

including the 2 patient representatives, reported values with little variation in favor of screening.

Critical resources are needed to screen children and adults for developmental delay and cognitive impairment. Such resources are likely more available in medical centers with comprehensive care for individuals with SCD than in primary care settings. Resources and tools for screenings have been designed for primary care settings and are widely available; however, practitioners need to prioritize screening followed by periodic surveillance as part of routine health care. Patients may have to travel to obtain appropriate cognitive and developmental screening, particularly in managed-care settings.

Research needs. The panel identified the following additional areas in need of research.

1. Better documentation of the prevalence and progression of cognitive impairments in adults with SCD is needed.
2. Evaluation of screening and surveillance approaches for cognitive and developmental concerns assessed within the SCD population should be developed, rather than relying on data from broader populations.
3. Research evaluating implementation practices that produce the best access to screening, surveillance, and assessment for developmental delays and cognitive impairments, or both, is needed.
4. Future research is required to determine which development and cognitive-screening tools have the highest clinical utility in low-middle- and high-income settings.

Should cognitive rehabilitation therapy vs no rehabilitation be used for children and adults with SCD and cognitive deficit?

Recommendation 9.1

For children with SCD and abnormal screening for developmental or cognitive status, the ASH guideline panel *recommends* the following:

1. A developmental, cognitive, medical evaluation to diagnose any related disorders and to identify modifiable risk factors for developmental delays or cognitive impairments;
2. Following the cognitive domain-specific evidence-based guidelines for these conditions to provide appropriate interventions. (Strong recommendation based on high certainty in the evidence about effects ⊕⊕⊕⊕).

Recommendation 9.2

For adults with SCD and abnormal screening for cognitive status, the ASH guideline panel *recommends* the following:

1. A developmental, cognitive, and medical evaluation to diagnose any related disorders and to identify modifiable risk factors for cognitive impairments;
2. Following the cognitive domain-specific evidence-based guidelines for these conditions to provide appropriate interventions. (Strong recommendation based on high certainty in the evidence about effects ⊕⊕⊕⊕).

Specific background. As previously mentioned, cognitive impairment is perhaps the most insidious CNS morbidity of SCD. Evidence-based rehabilitative interventions for cognitive function, specifically executive dysfunction, are well-established and endorsed practices in professional societies, such as the American Academy of Pediatrics, the American Academy of Neurology, and the American Congress of Rehabilitation Medicine.^{122,123,142} The guideline panel relied heavily on these well-established evidence-based practices treatments of cognitive morbidities.

Summary of the evidence. The systematic review did not identify any comparative studies in SCD that compared cognitive rehabilitation to no rehabilitation. The review identified 1 randomized controlled trial that compared academic tutoring with memory rehabilitation vs academic tutoring, 1 observational study that compared academic tutoring and specific learning and memory strategies with academic tutoring, and 1 observational study that compared computer-based cognitive training completers with noncompleters. The evidence summary and EtD framework can be found online at: <https://guidelines.gradepro.org/profile/c35a65914af486fba822a798f2059f64>.

Rationale and expected benefits. Cognitive impairment in SCD characteristically affect specific mental processes such as memory, attention, executive function, processing speed, and visual-spatial function. These deficits can impair one's learning, educational performance, work performance, medical adherence, and activities of daily living. However, these deficits will not be adequately identified without screening. Deficits in executive function are commonly found in children and adults with SCD.⁶ These deficits correlate with the frequent injury to the frontal lobe, a frequent area of the brain affected by silent cerebral infarcts.^{78,143}

A systematic review of rehabilitation for impairment of executive functions found a solid evidence base for interventions that incorporate metacognitive strategy instruction that offers strategies to solve problems, increase awareness, and cue for signals that may improve problem solving and internal training. Most of the available studies were conducted among adults with traumatic brain injury or stroke.¹⁴⁴ However, pilot studies that applied similar techniques to children with SCD generated positive results.¹⁴⁵ Cognitive lapses, which occur most often in individuals with cognitive impairments, and aspect of executive dysfunction (eg, defects in mental flexibility and working memory) are the most common cause of poor adherence to medical therapies in the general population.¹⁴⁶⁻¹⁴⁸

Functional assessments of executive function can both identify deficits and inform interventions by determining what types of cues patients need while completing multistep activities (Figure 3 in supplemental File 5).^{149,150} Once these deficits are diagnosed, interventions can be implemented (Figure 4 in supplemental File 5).¹⁴²

The intervention that makes the largest difference is the Cognitive Orientation to Daily Occupational Performance (CO-OP),¹⁵¹ a top-down approach that reduces impairments and improves health. "Developed for use with children who have occupational performance deficits, CO-OP is an individualized, client-centered approach focused on strategy-based skill acquisition" through a process of strategy use and guided discovery.¹²² CO-OP focuses treatments directly on improving performance in everyday life activity rather than treating the underlying impairments and hoping for secondary improvement in meaningful activities. Three randomized