex. Workplace protections to prevent ageism and Health Insurance Portability and Accountability Act protections for health information should be considered before instituting any new intervention. The priority is to protect the most-valuable assets (Top Secret material that presents grave danger for decades), and only a small proportion of individuals hold such information. First, it is important to determine the number of personnel who hold a security clearance and where they might fit in to

the different cells of the matrix. Quantifying the degree of risk inherent in each cell of the matrix could offer direction for where best to allocate resources toward prevention practices. The SF-86 data that describe military service history and the DD Form 214 (Report of Separation), which contain TBI documentation, can inform those estimates. Those data will reveal the percentage of the national security workforce with key risk factors for dementia, such as PTSD or a history of brain injury.

Research on risk factors for dementia in the national security workforce will help determine who might need further monitoring. Again, an increased understanding of the demographic, health, and behavioral contributors to MCI and dementia could improve prediction models. For instance, a retrospective medical record review found that, among people with TBI, posttraumatic amnesia and evidence of strokes or other cerebrovascular disease were significantly associated with the development of Alzheimer's disease (de Guise et al., 2022). Whether this is true in the national security workforce, where personnel might have a high degree of cognitive reserve, remains to be seen.

Research might be needed to identify the nature of the Top Secret classified material that could lead to extremely grave damage to national security decades later. For example, materials on processes and tactics might need to be protected longer than information about past events. A review of the documents' declassification timeline and an understanding of the half-life of specific categories of secrets can also improve prediction models to identify what might warrant long-term tracking.

We conclude this Perspective by laying out several steps that the IC, DoD, and other national security elements can take to better understand these risks and the

actions needed to mitigate them. The Risk Matrix presented in Figure 1 is designed to inform choices about what research to pursue and where limited federal funds could be invested to prevent this type of insider threat. The matrix can serve as a framework for considering whether and how to act. We demonstrate how it could be applied to the development and evaluation of potential interventions to prevent individuals who hold or held a security clearance and who develop dementia from becoming an unwitting insider threat.

Again, many personnel who hold a security clearance do not routinely access classified information, and their cognitive health likely poses little risk to national security. There is also a substantial amount of classified material that is declassified after a period because it no longer poses a threat to global or national security. Personnel accessing that material might pose little risk to national security.

## Intervention Intensity Matrix

We developed a version of our risk matrix that contains mitigation strategies categorized by the severity of cognitive impairment of the current or past security clearance holder and the burden to government agencies (Table 2). In the yellow, upper-left corner of the matrix, where the likelihood and impact are low, low-cost interventions, such as educating the national security workforce about how to recognize the early symptoms of dementia and combating stigma about receiving a diagnosis, are potential mitigation strategies to consider and evaluate. As the potential damage from an unauthorized disclosure of classified material increases in graveness, so should the extent of preventive interventions. More-intensive (both intrusive

and burdensome) interventions include screening for health concerns and consulting colleagues, friends, and family members about an individual's cognitive status. Screening, either with a brief questionnaire or with a blood test, requires far less time than neuropsychological testing, which might include intelligence, memory, and judgment assessments conducted by a trained professional. It might help to rely on different types of information, such as a screening instrument and caregiver reports. And neuropsychological assessments administered prior to retirement would serve as an important cognitive status baseline.

### Yellow: Training to Increase Awareness

Increased awareness of the risk associated with this type of insider threat might be a helpful first step toward risk mitigation. All security clearance holders are required to complete annual training to recognize and prevent security threats. Additional efforts to educate personnel, professional colleagues, and family members to help detect early signs of dementia and MCI and strategies to mask the symptoms might be beneficial. Another important component of education is to combat the stigma associated with a diagnosis; messages that support the value of early recognition and early intervention can serve this purpose. Efforts to educate and to reduce stigma could benefit the individual with dementia, colleagues, and personnel by facilitating recognition and intervention or self-identification.

