

## Integration of Neuropsychology in Primary Care

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### Abstract

The field of neuropsychology is making inroads in primary care as the importance of cognition in physical health is increasingly acknowledged. With neuropsychology primary care integration, patients receive a range of cognitive assessments (e.g., screens, brief neuropsychological assessments, treatment recommendations through provider-to-neuropsychologist consultations) based on a stepped model of care which can more efficiently diagnose cognitive disorders/problems and assist with treatment. Two case studies are described to illuminate this process. Information is provided to illustrate how neuropsychology integration was introduced in two primary care clinics at a community-based hospital system.

*Keywords:* Brief neuropsychological assessments; Neuropsychology; Primary care neuropsychology; Behavioral health integration; Cognitive screen

### Introduction

Neuropsychology integration in primary care is increasing as healthcare reform proliferates across the United States. This reflects a significant change in practice as primary care providers (PCPs) have long since been the least likely specialty to use neuropsychological services (Temple, Carvalho, & Tremont, 2006; Tremont, Westervelt, Javorsky, Podolanczuk, & Stern, 2002). But as medical treatment is now moving to new payment arrangements directed at improving the quality of patient care and reducing costs, behavioral health integration, and increased cognitive assessments is one in an increasing array of services in primary care clinics (Blount et al., 2007; Hunkeler et al., 2006). There is a growing recognition that cognitive health is integral to overall wellbeing and that identification of cognitive problems improves treatment efficacy. This has increased both access for patients and awareness in the medical community of the routine use of cognitive assessments.

Similar to PCP roles, neuropsychologists in primary care are specifically trained for and skilled in first point of contact for patients with an undiagnosed cognitive symptom or cognitive concern (the “undifferentiated” patient) not limited by problem origin (e.g., biological, behavioral, or social), or organ system. They promote cognitive health and maintenance, counseling, patient education, diagnosis, and make treatment recommendations for health improvement. Many neuropsychologists with specialized skills in medical neuropsychology work directly with PCPs to provide consultations, brief cognitive assessments, and treatment recommendations. Up-to-date knowledge of metabolic, immune, endocrine, and vascular conditions are particularly vital to working alongside PCPs and recognizing the impact of these conditions on cognitive health (see Armstrong & Morrow, 2010; Tarter, Butters, & Beer, 2001, for greater elaboration of field of medical neuropsychology). Neuropsychologists also have an intimate understanding of psychopathology and behavioral treatments, and typically combine their expertise in cognition and psychology to their understanding of patient diagnoses and functioning. Their training facilitates shared professional perspectives with primary behavioral health colleagues in primary care (psychiatrists, psychotherapists) as well as medical colleagues.

Similar to a primary care model of making medical treatment decisions based on a “stepped-care” approach (Abrams, 1993; Orleans, 1993; Sobell & Sobell, 1999), neuropsychological assessments are also conforming to this path. In stepped care, the selection of treatment is directed such that medical treatment proceeds in a stepwise fashion from least intensive to

most intensive. If the patient responds to the least invasive treatment, then treatment is maintained for as long as necessary, but if the patient's status remains the same or declines, then a more intensive level of treatment is implemented. The result is that more intensive treatments are reserved for more extreme problems (Sobell & Sobell, 2000). Many medical conditions (e.g., hypertension, diabetes) are treated in primary care using this approach, with the addition of specialist consultation at the higher steps of care as needed.

**Description of stepped cognitive assessments:** The application of a stepped model of care for neuropsychology in primary care has resulted in a menu of deliverables with the creation of varied types of neuropsychological assessments ranging from consultation to more comprehensive assessments with intervention. These steps can also be recursive. That is, a patient who may have had a full neuropsychological evaluation in the past, may only require a briefer evaluation for continued monitoring in the future or periodic consultation. As can be seen in Figure 1, in the least invasive assessment, “Step 0”, neuropsychologists provide consultations to PCPs. For these consultations, PCPs usually have questions about their patient's cognition and would like to know if more in-depth assessment is needed, if the concerning behavior can be considered normal or abnormal, or if certain treatments might be helpful in advance or in conjunction with pursuing more comprehensive neuropsychological assessment. Sometimes the consultation may focus on addressing improved cognitive strategies for cognitively impaired patients (e.g., what level of support might improve medication compliance). Ultimately, these consultations bring greater awareness of the cognitive deficits associated with chronic disease and improve disease management.

Cognitive screens and/or mood screens (e.g., Mini-Cog, MMSE) are frequently done prior to consultation for neuropsychology review. These screens are an important first step in assessing cognition in a health community. There are many different kinds of cognitive screens (see Mitrushina, 2009 for a review). Most are quick (5–10 min) and can be administered by multiple healthcare professionals (e.g., PCPs, nurses, medical assistants). They have sufficient psychometric properties to alert PCPs that cognitive problems might be occurring (Ebell, 2009). Block, Johnson-Greene, Pliskin, and Boake (2016) define and delineate the scope of cognitive screening and how it is differentiated from cognitive testing and neuropsychological assessment. Roebuck-Spencer et al. (2017) also delineate these distinctions, and outline the limitations to cognitive screening, particularly its inability to provide a diagnosis. If the cognitive screen in conjunction with the PCPs own assessment of his/her patient raises concerns then consultations can be sought in determining next steps. Neuropsychological consultations can also be done solely as chart reviews. If needed, increased neuropsychological intervention can then proceed from a screen to a brief neuropsychological assessment (BNA), or to a more comprehensive neuropsychological assessment with or without cognitive intervention. Consultations are not typically billable by most insurances yet (though this might change). However, they can be helpful in determining if greater neuropsychological intervention is needed. Consultations are provided within 1–2 days.

