

SPEECH/ LANGUAGE THERAPY FOR CHILDREN WITH NEURODEVELOPMENTAL DISORDERS



MARIJKE EYSEN, FABIAN DESIMPEL, ANS VAN GINCKEL

Title:	Speech/ language therapy for children with neurodevelopmental disorders.
Authors:	Marijke Eyssen (KCE), Fabian Desimpel (KCE), Ans Van Ginckel (KCE)
Project facilitator:	Nathalie Swartenbroekx (KCE)
Information specialist:	Nicolas Fairon (KCE)
External experts:	Annick Comblain (ULiège), Petra Warreyn (Onderzoeksgroep Ontwikkelingsdiversiteit, Universiteit Gent (Ugent))
Stakeholders:	Cinzia Agoni (Groupe d'Action qui dénonce le Manque de Places pour les personnes handicapées de grande dépendance (GAMP)), Sanae Bakkali Tahiri (Union Nationale des Mutualités Libres (UNML)), Christophe Barrea (Belgian Society of Pediatric Neurology (BSPN)), Patrick Beaufort (Conseil de l'Enseignement des Communes et des Provinces (CECP)), Julien Bodart (Agence wallonne pour une vie de qualité (AVIQ)), Laetitia Bokestael (Prodia, Vrij CLB (Centrum voor Leerlingenbegeleiding) Netwerk), Benjamin Carette (Iriscare), Sergio Cavallera (Fédération des Centres de Réadaptation Ambulatoire (FCRA)), Dave Ceule (Onafhankelijk Leven vzw), Allard Claessens (Downsyndroom Vlaanderen vzw), Eva Cloet (Centrum voor Ontwikkelingsstoornissen, Brussel (COS)), Katrijn Compennolle (Departement Zorg, Vlaanderen), Sarina Coniglio (AVIQ), Klaas Coopman (Centrum voor Ambulante Revalidatie (CAR Ter Eecken), Federatie Centra voor Ambulante Revalidatie), Thomas Dabeux (Inclusion asbl), Tom De Niels (COS, Gent), Georges Desquiers (Solidaris), Veronique Duchenne (Conseil Supérieur National des Personnes Handicapées (CSNPH)), Laetitia Duray-Maquestiau (Conseil supérieur des Centres psycho-médico-sociaux (CSCPMS)), Kris Evers (Expertisecentrum Autisme Leuven (ECA)), Laura Godeau (Rijksinstituut voor ziekte- en invaliditeitsverzekering – Institut national d'assurance maladie-invalidité (RIZIV - INAMI)), Ann Goeleven (UZ Leuven, KU Leuven), Bérengère Guccione (Iriscare), Marie Horlin (Centre Interfédéral pour l'égalité des chances (Unia)), Eddy Hoste (Centrum Taalontwikkelingsstoornissen (CETOS)), Lieve Kiebooms (Zorggroep Myna, Vlaamse Vereniging voor Kinder- en jeugdpsychiatrie (VVK)), Ronald Kloeck (Vereniging voor Infantiele Encefalopathie, hersenverlamming vzw), Lieve Krobea (Departement Zorg, Vlaanderen), Paul-André Leblanc (Secrétariat Général de l'Enseignement Catholique (SeGEC)), Stefaan Lefevere (Vlaamse Vereniging voor Logopedisten (VVL)), Christelle Maillart (Union Professionnelle des Logopèdes Francophones (UPLF)), Gisèle Marlière (CSNPH), Natallia Mastsepan (Nationale Hoge Raad voor Personen met een Handicap (NHRPH)), Rupal Mehta (Belgische beroepsvereniging voor Otorhinolaryngologie, Gelaat- en Halschirurgie), Marit Mellaerts (Vlaams Patiëntenplatform (VPP)), Benoîte Millet (Société Royale Belge d'Oto-Rhino-Laryngologie et de Chirurgie Cervico-Faciale (SRB ORL CCF)), Diane Estelle Ngatchou Djomo (Ligue des Usagers des Services de Santé (LUSS)), Jérémy Philippe (Fédération Des Etablissements Libres Subventionnés Indépendants Asbl (FELSI)), Julien Pot (Union Nationale des Mutualités Socialistes (UNMS)), Nathalie Saczuk (UPLF), Ruud Saerens (Onafhankelijke Ziekenfondsen (OZ)), Sarah Schaubroeck (Permanente Ondersteuningscel GO! CLB en Prodiagnostiek), Lut Schelpe (Referentiecentrum Autisme (RCA) UZ Brussel), Stefaan Singelée (Federatie Centra voor Ambulante Revalidatie), Martine Thys (Vlaamse Vereniging Autisme (VVA)), Bieke Van Deun (Solidaris), Hanne Van Diest (Landsbond van Neutrale Ziekenfondsen), Johan Van Dorst (Landsbond der Christelijke Mutualiteiten (LCM)), Viviane Van Elshocht (LCM), Maaïke Van Goethem (Prodia, Permanente Ondersteuningscel (POC) Onderwijsvereniging van Steden en Gemeenten (OVSG)), Heidi Van Grootel (RCA Antwerpen, Ziekenhuis Aan de Stroom (ZAS), Universitaire Kinder-en Jeugdpsychiatrie Antwerpen), Joke Vandereet (Expertisecentrum Autisme Leuven), Evelien Verschueren



	(RIZIV - INAMI), Margriet Verstreken (Antwerps Revalidatiecentrum (ARC), NKO dienst van ZAS campus Augustinus, Belgische beroepsvereniging van artsen-specialisten in de functionele en professionele revalidatie), Christine Vonckx (Vrij CLB Netwerk), Sophie Willekens (Kannet), An Wirix (COS Leuven-Limburg)
External validators:	Miet De Letter (UGent), Monica Melby-Lervåg (University of Oslo, Norway), Courtenay Norbury (University college of London, United Kingdom)
Acknowledgements:	Helena Van Deynse (KCE)
Reported interests KCE members:	KCE is a federal institution funded by INAMI/RIZIV, by the Federal Public Service of Health, Food chain Safety and Environment, and by the Federal Public Service of Social Security. KCE's mission is to advise policymakers on decisions relating to health care and health insurance on the basis of scientific and objective research. It is expected to identify and shed light on the best possible solutions, in the context of an accessible, high-quality health care system with due regard for growing demand and budgetary constraints. KCE has no interest in companies (commercial or non-commercial, i.e. hospitals and universities), associations (e.g. professional associations, unions), individuals or organisations (e.g. lobby groups) that could be positively or negatively affected (financially or in any other way) by the implementation of the recommendations. All experts involved in the writing of the report or the peer-review process completed a declaration of interest form. Information on potential conflicts of interest is published in the colophon of this report. All members of the KCE Expert Team make yearly declarations of interest and further details of these are available upon request.
Reported interests:	Membership of a stakeholder group on which the results of this report could have an impact: Christophe Barrea (Belgian Society of Pediatric Neurology), Julien Bodart (AVIQ (Walloon Region), rehabilitation sector)), Allard Claessens (Downsyndroom Vlaanderen (parents' association)), Thomas Dabeux (Association representing people with intellectual disabilities. People currently partially excluded from speech therapy reimbursement), Eddy Hoste (CETOS vzw), Ronald Kloeck (Vereniging voor Infantiele Encefalopathie, hersenverlamming vzw), Paul-André Leblanc (SeGEC), Christelle Maillart (Speech therapists), Benoîte Millet (ENT revalidation), Julien Pot (Alternate representative at Logomut for Solidaris FR), Stefaan Singelée (Federatie Centra voor Ambulante Revalidatie), Viviane Van Elshocht (Landsbond der Christelijke Mutualiteiten), Margriet Verstreken (Medical director in a CAR, the ARC, Antwerps Revalidatiecentrum), Sophie Willekens (Kannet+ vzw, organization for and by people with disabilities), Petra Warreyn (European Association for Research on Learning and Instruction, WAIMH (World Association for Infant Mental Health) Vlaanderen) Holder of intellectual property (patent, product developer, copyrights, trademarks, etc.): Miet De Letter (Patent, entitled: Analysis of evoked event-related potential data, granted on 07/11/2023, under no. US 11,810,470. This patent is not related to the KCE study) Fees or other compensation for writing a publication or participating in its development: Christelle Maillart (Work at the UPLF is subject to duties for monitoring dossiers), Sarah Schaubroeck (Expert for the update of the Guideline for Intellectual Disability from the Quality Center for Diagnostics), Petra Warreyn (Copyrights for various publications related to supporting children with autism) Participation in scientific or experimental research as an initiator, principal investigator or researcher: Ann Goeleven (KOTK studie HITCRAD – swallowing therapy head and neck oncology), Christelle Maillart (As part of my assignment as a teacher and researcher at the university, I conduct experimental research in the field of developmental language disorder (DLD)



and communication disorders. None of the research I conduct or have published is covered by the above report), Diane Estelle Ngatchou Djomo (PhD in drug quality in LMICs), Petra Warreyn (Principal investigator/supervisor of studies on the language development of children with autism and the (pre)academic development of various target groups)

A grant, fees or funds for a member of staff or another form of compensation for the execution of research described above: Ann Goeleven (KOTK)

Consultancy or employment for a company, an association or an organisation that may gain or lose financially due to the results of this report: Julien Bodart (AVIQ (Walloon region)), Stefaan Singelée (Federatie Centra voor Ambulante Revalidatie)

Payments to speak, training remuneration, subsidised travel or payment for participation at a conference: Christelle Maillart (For research functions, the FNRS regularly intervenes to reimburse travel costs linked to presentations), Petra Warreyn (Honoraria for training courses on early childhood development and the diagnosis of developmental disorders)

Presidency or accountable function within an institution, association, department or other entity on which the results of this report could have an impact: Thomas Dabeux (Advocacy manager for an association representing people with intellectual disabilities. People currently partially excluded from speech therapy reimbursement), Kris Evers (Coordinator Expertise Center Autism Leuven), Ann Goeleven (Head of speech therapy service – CAR MUCLA UZ Leuven), Lieve Kiebooms (COMGGKJ (Committee for a New Mental Health Policy for Children and Young People): member of plenary session, co-chair of the working group on mental health and disabilities, member of the working group on For-K), Ronald Kloeck (Vereniging voor Infantiele Encefalopathie, hersenverlamming vzw), Paul-André Leblanc (President of the Higher Council for Education for Students with Special Needs), Christelle Maillart (Vice-President of the UPLF. The impact of the study could have consequences for the way speech therapists practice. This is why we are being consulted. The study has no impact on my academic duties), Stefaan Singelée (President of the Federatie Centra voor Ambulante Revalidatie, Director Centre for ambulatory rehabilitation Ter Kouter (Deinze)), Margriet Verstreken (Medical director of the ARC), Sophie Willekens (Secretary General Kannet + vzw, organization for and by people with disabilities), Petra Warreyn (Member of the Board and General Assembly of the Inclusion Embassy)

Other possible interests that could lead to a potential or actual conflict of interest: Rupal Mehta (Secretary General, Belgian Professional Union for Otolaryngology (ENT), Head and Neck Surgery), Petra Warreyn (Professor education Speech/language therapists, Universiteit Gent)

Layout:

Ine Verhulst, Joyce Grijseels

Disclaimer:

- **The external experts were consulted about a (preliminary) version of the scientific report. They did not co-author the scientific report and did not necessarily agree with its content.**
- **Subsequently, a (final) version was submitted to the validators. The validation of the report results from a consensus or a voting process between the validators. The validators did not co-author the scientific report and did not necessarily all three agree with its content.**
- **Finally, this report has been approved by common assent by the Executive Board.**
- **Only the KCE is responsible for errors or omissions that could persist. The policy recommendations are also under the full responsibility of the KCE.**

Publication date:

29 April 2025



Project number: 2024-50-HSR

Domain: Health Services Research (HSR)

MeSH: Speech therapy; Language therapy; Child; Child, preschool; Neurodevelopmental Disorders

NLM Classification: WL 340.3

Language: English

Format: Adobe® PDF™ (A4)

Legal depot: D/2025/10.273/03

ISSN: 2466-6459

Copyright: KCE reports are published under a “by/nc/nd” Creative Commons Licence
<http://kce.fgov.be/content/about-copyrights-for-KCE-publications>.



How to refer to this document?

Eyssen M, Desimpel F, Van Ginckel A. Speech/ language therapy for children with neurodevelopmental disorders. Health Services Research (HSR) Brussels: Belgian Health Care Knowledge Centre (KCE). 2025. KCE Reports 399. D/2025/10.273/03.

This document is available on the website of the Belgian Health Care Knowledge Centre.

<https://doi.org/10.57598/R399>



■ TABLE OF CONTENTS

LIST OF FIGURES	3
LIST OF TABLES	3
LIST OF ABBREVIATIONS	5
■ SCIENTIFIC REPORT	8
1 INTRODUCTION	8
1.1 CONTEXT OF THIS REPORT	8
1.1.1 Background	8
1.1.2 Governance and organisation of health care, rehabilitation and education in Belgium: an outline in the context of this report	9
1.1.3 History of reimbursement of monodisciplinary speech/language therapy in Belgium	15
1.1.4 Current Request to KCE	20
1.1.5 Definitions and scope of this research	20
2 METHODS	29
2.1 GENERAL APPROACH	29
2.1.1 Development of Research Questions	29
2.1.2 Development of research strategy and PICOS	30
2.2 SEARCH FOR GUIDELINES	32
2.3 SEARCH FOR SYSTEMATIC REVIEWS	34
2.4 DATA EXTRACTION	36
2.4.1 Data from guidelines	36
2.4.2 Data from systematic reviews	45
2.5 STAKEHOLDER CONSULTATION	46
3 RESULTS GUIDELINES	47
3.1 CHARACTERISTICS OF SELECTED GL	47
3.1.1 Intellectual disability (ID)	47
3.1.2 Autism spectrum disorder (ASD)	49
3.1.3 Attention-deficit/hyperactivity disorder (ADHD)	51
3.1.4 Communication disorders (CD)	51
3.1.5 Specific learning disorder (LD)	51
3.2 SUMMARY OF THE FINDINGS	52
3.2.1 Intellectual disability (ID)	52
3.2.2 Autism spectrum disorder (ASD)	79
3.2.3 Attention-deficit/hyperactivity disorder (ADHD)	108

3.2.4	Communication disorders (CD).....	110
3.2.5	Specific learning disorder (LD).....	115
4	RESULTS SYSTEMATIC REVIEWS	116
4.1	CHARACTERISTICS OF INCLUDED STUDIES	116
4.2	SUMMARY OF THE FINDINGS.....	117
4.2.1	Systematic reviews with meta-analysis.....	117
4.2.2	Systematic reviews with narrative synthesis	118
5	NARRATIVE SYNTHESIS OF STAKEHOLDER VIEWS	131
5.1	ASSESSMENT	131
5.2	THERAPY	132
5.3	SETTING	133
5.4	ROLE OF EDUCATION.....	136
5.5	PRACTITIONER	137
5.6	AIMS	138
5.7	CUMUL RULES AND THERAPY SETTINGS	139
5.8	ADDITIONAL INFORMATION SHARED AFTER THE MEETINGS.....	140
6	CONCLUSION AND DISCUSSION	142
6.1	WHAT DID WE LEARN FROM THE LITERATURE?.....	143
6.2	MAIN METHODOLOGICAL CONSIDERATIONS	145
6.3	CONTEXTUAL CONSIDERATIONS: BELGIAN CONTEXT AND STAKEHOLDER VIEWS	147
6.4	FROM EVIDENCE TO RECOMMENDATIONS	150
6.4.1	Effectiveness of SLT in the target groups	150
6.4.2	ID and ASD: SLT in the framework of multiprofessional treatment planning and therapy provision	152
6.4.3	ID and ASD: monodisciplinary SLT	152
6.4.4	Multidisciplinary diagnostic assessments	152
6.4.5	Cumul rules: cumulation of treatment provision in different sectors	152
6.4.6	Intermediate measures	153
6.4.7	Accreditation and quality	154
6.4.8	Education and training of professionals	154
6.4.9	Early treatment	154
6.4.10	Augmentative and alternative communication (AAC)	155
6.4.11	Policy recommendations	155
■	REFERENCES	156



LIST OF FIGURES

Figure 1 – Distribution of Centres for Ambulatory Rehabilitation (CAR-CRA), Centres for Developmental Disorders (COS) and Autism Reference Centres (ARC) in Belgium (a) and for the Brussels Capital Region (b)	13
Figure 2 – History of reimbursement of monodisciplinary speech/language therapy for children with speech/language problems in the compulsory health insurance, and important Belgian state reforms.	18
Figure 3 – Distribution of IQ Scores in the general population	24
Figure 4 – American Academy of Pediatrics: Classification of the level of evidence and strength of recommendation in the GL “Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder”	45

LIST OF TABLES

Table 1 – PICOS for Guideline search strategy and in/exclusion criteria.....	30
Table 2 – PICOS for Systematic review search strategy and in/exclusion criteria.....	31
Table 3 – Intellectual disability (ID): Guidelines included for data extraction	33
Table 4 – Autism spectrum disorder (ASD): Guidelines included for data extraction.....	33
Table 5 – Attention deficit / Hyperactivity disorder (ADHD): Guidelines included for data extraction.....	34
Table 6 – Communication disorders (CD): Guidelines included for data extraction.....	34
Table 7 – Specific Learning Disorder (LD): Guidelines included for data extraction	34
Table 8 – Systematic reviews: studies included for data extraction	35
Table 9 – ID: Classification of the quality of the evidence in the included clinical practice guidelines	37
Table 10 – ID: Classification of the strength of recommendation in the included clinical practice guidelines	38
Table 11 – ASD: Classification of the quality of the evidence in the included clinical practice guidelines	40
Table 12 – ASD: Classification of the strength of recommendation in the included clinical practice guidelines	42
Table 13 – ID: Recommendations related to Assessment (N: 13)	53
Table 14 – ID: Recommendations related to Intervention (N: 23)	56
Table 15– ID: Recommendations related to setting (N: 16)	66
Table 16 – ID: Recommendations related to practitioner managing speech/language disorders (N: 8)	71
Table 17 – ID: Recommendations related to Aims (Goal) of intervention (N: 8)	75
Table 18 – ASD: Recommendations related to Assessment (N:23).....	80
Table 19 – ASD: Recommendations related to Intervention (N:23)	85

Table 20 – ASD: Recommendations related to Setting (N: 23):	94
Table 21 – ASD: Recommendations related to Practitioner (N:12)	102
Table 22 – ASD: Recommendations related to Aims (Goals) (N: 3)	106
Table 23 – ADHD: Recommendations related to Assessment/ Setting (N:3/N:1).....	109
Table 24 – CD: Recommendations related to Assessment (N:2).....	111
Table 25 – CD: Recommendations related to Intervention/ Aim (Goals) (N: 2)	112
Table 26 – CD: Recommendations related to Setting (N:5)	113
Table 27 – Data extraction: study characteristics and summary of the findings for SRs in mixed populations of NDD (N: 2)	119
Table 28 – Data extraction: study characteristics and summary of the findings for SRs in populations with ASD (N: 2).....	124
Table 29 – Data extraction: study characteristics and summary of the findings for SRs in populations with ID (DS) (N: 1)	129



LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
ABA	Applied Behavioral Analysis
AAC	Augmentative and Alternative Communication
ADHD	Attention-deficit/hyperactivity disorder
AEPS	Assessment, evaluation, and Programming Systems for Infants and Children
AMSTAR	A MeaSurement Tool to Assess systematic Reviews
ANAHM asbl	Association Nationale d'Aide aux Handicapés Mentaux- National Association for Assistance to Intellectually Disabled Persons
ASAP	Advancing Social communication And Play
ASD	Autism spectrum disorder
AVIQ	Agence pour une Vie de Qualité
AWMF	Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (https://www.awmf.org/)
BC-SMD	Between-Case Standardised Mean Difference
BIF	Borderline intellectual functioning
CAR	Centra voor ambulante revalidatie- Centre for Ambulatory Rehabilitation (CAR/CRA)
CBT	Cognitive Behavioural Therapy
CCWPSH	Conseil Consultatif Wallon des personnes en situation de handicap
CE	Caregiver Education
CRA	Centres de réadaptation ambulatoire/Centre(s) de Référence en Autisme- Centre for Ambulatory Rehabilitation (CAR/CRA)/ Reference centre for Autism (RCA)
CD	Communication disorders (language disorder, speech sound disorder, social (pragmatic) communication disorder)
CDIT	Child Directed Interaction Training
CLB	Centrum voor Leerlingenbegeleiding/ Pupil guidance centre
CME	Correlated Measurement Error
CSNPH	Conseil Supérieur National des Personnes Handicapées- National High Council for Persons with Disabilities
DSM-5-TR	Diagnostic and Statistical Manual of Mental Disorders, fifth edition, Text Revision
DS	Down Syndrome
DT	Delayed Treatment
ES	Effect Size
ESDM	Early Start Denver Model

FITT	Family Implemented TEACCH for Toddlers
GAMP	Groupe d'Action qui dénonce le Manque de Places pour les personnes handicapées de grande dépendance
GL(s)	Guideline(s)
GSMD	Griffiths Scale of Mental Development
HPP	Hanen Parent Programme
HELP	Hawaii Early Learning Profile
HMTW	Hanen More Than Words (registered trademark)
ICD-11	International Classification of Diseases, 11th Revision
ID	Intellectual developmental disorder, intellectual disability
INESSS	Institut national d'excellence en santé et en services sociaux (https://www.inesss.qc.ca/)
IQ	Intelligence Quotient
JA	Joint Attention
JAML	Joint Attention Mediated Learning
JE	Joint Engagement
JASPER	Joint Attention Symbolic Play, Engagement, and Regulation
KCE	Belgian Health Care Knowledge Centre (www.kce.fgov.be)
LD	Specific learning disorder (dyscalculia, dysgraphia, dyslexia)
MA(s)	Meta-Analysis(es)
MCT	Milieu Communication Treatment
MSEL	Mullen Scales of Early Learning
NDBI	Naturalistic Developmental Behavioural Interventions
NDD(s)	Neurodevelopmental disorder(s)
NHRPH	Nationale Hoge Raad voor Personen met een Handicap- National High Council for Persons with Disabilities
NICE	National Institute for Health and Care Excellence (www.nice.org.uk/)
NIHDI (RIZIV-INAMI)	National Institute for Health and Disability Insurance (Rijksinstituut voor Ziekte- en InvaliditeitsVerzekering – Institut National d'Assurance Maladie-Invalidité)
NIS	Non-Interpersonal Synchrony
NVHVG vzw	Nationale Vereniging voor Hulp aan Verstandelijk Gehandicapten- National Association for Assistance to Intellectually Disabled Persons
NVK	Nederlandse Vereniging voor Kindergeneeskunde (https://www.nvk.nl/)
PACT	Pre-school Autism Communication Trial
PASS	Parent-mediated intervention for Autism Spectrum Disorder in South Asia
PECS	Picture Exchange Communication System



PICO	Patients Interventions Comparators Outcome
PLS-4	Pre-school Language Scale, 4 th Edition
PMS/ CPMS	Centre(s) psycho-médico-social (-sociaux)/ Pupil guidance centre
PMT	Prelinguist Milieu Teaching
PPVT	Peabody Picture Vocabulary Test
PRT	Pivotal Response Training
PRISM	Pivotal Response Intervention for Social Motivation
P-TONI	Primary Test Of Non-verbal Intelligence
QED(s)	Quasi-Experimental Design(s)
RC	Recommendation
RCA	Referentiecentrum voor autisme - Reference centre for Autism (RCA)
RCT(s)	Randomised Controlled Trial(s)
RD	Royal Decree
RT/RE	Responsive teaching:education
RIT	Reciprocal Imitation Training
SIGN	Scottish Intercollegiate Guidelines Network (www.sign.ac.uk/)
SD	Standard Deviation
SLT	Speech/language therapy
SLTh(s)	Speech/language therapist(s)
SP	Symbolic Play
SR(s)	Systematic review(s)
SCED(s)	Single-Case Experimental Design(s)
TAU	Treatment As Usual
TEACCH	Treatment and Education of Autistic and related Communication Handicapped CHildren
VABS	Vineland Adaptive Behavioral Scales
VB-MAPP	Verbal Behavior Milestone Assessment and Placement Program
WHO	World Health Organization
WISC III-NL	Wechsler Intelligence Scale for Children – Netherlands
WPPSI	Wechsler Preschool & Primary Scale of Intelligence

■ SCIENTIFIC REPORT

1 INTRODUCTION

1.1 Context of this report

1.1.1 Background

The development of speech and language in children emerges so naturally that we often take it for granted. However, approximately 10% of all children exhibit difficulty learning language, with a wide variation in the nature and degree of these difficulties.¹ Unfortunately, these children face problems in many domains of later life, such as social interactions, mental health, education, and employment. It is, therefore, of foremost importance to support these children and provide interventions that might prevent later consequences on their life course, functioning, and well-being.²

Speech and language interventions that have proven to be effective in achieving better speech, language and communication outcomes should be identified and made accessible to children who can benefit from it. In a broader perspective, those interventions should above all focus on improving wellbeing, mental health, educational achievement and societal participation.

Speech/language therapists (SLThs) contribute specialist knowledge and skills regarding children's speech, language and communication development, as well as regarding swallowing functions. They work with children suffering from difficulties in these areas to enhance their communication and functioning.³

This involves in many cases individualized interventions provided by a SLTh for a specific child. SLThs can intervene in their role of individual health care professional, in monodisciplinary settings where they work mainly as an independently operating discipline and where other disciplines are not or only to a limited extent invoked. They can also be part of a multidisciplinary team with other care professionals, who have complementary skills and who discuss and share a common goal of maximizing the child's functioning and well-being. In both cases, the intervention can focus on the treatment of the child either individually or within a group of children depending on the age and needs of the children requiring therapy.

SLThs can also intervene in an indirect way. Indirect intervention is often perceived to be a more naturalistic approach where adults in the child's environment facilitate communication.⁴ In an indirect approach, SLThs support parents and the child's family in creating an optimum communicative environment for the child at home. Indirect approaches are also being employed within other settings, where SLThs train professionals and carers who work with the child, and provide programs or advice on how to maximize the child's communicative environment and enhance communicative attempts.⁴

The educational system plays an important and critical role, given how much time the child spends at school.¹ It plays a central role in the education and development of the child, and prepares the child for his later life in society. Schools are a suitable place to support and accompany children with difficulties in such a way that they too, can achieve the full development of their capacities and fully and effectively participate in society. Children with special needs should be educated in a way that accommodates their individual differences and disabilities, involving adapted teaching procedures, equipment and materials, and accessible settings. Schools for special education are designed specifically for those pupils, are experienced in specific teaching methods and support, and usually work in smaller class groups. Mainstream schools offering "inclusive education" aim to provide a suitable curriculum for students with special needs, amidst their peers. In many Western countries, SLThs are involved in a variable intensity at several organizational levels in the educational system: at the level of one or more schools, providing general services e.g. in pupil guidance centres (Centra voor leerlingenbegeleiding- CLB/ Centres psycho-médico-sociaux- Centres PMS), at the level of the



classroom to support and coach teachers in their work with the child, or at the individual level of the child (e.g. Leersteuncentra^a/ Pôles territoriaux,^b see 1.1.2.2)

1.1.2 Governance and organisation of health care, rehabilitation and education in Belgium: an outline in the context of this report

1.1.2.1 Governance

Belgium is a federal State consisting of one federal level and of federated entities.⁵

At the federated level, Belgium is divided into three regions based on territory (the Flemish region, the Walloon region and the region of Brussels-Capital) and three communities based on language (the Flemish, French and German community). Because both French- and Dutch-speaking citizens live in the Brussels-Capital region, three special institutions were also created.

The federal State is competent for matters in the general interest of all Belgians, e.g. judicial system, social security, compulsory health insurance as well as substantial parts of public health.

The regions are competent for matters closely related to their territory, e.g. economy, employment. The communities are competent for person-related matters, e.g. education, culture, social welfare and assistance to individuals, supporting families in the care of young children. In Flanders, however, institutions merged in 1980 so that a single government and a single parliament are responsible for both the community and the region's competences. Since 1993, some responsibilities of the French community have been devolved to the Walloon region (for the French-speaking part of the region) and to the French Community Commission (or COCOF) in the region of Brussels-Capital, mainly matters of social welfare and health policy.⁵

To facilitate cooperation between the federal authorities and the federated entities, inter-ministerial conferences are regularly organised.

Health policy and regulation of the health care system is divided among the federal State and the federated entities. Belgium has a compulsory health insurance at the federal level, managed by the NIHDI (National Institute for Health and Disability Insurance), and administered by sickness funds. Further, the Ministry of Health (Federal Public Service Health, Food Chain Safety and Environment) is responsible for the general organization and planning rules of the health system. Since the 2nd state reform of 1980, and especially the 6th reform of 2014, comprehensive packages of health related competencies have been transferred to the federated entities. Federated entities are now the main competent authorities in the fields of, among other, rehabilitation care, disabled care, mental health care, health promotion and disease prevention. For further details, and for the main administrations and agencies in charge of health-related matters, see Belgium HiT Report 2020.⁵

1.1.2.2 Organisation and financing

FEDERAL STATE: INDEPENDENT HEALTH CARE PROVIDERS

Health care is mainly provided by independent health care providers, who are remunerated in a fee-for-service system, organized and managed at the federal level by the NIHDI in the context of the national health insurance. Fees for services provided by health professionals within compulsory health insurance are fixed collectively within the NIHDI by agreements between sickness funds and the

^a <https://www.vlaanderen.be/onderwijs-en-vorming/ondersteuning-en-begeleiding-voor-leerlingen-cursisten-en-studenten/basis-en-secundair-onderwijs/leersteun-voor-leerlingen-met-specifieke-onderwijsbehoeften>

^b <https://www.wbe.be/polesterritoriaux/>

representative organizations of health professionals, in e.g. the Agreement Commission convening speech/language therapists (SLThs) and sickness funds.⁵

FEDERATED ENTITIES: OUTPATIENT MULTIDISCIPLINARY REHABILITATION

On the other hand, and important for the context of this report, organization of outpatient rehabilitation belongs to the competencies of the federated entities. Financing modalities for multidisciplinary rehabilitation diagnostic and/or therapeutic teams mostly involve lump sums, and are typically laid down in mutually agreed conventions ("rehabilitation agreements"). Examples are the so-called 9.53-9.65 conventions for **Centres for ambulatory rehabilitation (CAR/CRA)** (Centra voor ambulante revalidatie CAR - Centres de réadaptation ambulatoire CRA), which offer multidisciplinary diagnostic assessment and rehabilitation treatment for children with ASD, ID, learning disorders and complex developmental disorders, among other. Disciplines involved are medical doctors, psychologists, physiotherapists, speech/language therapists, occupational therapists etc. However, since many years long waiting lists exist for these centres, and geographically they are unevenly spread (See Figure 1). For a full list of those centres in Belgium, see Supplement 1.3. Of note, a limited number of other centres concluded so-called 7.74.0 conventions or rehabilitation agreements for specialized multidisciplinary day care or residential rehabilitation for children with severe mental health needs, such as ASD, and in some centres also other neurodevelopmental disorders^c. Further, a few specific conventions exist^d for highly specialized centres responsible for neurological and neurodevelopmental disorders, among other.

Other ambulatory services that fall within the competence of the federated entities are the **Reference centres for autism (RCA)** (Referentiecentra voor autisme RCA - Centres de Référence en Autisme CRA) (see Figure 1), for a full list see Supplement 1.3). Reference centres for autism (RCA) provide multidisciplinary diagnostic assessment in individuals suspected of ASD. They do not treat themselves, but can coordinate the treatment of persons with autism who have been diagnosed by them or other caregivers. The RCA make their expertise available to other professional organizations. A few RCA also provide therapeutic support (e.g. SUSA^e in Mons and Liège). Like the CAR/CRA, the RCA have long waiting lists.

Next, Flanders organizes and finances specific services for multidisciplinary diagnostic assessment and referral of young children with developmental disorders (ASD, ID...): the **Centres for developmental disorders (COS)** (Centra voor ontwikkelingsstoornissen- COS) (see Figure 1, for a full list see Supplement 1.3). Again, long waiting lists threaten accessibility. In Wallonia there is no specific counterpart with this precise mission.

Under the competencies of the federated entities, other multidisciplinary teams are involved in diagnosis, treatment and eventually referral of children with developmental disorders (e.g. in Flanders the ambulatory centres for mental health (centra voor geestelijke gezondheidszorg- CGG), the observation and treatment centres (observatie- en behandelcentra - OBC), ...), but their role in provision of, or referral to, rehabilitation services e.g. SLT is more limited.

Interesting to mention are the services for (early) support at home for infants and young children with difficulties in their development (Vroeg- en thuisbegeleiding (VAPH, Vlaanderen); Services

^c (<https://www.departementzorg.be/nl/instructies-voor-revalidatieovereenkomsten-voor-geestelijke-gezondheid> e.g. De Appelboom (Genk) for ASD (<https://www.deappelboom.org/>); <https://www.avig.be/fr/soins-de-sante/revalidation-fonctionnelle/troubles-pedopsychiatriques> e.g. Antenne 110 (Ottignies) (<https://www.antenne110.be/>)

^d Revalidatiecentrum Pulderbos (<https://www.revapulderbos.be/>): convention Flanders (Vlaams Agentschap Zorg en Gezondheid); Centre Neurologique William Lennox (<https://www.cnwl.be/>): convention NIHDI (RIZIV/INAMI)

^e <https://www.susa.be/>



d'accompagnement des jeunes enfants (AVIQ, Wallonia)).^f These services are available to parents to advise them on all matters related to their child's well-being and development. They support and accompany the family and professionals around the child, offering mostly educational, social and psychological support. Involvement of SLThs in these services is possible in Flanders, but currently very limited available.

FEDERATED ENTITIES: SECTOR OF EDUCATION

With the third State reform of 1988, the federated entities were given responsibility for education. The federated entities invest in care support in the educational system.

General services such as pupil guidance centres (Centra voor leerlingenbegeleiding- CLB/ Centres psycho-médico-sociaux- Centres PMS) are organized at the level of a school network. Multidisciplinary teams with medical doctors, nurses, psychologists and educational specialists, as well as social workers provide independently guidance to pupils for questions about e.g. studying and well-being, but also learning difficulties and special needs. In mainstream schools, CLB/PMS can initiate several intensities of educational support in the school.^g E.g., support by the class teacher can be intensified, or for children who need more intensive support, educational support centres (Leersteuncentra^h - Pôles territoriauxⁱ) can intervene. An educational support centre is a structure attached to special education schools that intervenes in mainstream education schools to support and coach the class teacher and help the child. It offers specific expertise and competencies not readily available in mainstream schools and is composed of a multidisciplinary team including teachers, therapists (e.g. SLThs), psychologists, nurses etc. Alternatively, the parents can be advised to look for individual therapeutic support for their child outside the school, such as a rehabilitation center, a speech/language therapist or physiotherapist, if necessary.

In schools for special education, educational specialists and rehabilitation professionals, e.g. SLThs, can be appointed by the school to intervene at the level of the classroom in order to support and coach teachers in their work with the children. The therapists can also offer individual support or therapy (remedial teaching) to a child. Next to it, the federated entities offer different types of intensive support for children with recognized disabilities, which can include rehabilitation services. E.g. the VAPH^j is in charge of multifunctional centres (multifunctionele centra- MFC), offering guidance, day care, and/or night accommodation. In the day care program, the child can use, if indicated, various forms of treatment and training (physiotherapy, speech/language therapy, occupational therapy, etc).^k These services are provided in close collaboration with the school, during or after school hours, or they can be offered to children (partially) exempted from compulsory education. AVIQ^l finances services in charge of support to school-age children with recognized disabilities, in order to promote their participation in their natural living environments (service d'accompagnement des jeunes en âge

^f VAPH: Vlaams Agentschap voor Personen met een Handicap (<https://www.vaph.be/>); AVIQ: Agence pour une Vie de Qualité (<https://www.aviq.be/fr>)

^g <https://www.vlaanderen.be/onderwijs-en-vorming/ondersteuning-en-begeleiding-voor-leerlingen-cursisten-en-studenten/basis-en-secundair-onderwijs/zorgcontinuum>

^h <https://www.vlaanderen.be/onderwijs-en-vorming/ondersteuning-en-begeleiding-voor-leerlingen-cursisten-en-studenten/basis-en-secundair-onderwijs/leersteun-voor-leerlingen-met-specifieke-onderwijsbehoeften>

ⁱ <https://www.wbe.be/polesterritoriaux/>

^j VAPH: Vlaams Agentschap voor Personen met een Handicap (<https://www.vaph.be/>);

^k <https://www.vaph.be/organisaties/mfc/ondersteuning>

^l AVIQ: Agence pour une Vie de Qualité (<https://www.aviq.be/fr>)

scolaire).^m These services collaborate closely with the school and PMS centres, however, they are mainly focusing on psychosocial and educational support of the child and its family, rather than on rehabilitation. AVIQ also supports day care centres and residential services for youth not or only partially attending school (services d'accueil spécialisés pour jeunes- SAS'J, services résidentiels pour jeunes- SRJ), offering day care or residential care (day-night) including rehabilitation services.ⁿ

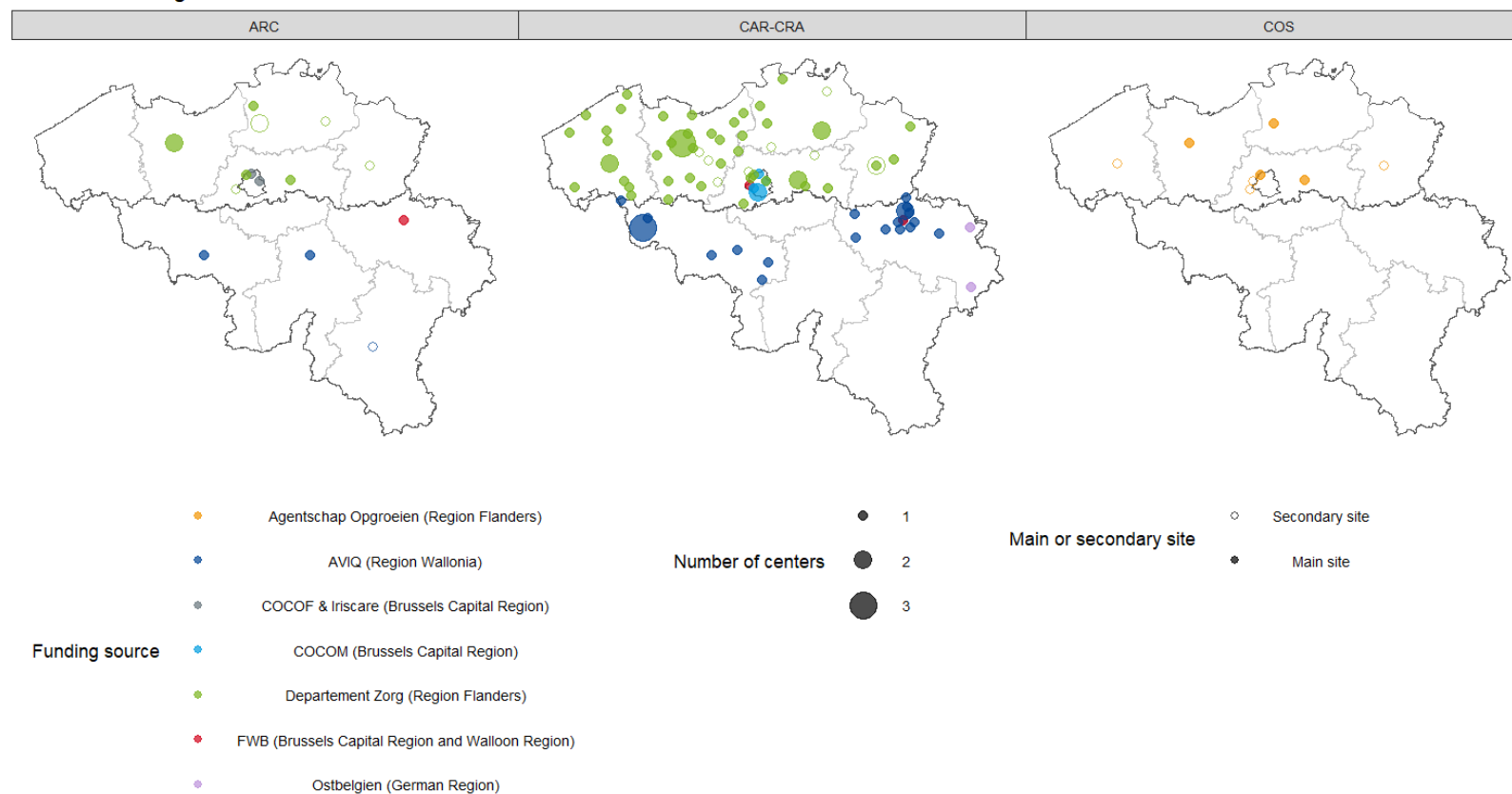
^m <https://www.aviq.be/fr/scolarite-et-formation/scolarite/soutien-a-la-scolarite/accompagnement-des-jeunes-en-age-scolaire>

ⁿ <https://www.aviq.be/fr/accueil-de-jour-pour-jeunes-non-scolarises-sasj>;
<https://www.aviq.be/fr/hebergement/handicap/residentiel-pour-jeunes-srj>

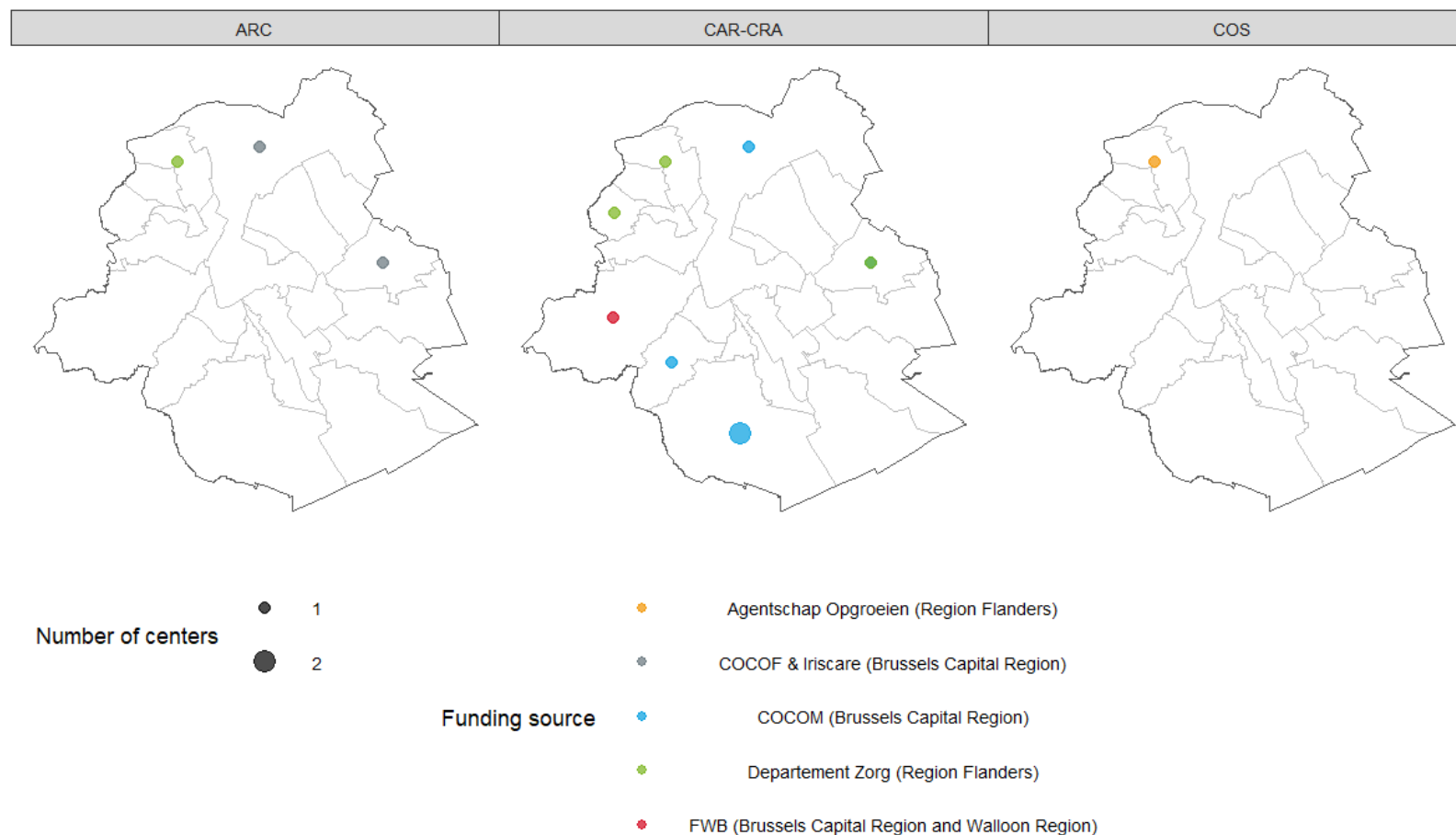


Figure 1 – Distribution of Centres for Ambulatory Rehabilitation (CAR-CRA), Centres for Developmental Disorders (COS) and Autism Reference Centres (ARC) in Belgium (a) and for the Brussels Capital Region (b)

a. Centers in Belgium



b. Centers in Brussels Capital Region



If centres involve multiple antenna-locations (secondary to main) sites, the numbers displayed on the map exceed the number of officially recognised centres. CAR-CRA and RCA-CRA (ARC) centres dedicated to the management of only adults are not displayed (CAR-CRA: n=4 (province of Liège); RCA-CRA (ARC): n=2 (province of Flemish Brabant and Antwerp)). A detailed list of CAR-CRA, COS and RCA-CRA (ARC) centres is provided in the Supplement 1.3. Sources: Departement Zorg Vlaanderen, Opgroeien Vlaanderen, Agence pour une Vie de Qualité (AVIQ), Flemish and French website of participate! (nl.participate-autisme.be and fr.participate-autisme.be), Ostbelgien Das Familienportal.



