

## Executive summary

### Background

Dyslexia – a permanent disability that primarily involves difficulty acquiring rapid, accurate decoding skills – is a common source of reading comprehension problems. Dyslexia also manifests clearly in the form of poor spelling. A frequent estimate is that 5-8 per cent of the world's population experiences the kinds of difficulties with reading and writing that meet the criteria for a dyslexia diagnosis. Early interventions and action programs for dyslexic children often concentrate on promoting learning development and quality of life.

The clinical practice varies widely, and identifying the screening methods, diagnostic processes and support measures for which scientific evidence has been established is a challenging task. Therefore the Swedish government has commissioned the Swedish Council on Technology Assessment in Health Care (SBU) to systematically review and evaluate the scientific evidence for diagnostic or screening tests and interventions for children and adolescents with dyslexia.

### Objective

The objective of this systematic review was to assess the scientific basis for tests and interventions for children and adolescents with dyslexia, as well as to systematically identify knowledge gaps, identify promising new research and actively disseminate information about the current state of dyslexia research.

### Method

A systematic review was performed following PRISMA statement the standard methods used by the SBU. Literature was searched in four different international databases (PubMed, PsycInfo, ERIC and LLBA) until September 2013. Risk of bias was assessed with checklists (QUADAS, AMSTAR, SBU checklist for RCT). The quality of evidence was assessed with GRADE.

### Conclusions

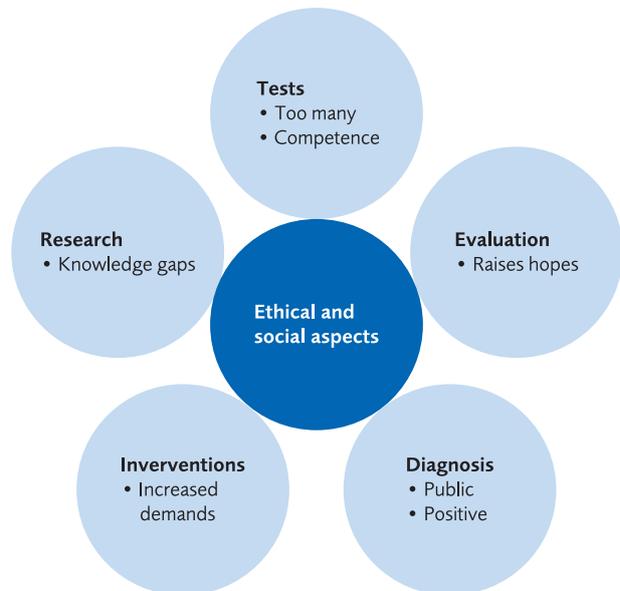
- ▶ By training children with dyslexia to associate speech sounds (phonemes) with letters (graphemes) in a structured way, improvements can be made in their reading comprehension, reading speed, spelling, and ability to pay attention to the language's phonetic structure (phonological awareness).
- ▶ Due to insufficient evidence no conclusions could be drawn regarding the usefulness of other forms of literacy training or assistive technologies (tools for support, compensate and develop reading skills such as apps in the mobile phone).
- ▶ Some tests may predict dyslexia even before children have been formally taught to read and write in school. For instance, rapid automatized naming (RAN), deficits in phonological awareness or letter knowledge can be detected early and may be associated with dyslexia. Benefits and potential risks of such early testing procedures have not been evaluated in this report. Interventions for children before they have begun school have not been evaluated in this report.
- ▶ Only few of the international diagnostic tests were scientifically evaluated. Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and Woodcock-Johnson Test of Achievement (WJ) have subtests that are reliable: DIBELS-Letter Naming Fluency and WJ- Word Identification/Letter-Word Identification, respectively DIBELS- Nonsense Word Fluency and WJ- Letter Word Identification/comprehension are validated.

## Knowledge gaps

- Diagnostic for tests to screen and diagnose dyslexia compared to an established reference standard
- Effects of interventions for children with dyslexia on school results, self-efficacy and quality of life
- Effects of assistive technologies
- Cost-effectiveness for diagnostic tests and interventions.

## Ethical and social aspects

While compiling this systematic review, we uncovered very little research assessing the ethical or social repercussions of dyslexia testing, screening or interventions. However we have identified some issues we feel warrant serious discussion. Children and adolescents with dyslexia are exposed to many different screening and diagnostic tests, most of which are insufficiently evaluated. While the diagnosis is often invaluable to the individual and his or her care givers, greater attention should be given to the effects 'labelling' might have on a child's development and self-image. Considering there are few evidence based interventions for dyslexia, parents and individuals diagnosed with dyslexia may need help coping with the expectation that help is available, as this hope is often awakened during the evaluation process. As modern society places greater and greater demands on individuals to read and write, it is increasingly important to find reliable tools to assess and assist individuals with dyslexia, helping them to become active members of that society.



**Figure 1** The ethical and social aspects.

### Project group

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