A “Step 1” level of cognitive evaluation is a brief neuropsychological evaluation, which provides an increased level of assessment of cognitive abilities and emotional functioning. They are distinct from cognitive screens in that they require a longer appointment (typically 60–90 min) and a quasi-flexible battery is administered by a neuropsychological expert trained to diagnose and make specific treatment recommendations. Brief neuropsychological assessments are not meant to replace

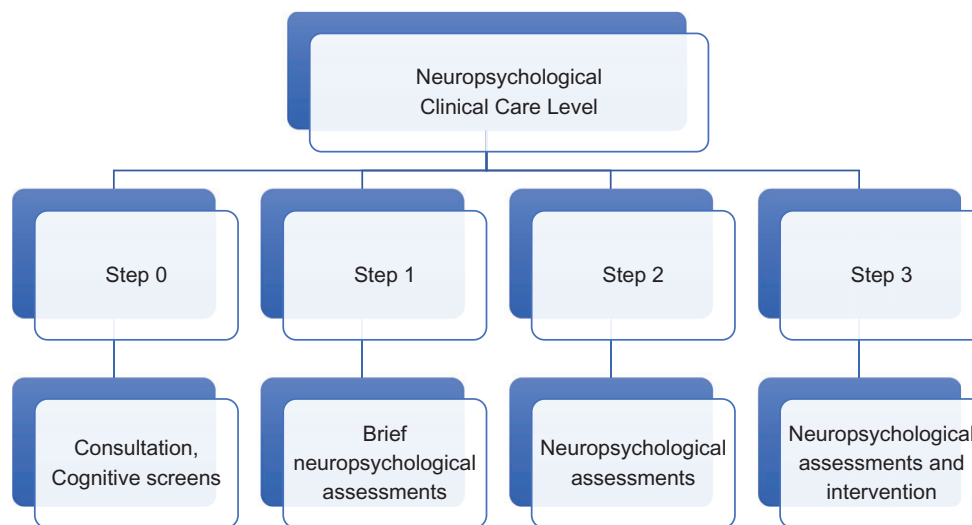


Figure 1. Description of neuropsychological care at each stepped level.

existing cognitive screens or neuropsychological evaluations; rather they target an intermediate stepped level of care between a comprehensive neuropsychological assessment and a cognitive screen. These appointments are typically made in advance as separate neuropsychological appointments in primary care, after the PCP has placed a referral and patients are seen within 2–3 weeks.

A BNA adopts select neuropsychological tests and targets specific referral questions (e.g., AD/HD, dementia). The interview, testing, and feedback portions of the evaluation occur during the same appointment. Feedback is provided at the end of the appointment, so that the patient could receive some immediate assistance, be it psychoeducation, referrals, recommendations for further treatment, and/or diagnosis. It should be noted that a diagnosis may not always be possible at this level of neuropsychological assessment since it does not provide the breadth of a comprehensive neuropsychological assessment. Sometimes a PCP is contacted following the appointment by personal communication, if the patient's health status is deemed to require immediate attention (i.e., patient having alteration of consciousness due to hypertensive episodes, or hypoglycemic episodes, patient expressing suicidal ideation, patients requiring toxicology screen due to suspected malingering). Some of these more urgent PCP communications require "warm hand-offs" (i.e., personal transfers) to the provider or medical staff for immediate medical attention. Coordination with the clinical pharmacist is sometimes beneficial as well for patients with medication compliance difficulties. Brief reports are sent to the referring provider within 24 h. Patients receive a copy of the report upon request, though typically the report is sent to the PCP through the electronic medical record (EMR). Patients are sometimes sent recommendations by mail.

"Step 2" level of care entails for a comprehensive neuropsychological evaluation and represents the typical neuropsychological assessment. Examples of patients who have gone beyond Step 1 include those who screened positive for dementia using the BNA but require more extensive evaluation to determine the extent of the condition and/or diagnostic specification of dementia subtype. Another example would be an AD/HD BNA with indeterminate AD/HD due to a learning disorder differential. They also span the scope of other typical referrals such as cognitive disorders due to other neurological conditions (e.g. multiple sclerosis, Parkinson's seizures) and psychiatric conditions (e.g. schizophrenia). These evaluations are conducted at the neuropsychologist's outpatient office and not in primary care, and appointments typically take longer to be scheduled than BNA.

For certain conditions, neuropsychology can provide both a comprehensive neuropsychological assessment and treatment intervention, such as cognitive remediation. This reflects the most intensive level of treatment, "Step 3". For example, an AD/HD patient can be evaluated and then trained on executive function strategies to improve planning, efficiency, inattention, and distractibility. A schizophrenic patient can be trained on techniques to improve problem-solving, planning, and memory, which are typically affected by the illness. A patient with early dementia can be trained on strategies to compensate for memory problems. This remediation problem is individually designed based on the patient's own cognitive profile.

### *Roadmap to Integration at a Community-based Hospital System*

Cambridge Health Alliance (CHA) is a community-based academic (Harvard Medical School) hospital system in Cambridge, Massachusetts with 12 primary care clinics. Neuropsychology is available for the entire hospital system primarily through the outpatient department of psychiatry. Step 1 BNA assessments are located at two community primary care clinics for one session (1/2 day) per week. Two patients are booked one morning each week at each clinic by the primary care office staff in advance through the EMR. This arrangement arose as part of the advent of behavioral health integration in primary care when CHA began transforming to an Accountable Care Organization 6 years ago. At the time, several salaried psychiatry staff (i.e., psychiatrists, psychologists, and social workers) were assigned to a primary care clinic as part of a re-allocation of their time to work in primary care. Since then new psychiatry staff hires to work solely in primary care have been made. The Chief of Psychiatry and the Medical Director at one primary care clinic, which had achieved Level 3 accreditation in patient-centered medical homes by the National Committee for Quality Assurance (NCQA), were presented with a proposal for BNAs by neuropsychology in which it was proposed that a neuropsychologist would reallocate time to primary care to conduct BNAs. The Medical Director was in full support of this proposal and expressed genuine need for assistance of cognitive evaluations. Upon approval, planning and implementation meetings with various medical administration ensued over the course of 6 months to resolve logistic hurdles (e.g., billing, space, referral flow). Once resolved, we began to conduct BNAs, but also held several primary care team meetings over the course of 6 months to develop and finesse the referral stream and discuss specific guidelines about the kinds of patients which were appropriate for these BNA referrals (as opposed to full neuropsychological evaluations). Patient visits were filled quickly and initially there was a wait list of 6–8 weeks, though within a year, this referral stream leveled to approximately 1–3 weeks. Within 2 years, neuropsychology expanded to a second primary care clinic at CHA with Level 3 NCQA accreditation. In 2016 one primary care clinic was named as 1 of 30 primary

care practices in the nation with an exemplary model of workforce innovation, through a new national project, “The Primary Care Team: Learning from Effective Ambulatory Practices”, also known as “LEAP.” The “LEAP” project is a joint initiative of the Robert Wood Johnson Foundation (RWJF) and the MacColl Center for Health Care Innovation at Group Health Research Institute.

