

Last reviewed: February 2023

Intervention website: <https://www.esdm.co/>

GUIDEBOOK INTERVENTION INFORMATION SHEET

Early Start Denver Model

Please note that in the ‘Intervention summary’ table below, ‘child age’, ‘level of need’, and ‘race and ethnicities’ information is **as evaluated in studies**. Information in other fields describes the intervention as **offered/supported by the intervention provider**.

Intervention summary	
Description	Early Start Denver Model is a therapeutic intervention for autistic children aged 1 to 5 years old. It is delivered by therapists to families for a period of two years, and aims to improve children’s cognitive, communicative, and social-emotional skills.
Evidence rating	3
Cost rating	5
Child outcomes	<ul style="list-style-type: none"> Enhancing school achievement and employment - Improved speech, language and communication.
Child age (population characteristic)	18 to 30 months (1.5 to 2.5 years old).
Level of need (population characteristic)	Targeted Indicated
Race and ethnicities (population characteristic)	<ul style="list-style-type: none"> Asian Hispanic Mixed racial background White.

Foundations Guidebook – Intervention information sheet

Visit the Foundations Guidebook | www.foundations.org.uk/guidebook

Intervention summary	
Type (model characteristic)	Individual
Setting (model characteristic)	<ul style="list-style-type: none">• Home• Children’s centre or early years setting• Out-patient health setting.
Workforce (model characteristic)	Therapist
UK available?	Yes
UK tested?	No

Model description

The Early Start Denver Model (ESDM) is an intensive, play-based intervention designed for autistic children aged 1 to 5 years old. Delivered in homes, community settings, or clinical environments, it focuses on developing cognitive, communicative, and social-emotional skills through one-to-one therapy. Sessions are built around engaging, real-life activities that encourage learning through social interaction.

ESDM is a naturalistic, play-based intervention, centred on teaching learning through social interaction. It is based on developmental psychological theories about how children typically learn and develop, especially how learning occurs within the context of social relationships by engaging in joint interactions in a shared activity, and learning to attend to important aspects of the environment needed for learning (e.g. in a routine such as playing ‘peekaboo’). The intervention integrates several approaches within therapy for autistic children, most significantly teaching techniques from Applied Behavioural Analysis, including:

- ‘Shaping’ uses small steps to teach a bigger skill
- ‘Prompting’ provides cues to help a child learn a skill
- ‘Fading’ reduces the number of cues over time.

Its overall goal is “to decrease the symptoms of autism that impair children’s ability to learn from everyday experiences and interactions”.

The manualised intervention is administered one-to-one by a certified therapist, ideally working in an interdisciplinary team, in 10 sessions 1.5 to 2 hours long for 20 hours a week. This continues for around two years, or until the ESDM Curriculum is completed. Every 12 weeks, the child’s progress

Foundations Guidebook – Intervention information sheet

Visit the Foundations Guidebook | www.foundations.org.uk/guidebook

is reviewed using the intervention checklist across a number of communicative, social and, cognitive domains and new individualised learning objectives are set. They set discrete, quantifiable goals, e.g. “When the child is hungry, he will approach an adult and say, ‘I’m hungry,’ spontaneously, with eye contact, several times per week, at home and at preschool” (Rogers, 2016:52). The therapist works with the child and parents to identify their priorities, and incorporates the child’s own interests and preferences into the therapy. The sessions ideally take place in a familiar environment for the child, such as at home. Parent involvement is important in the intervention, and parents are taught skills to embed ESDM techniques in everyday life. At preschool age, playdates with peers are incorporated.

The most rigorous evaluations of ESDM did not measure outcomes for children and young people’s wellbeing, or long-term effects. Additional research in this area would be valuable, particularly as some members of the autistic community advocate for shifting from ‘intervention’ (focus on changing autistic behaviour) to ‘support’ (focus on accommodation) (Davis et al., 2022) and parents of autistic children as well as autistic adults call for a focus on ‘real world’ outcomes, especially mental health and wellbeing (Autistica, 2016). For more on different approaches to autism interventions and support, the voice of the autistic community, and consideration of individuals’ needs, see Davis et al. (2022).

References

Autistica. (2016) *Your questions: Shaping future autism research*. Available at <https://www.autistica.org.uk/downloads/files/Autism-Top-10-Your-Priorities-for-Autism-Research.pdf>

Davis, R., Nordahl-Hansen, A., den Houting, J. & Fletcher-Watson, S. (2022) Helping autistic children. In P. K. Smith & C. H. Hart (Eds.), *The Wiley-Blackwell handbook of childhood social development* (3rd Edition, pp. 729–746). Available at <https://osf.io/preprints/osf/zrfyp>

Rogers, S. (2016). Early Start Denver Model. In R. G. Romanczyk & J. McEachin (Eds.), *Comprehensive models of autism spectrum disorder treatment* (pp. 45–62). Springer International Publishing. Available at https://link.springer.com/chapter/10.1007/978-3-319-40904-7_3

Target population

Age of child	1 to 5 years old
Target population	Children aged 1 to 5 years old with a diagnosis of Autistic Disorder or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS).

