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Applied Behavior Analysis Provided Via Telehealth

Evidence Review

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List of Abbreviations

ABA	applied behavior analysis
ASD	autism spectrum disorder
CASP	Council of Autism Service Providers
Center	Center for Evidence-based Policy
CI	confidence interval
CMS	Centers for Medicare & Medicaid Services
CoE	certainty of evidence
CQ	contextual question
DSM-5-TR	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision
GRADE	Grading of Recommendations, Assessment, Development, and Evaluations
KQ	Key question
LBA	licensed behavior analyst (New York-specific designation)
RCT	randomized controlled trial

Executive Summary

Background

Autism spectrum disorder (ASD) is a complex developmental condition associated with impaired communication and social interaction, restricted interests, and repetitive behaviors, affecting approximately 1 in 36 children in the US.[1,2] Applied behavior analysis (ABA) has been shown to be effective in addressing the spectrum of ASD behaviors.[3-8] ABA is considered an approach to treatment, rather than a specific intervention.[9] In ABA, systematic study of an individual's functional challenges is used to create a structured behavioral plan for improving their adaptive skills and decreasing inappropriate behaviors.[9] Individual treatment plans can employ any combination of approaches from the ABA toolbox, such as discrete trial training, functional communication training, or pivotal response training. Whatever the tools employed, ABA for ASD is differentiated from other behavior therapies by both intensity of treatment (10 to 24 hours per week for focused treatment and 30 to 40 hours per week for comprehensive treatment)[10] and an adherence to core principles that focus on change that is effective, measurable, generalizable, and meaningful to the client and their family.[9-11] While most commonly associated with ASD treatment, ABA may be used for individuals with Down syndrome, fragile X syndrome, or other intellectual disabilities.[12-15] ABA is most frequently provided in a clinic or autism center or in a child's home, particularly for younger children, but may also take place in school or community settings.[10,16]

The national certification body, the Behavior Analyst Certification Board, identifies behavior analysts as graduate-level professionals who can practice independently, while board-certified assistant behavior analysts and registered behavior technicians work with clients to deliver therapy under the supervision of a behavior analyst.[16] New York requires state-specific licensing as a behavior analyst (LBA) or certification as a behavior analyst assistant (CBAA) to provide ABA services.[17,18] Since November 2022, New York has accepted the national Behavior Analyst Certification Board examination for licensing as an LBA in the state.[19] Only a person who is licensed as an LBA or CBAA is legally able to practice ABA in New York.[20] Unlicensed individuals working under direction of an LBA or CBAA are permitted to provide support services, including working directly with clients to implement protocols designed by LBAs.[21] CBAAs and unlicensed support staff cannot bill state Medicaid for services, which are billed by the supervising LBA.[20]

Access to ABA therapy is limited across the nation and in New York State. More than half of all US counties do not have any behavior anlaysts[22] and New York had the lowest per capita supply in the northeast in 2020.[23] In a study exploring the supply of LBAs across New York State and its 62 counties, the aggregate per capita supply of LBAs per 100 students with ASD in 2022 was 3.2, less than half the supply benchmark of 6.67 established by the Council of Autism Service Providers (CASP).[19] No region in the state met the per capita supply benchmark of LBAs.[19] Because the study was limited to school-aged children with individualized education plans, the true shortage of ABA providers in New York is likely higher.[19]

Telehealth ABA services may be a means of increasing access for parents of children with limited ABA supports.[24] Telehealth delivery of ABA services is promoted as an accessible means of delivering treatment at a lower cost[25,26] and services can be synchronous or asynchronous.[24] Guidelines from CASP recommend limiting asynchronous telehealth services to supervision of

assistants providing in-person treatment and assessment of progress on treatment plans.[27] Synchronous support, which is the focus of this evidence review, can involve direct delivery of therapy through video conferencing, remote behavior analyst observation and coaching of a behavior analyst assistant or behavior technician providing in-person services, or caregiver-mediated services, in which a behavior analyst provides live instructions, feedback, and coaching to a parent implementing ABA procedures with their child.[27]

Key Questions

KQ1. What is the clinical effectiveness of ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorders?

KQ2. What are the harms of ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorders?

KQ3. What are the costs or cost-effectiveness studies related to providing ABA services via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorders?

KQ4. What are clinical practice guideline recommendations for providing ABA services via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorders?

KQ5. What are relevant Medicaid program coverage policies and private payer policies for ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorders?

Methods

Researchers from the Center for Evidence-based Policy (Center) searched Ovid MEDLINE and other clinical evidence sources for randomized controlled trials (RCTs), cost and cost-effectiveness studies, and clinical practice guidelines. Inclusion and exclusion decisions were made by consensus of dual screeners, with additional dual screening of risk of bias assessment. Accuracy of data abstracted from included clinical studies was verified by a second researcher. We applied the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach to rate the certainty of evidence for each primary and secondary outcome from the data we abstracted from trials. To identify relevant coverage policies, we searched 9 state Medicaid program websites, 8 health plan websites, and the Centers for Medicare & Medicaid Services (CMS) website for local and national coverage determinations of telehealth for ABA.