1.1.3 History of reimbursement of monodisciplinary speech/language therapy in Belgium

In the **Royal Decree (RD) of 14 September 1984**, a nomenclature^o of health services was established by the national compulsory health insurance (NIHDI, RIZIV-INAMI), determining in the annex the conditions for reimbursement of treatments that contribute to the improvement of specified speech/language disorders. For details see Box 1, and for timeline see Figure 2.

Importantly, the annex of this RD states that the following conditions are excluded from reimbursement of speech/language therapy (SLT):

- children with IQ < 86,
- children with “disorders resulting from psychiatric disorders or emotional states”, or hospitalized in a service for child psychiatry,
- children attending special education,
- children following a treatment in another rehabilitation setting where SLT is included in the standard treatments offered by this setting.

This measure (as argued by the federal legislator) assumes that children with intellectual disability (ID) or mental disorders, e.g. autism spectrum disorder (ASD), benefit more from speech/language therapy (SLT) sessions embedded in a multidisciplinary approach, such as provided e.g. in Centres for Ambulatory Rehabilitation (CAR-CRA) or in special education.

Note that for children with ID in primary school of mainstream education, monodisciplinary SLT is reimbursed by the national health insurance in case of learning disorders (dyslexia, dyscalculia, dysgraphia) without IQ limit (Article 36 §2 b)3°)

However, stakeholders^p have contested for many years that this approach to speech/language disorders does not align with reality because of the following arguments:

1. Children who do not meet the required IQ threshold for reimbursement of SLT can turn to CAR-CRAs. These centres provide a multidisciplinary approach, and belong to the responsibility of the federated entities. However, the geographical distribution of CAR-CRAs is very limited; in some provinces, these centres are scarcely present or completely absent. (Figure 1) Furthermore, there are long waiting lists for enrollment in a CAR-CRA, which can extend up to two years.
2. The argument that children receive SLT in special education, which is also a competency of the federated entities, overlooks the fact that they must then follow said special education. For many of these children, this approach conflicts with the principle of inclusion as outlined in the United Nations Convention on the Rights of Persons with Disabilities. Moreover, it also fails to consider the necessity of early intervention.
3. The lack of reimbursement for SLT sessions constitutes a fundamental infringement on the freedom of choice for parents to enroll their child in the form of education that best meets their needs. Parents may be compelled by financial considerations to place their child in special education because they cannot afford the cost of SLT themselves. In the context of increasing recognition of the right to inclusive education, the argument for placement in special education is considered outdated, and the issue and necessity of reimbursement for SLT costs increasingly pertinent.

^o fee schedule, which lists about 10 000 unique covered services and their payment rates or tariffs

^p More information: <https://www.unia.be/fr/connaissances-recommandations/recommandation-logopedie?lang=fr>

4. The school year covers only eight months per year, interrupted by school holidays, which is considered to be insufficient to meet the needs of the child in terms of both quantity and regularity. According to the stakeholders, speech/language therapy treatments at school are less intensive than those with independent therapists, and contacts between parents and practitioners are less frequent than in the rehabilitation centres.

In **2015**, and based on these findings, the Children's Rights Commissioner of the French Community, the Interfederal Equal Opportunities Centre (Unia), and the National Association for Assistance to Intellectually Disabled Persons (Association Nationale d'Aide aux Handicapés Mentaux/ Nationale Vereniging voor Hulp aan Verstandelijk Gehandicapten - ANAHM asbl/ NVHVG vzw) recommended the government to revise the nomenclature of the compulsory health insurance, so that the right to insurance is opened to children regardless of their IQ level. Following this, in **2016**, the National High Council for Persons with Disabilities (Nationale Hoge Raad voor Personen met een Handicap- Conseil Supérieur National des Personnes Handicapées NHRPH-CSNPH) also expressed the necessity to modify the conditions for reimbursement of SLT costs and requested a public health Interministerial Conference.^q

In **2019**, examined by the Public Health Committee of the House of Representatives and subsequently stipulated in the **Law of 8 May 2019** (for details, see Box 1), it was decided that the King, and based on multidisciplinary evaluation as approved by the Agreement Commission convening SLT and sickness funds, determines the cumulative rules for monodisciplinary SLT and multidisciplinary rehabilitation (as stipulated in article 36, annex RD 14 September 1984) for children with ID defined as a non-verbal IQ below 86.

The Agreements Committee convening SLT and sickness funds was invited to evaluate how this law could be implemented, and started consultations with relevant stakeholders and scientists.

Nevertheless, in **2020**, stakeholders in response expressed new recommendations concerning the Law of 2019 as it was perceived to insufficiently consider the interests of the affected children and their families. That is, the Children's Rights Commissioner of the French Community, Unia, and the French Belgian non-profit organization Inclusion asbl recommended a revision of the nomenclature to open up the right to reimbursement by the compulsory health insurance for the children concerned by article 36 (RD 1984) without distinction based on IQ level.^r Additionally, it was recommended this modification should not impact the possibility of also benefiting from multi-disciplinary treatment and follow-up in a CAR-CRA.

Given no decisions had yet been taken to implement the Law of 2019, **from February 2020** onwards, the federal Minister of Social Affairs and Public Health was questioned about this delay. Whereas the Agreements Committee had not yet reached a conclusion on this matter, the Minister argued that since the sixth state reform the competencies over CAR-CRAs had been transferred to the federated entities, and that education also had fallen outside the federal jurisdiction. If ad-hoc changes to the nomenclature system of the federal health insurance were to be initiated to complement the gaps in other structures, the budgetary impact should be carefully considered.

The Minister's arguments, however, were refuted in a position paper by The Action Group that denounces the Lack of Places for People with Severe Dependency (Groupe d'Action qui dénonce le Manque de Places pour les personnes handicapées de grande dépendance - GAMP).^s GAMP insisted

^q More information: <https://ph.belgium.be/nl/adviezen/advies-2016-13.html> ; [https://www.unia.be/fr/connaissances-recommandations/recommandation-logopedie?lang=fr](https://www.unia.be/fr/connaissances-recommandations/recommandation-logopedie?lang=fr;);

^r <https://www.inclusion-asbl.be/revendications/secretariat-politique/logopedie-revendications-inclusion-asbl/>; <https://www.unia.be/nl/kennis-aanbevelingen/aanbeveling-logopedie>

^s For more information: <https://www.dekamer.be/doc/CCRI/pdf/55/ic107.pdf>, <https://www.dekamer.be/QRVA/pdf/55/55K0076.pdf>, https://gamp.be/new/w-content/uploads/2023/04/2023_Avril_Dossier_Logopedie.pdf



on reimbursement of monodisciplinary SLT, not only for children with ID, but also for children with autism spectrum disorder (ASD).

In 2023, the National High Council for Persons with Disabilities renewed its call for revision, recommending that children with ID should be given access to monodisciplinary SLT as well as the possibility to follow mono- and multidisciplinary treatments in parallel.^t Although it was acknowledged that a multidisciplinary management approach is recommended for children with ID, it was argued that the recommendation to provide in monodisciplinary SLT was also supported by legal considerations. They referred, among other, to the United Nations Convention on the Rights of the Child (UN-CRC),^u and the United Nations Convention on the Rights of Persons with Disabilities (UN-CRPD)^v (see Supplement 1.2). The Council argued that monodisciplinary SLT is possible provided that collaboration with a multidisciplinary team is ensured (such as e.g., rehabilitation centres). It also stipulated that there is a need for more SLT in regular schools so that inclusive education can be effectively rolled out. The Advice of the Le Conseil Consultatif Wallon des personnes en situation de handicap – CCWPSH - (aussi interpellé par la Chambre des Représentants pour remettre son avis) goes in the same direction.

Accordingly, the Council delivered an advice concerning the right to reimbursement for monodisciplinary SLT in children with autism spectrum disorder (ASD). Again, the Council stressed the importance of a multidisciplinary approach but argued that monodisciplinary SLT, or a combination of monodisciplinary SLT and multidisciplinary therapy including SLT, should be allowed and reimbursed, provided these monodisciplinary therapists collaborate with a multidisciplinary team. Alternatively, they suggested to simply remove the entire exclusion of psychiatric disorders from the legal text.

Finally, the Council stated that all children attending special education should be entitled reimbursement of monodisciplinary SLT.

In 2024, the Minister of Social Affairs and Public Health adopted the **RD of 17 July 2024** (for details, see Box 1), implementing the law of 8 May 2019 concerning the reimbursement of SLT. Importantly, this decree provides for the reimbursement of monodisciplinary SLT for children and adolescents, regardless of their IQ. However, after the date of **30 June 2025**, children with an IQ below 70 will only be eligible for reimbursement on the condition that a multidisciplinary assessment including SLT was carried out in a CAR-CRA recognized by the federated entities, demonstrating the effectiveness of monodisciplinary SLT in such case.

In 2025, the Walloon Advisory Council for People with Disabilities (Conseil Consultatif Wallon des personnes en situation de handicap CCWPSH) issued an advice very similar to the advice of the National High Council for Persons with Disabilities (2023).^w

During the course of this project, AVIQ filed an appeal with the Council of State (Raad van State/Conseil d'État) against the RD of 17 July 2024 specifically challenging the rules regarding children with an IQ below 70. At the time of completing the KCE report, no formal legal decision had yet been made, and the potential implications for the KCE's recommendations were still unknown.

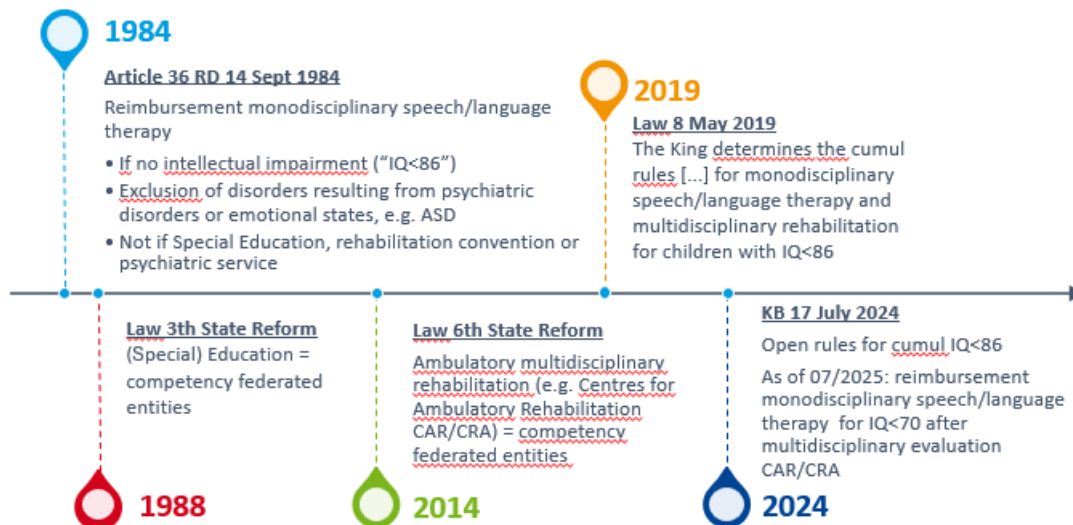
^t <https://ph.belgium.be/nl/adviezen/advies-2023-21.html>

^u Internationaal Verdrag inzake de Rechten van het Kind IVRK; Convention internationale des droits de l'enfant CIDE

^v Convention des Nations Unies relative aux droits des personnes handicapées (CN-UDPH) ; Verdrag van de Verenigde Naties inzake de rechten van personen met een handicap

^w https://www.ccwpsch.be/avis-suivis/2025/2305728_avis-0038

Figure 2 – History of reimbursement of monodisciplinary speech/language therapy for children with speech/language problems in the compulsory health insurance, and important Belgian state reforms.



Box 1 – Relevant legislation of the compulsory health insurance and reimbursement conditions of speech/language therapy in Belgium

a. Annex to the Royal Decree (RD) of 14 September 1984: article 36 (For the original text in Dutch and French, see Supplement 1.1)

Article 36, §2 of the annex to the RD of 14 September 1984 establishing the nomenclature^x of health services as applicable in the compulsory health insurance (NIHDI) stipulates the following:

‘ (...) the insurance coverage (reimbursement) may be granted insofar as the treatment can contribute to an improvement of the disorders;

(...)

(b) to the entitled person who has one of the following language and/or speech disorders:

(...)

2° disorders in receptive and/or expressive language development demonstrated by a language test whose result is below or equal to the 3rd percentile, where there is no intellectual impairment (total IQ of 86 or more, measured with an individual test) and no severe hearing disorder (the average hearing loss 2 does not exceed 40 dB HL at the best ear). These language tests should appear on an exhaustive list drawn up by the Agreements Committee convening speech/language therapists and sickness funds;

(...)

(f) to the beneficiary with dysphasia, i.e. severe expressive and/or receptive language disorders that persist beyond the fifth birthday and seriously interfere with social communication and/or daily activities involving oral language use, in the absence of a pervasive developmental disorder, a hearing impairment (the average hearing loss at the best ear does not exceed 40 dB HL), an intellectual impairment (performance or non-verbal IQ or OQ (developmental quotient) of 86 or more, measured by an individual test appearing on an exhaustive list approved by the Agreements Committee’

^x fee schedule, which lists about 10 000 unique covered services and their payment rates or tariffs

Also in Article 36 in §3(1), it is stated that no insurance coverage (reimbursement) is ever granted in case the entitled person:

- o with language and/or speech disorders or dysphasia attends special education (1°),
- o is accommodated in a state-subsidized institution where the 'speech/language therapist' function is part of the licensing standard (2°),
- o is admitted for nursing in a service recognized under one of the distinguishing letters^y G, T, A, Sp or K; (3°); (...);
- o is treated in a rehabilitation facility that has concluded an agreement with the NIHDI or with the federated entities that specifically covers treatment by a speech/language therapist (°5).

Its §3(2) states that insurance coverage (reimbursement) is also excluded for speech therapy for: 'disorders resulting from psychiatric disorders or emotional states (...)'.^y

b. The law of 8 May 2019 on the reimbursement of speech therapy (For the original text in Dutch and French, see Supplement 1.1)

The law of 8 May 2019 regarding the reimbursement of speech therapy states that the King determines the *cumul* rules for monodisciplinary speech therapy and multidisciplinary rehabilitation for children with an intellectual impairment defined as a performance or non-verbal IQ or OQ (development quotient) of less than 86, based on a multidisciplinary study approved by the Agreement Commission convening SLT and sickness funds.

c. The Royal Decree of 17 July 2024 (For the original text in Dutch and French, see Supplement 1.1)

This RD, entering into force on 01/09/2024, stipulates that the reimbursement by the compulsory health insurance may be granted, insofar as the treatment can contribute to an improvement of the disorders, to the entitled person with a total performance or non-verbal IQ or OQ (development quotient) less than 86, measured with an individual test occurring on an exhaustive list approved by the Agreements Committee convening speech/language therapists and sickness funds, for the speech therapy of the disorders provided for in § 2, b) 2 ° and f) of Article 36 of the Annex to the Royal Decree of 14 September (...).

For entitled persons with a total performance or non-verbal IQ or OQ less than 70, (...), this reimbursement can only be granted on condition that a multidisciplinary evaluation including speech therapy has been realized in a Centre for Ambulatory Rehabilitation (CAR/CRA) recognized by the federated states. This evaluation must demonstrate the effectiveness of a monodisciplinary speech therapy. The latter provision will enter into force on 1 July 2025.

These *cumul* rules will be evaluated no later than two years after their entry into force on the basis of a scientific study that monitors a significant number of patients who have received speech therapy under this decision.

^y G: geriatric hospital service; T, A: psychiatric (T) and neuropsychiatric (A) hospital service for adults; Sp: hospital service for rehabilitation; K: hospital service for child psychiatry

1.1.4 Current Request to KCE

During the stakeholder discussions preceding the law of 8 May 2019 and the RD of 17 July 2024, questions were raised about the availability of robust evidence regarding the evidence-based nature of monodisciplinary speech therapy for children with an intellectual disability, and by extension for children with complex developmental disorders and children suffering from mental disorders.

For this reason, the Minister of Social Affairs and Public Health commissioned the KCE to conduct a study on the appropriate model of care for the treatment of a developmental language disorder in children with an intellectual disability, a complex developmental disorder or a psychological disorder:

“Om deze reden verzoekt de minister van Volksgezondheid het Federaal Kenniscentrum voor de Gezondheidszorg een onderzoek te voeren naar het gepaste zorgmodel voor de behandeling van een taalontwikkelingsstoornis bij kinderen met een intelligentiestoornis, een complexe ontwikkelingsstoornis of een psychologische stoornis.”

« C'est pourquoi le ministre de la Santé publique demande au Centre fédéral d'expertise des soins de santé de mener une étude sur le modèle de soins approprié pour le traitement d'un trouble du développement du langage chez les enfants atteints d'un trouble d'intelligence, d'un trouble complexe du développement ou d'un trouble psychologique. »

Besides this KCE study, the RD of 17 July 2024 foresees an evaluation of the *cumul* rules on the basis of a scientific study monitoring a significant number of patients who have received speech/language therapy under this RD. This study was not assigned to KCE.

The request to the KCE focuses on children presenting with a developmental speech/language disorder and at the same time another condition affecting cognitive or mental functioning. These concepts need to be further clarified in order to delineate the scope and focus of this report. They will be explored in the next section, and the definitions used in this report will be presented.

1.1.5 Definitions and scope of this research

1.1.5.1 International classification systems

Several important international classification systems deal with the target groups defined in the request to the KCE.

WHO AND ICD-11

In 2023, the World Health Organization (WHO) referred to the International Classification of Diseases, 11th Revision (ICD-11), and put together several conditions under the umbrella of “developmental disabilities” for which they proposed the following definition: “Children and young people with developmental disabilities have underlying health conditions which affect the developing nervous system and cause impairments in motor, cognitive, language, behaviour and/or sensory functioning and associated disabilities. In interaction with various barriers and contextual factors, these impairments may hinder a child’s full and effective participation in society on an equal basis with others. Underlying health conditions which contribute to developmental disabilities include autism, disorders of intellectual development, attention deficit hyperactivity disorder and many other neurodevelopmental disorders listed in the International Classification of Diseases, 11th Revision (ICD-11) and also a much broader group of congenital conditions (such as Down syndrome) or conditions acquired at birth (such as cerebral palsy) or during childhood.”⁶



Importantly, WHO's International Classification of Functioning, Disability and Health (ICF) recognizes that disability results not only from a person's impairments, but also from the interaction of those impairments with various societal, physical or environmental barriers that may prevent their full participation in society.^{z,6}

The ICD-11 is one of the main international classification systems for diseases, including mental disorders.^{aa} A specific chapter is devoted to "neurodevelopmental disorders" (NDDs). These are behavioural and cognitive disorders that arise during the developmental period that involve significant difficulties in the acquisition and execution of specific intellectual, motor, language, or social functions. Although behavioural and cognitive deficits are present in many mental and behavioural disorders that can arise during the developmental period (e.g., Schizophrenia, Bipolar disorder), only disorders whose core features are neurodevelopmental are included in this grouping. The presumptive etiology for neurodevelopmental disorders is complex, and in many individual cases is unknown.

The following neurodevelopmental disorders are described in the ICD-11 (for more details, see Supplement 1.4):

- Disorders of intellectual development
- Developmental speech or language disorders
- Autism spectrum disorder
- Developmental learning disorder
- Attention deficit hyperactivity disorder
- (Developmental motor coordination disorder)
- (Stereotyped movement disorder)
- *Secondary neurodevelopmental syndrome*
- *Neurodevelopmental disorders, other or unspecified*

The disorders in this list put between brackets are typically not treated by speech/language therapists. The disorders in italics point to a specific subset of neurodevelopmental conditions (for more details, see Supplement 1.4) or are unspecified categories.

DSM-5

One of the most frequently used classifications for mental disorders is the Diagnostic and Statistical Manual of Mental Disorders, edited by the American Psychiatric Association.⁷ In its most recent version, the DSM-5-TR, a specific chapter is devoted to "neurodevelopmental disorders" (NDDs). DSM-5-TR defines neurodevelopmental disorders as "a group of conditions with onset in the developmental period. The disorders typically manifest early in development, often before the child enters school, and are characterized by developmental deficits or differences in brain processes that produce impairments of personal, social, academic, or occupational functioning".

The disorders classified in this chapter are presented in Box 2 (for more details, see Supplement 1.4)

^z For information on ICF, see: <https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health>

^{aa} For more information on the ICD-11, see <https://icd.who.int/en>

Box 2 – DSM-5-TR: classification of Neurodevelopmental Disorders

The DSM-5-TR categorizes the following disorders under Neurodevelopmental Disorders:

Intellectual Developmental Disorders

- Intellectual Developmental Disorder (Intellectual Disability)
 - Specify* current severity:
 - Mild
 - Moderate
 - Severe
 - Profound
- Global Developmental Delay
- Unspecified Intellectual Developmental Disorder (Intellectual Disability)

Communication Disorders

- Language Disorder
- Speech Sound Disorder
- Childhood-Onset Fluency Disorder (Stuttering)
- Social (Pragmatic) Communication Disorder
- Unspecified Communication Disorder

Autism Spectrum Disorder

Attention-Deficit/Hyperactivity Disorder

- Attention-Deficit/Hyperactivity Disorder
 - Combined presentation
 - Predominantly inattentive presentation
 - Predominantly hyperactive/impulsive presentation
- Other specified and Unspecified Attention-Deficit/Hyperactivity Disorder

Specific Learning Disorder

- Impairment in reading
- Impairment in written expression
- Impairment in mathematics

(Motor Disorders)

- Developmental Coordination Disorder
- Stereotypic Movement Disorder)

(Tic Disorders)

Other Neurodevelopmental Disorders

- *Other Specified and Unspecified Neurodevelopmental Disorders*

Source: DSM-5-TR⁷ - Legend: disorders put between brackets are typically not treated by speech/language therapists. Disorders in italics point to a specific subset of neurodevelopmental conditions not meeting the full criteria for any of the disorders in the diagnostic class, or to unspecified categories.



1.1.5.2 The diagnostic class of neurodevelopmental disorders

The overarching class of neurodevelopmental disorders (NDDs) as presented in these international classification systems largely covers the core group of disorders in the request to KCE.

However, while both ICD-11 and DSM-5-TR include children with an intellectual disability or with complex developmental disorders in the diagnostic class of NDDs, the group of “psychological disorders” of the request is only represented by Autism Spectrum Disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD). Impaired communication is a key feature of ASD, and as outlined in paragraph 1.1.3, the current demand from stakeholder organizations representing patients and parents especially relates to ASD (besides ID). Further, speech/language disorders as well as other neurodevelopmental disorders are well known comorbidities of ADHD.^{1, 7, 8} We are aware that many other mental disorders can occur in childhood and adolescence, e.g. anxiety or depressive disorders, eating disorders etc. However, their relation to speech/language disorders is less well described in the literature, and they belong to different diagnostic categories enlarging and complexifying the literature evaluation. Therefore, and given the limited research time for this report, it was preferred not to include other mental disorders, and to restrict the research in this report to the diagnostic category of neurodevelopmental disorders (NDDs) (see also 2.1).

In this report the DSM-5-TR definitions for NDDs will be used, since the Belgian health care system still relies on ICD-10 and implementation of the ICD-11 will only start in a few years' time.

Since this report aims to evaluate the evidence-based nature of SLT, the following disorders in the list of NDDs in the DSM-5-TR are considered to be out of scope: developmental coordination disorder, stereotypic movement disorder, and tic disorders. Other specified and unspecified neurodevelopmental disorders are within the remit of this report but will not be the focus of a separate literature review.

The classification in the DSM-5-TR describes mental disorders with associated criteria, with the aim to facilitate more reliable diagnoses of these disorders in clinical practice. The definitions used in this report rely on the DSM-5-TR, but it is important to realize that WHO's International Classification of Functioning, Disability and Health (ICF) is also fundamental to understand the functioning and disability of an individual. ICF is considered to complement classifications of diseases and disorders such as ICD and DSM, and emphasizes that disability results not only from a person's impairments, but also from the interaction of those impairments with various societal, physical or environmental barriers that may prevent their full participation in society.^{bb 6}

1.1.5.3 Definition of intellectual disability

Intellectual disability (ID) is a neurodevelopmental disorder defined by deficits in both intellectual and adaptive functioning, with onset during the developmental period of childhood or adolescence (see DSM-5-TR).⁷

To indicate this disorder, the DSM-5-TR uses “Intellectual developmental disorder” as well as “Intellectual disability”. In this report, the term “Intellectual disability” (ID) will be used.

Intellectual functioning involves capacities such as reasoning, problem solving, judgment, and learning. It is typically evaluated by tests of intelligence, and individuals with ID have scores of approximately two standard deviations or more below the population mean, including a margin for measurement error. In practice this involves a score of 65-75 (70 ± 5) (see Figure 3). Clinical judgment is important in interpreting the results of IQ tests, and using them as the sole criteria for the

^{bb} For information on ICF, see: <https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health>

diagnosis of an intellectual developmental disorder is insufficient.⁷ The Wechsler Intelligence scales are among the most commonly used IQ tests e.g. WISC (for Children), WAIS (for Adults).

Deficits in adaptive functioning result in failure to meet developmental and sociocultural standards for personal independence and social responsibility. Without ongoing support, the adaptive deficits limit functioning in one or more activities of daily life, such as communication, social participation, and independent living, across multiple environments, such as home, school, work, and community.⁷

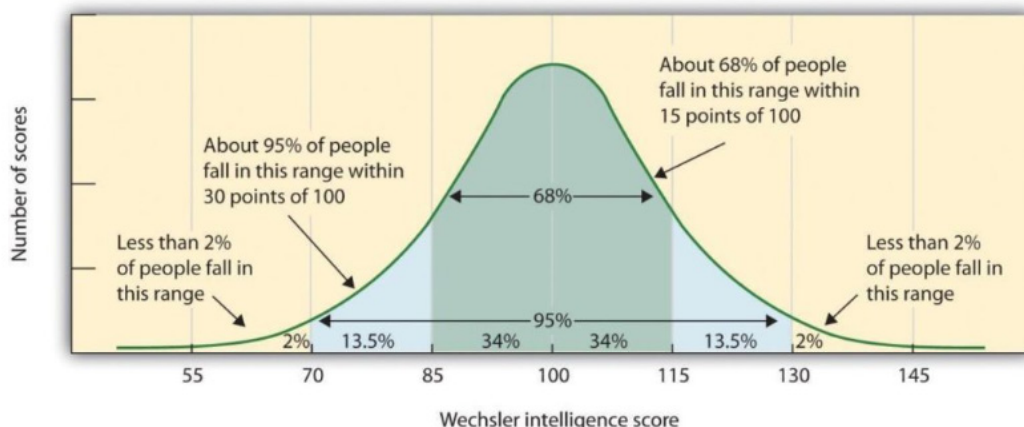
Adaptive functioning is assessed using both clinical evaluation, and standardized measures with knowledgeable informants (e.g., parent, teacher) and the individual to the extent possible.⁷

Four severity levels are defined: mild, moderate, severe and profound ID. The various levels of severity are assigned on the basis of adaptive functioning, and not IQ scores, because it is adaptive functioning that determines the level of supports required. Moreover, IQ measures are less valid in the lower end of the IQ range.⁷ For more details, see Supplement 1.4.

For the definition of communication disorder as a co-occurring disorder of ID, see 1.1.5.5.

For reasons of brevity, this report sometimes refers to individuals with ID as individuals with $IQ \leq 70$. This always implies that the conditions for the diagnosis of ID as stipulated above should be respected, including clinical judgement on the IQ test results and the margins of measurement error, as well as the evaluation of deficits in adaptive functioning, and onset during the developmental period. Although we use the DSM-5-TR terminology of intellectual disability (ID) in this report, we also take into account studies of children where other labels are used for the same group of individuals, such as intellectual developmental disorder, mental retardation, etc.

Figure 3 – Distribution of IQ Scores in the general population



Source: <https://courses.lumenlearning.com/suny-lifespandevelopment/chapter/extremes-of-intelligence-intellectual-disability-and-giftedness/>

1.1.5.4 The concept of borderline intellectual functioning

Before the Belgian RD of 17/07/2024, children with an IQ between 85 and 70 (or lower) were excluded from reimbursement of monodisciplinary SLT. Reference has often been made to the IQ range between 85 and 70 as “borderline intellectual functioning”. However, this concept has evolved strongly over time.

In DSM-I, borderline intellectual functioning was called “mild mental deficiency”, and listed in the section ‘Mental Deficiency’. The classification applied when there was both an IQ of about 1 to 2 standard deviations below the mean (equalling an IQ between 70 and 85) and functional impairment. This principle changed in 1980, when the DSM-III was published. From then onwards, borderline intellectual functioning was no longer part of the intellectual disorders, but was now a specific code

mentioned in the chapter 'Codes for Conditions Not Attributable to a Mental Disorder that are the Focus of Attention or Treatment'. This code could be used for persons with an IQ in the 71-84 range, until the publication of DSM-5 in 2013.⁹

The DSM-5 and DSM-5-TR just state that the code can be used when an individual's borderline intellectual functioning (BIF) is the focus of clinical attention or has an impact on their treatment or prognosis, without any description of what borderline intellectual functioning entails.¹⁰ The ICD-11 follows this position.^{cc} However, some authors point to the vulnerability of this group.^{10, 11} They are at increased risk of experiencing physical problems or poverty, have more difficulties with activities of daily living, and are more vulnerable to the development of mental health problems than people of average intelligence. Wieland et al. (2016)¹⁰ therefore recommend a renewed regard to the concept of borderline intellectual functioning and its place in the DSM and other classification systems such as the ICD. This should enhance the visibility of these individuals, which is necessary to provide them with timely help and support if they need it. In the "Gironda Declaration on borderline intellectual functioning" (2020), an international Consensus Group composed of care professionals and researchers call for action to promote policies and practices for improving the quality of life and health of people with this condition.¹¹

Of note, no specific search term exists for borderline intellectual functioning e.g. in the Medline or Embase database.

Since the publication of the Belgian RD of 17/07/2024, persons with an IQ 70-85 are no longer excluded from reimbursement of monodisciplinary speech therapy in the compulsory health insurance (NIHDI). No prior multidisciplinary evaluation of these persons is required to benefit from the reimbursement (see chapter 1.1.3). Although the concept of BIF is not well delineated in current classification systems such as DSM-5 and ICD-11, any publication regarding this group resulting from the search strategy in this report, will be included in the literature review.

1.1.5.5 Definitions of communication disorders

Disorders of communication, as defined in DSM-5-TR, include deficits in language, speech, and communication. *Communication* includes any verbal or nonverbal behavior (whether intentional or unintentional) that has the potential to influence the behavior, ideas, or attitudes of another individual. *Speech* is the expressive production of sounds and includes an individual's articulation, fluency, and voice quality. *Language* includes the form, function, and use of a conventional system of symbols (i.e., spoken words, sign language, written words, pictures) in a rule-governed manner for communication.⁷ The DSM-5-TR diagnostic category of communication disorders includes the following: language disorder, speech sound disorder, childhood-onset fluency disorder (stuttering), social (pragmatic) communication disorder, and unspecified communication disorders (see also 1.1.5.1 and Supplement 1.4).

Oral language is a multifaceted system that comprises vocabulary (semantics), grammar (morphology or word formation, and syntax or sentence formation) and discourse processing (pragmatics) in both the expressive (language production) and receptive (language comprehension) domains.¹² Speech sound production requires both the knowledge of speech sounds (phonology), and the ability to coordinate the movements for speech.⁷

To diagnose a language or speech sound disorder, abilities are substantially and quantifiably below those expected for age, and functional limitations in daily life and social participation must be present. The difficulties are not better explained by another medical or sensory condition and are not better explained by intellectual disability or global developmental delay. Onset is in the early developmental period (DSM-5-TR).⁷

^{cc} For more information on the ICD-11, see <https://icd.who.int/en>

Childhood-onset fluency disorder or stuttering is a disturbance in the normal fluency and time patterning of speech that are inappropriate for the individual's age and language skills, and persist over time. Its onset is in the early developmental period, and it causes functional limitations in daily life and social participation. It is not caused by another medical or sensory condition, or better explained by another mental disorder (DSM-5-TR).⁷

Social (pragmatic) communication disorder is characterized by persistent difficulties in the social use of verbal and nonverbal communication, resulting in functional limitations in effective communication, social participation, and daily life. Onset is in the early developmental period, and the deficits are not better explained by low abilities in the domains of structural language or cognitive ability or by autism spectrum disorder (DSM-5-TR).⁷

COMMUNICATION DISORDERS AND INTELLECTUAL DISABILITY

Importantly, DSM-5-TR states that communication disorders may co-occur with intellectual disability (ID). Both diagnoses are made if full criteria are met for ID and a communication disorder. Language disorder can occur with varying degrees of intellectual ability. Further, a discrepancy between verbal and nonverbal ability is not necessary for a diagnosis of language disorder.⁷

DEFINITIONS BY THE CATALIZE CONSORTIUM

In 2016, a panel of experts conducted a Delphi consensus procedure about criteria and terminology for children's language problems, in order to clarify many questions existing in this domain.^{13, 14} The following terminology is proposed by the CATALIZE consortium: the term 'language disorder' refers to all children with language difficulties that cause functional impairment in everyday life and are associated with poor prognosis. This includes children whose language difficulties occur in isolation (for which the recommended term is 'developmental language disorder', DLD) and those whose language difficulties are *associated* with other conditions such as intellectual disability (ID) or autism (ASD). These are biomedical conditions in which language impairment is one of a complex set of symptoms. These are distinguished from *co-occurring* conditions, such as learning disorders and attention deficit hyperactivity disorder (ADHD), in which language difficulties occur at higher than expected rates, but are not always present or characteristic of these conditions.^{2, 3, 13, 14}

Whereas the DSM-5-TR defines that communication disorders may be diagnosed in persons with ID, ASD, and other disorders such as ADHD, it does not differentiate between "associated" and "co-occurring" disorders as proposed by the CATALIZE consortium.

However, the conclusions of this consortium align with another statement in the definition of the DSM-5-TR (2022): "A discrepancy between verbal and nonverbal ability is not necessary for a diagnosis of language disorder." (see above). On the contrary, the definition of a developmental language disorder in the ICD-11 presumes that language abilities are markedly below the expected level given the individual's age and level of intellectual functioning (see also Supplement 1.4). A long discussion among scientists on the association of language disorder with the criterium of a nonverbal IQ at or above 85 preceded this statement, as pointed out in the publication by Rice (2016).^{15 dd} In a population-based survey study (the SCALES study), Norbury et al.¹⁷ demonstrated that children with

^{dd} The scope of this report did not encompass a detailed examination of diagnostic testing and intervention strategies for managing children with neurodevelopmental disorders (NDDs). Given the ongoing debate over diagnostic criteria for language disorders, whether isolated or co-occurring with other conditions, new technical investigations are emerging. These aim to quantify neural correlates to facilitate early detection of language disorders, as for example in children suspected of having ASD.¹⁶ Morrel J, Singapuri K, Landa RJ, Reetzke R. Neural correlates and predictors of speech and language development in infants at elevated likelihood for autism: a systematic review. *Front. Hum. Neurosci.* 2023;17:1211676. Further research, however, is required to support the implementation of these findings in individual diagnostics within clinical practice.



a nonverbal IQ between 71 and 85 did not exhibit significantly more severe language deficits compared to children with an average nonverbal IQ, despite a tendency for slightly lower performance. These findings support the exclusion of nonverbal IQ and the use of discrepancies between verbal and nonverbal abilities in diagnosing language disorders, as outlined by the DSM-5-TR. Notably, the debate surrounding diagnostic criteria and their terminology is ongoing, and some authors contest the criteria proposed by the CATALIZE consortium.¹⁸ Indeed, further research is needed to explore the impact of nonverbal IQ and treatment response to reinforce best practice guidelines.

As already mentioned, this report uses the terminology of the DSM-5-TR. Although we use the DSM-5 terminology of communication disorder in this report, we also take into account studies of children where other labels are used, such as developmental language disorder, receptive language disorder and specific language impairment, etc.

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC)

Augmentative and Alternative Communication (AAC) is considered to be a specific form of communication and is included in this report (see also 2.4.1). It encompasses all forms of communication (other than speech) that are used to express thoughts, needs, wants, and ideas in order to supplement spoken or written communication in individuals with severe disorders of speech-language production and/or comprehension. Levels of AAC technology can vary from unaided modes, in which no external device is required (sign languages or gestural cueing systems), to aided AAC. The latter includes low-technology (alphabet boards, symbol-based topic boards, and communication books or programs) and high-technology aided modes (electronics and computer technologies, e.g. voice-based devices, touch tablets or smart phones equipped with specialized software for oral communication).^{19, 20}

1.1.5.6 Definition of autism spectrum disorder and co-occurring language impairment

Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing and understanding relationships. In addition to the social communication deficits, the diagnosis of autism spectrum disorder requires the presence of restricted, repetitive patterns of behavior, interests, or activities. These symptoms are present from the early developmental period onwards, although they may only become fully manifest at a later point in life. The symptoms cause clinically significant impairment in functioning, and are not better explained by ID or global developmental delay (DSM-5-TR).⁷

Nevertheless, autism spectrum disorder is frequently associated with intellectual developmental disorder and language disorder (i.e., an inability to comprehend and construct sentences with proper grammar) (DSM-5-TR).⁷ While difficulties using language within a social context are hallmark symptoms of autism, difficulties with the content and form of language (vocabulary, morphology, syntax, phonology) are highly variable in these individuals.¹

The DSM-5-TR states that individual clinical characteristics can be further described through the use of specifiers (e.g. with or without accompanying intellectual impairment; with or without accompanying structural language impairment; etc) as well as specifiers that describe the severity of autistic symptoms.⁷ Of note, Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder (DSM-5-TR).⁷ For more details, see Supplement 1.4.