We developed a model of a BNA with two protocols, one for AD/HD and one for dementia, though theoretically, specialized BNA protocols can be constructed for a range of medical and/or neurological conditions. They are typically billed for two to three units as a neurobehavioral status examination (i.e., CPT 96116). The implementation of consultations and BNAs (Step 0 and Step 1) in primary care has also resulted in a reconfiguration of the referral flow for more comprehensive neuropsychological evaluations (Step 3) in the outpatient neuropsychology clinic by streamlining referrals that do not require comprehensive assessments. As CHA is a neuropsychology postdoctoral training site, neuropsychology fellows often observe and assist, as appropriate, though they do not bill for their time (since unlicensed clinicians cannot bill 96116).

### BNA for AD/HD

Cognitive difficulties associated with AD/HD are often first reported in primary care settings (Montano, 2004) and there has been a documented increase in the number of adult patients seeking diagnosis and treatment for their inattentive and/or hyperactive symptoms (Nigg, 2013). However, a sizable number (48%) of adult PCPs have not been thoroughly trained in the assessment and treatment of adult AD/HD, and are uncomfortable diagnosing this disorder (Brown, 2008; Weiss & Weiss, 2004). This may be due in part, to the high rate of comorbidity and overlap of cognitive symptoms with other neuropsychiatric disorders which can complicate accurate diagnosis of AD/HD. Approximately 50% of adults with AD/HD have a co-occurring disorder (Biederman et al., 1993; Kessler et al., 2006), most commonly mood (38.3%), anxiety (47.1%), substance use (15.2%), and impulse control disorders (19.6%; Kessler et al., 2006). PCPs are thus, more likely to defer to a specialist to assess AD/HD when compared to other disorders (Adler, Shaw, Sitt, Maya, & Morrill, 2009), which can delay care, reduce efficiency, and potentially increase costs. PCPs’ time constraints within primary care settings also pose an obstacle to the diagnosis and treatment of this patient population since appointments are fairly short (10–20 min) (Montano, 2004). The potential for stimulant abuse has also contributed to the reluctance of PCPs to diagnose and treat AD/HD (Adler et al., 2009; Kooij et al., 2012; Montano, 2004; Sullivan, May, & Galbally, 2007). As such, there is a particular need for accessible and efficient assessments of AD/HD in primary care that can address this influx and meet the treatment needs of this patient population (Braun et al., 2004).

The AD/HD BNA is comprised of a comprehensive psychiatric interview (approx. 45–60 min), which is the gold standard for assessment, with adjunctive select neuropsychological tests that have been shown to be useful in the determination of cognitive deficits often implicated in AD/HD such as mental flexibility, attention, working memory, and processing (Hervey, Epstein, & Curry, 2004; Schoechlin & Engel, 2005; see Table 1) (approx. 15 min), and can assist with determining brief cognitive strategies for patients. We administer self-report questionnaires to examine AD/HD symptoms and mood (approx. 5–10 min), and then provide feedback (approx. 15 min). We also include performance validity measures to assess task engagement and malingering, which is of particular relevance given the rise of stimulant abuse in the US. These measures are administered by a neuropsychologist. The goal of an AD/HD BNA is to provide an initial evaluation for AD/HD to rule out other complicating medical or psychiatric factors that can mimic AD/HD (e.g., sleep disorders, substance abuse). Patients sometimes present with attention problems that arise only in the context of a mood disorder. In these kinds of cases, psychoeducation, cognitive strategies, and a referral for psychiatric treatment is made. In one study at CHA about BNAs (M Lanca et al., in preparation), it was observed that only 20% of AD/HD BNAs yielded a diagnosis of AD/HD because of the complexity of

**Table 1.** Measures administered for AD/HD and dementia BNA

Measures Administered for AD/HD BNA	Measures Administered for Dementia BNA
Advanced Clinical Solutions (ACS), Test of Premorbid Functioning (TOPF-ACS) and Word Choice	Montreal Cognitive Assessment (MOCA)
Digit Span and Coding of Wechsler Adult Intelligence Scale (WAIS-IV); Reliable Digit Span	Advanced Clinical Solutions (ACS): Test of Premorbid Functioning (TOPF-ACS) and Word Choice
Trail Making Test A and B (TMT A, B)	Trail Making Test A and B (TMT A, B)
Rey-Osterrieth Complex Figure Test (ROCFT), copy	Semantic Fluency, Phonological Fluency
Barkley Adult AD/HD Rating Scale-IV (BAARS-IV)	Depression Inventory- Second Edition (BDI-II)/Geriatric Depression Scale
Depression Inventory- Second Edition (BDI-II)	Beck Anxiety Scale (BAI)/ Adult Manifest Anxiety
Beck Anxiety Scale (BAI)	Scale-Elder
Depression Anxiety Stress Scale-21 (DASS-21)	Depression Anxiety Stress Scale-21 (DASS-21)

the presentation secondary to the incidence of co-comorbidity with other psychiatric disorders or because of attention problems secondary to other medical problems. Seven percent of referred AD/HD BNAs were positive for malingering, which highlights potential benefits of PVT inclusion in the BNAs. Approximately 25% of BNAs were referred for a more comprehensive neuropsychological evaluation given the complexity of cases. For example, patients with long-standing psychiatric symptoms dating into childhood often require more time to examine the scope of their AD/HD symptoms.