Summary of Clinical Evidence and Recommendations

While telehealth for ABA can include providing remote therapy directly to a client, coaching of parent-mediated services through telehealth, or remote LBA supervision of a CBAA providing in-person therapy, the evidence the Center identified related solely to parent coaching.[27] We identified 5 clinical trials reported in 9 publications that evaluated the efficacy of various ABA interventions provided via telehealth.[25,28-35] One trial focused on delivery of ABA therapy for children with fragile X syndrome,[28,29] while the remainder focused on ABA for populations with ASD.[25,30-35] All studies focused exclusively on ABA provided to children via parent-mediated interventions and none included interventions in which therapists worked directly with children

via telehealth. A pilot study by Lindgren and colleagues (2016) and a subsequent trial by Lindgren and colleagues (2024) gave caregivers 6 months access to a website with 12 online modules on ABA principles and the use of naturalistic developmental behavioral interventions.[31,33] The self-directed group had asynchronous training without any therapist contact, while the intervention group had a 1-hour telehealth session weekly with a behavior analyst to reinforce training content and provide synchronous feedback and guidance as the parent practiced providing the intervention with their child.[31,33] Trials by Hall and colleagues (2020) and Lindgren and colleagues (2020) evaluated telehealth-based coaching and guidance from behavior analyst as parents provided interventions compared to a waitlist (no treatment) control.[25,28] Only 1 trial by Marino and colleagues (2020) directly compared in-person parent coaching with telehealth coaching, but the study had major methodological flaws that impacted interpretation of results.[34] Parent-mediated therapy provided via telehealth was associated with a greater reduction in challenging behaviors.[25,28] One study found an increase in the use of manding (verbal or non-verbal requests to communicate wants or needs) by children in the intervention group but not the waitlist control.[25] In contrast, a pilot study and trial comparing self-directed and therapist-assisted approaches to parent training found no between-group differences in adaptive behaviors,[31,33] with the exception of a significant improvement in social skills for the therapist-assisted group.[33] Caregivers were generally highly satisfied with ABA parent-mediated services provided via telehealth.[25,31,33] The studies comparing self-directed and parent-mediated training found no between-group differences in levels of parenting stress at the end of the intervention.[31,33] Studies that included a waitlist control found that intervention groups experienced greater reductions in stress than caregivers not receiving services.[28,31] The study that compared in-person and telehealth parent-mediated ABA found no between-group difference in stress when controlling for caregiver gender.[34] Strength of evidence for critical and important outcomes is summarized in Table ES1.

Table ES1. Summary of Findings (GRADE)

No. of studies No. of Participants	Findings	Certainty of Evidence	Rationale for Certainty of Evidence Rating
Reduction in challenging behaviors			
3 studies[25,28,34] N = 137 parents, 118 children	Effect in favor of telehealth compared to waitlist and no difference between in-person and telehealth parent coaching • Hall (2020) found significant improvement compared to waitlist in measures of child irritability ($P < .001$), hyperactivity ($P = .005$), and stereotypic behaviors ($P = .042$) at 12 weeks[28] • Lindgren (2020) found a mean reduction in problem behaviors significant for telehealth ($P < .001$) but not waitlist ($P = .99$)[25] • Marino (2020) found no between-group difference in severity of noncompliance at 12 weeks when	●○○○ Very low	Downgraded 1 level due to moderate to high risk of bias in included studies, 1 level for indirectness because studies did not directly compare ABA provided via telehealth to the same service provided in person, and 1 level for inconsistency due to differences among studies in the amount and type of other therapies a child could be receiving simultaneously.

No. of studies No. of Participants	Findings	Certainty of Evidence	Rationale for Certainty of Evidence Rating
	controlling for caregiver gender (P = .477)[34]		
Adaptive behavior			
3 studies[25,31,33] N = 112 parents, 112 children	Unclear effect • Ingersoll (2024) found no difference between telehealth therapist-assisted and self-directed groups in child intentional communication (P = .84), and no significant difference between telehealth therapist-directed and no treatment groups (P = 1) at 6 months[31] • Ingersoll (2024) found no difference in child expressive language ability between telehealth therapist-assisted and self-directed (P = .45) or no treatment groups (P = .93) at 6 months[31] • Lindgren (2020) found a significant increase in manding (verbal requests to communicate wants or needs) from baseline to 12 weeks for the telehealth group (P < .001) but not the waitlist group (P > .99), with a significant between-group difference (P < .001)[25] • Ingersoll (2016) found no difference between telehealth therapist and self-directed groups for vocabulary, language targets, or communication, but reported significant improvement in social skills for telehealth therapist-assisted compared to self-directed groups (P < .05)[33]	●●○○ Low	Downgraded 1 level for risk of bias (all studies had moderate risk of bias) and 1 level for indirectness. Studies did not compare ABA via telehealth to in-person treatment.
Caregiver acceptability and satisfaction			
4 studies[25,28,31,33] N = 169 parents, 169 children	High satisfaction and acceptability • Ingersoll (2024) found the telehealth therapist-assisted group had higher treatment satisfaction than the self-directed group (P = .048)[31] • Hall (2020) found the intervention group considered treatment reasonable (mean 17.9 on scale with max 21) and effective (16.9), with moderate disruption to family life (12.4) and minimal side effects (7.8)[28] • Lindgren (2020) reported mean satisfaction score of 6.3 on 7-point Likert scale[25]	●●○○ Low	Downgraded 1 level for all studies having moderate risk of bias and 1 level for indirectness because studies did not compare ABA via telehealth to in-person treatment.