1.1.5.7 *Definition of ADHD and specific learning disorder*

For other definitions of NDDs, the reader is referred to Supplement 1.4, and to the DSM-5-TR.⁷

Of note, ADHD may co-occur with other neurodevelopmental disorders, including intellectual developmental disorder, and language disorders.⁷ Although a growing body of research has consistently reported elevated rates of language difficulties among children with ADHD, estimates of prevalence are still scientifically debated.¹

1.1.5.8 *Definition of rehabilitation*

At several points in this report, we refer to rehabilitation, following the definition of WHO:

“Although the term “rehabilitation” suggests that a loss of functioning or a significant deviation from baseline occurred, which is the case in many conditions such as spinal cord injury, stroke, traumatic brain injury, the WHO defines rehabilitation as a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment. Rehabilitation can begin as soon as a condition is identified, including in early childhood. Thus, terms typically used in the developmental disability field such as “habilitation” and “treatment” can be interpreted as rehabilitation from a WHO perspective because their goal is to optimize functioning.”²¹



2 METHODS

2.1 General approach

Given the timeliness and urgency of requested results by the Minister of Social Affairs and Public Health, this study was established as a rapid review project^{ee} and endeavours to commit to the KCE recommendations of expedited scientific study and reporting.²² Two external experts in the domain (listed in the colophon) were consulted on a preliminary draft of the review methods, data extraction and preliminary results by means of a written review solicited at intermediate stages of the project.

2.1.1 Development of Research Questions

Firstly, the request to KCE was translated into the following research questions, taking the Belgian context and the previously mentioned definitions into account:

Research question 1: What is the scientific evidence for the effectiveness, and potential adverse effects, of speech/language therapy in children (<18yrs) with neurodevelopmental disorders (NDDs) more specifically the following conditions:

1. intellectual disability (intellectual developmental disorder) (ID)
2. a communication disorder (language disorder, speech sound disorder, social (pragmatic) communication disorder) (CD),
3. autism spectrum disorder (ASD),
4. attention-deficit/hyperactivity disorder (ADHD)
5. a specific learning disorder (dyscalculia, dysgraphia, dyslexia) (LD),

Research question 2: What is the scientific evidence regarding the delivery of speech/language therapy in a monodisciplinary setting and/or in a multidisciplinary setting for those children? What is the scientific evidence on monodisciplinary versus multidisciplinary management of speech-language disorders in children (<18yrs) with neurodevelopmental disorders (NDDs), more specifically the conditions defined in RQ1?

The research questions were answered by an evidence-based approach using a standard methodology based on a systematic review of the scientific literature. Further details about KCE and the systematic literature review processes are available at <https://kce.fgov.be/en/about-us/our-methods-and-procedures/scientific-research-processes>.

While language disorders, speech sound disorders, social communication disorders and specific learning disorders without co-occurring conditions are classified as neurodevelopmental disorders in DSM-5-TR (see 1.1.5), they are not the primary focus of this research. Indeed, speech/language therapy for these conditions has long been reimbursed by NIHDi if not accompanied by co-occurring disorders such as intellectual disability or mental health conditions. However, we have chosen not to exclude this group of disorders from the literature review to ensure studies would not be missed investigating children with these disorders and at the same time varying levels of intellectual functioning (IQ) or other co-occurring disorders of interest.

The results of this report might have consequences for the organisation of care in Belgium and could form the basis for further exploring how this could be optimized for this group of children. While these aspects are reflected on in the section “Discussion” of this report, the expected report delivery date expressed by the commissioners limited the research time, precluding a full Health Services Research (HSR) approach implementing the evidence results in the Belgian context. It was also anticipated that,

^{ee} For more information on KCE methodology: see <https://processbook.kce.be/rapid-reviews>

in order to further explore the findings from the literature using more comprehensive HSR methods, there is probably currently insufficient specific data available in Belgium for the target groups of interest in this report (e.g. ID, see KCE report 361).²³

2.1.2 Development of research strategy and PICOS

Secondly, a pilot Medline search was performed, using general search (MeSH) terms related to the topic, in combination with a search filter for systematic reviews and RCTs. This showed that high quality evidence in this field was limited. Further, a pragmatic approach was preferred since the limited time for research conduction precluded an in-depth systematic literature review for the various domains covered by the research questions.

Therefore it was decided to conduct a search for high-quality clinical practice guidelines (GL). To assure the quality of the included GL, only GL with a score of at least 60% in the domain 3 “Rigour of Development” of the AGREE instrument (<http://www.agreetrust.org/>) qualify for inclusion in this report. In GL, we anticipated additional contextual interpretation of the guideline development groups from those guidelines would be available, and might include interesting information and opinions from international experts in the field. This approach is in line with the methods used by WHO, who developed in 2023 an outline for the most essential interventions for rehabilitation for 20 health conditions.⁶ Indeed, GL focus on the effectiveness of interventions, provide a framework for clinical decision making, and explain the benefits and harms of alternative care options predicated on evidence and value judgments.

To build the GL search strategy, the research questions were further elaborated using the PICOS (Participants-Interventions-Comparator-Outcomes-Study Design) framework (Table 1). Inclusion criteria were kept broad given the expected paucity of high quality evidence in this field. Of note, in line with the pragmatic approach, Childhood-Onset Fluency Disorder (Stuttering) was excluded to avoid a risk of explosion of the search results and because the content of the therapy (speech/language therapy techniques and modalities) was out of scope in this report.

Table 1 – PICOS for Guideline search strategy and in/exclusion criteria

PICOS item	Description
Population	Inclusion criteria: Persons with neurodevelopmental disorders: 1. Intellectual Developmental Disorder, or 2. Communication Disorders (Language Disorder, Speech Sound Disorder, Social (Pragmatic) Communication Disorder), or 3. Autism spectrum disorder (ASD), or 4. Attention-deficit/hyperactivity disorder (ADHD), or 5. Specific Learning Disorders (dyscalculia, dysgraphia, dyslexia) All different levels of severity and intellectual functioning are included. Comorbidities are no reason for exclusion. Exclusion criteria: Tic Disorders, Motor Disorders, Childhood-Onset Fluency Disorder (Stuttering) Guidelines excluding children and adolescents
Intervention	Inclusion criteria: Management and treatment (more specifically rehabilitation) These interventions can be delivered by any healthcare provider or parent, mono- or multidisciplinary. All settings of treatment delivery are included (at home, at (pre-)school, in specialized care settings, in ambulatory or residential care). Exclusion criteria: Guidelines for assessment and diagnosis only

	Guidelines covering pharmacological treatments only, or other specific area only (e.g. nutrition, physical activity only) Guidelines not including rehabilitation interventions
Comparison	None
Outcome	Any
Study design	Guidelines based on one or more of the following types of study design: meta-analysis, Systematic review (SR) including SR as part of a HTA, RCT (randomized controlled trial), controlled clinical trials, quasi-experimental design, observational studies.
Language	No language restriction
Setting	OECD countries
Publication date	2014 - present

Next, an additional search was conducted for high-quality systematic reviews updating the selected guidelines from their last date of search onwards (see Supplement 5.1), to complement the information retrieved from the GL whilst accommodating a pragmatic timely approach. The SR search strategy was elaborated in the PICOS framework as shown below (Table 2). From the pilot Medline search it was learned that SRs including children and at the same time adults are less likely retrieved. Therefore, the SR sourcing focused on children only, whereas this was not the case for the search for GLs. For both the GLs as well as the SRs, we did not limit searches on publication language.

Table 2 – PICOS for Systematic review search strategy and in/exclusion criteria

PICOS item	Description
Population	Inclusion criteria: Children (age <18y) with neurodevelopmental disorders: 1. Intellectual Developmental Disorder, or 2. Communication Disorders (Language Disorder, Speech Sound Disorder, Social (Pragmatic) Communication Disorder), or 3. Autism spectrum disorder (ASD), or 4. Attention-deficit/hyperactivity disorder (ADHD), or 5. Specific Learning Disorders (dyscalculia, dysgraphia, dyslexia) All different levels of severity and intellectual functioning are included. Comorbidities are no reason for exclusion. Exclusion criteria: Tic Disorders, Motor Disorders, Childhood-Onset Fluency Disorder (Stuttering)
Intervention	Inclusion criteria: "Rehabilitation of Speech and Language Disorders"[Mesh] (Mesh: Procedures for assisting a person with a speech or language disorder to communicate with maximum efficiency). These interventions can be delivered by any healthcare provider or parent, mono- or multidisciplinary. All settings of treatment delivery are included (at home, at (pre-)school, in specialized care settings, in ambulatory or residential care). Exclusion criteria: Pharmacological interventions, arts-based therapy, or other specific area only (e.g. nutrition, physical activity only)
Comparison	Any comparator, such as treatment as usual, different types of therapy, waiting lists, or no intervention, to assess the impact of speech-language interventions.

Outcome	Any
Study design	Systematic reviews (SRs) with or without meta-analysis (MA) including RCTs, controlled clinical trials, quasi-experimental design, observational studies. MAs of single case designs were included if >100 cases were aggregated. Exclusion criteria: SRs (without MA) including >50% of studies with single case designs;
Language	No language restriction
Setting	OECD countries
Publication date	2020 – from 01/2020 onwards

2.2 Search for guidelines

In order to identify published clinical practice guidelines (GLs), the following electronic databases were searched in August and September 2024:

- MEDLINE (Ovid)
- Embase
- CINAHL
- ERIC (Education Resources Information Center)

The search strategies and resulting number of hits are documented in the Supplement 2 and 3.1 to this report. After deduplication, 3335 publications were retained for screening on title and abstract. Additionally a grey literature search was performed on professional guideline websites; this yielded 47 guidelines. The websites searched can be found in the Supplement 3.2.

All retrieved guidelines were screened on title and abstract using the PICOS in- and exclusion criteria (see Table 1). The first 150 publications were screened by two reviewers (FD, ME), and discrepancies were discussed until consensus was reached. The other publications were screened by one reviewer (FD). We used the Rayyan platform for title and abstract as well as full text screening.²⁴

In total, the database search and the website search yielded 102 publications for full-text screening. These references were subdivided into five topics, in line with the research questions: Intellectual disability (ID), Autism spectrum disorder (ASD), Attention-deficit / Hyperactivity disorder (ADHD), Communication disorders (CD), Specific Learning Disorder (LD). Further details can be found in the Supplement 3.1-3.3.

In a second step, the remaining papers were screened for eligibility by reading the full text, and based on the PICOS criteria (see Table 1). Full-text reading was done by one researcher (FD), and all papers were discussed with a second reviewer (ME). In total, 50 publications were included for further evaluation; two of these publications clearly dealt with 2 topics (ID and ASD) and were included in both. For each topic, the list of included papers and excluded papers with reason for exclusion can be found in the Supplement 3.3.

Among the remaining 50 publications, some were systematic reviews including guidelines, which were screened for inclusion. Only one SR contained supplementary guidelines that could be extracted (see Supplement 3.3). The AGREE II instrument was used to evaluate the methodological quality of the identified GLs (<http://www.agreetrust.org/>). Six documents were scored by two independent researchers (FD, ME) and the points of difference were discussed and reviewed in case of disagreement to come to a final score. The other GLs were scored by one reviewer (FD). For more details, and for the full AGREE appraisals of the 38 guidelines, see Supplement 4. Note that one GL clearly dealt with 2 subtopics (ID and ASD) and was included for both. Likewise, one GL obtained for



Communication disorders (CD) was also relevant for Intellectual disability (ID) and Autism spectrum disorder (ASD), and was also included in these subtopics.

The list of included and excluded guidelines for data extraction can be found in Supplement 5.1.

Following quality appraisal, a total of 22 different guidelines (with a score of $\geq 60\%$ in domain 3 of the AGREE instrument) were ultimately included. The following numbers of GLs per subtopic were included for data extraction: ID: 6 GLs; ASD: 9 GLs; ADHD: 6 GLs; CD: 2 GLs; LD: 2 GLs. An overview of GLs eligible for data extraction is presented in the tables (Table 3, Table 4, Table 5, Table 6, Table 7) below.

Table 3 – Intellectual disability (ID): Guidelines included for data extraction

Authors, date & Title
Nederlandse Vereniging voor Kindergeneeskunde (2021) - Medische begeleiding van kinderen met downsyndroom. ²⁵
NICE (2022) - Disabled children and young people up to 25 with severe complex needs: integrated service delivery and organisation across health, social care and education (NG213). ²⁶
WHO (2023) - Package of interventions for rehabilitation for disorders of intellectual development. ⁶
INESSS (2019) - L'autonomie des jeunes âgés de 6 à 21 ans qui présentent une déficience intellectuelle - Guide de pratique. ²⁰
Townend (2020) - Consensus-based guidelines for managing communication of individuals with Rett syndrome. ²⁷
AWMF (2022)* - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸

*Guideline obtained for Communication disorders (CD) but also relevant for Intellectual disability (ID).

Table 4 – Autism spectrum disorder (ASD): Guidelines included for data extraction

Authors, date & Title
AWMF (2021) - Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. S3-LL (028 – 047). ²⁹
NICE (2021) - Autism spectrum disorder in under 19s: support and management (CG170). ³⁰
The Danish Health Authority (2021) - National clinical guideline for the treatment of autism spectrum disorders in children and adolescents. ³¹
Whaikaha-Ministry of Disabled People and Ministry of Education (2022) - Aotearoa New Zealand Autism Guideline. ³²
AutismCRC (2022) - National Guideline for supporting the learning, participation, and wellbeing of autistic children and their families in Australia. ³³
SIGN (2016) - Assessment, diagnosis and interventions for autism spectrum disorders (CPG 145). ³⁴
KCE (2014) "Management of autism in children and young people: a Good Clinical Practice Guideline". ³⁵
WHO (2023)* - Package of interventions for rehabilitation for autism spectrum disorders ⁶
AWMF (2022)** - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸

* Guideline obtained for Intellectual disability (ID) but also relevant for Autism spectrum disorder (ASD)

** Guideline obtained for Communication disorders (CD) but also relevant for Autism spectrum disorder (ASD).

Table 5 – Attention deficit / Hyperactivity disorder (ADHD): Guidelines included for data extraction

Authors, date & Title
Sundhedsstyrelsen (2021) - National clinical guideline for the assessment and treatment of ADHD in children and adolescents. ³⁶
AWMF (2018) - S3-Leitlinie ADHS bei Kindern, Jugendlichen und Erwachsenen. ⁸
INESSS (2018) - Optimal service trajectory for children, adolescents and young adults with attention deficit disorder with or without hyperactivity (ADHD) or related problems. ³⁷
NICE (2018) - Attention deficit hyperactivity disorder: diagnosis and management (NG87). ³⁸
American Academy of Pediatrics (2019) - Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. ³⁹
AADPA (2022) - The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. ⁴⁰

Table 6 – Communication disorders (CD): Guidelines included for data extraction

Authors, date & Title
INESSS (2017) - Organisation du continuum et de la dispensation des services aux enfants âgés de 2 à 9 ans présentant un trouble développemental du langage. ⁴¹
AWMF (2022) - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸

Table 7 – Specific Learning Disorder (LD): Guidelines included for data extraction

Authors, date & Title
AWMF (2015) - S3-Leitlinie Diagnostik und Behandlung bei der Lese- und/oder Rechtschreibstörung. ⁴²
AWMF (2018) - S3-Leitlinie Diagnostik und Behandlung der Rechenstörung. ⁴³

2.3 Search for systematic reviews

An additional literature search for systematic reviews was conducted to update the evidence retrieved from the guidelines. The following electronic databases were searched in November 2024:

- MEDLINE (Ovid)
- Cochrane Library
- Embase
- CINAHL
- ERIC (Education Resources Information Center)

The electronic search covered the period from 01/01/2020 onwards, taking into account the most recent search dates of the guidelines included based on the AGREE evaluation (see Supplement 5.1 and 7.1 for more details).

The search strategies and resulting number of hits are documented in the Supplement 6 and 7.1 to this report. After deduplication, 544 publications were retained for screening on title and abstract.

All retrieved systematic reviews were screened on title and abstract using the PICO in- and exclusion criteria (see Table 2). The first 100 publications were screened by two reviewers (AVG, ME), and discrepancies were discussed until consensus was reached. Meta-analysis of a large number (>100

cases) of experimental single case design studies was accepted. The other publications were screened by one reviewer (AVG). This yielded 58 publications for full text screening.

In a second step, the remaining papers were screened by reading the full-text. The selection was done according to the PICO criteria (see Table 2). Full-text evaluation was performed by one researcher (AVG) and checked by a second reviewer (ME). Studies dealing with speech/language disorders as well as specific learning disorders were only included if a specific subgrouping by intellectual ability levels or by other comorbidities was presented. Indeed, speech/language therapy for children suffering from a pure speech/language disorder without comorbidities, or from learning disorders, has been reimbursed in Belgium by the national health insurance (NIHDI) since a long time, and therefore these studies were considered to be of less priority (see also 2.1). The list of included papers and excluded papers with reason for exclusion can be found in the Supplement 7.2. A total of 15 publications was included for quality appraisal.

Quality appraisal was performed using the AMSTAR 2 Checklist (A MeaSurement Tool to Assess systematic Reviews, <https://amstar.ca/>) by one reviewer (AVG), and the results were discussed with a second reviewer (MAE). First, the 7 critical domains (domain 2-4-7-9-11-13-15) as described by Shea et al (2017)⁴⁴ were evaluated. However, given the scarcity of literature of the highest quality (without any major flaw) in this field, we adapted the interpretation of weaknesses and critical items as follows. The second domain (a priori study design) was not considered critical, and the seventh domain (list of excluded studies and rationale) was not considered critical provided a flowchart with global summary of full text exclusion reasons was presented. Taking these considerations into account, only studies without critical flaws (moderate to high quality, according to the AMSTAR-2 quality rating definitions⁴⁴ were accepted for further inclusion, and for these studies, the AMSTAR 2 appraisal was completed for the remaining nine non-critical domains. This resulted in five studies eligible for data extraction (for an overview, see Table 8). One study included children with Intellectual disability (ID), Autism spectrum disorder (ASD) or Communication disorders (CD); another study included children with ID or with ASD. Two studies focused on children with ASD and one study on children with Down syndrome. No studies specifically targeting ADHD could be retained. Further details can be found in Supplement 8.

Table 8 – Systematic reviews: studies included for data extraction

First Author, Date & Title
Donolato (2023) - Oral language interventions can improve language outcomes in children with neurodevelopmental disorders: A systematic review and meta-analysis. ²
Ganz (2023) - Participant characteristics predicting communication outcomes in AAC implementation for individuals with ASD and IDD: a systematic review and meta-analysis. ⁴⁵
McDaniel (2022) - Effectiveness of Responsivity Intervention Strategies on Prelinguistic and Language Outcomes for Children with Autism Spectrum Disorder: A Systematic Review and Meta-Analysis of Group and Single Case Studies. ⁴⁶
Sandbank (2023) - Autism intervention meta-analysis of early childhood studies (Project AIM): updated systematic review and secondary analysis. ⁴⁷
Seager (2022) - A systematic review of speech, language and communication interventions for children with Down syndrome from 0 to 6 years. ⁴⁸

2.4 Data extraction

2.4.1 Data from guidelines

The goal of this report was to identify and extract information from the clinical practice guidelines selected in the literature review, and to summarize this information to answer the questions formulated in the RQ. The goal was not to re-formulate practice recommendations and to issue a new guideline on this topic for Belgium.

To this end, the selected guidelines were analyzed and the recommendations, with the wording as reported in the GL, were extracted by one researcher (FD) and reviewed by a second researcher (ME). In line with the Research Questions (see 2.1), all relevant, generic recommendations regarding speech-language therapy/ treatment for communication and speech-language disorders in the target group, or on mono- and/or multidisciplinary management of communication and speech-language disorders were taken into account. Augmentative and Alternative Communication (AAC) is considered to be a specific form of communication and is included in this report (for definition see 1.1.5.5). However, recommendations purely related to specific speech therapy techniques and modalities (intervention content) were not included, e.g. facilitated communication.^{ff}

For each recommendation, the corresponding level of evidence and strength of recommendation were extracted as well, as reported in the GL. If available, the evidence summary explaining the RC in the GL, or a link to it, was noted, but no additional data from evidence tables was included. Of note, each guideline used its own grading system for prescribing level of evidence as well as for defining strength of recommendation. An overview of the respective systems for the GL included for ID and ASD can be found in the Table 9, Table 10, Table 11 and Table 12 below. For the respective systems explaining the extracted data from the GL for ADHD, CD and LD the reader is referred to explanations for the INESSS and AWMF GLs in the same Tables. The respective systems for the ADHD GL published by the American Academy of Pediatrics is presented in Figure 4. Almost every GL also included RC based on “expert opinion”, that arose from clinical consensus from members of the guideline development group in cases in which there was insufficient empirical data to prescribe a level of evidence.

Next, for each target group included in the literature review (ID, ASD, CD, LD, ADHD), the recommendations were classified in the following subgroups (or categories):

- assessment
- intervention
- setting
- practitioner
- aim (goals) of intervention

Recommendations, along with corresponding levels of evidence and strength of recommendation as reported in the GL, could be classified into more than 1 subgroup. The categories were identified by one researcher (FD) and reviewed by a second researcher (ME).

Finally, for each target group a summary was made for every subgroup of recommendations accordingly. The summary was written by one researcher (ME) and reviewed by a second researcher (AVG).

To assure completeness of the information and accuracy of data extraction, a preliminary draft of the report was presented to two Belgian experts in this domain (see colophon), for their review (see also 2.1).

^{ff} Facilitated communication is defined as a process by which a facilitator supports the hand or arm of a communicatively impaired individual while using a keyboard or typing device (SIGN 2016)



Table 9 – ID: Classification of the quality of the evidence in the included clinical practice guidelines

<i>Institution or body</i>					
<i>NVK (GRADE)²⁵</i>	High: We are very confident that the true effect lies close to that of the estimate of the effect. Further research is very unlikely to change our confidence in the estimate of effect	Moderate: We are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different. Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.	Low: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect. Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.	Very low: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect. Any estimate of effect is very uncertain.	Expert opinion
<i>NICE (GRADE or GRADE-CERQual¹⁸)²⁶ (and WHO 2023, based on NICE)</i>	High: High confidence in the correlation between true and estimated effect.	Moderate: Moderate confidence in the estimated effect. It is possible that the true effect is very different from the estimated effect.	Low: Limited confidence in the estimated effect. The true effect may be very different from the estimated effect.	Very low: Very little confidence in the estimated effect. The true effect is very probably different from the estimated effect.	Limited evidence: The development group did not assign a rating for the quality of the evidence. The group only stated that the evidence was limited. Not applicable: The development group did not assign a rating for the quality of the evidence because no clinical evidence was found that met the inclusion criteria.
<i>INESSS²⁰</i>	High: All assessment criteria were positively assessed.	Moderate: Most of the criteria were positively assessed.	Low: All or most of the assessment criteria were given a negative rating.	--	Insufficient: No scientific data are available, or the

	A high level of confidence that the estimated effect is comparable to the objectives of the intervention is achieved. It is unlikely that the conclusion drawn from the scientific data will be strongly challenged by the results of future studies.	A moderate level of confidence that the estimated effect is comparable to the objectives of the intervention is achieved. It is quite likely that the conclusion drawn from these data will be challenged by future study results.	A low level of confidence that the estimated effect is comparable to the intervention objectives is achieved. It is very likely that the conclusion drawn from these data will be strongly challenged by the results of future studies.		available data is insufficient. No confidence in the relationship between the estimated effect and the objectives of the intervention, or no conclusion from the data presented.
AWMF (OCEBM)*²⁸	Level 1 : Systematic review of randomized trials or n-of-1 trials	Level 2 : Randomized trial or observational study with dramatic effect	Level 3 : Non-randomized controlled cohort/follow-up Study	Level 4 : Case-series, case-control studies, or historically controlled studies	Level 5 : Mechanism-based reasoning
Townsend	NA**	NA**			Expert opinion

*From: OCEBM Levels of Evidence Working Group (2011) of the Oxford Centre for Evidence-Based Medicine (OCEBM); §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015; ** NA: not applicable

Table 10 – ID: Classification of the strength of recommendation in the included clinical practice guidelines

<i>Institution or body</i>					
NVK (GRADE)²⁵	Strong: most informed patients would choose the recommended management and clinicians can structure	Weak: patients' choices will vary according to their values and preferences, and clinicians must ensure that patients' care is in keeping with their values and preferences.			



	their interactions with patients accordingly. Strength of recommendation is determined by the balance between desirable and undesirable consequences of alternative management strategies, quality of evidence, variability in values and preferences, and resource use.	Strength of recommendation is determined by the balance between desirable and undesirable consequences of alternative management strategies, quality of evidence, variability in values and preferences, and resource use.			
NICE (GRADE)³⁰ (and WHO 2023, based on NICE)	Strong in favour: Recommendations on interventions that 'should' be used, the guideline development group is confident that, for the vast majority of people, the intervention (or interventions) will do more good than harm.	Conditional: Recommendations on interventions that should be 'considered', the guideline development group is confident that the intervention will do more good than harm for most patients. The choice of intervention is therefore more likely to vary depending on a person's values and preferences, and so the healthcare professional should spend more time discussing the options with the patient.		--	
INESSS	NA**	NA**			

AWMF *28, 29	Degree of recommendation A: Strong Wording “shall/shall not”	Degree of recommendation B: (Positive) Recommendation Wording “should/should not”		Degree of recommendation O: Open recommendation Wording “can be considered/can be rejected”	Clinical consensus point (CCP) or expert consensus: recommended as “Good Clinical Practice Point” as a treatment standard reached by consensus and based on the clinical experience of the Guideline Group members where no experimental scientific research is possible or pursued
Townend	NA**	NA**	NA**		Expert opinion

*<https://www.awmf.org/regelwerk/formulierung-und-graduierung-von-empfehlungen>; ** NA: not applicable; **AWMF (2021) Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. S3-LL (028 – 047); §AWMF 2021- Methods section: Statements do not contain an immediate call to action, but they state or explain a certain fact. Statements are also formally adopted in the consensus conference, so that a consensus strength is indicated (for evidence-based statements, the level of evidence of the underlying literature is also indicated).

Table 11 – ASD: Classification of the quality of the evidence in the included clinical practice guidelines

Institution or body					
New Zealand Guidelines Group	A: Good The recommendation is supported by GOOD evidence (where there are a number of studies that are valid, applicable and clinically relevant).	B: Fair The recommendation is supported by FAIR evidence (based on studies that are mostly valid, but there are some concerns about the volume, consistency, applicability and/or clinical relevance of the evidence that may cause some uncertainty, but are not likely to be	C: Expert opinion The recommendation is supported by EXPERT OPINION only (from external opinion, published or unpublished, e.g., consensus guidelines).	I: Insufficient No recommendation can be made. The evidence is insufficient (either lacking, of poor quality or conflicting and the balance of benefits and harms cannot be determined).	GPP: Good Practice Point Where no evidence is available, best practice recommendations are made based on the experience of the Guideline Development Team/Living Guideline Group or feedback from consultation within New Zealand.



		overturned by other evidence).			
AWMF (OCEBM)*	Level 1: Systematic review of randomized trials or n-of-1 trials	Level 2: Randomized trial or observational study with dramatic effect	Level 3: Non-randomized controlled cohort/follow-up Study	Level 4: Case-series, case-control studies, or historically controlled studies	Level 5: Mechanism-based reasoning
Danish Health Authority 2021	High: We are very confident that the true effect is close to the estimated effect	Moderate: We are moderately confident in the estimated effect. The true effect is probably close to this, but there is a possibility that it is significantly different	Low: We have limited confidence in the estimated effect. The true effect may be significantly different from the estimated effect	Very low: We have very low confidence in the estimated effect. The true effect is likely to be significantly different from the estimated effect	
AutismCRC 2022	NA**	NA**	NA**	NA**	
SIGN (same classification in WHO 2023)	1++: High quality meta-analyses, systematic reviews of randomized controlled trials (RCTs), or RCTs with a very low risk of bias. 1+: Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias.	1-: Meta-analyses, systematic reviews, or RCTs with a high risk of bias. 2++: High quality systematic reviews of case control or cohort studies, High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.	2+: Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal. 2-: Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.	3: Non-analytic studies, e.g. case reports, case series. 4: Expert opinion.	--
KCE (same classification in WHO 2023)	--	--	Low: The final KCE recommendations for management and treatment of ASD are	--	Expert opinion: recommendations based on expert consensus were issued

consensus based and therefore their level of evidence is low.

for domains lacking EBM evidence

*From: OCEBM Levels of Evidence Working Group (2011) of the Oxford Centre for Evidence-Based Medicine (OCEBM); §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015; ** NA: not applicable

Table 12 – ASD: Classification of the strength of recommendation in the included clinical practice guidelines

<i>Institution or body</i>					
<i>New Zealand Guidelines Group</i>	NA**	NA**			
<i>AWMF*</i>	Degree of recommendation/ statement [§] A: Strong Wording “shall/shall not”	Degree of recommendation/ statement B: (Positive) Recommendation Wording “should/should not”	Degree of recommendation/ statement C** : no further explanation available	Degree of recommendation/ statement 0: Open recommendation Wording “can be considered/can be rejected”	Clinical consensus point (CCP) or expert consensus: recommended as “Good Clinical Practice Point” as a treatment standard reached by consensus and based on the clinical experience of the Guideline Group members where no experimental scientific research is possible or pursued
<i>Danish Health Authority 2021</i>	A strong recommendation is given when there is high-quality evidence showing that the overall benefits of the intervention clearly outweigh the disadvantages. This means that all, or almost all, patients will want the	A weak/conditional recommendation for the intervention is given when it is judged that the benefits of the intervention outweigh the harms, or the available evidence cannot exclude a significant benefit of the intervention, while the harms are judged to be few or absent. This recommendation is also			Good practices: Good practice is used when there is no relevant evidence and is thus based on professional consensus among the members of the working group that developed the clinical guideline. The recommendation can be either in favour or against the intervention. Since it is a professional consensus, this type of recommendation is weaker than evidence-based



<i>Institution or body</i>					
	recommended intervention A strong recommendation against is given when there is high-quality evidence showing that the overall harms of the intervention clearly outweigh the benefits. A strong recommendation against is also used when the review of the evidence shows that an intervention is almost certainly futile.	used when it is judged that patients' preferences vary. A weak/conditional recommendation against the intervention is given when it is judged that the harms of the intervention outweigh the benefits, but this is not supported by strong evidence. This recommendation is also used when there is strong evidence for both beneficial and harmful effects, but the balance between them is difficult to determine. Similarly, it is also used when it is judged that patient preferences vary			recommendations, regardless of whether evidence-based recommendations are strong or weak
<i>AutismCRC 2022</i>	Strong: as per the GRADE process and reflecting the confidence in the clarity of the balance between desirable and undesirable consequences	Conditional: The 'conditional' rating refers to factors to consider during implementation.			
<i>SIGN (same classification in WHO 2023)</i>	Strong in favour: Recommendations on interventions that 'should' be used, the	Conditional: Recommendations on interventions that should be 'considered', the			Good practice points: Recommended best practice based on the clinical experience

<i>Institution or body</i>					
	guideline development group is confident that, for the vast majority of people, the intervention (or interventions) will do more good than harm.	guideline development group is confident that the intervention will do more good than harm for most patients. The choice of intervention is therefore more likely to vary depending on a person's values and preferences, and so the healthcare professional should spend more time discussing the options with the patient.			of the guideline development group.
KCE	—	—			Expert opinion: Recommend best practice based on the clinical experience of the guideline development group.
WHO 2023 (regarding KCE 2014 RC)	Strong: The clinical practice guideline used the "should" to formulate the interventions. The WHO team interpreted this word as "strong".	Conditional: The clinical practice guideline used the "consider" to formulate the interventions. The WHO team interpreted this word as "conditional".			When no grade could be allocated, working group members attempted to reach professional agreement (PA) on specific topics

*<https://www.awmf.org/regelwerk/formulierung-und-graduierung-von-empfehlungen>; ** NA: not applicable; **AWMF (2021) Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. S3-LL (028 – 047); §AWMF 2021- Methods section: Statements do not contain an immediate call to action, but they state or explain a certain fact. Statements are also formally adopted in the consensus conference, so that a consensus strength is indicated (for evidence-based statements, the level of evidence of the underlying literature is also indicated).

Figure 4 – American Academy of Pediatrics: Classification of the level of evidence and strength of recommendation in the GL “Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder”

Aggregate Evidence Quality	Benefit or Harm Predominates	Benefit and Harm Enhanced
Level A Intervention: well-designed and conducted trials, meta-analyses on applicable populations Diagnosis: independent gold standard studies of applicable populations	Strong recommendation	Weak recommendation (based on balance of benefit and harm)
Level B Trials or diagnostic studies with minor limitations; consistent findings from multiple observational studies	Moderate recommendation	
Level C Single or few observational studies or multiple studies with inconsistent findings or major limitations.	Weak recommendation (based on low-quality evidence)	
Level D Expert opinion, case reports, reasoning from first principles		No recommendation may be made.
Level X Exceptional situations in which validating studies cannot be performed, and there is a clear preponderance of benefit or harm	Strong recommendation Moderate recommendation	

Source: American Academy of Pediatrics (2019) - *Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents*.³⁹

2.4.2 Data from systematic reviews

To allow for a support, conjecture and/or update of evidence published in the selected GL(s), the following data items were collected from the eligible SRs (n=5, see Table 8). Following a pilot data extraction in excel, and whenever available, one author (AVG) extracted data of study id (author, year), characteristics of included studies (date of last literature search, number of studies, study designs), participants (diagnosis, relevant subgroups of age, gender as well as level of IQ, language or developmental age), study setting, interventions (type, delivery mode, interventionist, duration), comparison (type), findings (outcome measures, results (main and moderator analysis), publication bias and other considerations).. For each study, data were extracted as reported by the study authors, and complemented with the respective AMSTAR-2 quality rating to provide with a comprehensive summary of the findings. The breadth as well as depth of data collection was limited to the study question and pragmatic research approach; yet all study details are available on request.

2.5 Stakeholder consultation

To ensure the KCE recommendations are appropriately tailored to the Belgian context and grounded in available evidence, a meeting with all relevant stakeholders was organised following the extraction of all data and the drafting of preliminary conclusions. The aim of this consultation was to collect relevant contextual information with regard to the scientific findings. Prior to the meeting, a written summary, including summary statements from the GLs (see chapter 3.2) and results from the SRs (see chapter 4.2), was shared with participants, who were invited to provide written comments. These comments were then summarized and presented during a plenary session. The results were discussed and completed where relevant. Afterwards, participants were given the opportunity to share any final written remarks with the KCE team.

While the scientific evidence is reported accurately, chapter 5 of this report presents a narrative overview of these discussions and written remarks in order to provide context to the scientific results.

The stakeholder panel included representatives from all relevant sectors, such as patient and parent representatives, healthcare professionals (prescribers and providers), education, national health insurance (sickness funds), and government representatives (both federal and federated entities). A list of invited stakeholders is provided in the colophon of this report.



3 RESULTS GUIDELINES

Key Points

- Six GLs were selected for data extraction related to SLT for children covering the various spectrum of ID, including Down syndrome (DS), severe complex (communication) needs, and Rett syndrome. Fifty unique recommendations are included for ID. Of these recommendations, 21/50 (42%) are stated to be evidence-based, and 10/50 (20%) are (according to the GL authors) based on good quality as indicated by the grading of the level of evidence.
- Nine GLs were selected for ASD. Overall, 43 unique recommendations relevant to the scope of this report were extracted for ASD. Of these recommendations, 12/43 (28%) are stated to be evidence-based, and 5/43 (12%) are (according to the GL authors) based on good quality as indicated by the grading of the level of evidence.
- For ADHD, six GLs were retained for inclusion in the report, and two of these GLs included recommendations related to the focus of this report. Overall, four unique recommendations were extracted for ADHD. 3/4 (75%) recommendations are stated to be evidence-based, of which none of good quality.
- Two GLs were retained for data extraction related to SLT for children with CD. Seven unique recommendations were extracted for CD. Only one (14%) recommendation is stated to be evidence-based, and based on good quality.
- For LD, 2 GLs were retained for inclusion in the report, but no recommendations relevant for the scope of the report could be extracted.
- Recommendations extracted from the GLs have been amalgamated according to diagnostic groups and themes, including Assessment, Intervention, Setting, Practitioner, and Aims (Goals). A summary of these can be found in the Discussion (see 6.1, and Supplement 5.3).

3.1 Characteristics of selected GL

3.1.1 Intellectual disability (ID)

Table 3 – Intellectual disability (ID): Guidelines included for data extraction

Authors, date & Title
Nederlandse Vereniging voor Kindergeneeskunde (2021) - Medische begeleiding van kinderen met downsyndroom. ²⁵
NICE (2022) - Disabled children and young people up to 25 with severe complex needs: integrated service delivery and organisation across health, social care and education (NG213). ²⁶
WHO (2023) - Package of interventions for rehabilitation for disorders of intellectual development. ⁶
INESSS (2019) - L'autonomie des jeunes âgés de 6 à 21 ans qui présentent une déficience intellectuelle - Guide de pratique. ²⁰
Townend (2020) - Consensus-based guidelines for managing communication of individuals with Rett syndrome. ²⁷
AWMF (2022) - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸

Six GL were selected for data extraction of RC for SLT for children with ID (see Table 3).

NVK (2021) (Nederlandse Vereniging voor Kindergeneeskunde 2021) is a Dutch GL on management of children with Down syndrome.²⁵ A large part covers medical treatment and follow-up, but needs in the domain of communication are also dealt with. All children with Down syndrome are included, without differentiating between milder or more severe clinical presentations.

NICE (2022)²⁶ aims to provide evidence-based recommendations for disabled children and young people up to 25 with severe complex needs, who require health, social care and education support. Children and young people who do not have needs in all 3 areas of health, social care and education are not included. Relevant conditions and disorders include, among other: neurological conditions, genetic conditions, autism spectrum disorder, attention-deficit/hyperactivity disorder, behaviour that challenges. It was decided to include this GL for the topic “ID” of this report, taking into account the literature base used in this GL to formulate RC, and the nature of the RC in this GL. relevant for our report. The target population of this GL is obviously the more severe spectrum of ID, although no levels of severity are explicitly stated.

WHO (2023) “Package of interventions for rehabilitation for disorders of intellectual development”⁶ is based on a systematic review of the literature published separately (Wickstrom 2021).²¹ This SR identified and summarized high-quality clinical practice guidelines for ID (and ASD) for potential inclusion in the WHO Rehabilitation Programme’s Package of Interventions for Rehabilitation⁶. Only the content of the recommendations, their corresponding level of evidence and strength of recommendation were extracted from the guidelines, and presented to the WHO Working Group to support their selection of the most relevant interventions. In WHO (2023), these RC are presented, with reference to the corresponding source GL. Further, the WHO Working Group also formulated recommendations based on their own expert opinion. The definition of ID in this GL refers to the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders and the ICD-11, thereby referring to persons with significant deficits in intellectual and adaptive functioning that started during the developmental period, as defined in these classification systems. A severity level from mild to profound can be assigned, but such levels are not included in the RC of this GL.

INESSS (2019)²⁰ focuses on how to improve autonomy of children and young people between 6 and 21 years suffering from ID, and covering the full spectrum of severity without specifying levels. Interestingly, to define ID the definition of the American Association on Intellectual and Developmental Disabilities (AAIDD) is used.⁹⁹ This association defines intellectual disability as a condition characterized by significant limitations in both intellectual functioning and adaptive behavior that originates before the age of 22. Limitations in intellectual functioning are defined as scores on an IQ test of around 70 or as high as 75. AAIDD stresses that additional factors must be taken into account when assessing intellectual functioning and adaptive behavior, such as the community environment typical of the individual’s peers and culture. Also, assessments must assume that limitations often coexist with strengths.

Townend (2020)²⁷ is a consensus-based guideline for managing communication of individuals with Rett syndrome. It was developed by combining available evidence and lived experience with expert opinion. Statements and recommendations were extracted from a literature review and combined with survey responses from communication professionals and caregivers, with 650 contributing participants from 43 countries. This was submitted to 35 professionals and caregivers who completed a two-phase Delphi survey resulting in a consensus-based GL.

AWMF (2022)²⁸ is a German GL dealing with SLT for developmental language delay and disorders, associated or not with comorbidities, such as hearing loss, ID and ASD. ID is defined as an impairment of intellectual abilities, starting during early development and manifesting itself in domains such as cognition, language, motor, everyday practical and social skills. It implies an IQ level more than 2 standard deviations below the mean of 100 (standard deviation 15). This means an IQ of ≤ 70 , as determined by a standardized test, and in the case of a manifest or suspected language development disorder a non-verbal intelligence test should be used. Reference is made to ICD-10 and its update, ICD-11. For ID, the guideline is divided in two parts. One part focuses on therapy of language development disorders in cases of general intellectual disability (also including literature on Down syndrome). The second part focuses on therapy for people with language development disorders

⁹⁹ <https://www.aaid.org/>

associated with syndromes and multiple disabilities, including a large range of syndromes with variable presentation and language capacities (e.g. Down syndrome, Angelman syndrome, Williams-Beuren syndrome, Fragile X-syndrome, Prader-Willi syndrome, Rett syndrome, 22q11 microdeletion syndrome (velo-cardiofacial syndrome or Shprintzen syndrome)).

3.1.2 Autism spectrum disorder (ASD)

Nine GL were selected for data extraction of RC for SLT for children with ASD (see Table 4).

NICE (2021) "Autism spectrum disorder in under 19s: support and management"²⁶ is an update from the comprehensive NICE GL published in 2013 on treatment of children and adolescents suffering from ASD. In 2021, an update and new recommendations were introduced for feeding problems including restricted diets, and for the use of melatonin for sleeping problems. For other content of the 2013 GL, no new evidence that could affect the recommendations was found; the recommendations remained unchanged and were considered to be still relevant. KCE (2014) "Management of autism in children and young people: a Good Clinical Practice Guideline"³⁵ started from the structure and evidence of the NICE 2013 GL, and was largely based on it. It adapted this GL to the Belgian context taking at the same time a guideline by the French Haute Autorité de la Santé (HAS) (2012)⁴⁹ into account, and involving a large group of Belgian experts while using a Delphi procedure. Hence KCE (2014) is considered to be more relevant to the Belgian context than NICE (2021), and therefore no RC will be extracted in this report from NICE (2021).