### *Brief AD/HD Case*

A 22-year-old gentleman previously diagnosed with AD/HD and two concussions as a child was referred for a neuropsychological screen to assess for AD/HD. Although AD/HD is a developmental disorder, recent research has revealed the greater incidence of receding symptoms in adults who had childhood AD/HD than once thought (Agnew-Blais et al., 2016; Caye et al., 2016). These findings underscore importance for updated re-evaluations to confirm continuation of AD/HD. For this patient, his experience of taking a stimulant medication was mixed and he expressed ambivalence about seeking treatment and potentially being prescribed a stimulant (which he took briefly in childhood). However, his recent life struggles after starting a new business prompted the evaluation. Medical history was non-contributory. Neurodevelopmental history (with documented academic and behavioral difficulty throughout his schooling) was strongly consistent with this disorder, and on interview he acknowledged that his symptoms persisted currently. He described daily problems with focus, lack of motivation, and forgetfulness. He denied any difficulty with ADLs and major IADLs but described problems completing tasks at work. He currently resided with his girlfriend whom he described as supportive, though his lack of organization and frequent forgetfulness had caused some tension. Mr. Smith recently started a business and reported mild stress.

### **Excerpt of Brief Neuropsychological Assessment Report**

#### *Summary and Recommendations*

Formal and embedded measures of performance validity were within normal limits; therefore, results were believed to be an accurate representation of Mr. Smith's current cognitive status. Testing revealed Mr. Smith to have estimated intellect in the average range. In this context, his focused auditory attention represented a relative strength (superior). His ability to mentally manipulate information, speed of processing, and sequencing of information were all average. However, his executive functioning represented relative weaknesses; mental flexibility was low average and his visual organization was severely impaired (his approach to copying a complex figure was poorly planned and disorganized).

Mr. Smith denied significant depressed mood, but related intermittent feelings of guilt and sadness. His endorsement on a screen of depressive symptoms over the past week was in the mild range including difficulty with motivation to do things, feeling down-hearted and blue, and not being enthusiastic about anything. He endorsed minimal levels of anxiety and stress including overreacting to situations, difficulty winding down, and becoming agitated easily. Taken together, in combination with the clinical interview, Mr. Smith appears to be experiencing some symptoms of depression possibly related to psychosocial stressors (i.e., passing of friends, tension with father), but further assessment is needed for diagnostic clarity.

On a self-report measure of symptoms of AD/HD, Mr. Smith endorsed clinical levels of inattention in childhood (ages 5–12), but marginal clinical levels of inattention and hyperactivity as an adult (past 6 months). He endorsed losing things necessary for tasks or activities and being easily distracted. Hyperactive symptoms included fidgeting with his hands or feet or squirming in his seat and leaving his seat in which seating is expected.

Overall, the results of this evaluation indicate AD/HD, predominantly inattentive type. Neurodevelopmental history was consistent with this disorder. Although Mr. Smith endorsed marginally sub-clinical significant problems with attention or hyperactivity in adulthood on a questionnaire, given the range of his symptom endorsement on interview, he appears to continue to struggle with AD/HD. Additionally, increased depressive symptoms due to recent stressors indicate the possibility of an adjustment disorder, though this cannot be definitively determined.

*Diagnoses.* F90.0 Attention-Deficit/Hyperactivity Disorder, predominately inattentive; F43.2 R/o Adjustment Disorder, with depressed mood.

*Disposition and recommendations.* Further assessment may be warranted regarding Mr. Smith's mood, which may be contributing to his cognitive difficulties. Mr. Smith also expressed a preference for non-pharmacological treatment; therefore, we discussed managing his symptoms behaviorally through cognitive strategies. Given Mr. Smith's preference for

non-pharmacological treatment, we discussed a possible referral to adults with AD/HD group offered in the psychiatry department; however, Mr. Smith did not appear interested. We defer to Dr. Primary Care regarding any psychopharmacology treatment for AD/HD. The results of the neuropsychological screen and accompanying recommendations were reviewed with Mr. Smith. Mr. Smith will be mailed a list of cognitive strategies to help manage his cognitive difficulties and books recommendations.

*Case discussion.* This patient was provided with feedback at the end of the session (10–15 min). We focused on behavioral management of his symptoms. In light of the cognitive testing findings, we provided targeted cognitive strategies based on test findings of poor organization and his report of distractibility. A discussion of his organizational challenges as it applied to starting his own business was particularly illuminating for him and prompted him to become more interested in an AD/HD treatment group. He was appreciative of learning about behavioral interventions and expressed interest in learning more. We discussed individual AD/HD coaching once he was more financially stable (as it was not a covered benefit). Select reading recommendations to assist with remediative strategies were also made.

The BNA was particularly useful in this case because of the multi-pronged approach of including interview, testing, and AD/HD and mood symptoms measures. Symptom measures alone would not have captured the scope of the patient's symptoms (and would have missed the diagnosis), and testing highlighted his organization weaknesses, which was useful in the feedback to help the patient understand his symptoms more fully and target his treatment. The PCP was apprised of the patient's reluctance to take medication and seek further assessment of mood. Therefore, the PCP took note that she would follow-up with the patient and monitor his mood symptoms herself (with consultation from psychiatry as needed), as he might be at risk for depression and necessitate further treatment. Although in this case the patient preferred not to engage with psychiatry, typically the integrated care team will coordinate care amongst the psychiatrist, PCP, and sometimes a psychotherapist. Coordination is conducted through EMR, though sometimes personal consultation with a team member is required.