No. of studies No. of Participants	Findings	Certainty of Evidence	Rationale for Certainty of Evidence Rating
	• Ingersoll (2016) found higher acceptability for telehealth therapist-assisted (mean 6.8 on single 7-point Likert scale question) compared to self-directed groups (6.35) (P = .03)[33]		
Caregiver stress			
4 studies[28,31,33,34] N = 173 parents, 154 children	Unclear effect • Ingersoll (2024) found no difference between self-directed and telehealth therapist-assisted groups at 6 or 9 months, but reported improvement relative to control with no treatment[31] • Hall (2020) found a greater reduction in stress for parents in intervention vs. waitlist groups (P = .01)[28] • Marino (2020) found no between-group difference when controlling for gender[34] • Ingersoll (2016) found no difference between telehealth therapist-assisted and self-directed groups in time-by-group analysis (P > .05)[33]	●○○○ Very low	Downgraded 1 level for moderate to high risk of bias in contributing studies, 1 level for inconsistency, and 1 level for indirectness. Studies allowed different levels of concurrent behavioral therapy but did not control for potential confounding, and only 1 of 4 studies compared ABA via telehealth to the same therapy provided in person.

Abbreviations. ABA: applied behavior analysis; GRADE: Grading of Recommendations, Assessment, Development, and Evaluations; No.: number.

Ongoing Trials

We identified 2 ongoing clinical trials, both of which focus on young children with ASD.[36,37] One trial (NCT05176808) tests the hypothesis that telehealth-delivered parent coaching is equivalent to in-person coaching for the treatment of core social-communication symptoms in toddlers with ASD.[37] An estimated 188 parent-child dyads will receive twice-weekly coaching sessions over a 12-week period.[37] Recruitment began in 2022 and the study is expected to be completed in January 2026.[37] The second trial (NCT04042337) compares pivotal response treatment provided via telehealth to a waitlist control.[36] The study aims to enroll 40 parent-child dyads.[36] Weekly 60-minute parent training sessions will be delivered via telehealth by a trained therapist for 12 weeks.[36] The study lists an estimated completion date of December 2026.[36]

Harms of Telehealth for ABA

Potential adverse effects of intensive behavioral interventions like ABA can include deterioration in adaptive behavior or autism symptom severity due to treatment.[3] Children with ASD may be at risk for injury due to self-directed behaviors like biting, hitting, or head banging, and may pose a risk to others through physical aggression and uncontrolled behaviors.[10] In telehealth delivery of ABA, therapists are not physically present to manage these behaviors, which could potentially lead to injury to the patient or other family members.[10] CASP guidelines advise that appropriate safety protocols should be in place during assessment and treatment,[10] but implementing safety protocols can be more challenging when services are provided remotely because providers must rely on caregivers to provide supervision and follow safety procedures such as clearing the area

of dangerous items, arranging furniture to decrease risk of tripping or injury to children who may climb, and closing doors to prevent a child from eloping. Providers are advised to conduct a risk assessment and safety planning when determining if telehealth is safe and appropriate for the patient and family.[10] Despite these issues, harms or adverse effects related to ABA therapy generally or ABA therapy provided via telehealth are rarely addressed in the literature.[3,26,38] Only 1 of 5 included trials reported on adverse effects, with no adverse events reported.[31] The remaining studies did not report on safety outcomes for children or their caregivers, describe safety plans, or refer to measurement of adverse effects.[25,28,33,34]

Cost and Cost-Effectiveness

We identified 1 study that addressed the programmatic costs and cost effectiveness of ABA delivered via telehealth.[39] The authors estimated implementation and intervention costs using a time-driven activity-based costing approach in which they created process maps for both implementation and intervention stages.[39] Using a payer perspective, the authors determined resource use and costs per unit procedure in the first year of the program.[39] For a virtually conducted, lower-dose intervention (1 hour of therapist contact per week) delivered over 6 months, Cidav and colleagues reported per child intervention costs of $2,576, the majority of which was therapist time.[39] For virtually delivered, higher-dose intervention (4 hours of therapist contact per week) delivered over 6 months, the per child cost was $9,650.[39] The authors identified significant travel costs associated with in-home delivery of the intervention, and estimated that the cost of delivering therapy in-home would be almost twice as much as the cost of virtual delivery.[39]

Clinical Practice Recommendations and Guidelines

We identified 4 clinical practice recommendations and guidelines.[10,27,40,41] A statement from the American Academy of Pediatrics provides only a passing reference to providing ABA via telehealth and offers no specific guidance or advice.[41] The Association of Applied Behavior Analysts supports the use of telehealth for ABA services but notes the need for privacy safeguards and careful assessment of whether clients and providers possess the necessary skills for productive sessions.[40] In publications from 2021 and 2024, CASP offers detailed guidance on assessing which clients are appropriate candidates for telehealth and how telehealth should be incorporated into practice.[10,27] CASP describes asynchronous telehealth as an appropriate modality for clinical supervision of behavior technicians providing in-person therapy or review of patient treatment progress but advises that synchronous approaches should be used for direct services or coaching of parent-mediated services.[27]

Key Policy Findings

We searched for coverage policies across 8 health plans and 9 state Medicaid agencies. We identified policies related to telehealth delivery of ABA therapy for 7 health plans, and though all 7 plans allowed telehealth delivery of some ABA treatments, coverage varied.[42-52] Our review of 9 state Medicaid agency policies indicated that all 9 states allow some ABA therapy services to be provided via telehealth.[53-68] States varied in their level of detail, with some limiting the hours per week,[58] the types of service providers who can bill for telehealth,[67] or the billing codes used,[63] but all permitted some level of telehealth for ABA when clinically appropriate.