Examples of messages that can be shared might be, "Scientists now believe that the damage to the brain that results from Alzheimer's disease may begin much earlier than previously thought, as much as a decade or more before symptoms appear. It is likely that treatment will be most effective at the earlier, pre-symptomatic stage," or,

TABLE 2  
Potential Strategies Matrix for Risk Mitigation

Intrusiveness	Intervention Intensity (burden to government agencies)			
	Minor (low cost and easy to implement)	Moderate	Serious	Extreme (high cost and very difficult to implement)
Minor	Educate professional colleagues on how to detect early signs of MCI/dementia	Combat stigma associated with MCI/dementia diagnosis	Develop predictive risk models to facilitate tracking of select groups	Monitor at-risk personnel based on predictive models
Moderate	Consider routine health assessments to identify at-risk groups	Include input from colleagues, friends, and family members in periodic evaluations	Require biannual health checkup with primary care provider	Assess environmental threat to determine the potential for bad actors to elicit classified material
Severe	Require dementia screenings after a certain age for select groups	Include colleagues, friends, and family members in periodic evaluation	Update investigation process to require interview of spouse or partner and/or primary care provider specifically about possible dementia symptoms	Conduct cognitive testing and consult with providers and families; implement monitoring systems
Extreme (extensive/frequent intrusions into individual's personal life; high likelihood of detecting dementia)	Require biannual health checkup with primary care provider	Require health exams and assess environmental risk factors	Require periodic neuropsychological testing; engage caregiver in assessing security risks	Consider assisted living options for highest-risk individuals

“While there is no cure, there are treatments that can slow the decline and other promising medications being studied.” We expect that by addressing the stigma that “nothing can be done,” there is more incentive to recognize and act when early symptoms appear.

**Orange: Identify and Monitor At-Risk Personnel**

The identification of dementia is a necessary precursor to managing associated risks. It might be reasonable to assess

those in the national security workforce who are over age 70 as a condition of continuing in their position. Screening tools and awareness and recognition of early warning signs are key to any mitigation strategy. Extensive research is underway to develop reliable and valid tests to detect cognitive impairment or its precursors. For instance, a self-administered cognitive test compared favorably with the routinely used, provider-administered Mini Mental Status Exam (Scharre et al., 2021). Relatedly, blood tests to accurately screen for Alzheimer’s disease are in develop-

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Investing resources in the identification of individuals who both are at high risk for dementia and held the most-sensitive and long-lasting national security information could reduce the risk of the most-egregious incidents.

ment and have shown promise (Husain, 2021). Furthermore, predictive models that specify components of the risk of becoming an insider threat because of dementia lend themselves to monitoring systems. That is, the variables or conditions that confer the greatest risk of dementia and might manifest prior to the emergence of any symptoms can be monitored to track select at-risk people. Other health-related monitoring programs, such as the military's periodic deployment health assessments, which are administered predeployment, postdeployment, and three to six months following return from a deployment, might serve as a model for routine cognitive health assessments (Health.mil, undated-b). The sensitivity and specificity of

the assessment or screening measures should be known to determine the level of confidence in the test(s) being used to detect cognitive impairment.

### **Red: Track and Intervene with High-Risk Personnel**

Consideration of postretirement practices for a small group of individuals who have accessed Top Secret material that remains classified for decades seems warranted. Although the red cells in Table 2 make up the smallest proportion of potential events, they reflect the gravest outcomes. Thus, investing resources in the identification of individuals who both are at high risk for dementia and held the most-sensitive and long-lasting national security information could reduce the risk of the most-egregious incidents. Individuals who have dementia might divulge nonsensical information, and some understanding of whether the integrity of the information that could be divulged is important for determining what intervention might be warranted.

The most-personally intrusive strategies would be warranted only in more-extreme situations (high likelihood, severe impact). Intrusive risk mitigation strategies could include required medical appointments and cognitive assessment. Although this would not be appropriate for all, one could imagine a scenario in which such screenings could be required for current or past Top Secret clearance holders after they reach a certain age. However, the legality of such a policy would need to first be considered. Additionally, efforts to empower family members to detect any bad actors seeking information (e.g., new paid "formal" caregivers) might be worth considering for evaluation.

There are examples of programs that require a higher level of individual scrutiny, such as the Personnel Reliability Program (PRP) that governs individuals responsible for

securing nuclear, chemical, and biological weapons (DoD Instruction 5210.42, 2012). Specific policies govern individuals in the PRP; they are held to a higher standard of trustworthiness. It could be possible to develop a new level of protection for a select group of most-vulnerable individuals. The Federal Aviation Administration requires neurocognitive evaluation when any neurocognitive impairment might be present; this evaluation might serve as an example of this type of close monitoring of select personnel (Federal Aviation Administration, 2020).