### *BNA for Dementia*

Dementia is a growing chronic disease with known complications that are typically managed in primary care, as patients generally seek their PCPs first because of comorbid illness, safety concerns, or behavioral and psychological symptoms that are associated with their brain illness (Prince et al., 2013). However, dementia diagnoses in primary care can often go unrecognized (Borson et al., 2006). Sometimes preventable healthcare crises and emergency room visits can obscure and further delay recognition of the underlying dementia. Dementia is costly, especially if untreated as healthcare outcomes for patients at 5 years are worse than for those with no cognitive impairment (Boustani et al., 2003). Rather, early identification and intervention can result in improved care and lower healthcare costs (Brayne, Fox, & Boustani, 2007). There has been greater recognition within primary care of the importance of early dementia detection and periodic cognitive screenings have been instituted into routine care. Dementia screens with modest sensitivity and specificity have been identified (Boustani, Peterson, & Hanson, 2005; McCarten et al., 2012). However, a more definitive assessment for cognitive impairment rests in a comprehensive diagnostic evaluation requiring time and skill. Before a comprehensive neuropsychological assessment is undertaken (Ravdin et al., 2004), a BNA by a neuropsychologist can be useful in providing greater sensitivity to diagnosis than a cognitive screen and can initiate treatment more quickly. It can also eliminate the need for longer neuropsychological assessments or can help identify other necessary treatments before a more comprehensive evaluation is undertaken. Serial BNAs can also be used to track progression of illness and update treatment plans. The dementia BNA instituted in our primary care clinics is comprised of an interview (approx. 40–45 min), with neuropsychological tests that are designed to target all cognitive domains (Table 1; approximately 15–20 min), self-report questionnaires to examine mood (approx. 5 min), and feedback (15–20 min).

### *Brief Dementia Case*

The patient was a 72-year-old woman who reported progressive memory problems and decreased functioning over the past 2–3 years in the context of two prior cerebrovascular events and cardiovascular risk factors (i.e., Graves' disease, arthropathy, hypertension, left ventricular hypertrophy, atrial ectopy, orthostatic hypotension, cardiac murmur), as well as chronic depression. A head CT a year earlier showed slightly progressed moderate likely chronic small vessel ischemic disease, and a non-specific small hyperdense focus with calcification in the right frontal lobe that was unchanged from a previous CT. A second head CT revealed hyper-attenuation in the right frontal lobe unchanged. Symptomatically, she described forgetting why she entered a room, having word-finding problems, and forgetting conversations and day-to-day tasks. She also endorsed trouble

remembering important dates. Her daughter added that she frequently repeated herself without awareness. There was no difficulty with ADLs, though her daughter took over household chores a year prior and her husband took over the cooking. Medication compliance was recently improved by a switch from bottles to weekly pre-fills given her intermittent confusion, though it was still problematic. She no longer went out unaccompanied secondary to concerns about falls and getting lost. Emotionally, she endorsed feelings of sadness, lack of motivation, low energy, apathy, and difficulty initiating tasks. Current stressors included concerns about her husband's newly diagnosed illness.

## Excerpt of Brief Neuropsychological Assessment Report

### Summary and Recommendations

Ms. Smith's previously administered cognitive screens were impaired (i.e., MoCA 11/30 in 2011, 14/30 in 2013, and 17/30 in 2014), and comparison to current findings (MOCA 15/30) revealed continued impairment. Her performance on the BNA indicated grossly intact orientation, focused brief attention, mental flexibility, and confrontation naming abilities in the context of estimated borderline to low average intellect. Working memory was variable. She also had difficulty on a task of vigilance. She demonstrated deficits in verbal skills (i.e., sentence repetition, phonemic fluency and verbal reasoning were impaired, though semantic fluency was normal). Clock drawing was impaired. Regarding memory, Ms. Smith's learning of a list was intact, but she was not able to recall a single word after a delay spontaneously. She recalled one word with a category cue, and recognized the remaining four words when provided with multiple choice format, suggesting the absence of amnesia.

Ms. Smith reported depressed mood as well as on-going worries and stress. She endorsed at least mild levels of depressive symptomatology, such as having dropped activities and interests, preferring to stay at home, and not being satisfied with her life. She endorsed minimal levels of anxiety on a questionnaire, but acknowledged feeling restless, worrying about her family, and being a burden to her family on interview. Given the nature and severity of symptoms, she met criteria for a major depressive disorder, but it was unclear whether she had a comorbid anxiety disorder.

In sum, the pattern of cognitive deficits (working memory, phonemic fluency, verbal reasoning, and verbal memory without evidence of amnesia), in combination with brain abnormalities on neuroimaging likely due to chronic vessel disease, evidence of progressive functional decline and multiple cerebrovascular/cardiovascular factors is consistent with a probable Major Vascular Neurocognitive Disorder. Mood, which was dysphoric, appears to be an on-going contributor to Ms. Smith's cognitive difficulties.

**Diagnoses.** F01.51 Probable Major Vascular Neurocognitive Disorder with behavioral disturbance; F33.1 Major depressive disorder, recurrent, moderate with anxious distress; F41.1 R/o Generalized Anxiety Disorder; F43.23 R/o Adjustment Disorder with mixed anxiety and depressed mood.

**Disposition.** The results of the evaluation were reviewed with Ms. Smith and her daughter, and explained that corroborating information from treating Dr. Psychiatrist (who knew the patient well) would be obtained, regarding the extent of functional decline for diagnostic clarity. They were encouraged to follow-up with Dr. Primary Care for treatment planning. Feedback about cognitive strategies to assist with memory and the other recommendations were discussed. Ms. Smith and her daughter were appreciative of the feedback.

**Recommendations.** Given the likelihood of a dementia, updated neuroimaging, preferably a brain MRI, might be considered for further diagnostic certainty. Ms. Smith reported little alleviation in depression despite taking an anti-depressant; she is therefore advised to follow-up with Dr. Psychiatrist, as she may benefit from re-assessment of her psychiatric medications. Ms. Smith denied needing additional assistance beyond the oversight provided by her daughter. However, Ms. Smith's daughter expressed concerns about Ms. Smith keeping her various medical appointments. Arrangements to have Ms. Smith's daughter as the primary contact for scheduling/confirming appointments might be considered. Family members are encouraged to continue to monitor daily tasks for safety. A more comprehensive neuropsychological evaluation might be considered if there are more questions about the extent of her cognitive difficulties and treatment planning.