Conclusions

This evidence review identified 9 publications from 5 eligible trials with effectiveness outcomes,[25,28-35] 1 cost-effectiveness analysis,[39] and 4 clinical practice guidelines.[10,27,40,41] Of the 5 trials included in this evidence review, 4 recruited children with ASD,[25,30,32,34] while 1 recruited boys with fragile X syndrome.[28] All studies focused on telehealth for providing professional guidance on parent-mediated interventions in which the behavior analyst provides the caregiver with instructions, feedback, and coaching to implement ABA procedures.[25,28,31,33,34] The sole study to provide a head-to-head comparison of in-person and telehealth delivery of parent-mediated ABA found no between-group differences in severity of behaviors or parenting stress when controlling for parent gender.[34] The 2 studies that compared telehealth parent coaching with no treatment found an effect in favor of telehealth for reducing challenging behaviors,[25,28] while 2 studies that compared self-directed asynchronous parent education with or without synchronous therapist assistance found no differences in adaptive behavior measures or parenting stress.[31,33] Caregivers were highly satisfied with telehealth interventions.[25,28,31,33] Moderate to high risk of bias across studies, methodological issues, and small sample sizes impacted the ability of these studies to address the key questions.

Only 1 of 5 included trials reported on adverse effects, with no adverse events reported.[31] The remaining studies did not report on safety outcomes or refer to measurement of adverse effects.[25,28,33,34] The only cost-effectiveness study identified found significant cost savings for services provided via telehealth due to a reduction in travel costs.[39] Clinical practice guidelines stress the importance of addressing privacy concerns before using telehealth modalities and carefully considering the balance of benefits and harms for each client.[10,27,40] Across 7 health plans and 9 state Medicaid agencies for which we found information on ABA services, all allowed some level of telehealth delivery of ABA treatments, though coverage details varied by health plan and state Medicaid agency.

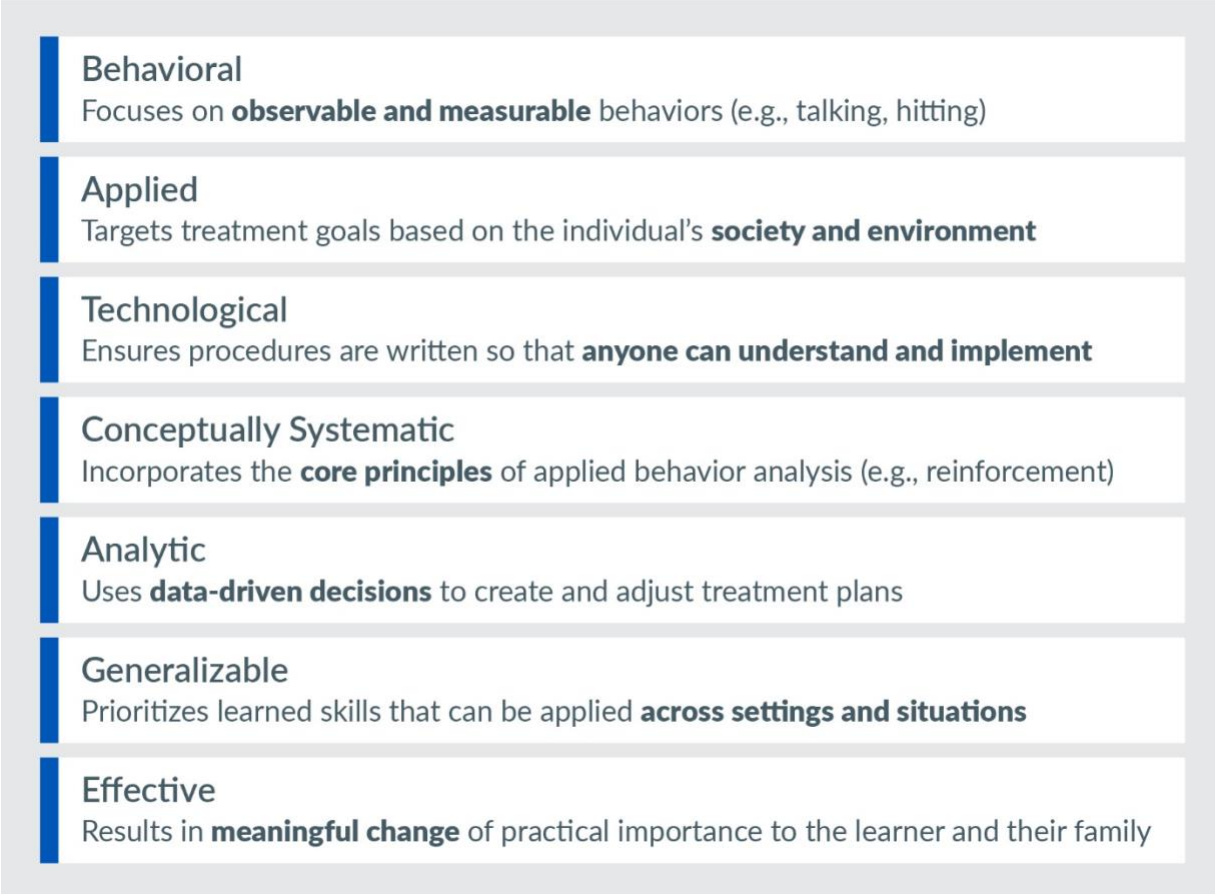
While synchronous telehealth delivery of ABA services appears to be a promising model for increasing access to ABA therapy for families in rural or low-resource areas, there is little evidence from controlled trials to provide direct support for the model, and telehealth delivery of ABA is not appropriate for all families.[10,27] Telehealth services require families to have access to a secure internet connection and the required technology, which can limit access to telehealth for some families based on social or geographic characteristics.[10] Provision of direct services via telehealth requires patients to have some technological skill and a baseline level of attention, as well as receptive language skills, and self-control to participate safely and meaningfully.[27] A significant commitment from caregivers, who may be torn by competing family and work responsibilities, may be necessary for safe and effective delivery of direct services to a patient via telehealth, while the level of time and commitment for parent-mediated services is roughly equivalent whether coaching is provided in-person or via telehealth.[27] Parent-mediated interventions similarly require a significant level of commitment from caregivers, some basic technological skills, and an ability to understand and implement therapies with fidelity under the guidance of a therapist who is unable to provide hands-on demonstrations.[27]