AWMF (2022) "Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015)"²⁸ is a German GL dealing with SLT for developmental language delay and disorders, associated or not with comorbidities, such as hearing loss, ID and ASD. In the part related to developmental language disorders associated with ASD, the authors refer to and take over the RC from the AWMF (2021) GL "'Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. S3-LL (028 – 047)".²⁹ AWMF (2021) was also selected for inclusion and extraction of RC in the current report. Therefore only one additional, general RC has been extracted from AWMF (2022) for this section.

AWMF (2021)²⁹ is a comprehensive German GL on the treatment of children, adolescents and adults with ASD. In most chapters of this GL, the NICE (2013) "Autism spectrum disorder in under 19s: support and management" (as well as the corresponding NICE GL for adults) is included and taken as a starting point for update of the literature. For most RC regarding treatment, a distinction is made between children without or with ID, defined as IQ<70.

AutismCRC (2022) "National Guideline for supporting the learning, participation, and wellbeing of autistic children and their families in Australia"³³ aims at explaining to practitioners how to work with autistic children and their families in ways that are safe, effective, and desirable. It does not include detailed RC on SLT in children with ASD. Nevertheless, some generic recommendations could be extracted for the purpose of this report. All RC in this GL are based on the best available evidence, in combination with information from surveys and focus groups among autistic persons, their family, practitioners and other relevant stakeholders. Of notice, the umbrella review of systematic reviews on effectiveness of ASD treatments included a section on adverse events. Adverse events were rarely considered, and only identified in 1 SR (see also 3.2.2.2).

SIGN (2016) "Assessment, diagnosis and interventions for autism spectrum disorders (CPG 145)"³⁴ is a Scottish GL aiming to provide the evidence base and recommendations to inform clinical service provision, in particular, assessment and clinical intervention, for children, young people and adults suffering from ASD. The guideline was revalidated in August 2019, it was concluded that no evidence had been identified that would significantly change the key recommendations. A new revalidation process was scheduled for 2023.

WHO (2023) “Package of interventions for rehabilitation for autism spectrum disorders”⁶ is based on a systematic review of the literature published separately (Wickstrom 2021)²¹. This SR identified and summarized high-quality clinical practice guidelines for ASD (and ID) for potential inclusion in the WHO Rehabilitation Programme’s Package of Interventions for Rehabilitation⁶. Only the content of the recommendations, their corresponding level of evidence and strength of recommendation were extracted from the guidelines, and presented to the WHO Working Group to support their selection of the most relevant interventions. In WHO (2023), these RC are presented, with reference to the corresponding source GL.

The Danish Health Authority (2021) “National clinical guideline for the treatment of autism spectrum disorders in children and adolescents”³¹: this GL deals with recommendations for nine specific types of treatment, prioritised by a working group of professionals as the areas where it is most important to clarify the evidence in relation to the treatment. Interventions for social skill and communication training and language development are among the priorities.

Whaikaha-Ministry of Disabled People and Ministry of Education (2022) - Aotearoa New Zealand Autism Guideline³²: this GL is intended to provide guidance around supporting people with ASD in New Zealand across the lifespan. It covers identification, diagnosis, ongoing assessment, and access to supports and services. It is an evidence-based “living” GL continuously updating selected topics when the recommendations in the first edition of the guideline are no longer considered valid in the face of new evidence. The publication date of the last available evidence summary update varies for the respective topics from 2010 to 2024.

To conclude, RC were extracted from 8 GL, and if a GL copied RC from another GL that is also included in the current report, this was mentioned as “copy”

Table 4 – Autism spectrum disorder (ASD): Guidelines included for data extraction

Authors, date & Title
AWMF (2021) - Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. S3-LL (028 – 047). ²⁹
NICE (2021) - Autism spectrum disorder in under 19s: support and management (CG170). ³⁰
The Danish Health Authority (2021) - National clinical guideline for the treatment of autism spectrum disorders in children and adolescents. ³¹
Whaikaha-Ministry of Disabled People and Ministry of Education (2022) - Aotearoa New Zealand Autism Guideline. ³²
AutismCRC (2022) - National Guideline for supporting the learning, participation, and wellbeing of autistic children and their families in Australia. ³³
SIGN (2016) - Assessment, diagnosis and interventions for autism spectrum disorders (CPG 145). ³⁴
KCE (2014) “Management of autism in children and young people: a Good Clinical Practice Guideline”. ³⁵
WHO (2023)* - Package of interventions for rehabilitation for autism spectrum disorders. ⁶
AWMF (2022)** - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸



3.1.3 Attention-deficit/hyperactivity disorder (ADHD)

Six GL were selected for data extraction of RC for SLT for children with ADHD (see Table 5).

Table 5 – Attention deficit / Hyperactivity disorder (ADHD): Guidelines included for data extraction

Guidelines ADHD selected for data extraction
Sundhedsstyrelsen (2021) - National clinical guideline for the assessment and treatment of ADHD in children and adolescents. ³¹
AWMF (2018) - S3-Leitlinie ADHS bei Kindern, Jugendlichen und Erwachsenen. ⁸
INESSS (2018) - Optimal service trajectory for children, adolescents and young adults with attention deficit disorder with or without hyperactivity (ADHD) or related problems. ³⁷
NICE (2018) - Attention deficit hyperactivity disorder: diagnosis and management (NG87). ³⁸
American Academy of Pediatrics (2019) - Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. ³⁹
AADPA (2022) - The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. ⁵⁰

Only the Guidelines “AWMF (2018) - S3-Leitlinie ADHS bei Kindern, Jugendlichen und Erwachsenen” and “American Academy of Pediatrics (2019) - Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents” included recommendations related to the research questions and focus of this report.

3.1.4 Communication disorders (CD)

Two GLs were selected for data extraction of RC for SLT for children with CD (see Table 6).

Table 6 – Communication disorders (CD): Guidelines included for data extraction

Authors, date & Title
INESSS (2017) - Organisation du continuum et de la dispensation des services aux enfants âgés de 2 à 9 ans présentant un trouble développemental du langage. ⁴¹
AWMF (2022) - Therapie von Sprachentwicklungsstörungen Interdisziplinäre S3-Leitlinie (AMWF 049-015). ²⁸

We extracted 3 recommendations and a statement from the AWMF 2022 guideline on Developmental Language Disorders which are applicable to the scope of the current study. Other sections of the AWMF 2022 guideline on Developmental Language Disorders are included in the respective recommendation table of ID and ASD. We also extracted 3 recommendations relevant to the scope of this report from the INESSS 2017 guideline on children of 2 to 9 years old presenting with Developmental Language Disorder.

3.1.5 Specific learning disorder (LD)

Two GLs were selected for data extraction of RC for SLT for children with LD (see Table 7).

Table 7 – Specific Learning Disorder (LD): Guidelines included for data extraction

Authors, date & Title
AWMF (2015) - S3-Leitlinie Diagnostik und Behandlung bei der Lese- und/oder Rechtschreibstörung. ⁴²
AWMF (2018) - S3-Leitlinie Diagnostik und Behandlung der Rechenstörung. ⁴³

No recommendations relevant for the scope of this report could be extracted. (e.g. IQ limits)

3.2 Summary of the findings

3.2.1 Intellectual disability (ID)

An overview of all included RC from the 6 selected GL for ID can be found in Supplement 5.2.1 (Table 26). In the next sections, an overview of the RC as classified per subgroup is presented, as well as a summary for every subgroup.

A total of 50 recommendations was extracted from the 6 GL. Two of these 50 RC were copies taken over in the WHO 2023 GL from NICE GLs^{hh} not included in this report.

Thus overall, 50 unique recommendations are included for ID. 21/50 (42%) recommendations are stated to be evidence-based, and 10/50 (20%) are (according to the GL authors) based on good quality as indicated by the grading of the level of evidence (RC 21-22-23-24-27-31-32-33-34-36).

3.2.1.1 Assessment

The recommendations that deal with initial assessment of children with intellectual disability, are presented in Table 13. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

^{hh} Challenging behaviour and learning disabilities: Prevention and interventions for people with learning disabilities whose behaviour challenges (NG 11). London: National Institute for Health and Care Excellence (NICE); 2015; Mental health problems in people with learning disabilities: prevention, assessment, and management (NG 54). London: National Institute for Health and Care Excellence (NICE); 2016



Table 13 – ID: Recommendations related to Assessment (N: 13)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
ID-A1	12	The production of voice and speech is often limited in people with DID. Therefore, the development group considers the assessment of speech functions as essential for the determination of intervention needs. To the knowledge of the development group, no severe harms are associated with the assessment. The cost-benefit ratio in relation to the clinical benefits justifies the inclusion of the assessment in the Package of interventions for rehabilitation. Furthermore, the assessment is considered as feasible and accepted by people with DID.	A	WHO 2023	Expert Opinion		
	29	In all syndromal disorders, child development can vary greatly from one individual to another, as the syndromes can show different areas of disorder and degrees of severity. This means that there can be no standardized treatment recommendations based solely on the diagnosis. In many syndromic disorders, speech development disorders are accompanied by associated learning disorders or intellectual disability of varying degrees, often including hearing disorders, and can range from discrete speech abnormalities to failure to acquire language.	A/I	AWMF 2022	Expert Opinion	CCP***	
ID-A2	45	Due to the complexity of their communication needs, assessment of individuals with Rett syndrome should be part of a team process.	A/S	Townend 2020	Expert Opinion		
	46	The outcome of the assessment should not rely on the judgement of one professional in isolation.	A/S	Townend 2020	Expert Opinion		
ID-A3	42	The individual and their family may be referred to a Rett Specialist Clinic or Expertise Center in order to get a diagnosis, for specialized assessment and advice, or for a second-opinion at any point following diagnosis.	A/S	Townend 2020	Expert Opinion		
	8	Education, health and social care practitioners should refer disabled children and young people with severe complex needs to specialised augmentative and alternative communication services if they meet the eligibility criteria.	A/S	NICE 2022	Expert Opinion	Strong	
	47	At the time of diagnosis, individuals with Rett syndrome should be referred for AAC evaluation.	A	Townend 2020	Expert Opinion		

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
ID-A4	44	Assessment should consider the opportunities and barriers to communication that may be present in various environments (e.g., home, school, and social settings). Observations should be conducted in a range of communication environments and with a range of communication partners.	A/S	Townend 2020	Expert Opinion		
ID-A5	25	The conception of a speech therapy intervention for a language development disorder associated with intellectual disability should be based on the overall development of the patient, his/her communicative participation, the existing environmental factors and his/her main language disorders and symptoms, which have been determined in a comprehensive individual diagnosis of his/her phonological, semantic-lexical, morphological-syntactic and pragmatic abilities.	A	AWMF 2022	Expert Opinion	CCP***	
ID-A6	2	Align the choice of a particular strategy, form of communication or tool with the skills and capabilities of the child and its main communication partners.	A	NVK 2021	Expert Opinion		
	6	Find out what communication formats and media the child or young person prefers (for example, children who are non-verbal might use alternative and augmentative communication). Communicate with them using their preferred format. Ensure the format allows them to use any inclusive terminology that is relevant to them.	A	NICE 2022	Evidence-based		GRADE-CERQual [§] : Low
	37	When selecting and organizing vocabulary in AAC, it should be taken into account that children use the core vocabulary more frequently than the peripheral vocabulary. Furthermore, individual, developmental and environmental aspects should be taken into account.	A	AWMF 2022	Expert Opinion	CCP***	5
ID-A7	4	Encourage and support children and young people to give their views on their health, care, education and support, and express what they want and need. Take account of the communication needs of children and young people. If needed, consider getting support from a specialist to help them participate in discussions and decisions and express their views. Encourage parents and carers to think about how their child can give their own views and be involved in decisions. Ask them what services can do to support their child in communicating their views.	A/P	NICE 2022	Evidence-based		GRADE-CERQual [§] : Moderate

(#): see Supplement Table 24; *as mentioned in GL, see Table 9-10 and Supplement Table 24; **Sub-Group: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point; [§]Confidence in the Evidence from Reviews of Qualitative research; Lewin 2015.



The main points of these recommendations can be summarised as follows:

	ID: Summary points "Assessment"	RC n°- (#)	Evidence (#)
ID-A1	The assessment of speech functions can be considered as essential for the determination of intervention needs for children and young people with ID. There can be no standardized treatment recommendations based solely on the diagnosis. As far as known, no severe harms are associated with the assessment. Furthermore, it is considered as feasible and accepted by people with intellectual disability.	12, 29	Expert opinion (WHO, AWMF)
ID-A2	For children and young people with ID and complex communication needs (e.g. Rett syndrome), assessment should be part of a team process and should not rely on the judgement of one professional in isolation.	45, 46	Expert opinion (Townend)
ID-A3	Children and young people with ID and complex communication needs (e.g. Rett syndrome), may be referred to a Specialist Clinic or Expertise Centre in order to get a diagnosis, for specialized assessment and advice, or for a second-opinion at any point following diagnosis. Education, health and social care practitioners should refer children and young people with severe complex needs to specialised augmentative and alternative communication (AAC) services for evaluation if they might benefit from it.	42, 8, 47	Expert opinion (Townend, NICE) (1GL- NICE: 1RC strong)
ID-A4	Assessment should consider the opportunities and barriers to communication that may be present in various environments (e.g., home, school, and social settings). Observations should be conducted in a range of communication environments and with a range of communication partners.	44	Expert opinion (Townend)
ID-A5	The conception of a speech therapy intervention for a language development disorder associated with intellectual disability should be based on the overall development of the patient, his/her communicative participation, the existing environmental factors and his/her main language disorders and symptoms, which have been determined in a comprehensive individual diagnosis of his/her phonological, semantic-lexical, morphological-syntactic and pragmatic abilities.	25	Expert opinion (AWMF)
ID-A6	The choice of a particular strategy, format of communication or tool should align with the skills and capabilities of the child and its main communication partners. The preferences of the child or young person as well as individual, development and environmental aspects should be taken into account.	2, 6, 37	Expert opinion (NVK, AWMF); Evidence-based (1GL) (NICE: 1RC GRADE-CERQual [§] : Low)
ID-A7	Encourage and support children and young people to give their views, and express what they want and need. If needed, consider getting support from a specialist to help them participate in discussions and decisions. Ask parents and carers what services can do to support their child in communicating their views and be involved in decisions.	4	Evidence-based (1GL) (NICE: 1RC GRADE-CERQual [§] : Moderate)

(#): see Table 9-10 and Supplement Table 24 ; [§]Confidence in the Evidence from Reviews of Qualitative research; Lewin 2015

REMARKS:

These conclusions are largely based on expert opinion (albeit with a strong recommendation in one GL), and on some evidence from qualitative research of low to moderate quality.

3.2.1.2 Intervention

The recommendations that deal with intervention for speech/language disorders in children with intellectual disability, are presented in Table 14. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 14 – ID: Recommendations related to Intervention (N: 23)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
ID-I1	11	Cognitive functions of language are often limited in people with DID. Therefore, the development group considers language therapy as essential for people with DID. To the knowledge of the development group, no severe harms are associated with the use of speech and language therapy in people with DID. The cost-benefit ratio in relation to the clinical benefits justifies the inclusion of this intervention in the Package of interventions for rehabilitation. Furthermore, speech and language therapy is considered as feasible and accepted by people with intellectual disability.	I	WHO 2023	Expert Opinion		
	13	The production of voice and speech is often limited in people with DID. Therefore, the development group considers speech therapy as essential for people with DID. To the knowledge of the development group, no severe harms are associated with the use of speech therapy in people with DID. The cost-benefit ratio in relation to the clinical benefits justifies the inclusion of this intervention in the Package of interventions for rehabilitation. Furthermore, speech therapy is considered as feasible and accepted by people with DID.	I	WHO 2023	Expert Opinion		
	20	Language development disorders are common in children with an intellectual disability. Affected children have been shown to benefit from early speech therapy intervention.	I/P/S	AWMF 2022	Expert Opinion	CCP***	



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
		In addition, educational support measures also appear to be useful.					
	21	Children with language development disorders associated with intellectual disability should receive early speech therapy intervention according to their cognitive and general developmental level in a multi-professional setting. Therapy and support for language development in children with intellectual disability or a global developmental disorder should be communication-centered, taking into account the level of development and the underlying etiology, integrated into a comprehensive therapy and support concept and coordinated in an interdisciplinary treatment team.	I/P/S	AWMF 2022	Evidence-based	B	1 to 2
	27	In speech therapy for children with speech development disorders or pronunciation/speech disorders, associated with intellectual disability, therapeutic methods shall be used that have proven to be effective in research for children who do not fall into this category. These are described in detail in chapters 3.1.1 (Therapy of pronunciation disorders), 3.1.2 (Therapy of lexical-semantic disorders), 3.1.3 (Therapy of morphological-syntactic disorders), 3.1.4 (Therapy of pragmatic-communicative disorders), 3.2.3 (Therapy of language development disorders associated with syndromes and multiple disabilities) and include input enrichment, modelling techniques, elicitation methods to create production opportunities and the use of visualization. In addition, methods of augmentative and alternative communication (including sign language, electronic and non-electronic communication aids) shall be used in speech therapy.	I	AWMF 2022	Evidence-based	A	1
	31	Speech therapy can improve the spoken and written language skills of people with Down syndrome and shall be used.	I	AWMF 2022	Evidence-based	A	1
	32	For children with Fetal Alcohol Spectrum Disorders (FASD), treatment of phonics and literacy skills can improve these and should be used.	I	AWMF 2022	Evidence-based	B	1 to 2

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
	33	In children with language development disorders associated with Rett syndrome, treatment of language and communication skills can be effective and should be considered.	I	AWMF 2022	Evidence-based	0 (Open recomm)	1 to 2 (moderate evidence for efficacy, often individual case studies)
ID-12	14 (see also RC20)	Preschool classroom-based interventions (for children aged 3–5 years) should have multiple components, including: • curriculum design and development • social and communication skills training for the children • skills training in behavioural strategies for parents or carers • training on how to mediate the intervention for preschool teachers.	I/S	WHO 2023	Evidence-based	Strong	GRADE: Very low to low
ID-13	3	Preferably start early (< 1 year) with speech therapy for children with Down syndrome to stimulate speech language development and (non-verbal) communication. Preference is given to a speech therapist who has experience with and knowledge of children with Down syndrome.	I/P	NVK 2021	Expert Opinion		
	49	Communication intervention and management should start early and be lifelong.	I	Townend 2020	Expert Opinion		
ID-14	34	For children with speech and/or communication disorders in the context of a syndromic disorder, joint child- and parent-centered treatment shall be carried out; parental counseling is particularly important for interaction design and responsiveness.	I	AWMF 2022	Evidence-based	A	1 to 2
ID-15	1	Encourage the communication of children with Down syndrome by using various forms of supportive communication. Use a (unique) set of forms of communication tailored to the child and his communication partners, using one or more of the standardized methods of communication support available in the Netherlands. Think of spoken language in combination with supporting communication without aids (such as gestures and posture), with non-technical aids (use of reproaches, written	I	NVK 2021	Expert Opinion		



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
		words / text, icons or photos) and with technical aids (such as voice button, voice computer or tablet).					
	17	From adolescence, the targeted skills are the same as those developed in childhood, adjusted to the contexts of adolescence and early adulthood. The combined use of multiple communication modes (e.g., oral, gestural, written) should be encouraged for expressive and receptive communication, even if the youth uses oral language partially (e.g. learned signs, natural gestures, written language, image supports, basis and high tech aids). The youth should be given maximum opportunities to communicate in all environments they are living in (e.g., through play, changing environmental conditions). Behavioural intervention techniques such as those used in applied behaviour analysis should be employed to develop the young person's communication skills.	Aim/I	INESSS 2019	Expert Opinion		
	28	The respective combination and weighting of the methods should be tailored to the individual case, taking into account individual factors (age, awareness of the disorder, therapy goals, therapy phase). A multimodal communication concept, i.e. the use of different communication channels (e.g. spoken language, gestures, external communication aids) should be aimed for.	I	AWMF 2022	Evidence-based	B	2b
	50	Interventions for developing or maintaining sound production, spoken words, or sentences should be combined with aided AAC.	I	Townend 2020	Expert Opinion		
	29	In all syndromal disorders, child development can vary greatly from one individual to another, as the syndromes can show different areas of disorder and degrees of severity. This means that there can be no standardized treatment recommendations based solely on the diagnosis. In many syndromic disorders, speech development disorders are accompanied by associated learning disorders or intellectual disability of varying degrees, often including hearing disorders, and can range from discrete speech abnormalities to failure to acquire language.	A/I	AWMF 2022	Expert Opinion	CCP***	

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
ID-I6	7	Education, health and social care practitioners should tell children and young people who use augmentative and alternative communication and their families and carers about any support and mentoring groups that could help them with communication and social interaction.	I	NICE 2022	Expert Opinion		
	15	Provision and training in the use of assistive products for communication by a speech and language therapist/pathologist is included in the resources required for rehabilitation in disorders of intellectual development.	I/P	WHO 2023	Evidence-based	Strong	GRADE: Very low
	18	For the young person who needs communication aids: The young person and his family should be supported by a multidisciplinary team in choosing types of communication aids: • Communication without technical assistance (e.g., oral language, natural gestures, learned signs) • Communication with technical aids without technology (e.g. symbolic objects, communication boards with images or pictograms or using written language, PECS system); • Communication with low-tech technical aids (e.g. voice-based devices such as BIGMack, GoTalk) or high-tech devices (e.g. touch tablets or smart phones equipped with specialized software for oral communication). The modes (e.g., oral, gestural, written) and technical aids chosen should be available at all times and their use should be widespread, to allow effective expressive and receptive communication in the different environments that the young person frequents.	I/S	INESSS 2019	Evidence-based		Low to High
	19	For the young person who needs communication assistance: The young person and his family should be educated from childhood so that the young person develops, in particular, the skills necessary to use a technical communication aid: • Know and understand the content of the communication aid (e.g., images and their meaning); • Properly handling the communication aid (e.g., moving a cursor, navigating between different pages or tables of communication);	Aim/I	INESSS 2019	Expert Opinion		



	RC n° (#)	Recommendation*	Sub- Group**	Guideline	Level Evidence*	Strength recommendation*	RC Grading*
		- To deal with unforeseen events (e.g. breakage, missing equipment); - Contribute to the adaptation of the contents of the communication aid, according to the evolution of the developmental needs. Behavioural intervention techniques such as those used in applied behaviour analysis should be employed to develop the ability to use a communication aid					
	36	AAC can compensate for temporary or permanent impairments and limitations in spoken and written language skills, communication, activity and participation for children with (severe) language development disorders associated with syndromic diseases and multiple disabilities and shall be used for these children.	I	AWMF 2022	Evidence-based	A	1
	38	AAC measures to promote language development should follow a common pedagogical and therapeutic concept for the selection and organization of vocabulary, regardless of the AAC strategies and systems used.	I	AWMF 2022	Evidence-based	B	2

(#): see Supplement Table 24; *as mentioned in GL, see Table 9-10 and Supplement Table 24; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point.

The main points of these recommendations can be summarised as follows:

	ID: Summary points “Intervention”	RC n° (#)	Evidence (#)
ID-I1	Children with language development disorders associated with intellectual disability, including children with syndromal disorders, should receive early speech/language therapy according to their cognitive and general developmental level. Speech/language therapy is considered as essential for people with ID. As far as known, no severe harms are associated with the use of speech/language therapy in people with ID, and it is considered as feasible and accepted by people with ID. Therapy and support for speech/language development in children with intellectual disability or a global developmental disorder should be communication-centered, taking into account the level of development and the underlying etiology, and integrated into a comprehensive therapy and support concept. Therapeutic methods shall be used that have proven to be effective in research for children who do not fall into this category. In addition, methods of augmentative and alternative communication (including sign language, non-electronic and electronic communication aids) shall be used. In line with summary point ID-A6, the preferences of the child or young person should be taken into account.	11, 13, 20, 21, 27, 31, 32, 33	Expert opinion (WHO, AWMF); Evidence-based (1GL) (AWMF: 5RC grading 1 to 2) (1GL- AWMF: 5RC from strong RC to open RC)
ID-I2	Educational support measures also appear to be useful. More specifically, pre-school classroom-based interventions (for children aged 3–5 years) should have multiple components, such as social and communication skills training for the children, and training on how to mediate the intervention for preschool teachers.	14, 20	Expert opinion (AWMF); Evidence-based (1GL) (WHO: GRADE: Very low to low) (1GL-WHO: 1RC strong)
ID-I3	Preferably start early (< 1 year) with speech/language therapy by a specialized speech/language therapist to stimulate speech language development and (non-verbal) communication.	3, 49	Expert opinion (NVK, Townend)
ID-I4	Joint child- and parent-centered treatment shall be carried out; parental counseling is particularly important for interaction design and responsiveness	34	Evidence-based (1GL) (AWMF: 1RC level 1 to 2) (1GL-AWMF: 1RC strong)
ID-I5	In all disorders associated with intellectual disability, child development can vary greatly from one individual to another. This means that there can be no standardized treatment recommendations based solely on the diagnosis. Various forms of supportive communication should be used, tailored to the needs of the child and its communication partners. Think of spoken language in combination with supporting communication without aids (such as gestures and posture), with non-technical aids (use of referrers, written words / text, icons or photos) and with technical aids (such as voice button, voice computer or tablet).	29, 1, 28, 17, 50	Expert opinion (AWMF, NVK, INESSS, Townend)



	The combined use of multiple communication modes (e.g., oral, gestural, written) should be encouraged for expressive and receptive communication, even if oral language is partially used.		Evidence-based (1GL) (AWMF: 1RC level2b) (1GL-AWMF: 1RC positive)
ID-I6	Provision of and training in the use of assistive products for communication shall be foreseen. AAC can compensate for temporary or permanent impairments and limitations in spoken and written language skills, communication, activity and participation for children with (severe) language development disorders associated with intellectual disability and shall be used for these children. The young person and his family should be supported by a multidisciplinary team in choosing types of communication aids, without technology (e.g. gestures, communication boards with images or pictograms, PECS system) or with technological assistance (e.g., voice-based devices, touch tablets with specialized communication software). Education, health and social care practitioners should tell children and young people who use AAC, and their families and carers, about any support that could help them. AAC measures to promote language development should follow a common pedagogical and therapeutic concept for the selection and organization of vocabulary, regardless of the AAC strategies and systems used.	7, 15, 18, 19, 36, 38	Expert opinion (NICE, INESSS) Evidence-based (3GL) (WHO: 1RC: GRADE: Very low/ INESSS: 1RC: Low to high/ AWMF: 1RC: level1/ AWMF: 1RC: level2) (WHO: 1RC strong-AWMF: 1 RC strong; 1RC positive)

(#): see Table 9-10 and Supplement Table 24

REMARKS:

ID-I1: this conclusion is based on expert opinion (2 GL, WHO 2021 and AWMF 2022) on the one hand. On the other hand, there is level 1- 2 evidence (1GL, AWMF 2022) from systematic reviews and meta-analyses, RCTs, or observational studies with large effect. The strength of evidence for this conclusion as reported by the guidelines is thus variable, and this is probably related to the different systems applied for grading of the evidence, and the different appreciation of the strengths and weaknesses in the underlying publications. E.g. the AWMF grading system only takes the publication type into account, and not the risk of bias or other methodological weaknesses.

The evidence selected for the GL mostly dealt with children with Down syndrome, although studies for Fetal alcohol spectrum disorders and Rett syndrome were included as well. Many of the underlying studies were based on very small samples, and the population characteristics as well as the interventions were heterogeneous. Most studies included in SRs showed a moderate to high risk of bias. Authors noticed that significant transfer effects on non-trained aspects of language were rare, and that more robust research is needed. Next, the GL also included evidence for AAC. Overall findings demonstrated the effectiveness of AAC interventions for behavioural change and generalisation, based on single-subject experimental designs or a few RCTs. However, these studies mainly focused on severe expressive communication disorders, and included children who varied widely in functional profiles related to movement, cognition etc.

ID-I2: /

ID-I3, ID-I5: the RC by NVK 2021 and Townend 2020 are focused on children with Down syndrome and Rett syndrome. It is reasonable to assume that this statement can be extended to all children with ID and associated speech/language development disorders.

ID-I6: I1: this conclusion is largely based on evidence, but the strength of the evidence as reported by the guidelines is variable. This is probably related to the different systems applied for grading of the evidence, and the different appreciation of the strengths and weaknesses in the underlying publications

DISCUSSION:

ID-I1: cfr Remarks: for the key conclusion I1: The strength of evidence for this conclusion as reported by the guidelines is variable and ranges from expert opinion to level 1- 2 evidence. This is probably related to the different systems applied for grading of the evidence, and the different appreciation of the strengths and weaknesses in the underlying publications. There is some scientific evidence in this field, including evidence from SRs, MAs, and RCTs, but this evidence is often characterized by underlying methodological weaknesses such as small sample sizes, heterogeneity, elevated risk of bias,... Authors noticed that significant transfer effects on non-trained aspects of language were rare, and that more robust research is needed.

WHO considers speech/language therapy as essential for people with ID and associated speech/language development disorders. This statement is backed by the WHO development group for this GL, a large international consortium of experts in the field. On this point, the German AWMF 2022 guideline formulated strong recommendations (level A, "shall/shall not"), e.g. for Down syndrome, positive recommendations (level B, "should/should not"), and open (level 0, "can be considered/can be rejected") recommendations, e.g. for Rett syndrome. Therefore it is reasonable to state that children with language development disorders associated with intellectual disability should receive early speech/language therapy according to their cognitive and general developmental level, and taking into account the underlying etiology. Preferably, therapy should be started early. Of notice, the GL states that this therapy should be integrated into a comprehensive therapy and support concept (see further).



As far as known, no severe harms are associated with the use of speech therapy in people with ID, and it is considered as feasible and accepted by people with ID. However, in the context of this report little or no evidence or documented information was found to support this general impression of experts in the field.

ID-I2: Of note, a role has been assigned to the educational system as well.

3.2.1.3 Setting

The recommendations discussing in which setting speech/language disorders for children with ID should be managed, are presented in Table 15. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 15– ID: Recommendations related to setting (N: 16)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation *	GRADE*
ID-S1	21	Children with language development disorders associated with intellectual disability should receive early speech therapy intervention according to their cognitive and general developmental level in a multi-professional setting. Therapy and support for language development in children with intellectual disability or a global developmental disorder should be communication-centered, taking into account the level of development and the underlying etiology, integrated into a comprehensive therapy and support concept and coordinated in an interdisciplinary treatment team.	I/P/S	AWMF 2022	Evidence-based	B	1 to 2
	22	The optimal treatment of a language development disorder associated with an intellectual disability should be a multidisciplinary, team-based and family-centered approach.	S	AWMF 2022	Evidence-based	A	1b
	30	Children and adolescents with syndromic disorders require multi-professional therapy. Speech therapy measures should be embedded in this therapy concept.	S	AWMF 2022	Expert Opinion	CCP***	
	39	Every individual with Rett syndrome should be supported by a multidisciplinary team.	S	Townend 2020	Expert Opinion		
	45	Due to the complexity of their communication needs, assessment of individuals with Rett syndrome should be part of a team process.	A/S	Townend 2020	Expert Opinion		
	46	The outcome of the assessment should not rely on the judgement of one professional in isolation.	A/S	Townend 2020	Expert Opinion		
ID-S2	9	Education, health and social care services should: • organise all the practitioners working with the child or young person into an interagency team • ensure that interagency teams include practitioners with the skills and experience to address all of the child or young person's needs (from birth to 25 years).	P/S	NICE 2022	Evidence-based		GRADE: Very low



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation *	GRADE*
	10	Interagency teams should ensure that the child or young person's needs are met in all settings (for example, if they communicate differently, make sure they have support at home and in school).	S	NICE 2022	Evidence-based		GRADE: Very low
ID-S3	42	The individual and their family may be referred to a Rett Specialist Clinic or Expertise Center in order to get a diagnosis, for specialized assessment and advice, or for a second-opinion at any point following diagnosis.	A/S	Townend 2020	Expert Opinion		
	43	Communication professionals attached to a Rett Specialist Clinic or Expertise Center should be available to offer advice and support to, and answer questions from, locally treating therapists.	S	Townend 2020	Expert Opinion		
ID-S4	18	For the young person who needs communication aids: The young person and his family should be supported by a multidisciplinary team in choosing types of communication aids: • Communication without technical assistance (e.g., oral language, natural gestures, learned signs) • Communication with technical aids without technology (e.g. symbolic objects, communication boards with images or pictograms or using written language, PECS system); • Communication with low-tech technical aids (e.g. voice-based devices such as BIGmack, GoTalk) or high-tech devices (e.g. touch tablets or smart phones equipped with specialized software for oral communication). The modes (e.g., oral, gestural, written) and technical aids chosen should be available at all times and their use should be widespread, to allow effective expressive and receptive communication in the different environments that the young person frequents.	I/S	INESSS 2019	Evidence-based		Low to High
	8	Education, health and social care practitioners should refer disabled children and young people with severe complex needs to specialised augmentative and alternative communication services if they meet the eligibility criteria.	A/S	NICE 2022	Expert Opinion	Strong	
ID-S5	44 (See also RC10)	Assessment should consider the opportunities and barriers to communication that may be present in various environments (e.g., home, school, and social settings). Observations should be conducted in a range of communication environments and with a range of communication partners.	A/S	Townend 2020	Expert Opinion		

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation *	GRADE*
	48	It is preferable that intervention takes place in a naturalistic context.	S	Townend 2020	Expert Opinion		
	20	Language development disorders are common in children with an intellectual disability. Affected children have been shown to benefit from early speech therapy intervention. In addition, educational support measures also appear to be useful.	I/P/S	AWMF 2022	Expert Opinion	CCP***	
	14	Preschool classroom-based interventions (for children aged 3–5 years) should have multiple components, including: • curriculum design and development • social and communication skills training for the children • skills training in behavioural strategies for parents or carers • training on how to mediate the intervention for preschool teachers.	I/S	WHO 2023	Evidence-based	Strong	GRADE: Very low to low

(#): see Supplement Table 24; *as mentioned in GL, see Table 9-10 and Supplement Table 24; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point.

The main points of these recommendations can be summarised as follows:

	ID: Summary points "Setting"	RC n° (#)	Evidence (#)
ID-S1	The optimal treatment of a language development disorder associated with an intellectual disability should be a multidisciplinary, team-based and family-centered approach . Those children should receive early speech therapy intervention according to their cognitive and general developmental level in a multi-professional setting. Therapy and support should be communication-centered, integrated into a comprehensive therapy and support concept and coordinated in an interdisciplinary treatment team . For children and young people with ID and complex communication needs (e.g. Rett syndrome), assessment should be part of a team process and should not rely on the judgement of one professional in isolation .	22, 21, 30, 39, 45, 46	Expert opinion (AWMF, Townend) Evidence-based (1GL) (AWMF: 1RC level 1 to 2, 1RC level 1b) (1GL-AWMF: 1RC strong, 1RC positive)
ID-S2	Education, health and social care services should organise all the practitioners working with the child or young person into an interagency team and ensure that these interagency teams include practitioners with the skills and experience to address all of the child or young person's needs . Interagency teams should ensure that the child or young person's needs are met in all settings (for example, at home and in school).	9, 10	Evidence-based (1GL) (NICE: 2RC: GRADE: Very low).



ID-S3	Children and young people with ID and complex communication needs (e.g. Rett syndrome), and their family, may be referred to a specialist clinic or expertise center in order to get a diagnosis, for specialized assessment and advice, or for a second-opinion at any point following diagnosis. Communication professionals attached to a specialist clinic or expertise center should be available to offer advice and support to, and answer questions from, locally treating therapists.	42, 43	Expert opinion (Townend)
ID-S4	Education, health and social care practitioners should refer disabled children and young people with severe complex needs to specialised augmentative and alternative communication services if they meet the eligibility criteria. A young person who needs communication aids should be supported by a multidisciplinary team in choosing types of communication aids.	18, 8	Expert opinion (NICE) Evidence-based (1GL) (INESSS: 1RC Low to High) (1GL-NICE: 1RC strong)
ID-S5	Assessment should consider the opportunities and barriers to communication that may be present in various environments (e.g., home, school, and social settings). Observations should be conducted in a range of communication environments and with a range of communication partners. Interagency teams should ensure that the child or young person's needs are met in all settings (for example, at home and in school). It is preferable that interventions take place in settings that are as natural as possible, so that skills that are used frequently throughout the day can be taught and practised. Besides speech therapy intervention, educational support measures also appear to be useful. More specifically, pre-school classroom-based interventions (for children aged 3–5 years) should have multiple components, such as social and communication skills training for the children, and training on how to mediate the intervention for preschool teachers.	44, 48, 20, 14	Expert opinion (Townend , AWMF); Evidence-based (1GL) (WHO: GRADE: Very low to low) (1GL-WHO: 1RC strong)

(#): see Table 9-10 and Supplement Table 24

REMARKS:

ID-S1: this conclusion is based on expert opinion (2 GL, AWMF 2022 and Townend 2020). For some parts of the conclusion, there is level 1- 2 evidence (1GL, AWMF 2022) from systematic reviews and meta-analyses, RCTs, or observational studies with large effect. This evidence is mainly related to effectiveness of speech/language therapy in Down syndrome (see Remarks in section Intervention), and on family-centered approach.

ID-S2: NICE 2022: very low quality evidence (3 before-after studies) of an important benefit when practitioners work together as part of an interagency team, specifically in increasing the participation and education achievement.

ID-S3: the RC Townend 2020 are focused on children with Rett syndrome. It is reasonable to assume that this statement can be extended to all children with ID and complex communication needs.

ID-S4: INESSS 2019: low to high level of evidence for efficacy of different modalities of communication aids

ID-S5: RC48 is further explained in "Rett syndrome communication guidelines: a handbook" (Townend et al. 2020)

DISCUSSION:

Four out of the six included guidelines (INESSS 2019, Townend 2020, AWMF 2022, NICE 2022) point to the importance of assessment and/or treatment by a multidisciplinary team. SLT should be integrated in a comprehensive therapy and support concept, and this therapy plan should be coordinated by the multidisciplinary treatment team (AWMF 2022). The team should include practitioners with the skills and experience to address all of the child's needs (NICE 2022)

Moreover, two GL (NICE 2022, WHO 2023) point to the necessity/need for inter-sector collaboration. NICE 2022 calls for an interagency team to enable collaboration between healthcare, social care and the educational system in order to meet all needs of the children .

Referral to specialised services or expertise centres should be possible for severe or complex communication needs, for a diagnosis or advice. Specialised augmentative and alternative communication services should foresee in advanced support if communication aids is necessary.



3.2.1.4 Practitioner

The recommendations discussing which practitioner should be involved to manage children with ID and speech/language disorders, are presented in Table 16. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 16 – ID: Recommendations related to practitioner managing speech/language disorders (N: 8)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ID-P1	3	Preferably start early (< 1 year) with speech therapy for children with Down syndrome to stimulate speech language development and (non-verbal) communication. Preference is given to a speech therapist who has experience with and knowledge of children with Down syndrome.	I/P	NVK 2021	Expert Opinion		
	15	Provision and training in the use of assistive products for communication by a speech and language therapist/pathologist is included in the resources required for rehabilitation in disorders of intellectual development.	I/P	WHO 2023	Evidence-based	Strong	GRADE: Very low
	20	Language development disorders are common in children with an intellectual disability. Affected children have been shown to benefit from early speech therapy intervention. In addition, educational support measures also appear to be useful.	I/P/S	AWMF 2022	Expert Opinion	CCP***	
ID-P2	4	Encourage and support children and young people to give their views on their health, care, education and support, and express what they want and need. Take account of the communication needs of children and young people. If needed, consider getting support from a specialist to help them participate in discussions and decisions and express their views. Encourage parents and carers to think about how their child can give their own views and be involved in decisions. Ask them what services can do to support their child in communicating their views.	A/P	NICE 2022	Evidence-based		GRADE-CERQual: Moderate [§]
ID-P3	21	Children with language development disorders associated with intellectual disability should receive early speech therapy intervention according to their cognitive and general developmental level in a multi-professional setting. Therapy and support for language development in children with intellectual disability or a global developmental disorder	I/P/S	AWMF 2022	Evidence-based	B	1 to 2

		should be communication-centered, taking into account the level of development and the underlying etiology, integrated into a comprehensive therapy and support concept and coordinated in an interdisciplinary treatment team.					
40		The team should incorporate all significant communication partners and may include the individual with Rett syndrome, their parents/other family members, AAC specialists, Speech-Language Pathologists, Occupational Therapists, Physical Therapists, Rett specialist staff, and other key people in the individual's life. At a minimum, the team will consist of the Speech-Language Pathologist, parents or other family members/caregivers, and the individual with Rett syndrome.	P	Townend 2020	Expert Opinion		
41		Professionals who are working in isolation (e.g., working as independent practitioner) should connect with the other members of the broader team who are working with the individual and family so that support, advice, and recommendations are coordinated.	P	Townend 2020	Expert Opinion		
9		Education, health and social care services should: • organise all the practitioners working with the child or young person into an interagency team • ensure that interagency teams include practitioners with the skills and experience to address all of the child or young person's needs (from birth to 25 years).	P/S	NICE 2022	Evidence-based		GRADE: Very low

(#): see Supplement Table 24; *as mentioned in GL, see Table 9-10 and Supplement Table 24; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point; §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015



The main points of these recommendations can be summarised as follows:

	ID: Summary points "Practitioner"	RC n° (#)	Evidence (#)
ID-P1	To stimulate speech language development and (non-verbal) communication in children with ID, preference is given to a speech/language therapist who has experience with and knowledge of working with those children. Speech/language therapists shall also provide and train in the use of assistive products for communication. In addition, educational support measures also appear to be useful.	3, 15, 20	Expert Opinion (NVK, AWMF) Evidence-based (1GL) (WHO: 1RC: GRADE: Very low) (WHO: 1RC strong)
ID-P2	Encourage and support children and young people to give their views on their health, care, education and support, and express what they want and need. If needed, consider getting support from a specialist to help them participate in discussions and decisions and express their views. Encourage parents and carers to think about how their child can give their own views and be involved in decisions, and what services can support their child in communicating their views.	4	Evidence-based (1GL) (NICE: 1RC GRADE-CERQual [§] : Moderate)
ID-P3	Children with language development disorders associated with intellectual disability should receive SLT in a multi-professional setting . The team should incorporate all significant communication partners and should include all practitioners needed to address all of the child or young person's needs (until young adulthood). It may include the individual with ID, their parents/other family members, AAC specialists, speech-language therapists, occupational therapists, physical therapists, ID specialist staff, and other key people in the individual's life. At a minimum, the team will consist of the speech/language therapist, parents or other family members/caregivers, and the individual with ID. Professionals who are working in isolation (e.g., working as independent practitioner) should connect with the other members of the broader team so that support, advice, and recommendations are coordinated.	21, 40, 41, 9	Expert Opinion (Townend) Evidence-based (2GL) (NICE: 1RC GRADE very low; AWMF: 1RC level 1 to 2) (1GL-AWMF: 1RC positive)

(#): see Table 9-10 and Supplement Table 24; §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015

REMARKS:

ID-P1, ID-P3: the RC by NVK 2021 and Townend 2020 are focused on children with Down syndrome and Rett syndrome. It is reasonable to assume that this statement can be extended to all children with ID and associated speech/language development disorders.