**Case discussion.** Collateral feedback from the integrated care team about the extent of the patient's functional decline, particularly the psychiatrist who knew the patient best, was important in this case because the patient was a poor historian (and the daughter did not live with her). This information was obtained before finalizing the report. The patient denied needing

**Table 2.** Sample BNA treatment recommendations for AD/HD and dementia

Treatment Recommendations	Examples
Cognitive Strategies	Organization (improved systems, planning strategies) other executive function (working memory, shifting, inhibiting, emotional control) and attention strategies (for focused, sustained or mental flexibility)
Memory	Physical aides (e.g., calendars, sticky notes reminders, alarms) memory strategies (e.g., repetition, writing things down, visualization)
Psychotherapy	General or specialized psychotherapy
Psychopharmacology	Psychiatry referral
Sleep hygiene	Strategies to improve sleep maintenance (e.g., stimulus control, sleep restriction, improved routines, provide handouts, internet resources)
Neuropsychological assessment	Comprehensive neuropsychological assessment referral
Healthy Living	Improved exercise (e.g., yoga, walking, exercise depending on physical limitations), diet (education and possible nutritionist referral)
Substance Use	Referral to outpatient program, other community substance programs
Psychosocial Support	Referrals to life, AD/HD, or executive coach, stress reduction
Academic Support	Tutoring referrals, academic coach referrals, learning disability centers at college/university referrals
Stress Reduction	Relaxation techniques (e.g., phone app resources), meditation resources (e.g., community programs, phone apps)
Primary care for medical work-up	Metabolic panels, neuroimaging
Neurology	Referral to behavioral neurology, epilepsy, or sleep specialist
Psychoeducation	Books, articles, pamphlets on AD/HD and dementia
Community resources	Elder senior center activities, local chapter of Alzheimer's Disease, Community elder services
Clinical pharmacy	Referral to primary care clinical pharmacist
Medication compliance	Strategies (e.g., pillbox), referral for bubble packing medication by pharmacy, increased medication oversight (e.g., by family, visiting home nurse)

additional assistance beyond the help provided by her daughter, but her daughter expressed concerns about her mother missing medical appointments. One focus of the feedback was to help convince Ms. Smith to have her daughter as the primary contact with regards to scheduling/confirming appointments by understanding the importance of keeping all her medical appointments. After some discussion, she agreed. We also discussed cognitive strategies to increase medication compliance through better memory systems in the home and greater vigilance by the daughter. The primary care team was provided with our feedback and alerted to the greater need for oversight in appointment and medication compliance. The patient's difficulty with medication compliance despite being switched to pre-fills was not known to the team. A comprehensive neuropsychological evaluation was recommended within 1 year if there were continued questions about the patient's symptoms and with treatment planning.

## Discussion

The implementation of neuropsychology consultation and BNAs in two CHA primary care clinics has resulted in greater patient access to cognitive assessments and increased management of cognitive disturbance. These BNAs provide the ability to identify patients with cognitive symptoms within a primary care setting earlier and more efficiently. They provide diagnosis, target treatment, improve treatment compliance, and help patients with their cognitive symptoms.

One of the greatest benefits of a BNA is that patients receive immediate feedback at the end of the appointment and are provided individualized treatment options based on their symptoms, diagnoses, cognitive test findings, and expressed treatment preferences. Patients respond positively to cognitive recommendations and psychoeducation. These kinds of cognitive interventions are specific to neuropsychological expertise and with these BNAs patients have access to immediate interventional assistance and potential relief. The use of motivational interviewing strategies is also frequently used in promoting engagement with medical treatment, especially when patients are reluctant or intimidated to seek specialty care (e.g., psychiatry) or for those who have reservations about their prescribed medication, as seen in the AD/HD case.

Table 2 provides a list of the common treatment recommendation domains and some examples of recommendations. For patients with AD/HD, we help them initiate life changes above and beyond the benefits of stimulant medication alone (i.e., psychoeducation, AD/HD groups, AD/HD coaching, AD/HD self-help literature, psychosocial supports, cognitive strategies). For those who sought an AD/HD evaluation but do not have AD/HD or for whom the diagnosis remains a rule out at the end of the BNA, we can still address cognitive symptoms and provide other recommendations for potential relief (e.g., cognitive strategies, sleep hygiene recommendations, further testing for sleep problems). For those whom psychostimulants are contraindicated, provision of a clear rationale (e.g., exacerbation of co-occurring anxiety) has been helpful for both patients and PCPs in understanding risks as well as redefining treatment goals.



For dementia patients, clarification of cognitive status (above and beyond diagnosis) typically creates greater understanding by the integrated care team that the patient may require more assistance, or adaptations during the medical visit such as increased repetition by providers, having instructions written out. Some patients may require additional appointment reminders or supports at home, assignment of a care manager, etc. These additional supports can improve patient treatment compliance and overall patient health. Brief neuropsychological assessments for elders can also inform the integrated care team's evaluation of a patient's decision-making capacity and/or ability to live alone.

Feedback from PCPs about BNAs has been very positive and several have requested BNAs for other medical conditions or a general BNA for those patients whom they recognize might have cognitive problems regardless of their medical conditions. The primary care environment is increasingly fast-paced, underscoring the need for diagnoses to be made and treated quickly yet reliably; this includes complex psychiatric and neurological disorders such as AD/HD and dementia. PCPs, especially those working in a patient-centered medical home are appreciative of integrated care specialists who can assist with patient care, including neuropsychologists. The methodological similarities between PCPs and neuropsychologists also make collaboration fluid. Both fields are comfortable with the culture of testing and Bayesian logic, with its concepts of diagnostic sensitivity and specificity, screening cutoffs, and pre-test probability. Overall, the integration of neuropsychology to primary care at CHA has been affirming and has led to increased understanding of the benefits of neuropsychology. This appreciation has increased our neuropsychologists' satisfaction in their work. Neuropsychologists across the country wishing to make inroads in primary care are encouraged to partner with PCPs and/or medical directors. Initial in-service consultations or psychoeducation to primary care integrated teams can be useful in highlighting the benefits and utility of neuropsychology (e.g., [Mercury, Kehoe, & Tshan, 2007](#) for a helpful introduction and description of neuropsychology utility to PCPs). If medical directors express interest, a forged partnership can resolve institutional challenges.