Background

Applied Behavior Analysis

Autism spectrum disorder (ASD) is a complex developmental condition associated with impaired communication and social interaction, restricted interests, and repetitive behaviors.[1] According to the Centers for Disease Control and Prevention, approximately 1 in 36 children has ASD, which is nearly 4 times more common in boys than girls.[2] Applied behavior analysis (ABA) has been shown to be effective for addressing the spectrum of ASD behaviors.[3-7,69] With a focus on applying learning theories and interventions to improve behavior, ABA is considered a science rather than a methodology.[70] In ABA, systematic study of an individual's functional challenges is used to create a structured behavioral plan for improving adaptive skills and decreasing inappropriate behaviors, with the ultimate goal of improving quality of life and increasing independence.[9] The 7 dimensions of ABA that guide research and practice were first described in the 1960s (Figure 1).[71] Rather than being rigid, prescriptive rules for practice, the 7 dimensions are core principles that help ensure the effectiveness of individual treatment plans.[9,11]

Figure 1. The 7 Dimensions of Applied Behavior Analysis



While a full review of the evidence for ABA is beyond the scope of this report, we provide the following introduction to ABA therapy. ABA is prescribed or recommended by a physician or licensed psychologist.[41] While there is no one standard recommended treatment for ASD,[3] there is a large body of research related to ABA and it is recognized by the American Academy of

Pediatrics (AAP) as an evidence-based treatment model for ASD.[41] ABA includes 2 primary approaches: comprehensive treatment models and focused intervention.[72] Comprehensive treatment models are structured treatment programs that are implemented for an extended period (e.g., 25 hours a week for a year), include interventions targeting multiple domains (e.g., cognitive functions, social skills, and adaptive behaviors), and include multiple treatment components to address core features of autism.[72] Focused intervention practices, on the other hand, are designed to impact a single behavior or particular skill.[72] Comparative studies have shown that both comprehensive and focused behavioral interventions show greater effectiveness than other treatments for autism.[6,7,73,74] A Cochrane review published in 2018 found that ABA deployed as an early intensive behavioral intervention improved adaptive behavior, intelligence quotient, and expressive and receptive language skills compared to children receiving general special education services, although there was no evidence of improvement in autism symptom severity or problem behaviors.[3] Because a lack of randomized studies created high risk of bias, the Cochrane review rated the overall quality of evidence as low to very low.[3] Variables affecting treatment outcomes include treatment intensity (hours per week), severity of autism, and age at onset of treatment.[6,75] Research has also highlighted the importance of the therapist-client relationship and the need to build rapport.[76,77]

ABA typically focuses on building skills in different domains of functioning, such as social skills, language (expressive and receptive), communication (verbal and nonverbal), motor dexterity, hygiene, and grooming.[9] Table 1 includes examples of functional domains and skills that can be addressed through ABA. Treatment plans are adapted to each child's age, functional level, individual needs, and challenges. For a child who hits or bites when frustrated, for example, functional communication training can be used to teach more effective and socially acceptable ways to communicate needs and desires.[78] The ABA toolbox includes a number of treatment approaches that can be used to address different needs and learning styles, including discrete trial training (which breaks skills down into smaller pieces to facilitate learning while using positive reinforcement for desired behaviors), pivotal response training (a play-based approach that targets pivotal areas of child development like communication and social behavior), and natural environment training (which incorporates learning opportunities in a child's natural environment through everyday activities and situations).[79]

Table 1. Examples of Functional Domains Addressed by ABA[9]