ID-P3: this conclusion is based on expert opinion (Townend 2020). There is also very low quality evidence (NICE 2022) of an important benefit when practitioners work together as part of an interagency team, specifically in increasing the participation and education achievement. For some parts of the conclusion, there is level 1- 2 evidence (1GL, AWMF 2022) from systematic reviews and meta-analyses, RCTs, or observational studies with large effect. This evidence is mainly related to effectiveness of speech/language therapy in Down syndrome (see Remarks in section Intervention).

DISCUSSION: /



3.2.1.5 Aims (Goal)

The recommendations discussing in which setting speech/language disorders for children with ID should be managed, are presented in Table 17. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 17 – ID: Recommendations related to Aims (Goal) of intervention (N: 8)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level of Evidence*	Strength of recommendation*	GRADE*
ID-Aim1	23	The aim of speech therapy interventions for children with a language development disorder associated with intellectual disability is to improve communicative and language skills and to maintain, establish or improve social participation. Any necessary prioritization of medical, therapeutic and educational interventions should be based on their respective importance for the patient's overall situation and the extent to which their physical functions, activity, independence, social participation and health-related quality of life can be improved.	Aim	AWMF 2022	Evidence-based	A	1b
	24	For patients with intellectual disabilities, everyday practical skills should be the focus of support and therapy, as should the expansion of their individual communicative possibilities.	Aim	AWMF 2022	Evidence-based	A	1b
ID-Aim2	16	The young person and his family should be educated from childhood so that the young person develops, among other things, the following skills: • Produce an effective message (e.g. answer yes or no, make a choice, request, communicate needs and desires, choose and convey the appropriate information based on the communication intent and the interlocutor); • understand a message (e.g., follow instructions, routine, schedule) or question; • Engaging with people in an appropriate manner (e.g., expressing interest, responding to questions and comments from others); • Participate in a dyad or group exchange (e.g., initiate, maintain and complete an exchange, adjust to context) • Deal with unsuccessful communication situations (e.g. message is	Aim	INESSS 2019	Expert Opinion		

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level of Evidence*	Strength of recommendation*	GRADE*
		misunderstood) • Use different communication media (e.g. phone, text, email, social networks).					
	17	From adolescence, the targeted skills are the same as those developed in childhood, adjusted to the contexts of adolescence and early adulthood. The combined use of multiple communication modes (e.g., oral, gestural, written) should be encouraged for expressive and receptive communication, even if the youth uses oral language partially (e.g. learned signs, natural gestures, written language, image supports, basis and high tech aids). The youth should be given maximum opportunities to communicate in all environments they are living in (e.g., through play, changing environmental conditions). Behavioural intervention techniques such as those used in applied behaviour analysis should be employed to develop the young person's communication skills.	Aim/I	INESSS 2019	Expert Opinion		
	19	For the young person who needs communication assistance: The young person and his family should be educated from childhood so that the young person develops, in particular, the skills necessary to use a technical communication aid: • Know and understand the content of the communication aid (e.g., images and their meaning); • Properly handling the communication aid (e.g., moving a cursor, navigating between different pages or tables of communication); • To deal with unforeseen events (e.g. breakage, missing equipment); • Contribute to the adaptation of the contents of the communication aid, according to the evolution of the developmental needs. Behavioural intervention techniques such as those used in applied behaviour analysis should be employed to develop the ability to use a communication aid	Aim/I	INESSS 2019	Expert Opinion		
ID-Aim3	5	Enable children and young people to communicate their views in a way that is appropriate for their age, developmental level and communication abilities.	Aim	NICE 2022	Evidence-based		GRADE-CERQual [§] : Low



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level of Evidence*	Strength of recommendation*	GRADE*
	35	Children and young people are dependent on AAC if they are threatened or affected (temporarily or permanently) by a profound impairment of their receptive and expressive communication skills and their development, and this poses a risk or restriction to their participation in social life.	Aim	AWMF 2022	Expert Opinion	CCP	
	26	In therapy, the aim is to work on linguistic and non-linguistic target structures introduced in a developmentally logical sequence.	Aim	AWMF 2022	Evidence-based	B	2b

(#): see Supplement Table 24; *as mentioned in GL, see Table 9-10 and Supplement Table 24; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point; §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015

The main points of these recommendations can be summarised as follows:

	ID: Summary points "Aims (Goal) of intervention"	RC n° (#)	Evidence (#)
ID-Aim1	The aim of speech therapy interventions for children with a language development disorder associated with intellectual disability is to improve communicative and language skills and to maintain, establish or improve social participation. Any necessary prioritization of medical, therapeutic and educational interventions should be based on their respective importance for the patient's overall situation and the extent to which their physical functions, activity, independence, social participation and health-related quality of life can be improved. For patients with intellectual disabilities, everyday practical skills should be the focus of support and therapy, as should the expansion of their individual communicative possibilities.	23, 24	Evidence-based (1GL) (AWMF: 2RC level 1b) (1GL-AWMF: 2RC strong)
ID-Aim2	The young person and his family should be educated from childhood so that the young person develops, among other things, the following skills: • Produce an effective message (e.g. answer yes or no, make a choice, request, communicate needs and desires, choose and convey the appropriate information based on the communication intent and the interlocutor); • understand a message (e.g., follow instructions, routine, schedule) or question; • Engaging with people in an appropriate manner (e.g., expressing interest, responding to questions and comments from others); • Participate in a dyad or group exchange (e.g., initiate, maintain and complete an exchange, adjust to context)	16, 17, 19	Expert Opinion (INESSS)

	ID: Summary points “Aims (Goal) of intervention”	RC n° (#)	Evidence (#)
	• Deal with unsuccessful communication situations (e.g. message is misunderstood) • Use different communication media (e.g. phone, text, email, social networks). From adolescence, the targeted skills are the same as those developed in childhood, adjusted to the contexts of adolescence and early adulthood. The combined use of multiple communication modes (e.g., oral, gestural, written) should be encouraged for expressive and receptive communication, even if the youth uses oral language partially (e.g. learned signs, natural gestures, written language, image supports, basis and high tech aids). The youth should be given maximum opportunities to communicate in all environments they are living in (e.g., through play, changing environmental conditions). For the young person who needs communication assistance: The young person and his family should be educated from childhood so that the young person develops, in particular, the skills necessary to use a technical communication aid: • Know and understand the content of the communication aid (e.g., images and their meaning); • Properly handling the communication aid (e.g., moving a cursor, navigating between different pages or tables of communication); • To deal with unforeseen events (e.g. breakage, missing equipment); • Contribute to the adaptation of the contents of the communication aid, according to the evolution of the developmental needs.		
ID-Aim3	Enable children and young people to communicate their views in a way that is appropriate for their age, developmental level and communication abilities. Children and young people are dependent on AAC if they are threatened or affected (temporarily or permanently) by a profound impairment of their receptive and expressive communication skills and their development, and this poses a risk or restriction to their participation in social life. In therapy, the aim is to work on linguistic and non-linguistic target structures introduced in a developmentally logical sequence.	5, 35, 26	Expert opinion (AWMF) Evidence-based (2GL) (NICE: 1RC GRADE-CERQual[§]: Low; AWMF: 1RC level 2b) (1GL-AWMF: 1RC positive)

(#): see Table 9-10 and Supplement Table 24; §Confidence in the Evidence from Reviews of Qualitative research, Lewin 2015

No specific remarks or discussion

3.2.2 *Autism spectrum disorder (ASD)*

Results: An overview of all included RC from the 8 included GL for ASD can be found in Supplement 5.2.2 (Table 25). In the next sections, an overview of the RC as classified per subgroup is presented, as well as a summary for every subgroup.

A total of 49 recommendations was extracted from the 8 GL. Six of these 49 RC were copies from KCE 2014 or SIGN 2016 recommendations taken over in the WHO 2023 GL.

Thus overall, 43 unique recommendations are included for ASD. 12/43 (28%) recommendations are stated to be evidence-based, and 5/43 (12%) are (according to the GL authors) based on good quality as indicated by the grading of the level of evidence (RC 14-16-27-29-33). It should be noted that two of these RCs, graded “good” in the New Zealand GL (2022), are nevertheless based on old evidence. Indeed, this GL is a living guideline and evidence tables for this part date from 2009.

3.2.2.1 Assessment

The recommendations that deal with initial assessment of children with ASD, are presented in Table 18. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 18 – ASD: Recommendations related to Assessment (N:23)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD-A1	22	A diagnostic assessment, alongside a profile of the individual's strengths and weaknesses, carried out by a multidisciplinary team which has the skills and experience to undertake the assessments, should be considered as the optimum approach for individuals suspected of having ASD.	A/P/S	SIGN 2016	Expert Opinion	Conditional	
	18	All autistic children should have an assessment and support suggestions by a speech-language therapist with expertise in the autism spectrum at a minimum of once a year, more often in early childhood.	A/P	New Zealand Guideline 2022	Expert Opinion		GPP
	15	The assessment and development of communication and social goals should complement each other. Teaching of the two areas should be carried out in parallel.	A/I	New Zealand Guideline 2022	Expert Opinion		C
	23 (and WHO RC 30)	All children and young people with ASD should have a comprehensive evaluation of their speech and language and communication skills, which should inform intervention.	A	SIGN 2016 + WHO 2023	Evidence-based	Strong	3
	26	Choice of interventions to support communication in children and young people with ASD should be informed by effective assessment.	A	SIGN 2016	Expert Opinion	Strong	
	27	Interventions to support social communication should be considered for children and young people with ASD, with the most appropriate intervention being assessed on an individual basis.	A/I	SIGN 2016	Evidence-based	Conditional	1 to 2
	42	Develop a personalised program based on evaluation with appropriate tools and on observation in daily life, and in	A	KCE 2014	Expert Opinion		



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		agreement with the patient, the parents and all professionals involved.					
ASD-A2	9 (see also RC 42)	Consider offering language intervention for children aged 18 months-6 years with autism with delayed or deviant language development. If there are concerns about delayed or deviant language development, a language assessment for the child's age group can be obtained from the language assessment tools provided to municipalities by the Ministry of Children and Education. The language assessment is done in collaboration with the daycare centre or school. A language intervention in this context is an intervention that aims to prevent or treat language delay or deficit and/or promote the child's expressive language and/or language understanding. The intervention must be delivered by a professional, either directly to the child or to the parents who implement the intervention at home. The working group believes that the language intervention should have a minimum duration of 10 sessions and should target the child's language skills and development.	A/I/S	The Danish Health Authority (2021)	Evidence-based	Weak	Very low
	17	The communicative demands of the environment should be assessed.	A/S	New Zealand Guideline 2022	Expert Opinion		C
ASD-A3	10	The initial assessment of children may be undertaken by an individual practitioner. If there are ongoing concerns, a multidisciplinary assessment is recommended.	A/S	New Zealand Guideline 2022	Evidence-based		Fair
	11	Preferably, a multidisciplinary team of health care practitioners experienced in autism should undertake diagnostic assessment of young people and adults suspected of being autistic. In the absence of an assessment team, a health care practitioner trained	A/P/S	New Zealand Guideline 2022	Evidence-based		Fair

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		and highly experienced in the autism spectrum may undertake diagnostic assessment.					
	12	Health New Zealand should have in place processes that ensure: a. referral pathways for children and adults (...) are clearly understood by professionals b. services are coordinated within and across sectors c. multidisciplinary, multiagency assessments are provided d. all services are provided in a timely manner.	A/S	New Zealand Guideline 2022	Expert Opinion		C

(#): see Supplement Table 25; *as mentioned in GL, see Table 11-12 and Supplement Table 25; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.

The main points of these recommendations can be summarised as follows:

	ASD: Summary points "Assessment"	RC n° (#)	Evidence (#)
ASD-A1	A diagnostic assessment, alongside a profile of the individual's strengths and weaknesses, carried out by a multidisciplinary team which has the skills and experience to undertake the assessments, should be considered as the optimum approach for individuals suspected of having ASD. A comprehensive evaluation should inform intervention, with the most appropriate intervention being assessed on an individual basis. A personalised program should be developed based on evaluation with appropriate tools and on observation in daily life, and in agreement with the patient, the parents and all professionals involved. All autistic children should have an assessment and support suggestions by a speech/language therapist with expertise in the autism spectrum at a minimum of once a year, more often in early childhood. The assessment and development of communication and social goals should complement each other.	15, 18, 22, 23, 26, 27, 42 (and WHO RC 30)	Expert Opinion (SIGN, New Zealand Guideline, KCE) Evidence-based (2GL) (SIGN: 1RC level 3 and 1 RC level 1 to 2; WHO: 1RC level 3) (2GL- SIGN, WHO: 1 RC Strong; 1GL- SIGN: 1RC Conditional)
ASD-A2	Develop a personalised program based on evaluation with appropriate tools and on observation in daily life, and in agreement with the patient, the parents and all professionals involved. Daycare centre or school should be involved and the communicative demands of the environment should be assessed.	9, 17, 42	Expert Opinion (New Zealand Guideline, KCE) Evidence-based (1GL) (The Danish Health Authority: 1RC very low)



			(1GL The Danish Health Authority: 1RC Weak)
ASD-A3	Referral pathways for children should be clearly understood by professionals. Preferably, a multidisciplinary team of health care practitioners experienced in autism should undertake diagnostic assessment of young people suspected of being autistic. Multidisciplinary, multiagency assessments should be provided. In the absence of an assessment team, a health care practitioner trained and highly experienced in the autism spectrum may undertake diagnostic assessment. If there are ongoing concerns, a multidisciplinary assessment is recommended.	10, 11, 12	Expert Opinion (New Zealand Guideline) Evidence-based (1GL) (New Zealand Guideline: 2RC Fair)

(#) see Table 11-12 and Supplement Table 25

REMARKS:

ASD-A1:

Most of this summary point is based on expert opinion. However, given the evidence for speech/language and communication intervention in ASD (see section Intervention 3.2.2.2), it seems logical to include a comprehensive evaluation of speech and language and communication skills to inform intervention. RC23 (SIGN 2016) and RC30 (WHO 2023) concluded that a wide range of speech and language and communication assessments were available but that there was limited evidence to support the use of one assessment instrument over another (level 3 quality of evidence). The evidence for RC27 by SIGN (2016) focused on interventions (not on assessment). Level 1 to 2 quality of evidence was found for social skill interventions, part of this evidence comes from young people with average or above average intellectual functioning.

ASD-A2:

The evidence for RC9 by The Danish Health Authority (2021) focused on interventions (not on assessment). A very low quality of evidence was found for psychosocial interventions in young children, due to several methodological shortcomings for the included RCTs.

ASD-A3:

RC10 and RC11 by the New Zealand Guideline (2022) are supported by evidence. This GL is a living guideline and evidence tables for this part date from 2009. The authors comment that a multidisciplinary specialist assessment team involves a group of professionals working collaboratively to assess the child. This team usually includes at least two or three members drawn from the following professions: paediatricians, child and adolescent psychiatrists, clinical or educational psychologists, speech/language therapists and occupational therapists.

DISCUSSION:

Most of these summary points are based on expert opinion. However, given the evidence for speech/language and communication intervention in ASD (see section Intervention 3.2.2.2), it seems logical to include a comprehensive evaluation of speech and language and communication skills to inform intervention



3.2.2.2 Intervention

The recommendations that deal with intervention for communication and speech/language disorders in children with ASD, are presented in Table 19. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 19 – ASD: Recommendations related to Intervention (N:23)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD -I1	4	Recommendation regarding autism-specific psychosocial therapies for young children and preschoolers (C.4.2.2) In young children and preschoolers, regardless of developmental age and cognitive skills, autism-specific therapy should be carried out early, at the latest from the age of 2 years or directly after diagnosis. [...] Therapy shall include individualized parent-child therapy in which parents are instructed to interact with the child in a nurturing manner at home, and therapy should include specific, individualized exercises with the child to build and practice new social-interactive, communication, language, cognitive, and daily living skills. [...] These exercises with the child should be carried out with the involvement of the parents/primary caregivers either in a therapeutic institution or, if the spatial and staffing conditions there are appropriate, in the kindergarten. And/or the parents/primary caregivers should be systematically guided by professional therapists in a therapeutic setting or at home to implement the exercises with the child at home. [...]	I/S	AWMF 2021	Evidence-based	A	2 to 3
	5	Statement regarding psychosocial therapy to promote social interaction and communication in all age ranges, all cognitive skills - adverse effects (C.4.2.10): Children, adolescents and adults, regardless of cognitive skills: In the case of psychosocial interventions, no undesirable effects have been reported to date if they are	I	AWMF 2021	Evidence-based (Statement)	A	1 to 3

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		carried out correctly, although they have rarely been systematically investigated.					
	6	Recommendation regarding promotion of language and verbal communication (C.5.1.1) In toddlers and preschoolers (with and without intelligence impairment), the language support for ASD should initially be based on comprehensive, low-frequency (approx. 2 hours/week) psychosocial therapy methods including [...] flexible practice of receptive language skills (vocabulary), natural reinforcement of spontaneous sounds (including stereotyped ones) and successive expressive language skills (Level B) The setting should include therapist-based work with the child as well as intensive involvement and guidance of the parents so that learned skills can be generalized in everyday life. (Level A) Children who have difficulties in learning non-verbal communication principles in the context of the above-mentioned therapy and do not make sufficient linguistic progress can be given additional support to build up non-verbal and verbal communication by using picture cards or visual symbols combined with linguistic sounds (computer-based/speech output devices) [...] (Level C) For children of primary school age who do not (yet) speak (with and without intellectual disability), the above methods can be further applied to children of early primary school age with the aim that children of this age also learn to communicate verbally. If picture cards are used, further attempts should be made at the same time to stimulate verbal expressions. (Level C)	I	AWMF 2021	Evidence-based	A to C	1 to 3
	8	In children and adolescents with language development disorders associated with autism spectrum disorders, language development-specific therapy methods can be	I	AWMF 2022	Expert Opinion		CCP***



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		used in addition to autism-specific support in accordance with the guidelines					
	9	Consider offering language intervention for children aged 18 months-6 years with autism with delayed or deviant language development. If there are concerns about delayed or deviant language development, a language assessment for the child's age group can be obtained from the language assessment tools provided to municipalities by the Ministry of Children and Education. The language assessment is done in collaboration with the daycare centre or school. A language intervention in this context is an intervention that aims to prevent or treat language delay or deficit and/or promote the child's expressive language and/or language understanding. The intervention must be delivered by a professional, either directly to the child or to the parents who implement the intervention at home. The working group believes that the language intervention should have a minimum duration of 10 sessions and should target the child's language skills and development.	A/I/S	The Danish Health Authority (2021)	Evidence-based	Weak	Very low
	15	The assessment and development of communication and social goals should complement each other. Teaching of the two areas should be carried out in parallel.	A/I	New Zealand Guideline 2022	Expert Opinion		C
	24	Parent-mediated intervention programmes are used to both advance the development and communication of an affected child and to offer practical advice and support to parents. Parent-mediated intervention programmes should be considered for children and young people of all ages who are affected by ASD, as they may help families interact	I	SIGN 2016	Expert Opinion	Conditional	1++

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		with their child, promote development and increase parental satisfaction, empowerment and mental health.					
	27	Interventions to support social communication should be considered for children and young people with ASD, with the most appropriate intervention being assessed on an individual basis.	A/I	SIGN 2016	Evidence-based	Conditional	1 to 2
	31	Based on expert consensus speech therapy is recommended in autistic children with identified speech and language problems.	Copy KCE	WHO 2023	Expert Opinion	Strong	
	47	In children and young people with autism, consider a specific social-communication intervention for the core feature of impaired reciprocal social communication and interaction. This intervention should include play-based strategies with parents, carers and teachers to increase joint attention, engagement and reciprocal communication in the child or young person. Strategies should: - be adjusted to the child or young person's developmental level; - aim to increase the parents', carers', teachers' or peers' understanding of, and sensitivity and responsiveness to, the child or young person's patterns of communication and interaction; - include techniques to expand the child or young person's communication, interactive play and social routines. The intervention should be delivered by a trained professional. For preschool children consider parent, carer or teacher mediation. For school aged children consider peer mediation.	Aim/I/P/S	KCE 2014	Expert Opinion		
	48 (and WHO RC 32)	Based on expert consensus speech and language problems in children with autism should be addressed	I/S	KCE 2014 + WHO 2023	Expert Opinion		



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		within a personalized project including functional objectives in the field of verbal or non-verbal communication. This program could include PECS, should be initiated early on, include speech and language therapy and involve the parents. The indication for speech therapy should be determined independent of the child's IQ and should be integrated in a multidisciplinary approach.					
ASD -I2	20 (see also RC 4, 27, 48) (and WHO RC 31, 32)	Supports should be individualised for each child and family, and practitioners should work in partnership with the child and family to consider goals [...]	I	AutismCRC 2022	Expert Opinion	Strong	GPP***
	41	A therapeutic team should establish a framework for an individualized work plan and should identify a coordinator.	I/S	KCE 2014	Expert Opinion		
ASD -I3	7 (see also RC 6,19,48) (and WHO RC 31, 32)	Recommendation regarding the promotion of non-verbal communication in non-speaking individuals with ASD (C. 5.1.2) Non-speaking children from late primary school age, adolescents and adults with and without intellectual impairment: If children, adolescents and adults do not learn to speak after correct and sufficiently long use of the above-mentioned therapy methods, a picture card system or also a device that outputs speech via visual symbols can be used to promote communication with other persons. [...]	I	AWMF 2021	Expert Opinion		CCP***
	25 (and WHO RC 34)	Interventions to support communicative understanding and expression in individuals with ASD, such as the Picture Exchange Communication System and the use of environmental visual supports (eg in the form of pictures or objects), should be considered.	I	SIGN 2016 + WHO 2023	Evidence-based	Conditional	1 to 3

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD -14	29 (and WHO RC 33)	Access to support from staff trained in applied behaviour analysis-based technologies (eg Picture Exchange Communication System, discrete trial training, task analysis, prompting, fading or shaping) to build independence in adaptive, communication and social skills should be considered for children with ASD.	I/P	SIGN 2016 + WHO 2023	Evidence-based	Conditional	1 to 2
	49 (and WHO RC 32, 35)	(Based on expert consensus, speech and language problems in children with autism should be addressed within a personalized project including functional objectives in the field of verbal or non-verbal communication.) This program could include augmentative communication, such as PECS and should be initiated early on.	I	KCE 2014 + WHO 2023	Expert Opinion		
	19 (see also RC 25) (and WHO RC 34)	In choosing a supportive approach, strategy, practitioner or therapist, the following principles for ethical practice are recommended: [...] • Provide access to communication modalities that facilitate an autistic person's ability to process and express (e.g., augmentative and alternative communication (AAC) devices, signing, quiet space).	I	New Zealand Guideline 2022	Expert Opinion		GPP***
	28	Adapting the communicative, social and physical environments of children and young people with ASD may be of benefit (options include providing visual prompts, reducing requirements for complex social interactions, using routine, timetabling and prompting and minimising sensory irritations).	I	SIGN 2016	Expert Opinion		

(#): see Supplement Table 25; *as mentioned in GL, see , see Table 11-12 and Supplement Table 25; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.



The main points of these recommendations can be summarised as follows:

	ASD: Summary points “Intervention”	RC n° (#)	Evidence (#)
ASD-I1	Speech and language problems in children with autism should be addressed within a personalized project including functional objectives in the field of verbal or non-verbal communication. This program should be initiated early on, include speech and language therapy and involve the parents. It could include augmentative and alternative communication (such as PECS). The indication for speech therapy should be determined independent of the child’s IQ and should be integrated in a multidisciplinary approach. In children and adolescents with language development disorders associated with autism spectrum disorders, language development-specific therapy methods can be used in addition to autism-specific support in accordance with the guidelines. The assessment and development of communication and social goals should complement each other. Teaching of the two areas should be carried out in parallel. Speech/language therapy is recommended in autistic children with identified speech and language problems. For psychosocial interventions in general, if these interventions are carried out correctly, no undesirable effects have been reported to date in children and adolescents regardless of their cognitive skills, although they have rarely been systematically investigated.	4, 5, 6, 8, 9, 15, 24, 27, 31, 47, 48 (and WHO RC 32)	Expert opinion (AWMF 2022, New Zealand Guideline, SIGN, KCE, WHO) Evidence-based (3GL) (AWMF 2021: 1RC 2 to 3 and 2RC 1 to 3; The Danish Health Authority: 1RC very low; SIGN: 1RC 1 to 2) (1 GL- AWMF 2021: 2RC A and 1 RC A to C; 1 GL- The Danish Health Authority: 1 RC weak; 1 GL- SIGN: 2RC conditional; 1GL WHO: 1 RC strong)
ASD-I2	A therapeutic team should establish a framework for an individualized work plan. Speech and language problems in children with autism should be addressed within a personalized project including functional objectives. The indication for speech therapy should be determined independent of the child’s IQ and should be integrated in a multidisciplinary approach. Supports should be individualised for each child and family, and practitioners should work in partnership with the child and family to consider goals.	4, 20, 27, 41, 48 (and WHO RC 31, 32)	Expert Opinion (AutismCRC, KCE, WHO) Evidence-based (2GL) (AWMF 2021: 1RC 2 to 3; SIGN: 1RC 1 to 2) (1GL- AWMF2021: 1RC A; 1GL- SIGN: 1RC Conditional)
ASD-I3	In toddlers and preschoolers (up to the age of 6 years) who have difficulties in learning non-verbal communication principles and do not make sufficient linguistic progress despite adequate therapy including receptive and expressive language skills, or in children and adolescents with or without intellectual disability who do not learn to speak, a program of augmentative communication such as the Picture Exchange Communication System (PECS), the use of environmental visual supports (eg in the form of pictures or objects), or also a device that outputs speech via visual symbols can be used to promote communication with other persons (computer-based/speech output devices). In young children and children of primary school age further attempts should be made at the same time to stimulate verbal expressions.	6, 7, 19, 25, 29, 48, 49 (and WHO RC 31, 32, 33, 34, 35)	Expert opinion (AWMF, KCE, WHO, New Zealand Guideline) Evidence-based (3GL) (SIGN: 1RC 1 to 3 and 1 RC 1 to 2; WHO: 1RC 1 to 3 and 1 RC 1 to 2; AWMF: 1RC 1to 3)

			(2GL- SIGN, WHO: 2RC conditional; 1GL- AWMF: 1RC level C)
ASD-I4	Adapting the communicative, social and physical environments of children and young people with ASD may be of benefit (options include providing visual prompts or signing, reducing requirements for complex social interactions, using routine, timetabling, prompting and minimising sensory irritations, or quiet space)	19, 25, 28 (and WHO RC 34)	Expert Opinion (New Zealand Guideline, SIGN) Evidence-based (2GL) (SIGN: 1RC 1 to 3; WHO: 1RC 1 to 3) (2GL- SIGN, WHO: 1RC Conditional)

(#) see Table 11-12 and Supplement Table 25

**REMARKS:**

ASD-I1:

Evidence for RC4 and RC6 by AWMF (2021), and RC9 by the Danish Health Authority (2021), is mainly related to psychosocial interventions developed for autism-related behaviour. These interventions aim to promote social interaction and communication, including language development in young children, as the latter only develops through the promotion of communication and social interaction. Outcomes on language development are reported in many studies. The strength of evidence for this conclusion as reported by the guidelines is variable, and this is probably related to the different systems applied for grading of the evidence, and the different appreciation of the strengths and weaknesses in the underlying publications. E.g. the AWMF grading system only takes the publication type into account, and not the risk of bias or other methodological weaknesses.

RC27 by SIGN (2016) focuses on social skill interventions to improve social communication, for which level 1 to 2 quality of evidence was found; part of this evidence comes from young people with average or above average intellectual functioning.

RC5 by AWMF (2021) stated that no undesirable effects had been reported for psychosocial interventions, but also that they had rarely been systematically investigated. Of notice, the Australian Autism CRC GL (2022) included an umbrella review of 48 systematic reviews on effectiveness of ASD treatments, and developed a section on adverse events. Adverse events were rarely considered, and only identified in 1 SR.

ASD-I2:

This summary point is based on expert opinion, and on supporting evidence mainly related to psychosocial interventions in this domain (see also remarks for ASD-I1).

ASD-I3:

Augmentative and alternative communication (AAC) is considered to be a specific form of communication and is included in this report (see section Introduction and 2.4.1). SIGN 2016 recommends to involve staff trained in applied behaviour analysis-based technologies. However, RC purely related to specific SLT techniques and modalities were not included (see section 2.4.1)

RC 6 from AWMF 2021 is (for the extracted part of the RC) a.o. based on a Cochrane review including an RCT with a high risk of bias on PECS. The study showed a positive effect which was not retained 10 months after the intervention. Another RCT on speech generating devices also showed positive results which were not retained after 9 months.

RC 25 by SIGN 2016 (and RC 34 by WHO 2023) is based on 2 meta-analyses for PECS, including mainly single case experimental designs, and reporting small to moderate improvements in communication. Learners with ASD alone (with or without comorbid speech impairment) had better outcomes than learners with ASD and comorbid intellectual disability. A few included studies reported speech improvements. Some studies on the use of environmental visual supports were detected as well. The number of participants in each study was very small and the study populations were heterogeneous, making it difficult to generalize from their findings.

RC 29 by SIGN 2016 (and RC 33 by WHO 2023) is based on a large amount of evidence for Early intensive behavioural intervention programmes (EIBI). These ABA-based interventions were associated with improvement in a.o. language skills in some groups of young children. Not all improvements were maintained at long-term follow up (...) There were problems with small sample sizes, non-randomisation and partial blinding. A Cochrane review concluded that while EIBI cannot be recommended universally it should be considered on a case-by-case basis. SIGN 2016 considers PECS to be based on ABA as well.

ASD-I4: --

DISCUSSION: --

3.2.2.3 Setting

The recommendations discussing in which setting communication and speech/language disorders for children with ASD should be managed, are presented in Table 20. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 20 – ASD: Recommendations related to Setting (N: 23):

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD-S1	2	Recommendation regarding the supply structure (C.3.2) Case management: If care measures are indicated or necessary, these measures should be coordinated, networked and agreed upon by one source in order to avoid gaps, duplications, ineffective or even harmful interventions. [...]	S	AWMF 2021	Expert Opinion		CCP
	3	Recommendation regarding therapist competencies (C.3.3) All health and social care professionals working with people with autism spectrum disorders should therefore have the following competencies: 1. Sound, scientifically based knowledge of autism spectrum disorder and the needs of patients and their families; [...] In a multidisciplinary team or network, a licensed specialist should be responsible for case management.	P/S	AWMF 2021	Expert Opinion		CCP
	10	The initial assessment of children may be undertaken by an individual practitioner. If there are ongoing concerns, a multidisciplinary assessment is recommended.	A/S	New Zealand Guideline 2022	Evidence-based		Fair
	11	Preferably, a multidisciplinary team of health care practitioners experienced in autism should undertake diagnostic assessment of young people and adults suspected of being autistic. In the absence of an assessment team, a health care practitioner trained and highly	A/P/S	New Zealand Guideline 2022	Evidence-based		Fair



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		experienced in the autism spectrum may undertake diagnostic assessment.					
	12	Health New Zealand should have in place processes that ensure: a. referral pathways for children and adults (...) are clearly understood by professionals b. services are coordinated within and across sectors c. multidisciplinary, multiagency assessments are provided d. all services are provided in a timely manner.	A/S	New Zealand Guideline 2022	Expert Opinion		C
	13	A coordinated approach to planning and implementing services should be developed to meet the identified needs of an autistic individual, including linkage or integration and coordination of multiple services	S	New Zealand Guideline 2022	Expert Opinion		GPP
	21	Practitioners should coordinate the supports they deliver with other relevant service providers and service systems.	S	AutismCRC 2022	Expert Opinion	Conditional	GPP
	22	A diagnostic assessment, alongside a profile of the individual's strengths and weaknesses, carried out by a multidisciplinary team which has the skills and experience to undertake the assessments, should be considered as the optimum approach for individuals suspected of having ASD.	A/P/S	SIGN 2016	Expert Opinion	Conditional	
	39	A coherent multidisciplinary approach is needed.	S	KCE 2014	Expert Opinion		
	40	Define a framework and quality criteria for multi (trans) disciplinary approach in the same or in different institutions.	S	KCE 2014	Expert Opinion		
	41	A therapeutic team should establish a framework for an individualized work plan and should identify a coordinator.	I/S	KCE 2014	Expert Opinion		
	45	Diagnostic and therapeutic teams should collaborate closely. Professionals who intervene only occasionally should consult the team.	P/S	KCE 2014	Expert Opinion		

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
	48 (and WHO RC 32)	Based on expert consensus speech and language problems in children with autism should be addressed within a personalized project including functional objectives in the field of verbal or non-verbal communication. This program could include PECS, should be initiated early on, include speech and language therapy and involve the parents. The indication for speech therapy should be determined independent of the child's IQ and should be integrated in a multidisciplinary approach.	I/S	KCE 2014 + WHO 2023	Expert Opinion		
ASD-S2	37 (see also RC 2, 3, 21, 41)	Children and young people with autism should have access to a key worker approach in order to manage and coordinate treatment, care and support, including the management of transitions, for the child or young person with autism and their family and carers.	P/S	KCE 2014	Expert Opinion		
	43	A person who had a comprehensive training (including all the important aspects of ASS) will be responsible for overseeing and/or delegating the coordination task.	P/S	KCE 2014	Expert Opinion		
ASD-S3	38	All children and young people with autism should have access to healthcare and social care services, including mental health services. Services should be adapted to the level of care specialisation the child needs. Services should be within a reasonable distance from their homes. Access should take the level of functional impairment into account but should not be restricted based on a child's intellectual ability, autism diagnosis, or any other eligibility criteria.	S	KCE 2014	Expert Opinion		
	44	The Reference Centres for Autism have a specific but not exclusive role in supporting the networking. Referrals should include all relevant collaborators.	S	KCE 2014	Expert Opinion		
ASD-S4	4	Recommendation regarding autism-specific psychosocial therapies for young children and preschoolers (C.4.2.2) In young children and preschoolers, regardless of	I/S	AWMF 2021	Evidence-based	A	2 to 3



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		developmental age and cognitive skills, autism-specific therapy should be carried out early, at the latest from the age of 2 years or directly after diagnosis. [...] Therapy shall include individualized parent-child therapy in which parents are instructed to interact with the child in a nurturing manner at home, and therapy should include specific, individualized exercises with the child to build and practice new social-interactive, communication, language, cognitive, and daily living skills. [...] These exercises with the child should be carried out with the involvement of the parents/primary caregivers either in a therapeutic institution or, if the spatial and staffing conditions there are appropriate, in the kindergarten. And/or the parents/primary caregivers should be systematically guided by professional therapists in a therapeutic setting or at home to implement the exercises with the child at home. [...]					
	9	Consider offering language intervention for children aged 18 months-6 years with autism with delayed or deviant language development. If there are concerns about delayed or deviant language development, a language assessment for the child's age group can be obtained from the language assessment tools provided to municipalities by the Ministry of Children and Education. The language assessment is done in collaboration with the daycare centre or school. A language intervention in this context is an intervention that aims to prevent or treat language delay or deficit and/or promote the child's expressive language and/or language understanding. The intervention must be delivered by a professional, either directly to the child or to the parents who implement the intervention at home. The working group believes that the language intervention should have a minimum duration of 10	A/I/S	The Danish Health Authority (2021)	Evidence-based	Weak	Very low

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		sessions and should target the child's language skills and development.					
	16	Supports should take place in natural settings, using natural routines and natural consequences.	S	New Zealand Guideline 2022	Evidence-based		Good
	17	The communicative demands of the environment should be assessed.	A/S	New Zealand Guideline 2022	Expert Opinion		C
	47	In children and young people with autism, consider a specific social-communication intervention for the core feature of impaired reciprocal social communication and interaction. This intervention should include play-based strategies with parents, carers and teachers to increase joint attention, engagement and reciprocal communication in the child or young person. Strategies should: - be adjusted to the child or young person's developmental level; - aim to increase the parents', carers', teachers' or peers' understanding of, and sensitivity and responsiveness to, the child or young person's patterns of communication and interaction; - include techniques to expand the child or young person's communication, interactive play and social routines. The intervention should be delivered by a trained professional. For preschool children consider parent, carer or teacher mediation. For schoolaged children consider peer mediation.	Aim/I/P/S	KCE 2014	Expert Opinion		

(#): see Supplement Table 25; *as mentioned in GL, see , see Table 11-12 and Supplement Table 25 **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.



The main points of these recommendations can be summarised as follows:

	ASD: Summary points “Setting”	RC n° (#)	Evidence (#)
ASD-S1	Regarding intervention, a coherent multidisciplinary approach is needed. Practitioners should coordinate the supports they deliver, and measures should be coordinated, networked and agreed upon. Services should be coordinated within and across sectors. A framework and quality criteria for a multi (trans) disciplinary approach in the same or in different institutions should be defined. Diagnostic and therapeutic teams should collaborate closely. Professionals who intervene only occasionally should consult the team Diagnostic assessment (see also section 3.2.2.1) should preferably be undertaken by a multidisciplinary team of health care practitioners experienced in autism. Multidisciplinary, multiagency assessments should be provided. In the absence of an assessment team, a health care practitioner trained and highly experienced in the autism spectrum may undertake diagnostic assessment. If there are ongoing concerns, a multidisciplinary assessment is recommended.	2, 3, 10, 11, 12, 13, 21, 22, 39, 40, 41, 45, 48 (and WHO RC 32)	Expert Opinion (AWMF 2021, New Zealand Guideline, AutismCRC, SIGN, KCE, WHO) Evidence-based (1GL) (New Zealand Guideline: 2RC Fair) (1 GL- AutismCRC: 1RC Conditional; 1 GL- SIGN: 1RC Conditional; 1GL- WHO: 1RC Strong)
ASD-S2	Children and young people with autism should have access to a key worker approach in order to manage and coordinate treatment, care and support. Measures should be coordinated, networked and agreed upon by one source in order to avoid gaps, duplications, ineffective or even harmful interventions. Practitioners should coordinate the supports they deliver with other relevant service providers and service systems, and a multidisciplinary team or network should identify a coordinator responsible for case management A person who had a comprehensive training (including all the important aspects of ASS) will be responsible for overseeing and/or delegating the coordination task.	2, 3, 21, 37, 41, 43	Expert Opinion (AWMF 2021, AutismCRC, KCE) (1GL- AutismCRC: 1 RC Conditional)
ASD-S3	Services should be adapted to the level of care specialisation the child needs. Services should be within a reasonable distance from their homes. Access should take the level of functional impairment into account but should not be restricted based on a child’s intellectual ability, autism diagnosis, or any other eligibility criteria. The (Belgian) Reference Centres for Autism have a specific but not exclusive role in supporting the networking.	38, 44	Expert Opinion (KCE)
ASD-S4	Supports should take place in natural settings, using natural routines and natural consequences. The communicative demands of the environment should be assessed. Therapy with young children up to the age of 6 years should be carried out with the involvement of the parents/primary caregivers either in a therapeutic institution or, if the spatial and staffing conditions there are appropriate, in the daycare centre or school. And/or the parents/primary caregivers should be systematically	4, 9, 16, 17, 47	Expert Opinion (New Zealand Guideline, KCE) Evidence-based (3GL) (AWMF 2021: 1RC 2 to 3; The Danish Health Authority: 1RC



guided by professional therapists in a therapeutic setting or at home, to implement the exercises with the child at home. Teacher mediation should be considered as well.

very low; New Zealand
Guideline: 1RC Good)
(1GL- AWMF 2021:1RC A;
1GL The Danish Health
Authority: 1 RC weak)

(#): see Supplement Table 25 and see Table 11-12

**REMARKS:**

ASD-S1: RC10 and RC11 by the New Zealand Guideline (2022) are supported by evidence. This GL is a living guideline and evidence tables for this part date from 2009. The authors comment that a multidisciplinary specialist assessment team involves a group of professionals working collaboratively to assess the child. This team usually includes at least two or three members drawn from the following professions: paediatricians, child and adolescent psychiatrists, clinical or educational psychologists, speech/language therapists and occupational therapists.

ASD-S2 and ASD-S3: These summary points are based on expert opinion.

ASD-S4:

This summary point is based on expert opinion, and on supporting evidence mainly related to effectiveness of psychosocial interventions developed for autism-related behaviour (see RC4 by AWMF (2021), and RC9 by the Danish Health Authority (2021)). These interventions aim to promote social interaction and communication, including language development in young children, as the latter only develops through the promotion of communication and social interaction. Outcomes on language development are reported in many studies. The strength of evidence for this conclusion as reported by the guidelines is variable, and this is probably related to the different systems applied for grading of the evidence, and the different appreciation of the strengths and weaknesses in the underlying publications. E.g. the AWMF grading system only takes the publication type into account, and not the risk of bias or other methodological weaknesses.

RC16 from the New Zealand Guideline (2022) is supported by evidence. This GL is a living guideline and evidence tables for this part date from 2009.