## Conclusions

The field of neuropsychology is making inroads in primary care as the importance of cognition in physical and mental health is increasingly acknowledged. With neuropsychology primary care integration, patients receive a range of cognitive assessments (e.g., screens, BNA, treatment recommendations through consultations), all without having to navigate the specialty care medical system, making treatment more efficient and cost-effective. Patients are typically seen more rapidly in the primary care clinics than in the neuropsychology outpatient clinic, they travel to their familiar primary care office for their appointment, and feedback turn-around to the integrated care team and the patient is timely. Cost-cutting effects are seen directly by reducing the number of patients who do not require more comprehensive neuropsychological evaluations beyond BNAs. Other cost savings are seen in patients for whom stimulants had been incorrectly prescribed or for stimulant seekers (about 7% of AD/HD referred patients fail PVT in our clinics). Patients who are diagnosed with AD/HD can be put on the path to better health outcomes, as undiagnosed and untreated AD/HD have been shown to cause significant health, medical, and social burdens including greater medical costs ([Secnik, Swenson, & Lange, 2005](#)), increased psychological distress ([Kessler et al., 2006](#)), substance use ([Wilens, 2004](#)), poorer work performance ([Barkley et al., 2006](#)) and unemployment ([Kessler et al., 2006](#)). Further, AD/HD has been conceptualized as early and reliable predictors of adverse health outcomes over time, which makes it an important target for secondary prevention efforts ([Nigg, 2013](#)) and increases the importance of early diagnosis. Other studies have also noted the social and fiscal benefits of early dementia diagnosis ([Weimer & Sager, 2009](#)).

Primary care medicine has been changing not only with the reorganization of accountable care organizations and implementation of medical home models of care, but also with the range of illnesses and conditions that are treated in primary care. Patients are living longer and healthier lives, but are also living decades longer with chronic diseases. Chronic diseases impose a high burden on the PCP to continually monitor, assess and treat conditions. It also increases the patient burden of functioning with their conditions, many of which take a cognitive and emotional toll. This raises the premium to understand the cognitive impact of certain diseases and how to best manage it. Patients with even mild cognitive deficits might be less successful in controlling the course of their illness. Although our current BNA protocols are directed to dementia and AD/HD evaluations, protocols for other conditions can also be useful, and the implementation of BNAs in primary care is likely to grow. Ultimately, cognition should be considered as the sixth vital sign in primary care where there is on-going regular monitoring of cognitive health.

## Conflict of interest

None declared.