Domain	Description
Adaptive behavior	Behaviors that increase independence and the ability to adapt to one's environment (an umbrella term for conceptual, social, and practical skills people need for everyday life)
Challenging behaviors	Behaviors such as aggression (scratching, biting, hitting, or kicking), self-injury (hair-pulling, hand-biting, head banding), tantrums, or property destruction
Communication skills	Verbal (expressing thoughts, needs, and desires) and nonverbal (understanding social cues, interpreting facial expressions)
Daily living skills	From basic skills like using the toilet, brushing teeth, or getting dressed to more advanced skills like meal preparation, taking the bus, or managing finances
Language skills	Expressive (communicating needs and desires) and receptive (understanding and processing spoken and written language, such as the ability to follow instructions or understand stories)

Domain	Description
Motor skills	Fine motor skills like holding a pencil or gross motor skills like throwing a ball
Social skills	Appropriate interaction with peers, family members, schoolmates, and others, including specific skills like initiating conversation, understanding the give-and-take of conversation, taking turns in games or activities, or identifying emotions

ABA is most frequently provided in a clinic or autism center or in a child's home, particularly for younger children, but may also take place in school or community settings for older children, adolescents, and adults.[10] While there are advantages and challenges for both home and clinic settings,[80] a Cochrane systematic review found that ABA provided in a home setting was associated with improvements in adaptive behavior, autism symptom severity, and both expressive and receptive language skills.[3] Centers for Medicare & Medicaid Services requires states to cover treatments for autism services but does not specifically require coverage of ABA.[81] However, all 50 states have passed mandates to require insurance plans to cover ABA services for individuals with autism.[79] Accordingly, Medicaid programs in all 50 states and the District of Columbia cover ABA when medically necessary for treatment for ASD.[82]

Though most commonly associated with management of behaviors associated with ASD, ABA has been used across a variety of contexts, including teaching new skills to individuals with Down syndrome or intellectual disabilities[14,15,83] and addressing challenging behaviors in adults with dementia[84,85] or mental health diagnoses.[86,87] ABA may also be used for treating children with fragile X syndrome, which is the most common form of inherited intellectual and developmental disability.[88] Fragile X commonly co-occurs with ASD and it estimated that individuals with fragile X account for 1% to 6% of all cases of ASD.[12] However, social and communicative symptomology and learning styles may differ for children with fragile X, requiring adaptation of traditional ABA therapeutic approaches.[89-91] According to the 2024 New York State Medicaid *Applied Behavior Analysis Policy Manual*, New York Medicaid covers ABA therapy for individuals with a diagnosis of ASD or Rett Syndrome.[20]

Who Can Provide ABA Therapy in New York State?

New York law stipulates that ABA may only be provided by individuals licensed by the state as a behavior analyst (LBA) or certified behavior analyst assistant (CBAA).[17] Unlicensed individuals working under the direction of an LBA or CBAA are permitted to provide support services, including working directly with clients to implement protocols designed by LBAs.[21] CBAAs and unlicensed paraprofessionals cannot bill state Medicaid for services; these are billed by the supervising LBA.[20] In most other states, certification as a behavior analyst through the Behavior Analyst Certification Board is required to provide ABA therapy.[16] Since November 2022, New York has accepted the national Behavior Analyst Certification Board examination for licensing as an LBA in the state.[19] The state's lack of recognition of national certification prior to November 2022 has been cited as a contributor to New York's shortage of ABA providers.[19] although the 2022 rule change may help to alleviate this issue.[18]

National certification type and autonomy level are based on educational qualifications[16]:

- Board-Certified Behavior Analyst: a graduate-level professional trained in behavior analysis who can practice independently. Behavior analysts design, implement, and evaluate

treatment plans, as well as supervising and training individuals conducting individual sessions with clients.
- Board-Certified Assistant Behavior Analyst: an undergraduate-level professional who practices under the supervision of a behavior analyst. Behavior analyst assistants perform direct work with clients or supervise the work of technicians.
- Registered Behavior Technician: a paraprofessional who practices under the close, ongoing supervision of a behavior analyst. Behavior technicians work directly with clients, following protocols designed by the behavior analyst.

Treatment Intensity

Treatment intensity in ABA refers to the amount and frequency of therapeutic intervention provided to an individual, including the number of hours per week of therapy, the number of trials or teaching attempts made during each therapy session, and the duration over which the therapy is provided.[92] Though treatment intensity is adjusted based on each child's needs and progress,[92] research has shown that total hours spent on the intervention is the most crucial factor in predicting positive outcomes.[93] For children with ASD, high-intensity treatments lead to the greatest clinically significant gains, particularly when treatment begins at an earlier age.[6,93,94] High intensity is typically defined as 25 to 40 hours per week for young children.[6,92] The Council of Autism Service Providers (CASP) 2024 guidelines recommend 10 to 24 hours per week for implementing focused treatment and 30 to 40 hours per week for comprehensive treatment.[10]

Despite these recommendations, there is considerable variability in the number of ABA treatment hours that individual clinicians recommend or that caregivers can accommodate.[95] In a survey of 559 ABA treatment providers, Hustyi and Yingling found that individual treatment intensity recommendations were based primarily on patient diagnosis and skills.[95] However, logistical factors also had a significant influence on treatment intensity recommendations and were often responsible for decreased treatment intensity.[95] These factors included family availability and preferences, the burden imposed by driving distance to the clinic, child availability (especially for children enrolled in school), financial costs to the family, and low caregiver commitment or willingness to participate in treatment.[95]