DISCUSSION:

Five out of the seven most important included guidelines (AWMF (2021), AutismCRC (2022), New Zealand Guideline (2022), SIGN (2016), KCE (2014)) point to the importance of assessment and/or treatment by a coordinated multidisciplinary team, and/or to the need for inter-sector collaboration. Note that the eight GL from which RC were included, AWMF (2022), only contributed with one general RC while referring to AWMF (2021) for specific RC related to SLT in ASD.

3.2.2.4 Practitioner

The recommendations discussing which practitioner should be involved to manage children with ASD and communication or speech/language disorders, are presented in Table 21. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 21 – ASD: Recommendations related to Practitioner (N:12)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD-P1	3	Recommendation regarding therapist competencies (C.3.3) All health and social care professionals working with people with autism spectrum disorders should therefore have the following competencies: 1. Sound, scientifically based knowledge of autism spectrum disorder and the needs of patients and their families; [...] In a multidisciplinary team or network, a licensed specialist should be responsible for case management.	P/S	AWMF 2021	Expert Opinion		CCP
	22	A diagnostic assessment, alongside a profile of the individual's strengths and weaknesses, carried out by a multidisciplinary team which has the skills and experience to undertake the assessments, should be considered as the optimum approach for individuals suspected of having ASD.	A/P/S	SIGN 2016	Expert Opinion	Conditional	
	36	All staff working with children and young people with autism should have an understanding of autism.	P	KCE 2014	Expert Opinion		
	47	In children and young people with autism, consider a specific social-communication intervention for the core feature of impaired reciprocal social communication and interaction. This intervention should include play-based strategies with parents, carers and teachers to increase joint attention, engagement and reciprocal communication in the child or young person. Strategies should:	Aim/I/P/S	KCE 2014	Expert Opinion		



	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
		- be adjusted to the child or young person's developmental level; - aim to increase the parents', carers', teachers' or peers' understanding of, and sensitivity and responsiveness to, the child or young person's patterns of communication and interaction; - include techniques to expand the child or young person's communication, interactive play and social routines. The intervention should be delivered by a trained professional. For preschool children consider parent, carer or teacher mediation. For schoolaged children consider peer mediation.					
	18	All autistic children should have an assessment and support suggestions by a speech-language therapist with expertise in the autism spectrum at a minimum of once a year, more often in early childhood.	A/P	New Zealand Guideline 2022	Expert Opinion		GPP
ASD-P2	11	Preferably, a multidisciplinary team of health care practitioners experienced in autism should undertake diagnostic assessment of young people and adults suspected of being autistic. In the absence of an assessment team, a health care practitioner trained and highly experienced in the autism spectrum may undertake diagnostic assessment.	A/P/S	New Zealand Guideline 2022	Evidence-based		Fair
	45	Diagnostic and therapeutic teams should collaborate closely. Professionals who intervene only occasionally should consult the team.	P/S	KCE 2014	Expert Opinion		
	46	Professionals should not work in isolation but share experiences with peers or be supervised.	P	KCE 2014	Expert Opinion		
ASD-P3	37	Children and young people with autism should have access to a key worker approach in order to manage and coordinate treatment, care and support, including the management of transitions, for the child or young person with autism and their family and carers.	P/S	KCE 2014	Expert Opinion		

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
	43	A person who had a comprehensive training (including all the important aspects of ASS) will be responsible for overseeing and/or delegating the coordination task.	P/S	KCE 2014	Expert Opinion		
Not retained	29 (and WHO RC 33)	Access to support from staff trained in applied behaviour analysis-based technologies (eg Picture Exchange Communication System, discrete trial training, task analysis, prompting, fading or shaping) to build independence in adaptive, communication and social skills should be considered for children with ASD.	I/P	SIGN 2016 + WHO 2023	Evidence-based	Conditional	1 to 2

(#): see Supplement Table 25; *as mentioned in GL, see Table 11-12 and Supplement Table 25; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.

The main points of these recommendations can be summarised as follows:

	ASD: Summary points "Practitioner"	RC n° (#)	Evidence (#)
ASD-P1	All health and social care professionals working with people with autism spectrum disorders, including speech/language therapists, should have sound, scientifically based knowledge of autism spectrum disorder and the needs of patients and their families.	3, 22, 36, 47, 18	Expert Opinion (AWMF 2021, SIGN, KCE, New Zealand Guideline) (1 GL- SIGN:1RC conditional)
ASD-P2	Preferably, a multidisciplinary team of health care practitioners experienced in autism should undertake diagnostic assessment of young people and adults suspected of being autistic. In the absence of an assessment team, a health care practitioner trained and highly experienced in the autism spectrum may undertake diagnostic assessment. Diagnostic and therapeutic teams should collaborate closely. Professionals who intervene only occasionally should consult the team. Professionals should not work in isolation but share experiences with peers or be supervised.	11, 45, 46	Expert Opinion (KCE) Evidence-based (1GL) (New Zealand Guideline: 1RC Fair)
ASD-P3	Children and young people with autism should have access to a key worker approach in order to manage and coordinate treatment, care and support. A person who had a comprehensive training (including all the important aspects of ASS) will be responsible for overseeing and/or delegating the coordination task.	37, 43	Expert Opinion (KCE)

(#): see Supplement Table 25 and see Table 11-12

**REMARKS:**

ASD-P1: The strength of recommendation for 1 RC in SIGN 2016 is conditional; this is mainly related to the multidisciplinary team which is considered as the optimum approach.

ASD-P2, ASD-P3: --

Regarding RC 29 (and WHO RC33): cfr ASD-I3: Augmentative and alternative communication (AAC) is considered to be a specific form of communication and is included in this report (see section Introduction and 2.4.1). SIGN 2016 recommends to involve staff trained in applied behaviour analysis-based technologies. However, as also mentioned in the summary point ASD-I3, RC purely related to specific SLT techniques and modalities (intervention content) were not included (see section 2.4.1)

DISCUSSION --

3.2.2.5 Aims (Goal)

The recommendations discussing in which setting speech/language and communication disorders for children with ASD should be managed, are presented in Table 22. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 22 – ASD: Recommendations related to Aims (Goals) (N: 3)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ASD-Aim1	1	Recommendation regarding the need to formulate concrete, individual therapy goals (C.1.1) [...] Each person with an autism spectrum disorder and, in the case of children and adolescents, the parents or guardians should be involved in the formulation of concrete therapy goals [...] The main goals of therapy are the improvement of autistic core symptoms in the areas of social interaction and communication (area A) as well as stereotypical and repetitive behaviour and stressful sensory and special interests (area B). [...] The individual learning possibilities of the person with autism spectrum disorder should be taken into account with regard to the therapy planning. [...] The promotion of receptive and expressive language skills should also be chosen as an important therapy goal for children who cannot yet speak actively.	Aim	AWMF 2021	Expert Opinion		CCP
	14	Communication should be seen as a high-priority learning area, and communication goals should be included in individual plans for all autistic children and young people.	Aim	New Zealand Guideline 2022	Evidence-based		Good
	47	In children and young people with autism, consider a specific social-communication intervention for the core feature of impaired reciprocal social communication and interaction. This intervention should include play-based strategies with parents, carers and teachers to increase joint attention, engagement and reciprocal communication in the child or young person. Strategies should: - be adjusted to the child or young person's developmental level; - aim to increase the parents', carers', teachers' or peers' understanding of, and sensitivity and responsiveness to, the child or young person's patterns of communication and interaction;	Aim/I/P/S	KCE 2014	Expert Opinion		



		- include techniques to expand the child or young person's communication, interactive play and social routines. The intervention should be delivered by a trained professional. For preschool children consider parent, carer or teacher mediation. For schoolaged children consider peer mediation.					
--	--	---	--	--	--	--	--

(#): see Supplement Table 25; *as mentioned in GL, see Table 11-12 and Supplement Table 25; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.

The main points of these recommendations can be summarised as follows:

	ASD: Summary points "Aims (Goals)"	RC n° (#)	Evidence (#)
ASD-Aims1	There is a need to formulate concrete, individual therapy goals: Each person with an autism spectrum disorder and, in the case of children and adolescents, the parents or guardians should be involved in the formulation of concrete therapy goals. The main goals of therapy are the improvement of autistic core symptoms in the areas of social interaction and communication (area A) as well as stereotypical and repetitive behaviour and stressful sensory and special interests (area B). The individual learning possibilities of the person with autism spectrum disorder should be taken into account with regard to the therapy planning, and strategies should be adjusted to the child or young person's developmental level. Communication should be seen as a high-priority learning area, and communication goals should be included in individual plans for all autistic children and young people. The promotion of receptive and expressive language skills should also be chosen as an important therapy goal for children who cannot yet speak actively. Strategies should aim to increase the parents', carers', teachers' or peers' understanding of, and sensitivity and responsiveness to, the child or young person's patterns of communication and interaction.	1, 14, 47	Expert Opinion (AWMF2021, KCE) Evidence-based (1GL) (New Zealand Guideline: 1RC Good)

(#): see Supplement Table 25 and see Table 11-12

REMARKS:

RC14 from the New Zealand Guideline (2022) is supported by evidence. This GL is a living guideline and evidence tables for this part date from 2009

DISCUSSION: --**3.2.3 *Attention-deficit/hyperactivity disorder (ADHD)***

Results: An overview of all included RC included from the 2 included GL for ADHD can be found in Supplement 5.2.3 (Table 26). In the next sections, an overview of the RC as classified per subgroup is presented, as well as a summary for every subgroup.

Overall, 4 unique recommendations are included for ADHD. 3/4 (75%) recommendations are stated to be evidence-based, of which none of good quality.



3.2.3.1 Assessment and Setting

The recommendations that deal with initial assessment and with setting for children with ADHD, are presented in Table 23. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 23 – ADHD: Recommendations related to Assessment/ Setting (N:3/N:1)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
ADHD-A1	1	The disorders that occur with the greatest frequency include oppositional defiant behavior (in children) and other conduct disorders, tic disorders, specific developmental disorders (of motor function, language, scholastic skills), anxiety disorders, depressive disorders, autism spectrum disorders and, from adolescence onward, substance use disorders and personality disorders; these should be monitored, diagnosed based on the appropriate evidence and treated according to the respective guidelines.	A	AWMF 2018	Evidence-based	Strong	Moderate
	2	Coexisting disorders should be treated in accordance with practice guidelines. When deciding which disorder should be treated first, the severity of the disorder, amongst others, should be considered.	A	AWMF 2018	Expert Opinion		
	3	In the evaluation of a child or adolescent for ADHD, the primary care clinician (PCC) should include a process to at least screen for comorbid conditions, including emotional or behavioral conditions (eg, anxiety, depression, oppositional defiant disorder, conduct disorders, substance use), developmental conditions (eg, learning and language disorders, autism spectrum disorders), and physical conditions (eg, tics, sleep apnea).	A	AAP	Evidence-based	Strong	B
ADHD-S1	4	The PCC, if trained or experienced in diagnosing comorbid conditions, may initiate treatment of such conditions or make a referral to an appropriate subspecialist for treatment. After detecting possible comorbid conditions, if the PCC is not trained or experienced in making the diagnosis or initiating treatment, the patient should be referred to an appropriate subspecialist to make the diagnosis and initiate treatment	S	AAP	Evidence-based	Positive	C

(#): see Supplement Table 26; *as mentioned in GL, see Table 9-10, Figure 4 and Supplement Table 26; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting

The main points of these recommendations can be summarised as follows:

	ADHD: Summary points “Assessment” and “Setting”	RC n° (#)	Evidence (#)
ADHD-A1	In the evaluation of a child or adolescent for ADHD, the primary care clinician should include a process to at least screen for comorbid conditions, including emotional or behavioral conditions (eg, anxiety, depression,...), developmental conditions (eg, learning and language disorders, autism spectrum disorders), and physical conditions (eg, tics,...). These comorbid conditions should be monitored, diagnosed based on the appropriate evidence and treated according to the respective guidelines. When deciding which disorder should be treated first, the severity of the disorder, amongst others, should be considered.	1, 2, 3	Expert Opinion (AWMF) Evidence-based (2GL) (AWMF: 1RC Moderate; AAP: 1RC level B) (1GL – AWMF: 1RC Strong; 1GL – AAP: 1RC Strong)
ADHD-S1	The primary care clinician, if trained or experienced in diagnosing comorbid conditions, may initiate treatment of such conditions or make a referral to an appropriate subspecialist for treatment. After detecting possible comorbid conditions, if the primary care clinician is not trained or experienced in making the diagnosis or initiating treatment, the patient should be referred to an appropriate subspecialist to make the diagnosis and initiate treatment.	4	Evidence-based (1GL) (AAP: 1RC level C) (1GL – AAP: 1RC Positive)

(#): see Tables 9-10, Figure 4 and Supplement Table 26

No specific remarks or discussion

3.2.4 Communication disorders (CD)

An overview of all included RC from the 2 selected GL for CD can be found in Supplement 5.2.4 (Table 27). In the next sections, an overview of the RC as classified per subgroup is presented, as well as a summary for the subgroups.

Overall, 7 unique recommendations are included for CD. Only one (14%) recommendation is stated to be evidence-based, and based on good quality.

3.2.4.1 CD-Assessment

The recommendations that deal with assessment of children with CD, are presented in Table 24. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.



Table 24 – CD: Recommendations related to Assessment (N:2)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
CD-A1	6	In the case of a speech development disorder associated with a comorbidity, a multiprofessional treatment plan should be drawn up, taking into account speech therapy requirements.	A/S	AWMF 2022	Expert Opinion	CCP	
	7	The bio-psycho-social framework conditions of the child and its potential overstraining as well as other side effects of the language intervention(s) should be taken into account.	A/I	AWMF 2022	Expert Opinion	CCP	

(#): see Supplement Table 27; *as mentioned in GL, see Tables 9-10, and Supplement Table 27; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting

The main points of these recommendations can be summarised as follows:

	CD: Summary points “Assessment”	RC n° (#)	Evidence (#)
CD-A1	In the case of a speech development disorder associated with a comorbidity, a multiprofessional treatment plan should be drawn up, taking into account speech therapy requirements. The bio-psycho-social framework conditions of the child and its potential overstraining as well as other side effects of the language intervention(s) should be taken into account.	6, 7	Expert (AWMF) Opinion

(#): see Tables 9-10, and Supplement Table 27

No specific remarks or discussion

3.2.4.2 Intervention/ Aim (Goals)

The recommendations that deal with intervention and aims (goal) of intervention for children with CD, are presented in Table 25. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 25 – CD: Recommendations related to Intervention/ Aim (Goals) (N: 2)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
CD-I1	7	The bio-psycho-social framework conditions of the child and its potential overstraining as well as other side effects of the language intervention(s) should be taken into account.	A/I	AWMF 2022	Expert Opinion	CCP	
CD-Aim1	5	Children with speech development disorders should receive evidence-based, disorder-specific, parent- or child-centered speech therapy. It should serve to develop age-appropriate language skills and performance and/or prevent possible negative psycho-emotional, social, cognitive, educational and occupational consequences. The approach in speech therapy should be development-oriented and geared towards undisturbed speech development as well as the individual developmental prerequisites of a child and possible comorbidities.	Aim	AWMF 2022	Evidence-based	Strong	A

(#): see Supplement Table 27; *as mentioned in GL, see Tables 9-10, and Supplement Table 27; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting; ***Clinical consensus point or Good Practice Point.

The main points of these recommendations can be summarised as follows:

	CD: Summary points “Intervention / Aim (Goals)”	RC n° (#)	Evidence (#)
CD-I1	The bio-psycho-social framework conditions of the child and its potential overstraining as well as other side effects of the language intervention(s) should be taken into account.	7	Expert Opinion (AWMF)
CD-Aim1	Children with speech development disorders should receive evidence-based, disorder-specific, parent- or child-centered speech therapy. It should serve to develop age-appropriate language skills and performance and/or prevent possible negative psycho-emotional, social, cognitive, educational and occupational consequences. The approach in speech therapy should be development-oriented and geared towards undisturbed speech development as well as the individual developmental prerequisites of a child and possible comorbidities.	5	Evidence-based (1GL) (AWMF: 1RC level A) (1GL – AWMF: 1RC Strong)

(#): see Tables 9-10, and Supplement Table 27

No specific remarks or discussion



3.2.4.3 Setting

The recommendations that deal with the setting for management of children with CD, are presented in Table 26. For the formulation of the recommendation, the level of evidence, the strength of recommendation and the GRADE assessment, the wording of the original guideline is respected.

Table 26 – CD: Recommendations related to Setting (N:5)

	RC n° (#)	Recommendation*	Sub-Group**	Guideline	Level Evidence*	Strength recommendation*	GRADE*
CD-S1	1	The models of collaboration between the child, the family and the clinicians should be determined according to the complexity of the child's and the family's needs and according to collaborative intent.	S	INESSS 2017	Expert Opinion		
	6	In the case of a speech development disorder associated with a comorbidity, a multiprofessional treatment plan should be drawn up, taking into account speech therapy requirements.	A/S	AWMF 2022	Expert Opinion	CCP	
CD-S2	3	There should be close and ongoing collaboration between the clinicians in the health and social services system and teachers or daycare educators.	S	INESSS 2017	Expert Opinion		
	4	Children and young people with language development disorders need help and support integrated into everyday life and the classroom in early childhood or school education. This includes measures that improve language, task and text comprehension and learning and the acquisition of skills at school as well as the education-related improve participation despite the language development disorder and the associated language processing problems. Speech therapy and language-promoting measures and elements can be integrated into the pedagogical offerings in daycare centers and schools; this allows a high frequency of exercises to be achieved.	S	AWMF 2022	Statement		
	2	The Ministry of Health and Social Services should, together with the Ministry of Education and Higher Education and the Ministry of Family, start reviewing how resources are allocated on the basis of the child's needs and on identifying the best service providers, based on the different stages of the child's life.	S	INESSS 2017	Expert Opinion		

(#): see Supplement Table 27; *as mentioned in GL, see Tables 9-10, and Supplement Table 27; **Sub-Group: Aim: Aim (goal); A: Assessment; I: Intervention; P: Practitioner; S: Setting

The main points of these recommendations can be summarised as follows:

	CD: Summary points “Setting”	RC n° (#)	Evidence (#)
CD-S1	In the case of a speech development disorder associated with a comorbidity, a multiprofessional treatment plan should be drawn up, taking into account speech therapy requirements. The models of collaboration between the child, the family and the clinicians should be determined according to the complexity of the child's and the family's needs and according to collaborative intent.	1, 6	Expert Opinion (AWMF, INESSS)
CD-S2	There should be close and ongoing collaboration between the clinicians in the health and social services system and teachers or daycare educators. Children and young people with language development disorders need help and support integrated into everyday life and the classroom in early childhood or school education. Speech therapy and language-promoting measures and elements can be integrated into the pedagogical offerings in daycare centers and schools; this allows a high frequency of exercises to be achieved. The responsible Ministries of Health, Welfare and Education should start reviewing how resources are allocated on the basis of the child's needs and on identifying the best service providers, based on the different stages of the child's life.	2, 3, 4	Expert Opinion (AWMF, INESSS)

(#): see Tables 9-10, and Supplement Table 27



No specific remarks or discussion

3.2.5 *Specific learning disorder (LD)*

No recommendations relevant for the scope of this study (e.g. IQ limits), could be included from the following GL:

AWMF (2015) - S3-Leitlinie Diagnostik und Behandlung bei der Lese- und/oder Rechtschreibstörung⁴²; AWMF (2018) - S3-Leitlinie Diagnostik und Behandlung der Rechenstörung.⁴³

4 RESULTS SYSTEMATIC REVIEWS

Key Points

- Five SRs, including 4 MAs and one narrative synthesis, were retained for data extraction, and studied specific diagnostic groups like ASD and ID (DS), and mixed populations of NDDs.
- Overall, findings from these SRs confirmed the recommendations of the guidelines (GLs) without providing new updates or refutations. Evidence remains inconclusive regarding which subgroups might benefit more from interventions.
- The SRs highlighted significant methodological biases in original studies, including concerns of heterogeneity, imprecision and publication bias, which reduce confidence in the summary evidence.
- The SRs emphasized the lack of reporting on adverse events or harms, impeding a comprehensive benefits-risk evaluation of SLT intervention in these groups of children.

4.1 Characteristics of included studies

The overview of the study selection and reasons for exclusion are displayed in the Supplement 7.2 (Figure 2 and Table 29). Of the eligible full texts, 9 studies were ultimately excluded because of critical methodological flaws, primarily in the domains of appropriate methods to combine findings (if relevant), use of risk of bias in the interpretation of results and conclusions and/or adequate investigation of publication bias and its impact (if relevant) (see Supplement 8, Table 30).

Of the included SRs (n=5), the majority studied specific patient groups (either ASD or ID (DS)) whilst two reviews addressed mixed populations of neurodevelopmental disorders with diagnoses of ASD and/or CD (language disorders) most commonly represented. All but two review studies included randomized (RCTs or cluster RCTs) or quasi-experimental group designs. That is, the study by Ganz et al.⁴⁵ and McDaniel et al.⁴⁶ were also considered eligible despite the inclusion of SCED as original study results were aggregated in a formal meta-analysis. Overall (and if reported), review studies primarily investigated young children (with a chronological age of up to 6 years on average). The review studies involved children with varying levels of IQ or developmental ages, ranging from normal through to severe intellectual disability. In addition to the study by Ganz et al. summarizing treatment effects of AAC,⁴⁵ interventions were varied in nature and approach, and involved oral language interventions (receptive, expressive and discourse), a range of responsivity intervention strategies or considered a set of predefined categories (animal assisted, behavioural, cognitive behavioral therapy (CBT), naturalistic developmental behavioural interventions (NDBI), Treatment and Education of Autistic and related Communication Handicapped CHildren (TEACCH), technology-based, sensory-based or other interventions). In general, yet confounded by disparate reporting, studies reported on interventions of relatively short total duration with the exception of one review which included interventions up to 27 months of duration.⁴⁶ In all reviews composed of group designs studies, intervention effects were appraised relative to active as well as passive comparators. For the studies implementing single-case experimental designs (SCEDs), the comparison to baseline or alternative strategies was assumed; however, this was not clearly summarized by the study authors. Based on the available information, interventions were most commonly delivered one-on-one rather than in group, also in collaboration with interventionists other than speech/language therapists (as for example, psychologists or paraprofessionals, teacher (assistants), parents and/or research staff) and in settings relevant to day-to-day clinical practice (home, school, clinic). In line with the focus of this report, data extraction was limited to language- or communication-related outcomes; however any other data are available on request. For a summary of the study findings, see chapter 4.2.

Although for SRs eligible for this report no major flaws were indicated, the overall AMSTAR-2 quality appraisal showed that the methodological quality ranged from moderate to moderate-to-low. Most common non-critical flaws involved the lack of an a priori study design, explanation of included study designs, list of excluded studies and rationale as well as the lack of report of sources of funding for included studies. Compared to the studies of moderate quality overall, studies that were downgraded to moderate-to-low methodological quality additionally failed to report duplicate study selection and/or duplicate data extraction. Given all studies exhibited more than one non-critical flaw, none was assigned a high methodological quality (see Supplement 8, Table 31)

The characteristics of included SRs are displayed below (Table 27, Table 28, Table 29) Of the 5 SRs, four studies also performed a MA whilst one study conducted a narrative evidence synthesis only. To allow for an appraisal of the certainty of the evidence, the summary of findings from these studies is presented accordingly (see chapter 4.2). Subsequently, findings arising from SRs were also incorporated and amalgamated with the findings derived from eligible GLs (see chapters 4, 6.1).

4.2 Summary of the findings

4.2.1 Systematic reviews with meta-analysis

In general, irrespective of diagnostic group, intelligence levels and/or intervention approach, the SRs that also conducted a MA concluded with **promising, but tentative, results**.^{2, 45-47} That is, interventions were suggested to have a positive impact with moderate to large effects on average on language and/or communication outcomes measured immediately after the intervention as well as to a smaller extent after on average 6 months of follow-up (if such data were available). Studies that attempted moderator analyses were generally unable to indicate subgroups of patients relevant to this report (as for example according to diagnosis, intelligence level, interventionist, age..) with significantly different treatment effects. Of note, although moderator analyses of selected meta-analyses,^{2, 46} considering their methodological limitations and exploratory nature, were unable to statistically confirm the impact of the type of interventionist on treatment response, greater benefits have been suggested when SLT interventions are delivered by clinicians compared to other professionals or non-skilled individuals, such as teachers or parents.² A detailed listing of MA results for each study according to intervention and/or studied subgroups is provided in Table 27 and Table 28.

Whilst these studies overall suggest that intervention strategies as such may be considered a fruitful approach for all patients with NDD (and primarily CD, ASD, ID), **caution is warranted** in the interpretation of the findings and confidence in the certainty of the evidence. Although the MAs were direct in terms of investigated patients, interventions, settings and outcomes relevant to our research questions, the underlying evidence is prone to important study biases. As such, resulting effects estimates are impacted by imprecision, heterogeneity and publication bias all of which substantially **downgrade the confidence in the estimated effects**. The main concerns were as follows;

- In all MAs a **publication bias** was suspected or shown against small studies with negative effects; either via formal statistical tests and funnel plots or via a comparison of effects between published and unpublished (dissertation) sources. In fact, Donolato et al.² showed null, to even negative, effect sizes to remain after such bias-correction. In addition to this, exaggeration ratios were provided to warn for overestimated mean effects that may arise from spurious effects measured in smaller samples. Indeed, the studies included in the selected MAs were generally of smaller sample sizes and likely underpowered to show modest treatment effects.²
- As discussed in all studies, the underlying evidence was mostly of unclear/moderate to high **risk of study bias**; the most important ones being risks of detection bias and blinding of participants, attrition bias, risks of correlated measurement errors and poor reporting quality overall. These biases were likely to have impacted the magnitude of estimated effect sizes in MAs. As for example, Sandbank et al.⁴⁷ showed markedly lower effect estimates from RCTs of NDBI without

high risk of bias on language or social communication outcomes than when compared to effects estimates statistically pooled from all relevant RCTs.

- Whilst generally MAs were able to show significant positive treatment effects on average, effects estimates were prone to large **heterogeneity and/or** substantial **imprecision** (the latter due to the smaller samples in original research). That said, although all MA performed (preplanned) moderator analyses, analyses were impeded by too few degrees of freedom, insufficient statistical power and/or lack of randomization of tested moderator variables in the original studies to show consistent moderation or subgroup effects. As such the evidence remains inconclusive as to which subgroups (if any) would perceive greater benefit from language or communication interventions on respective outcomes, and variability in treatment effect between participants persists.^{2, 45-47}

Finally, as pointed out by Sandbank et al.,⁴⁷ despite evidence of improvement on language or social communication from studied interventions, adequate reporting of adverse events and harms is lacking, and thus, a comprehensive assessment of effectiveness including benefits-harms ratios is precluded.

4.2.2 Systematic reviews with narrative synthesis

One SR by Seager et al.⁴⁸ investigated speech, language and communication interventions in children with DS from 0 to 6 years, and refrained from conducting a MA because of too large heterogeneity in outcomes and measures. The authors suggested a **potential benefit** for these children if high dosage, language and communication training was provided in a preferably naturalistic setting and co-delivered by parents and clinicians. Again, the authors warn for **important limitations that downgrade confidence in the certainty of the evidence**. Also outlined in Table 29, these include the limited number of studies of moderate to high risk of bias overall, heterogeneity in outcomes and poor study reporting quality.

Details of study findings, biases and other limitations can be consulted in Table 27, Table 28 and Table 29.



Table 27 – Data extraction: study characteristics and summary of the findings for SRs in mixed populations of NDD (N: 2)

Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating – AMSTAR 2
Donolato (2023)	Last search April 2022 n=42, RCT (n=21), QED (n=21)	Total participants: 2 396 Children with - Language disorders (n=22) - ASD (n=14) - DS (n=3) - Fragile X syndrome (n=1) - mixed cases (n=2; ID and DS, ASD, pragmatic language impairment or social communication, - Williams syndrome (n=0) Age: mean age 6.5 yrs (range 2.6-14.2 yrs) Gender: median % males 75.0% (range 20.6% - 100.0%). IQ: unweighted grand avg non-verbal IQ (standardised score) (reported by n=14), 84.68 (range 41.5 and 107.7). Language: baseline unweighted grand avg global language levels (standardised score) (reported by 10 studies) 80.93 (range 70.76 - 91.95).	Schools (n=16), the clinic (n=13), home (n=12), NR (n=1).	Types of oral language intervention - Explicit instruction (n=23), implicit/incidental approach (n=12), a hybrid approach (n=8). - Specific language skill-focus on vocabulary (n=7), grammar (n=6), multi-component programmes (n=2). - General language stimulation intervention (n=10), a book reading–related language programme (n=8). - Focus on narrative skills (n=2), social communication skills (n=2). Interventionists - clinicians (n=15), - research staff (n=3), - parent-mediated (n=17), - teacher-mediated (n=8); - parent- and teacher-mediated (n=1) Delivery	Active comparator (n=2), waiting list (n=16), business-as-usual (n=23), NR (n=1).	Outcomes: - vocabulary (expressive vocabulary (n=16), receptive vocabulary (n=6)), - grammar (n=16), - discourse (expressive discourse (n=15), receptive discourse(n=121), - omnibus measures (total receptive language (n=7), total expressive language (n=7) Results MA <i>Overall estimate effect</i> - Moderate to large: 0.27 [95% confidence interval [CI]: 0.15, 0.38] (pre-test/posttest comparisons, 46 group comparisons, 108 effects) - Moderate overall true heterogeneity ($I^2 = 45\%$, $T_{study} = 0.00$, $T_{comparison} = 0.13$, $\omega = 0.21$) <i>At Follow-up (avg 6 mths, range 3-12 mths) estimate effect</i> - Small to moderate: 0.18 [95% CI: 0.03, 0.33] (pre-test/follow-up comparisons, 12 group comparisons; 21 effects).	Moderate



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating – AMSTAR 2
				- individual (n=27), - group (n=13) - mixed (n=2) Duration - avg 12.81 wks (range 5 - 22)		- Small heterogeneity ($I^2 = 10\%$, $T_{study} = 0.00$, $T_{comparison} = 0.06$, $\omega = 0.06$). - Results of sensitivity analyses, aggregation by disorder available on request. <i>Moderators (pre-test/post-test comparisons)</i> - Significant effects for language outcome measures (smaller ES receptive vocabulary and omnibus receptive tests, $Q(6) = 28.89$, $p < 0.001$), session duration ($Q(1) = 13.09$, $p = < 0.001$, $B = 0.006$) and number of weeks (but not total number of sessions) ($Q(1) = 5.75$, $p = 0.017$, $B = 0.027$) - No evidence for participant characteristics (i.e. diagnostic conditions, age, sex, IQ, language level, intervention type, intervention focus, settings, interventionists, delivery, indicators of study quality (details available on request)) <i>Publication bias</i> - P-curve analysis: no risk (cave limited number of studies) - PET-PEESE metaregression method: SE significant positive	



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating – AMSTAR 2
						moderator of ES for pre-test/post-test comparisons and pre-test-follow-up comparisons. Bias corrected-effects sizes non-significant and negative <i>General considerations</i> • Overestimation of true treatment effects suggested. • Limited power to detect moderators and studies not randomized on moderators, and modest effects; cave spurious findings in smaller studies & publication bias. • Many studies excluded focussing on social skills in ASD • Most studies unclear risk of bias, generally poor reporting quality	
Ganz (2023)	Last search April 2020 n=114, SCED	Total participants: 330 School-aged individuals with • ASD: n=85 • ASD, ID: n=16 • ID: n= 41 Age: range 1-21 yrs • 0-3 yrs:n= 37 • 4-5 yrs: n= 53	Not specified	Instructional features of AAC • graphic prompt: n= 6 • modeling: n= 75 • physical prompts: n= 63 • preference assessment: n= 57 • prompt fading: n= 103 • reinforcement: n= 106 • systematic arrangement: n= 102	SCED, comparing to baseline or alternative interventions depending on the design. Not further specified	Outcomes: • Communication: AAC, verbalizations, paralinguistic communication Results MA 114 studies, 330 participants, 767 data series. Log-response ratio on subset (93 studies, 293 participants, 516 ES) <i>Overall estimate effect</i>	Moderate to low



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating – AMSTAR 2
		6-10 yrs: n= 54 11-14 yrs: n= 25 >14 yrs: n= 16 Gender: NR IQ: NR Language: <u>Word use prior to intervention</u> 0-5 words: n=34 6-50 words: n=23 >50 words: n=8 - NR=n=87 <u>Communication modes prior to intervention</u> - Verbalization: n=27 - Natural gestures: n=18 - Vocalization: n=8 - Manual sign language: n=8 - Low-tech AAC: n=8 - Mid-to-high tech AAC: n=4 2 or more categories: n=74 - NR: n=15		- verbal prompts: n= 76 Initiator - child: n=17 - Interventionist: n= 97 Delivery - one-on-one: n=104 - group: n=10 Teaching opportunities - Dispersed: n= 12 - Massed: n= 102 Activity context - Contrived: n= 93 - Embedded: n= 21 Teaching stimuli - Limited: n= 41 - Varied: n= 73 Instructional environment - Controlled: n= 54 - Natural: n= 60		<u>Tau (AB) metric:</u> - Estimate: 0.719, 95% CI [0.670, 0.768], distribution strongly skewed. - Substantial variation at study level (SD estimate: 0.22) but less at within-study between-participant level (SD estimate: 0.04) and no variation within participants (estimate: 0.00) <u>Log response ratio:</u> - Estimate: 1.86, 95% CI [1.58, 2.13], corresponds to an increase in behavior of 541%, 95% CI [386%, 744%] from baseline to intervention. - Highly heterogeneous between studies (SD estimate: 1.16) and cases within participants (SD estimate: 1.12), and little variation between participants nested within studies (SD estimate: 0.11). <u>Moderator analyses</u> - Significant differences between combinations of communication modes. - No significant effects for diagnosis, age, communication modes prior to the intervention, word use prior to the	



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating – AMSTAR 2
		<u>Imitation use prior to intervention</u> NR: n=95				intervention, imitation use prior to the intervention. <i>Publication bias</i> - Funnel plots no indications of publication bias; however, not designed for use with meta-analyses of SCEDs. - Higher Tau(AB) ES and log response ratios in published sources vs. dissertations (p=0.048, p=0.595, resp.) <i>General considerations</i> - Bulk of studies insufficient reporting to determine participant imitation use - Infrequent reporting of potential moderators impeded analysis - Much larger number of younger participant included in this study compared to previous MA	

n=number of studies. RCT=randomized controlled trial. QED=Quasi-Experimental Design. NR=not reported. ASD= autism spectrum disorder. ID= Intellectual Disability. DS= Down Syndrome. SCED=single case experimental design. AAC: augmentative and alternative communication. Yrs= years. Avg=average. Wks=weeks. Min=minutes. Mths=months. MA= meta-analysis. 95% CI: 95% confidence interval.



Table 28 – Data extraction: study characteristics and summary of the findings for SRs in populations with ASD (N: 2)

Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
Mc Daniel (2022)	Last search March 2020 N=92, group design RCTs n=45, SCED n=47	Total participants: 1 061 (RCT), 143 (SCED) Children with ASD Age: mean age at study initiation was 43.01 mths (SD = 17.97 mths). Gender: NR IQ - language: various use of scales (MSEL, GSMD, VABS, Bayley, (nonverbal, performance) IQ, Leiter-R IQ, Chinese WPPSI IQ, Uzgiris-Hunt, WISC-III NL, receptive vocabulary, PPVT, VB-MAPP milestones, HELP cognitive, PLS-4, P-TONI). NR in n=14	Not consistently specified	Types of responsivity strategy interventions - ASAP n=1, - HMTW n=2 - JASPER n=5 - CDIT n=1 - JA n=5 - PRT n=6 - JE n=1 - Interpersonal synchrony (AEPS) n=1 - PASS n=1 - JAML n=2 - Focused playtime intervention n=1 - FITT n=1 - PRISM n=1 - Communication-focused treatment n=1 - ESDM n=1 - PACT n=1 - RIT n=1 Interventionist - Educator: n=5 - Caregiver: n=23	TAU : n=15, DT : n=9, CE : n=4, NIS : n=1, ABA : n=1, PECS : n=1, SP : n=2, Control n=1	Outcomes: - Prelinguistic skills and/or expressive/receptive language measures Results MA 294 ES from 33 RCTs and 69 ES from 34 SCED studies, a total of 1 040 participants <i>Overall estimate effect</i> <u>RCT:</u> - SMD: 0.36, 95% CI [0.21, 0.51], moderate effect - Substantial heterogeneity (τ^2 values 0.19) <u>SCED:</u> - mean BC-SMD = 1.20, 95% CI [0.87, 1.54], large effect - Substantial heterogeneity (τ^2 values 0.67) <i>Moderator analyses</i> <u>RCT</u> 6 planned (interventionist, time in intervention, proximity, boundedness, risk for CME, publication status) - Context bound larger mean ES ($p<0.05$, $g:0.47$) vs generalized or potentially context-bounded.	Moderate



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
				- Clinician: n=9 Delivery - Individual: n=33 - Group: n=5 Duration - Duration: range 2 wks – 27 months		- Studies at risks of CME larger mean ES (g=0.39) vs studies free from risk (g=0.12) - Correlation risk of CME and boundedness (r=0.68) - Other analyses: non-significant (cave too low degree of freedom) <u>SCED</u> 3 completed moderator analyses (i.e., interventionist, time in intervention, and publication bias), other insufficient variation across studies. - None significant . <i>Publication bias</i> <u>RCT</u> - Not detected via moderator analysis (low number of studies) - Egger test: p<0.01 <u>SCED</u> - Not detected via moderator analyses - Egger test: p<0.001 <i>General considerations</i> Concerns of study quality – risk of bias, and omission of key intervention details observed	



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
Sandbank (2023)	Last search November 2021 N=252, RCT 173 QED 79	Total participants: 13 304 Children with ASD Age: mean 56.11 mths (range 18.9-95.2, SD 19.08). Gender: avg 82.57% males (standard deviation 11.27). IQ: NR Language: mean language age equivalent 22.36 mths (SD 12.73)	Not specified	Types of intervention categories - animal assisted interventions (n=10), - cognitive behavioral therapy (n=4), - behavioral interventions (n=51), developmental interventions (n=24), - music therapy (n=8), - NDBI (n=75), - Sensory integration therapy (n=6), - Other sensory based interventions (n=7), - TEACCH (n=9), - Technology based interventions (n=33), - Other (n=72) Categoization of studies by type was not mutually exclusive. Interventionists Not specified. Delivery Not specified. Duration	usual treatments or control groups, not specified	Outcomes: - By Domain (ASD diagnostic characteristics or related domains), proximity and boundedness. Results MA Focus on communication and language outcomes only (results of other outcomes or when including QED available on request) <i>Estimated effects from RCTs</i> <u>Behavioral intervention:</u> - Social communication : 0.54 (-0.24-1.32) (n=9, 84 ES) <u>NDBI</u> - Language: 0.16 (0.01-0.31) (n=26, 138 ES) - Social communication: 0.35 (0.23-0.47) (n=32, 322 ES) <u>Technology-based</u> - Language: 0.21 (-0.13-0.55) (n=9, 29 ES) - Social communication: 0.33(0.02-0.64) (n=17, 84 ES) <i>Estimated effects from RCTs excluding outcomes from caregiver or teacher reports</i> <u>Developmental</u> - Social communication: 0.31 (0.13-0.49) (n=13, 100 ES)	Moderate



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
				Not specified		<u>NBDI</u> - Language: 0.13 (-0.04-0.30) (n=22, 101 ES) - Social communication: 0.36 (0.23-0.49) (n=26, 231 ES) <u>Technology based</u> - Language: 0.26 (-0.14-0.66) (n=8, 21 ES) - Social communication: 0.20 (-0.01-0.41) (n=13, 44 ES) <i>Estimates from RCTs excluding outcomes subject to high risk of bias</i> <u>NBDI</u> - Language: 0.06 (-0.13-0.25) (n=15, 58 ES) - Social communication: 0.11 (-0.03-0.26) (n=15, 77 ES) <i>Moderator analyses</i> - Smaller effects for distal vs proximal outcomes (B=-0.15, P=0.002) and generalized vs context-bound ES (B=-0.27, P<0.001) <i>Publication bias</i> - Egger multilevel meta-analysis & multiple comparison correction: publication bias, influence on findings by intervention type unclear.	



Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
						<i>General considerations</i> • Risk of detection bias (65.19% of outcomes), derivation from caregiver or teacher reports (45.51% of outcomes), high attrition bias for 15.67% of outcomes. Most studies blinding participants to intervention impossible. • Adverse events (mentioned in 10% of studies) inadequately monitored and/or reported	

n=number of studies. RCT=randomized controlled trial. QED=Quasi-Experimental Design. NR=not reported. ASD= autism spectrum disorder. ID= Intellectual Disability. DS= Down Syndrome. SCED=single case experimental design. Yrs= years. Avg=average. Wks=weeks. Min=minutes. Mths=months. MA= meta-analysis. 95% CI: 95% confidence interval. SD=standard deviation. ES=effect size. (BC-)SMD= (between case) standardized mean difference. CME= correlated measurement error. ASAP=advancing social communication and play. HMTW= Hanen More Than Words (registered trademark). JASPER= Joint Attention Symbolic Play, Engagement, and Regulation. CDIT= Child Directed Interaction Training. JA= Joint Attention. PRT= Pivotal Response Training. JE= Joint Engagement. AEPS= Assessment, evaluation, and Programming Systems for Infants and Children. PASS= Parent-mediated intervention for Autism Spectrum Disorder in South Asia. JAML= Joint Attention Mediated Learning. FITT= Family Implemented TEACCH for Toddlers . TEACCH=Treatment and Education of Autistic and Communication-Handicapped Children. PRISM= Pivotal Response Intervention for Social Motivation. ESDM=Early Start Denver Model . PACT= Pre-school Autism Communication Trial. RIT= Reciprocal Imitation Training. TAU= treatment as usual. DT= delayed treatment. CE= caregiver education. NIS= non-interpersonal synchrony. ABA= applied behavioral analysis. PECS= picture exchange communication system. SP= symbolic play . MSEL=Mullen Scales of Early Learning. GSMD= Griffiths Scale of Mental Development. VABS=Vineland Adaptive Behavioral Scales. IQ= intelligence quotient. WPPSI= Wechsler Preschool & Primary Scale of Intelligence. WISC III-NL= Wechsler Intelligence Scale for Children – Netherlands. PPVT= Peabody Picture Vocabulary Test. VB-MAPP= Verbal Behavior Milestone Assessment and Placement Program. HELP=Hawaii Early Learning Profile. PLS-4= Pre-school Language Scale, 4th Edition. P-TONI= Primary Test Of Non-verbal Intelligence.