Please note that the information in this section on target population is as **offered/supported by the intervention provider**.



Theory of change

Why		Who	How	What		
Science-based assumption	Science-based assumption	Science-based assumption	Intervention	Short-term outcomes	Medium-term outcomes	Long-term outcomes
On some theoretical models, autistic traits reduce children's ability to learn from everyday interactions in early development, increasing the risk of poor outcomes in communication, social interaction, and self-care.	Positive relationships provide a rich learning context in which children develop communicative skills, including language and social interaction.	Young children with a diagnosis of autism.	<ul style="list-style-type: none"> • Therapists and parents develop positive relationships with the child, with responsive and sensitive strategies • Therapists use a range of Applied Behavioural Analysis techniques in a developmentally appropriate, play-based way to teach a range of skills, including communication skills. • Parent training helps parents to implement ESDM techniques in everyday life. 	<ul style="list-style-type: none"> • Parents learn ESDM techniques • More positive parent–child relationship <p>Improved child focus on aspects of environment and social interactions.</p>	<ul style="list-style-type: none"> • Improved child communication, which may involve verbal or non-verbal communication • Improved child social-emotional skills • Improved play <p>Improved self-care skills.</p>	<ul style="list-style-type: none"> • Improved communication skills • Improved social interaction • Improved life chances.



Implementation requirements

Who is eligible?	Children aged 1 to 5 years old diagnosed with autism spectrum disorder (ASD), particularly those with early social and communication challenges, and whose families can engage in a home-based, parent-involved treatment model.
How is it delivered?	Early Start Denver Model is delivered in sessions twice per day, five days a week of two hours' duration each by a therapist, to individual families for a period of two years.
What happens during the intervention?	<ul style="list-style-type: none"> • The therapist and child engage in short joint activities, such as playing together, interacting with objects, or playing games like 'peekaboo', to create a social-emotional learning environment. • The therapist helps the child focus on key elements in their surroundings necessary for language and social development, such as faces, actions, and emotions. • Preschool-age children also participate in play dates with peers. • Parents receive training on techniques from the Early Start Denver Model and are encouraged to implement them at home, focusing on following the child's lead and discussing their current interests. • The intervention uses a manual and Curriculum Checklist to set individualised goals for the child across various developmental areas, which are assessed every 12 weeks. • It is intended that the therapist is supported by a multi-disciplinary team including child psychologists, speech and language therapists, and occupational therapists.
Who can deliver it?	The practitioner who delivers this intervention is a therapist. Certified therapists have at least a BSc or BA in a relevant degree (e.g. Early Years Education, Psychology, etc.) and a MSc or MA, and have successfully completed the ESDM training and certification process.
What are the training requirements?	Training includes: <ul style="list-style-type: none"> • Reading of the ESDM published manual (Early Start Denver Model for Young Children with Autism: Promoting Language, Learning, and Engagement, by Rogers & Dawson, 2010) • Introductory online workshop • Advanced workshop • A minimum of two cases of practice • Supervision hours • Certification process.
How are practitioners supervised?	It is recommended that practitioners are supervised by an ESDM trainer.



Implementation requirements (Cont.)

What are the systems for maintaining fidelity?	Intervention fidelity is maintained through the following processes: <ul style="list-style-type: none"> • Training manual • Interaction video • Supervision.
Is there a licensing requirement?	No
*Contact details	<p>Contact person: Ifigeneia Mourelatou</p> <p>Organisation: Recognition Health</p> <p>Email address: imourelatou@re-cognitionhealth.com</p> <p>Website: https://www.esdm.co/</p> <p>*Please note that this information may not be up to date. In this case, please visit the listed intervention website for up to date contact details.</p>

Evidence summary

Early Start Denver Model's most rigorous evidence comes from an RCT conducted in the United States consistent with Foundations' Level 3 evidence strength threshold.

Children in the intervention group demonstrated statistically significant improvements in receptive language at post-intervention and one-year follow-up and expressive language at one-year follow-up.

ESDM can be described as evidence-based: it has evidence from at least one rigorously conducted RCT or QED demonstrating a statistically significant positive impact on at least one child outcome.