## References

- Abrams, D. B. (1993). Treatment issues in tobacco dependence: Towards a stepped-care model. *Tobacco Control*, 2 (Suppl.), S17–S37.
- Adler, L., Shaw, D., Sitt, D., Maya, E., & Morrill, M. I. (2009). Issues in the diagnosis and treatment of adult ADHD by PCPs. *Primary Psychiatry*, 16, 57–63.
- Agnew-Blais, J. C., Polanczyk, G. V., Danese, A., Wertz, J., Moffitt, T. E., & Arseneault, L. (2016). Evaluation of the persistence, remission, and emergence of Attention-Deficit/Hyperactivity Disorder in young adulthood. *Journal of the American Medical Association: Psychiatry*, 73, 713–720.
- Armstrong C. L., & Morrow L. (Eds.) (2010). *Handbook of medical neuropsychology*. New York: Springer Science.
- Barkely, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2006). Young adult follow-up of hyper-active children: Adaptive functioning in major life activities. *Journal of American Academy of Child and Adolescent Psychiatry*, 45, 192–202.
- Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Norman, D., Lapey, K. A., et al. (1993). Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with Attention Deficit Hyperactivity Disorder. *American Journal of Psychiatry*, 150, 1792–1798.
- Block, C. K., Johnson-Greene, D., Pliskin, N., & Boake, C. (2016). Discriminating cognitive screening and cognitive testing from neuropsychological assessment: Implications for professional practice. *The Clinical Neuropsychologist*, 31, 487–500.
- Blount, A., Kathol, R., Thomas, M., Schoenbaum, M., Rollman, B. L., & O'Donohue, W. (2007). The Economics of behavioral health services in medical settings: A summary of the evidence. *Professional Psychology: Research and Practice*, 38, 290–297.
- Borson, S., Scanlan, J. M., Watanabe, J., Tu, S. P., & Lessig, M. (2006). Improving identification of cognitive impairment in primary care. *International Journal of Geriatric Psychiatry*, 21, 349–355.
- Braun, D. L., Dulit, R. A., Adler, D. A., Berlant, J., Dixon, L., Fornari, V., et al. (2004). Attention-deficit/hyperactivity disorder in adults: Clinical information for PCPs. *Primary Psychiatry*, 11, 56–65.
- Brayne, C., Fox, C., & Boustani, M. (2007). Dementia screening in primary care: Is it time? *Journal of the American Medical Association*, 298, 2409–2411.
- Boustani, M., Callahan, C.M., Unverzagt, F. W., Austrom, M. G., Perkins, A. J., Fultz, B. A., et al. (2005). Implementing a screening and diagnosis program for dementia in primary care. *Journal of General Internal Medicine*, 20, 572–577.
- Boustani, M., Peterson, B., Hanson, L., et al. (2005). Screening for dementia: Systematic review. <http://www.ahrq.gov/clinic/uspstfix.htm>. Accessed April 24, 2007.
- Brown, T. E. (2008). ADD/ADHD and impaired executive function in clinical practice. *Current Psychiatry Reports*, 10, 407–411.
- Caye, M., Rocha, T., Anselmi, L., Murray, J., Menezes, A. M. B., Barros, F. C., et al. (2016). Attention-deficit/hyperactivity disorder trajectories from childhood to young adulthood: Evidence from a birth cohort supporting a late-onset syndrome. *Journal of the American Medical Association: Psychiatry*, 73, 705–712.
- Ebell, M. H. (2009). Brief Screening instruments for dementia in primary care. *American Family Physician*, 79, 497–498. 500.
- Hervey, A. S., Epstein, J. N., & Curry, J. F. (2004). Neuropsychology of adults with attention deficit/hyperactivity disorder: A meta-analytic review. *Neuropsychology*, 18, 485–503.
- Hunkeler, E. M., Katon, W., Tang, L., Williams, J. W., Kroenke, K., Lin, E. H. B., et al. (2006). Long term outcomes from the IMPACT randomised trial for depressed elderly patients in primary care. *British Medical Journal*, 332, 259–263.
- Kessler, R. C., Alder, R. C., Barkley, R., Biederman, J., Conners, C. K., Demler, O., et al. (2006). The prevalence and correlates of adult AD/HD in the United States: Results from the national comorbidity survey replication. *American Journal of Psychiatry*, 163, 716–723.
- Kooij, J. J. S., Huss, M., Asherson, P., Lakehurst, R., Blusterier, K., French, A., et al. (2012). Distinguishing comorbidity and successful management of adult ADHD. *Journal of Attention Disorders*, 16, 3S–19S.
- McCarten, J. R., Anderson, P., Kuskowski, M. A., McPherson, S. E., Borson, S., & Dysken, M. W. (2012). Finding dementia in primary care: The results of a clinical demonstration project. *Journal of the American Geriatrics Society*, 60, 210–217.
- Mercury, M. G., Kehoe, B. A., & Tshan, M. A. (2007). Neuropsychology for the PCP. *Disease-a-month*, 53, 138–141.
- Mitrushina, M. (2009). Cognitive screening methods. In Grant I., & Adams M. (Eds.), *Neuropsychological Assessment of Neuropsychiatric and Neuromedical Disorders* (3rd ed., pp. 101–126). New York: Oxford University Press.
- Montano, B. (2004). Diagnosis and treatment of ADHD in primary care. *Journal of Clinical Psychiatry*, 65, 18–21.
- Nigg, J. T. (2013). Attention-deficit/hyperactivity disorder and adverse health outcomes. *Clinical Psychology Review*, 33, 215–228.
- Orleans, C. T. (1993). Treating nicotine in a medical setting: A stepped model of care. In Orleans C. T., & Slade J. (Eds.), *Nicotine addiction: Principles and management* (pp. 145–161). New York: Oxford University Press.
- Prince, M., Bryce, R., Albanese, E., Wimo, A., Ribeiro, W., & Ferri, C. P. (2013). The global prevalence of dementia: a systematic review and metaanalysis. *Alzheimers Dementia*, 9, 63–75.
- Ravdin, L. D., Mattis, P. J., & Lachs, M. S. (2004). Assessment of cognition in primary care: Neuropsychological evaluation of the geriatric patient. *Geriatrics*, 59, 37–44.
- Roebuck-Spencer, T., Glen, T., Puente, A., Denney, R., Ruff, R., Hostetter, G., et al. (2017). Cognitive screening tests versus comprehensive neuropsychological test batteries: A National Academy of Neuropsychology Education Paper. *Archives of Clinical Neuropsychology*, 32, 491–498.
- Secnik, K., Swensen, A., & Lage, M. J. (2005). Comorbidities and costs of adult patients diagnosed with attention-deficit hyperactivity disorder. *Pharmacoconomics*, 23, 93–102.
- Schoechlin, C., & Engel, R. R. (2005). Neuropsychological performance in adult attention-deficit hyperactivity disorder: meta-analysis of empirical data. *Archives of Clinical Neuropsychology*, 20, 727–744.
- Sobell, M. B., & Sobell, L. C. (1999). Stepped care for alcohol problems: An efficient method for planning and delivering clinical services. In J. A. Tucker, D. A. Donovan, & G. A. Marlatt (Eds.), *Changing addictive behavior. Bridging clinical and public health strategies* (pp. 331–343). New York: Guilford Press.
- Sobell, M. B., & Sobell, L. C. (2000). Stepped care as a heuristic approach to the treatment of alcohol problems. *Journal of the Consulting Clinical Psychology*, 68, 573–579.
- Sullivan, B. K., May, K., & Galbally, L. (2007). Symptom exaggeration by college adults in attention-deficit hyperactivity disorder and learning disorder assessments. *Applied Neuropsychology*, 14, 189–207.

- Tarter M. E., Butters R., & Beers S. R. (Eds.) (2001). *Medical neuropsychology*. New York: Kluwer Academic/Plenum Publishers.
- Temple, R. O., Carvalho, J. K., & Tremont, G. (2006). A national survey of physicians' use and satisfaction with neuropsychological services. *Archives Clinical Neuropsychology*, 21, 371–382.
- Tremont, G., Westervelt, H. J., Javorsky, D. J., Podolanczuk, A., & Stern, R. A. (2002). Referring physicians' perceptions of the neuropsychological evaluation: How are we doing? *Archives of Clinical Neuropsychology*, 16, 551–554.
- Weimer, D. L., & Sager, M. A. (2009). Early identification and treatment of Alzheimer's disease: Social and fiscal outcomes. *Alzheimer's Dementia*, 5, 215–226.
- Weiss, M. D., & Weiss, J. R. (2004). A guide to the treatment of adults with ADHD. *Journal of Clinical Psychiatry*, 65, 27–37.
- Wilens, T. (2004). Attention deficit disorder and the substance use disorders: The nature of the relationship, subtypes at risk, and treatment issues. In T. Spencer (ed.), *Attention-deficit hyperactivity disorder*. Psychiatric clinics of North America, 27, 283–302.

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