Table 29 – Data extraction: study characteristics and summary of the findings for SRs in populations with ID (DS) (N: 1)

Author, Year	Included Study Designs	Participants	Settings	Interventions	Comparators	Findings	Quality rating - AMSTAR 2
Seager (2022)	Last search May 2020 N=11, RCT =4, QED=7	Total participants: 242 Children with DS Age: at beginning intervention: 0 and 55 mths Gender: avg 82.57% males (SD 11.27). Developmental/cognitive age or quotient at baseline: 14.8-19.9 (mths) or 57-85 quotient (NR or unknown in n=23) Language age or quotient at baseline: 16.5-18.6 mths (NR or unknown n=18) or 48-68 Typically developing children: (n=1)	Not specified, naturalistic setting	Types of speech, language and communication interventions - Dialectic-didactic intervention (n=1), - modelled or written instructions (n=2), - NR (n=1), - social reward (n=1), - behavioral modification (n=1), - HPP: n=1), - RT (n=1), - oral language (n=1), - RE/PMT (n=1), - high dose MCT (n=1) Interventionists clinicians or parents, not further specified) Delivery Individually or group, not further specified Duration - range 13 – 100 wks, - NR in n=2	no treatment/control (n=1) usual care (n=4), a different intervention (n=3), a group receiving a different dose of the active intervention (n=1), or chronological age/developmental age group comparison (n=1), NR (n=1)	Outcomes: - Language, verbal or social communication measure - Parental responsiveness, communication, behaviour: details available on request Results narrative synthesis - N=11: stat sign on ≥1 outcome measure post-intervention (after treatment or follow-up) - ES (n=3 studies): small to medium (inadequate descriptive statistics in n=7) - Significant positive outcome: n=7 - Significant lower growth curve in requesting behavior in intervention group vs control; n=1 - No difference between groups: n=3 Narrative details available on request. <i>General considerations</i> - Adequate level of reporting (n=4, out of 11) - Moderate to high risk of bias overall	Moderate to low



						• No MA performed due to heterogeneity of outcomes and measures, individual RCTs & group comparison studies of small sample sizes, with ES without power calculations • Limitations: small samples or inadequate reporting/lack of intervention, outcome measures, treatment fidelity, control groups with same baseline assessment, results without SD or ranges	
--	--	--	--	--	--	---	--

n=number of studies. RCT=randomized controlled trial. QED=Quasi-Experimental Design. NR=not reported. DS= Down Syndrome. SCED=single case experimental design. Yrs= years. Avg=average. Wks=weeks. Min=minutes. Mths=months. MA= meta-analysis. SD=standard deviation. ES=effect size. HPP: Hanen Parent Programme. RT=responsive teaching. RE= Responsive education. PMT= prelinguist milieu teaching. MCT=milieu communication treatment.



5 NARRATIVE SYNTHESIS OF STAKEHOLDER VIEWS

On 13 and 14/02/2025, two meetings were organized with in total 50 participating stakeholders. The aim was not to conduct an exhaustive and conclusive stakeholder involvement process applying qualitative and/or quantitative research methods, but rather to gather some contextual elements on the Belgian situation that might be informative in light of the conclusions from the evidence. As pointed out before (see 2.5), written comments could be provided to the KCE team prior to the meetings. This summary reflects as accurately as possible the written comments as well as the discussions among stakeholders (SHs) during the plenary sessions. Evidence conclusions in chapter 3 and 4 were not influenced by the stakeholder views, as these were written before the meetings took place. This synthesis does not necessarily express conclusions or recommendations proposed by KCE for this report. The aim is to provide an overview of the most important (recurring) discussion points and the description may not be exhaustive.

5.1 Assessment

Most stakeholders (SHs) agreed that assessing speech/ language functions is essential, feasible, and acceptable. They preferred a multidisciplinary approach for both diagnosis and treatment planning of children with intellectual disabilities (ID) (IQ ≤ 70 with deficits in adaptive functioning) and children with autism spectrum disorder (ASD), rather than assessment by a single care professional. It was considered important that children and young people are encouraged and supported to express their views during the assessment, and that the family is involved.

For children with ASD, the necessity of a multidisciplinary assessment was emphasized. Stakeholders indicated very clearly that monodisciplinary speech/language therapy has no role in diagnostics and treatment planning for children suspected of having ASD. To avoid the risk of misdiagnosis by a single, less well-trained professional, it was stressed that centres specializing in ASD, in close collaboration with paediatric neurologists or child psychiatrists, should establish the diagnosis and associated severity levels.

Given the required expertise for this patient niche, a monodisciplinary speech/language therapist may lack the training and capability to conduct comprehensive assessments. However, the shortage of CAR/CRA centres and lengthy waiting lists pose challenges.

Some stakeholders mentioned the concept of "process diagnostics," where treatment begins while the diagnostic process is still ongoing, as a potentially valuable approach, particularly for young children and those with complex, undefined clinical presentations. Of note, process diagnostics is already implemented in the CAR-CRA centres for very young children.

Although the importance of regular assessment was generally endorsed, the clinical recommendation to prescribe a fixed minimum frequency, such as annually, for children with ASD was perceived as too rigid.

One stakeholder highlighted that the importance of speech/language therapy, and its reimbursement/funding, should be viewed more broadly than the children currently studied, as it is relevant to the larger population seen and treated in child psychiatry wards (K-dienst/ service K).

Another stakeholder sought clarification on whether assessment refers to the diagnostic process, such as establishing an ASD diagnosis, or the assessment of delays in speech /language development for treatment planning. The latter is likely to be repeated over time.

It was reiterated that the CAR-CRA centres currently nominated in the Royal Decree of July 2024 are expected to adhere to the relevant clinical guidelines.

Some stakeholders, particularly the health care referrers and/or providers, brought to the attention that the terminology used in the literature, and/or put forward by DSM-5, is not necessarily in line with the diagnostic terminology used in the field and that discrepancies in terminology exist between providers

and regulators, as for example the currently used NIHDI (RIZIV-INAMI) nomenclature classification definitions are based on the ICD framework.

5.2 Therapy

Upon reviewing the summary evidence and while recognizing the significant study biases associated with the overall effectiveness of speech/language therapy (SLT) in children with neurodevelopmental disorders (regardless of IQ levels and type of SLT), all stakeholders concurred that SLT is indicated for these groups. They emphasized that the omission of IQ criteria is a crucial takeaway from these findings. A stakeholder noted that reimbursement for monodisciplinary SLT for children with ASD is currently not foreseen, proposing that this group should form a distinct new subgroup in the nomenclature.

Similar to the assessment, most stakeholders (SHs) agreed that a multidisciplinary therapeutic approach is preferred for ID and ASD, and that no standardized treatment recommendations should be based solely on the diagnosis. This aligns with the conceptualization and interpretation of disability in Belgium, where a diagnosis does not confer status but rather requires an assessment of its impact on autonomy and quality of life in social, educational, professional, and family environments. Several stakeholders emphasized the importance of coordination alongside teamwork and a multidisciplinary approach. As all children deserve an individual treatment plan adapted to their personal needs, and this should be developed with input from all relevant parties within a multidisciplinary team.

With regard to therapy, one SH argued that the relevance of the results should be viewed in terms of the interventions studied and outcome data collected. The SH mentioned that a focus on speech/language outcomes is restrictive as the ultimate aim of intervention/management is an improved integration of the child. Other outcomes such as the effectiveness of interventions to improve autonomy, wellbeing, or overall integration were not included in the literature.

One SH pointed out that the current nomenclature is not suited to a multidisciplinary approach; and one should ask whether a multidisciplinary approach warrants team financing or discipline financing. In terms of cost-efficiency, a multidisciplinary team may be better suited, as exemplified by a CAR-CRA. Indeed, discipline financing would require the creation of an additional fee to reimburse coordination and consultation between colleagues.

In the case of autism spectrum disorder (ASD), for children with both communication and social therapy goals, a parallel approach of both aspects is needed.

Despite advocating for a multidisciplinary approach, stakeholders remarked that the scientific results do not specify how collaboration should be structured.

ALTERNATIVE AND AUGMENTED COMMUNICATION (AAC)

Regarding Alternative and Augmented Communication (AAC), most stakeholders agreed that various forms of supportive communication should be tailored to the needs of the child and their communication partners. Although AAC is not always available (e.g., in the French-speaking region), it may be unclear what it refers to in the Belgian system, and sometimes there is a lack of sufficient expertise.

The need for a multidisciplinary team, with coordination between speech/language therapists, parents, teachers, and other involved professionals, was emphasized to achieve consistent and effective application of the supportive communication across different contexts. Settings such as COS and CAR-CRA centres collaborate with specialized expertise centres in supportive communication, such as the “Modem” expert network, and/or experienced speech/language therapists. It was also highlighted that an analysis of the family and home environment is necessary for method choice, considering factors such as screen placement in the home and financial means. Indeed, certain methods can be financially demanding, and AAC is currently not included in the nomenclature or eligible for reimbursement.



EARLY TREATMENT

Most SHs agreed that treatment for children with neurodevelopmental disorders should start early, preferably before the age of one year, particularly in children with intellectual disabilities. However, there were questions regarding the feasibility of assessment and therapy at that age. In this regard, several SHs suggested the involvement of speech/language therapists in services for early support at home. Additionally, some SHs raised concerns about the limited possibilities for reimbursing feeding problems in young children, or for specific training of parents on communication (such as the ImPact programme, which may already be offered by some CAR/CRA, though access remains limited).

Some questions were posed about whether assessment and/or therapy is indeed feasible at such a young age, and that unnecessary anxiety for families and prospective parents should be avoided. Further it was noted that Flanders has the COS (Centrum voor Ontwikkelingsstoornissen) service, but that Brussels and Wallonia have no established care pathway to detect developmental difficulties in young children, and that it is not really known if such a service is indeed the best practice.

In addition to this, one SH brought up the importance of educating and involving the parents as early as possible, as they are also considered part of the team. The concern of the SH was that the familial context does not always allow for effective (early) interventions and that, in addition to the child, the parents too require care, follow-up, and support.

The question was also raised if an updated and comprehensive overview of specialized SLThs for these young children is available.

Finally, a SH highlighted the relevance of motor aspects, and thus of a multidisciplinary approach. "There's no point in starting early with pictograms if the pointing isn't there." The SH confirmed that therapy should start early, but one should not necessarily expect immediate results.

Overall, SHs underscored the undeniable benefits of SLT from an early age.

5.3 Setting

All SHs agreed that more multidisciplinary capacity is necessary due to geographical disparities:

"The CRAs offer unequal care in terms of capacity and good practice for children with neurodevelopmental disorders requiring speech/language therapy. This depends on the territory and the regions. In particular, the Flemish region/community is better served than the Walloon region/French community. This disparity was inherited from the federal government with the transfer of powers. Some provinces in Wallonia are very poorly equipped with CRAs (e.g. Luxembourg)."

SH also invariably point to long waiting lists for multidisciplinary care. Some also pointed to waiting lists for access to specialized education.

To overcome this problem, two SHs argued explicitly for more capacity in CAR/CRA, and/or the establishment of new CAR/CRA. Some SHs argued that management (i.e., assessment and treatment) should be exclusively undertaken by multidisciplinary teams, particularly the CAR/CRA centres, for the following reasons:

- They possess the necessary competences.
- Speech/language therapists are currently not well-trained during their basic education to work effectively with these groups of children, complicating monodisciplinary SLT.
- There is concern about maintaining sufficient treatment capacity for conditions that, according to clinical guidelines, could be effectively treated with monodisciplinary speech/language therapy.
- A multidisciplinary approach is crucial, but coordination plays a significant role, which is often missing when care is organized separately by different disciplines.
- The team should lead, and private SLThs must be supervised, requiring intense collaboration. Hence, multidisciplinary therapy is considered the best approach.

Two other SHs suggested allowing monodisciplinary SLT whilst awaiting more capacity in CAR/CRA:

- While on the waiting list at CAR/CRA, monodisciplinary SLT in the meantime? However, it was mentioned that the story is “nuanced”, as monodisciplinary treatment is not a valuable approach for just any child. Simply allowing children to enter monodisciplinary SLT is not a solution to the fundamental problem (i.e., too few CAR-CRA centres or inadequate geographical spread thereof).
- “The main concern is that not all children have access to care... There isn’t just one model. Ideally, a range of options should be available to care professionals, including the option of prescribing a monodisciplinary approach in the absence of other solutions better suited to the problem, while ensuring the training and quality of the professionals involved and giving them the means to consult with all partners.”

Other SHs argued for regular access to monodisciplinary SLT but under strict conditions:

- “With regards to ID, a multi-professional setting is preferred. However, it is also stated in one GL that the minimum team can consist of a child, parents, and speech/language therapist, which is an unusual way of describing a team. If the choice is made to treat some children in a more local setting, or spread over separately operating care providers, provision must be made for support by a specialized team, and the possibility of multidisciplinary consultation with other actors (education, parents, etc.) must be provided.”
- For ASD, one SH remarked that an approach by a provider who is not an integral part of the team (i.e., speech/language therapist) seems to have a place only in exceptional cases, and only after diagnostic assessment and coordination with the team. Only if a well-coordinated approach with regular coordination is possible does it seem feasible to involve care providers “who do not work under one roof within the same team.”
- Also, some SHs mentioned that collaboration between the centre and a locally treating therapist could be beneficial, provided the basic training of a SLTh includes the skills to treat a young person with ID, which is currently not the case.
- One SH proposed a stepped care model: “The proposed model in which a healthcare provider can seek advice from a specialized team is worth exploring. This approach is now used to follow up patients with eating disorders, for example, where MAST teams (multidisciplinary ambulatory support teams) provide case support, help with referrals, etc. A similar approach could be developed for children currently falling between the cracks (e.g., no enrolment in special education, no place in CAR/CRA). Care must be taken to ensure that children with the most complex needs can access the most specialized services in good time. Organization of such a stepped care model (in which expertise of a CAR-CRA or university-based centres could support determining individual needs of a child) is not easy but a trend in actual government policy and government agreement. However, the evaluation of this model is difficult and currently not yet well known in the Belgian setting.”

The following suggestions and additional questions were postulated:

- One SH remarked that monodisciplinary or independent therapists would need to adapt continuously if they collaborated with other professionals, unlike when collaboration occurs within the same multidisciplinary team or clinic
- “When it comes to individual therapists, further efforts should be made on how they can stay connected with the broader treatment plan for the child and support plan for the context. This requires additional investment to ensure they are reimbursed and trained accordingly.”
- “Clear and well-founded guidelines are necessary in this case.”
- Strengthening current diagnostic capacity seems very appropriate; assessments are also needed in cases of (suspicion of) slower development. In this context, strengthening first-line services



such as Kind & Gezinⁱⁱ/ONE or CLB/PMS (Centra voor Leerlingenbegeleiding/ Centres psycho-médicaux-sociaux) with SLThs would be an added value, ensuring independent and multidisciplinary assessment. The need for multi-disciplinarity is apparent in several services; hospital K-wards, services for early support at home, schools, multifunctional centres (MFC), CAR-CRA centres, child day care, educational support centres...

- With regard to multidisciplinary teams, all relevant teams, such as the COS and the autism reference centres, should be indicated in the respective RD of 07/2024, and not just the CAR-CRA.
- As early as possible, “open all registers” (via multidisciplinary management) to detect all symptoms (particularly minor signs) to avoid focusing on speech/language problems at the expense of other (more hidden) symptoms.

Nevertheless, difficulties with a monodisciplinary speech/language approach were expressed by a number of SHs. As pointed out above, individual therapists may need to adapt more when collaborating with other professionals compared to continuously working within the same multidisciplinary team or clinic. In this regard, several questions were raised about how follow-up, coordination, and contacts with the school could effectively be organized if the SLTh does not work within a multidisciplinary setting.

Some SHs postulated again that the fundamental problem lies in the shortage and/or poor distribution of the CAR-CRA centres. This is a call to the respective governing bodies to take their responsibility. And the question arose: “What is going to happen with these children (who have not had a multidisciplinary assessment yet) after June 2025?”

HOW TO ORGANIZE MULTIDISCIPLINARY TEAM WORK?

Overall, guidelines suggest that the assessment and treatment of these groups of children should be organized in a multidisciplinary team, in a coordinated way, with quality assurance. While most stakeholders agreed on the preference for a multidisciplinary approach, some mentioned that multidisciplinary management may also be possible in private practices or clinics. They highlighted that the guidelines do not dictate that professionals “should work under the same roof,” and that management should be organized in a centre such as CAR/CRA. These SHs agree that it is not a prerequisite for disciplines to be active in the same setting, but that collaboration should be effective, and care should be coordinated. One SH proposed that in fact “a guidance team” should be organized to support the child, which could involve monodisciplinary treatment and should not be restricted to a centre.

Examples of their remarks and questions include:

- It is not necessarily an issue of specialized healthcare providers; the problem lies in the coordination of specialists in the domain. But how to organize this, particularly with a view to financial planning. Access to monodisciplinary speech/language therapy will turn out more expensive for the parents. To some SHs, this would be an additional argument in favour of reimbursement.
- Specialized centres and therapists are required: via centres such as CAR/CRA; or pluridisciplinary and coordinated management, with professionals working independently (or monodisciplinary) and coordinated by a child psychiatrist or neurologist.

ⁱⁱ <https://www.kindengezin.be/nl>; Office de la naissance et de l'enfance <https://www.one.be/public/>

On this note, some SHs emphasized that coordination is essential in combination with the financing of this model of care/care trajectory. The problem brings about discussions on criteria, speech/language therapy platforms, access and distribution of CAR-CRAs, which play a key role for most of the insured children.

Additionally, one SH mentioned that CAR-CRA centres aim to employ a holistic and integrated care approach “within the walls of the CAR-CRA” On this note, one SH contested this assumption, stating that (in the Walloon region, with no knowledge about the Flemish region) CRA-CAR centres do not necessarily implement the actually recommended practice of care and/or that the quality of therapy is not adequate. It was mentioned that not only do the speech/language therapists require accreditation of specialty and quality of care, but a control audit of CAR-CRAs may also be required.

Additionally, the following question was raised on the need for expert speech/language therapists and training:

- Which option is better: should all speech/language therapists have the required knowledge, expertise, and skills (and only use them sporadically), or should a specific specialization be made available, taken by a smaller number of therapists dedicating their practice specifically to the needs of these children?

How would this work in day-to-day practice; how to find speech/language therapists with sufficient experience?

5.4 Role of Education

Among the participants, it was generally agreed that schools should participate in the interventions. However, most stakeholders noted that currently, the supply of individualized speech/language therapy in special education is mostly insufficient, among other due to the involvement of the therapists in classroom learning activities rather than providing therapy. Consequently, implementing the multidisciplinary approach is more challenging in schools.

Some stakeholders proposed that schools should be more involved and should receive the necessary financial resources for intense collaboration with specialist centres, requiring an inter-ministerial conference involving all relevant ministers of health, education, and welfare. It was also reiterated that currently, children attending special schools are not eligible for reimbursements of monodisciplinary SLT.

The following remarks on this topic were noted:

- Specific support at school is also needed.
- In therapy, the transfer to the school context should not be forgotten. The needs of the school team should be considered, involving them in the intervention and integrating the interventions as part of creating an inclusive school environment.
- Within the context of intersectoral coordination, this concerns both skills and the organization (money, time, space, shared dossiers) in line with the principles of integrated care.
- Whether the speech/language therapy provided within special education is sufficient depends heavily on the expertise of the speech/language therapists working there. Sometimes there is insufficient expertise, for example, in supported communication. In such cases, it is valuable to refer to a private speech/language therapist with expertise.
- It is a misconception that comprehensive speech/language therapy (in any form/approach) can be provided in special education schools (BuO). Children with needs in this area are often underserved, as speech/language therapists in schools often work supportively in classes and not always at an individual level.



- No reimbursement exists for speech/language therapy for children in special education, which often means that the needs of these children cannot be adequately met. In special education, there are too few speech/language therapy hours to provide truly individual therapy. This underscores the importance of a multidisciplinary intervention team.
- In special education, financial means are provided according to the type of schools and children are categorized according to the same typology regardless of co-existing conditions. This adds to the shortage or inadequate provision of financial means to a school.
- The paramedical support offered in special education schools, depending on the type of education, is largely insufficient and cannot replace the specific and specialized support offered in CAR-CRA. For instance, a type 3 school with 100 enrolled students can only offer about 2 full-time equivalents to cover all needs, which is insufficient. The work done in CAR-CRA centres complements that of the paramedical staff in schools but is also different due to its intensity and multidisciplinary nature, necessary for the child's issues.
- Parental involvement is lower when speech/language therapy or guidance takes place at school; however, it is important.

A SH argued in favour of the necessity for a very well-thought-out collaboration between the sectors responsible for healthcare, wellbeing, and education with the ultimate aim of "inclusive schools" with the support of multidisciplinary teams.

In general, and particularly related to ASD, a stakeholder highlighted the positive value of a holistic approach involving both professionals and the immediate environment (school or daycare). This ensures that interventions align with the daily reality of the person with ASD.

5.5 Practitioner

All SHs seem to agree that specialization of speech/language therapists is preferred, that is, with specialized knowledge and developed expertise. Many believe this is readily available within a multidisciplinary team. Classical/basic training of SLThs does not provide this, according to many SHs.

Some of the additional points suggested were as follows:

- The treatment objectives for this target group will have a very different focus compared to the "ordinary target group" of speech/language therapists. Thus, specific expertise is needed to work with this target group, and this cannot simply be extended to the entire field of speech/language therapy.
- An individualized treatment plan is required, necessitating good knowledge of ASD. ASD impacts both the objectives and the treatment plan. This is likely not basic knowledge but a specialization.
- Speech/language therapists are currently not well-trained for this during their basic education. Therapists working under nomenclature must be trained to treat children with an IQ < 86 without complex language disorders. This is a different therapeutic approach compared to children with an IQ > 86.
- A registration system is needed to record the training, methods, and experience of speech/language therapists with specific target groups. However, recognized specializations in speech/language therapy do not exist; thus it is difficult to compose such a list.
- If no multidisciplinary team is available, there is still a need for a care provider with specific training and experience, indicating a need for more education.

Two SHs mentioned earlier legislative works to optimize speech/language therapy training in the base education in Belgium (as established in the RD of 1994), which had already been taken on by a working group at the federal level.^{jj} One of the included proposals would improve SLTh training for children with complex needs such as neurodevelopmental disorders. However, a definite outcome of these discussions is not yet known. SHs indicated that the base education is the same for every aspiring speech/language therapist but indeed specialization is necessary afterwards. In this matter, professional ethics is paramount to refer a child to a more suitable colleague in case of inadequate expertise. One SH illustrated the case in the French-speaking region where speech/language therapists can follow specialization trainings in a private setting (and receive a certification upon completion) and take charge of coordination themselves. This underpins need for a regulated structure.

KEY WORKER APPROACH

With respect to the key worker approach proposed in the literature, most SHs agree that coordination is necessary and mandatory (see also “Setting”). However, in addition to the remarks outlined above, this suggestion elicited a number of questions related to the organization of care:

- Although the scientific guidance states that a well-trained professional should take on the coordination role, it remains unclear how this is implemented in practice. Who assumes this role? How is collaboration between different services structurally ensured? In Flanders, it is often unclear who holds ultimate responsibility for care coordination, leaving families to manage many aspects themselves.
- The scientific guidance assumes that there are enough trained professionals available to take on this key role. However, in reality, there is a shortage of specialized care providers, and many parents face fragmented support. Additionally, administrative overload within support services is not taken into account, complicating the effective implementation of a coordinator.
- Sufficient means should be provided to realize this.

Facing these questions, a SH proposed the following: “The ‘key worker approach’ reminds me of proposals regarding the installation of case managers (e.g., within the framework of integrated care). Feasibility? We could also link this to the pivot function of CLB/PMS, although this function remains limited to the school environment only.”

5.6 Aims

SHs seemed to agree on the importance of natural settings and the involvement of children and parents. One stakeholder expressed an alternative view on the level of ambitions to pursue. The main questions and remarks posed are listed below:

1. **Agreement on Management in Natural Settings:** There is an overall agreement that management should take place as much as possible in “natural settings” (home, school).
 - A stakeholder noted that this is certainly recommendable, but he asked what is the feasibility of this approach? In Flanders, parents experience a lack of guidance and do not always feel adequately supported to correctly implement therapeutic exercises at home. Additionally, daycare centres and schools often lack the resources or expertise to structurally integrate therapies.
2. **Involving Child and Parents:** There is unanimity on the importance of involving the child and parents, e.g. to formulate the right and individualised goals. Many stakeholders underscored the

^{jj} For more information: https://organesdeconcertation.sante.belgique.be/sites/default/files/documents/cfpp-2021-01_logopedie_frbp-2021-01.pdf



importance of this point. One SH emphasizes that it would be important for parents to be able to choose the type of care and their therapists.

3. **Alternative View on Aims for Children with ID:** One SH had another point of view regarding aims for children with ID: Do not focus on daily tasks but have more ambition. Do not rely on the ability to reproduce to evaluate learning capacities. All uncomfortable situations are acceptable as long as everyone is committed to this approach.

5.7 Cumul Rules and therapy settings

There were no data available in the GLs nor in the selected SR that addressed settings or the contexts of the cumul rules combining treatment in CAR-CRA and/or monodisciplinary SLT.

Taking into account the remarks of most SHs, the overall conclusion proposed for discussion during the plenary sessions was as follows:

- **Assessment** Multidisciplinary assessment is mandatory, for ID and ASD
- **Therapy:** Multidisciplinary treatment is to be preferred, for ID and ASD. Providing monodisciplinary treatment should remain the exception and under specific circumstances that ensure collaboration and quality.
- Given the current scarcity of care access, a solution must be sought pending increased multidisciplinary availability.

Most stakeholders supported this view.

However, some divergent viewpoints were expressed. One SH holds a different perspective, advocating that reimbursement should not be excluded for those already receiving therapy in special education, as complementarity is essential. The SH emphasized the importance of maintaining freedom of choice for speech/language therapists, arguing that the geographical criterion is not necessarily the best. It is crucial to avoid giving a monopoly to centres and to allow for the selection of therapists. Another SH raised the question of whether it was correct to assume from the GL texts that it would be important for parents to have the ability to choose (the type of care and) their therapists.

Additional remarks from other SHs (some were already introduced above) include the following:

- It is not always necessary to have the same level of specialization, as the severity of the disorder should be considered. Conversely, reasonable proximity to the place of residence is important. A good distribution of specialized care providers is more crucial than having a large number.
- In special education there is sometimes insufficient expertise, for example, in supported communication. In such cases, it is valuable to refer to a private speech/language therapist with expertise.
- Under current regulations, children are shortchanged with a limited number of speech/language therapy hours in a type 2 school, and there is no possibility of combining this with private speech/language therapy.
- “The main concern is that not all children have access to care. There is no single model; each child must receive care according to their needs, which depend as much on their personal situation as on their family. Ideally, a range of options should be available to care professionals, including prescribing monodisciplinary approaches in the absence of other solutions better suited to their problems, while ensuring the training and quality of the involved professional and giving them the means for consultation with all partners. This implies that restrictions on cumul rules should be abolished.”

One SH proposed a cumul between multi- and monodisciplinary management in the specific case where a child approaches the end of multidisciplinary rehabilitation and the team agrees continued speech/language therapy is needed and a monodisciplinary setting is acceptable. It was pointed out that therapy cumuls are already allowed in Flanders between special education schools and MFC ("multifunctional centre") centres.

Whilst in this discussion, some SHs reiterated the relevance of monodisciplinary speech/language therapy in combination with a support network to relieve parents and/or access to CARs. One SH referred to a model implemented in France in which multidisciplinary management (as for example in remote areas) is supported by means of an internet-based network. However, as alluded elsewhere in this chapter, to allow for early therapy it will be very important to optimise the familial surrounding of the child. The parents should always be well aware of the actual needs of their child.

Regarding the issue of cumul rules for SLT during school hours, one SH stated the following: "Not only is it regrettable that children attending special education are deprived of reimbursement for speech/language therapy sessions outside school hours, but they are also sometimes discouraged by their school from attending rehabilitation centres such as CAR-CRA during school hours. Article 103 of the decree on specialised education states that 'children undergoing therapeutic or rehabilitation treatments provided by persons whose employment is not subsidised or organised by the French Community are not included in the capital periods of the establishment.' This capital period is determined by the number of enrolled pupils multiplied by the guide number assigned to the type of specialised education recommended according to their pathologies. Schools, therefore, have every interest in ensuring their pupils follow their therapeutic or rehabilitation treatments outside school hours so they can be counted towards the paramedical, social, and psychological staff necessary for the own establishment's operation. As a result, some school administrations oppose children leaving the establishment during school hours to receive follow-up in a CAR-CRA, even if they are aware of the benefits and cannot offer equivalent paramedical follow-up."

In addition to issues with cumul rules, it was also highlighted that double financing (of the educational organization and the CAR-CRA if the child attends the CAR-CRA during school hours) should be avoided, and the question of which setting is most effective remains.

5.8 Additional information shared after the meetings

In addition to all issues discussed above, following the plenary sessions the following discussion points were provided by some SHs:

- The care pathway should take account of neurodevelopmental disorders in their entirety and complexity. Limiting the discussion to one pathology or another does not seem very coherent.
- A much broader reflection on the organization of the care pathway for patients with developmental disorders, by experts in the field who take account of the specific Belgian situation, should be carried out.
- The family and the child must be closely involved in the therapeutic plan. In this context, it would be interesting to assess how the CRAs are currently responding to the practices set out by the experts (role of families in care, parental guidance, etc.). Looking at multidisciplinary from the angle of networking independent professionals also allows free choice of therapist, which is an essential element. This should also be seen in the context of Article 6 of the legislation on patients' rights, which states that the patient has 'the right to free choice of professional practitioner and has the right to change his or her choice [...]'.
 - There is no GL to suggest that the skills of independent providers are any less than those of therapists in a multidisciplinary centre.
 - We would like to draw attention to the importance of taking into account the reality of the Belgian institutional system in order to make recommendations that are as close as possible to the realities



experienced by families. In this respect, we regret that no Belgian study was analysed in order to gain a better understanding of the difficulties in accessing speech/language therapy in our country. It is also interesting to note that none of the selected GL, which come from several countries, allow access to speech/language therapy conditional on a minimum score on an IQ test.

- There is unacceptable discrimination in the care of children with autism and ID based on their families' financial resources.
- Only families with sufficient financial resources are able to cope with the shortcomings and shortages of subsidized public services and pay out of their own pockets for non-reimbursed private speech/language therapy sessions.
- Access to monodisciplinary speech/language therapy is at the crossroads of the fundamental principles enshrined in the Convention on the Rights of Persons with Disabilities (UNCRPD) - ratified by Belgium in 2009 - and the Belgian Constitution, both of which make the freedom of choice of people with disabilities, their autonomy and their social inclusion major and inescapable principles that should guide the thinking and decision-making of all policy-makers and stakeholders. If there is one area in which children with disabilities can enhance their ability to communicate and thus give practical expression to the above principles - by whatever means - it is speech/language therapy.
- In the current context of access to multidisciplinary speech/language therapy - which is totally inadequate and the conditions for which are exclusionary - to deprive children and adults with disabilities of monodisciplinary speech/language therapy is to create a double penalty. Multidisciplinary and monodisciplinary approaches complement each other across the life course.
- Finally, some SHs additionally referred to their recommendations which were also formulated for the Commissie voor Gezondheid en Gelijke Kansen van de Kamer van Volksvertegenwoordigers (Commission for Health and Equal Opportunities in the Chamber of Representatives).

6 CONCLUSION AND DISCUSSION

Key Points

Evidence from GLs and SRs

- An overview of the results of the literature review is presented in section 6..

Contextual considerations in Belgium

- The clinical guidance, supported by some evidence, points clearly toward a model of multidisciplinary approach as standard of care for children with ID or ASD and a co-occurring speech/language disorder. However, access to multidisciplinary teams for these target groups is problematic in Belgium, in the rehabilitation sector as well as in the sector of education.
- In some cases the conclusion of the multidisciplinary assessment and treatment planning for children with ID or ASD can be that the child only needs therapeutic support by one discipline. Also, at the end of a multidisciplinary treatment episode, continued monodisciplinary support might be indicated. In line with the international clinical guidance, the therapist should be well-trained and have knowledge of working with the target groups, and should not work in isolation but connect with a team. The RD of 17 July 2024 defines the modalities for reimbursement of monodisciplinary SLT for children with ID, but children with ASD, or other mental disorders such as ADHD, are currently excluded.
- In the literature, speech/language disorders are recognized as frequent comorbidities of ADHD. GLs on ADHD retained in this report emphasize the need of adequate assessment of these comorbidities in children with ADHD, as well as treatment by experienced therapists according to existing GL for SLT. According to one GL, the setting can be monodisciplinary or multidisciplinary, as long as the therapist is adequately trained.
- The current rules for reimbursement of monodisciplinary SLT by the national health insurance exclude children attending special education, as well as children following a treatment in another rehabilitation setting where SLT is included (e.g. CAR/CRA), and these rules have been questioned in several position papers published by stakeholders. Another question was raised during the stakeholder meetings regarding the possibility to attend multidisciplinary rehabilitation outside the school (e.g. in a CAR/CRA) during school hours, since (some) schools for special education would refuse this because of interference with their own educational program and/or reduction of the funds for their own establishment's paramedical support for this child.
- Evidence is lacking allowing for a comprehensive comparison between multidisciplinary and/or monodisciplinary models of care versus a combined multi-mono modus for the target groups of ID and ASD, and cost-effectiveness of such models has not been studied in the literature. Thus, it is not possible to provide an evidence-based clear-cut reply to the above questions of cumul.
- However, international clinical guidance for ID and ASD strongly emphasizes that services should be coordinated within and across sectors, and intense collaboration between agencies and sectors, and/or interagency and intersector teams are advised. Moreover, therapy delivery should take place in environments as natural as possible. From this guidance, it is clear that transitions between the educational system, the rehabilitation system and the system of monodisciplinary SLT should be organized smoothly, while avoiding double financing.
- Creating sufficient capacity for multidisciplinary teams that are well distributed regionally is paramount, so that children from these target groups have timely and continuous access to the necessary care. Pending the creation of more multidisciplinary capacity for the ID and ASD target groups, it may be considered to continuing the current policy of TEMPORARILY allowing monodisciplinary SLT for speech/language disorders in children with IQ $\leq$ 70. Based on international clinical guidance and meetings with stakeholders, it does not seem appropriate to



allow, even not temporarily, monodisciplinary SLT for children with ASD without prior multidisciplinary assessment. Monitoring of inflow and care consumption must be continued in order to better identify the magnitude of this target group.

- The period for this temporary measure should be as short as possible, and this temporary measure should not lead to further delays in expanding the multidisciplinary capacity for these target groups. As soon as possible multidisciplinary assessment, treatment planning and therapy provision should be available and accessible to all children with ID or ASD who need it. From then onwards, monodisciplinary SLT for speech/language disorders should only be reimbursed for children with ID or ASD if the multidisciplinary assessment points toward a single need in the domain of SLT only.
- Based on clinical guidance and confirmed by the group of stakeholders in this report, experienced and well-trained professionals, combined with sustained collaboration between professionals sharing common goals for the child with ID or ASD, are critical for the model of care to be successful.
- Adequate skills, knowledge, and expertise are paramount for all actors working with the child. A comprehensive overview is currently lacking to assist referral or collaboration with therapists with the required expertise, nor is a formal structure of accredited and certified training available yet.
- Concerns about the quality of the rehabilitation care currently provided to children with neurodevelopmental disorders were mentioned by some stakeholders during the meetings. Clear quality criteria should be applied in all settings working with these children.

Methodological considerations

- A rapid review methodology was applied, focused on the diagnostic groups specified by the Minister's question.
- ASD and ADHD were included in this research to represent mental disorders given the Minister's request, the conditions already discussed by stakeholders in this particular dossier and the need for expedited research and reporting. One could argue that the choice to limit the population of children with mental disorders to these two conditions might have been too restrictive, and further research could be of interest.
- The focus in the literature on short term outcomes, and on communication and linguistic outcomes rather than broader outcomes like autonomy and social integration, may limit the transferability of findings.
- A lack of evidence exists to directly support decisions on the model of care or identifying which subgroups would benefit most from the interventions.

From evidence to recommendations

- Based on the evidence, and embedded in the Belgian context to the extent possible, 18 policy recommendations have been formulated complemented with a proposition for future research directions.

6.1 What did we learn from the literature?

The selected guidelines (GLs) summarizing the scientific literature and supplementing it with international expert opinions, underscore the potential of speech/language therapy to **effectively and safely** improve speech/language functioning and social communication in children with neurodevelopmental disorders, particularly those with intellectual disabilities as well as ASD. The indication for SLT should be determined independent of the child's IQ. The carefully selected systematic reviews (SRs), updating the literature of the GLs, do not contradict this, while also pointing explicitly to the methodological flaws in the underlying studies, and mentioning the lack of systematic evaluation of potential adverse effects.

The clinical guidance highlights the value of a multidisciplinary approach in both **diagnostic and speech/language assessment**, as well as **treatment planning**. Observation in daily life and in various environments such as day care centre or school should be part of the assessment. This should result in an individualized, comprehensive therapy and support plan, integrating SLT if appropriate, and taking the preferences of the child and its family into account. The literature suggests that multidisciplinary assessment by a skilled professional team is preferred for children with neurodevelopmental disorders such as ID, and is considered a prerequisite for children with severe intellectual disabilities and complex communication needs (e.g., Rett syndrome) as well as for all children with ASD. Referral to specialized or expertise centres, e.g. for complex diagnoses or for advice on AAC, may be indicated. One GL stipulates that, while multidisciplinary assessment is clearly to be preferred, monodisciplinary evaluation can be an option in the absence of a multidisciplinary team. In this case it should be performed by a trained and highly experienced professional connecting with a team for advice or supervision.

Regarding **intervention** for speech/language disorders in ID and ASD, a coherent multidisciplinary approach, team-based and family-centred, is clearly and repeatedly recommended in the clinical guidance. Management of speech/language disorders should start early, and preferably, according to one GL, before the age of one year in case of ID. It should be targeted to the needs of the child and their environment, whether at home, the day centre, or school. Goals should be considered in partnership with the child and family. It is preferable that interventions take place in settings that are as natural as possible, so that skills that are used frequently throughout the day can be taught and practiced. Especially in young children up to the age of 6 years, parent mediated and teacher mediated therapy should be considered, and parents or teachers should be trained in how to mediate the intervention. If necessary, provision of and training in AAC should be supported by an experienced multidisciplinary team.

In the clinical GLs, much emphasis is placed on the need for practitioners to coordinate the services they deliver, and to coordinate support and measures within and across sectors. To do so, education, health and social care services should organize all the practitioners working with the child or young person into an interagency team, or network, capable to address the child's needs in all settings. Professionals who are working in isolation (e.g., working as independent practitioner) should connect with the other members of the broader team so that support, advice, and recommendations are aligned. For ASD, it is advised to appoint an appropriately trained keyworker or coordinator who should be responsible for case management.

The importance of **professional knowledge of and experience with** the target groups of ID and ASD is stressed in many GL. To stimulate speech/language development and (non-verbal) communication in children with ID or ASD, preference is given to a SLTh who is well-trained and experienced in working with those children.

Regarding **ADHD**, it is noted that speech/language disorders are recognized as frequent comorbidities of ADHD (see 1.1.5.2), and two GL emphasize the need of adequate assessment of these comorbidities in children with ADHD, as well as treatment by experienced therapists according to existing GL for SLT (see 3.2.3.1).



The RC extracted from two GL on **Communication Disorders (CD)** emphasize once more the importance of an individualized, multidisciplinary approach in case of association with a comorbidity. They point to the importance to consider the bio-psycho-social framework conditions of the child, and to be aware of potential adverse effects of SLT such as overstraining of the child. In line with the clinical guidance for children with speech/language disorders associated with ID and ASD, they recommend to integrate the treatment and support of every child with speech/language disorders into everyday life, and to integrate therapeutic measures and elements into the pedagogical offerings in daycare centers and schools allowing for a high frequency of exercises. This requires close collaboration between clinicians and teachers or daycare educators, and the responsible Ministers of these sectors should adapt organization and financing accordingly.

An overview of the summary points of the recommendations extracted for ID, ASD, ADHD, and CD can be found in Supplement 5.3. An overview of the findings from the SRs can be found in chapter 4.2.

6.2 Main methodological considerations

Due to time constraints, we opted to conduct a **rapid review** on the effectiveness of SLT in children with neurodevelopmental disorders. This methodological choice may affect the comprehensiveness of our findings, as the number of databases reviewed and the extent of the grey literature search were relatively limited. Additionally, the depth of data extraction was constrained, with details on SLT content not elaborated upon, which may affect the transferability of findings to the Belgian context.

Our objective was to outline the main conclusions and key points without omitting critical information that could change our recommendations to the government. Given the expert-opinion-based consensus in various international guidelines and the impact of publication bias on effect sizes in recent meta-analyses,² including additional (grey) literature is unlikely to change the project's main conclusions. Noteworthy, our selection of robust evidence is comprised of moderate-to-high quality GLs and SRs only.