Search and review

	Number of studies
Identified in search	23
Studies reviewed	1
Meeting the L2 threshold	0
Meeting the L3 threshold	1



	Number of studies
Contributing to the L4 threshold	0
Ineligible	22

Individual study summary: Study 1

Study 1	
Study design	RCT
Country	United States
Sample characteristics	48 children aged 18 to 30 months (1.5 to 2.5 years old) who are diagnosed with autism.
Race, ethnicities, and nationalities	<ul style="list-style-type: none"> • 72.9% White • 14.5% Multi-racial • 12.5% Asian • 10.4% Hispanic
Population risk factors	None
Timing	<ul style="list-style-type: none"> • Baseline • Mid-intervention (after 1 year) • Post-intervention (after 2 years, or when child is 48 months).
Child outcomes	Improved receptive and expressive language
Other outcomes	None
Study Rating	3
Citations	<p>Study 1a: Sullivan, K. A. (2013) <i>The Early Start Denver Model: Outcomes and moderators of an intervention for toddlers with autism</i> (Doctoral dissertation, University of Washington).</p> <p>Study 1b: Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., Donaldson, A. & Varley, J. (2010) Randomized, controlled</p>



Study 1	
	<p>trial of an intervention for toddlers with autism: The Early Start Denver Model. <i>Pediatrics</i>. 125 (1), e17–e23.</p> <p><i>Note: Only study 1a contributes to the rating; study 1b received a Level 2+ rating.</i></p>

Brief summary

Population characteristics

This study involved 48 children aged 18 to 30 months (1.5 to 2.5 years old) living in Seattle, United States who are diagnosed with Autistic Disorder or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). 77% were boys, and the male-to-female ratio of 3.5:1 reflects the diagnosis rates of autism at the time. The sample's ethnic distribution was Asian (12.5%), White (72.9%), Hispanic (12.5%), and Multi-racial (14.6%).

Study design

24 participants were randomly assigned to the ESDM group, which received yearly assessments, intervention, parent training, and any additional community services, and 24 participants to a business-as-usual control group who received yearly assessments and access to community services. Participants were randomised by first stratifying into two groups based on IQ level (<55 or ≥55) and gender to ensure balance between treatment groups. Within each strata, they were randomly assigned using permuted blocks of four. There were no statistically significant differences at baseline between the two groups.



Measurement

Assessments took place at baseline, after one year, and after two years (post-intervention).

- **Researcher-led** assessments included the Mullen Scales of Early Learning (Expressive Language and Receptive Language subscales) and the Communication and Symbolic Behaviour Scales – Developmental Profile (at baseline and one-year follow-up only).

Study retention

After one year of intervention

98% (47) of children participated in post-intervention assessment, representing 100% (24) of intervention group participants, and 96% (23) of control group participants.

Post-intervention

After two years of intervention, or when the child was 48 months (whichever was soonest), 94% (45) of children participated, representing 100% (24) of intervention group participants and 88% (21) of control group participants.

Results

Data-analytic strategy

A repeated measures analysis of variance (ANOVA) was used to evaluate the intervention's effects on the intended outcomes. An intent-to-treat approach was used, and missing data was addressed using multiple imputation.

Findings

Children in the intervention group demonstrated statistically significant improvements in receptive language mid-intervention after one year, and in receptive and expressive language at post-intervention after two years.

In study 1b, which received a lower rating, a significant improvement was also observed on social, communication, motor, and daily living skills as measured by the Vineland Adaptive Behaviour Scales (parent report).

Limitations

Note that study 1b has limitations pertaining to a lack of clarity around the intention-to-intent analyses, which means it received a Level 2+ rating.



Study 1: Outcomes table

Outcome	Measure	Effect size	Statistical significance	Number of participants	Measurement time point
Child outcomes					
Positive affect and gesture use	Communication and Symbolic Behavior Scales-Developmental Profile (CSBS–DP) (Direct assessment)	N/A	No	45	Post-intervention
Receptive language	Mullen Scales of Early Learning (MSEL) (Direct assessment)	N/A	Yes	47	Mid-intervention
Receptive language	Mullen Scales of Early Learning (MSEL) (Direct assessment)	N/A	Yes	45	Post-intervention
Expressive language	Mullen Scales of Early Learning (MSEL) (Direct assessment)	N/A	No	47	Mid-intervention
Expressive language	Mullen Scales of Early Learning (MSEL) (Direct assessment)	N/A	Yes	45	Post-intervention



Other studies

The following studies were identified for this intervention but did not count towards the intervention's overall evidence rating. An intervention receives the same rating as its most robust study or studies.

Aaronson, B., Estes, A., Rogers, S. J., Dawson, G. & Bernier, R. (2021) The Early Start Denver Model intervention and Mu rhythm attenuation in autism spectrum disorders. *Journal of Autism and Developmental Disorders*. 52 (7), 3304–3313.

Chiang, C. H., Lin, T. L., Lin, H. Y., Ho, S. Y., Wong, C. C. & Wu, H. C. (2022) Short-term low-intensity Early Start Denver Model program implemented in regional hospitals in Northern Taiwan. *Autism*. 27 (3), 778–787.