Access to ABA in New York State

A study by Zhang and Cummings (2020) analyzed the per capita supply of behavior analysts based on caseload recommendations for an estimated number of children with ASD in each US state and found that New York had the lowest per capita supply in the Northeast, despite having the highest per pupil public education spending of all states in the 2020 fiscal year.[23] In a 2023 publication, Mellon and colleagues calculated the supply of LBAs for New York state, its 6 regions, and its 62 individual counties to assess the shortage of providers.[19] The authors used county-level public data to compare the per capita supply of LBAs using benchmark caseload guidelines from CASP.[19] The aggregate per capita supply of LBAs per 100 students with ASD in New York in 2022 was 3.2, less than half the supply benchmark of 6.67.[19] None of the 6 regions in the state met the per capita supply benchmark of LBAs.[19] The number of LBAs per 100 students with ASD was highest in the Hudson Valley and lowest in the Central region (a 12-county area including Broome, Madison, and Seneca counties).[19] Due to the concentration of populations in urban areas, the number of additional LBAs needed to meet supply benchmarks

was highest in the New York City/Long Island region, with an additional 1,258 LBAs needed to meet supply benchmarks.[19] The authors noted that the county-level supply of LBAs was so low that most counties could not meet the demand for services even if each LBA took on caseloads that doubled those recommended in the CASP guideline.[19] A key limitation of the study was the use of New York State Education Department data that only included students with ASD who had individualized education programs and were between the ages of 4 and 21.[19] Because younger children and those without individualized education programs were not reflected in the analysis, the shortage of LBAs is likely much higher than estimated.[19] The authors posit that one reason for the shortage may be the lack of reciprocity prior to a November 2022 state rule change between the New York license and the national behavior analyst credential that many other state licensing boards recognize as meeting state licensure requirements.[19] The November 2022 rule change appears to be having the desired effect of increasing the number of LBA providers in the state, with the number of LBA licenses issued in the state rising from 207 in 2022 to 850 in 2023.[96]

Description of the Intervention

Though remote delivery of ABA services has been studied for more than a decade, interest expanded rapidly during the COVID-19 pandemic as a means to maintain continuity of care when in-person services were unavailable.[97] Telehealth-based ABA services also hold promise as a means of increasing access for parents of children in areas with limited ABA supports.[24] Research indicates telehealth delivery of ABA services is an accessible, cost-effective means of delivering treatment,[98] modifying parent behavior,[99] increasing parental self-efficacy,[99,100] and training caregivers to deliver behavior analytic interventions.[26]

ABA-based telehealth services can take on several different formats. The two main categories—synchronous and asynchronous delivery—differ based on time, presence, and mode of participation.[24] The asynchronous support model typically involves providing access to videos or electronic learning materials that caregivers can complete at their own pace.[24] This model is designed to increase knowledge of ABA concepts or teach practical skills, but it does not included one-on-one real-time contact between the ABA therapist and the caregiver to reinforce learning or help the parent to practice and hone skills.[101] This evidence review focuses on synchronous or asynchronous delivery of ABA through telehealth, as defined in CASP guidelines.[10] Synchronous, real-time support can involve one-on-one service delivery with videoconferencing or audio-only meetings between the ABA practitioner and the child, or one-on-one meetings between caregivers and practitioners with or without children present.[102-104] Some hybrid parent training programs combine group remote learning sessions with caregivers with one-on-one telehealth contact between parents and providers to reinforce concepts learned in the group course and practice skills, with or without children present.[31,32]

Delivering direct, one-on-one ABA services to children via telehealth requires the behavior analyst to identify which children can benefit (with or without modifications to goals, teaching procedures, or behavior intervention plans) and which clients have barriers that require advanced problem solving from practitioners and substantial assistance from caregivers.[97] Children with ASD or other developmental disorders vary in their ability to pay attention and respond to skills acquisition programs when they are not in the physical presence of the treatment provider, and caregivers differ in their skill level and ability to act as facilitators and manage behavior during

remote delivery of ABA.[97] For clients that require high levels of physical prompting, continual reinforcement, and stimulus control during ABA therapy, the participation of caregivers is crucial.[97] Training and coaching of caregivers that are at home with the child during ABA therapy thus becomes a key component of many telehealth interventions utilized in a home setting.[97]

While telehealth ABA services can be provided in a variety of settings, including clinic, home, or school, the home setting is the most common.[27] Guidelines from CASP note the value of involving caregivers in the treatment process, including providing training in implementation to improve long-term maintenance of behavioral treatment outcomes.[27] Guidelines stress the importance of synchronous training and guidance, as opposed to providing asynchronous access to prerecorded training content.[27] Coaching includes prompting the parent to implement the intervention techniques and providing feedback on the parent's performance, typically through a Bluetooth earpiece to minimize distractions for the child.[27] In ABA telehealth delivery research, however, teaching and training strategies for caregivers often incorporate multiple strategies, including video recordings and scripted role play.[100,105] Real-time video meetings may be combined with online asynchronous instruction, allowing caregivers to make their way through training sessions at their own pace while maintaining access to behavior analysts or behavior analyst assistants for support and direction.[104] Parents may practice skills through role playing while receiving feedback from ABA providers or practice skills with their children on camera with prompting and support from ABA providers.[24]

A number of contextual questions (CQs) were identified by the New York State Department of Health. These questions address issues related to patient selection, the benefits and risks of providing ABA via telehealth, the facilitators and barriers to telehealth delivery of ABA services, and health equity considerations. While the evidence identified in this review was limited to coaching of parent-mediated ABA therapy via telehealth, our discussion of contextual questions addresses all 3 potential uses of telehealth for ABA: providing direct therapy to clients, coaching of parent-mediated therapy, and LBA supervision of therapies provided in-person by CBAAs.