Based on a pilot search we anticipated a modest yield of high-quality evidence in this field. Therefore, we initially based our **approach** on evidence **from clinical guidelines**. This allowed us to complement the **literature evidence** with consensus statements endorsed by international expert panels. A similar approach has been used by a WHO study into packages of interventions for rehabilitation.⁶ We subsequently enriched our data collection with carefully selected and recently published systematic reviews. Notably, the findings from these systematic reviews did not contest or provide major advances in the field, supporting the robustness of clinical guideline recommendations as a basis for this project. Indeed, we consulted significant international guidelines (e.g. NICE, SIGN)^{26, 30, 34, 38, 51, 52} and recent systematic reviews (e.g. Campbell Systematic Review Repository, BMJ).^{2, 47} During the study selection phase, several systematic reviews (without formal meta-analysis) were excluded due to the predominant use of single-case experimental designs in the original studies. This design is often employed in this field due to the relatively small number of (often vulnerable) children to be studied.³⁴ However, a meta-analysis combining data from multiple such studies was included nevertheless to mitigate potential selection bias in summarizing the findings.⁴⁵

While scientific evidence forms the basis for recommendations to improve the organisation of care, our aim was to report on the **overall effectiveness of SLT** rather than develop a new clinical guideline dedicated to SLT for these children in Belgium. Next, although we did not impose limitations on treatment outcomes during study selection, our literature yield and data extraction focused on communication and/or linguistic outcomes and not on other relevant treatment outcomes of autonomy, social integration, overall well-being which could be considered the ultimate aims of management. Future research including these outcomes is much needed. Notably, both Donolato et al.² and Sandbank et al.⁴⁷, as well as the AutismCRC (2022),³³ AWMF (2021)²⁹ and AWMF (2022)²⁸ GL (see also 3.2.2.2) highlighted the lack or scarcity of studies adequately investigating, reporting on, or discussing potential **adverse effects** from these interventions. For example, the potential side effects associated with missing classroom learning activities or leisure time are currently largely unknown.

Future studies should improve adverse events reporting to better understand the balance between intervention benefits and harms.

Additionally, some stakeholders argued that our choice to limit the population of children with **mental disorders** to those with **ASD and ADHD** might have been too restrictive given the potential relevance of SLT to support the efficacy of psychotherapy in a range of pediatric and/or adolescent neuropsychiatric disorders (as for example anxiety or depression disorders, eating disorders etc.). However, the relationship between such disorders and speech/language disorders is currently unclear and, as explained in chapter 1.1.5.2, their inclusion in search strategies was not preferred to avoid unnecessary increases in citation hits and/or yield. For these reasons and as pointed out in the Introduction (chapter 1.1.3 and 1.1.4), these two conditions were included to represent mental disorders given the Minister's request, the conditions already discussed by stakeholders in this particular dossier and the need for expedited research and reporting. Nevertheless, further research in this domain would be very relevant, given the importance of language capabilities as enabler of self-expression and psychotherapy for persons with mental disorders, which might in turn prevent or mitigate symptoms as e.g. outbursts of anger, and improve general well-being.

We were unable to comprehensively compare the treatment effects in **multidisciplinary versus monodisciplinary settings**, or versus a combined multi-mono modus. Apart from few quasi-experimental studies addressed in the NICE guideline²⁶, pertinent evidence was lacking. This is understandable given the characteristics and vulnerability of the studied populations, which facilitate examining these children in current multidisciplinary care settings. Ethically, it is currently challenging to study these children outside a multidisciplinary care setting to allow for a direct comparison of treatment effects, given that multidisciplinary treatment is clearly preferred in international GL. Thus, in this report some scientific evidence was provided to promote the interdisciplinary and intersectoral management of children with neurodevelopmental disorders, in particular intellectual disability, and at the same time the report incorporates the advice of international experts given in selected high-quality clinical guidelines. Indeed, in circumstances of scarce evidence, expert opinions, which may be based on knowledge transfer from other care settings, are often solicited.

Based on the available scientific evidence, any distinction in terms of effectiveness of SLT for **different severity levels of intellectual disability** remains challenging. The search strategy taxonomy does not allow for specification into mild to profound intellectual disability, and the selected GLs and SRs do not report findings accordingly. Likewise, no specific search term exists for **borderline intellectual functioning** in the MeSh or Emtree database. Nonetheless, our search strategy's sensitivity and specificity were optimised for a robust rapid review, and both the yield of GLs and SRs provided a balanced representation of the spectrum of intellectual disabilities. Indeed, four out of the six GLs^{6, 20, 25, 28} included for ID cover the full spectrum of ID without specifying severity levels, while two GLs^{26, 27} clearly focus on persons with more severe presentations of ID. Of note, in none of the selected publications borderline intellectual functioning was specifically targeted nor discussed. Importantly, while our evidence sources pointed towards similar conclusions regarding SLT effectiveness, the few meta-analyses studied did not establish significant moderator effects from factors such as children's intelligence levels, interventionists, or types of SLT on treatment outcomes.^{2, 45-47}

As outlined in detail in chapter 1, in this report, we used DSM-5-TR terminology of speech/language disorders where appropriate. However, regarding the data extracted from GLs and SRs we respected **the literal wording of the definitions used in the original studies**. Subsequently, these studies might have included children diagnosed based on slightly different speech/language concepts. Nevertheless, this may also reflect the variability of diagnostic terminology used in day-to-day practice. Keeping the overall aim of this study in mind, the majority of participants included in the selected GLs and SRs comprise of children with speech/language disorder with a co-occurring neurodevelopmental condition of interest to this study. Given these real-world conditions may hinder analyzing the evidence base for the model of care under study, we note that while the RD of July 2024 was in effect, **sickness funds** (all national sickness funds ("mutualities") except HR Rail) collected data on patients entering the proposed new model of care since 01 Sept 2024. The data suggest that 1,425 children were



affected by the RD, with approximately 12 percent having a non-verbal IQ < 70 (176 from a total of 1 425 children), and the remaining 1249 children having a non-verbal IQ between 70 and 86, Personal Communication, numbers date from 7 February 2025 and may be incomplete since claims for the past period can still be submitted).

Finally, the findings from the scientific literature hold promise of a **positive treatment effect** of speech/language therapy in children with NDD, **albeit in the shorter term only and arguably conclusive**. Indeed, it is important to highlight that the studies underpinning this report's findings and recommendations are relatively few in number, and mostly limited with regard to studies addressing longevity of treatment effects beyond 6 months or 1 year of duration. This is reflected by a considerable number of GL recommendations based on expert opinion, and impacted by inherent limitations such as study risk of bias, publication bias, imprecision, and variability in treatment effect sizes, all of which reduce confidence in the certainty of the evidence. Whilst it was highlighted that more studies of methodological quality and rigor are required, research into the sustained effects of child-hood speech/language therapy on ADL functioning, self-management, societal participation, and well-being of the person with NDD (as well as their environment) in later life would be a worthwhile area of future research. In particular, considering the limitations of moderator analyses on the impact of the child's age on treatment success,^{2, 45} more studies are needed into adolescence and later life to understand the role of age as a treatment moderator. This research is essential to optimise access and delivery of care for these children beyond early life and childhood.

6.3 Contextual considerations: Belgian context and stakeholder views

Currently in **Belgium**, for children with neurodevelopmental disorders such as ID, ASD, or ADHD, or with other mental health conditions, ambulatory multidisciplinary teams constitute the main actors in rehabilitation management including SLT. Additionally, children attending special education can benefit from rehabilitation support and SLT through the educational system, or, if they qualify for it, through supplementary support organized by the federated entities in a day care or residential program affiliated with the school. Since the RD of July 2024, into effect as from 1 Sept 2024, complementary monodisciplinary SLT has been reimbursed for children with ID but not those with ASD. Likewise, for children with other mental disorders, e.g. ADHD, monodisciplinary SLT is in principle not reimbursed. Anyhow, children in special education whatever their disability, cannot benefit from reimbursement of monodisciplinary SLT.

Following the **literature results**, it is clear that for children with (suspicion of) ID or ASD, a multidisciplinary assessment is to be preferred. An individualized, comprehensive therapy plan can include SLT, in which case this therapy should be provided in a multi-professional setting. A lot of emphasis is also put on the principle that treatment should be provided in an environment as natural as possible, e.g. daycare centre or school, and evidence supports parent- or teacher mediated interventions especially in young children.

Of note, in none of the selected publications, borderline intellectual functioning was specifically targeted nor discussed.

Regarding ADHD, speech/language disorders are recognized as frequent comorbidities, and the retained GLs emphasize the need of adequate assessment as well as treatment by experienced therapists according to existing GL for SLT.

While a **multidisciplinary approach** in treatment planning and therapy provision is considered essential for ID and ASD, most **stakeholders** confirmed this but some of them (including representatives of child and parents, of healthcare professionals, and of government) also appreciated there could be a place for **monodisciplinary speech/language therapy under certain, carefully determined conditions**.

Although caution is warranted and a nuanced approach in such decisions is imperative, reasons for such a model of care mainly included: (1) the fundamental problem of access to required care (e.g., too few CAR-CRA centres, inadequate funding to provide for effective speech/language therapy during or at school) and (2) changes in the support or treatment needs of a child over time.

Whilst scientific evidence is lacking comparing treatment and cost-effectiveness of a multi- and monodisciplinary treatment model, either in parallel or via a stepped-care approach, relevant clinical guidelines **do not explicitly recommend that multidisciplinary management take place “within one rehabilitation centre”**.

While it is emphasized that an multidisciplinary treatment team should be the standard of care for children with ID or ASD, it is recognized in one GL²⁷ that independent professionals working outside a specialized centre can intervene in the absence of a multidisciplinary team. In all cases, **effective coordination and intersectoral collaboration** (including schools and home or daycare settings) are recommended in most GL, and independently working professionals should connect with the team so that their work is aligned and their goals for the child and its family are shared with the other professionals. Also, thorough knowledge of and experience with the target groups are considered to be essential for all professionals working with the child. Professionals working in isolation should be well-trained and should connect with or be supervised by domain experts. So **in any case, based on clinical guidance and confirmed by the group of stakeholders in this study, experienced and well-trained professionals, combined with sustained collaboration between professionals sharing common goals for the child, are critical for the model of care to be successful**.

However, implementing such a model in the current Belgian context faces significant hurdles. The most important challenges, as pointed out by the consulted stakeholders, can be summarised as follows:

- Insufficient capacity for effective and timely (early) multidisciplinary assessment by the CAR-CRA centres (nominated as the only recognized multidisciplinary centres by the RD in effect). To avoid duplication of efforts, assessments of children with IQ≤70 by other qualified centres (e.g., COS, autism reference centres) could be accepted as well in the context of the RD of 17/07/2024. Internet-based networks were proposed to overcome centre scarcity in sparsely populated areas, particularly in the Walloon region. Nevertheless, more investment in multidisciplinary rehabilitation teams seems necessary.
- Adequate skills, knowledge, and expertise are paramount for all actors working with the child, from professionals supporting families (and “training” parents) early on, to professionals working in multidisciplinary teams, key workers, coordinators, rehabilitation professionals working in the educational system, and speech/language therapists in monodisciplinary settings. A comprehensive overview is currently lacking to assist referral or collaboration with therapists with the required expertise, nor is a formal structure of accredited and certified training available yet. At the writing of this report, a revision of the RD of 20/10/1994 (concerning the professional title and qualification requirements to perform the SLTh profession)^{kk} was in progress to review, among other aspects, the training of speech/language therapists in Belgium, and this would include, as for example, more training on ID.
- Insufficient capacity for effective speech/language therapy during school hours with optimal engagement of other actors, confirming the need for more investments in the educational sector as well as investments in more effective intersectoral collaboration.
- In this regard, it is important to note that the GL on communication disorders not associated with other neurodevelopmental conditions, recommend to integrate the treatment and support of every

^{kk} More information on the advice delivered: https://organesdeconcertation.sante.belgique.be/sites/default/files/documents/cfpp-2021-01_logopedie_frbp-2021-01.pdf



child with speech/language disorders into everyday life, and to integrate therapeutic measures into the pedagogical offerings in daycare centers and schools. These GL emphasize close collaboration between the health and education sector, and call on the responsible Ministers of these sectors to adapt organization and financing accordingly.

- The pragmatic feasibility of effective multidisciplinary and/or intersectoral collaboration is not straightforward. Several questions related to the organisation remain unanswered as they were considered out of scope for this report.
- The financial feasibility and cost-effectiveness of such a model in a Belgian context are currently unknown. Data on cost-effectiveness are lacking to support access to multi- and/or monodisciplinary therapy for all children with neurodevelopmental disorders diagnosed and treated in Belgium. Based on data collected by the Flemish sickness funds between 01/09/2024 and 07/02/2025 on children with an IQ below 86 and <70 (although incomplete), the impact in terms of number seems nevertheless relatively limited (see above). A specific study to evaluate the *cumul* rules while monitoring a significant number of patients who have received SLT under the RD of 2024, was foreseen in this RD. The results are not yet known to KCE at the time of writing this report.
- Since the 6th state reform, relevant responsibilities have been transferred from the federal government to the federated entities for teams working in a recognised rehabilitation centre. On the other hand, (independent) speech/language therapists (federal level, NIHDI (RIZIV-INAMI)) provide monodisciplinary SLT.
- In this broader context, some stakeholders argued that for multidisciplinary teams, a difference in cost-effectiveness exists, favouring team financing in established teams (e.g. CAR-CRA), over discipline-financing of independent professionals while also foreseeing fees for coordination and interdisciplinary meetings. They also argued that established teams who collaborate on a regular basis are more effective in working around common goals for the child than individually working professionals collaborating on an ad-hoc basis with different caregivers.
- Quality of care is paramount, irrespective of the model of care implemented. As inconsistencies in up-to-date evidence-based rehabilitation practice were mentioned by some stakeholders, and concerns about the unknown quality of monodisciplinary treatments currently available in the field, structurally embedded quality control remains important. An area of future research could be the development of quality indicators (based on available and/or updated relevant guidelines and in consultation with experts in this field) dedicated to the Belgian setting, which could serve as a basis for model evaluation, centre qualifications, and reimbursement conditions.

The study of *cumul* feasibility, both from a financial and organisational perspective, was beyond the scope of this KCE assignment. Stakeholders pointed out that current trends in healthcare and government policy are moving towards stepped care approaches. The work of MAST teams^{II} in eating disorders or the management of obesity in children was suggested as a starting point to roll out a similar effort in the context of this study. At the same time, they acknowledged that the (cost-)effectiveness of this approach still remains to be seen. Also, in the context of the current report, the educational system would be an important supplementary player in the network of such teams.

^{II} multidisciplinary ambulatory support team, see (NL) <https://www.riziv.fgov.be/nl/thema-s/verzorging-kosten-en-terugbetaling/wat-het-ziekenfonds-terugbetaalt/geestelijke-gezondheidszorg/toegankelijke-zorg-voor-jongeren-tot-en-met-23-jaar-met-een-eetstoornis-dankzij-een-multidisciplinair-zorgtraject#multidisciplinaire-ambulante-supportteams-als-ondersteuning-van-de-zorgverleners>; (FR) <https://www.inami.fgov.be/fr/themes/soins-de-sante-cout-et-remboursement/les-prestations-de-sante-que-vous-rembourse-votre-mutualite/soins-de-sante-mentale/prise-en-charge-des-troubles-du-comportement-alimentaire-pour-les-jeunes-jusqu-a-23-ans-inclus>

Importantly, due to the lack of easily accessible organisational structures and sufficient capacity across the federated entities in Belgium, it will take time to tackle the hurdles and address the fundamental issues of timely and continuous access to quality care. Subsequently, due to legislative changes related to the RD of June 2024, children with an IQ <70 will face interruptions in reimbursement of monodisciplinary speech/language therapy unless they have been seen by a CAR/CRA team before 01/07/2025. Whilst awaiting policy decisions and actions to facilitate the necessary capacity, it may be worthwhile to consider intermediary solutions, such as “usurperende bevoegdheden/ compétences usurpées/ usurping competencies” which still consider the federal government as the budget responsible despite governing responsibilities transferred to the federated entities ”.

6.4 From evidence to recommendations

The initial question of the Minister of Social Affairs and Public Health to the KCE was to conduct a study on the appropriate model of care for the treatment of a developmental language disorder in children with an **intellectual disability**, a **complex developmental disorder** or a **psychological disorder**:

“Om deze reden verzoekt de minister van Volksgezondheid het Federaal Kenniscentrum voor de Gezondheidszorg een onderzoek te voeren naar het gepaste zorgmodel voor de behandeling van een taalontwikkelingsstoornis bij kinderen met een intelligentiestoornis, een complexe ontwikkelingsstoornis of een psychologische stoornis.”

« C’est pourquoi le ministre de la Santé publique demande au Centre fédéral d’expertise des soins de santé de mener une étude sur le modèle de soins approprié pour le traitement d’un trouble du développement du langage chez les enfants atteints d’un trouble d’intelligence, d’un trouble complexe du développement ou d’un trouble psychologique. »

The current rules for reimbursement of **monodisciplinary SLT** by the national health insurance are defined in the annex of the RD of 14/09/1984. This annex states that the following conditions are excluded from reimbursement of monodisciplinary speech/language therapy (SLT):

- children with IQ < 86,
- children with “disorders resulting from psychiatric disorders or emotional states”, or hospitalized in a service for child psychiatry,
- children attending special education,
- children following a treatment in another rehabilitation setting where SLT is included in the standard treatments offered by this setting.

Further, the RD of 17 July 2024 provides for the reimbursement of monodisciplinary SLT for children and adolescents, regardless of their IQ. However, after the date of 30 June 2025, children with an IQ below 70 will only be eligible for reimbursement on the condition that a multidisciplinary assessment including SLT was carried out by a multidisciplinary team of a CAR-CRA recognized by the federated entities, demonstrating the effectiveness of monodisciplinary SLT in such case. Of note, AVIQ filed an appeal with the Council of State (Raad van State/Conseil d'État) against the RD of 17 July 2024 specifically challenging the rules regarding children with an IQ below 70. At the time of completing the KCE report, no formal legal decision had yet been made.

The organization and financing of **outpatient rehabilitation as well as disabled care** belongs to the competencies of the federated entities, who at the same time bear responsibility for the **educational sector**.



6.4.1 Effectiveness of SLT in the target groups

As pointed out in 6.1, the selected evidence-based clinical guidelines underscore the **effectiveness and potential of SLT in children with neurodevelopmental disorders, particularly those with intellectual disabilities as well as ASD**. This is confirmed by the retained recent systematic reviews, although these reviews point toward the methodological flaws and the lack of systematic evaluation of potential adverse effects in the underlying studies, while recommending more robust research in this domain. Nevertheless, in this regard, a real-world cohort study in the UK by Norbury et al. (SCALES-study, 2017) is interesting.⁵³ This study evaluated speech/language development, at the entrance of primary school and two years later, in typically developing children, and compared it with speech/language development of children with pure SLD (of which 55% received SLT as part of their routine treatment), and of children with SLD and co-occurring ID (of which 84% received SLT and 40% attended special education). There was limited evidence that children with pure SLD had narrowed the gap with typical peers, and that children with SLD and co-occurring ID were not falling further behind. The latter group showed a language trajectory at a lower level, but in parallel to that of the typical children.⁵³

The indication for SLT should be determined independent of the child's IQ. The majority of the included literature related to children with ID referred to a definition of deficits in both intellectual and adaptive functioning, with onset during childhood and with intellectual functioning referring to IQ levels around or below 70 (see 3.1.1).

In our literature review, no specific publications or conclusions were identified related to children with **borderline intellectual functioning (BIF)**. In older versions of the DSM and ICD classifications, this term was used for persons with IQ levels between 70 and 85, associated with functional impairment. Some authors point to the vulnerability of this group (see 1.1.5.4). The DSM-5-TR and ICD-11 list this code without any description of what it entails. These children are considered to fall within the range of mainstream IQ levels and functioning, and all children in this range should have equal access to SLT if indicated. Of note, and although based on preliminary data only (see 6.2), the large majority of children currently enrolled in monodisciplinary SLT in the context of the RD of 17/07/24, seems to belong to the group of BIF.

In the literature, speech/language disorders are recognized as frequent comorbidities of **ADHD** (see 1.1.5.2). Nevertheless, only a few GL on ADHD retained in this report dealt with comorbidities, e.g. speech/language disorders. These GL emphasize the need of adequate assessment of these comorbidities in children with ADHD, as well as treatment by experienced therapists according to existing GL for SLT. According to one GL, the setting can be monodisciplinary or multidisciplinary, as long as the therapist is adequately trained (see 3.2.3.1, 6.1). The literature does not specify about indication for assessment or treatment in an ambulatory versus a hospitalized context. However, it can be questioned if such a distinction should be made, although potential mechanisms of double financing via the hospital budget should be excluded. *Indeed, stakeholders mentioned that some of those children stay for periods of many months on a child psychiatry hospital ward.* Mental health conditions not included in the DSM-5-TR category of neurodevelopmental disorders (NDDs), e.g. anxiety or depressive disorders, eating disorders etc., were not part of the scope of this report, and their relationship to speech/language disorders is less well described in the literature (1.1.5.2). For these other mental health conditions, it could be considered to treating co-occurring SLT in the same way as SLT associated with ADHD, and further research in this area might disentangle the specific influence of speech/language disorders on mental health conditions. *Stakeholders pointed indeed towards the general importance of adequate differential diagnosis between speech/language disorders and mental disorders, as well as the importance of oral communication as a basis for psychotherapy.*

6.4.2 ID and ASD: SLT in the framework of multiprofessional treatment planning and therapy provision

As discussed in 6.1 and 6.2, the clinical guidance, supported by some evidence (see 3.2.1.3- 3.2.1.4- 3.2.2.3- 3.2.2.4), points clearly toward a **model of multidisciplinary approach as standard of care** for children with ID or ASD and a co-occurring speech/language disorder for which SLT is indicated. Indeed, multidisciplinary treatment planning and the provision of SLT in the framework of a multiprofessional team is considered essential for these children. Moreover, **services should be coordinated within and across sectors**. *Some stakeholders pointed to the fact that coordination of services requires investment of personnel and has a cost, which should be foreseen in the model of collaboration.* Further, all professionals working with the child should be well trained and experienced with the target groups. As mentioned in 6.3, to implement such a model in Belgium, several hurdles are to be taken.

Another recurring principle in the clinical guidance (see 3.2.1 and 3.2.2), for both these disorders is that assessment should be based on observation in daily life and that **treatment should be provided in an environment as natural as possible**. Involvement of daycare centre and school are advised in several GL, and there is evidence to support (parent- or) teacher mediated interventions especially in young children. Moreover, the **principle of integrating therapeutic measures into the pedagogical offerings in daycare centers and schools** is mentioned even in GL on communication disorders not associated with other neurodevelopmental conditions, and close collaboration between the health and educational sector is advised (see 3.2.4.3 and 6.3).

6.4.3 ID and ASD: monodisciplinary SLT

In some cases the conclusion of the multidisciplinary assessment and treatment planning for children with ID or ASD can be that the **child only needs therapeutic support by one discipline**. Also, at the end of a multidisciplinary treatment episode, continued monodisciplinary support might be indicated. *During the meetings, most stakeholders agreed that these situations should rather be exceptional, taking into account the preferred model of therapy provision in the framework of a multiprofessional team put forward in the literature.* To deal with such situations, monodisciplinary SLT should be reimbursed. In line with the international clinical guidance, the **therapist should be trained and have knowledge of working with the target groups, and should not work in isolation** but share experiences with peers, and network or connect with a team.

6.4.4 Multidisciplinary diagnostic assessments

Currently, in daily clinical practice, and in reimbursements by the respective federal and federated entities, **different diagnostic criteria are used for ID and ASD, and for speech/language disorders** in general, which are not always consistent with the scientific diagnostic criteria such as eg. the DSM-5-TR. This is confusing and complicates accessibility of care.

To **avoid duplication of efforts** whilst reducing waiting times to child-centered care, assessments of children with IQ≤70 by other qualified centres (e.g., COS, autism reference centres, other conventions) could be accepted as well in the context of the RD of 17/07/2024.

6.4.5 Cumul rules: cumulation of treatment provision in different sectors

The current rules for reimbursement of monodisciplinary SLT by the national health insurance exclude children attending special education, as well as children following a treatment in another rehabilitation setting where SLT is included (e.g. CAR/CRA), and these rules have been questioned in several position papers published by stakeholders (see 1.1.3). Another question was raised during the stakeholder meetings regarding the possibility to attend multidisciplinary rehabilitation outside the school (e.g. in a CAR/CRA) during school hours, since (some) schools for special education would refuse this because of interference with their own educational program and/or reduction of the funds for their own establishment's paramedical support for this child (see 5.7).



Evidence is lacking allowing for a comprehensive comparison between multidisciplinary and/or monodisciplinary models of care versus a combined multi-mono modus for the target groups of ID and ASD, and cost-effectiveness of such models has not been studied in the literature (see 6.3). Thus, it is not possible to provide an evidence-based clear-cut reply to the questions of *cumul*.

However, it is clear that the needs of the child and its family should be at the center of the therapy planning. Based on these needs, a multidisciplinary team should define an individualized, comprehensive treatment and support plan. The parents and, if possible, the child should be involved in the determination of the therapy goals. International clinical guidance for ID and ASD strongly emphasizes that **services should be coordinated within and across sectors, and intense collaboration between agencies and sectors, and/or interagency and intersector teams are advised**. Moreover, therapy delivery should take place in environments as natural as possible. From this guidance, it is clear that transitions between the educational system, the rehabilitation system and the system of monodisciplinary SLT should be organized smoothly. Ideally, the child with ID or ASD receives at school an educational program, with maximal integration of its therapeutic needs, to realize the educational as well as the rehabilitation goals set in its personal work plan. Further, while rehabilitation services typically are organized in “care episodes” lasting for up to a few years, education is ongoing throughout the school years. In a system of close collaboration between the educational and rehabilitation sector, education can help to assure maintenance of the competences acquired in individual SLT sessions. To this end, the CLB/PMS or learning support centres are well-placed to facilitate any such smooth transition, follow-up of the child and/or coordination of services at the school level.

While indirect support by therapists to the teacher, and direct therapeutic support provided to the child, can be considered to be different approaches that might be combined if indicated, the main question is **how the federated entities want to organize the multidisciplinary teams under their responsibility in the educational system on the one hand, and in the care system on the other hand** (see 1.1.2.2), and how they want to coordinate collaboration between education and rehabilitation care with respect for both the educational and the rehabilitation goals for the child. From a point of view of cost-effectiveness, it seems logical to avoid potential systems of double financing.

Well-coordinated and intense collaboration between the sector of multidisciplinary rehabilitation and the sector of mainstream and special education is the main area for further development. However, for some children with ID and ASD monodisciplinary SLT can be indicated. According to the guidelines, this should also be provided by well-trained therapists not working in isolation but networking with (recognized) multidisciplinary teams. To build such networks, to allow for coherence between the federal and the federated system, and to facilitate collaboration or even integration between the two systems, mechanisms as described in the “Interfederaal plan geïntegreerde Zorg/ Plan interfédéral de l’aide et des soins intégrés” (18/11/2023)^{mm} might be considered.

6.4.6 Intermediate measures

For more than 10 years, interest associations and parents have been complaining about the lack of accessible SLT for children with ID or ASD. A clear political signal is expected and it is essential to take steps forward in this matter. **Creating more capacity for multidisciplinary teams that are well distributed regionally (see above) is paramount**, so that children from these target groups have timely and continuous access to the necessary care. However, this capacity extension will take some time.

^{mm} <https://www.health.belgium.be/nl/08112023-protocolakkoord-interfederaal-plan-geintegreerde-zorg>;
<https://www.health.belgium.be/fr/08112023-protocole-daccordplan-interfederal-de-laide-et-des-soins-integres>;

Preliminary figures from 01/09/2024 to 07/02/2025 seem to show that only a small number of children with IQ<70 use the RD 07/2024 (see 6.2). This RD does not provide reimbursement for monodisciplinary SLT to children with ASD (or other mental disorders), or to children in special education.

Pending the creation of more multidisciplinary capacity for the ID and ASD target groups, **it may be considered to continuing the current policy of TEMPORARILY allowing monodisciplinary SLT for speech/language disorders in children with IQ≤70.** Based on international clinical guidance and meetings with stakeholders, it does not seem appropriate to allow, even not temporarily, monodisciplinary SLT for children with ASD without prior multidisciplinary assessment.

Monitoring of inflow and care consumption must be continued in order to better identify the magnitude of this target group. The period for this temporary measure should be as short as possible, given the fact that this is not in line with international clinical guidance. **Also, this temporary measure should not lead to further delays in expanding the multidisciplinary capacity for these target groups. As soon as possible multidisciplinary assessment, treatment planning and therapy provision should be available and accessible to all children with ID or ASD who need it. From then onwards, monodisciplinary SLT for speech/language disorders should only be reimbursed for children with ID or ASD if the multidisciplinary assessment points toward a single need in the domain of SLT only.**

Note that for children with ID in primary school of mainstream education, monodisciplinary SLT is already reimbursed by the national health insurance in case of learning disorders (dyslexia, dyscalculia, dysgraphia) without IQ limit (Article 36 §2 b)3°)

A working group could consider whether this temporary measure could fall under the “usurping competencies” and the budgets available for this, and provided that number of patients and healthcare consumption are monitored.

6.4.7 Accreditation and quality

As pointed out before, concerns about the quality of the rehabilitation care currently provided to children with neurodevelopmental disorders were mentioned by some stakeholders during the meetings. Further, if the choice will be made for a new accreditation system for multidisciplinary rehabilitation teams besides the system of conventions, **clear quality criteria should be defined** for such teams.

6.4.8 Education and training of professionals

One of the main recommendations in the international clinical guidance is that **all professionals working with children with neurodevelopmental disorders, specifically ID and ASD, should have adequate knowledge, and expertise in working with these children.**

As pointed out in chapter 6.3, no formal structure of accredited and certified training in this domain is available yet in Belgium, although a revision of the RD of 20/10/1994 (concerning the professional title and qualification requirements to perform the SLTh profession, see 6.3) is in progress. This hampers referral to or collaboration with therapists with the required expertise.

6.4.9 Early treatment

According to the international clinical guidance, **management of speech/language disorders in children with ID or ASD should start early**, and preferably, according to one GL, before the age of one year in case of ID. Early assessment, although this might not yet be conclusive at very young ages, should be accessible and available, as well as a therapeutic offer in an environment as natural as possible. Parents should be closely involved and supported. For treatment of very young children not yet attending school, Services for early support at home (see 1.1.2.2) might be an alternative for multidisciplinary rehabilitation teams e.g. CAR/CRA.



6.4.10 Augmentative and alternative communication (AAC)

Children with more severe communication needs might benefit from AAC. Advice about the use of AAC, provision of the technical equipment, adjusting the material to the different living environments of the child, and provision of training in its use across different contexts, requires **specialized knowledge and the involvement of a multidisciplinary team** in which, according to the international guidance, SLThs should be involved. In Belgium, some specialized services exist (e.g. Modem Expert Networkⁿⁿ, reimbursement possible by VAPH or (in specific situations) RIZIV). *However, several stakeholders indicated that in some regions it was difficult to access such specialized services.*

6.4.11 Policy recommendations

For the policy recommendations in Dutch and French, see documents “Synthese (NL) / Synthèse (FR)”

ⁿⁿ <https://www.modemadvies.be/>

■ REFERENCES

1. Law J, Reilly S, McKean C, editors. Language Development - Individual Differences in a Social Context. 2022.
2. Donolato E, Toffalini E, Rogde K, Nordahl-Hansen A, Lervag A, Norbury C, et al. Oral language interventions can improve language outcomes in children with neurodevelopmental disorders: A systematic review and meta-analysis. *Campbell Syst Rev.* 2023;19(4):e1368.
3. Ebbels SH, McCartney E, Slonims V, Dockrell JE, Norbury CF. Evidence-based pathways to intervention for children with language disorders. *Int J Lang Commun Disord.* 2019;54(1):3-19.
4. Law J, Garrett Z, Nye C. Speech and language therapy interventions for children with primary speech and language delay or disorder. *Cochrane Database Syst Rev.* 2003;2003(3):Cd004110.
5. Gerkens S, Merkur S. Belgium: Health system review 2020. *Health Systems in Transition* 22 (5)
6. World Health Organization (WHO). Package of interventions for rehabilitation. Module 5. Neurodevelopmental disorders. Geneva: 2023. Available from: <https://www.who.int/publications/i/item/9789240071193>
7. Diagnostic and Statistical Manual of Mental Disorders - Fifth edition, Text revision (DSM-5-TR). American Psychiatric Association. 2022.
8. Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie ADHS bei Kindern, Jugendlichen und Erwachsenen. 2018.
9. Zinkstok J, Buitelaar JK. Het hoofdstuk 'neurodevelopmental disorders' in de DSM-5. *Tijdschrift voor Psychiatrie.* 2014;56(3):162-6.
10. Wieland J, Zitman FG. It is time to bring borderline intellectual functioning back into the main fold of classification systems. *BJPsych Bull.* 2016;40(4):204-6.
11. Martinez-Leal R, Folch A, Munir K, Novell R, Salvador-Carulla L, Borderline Intellectual Functioning Consensus G. The Girona declaration on borderline intellectual functioning. *Lancet Psychiatry.* 2020;7(3):e8.
12. Lervåg A, Hulme C, Melby-Lervåg M. Unpicking the Developmental Relationship Between Oral Language Skills and Reading Comprehension: It's Simple, But Complex. *Child Dev.* 2018;89(5):1821-38.
13. Bishop DV, Snowling MJ, Thompson PA, Greenhalgh T. CATALISE: A Multinational and Multidisciplinary Delphi Consensus Study. Identifying Language Impairments in Children. *PLoS One.* 2016;11(7):e0158753.
14. Bishop DVM, Snowling MJ, Thompson PA, Greenhalgh T. Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *J Child Psychol Psychiatry.* 2017;58(10):1068-80.
15. Rice ML. Specific Language Impairment, Nonverbal IQ, Attention-Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, Cochlear Implants, Bilingualism, and Dialectal Variants: Defining the Boundaries, Clarifying Clinical Conditions, and Sorting Out Causes. *J Speech Lang Hear Res.* 2016;59(1):122-32.
16. Morrel J, Singapuri K, Landa RJ, Reetzke R. Neural correlates and predictors of speech and language development in infants at elevated likelihood for autism: a systematic review. *Front. Hum. Neurosci.* 2023;17:1211676.
17. Norbury CF, Gooch D, Wray C, Baird G, Charman T, Simonoff E, et al. The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. *J Child Psychol Psychiatry.* 2016;57(11):1247-57.



18. Neumann K, Arnold B, Baumann A, Bohr C, Euler H, Fischbach T, et al. Neue Terminologie für Sprachentwicklungsstörungen? Monatsschrift Kinderheilkunde. 2021;169:837-42.
19. Costantino MA, Bonati M. A scoping review of interventions to supplement spoken communication for children with limited speech or language skills. PLoS One. 2014;9(3):e90744.
20. Institut National d'Excellence en Santé et en Services Sociaux (INESSS). L'autonomie des jeunes âgés de 6 à 21 ans qui présentent une déficience intellectuelle - Guide de pratique. 2019. Available from: <https://www.inesss.qc.ca/publications/repertoire-des-publications/publication/lautonomie-des-jeunes-ages-de-6-a-21-ans-qui-presentent-une-deficience-intellectuelle.html>
21. Wickstrom J, Dell'Armo K, Salzman E, Hooker JL, Delehanty A, Bishop S, et al. Systematic Review: Recommendations for Rehabilitation in ASD and ID From Clinical Practice Guidelines. Arch Rehabil Res Clin Transl. 2021;3(3):100140.
22. Roberfroid D, Castanares-Zapatero D, Chalon P, Costa E, Dauvrin M, de Meester C, et al. Expedited Scientific Research and Reporting (ESRO) at KCE. Method. Brussels: Belgian Health Care Knowledge Centre (KCE); 2024. KCE Reports (386C)
23. Ricour C, Desomer A, Dauvrin M, Devos C. How to improve Access to health care for people with intellectual disabilities? Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2022. KCE Reports (361C)
24. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan-a web and mobile app for systematic reviews. Syst Rev. 2016;5(1):210.
25. Nederlandse Vereniging voor Kindergeneeskunde. Medische begeleiding van kinderen met downsyndroom. 2021. Available from: <https://richtlijndatabase.nl/richtlijn/medische-begeleiding-van-kinderen-met-downsyndroom/startpagina-medische-begeleiding-van-kinderen-met-downsyndroom.html>
26. National Institute for Health and Clinical Excellence (NICE). Disabled children and young people up to 25 with severe complex needs: integrated service delivery and organisation across health, social care and education (NG213). 2022.
27. Townend GS, Bartolotta TE, Urbanowicz A, Wandin H, Curfs LMG. Development of consensus-based guidelines for managing communication of individuals with Rett syndrome. Augment Altern Commun. 2020;36(2):71-81.
28. Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie Therapie von Sprachentwicklungsstörungen. 2022. Available from: <https://register.awmf.org/de/leitlinien/detail/049-015>
29. Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie Autismus-Spektrum-Störungen im Kindes-, Jugend- und Erwachsenenalter. Teil 2: Therapie. 2021.
30. National Institute for Health and Clinical Excellence (NICE). Autism spectrum disorder in under 19s: support and management (CG170). 2021.
31. The Danish Health Authority. National klinisk retningslinje for behandling af autismespektrumforstyrrelser hos børn og unge. 2021.
32. Whaikaha – Ministry of Disabled People and Ministry of Education. Aotearoa New Zealand Autism Guideline: He Waka Huia Takiwātanga Rau: Third edition. Wellington: 2022.
33. Autism CRC. National Guideline for supporting the learning, participation, and wellbeing of autistic children and their families in Australia. Brisbane: 2022.
34. Scottish Intercollegiate Guidelines Network (SIGN). Assessment, diagnosis and interventions for autism spectrum disorders (SIGN145). Edinburgh: 2016.
35. Veereman G, Holdt Henningsen K, Eyssen M, Benahmed N, Christiaens W, Bouchez M-H, et al. Management of autism in children and young people: a good clinical practice guideline.

- Good Clinical Practice (GCP). Brussels: Belgian Health Care Knowledge Centre (KCE); 2014. KCE Reports (233)
36. The Danish Health Authority. Udredning og behandling af ADHD hos børn og unge. 2021. Available from: <https://www.sst.dk/da/udgivelser/2021/NKR-ADHD-hos-boern-og-unge>
 37. Institut National d'Excellence en Santé et en Services Sociaux (INESSS). Optimal service trajectory for children, adolescents and young adults with attention deficit disorder with or without hyperactivity (ADHD) or related problems. 2018. Available from: <https://www.inesss.qc.ca/en/publications/publications/publication/optimal-service-trajectory-for-children-adolescents-and-young-adults-with-attention-deficit-disorder-with-or-without-hyperactivity-adhd-or-related-problems.html>
 38. National Institute for Health and Clinical Excellence (NICE). Attention deficit hyperactivity disorder: diagnosis and management (NG87). 2018.
 39. Wolraich ML, Hagan JF, Jr., Allan C, Chan E, Davison D, Earls M, et al. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics*. 2019;144(4).
 40. ADHD Guideline Development Group. Australian evidence-based clinical practice guideline for Attention Deficit Hyperactivity. Melbourne: Australasian ADHD Professionals Association.: 2022.
 41. Institut National d'Excellence en Santé et en Services Sociaux (INESSS). Organisation du continuum et de la dispensation des services aux enfants âgés de 2 à 9 ans présentant un trouble développemental du langage. 2017. Available from: <https://www.inesss.qc.ca/publications/repertoire-des-publications/publication/organisation-du-continuum-et-de-la-dispensation-des-services-aux-enfants-ages-de-2-a-9-ans-presentant-un-trouble-developpemental-du-langage-trouble-primaire-du-langage.html>
 42. Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie Diagnostik und Behandlung bei der Lese- und/oder Rechtschreibstörung. 2015.
 43. Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). S3-Leitlinie Diagnostik und Behandlung der Rechenstörung. 2018.
 44. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017;358:j4008.
 45. Ganz JB, Pustejovsky JE, Reichle J, Vannest KJ, Foster M, Pierson LM, et al. Participant characteristics predicting communication outcomes in AAC implementation for individuals with ASD and IDD: a systematic review and meta-analysis. *Augmentative and Alternative Communication*. 2023;39(1):7-22.
 46. McDaniel J, Brady NC, Warren SF. Effectiveness of Responsivity Intervention Strategies on Prelinguistic and Language Outcomes for Children with Autism Spectrum Disorder: A Systematic Review and Meta-Analysis of Group and Single Case Studies. *Journal of Autism and Developmental Disorders*. 2022;52:4783-816.
 47. Sandbank M, Bottema-Beutel K, Crowley LaPoint S, Feldman JI, Barrett DJ, Caldwell N, et al. Autism intervention meta-analysis of early childhood studies (Project AIM): updated systematic review and secondary analysis. *BMJ*. 2023;383:e076733.
 48. Seager E, Sampson S, Sin J, Pagnamenta E, Stojanovik V. A systematic review of speech, language and communication interventions for children with Down syndrome from 0 to 6 years. *Int J Lang Commun Disord*. 2022;57:441-63.
 49. Haute Autorité de Santé (HAS). Autisme et autres troubles envahissants du développement : interventions éducatives et thérapeutiques coordonnées chez l'enfant et l'adolescent. HAS; 2012 March 2012. Available from: https://www.has-sante.fr/upload/docs/application/pdf/2012-03/recommandations_autisme_ted_enfant_adolescent_interventions.pdf



50. May T, Birch E, Chaves K, Cranswick N, Culnane E, Delaney J, et al. The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. *Aust N Z J Psychiatry*. 2023;57(8):1101-16.
51. National Institute for Health and Clinical Excellence (NICE). Challenging behaviour and learning disabilities: prevention and interventions for people with learning disabilities whose behaviour challenges (NG11). 2015.
52. National Institute for Health and Clinical Excellence (NICE). Autism spectrum disorder in under 19s: recognition, referral and diagnosis (CG128). 2017.
53. Norbury CF, Vamvakas G, Gooch D, Baird G, Charman T, Simonoff E, et al. Language growth in children with heterogeneous language disorders: a population study. *J Child Psychol Psychiatry*. 2017;58(10):1092-105.