Colombi, C., Narzisi, A., Ruta, L., Cigala, V., Gagliano, A., Pioggia, G., Siracusano, R., Rogers, S. J. & Muratori, F. (2018) Implementation of the Early Start Denver Model in an Italian community. *Autism*. 22 (2), 126–133.

Cucinotta, F., Vetri, L., Ruta, L., Turriziani, L., Benedetto, L., Ingrassia, M., Maggio, R., Germanò, E., Alquino, A., Siracusano, R., Roccella, M. & Gagliano, A. (2022) Impact of three kinds of early interventions on developmental profile in toddlers with autism spectrum disorder. *Journal of Clinical Medicine*. 11 (18), 5424.

Dawson, G. et al. (2012) Early behavioral intervention is associated with normalized brain activity in young children with autism. *Journal of the American Academy of Child and Adolescent Psychiatry*. 51 (11), 1150–1159.

Devescovi, R., Colonna, V., Disegna, A., Bresciani, G., Carrozzi, M. & Colombi, C. (2021) Feasibility and outcomes of the Early Start Denver Model delivered within the public health system of the Friuli Venezia Giulia Italian Region. *Brain Sciences*. 11 (9), 1191.

Estes, A. et al. (2015) Long-term outcomes of early intervention in 6-year-old children with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*. 54 (7), 580–587.

Estes, A. et al. (2021) The effect of early autism intervention on parental sense of efficacy in a randomized trial depends on the initial level of parent stress. *Autism*. 25 (7), 1924–1934.

Feng, J. Y. et al. (2019) Clinical effect of vitamin D3 combined with the Early Start Denver Model in the treatment of autism spectrum disorder in toddlers. *Chinese Journal of Contemporary Pediatrics*. 21 (4), 337–341.

Gao, D. et al. (2020) Effect of parental training based on Early Start Denver Model combined with intensive training on children with autism spectrum disorder and its impact on parenting stress. *Chinese Journal of Contemporary Pediatrics*. 22 (2), 158–163.

Laister, D. et al. (2021) Social-communicative gestures at baseline predict verbal and nonverbal gains for children with autism receiving the Early Start Denver Model. *Autism*. 25 (6), 1640–1652.



Laister, D. et al. (2021) Enhancement of social communication behaviors in young children with autism affects maternal stress. *Frontiers in Psychiatry*. 12, 797148.

Li, H.H. et al. (2018) Preliminary application of Early Start Denver Model in children with autism spectrum disorder. *Chinese Journal of Contemporary Pediatrics*. 20 (10), 793–798.

Normand, J. (n.d.) *L'Early Start Denver Model (Modèle de Denver): étude contrôlée dans une population d'enfants avec Trouble du Spectre de l'Autisme* (Master's thesis).

Rogers, S. J. et al. (2019) A multisite randomized controlled two-phase trial of the Early Start Denver Model compared to treatment as usual. *Journal of the American Academy of Child & Adolescent Psychiatry*. 58 (9), 853–865.

Rogers, S. J. et al. (2021) A multisite randomized controlled trial comparing the effects of intervention intensity and intervention style on outcomes for young children with autism. *Journal of the American Academy of Child & Adolescent Psychiatry*. 60 (6), 710–722.

Sayid, H. A. (2020) Early Start Denver Model developing social skills for virtual autism children. *Al-Adab Journal*. 1 (135 Supplement 1).

Vismara, L. A. et al. (2009) Dissemination of evidence-based practice: Can we train therapists from a distance? *Journal of Autism and Developmental Disorders*. 39, 1636–1651.

Waddington, H. (2018) *Evaluation of low-intensity therapy and parent training for young children with autism based on the Early Start Denver Model* (Doctoral thesis, University of Wellington).

Waddington, H. et al. (2022) Evaluation of low-intensity therapist-delivered intervention in addition to parent coaching for young children with autism spectrum disorder. *International Journal of Disability, Development and Education*. 71 (2), 1–21.

Wang, J. et al. (2019) Efficacy analysis of Early Start Denver Model in children with autism spectrum disorder. *Chinese Journal of Behavioral Medicine and Brain Science*. 10, 684–688.

Xu, Y. et al. (2018) A pilot study of a culturally adapted early intervention for young children with autism spectrum disorders in China. *Journal of Early Intervention*. 40 (1), 52–68.

Zelmar, A. et al. (2018) Impact of the ESDM on the development of children with ASD in a European French-speaking population: First results of the intervention implementation. *Revue d'Épidémiologie et de Santé Publique*. 66, S416.

—

Note on provider involvement: This provider has agreed to Foundations' terms of reference (or the Early Intervention Foundation's terms of reference), and the assessment has been conducted and published with the full cooperation of the intervention provider.