## Workplace Protections and Employment Policies

Research and policies that treat people differently based on age must consider employment discrimination regulations, and to be clear, this is about managing dementia, not age. Mandatory retirement is generally illegal in the United States based on the Age Discrimination in Employment Act of 1967 (ADEA), but certain occupations are governed by different regulations. For instance, the Federal Aviation Administration maintains the controversial “Age 65 Rule” prohibiting pilots aged 65 or older from serving as captain or co-captain on large commercial aircraft (U.S. General Accounting Office, 1989). This rule was changed from the “Age 60 Rule” in 2007, in clear recognition of the capabilities of pilots over age 60 to fly (Federal Aviation Administration, 2019). Wilkening concluded that there was no clear justification for the policy based on medical, scientific, or safety data and that the policy constituted age discrimination (Wilkening, 2002).

The ADEA establishes that it is unlawful for employers “to fail or refuse to hire or to discharge any individual or

otherwise discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual’s age,” and applies to workers aged 40 and older (U.S. Code, Title 29, Section 623[a][1]). An important exception is that employers might make adverse age-based decisions if age is a bona fide occupational qualification that is reasonably necessary for business operations (U.S. Code, Title 29, Section 623[f][1]). The ADEA is enforced by the U.S. Equal Employment Opportunity Commission. One practice that recently came under fire by the commission is mandatory neuropsychological testing of employees based solely on reaching a certain age (*Equal Employment Opportunity Commission*, 2020; Steffany, 2022). In that case, the Equal Employment Opportunity Commission sued Yale New Haven Hospital for requiring physicians over the age of 70 to take neuropsychological tests and an eye exam when seeking renewed staff privileges (U.S. Equal Employment Opportunity Commission, 2020).

## Conclusions

As people live longer and retire later, challenges associated with cognitive impairment in the workplace will need to be addressed. Our limited research suggests this concern is an emerging security blind spot. Considering the potential consequences of an inadvertent security breach stemming from cognitive impairment, we believe that further study of risk, recognition, and mitigation strategies is important. Such research should be paired with educating the current and retired security workforce and their families to increase awareness and recognition of dementia symptoms. It will be important to codify a process for reporting con-

cerns about individuals that ensures some level of privacy and scrutiny to validate the reports. The reports will most likely come from spouses or adult children and, possibly, from close friends; patients with the disease might make a report themselves, or a report might be made by hired caregivers or staff in a chronic care facility, should the dementia become that severe.

As national security agencies begin to consider mitigation strategies, it will be worthwhile to first take stock of risk management efforts already underway to improve the detection of insider threats. RAND researchers previously offered 22 recommendations to prevent leaks in the federal government (Bruce and Jameson, 2013); among them are the need to identify the most-serious classified disclosures, study ways to improve measures to identify leakers, and review procedures for reliable prediction of security trustworthiness. Those efforts could help identify, track, and mitigate potential dementia-related insider threats. Prediction models might well be extended to include risk factors for dementia and the amount and type of classified material that was accessed over the course of an individual's career. According to Bruce, Beaghley, and Jameson (2018, p. 1), beyond personnel vetting, "an improved system will afford significantly better protection to secrets that truly

need it, reduce overclassification by providing clear parameters for creating secrets, and more fully support government transparency goals." Such improvements would better enable the U.S. government to track personnel who hold a security clearance and know critical secrets.

The IC and national security workforce is unique in many ways. Some individuals might be more likely to be resilient and not disclose information, even in the face of dementia. Perhaps those with higher levels of security clearance held across a lifetime of employment would keep information secure because it is second nature for them to do so. Whether they are successful if they face cognitive impairment could depend on the type of dementia they experience. Someone with Lewy body dementia who does not have memory issues could be less prone to being targeted by a bad actor to elicit information than someone with Alzheimer's dementia; someone with Alzheimer's dementia might be more likely to forget about the secrecy of their information, but they might also be more likely to disclose unreliable or incoherent material. Further understanding of cognitive impairment and cognitive decline within an aging IC and national security workforce cohort could contribute to securing the safety of classified information in the United States.

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## About This Perspective

People who are trusted by the U.S. government to hold a security clearance are responsible for securing government secrets. The U.S. government entrusts classified material to individuals who possess a security clearance; but how do those clearance holders secure that information if they are impaired? Two broad trends might contribute to a new type of national security threat: (1) People are living longer, and (2) people are working later in life. As a result, the workforce might experience a higher dementia prevalence than in past generations. Taken together, we believe an increasing number of cleared personnel—those who hold or previously held a security clearance—have or will have dementia. The purpose of this Perspective is to describe ways in which current and retired cleared personnel with dementia could pose a threat to global security and to provide a framework for studying this complex issue.

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