CQ1. What are the considerations for patient and caregiver selection when providing ABA services via telehealth for children, adolescents, and adults and their caregivers?

In 2021, CASP released practice parameters for telehealth-implementation of ABA, noting that not all patients are appropriate for a telehealth service delivery model.[27] When considering implementing direct ABA services via telehealth, guidelines advise that ABA providers should evaluate the patient's individualized treatment plan to determine if the patient's goals and objectives are suitable for telehealth, with or without modifications, and carefully "evaluate the risks and benefits associated with each telehealth model for ABA service delivery."[27] Providers "should use their clinical judgment based on the characteristics of each patient and their caregivers to ensure that the selected model and delivery modalities lead to meaningful patient interactions."[27] Providers must document that the patient and their caregiver have "the skills required to participate in a meaningful way" during telehealth-delivered services.[27] Providers must also assess whether patients and caregivers who will participate in telehealth services have access to a secure internet connection and the required technology and whether there is an area in the home that is conducive to the safe and beneficial delivery of services via telehealth.[27] Telehealth services also require families to have access to a secure internet connection and the

required technology, which can limit access to telehealth for some families based on social or geographic characteristics.[10]

Issues related to a patients' ability to participate in telehealth-based treatment are minimized when an in-person behavior analyst assistant or behavior technician is delivering treatment with a behavior analyst providing clinical direction via telehealth, although providers must assess a patient's level of distractibility during telehealth sessions before proceeding.[27] Patient distraction can be minimized by having the in-person provider use an earpiece or receive clinical direction after the session ends.

Safety Concerns

CASP advises that treatment providers should conduct a risk assessment and safety planning as they determine if telehealth is safe and appropriate for the patient and family.[27] The presence of challenging behaviors does not automatically preclude telehealth services, but environmental modifications and family agreement with the safety plans is necessary before proceeding with a telehealth-based treatment plan for patients who have a history of aggressive, destructive, or self-injurious behaviors.[27] Providers should also assess the caregivers' ability to cope with challenging behaviors before proceeding with a plan for telehealth delivery of services.[27] Caregivers who can be easily overpowered by patients who are much larger and stronger than they are, or caregivers who have mobility limitations that would interfere with their ability to quickly move out of danger may not be appropriate candidates for parent-mediated telehealth therapies.[27]

Patient Characteristics

Direct delivery of ABA services via telehealth can involve one-on-one services or participation in social skills groups.[27] In either instance, providers should assess whether the patient has the prerequisite skills to respond to an intervention delivered by the technician via telehealth, with or without caregiver assistance.[27]

CASP guidelines (2021) suggest the following minimum prerequisite patient skills for considering telehealth direct treatment[27]:

- Basic joint attention skills (2 people paying attention to the same thing at the same time)
- Basic discrimination skills (ability to detect differences and classify objects, such as the difference between numbers and letters or the difference between eyes and nose)
- Basic echoic skills (ability to repeat a sound, word, or phrase)
- Basic motor intention skills (ability to predict another person's subsequent action from their gaze or gestures, such as reach-to-grasp actions)
- Ability to follow common 1-step instructions (such as "pick up the block")
- Ability to participate in a session with limited caregiver assistance
- Ability to sit independently at a computer or tablet for 8 to 10 minutes

If patients meet these basic requirements, they can be further assessed to determine if they have the ability to interact effectively via telehealth (including following instructions delivered by a technician via synchronous video conferencing and being able to delay reinforcement, stay in view of the camera, and independently manipulate a mouse and keyboard or independently operate a touchscreen device).[27] If patients display a high level of challenging behaviors or

escape-related behaviors, however, in-person ABA delivery or parent-mediated telehealth delivery may be a better option than telehealth direct ABA services with the child.[27]

In cases where parent-mediated telehealth delivery is being considered, the ABA provider should carefully assess caregivers' technological skills, physical capabilities, ability to follow verbal directions via telehealth, and the effect of any other individuals in the home for whom the caregiver is responsible.[27] Providers should consider whether treatment protocols can be simplified or adapted for use by caregivers, and how they will ensure that parents have the therapeutic materials needed to implement treatment protocols, such as sensory toys, timers, flashcards, worksheets, or other items needed for the intervention.[27]

CQ2. What are the benefits and risks to providing ABA services via telehealth for children, adolescents, and adults and their caregivers?

Pantermuehl and Lechago refer to the risks to user privacy posed by videoconferencing software, noting that most videochat platforms are not compliant with the Health Insurance Portability and Accountability Act (HIPAA).[103] Providing services to clients via ABA without careful consideration of the client and family's suitability for telehealth services, which were often necessitated during the COVID-19 pandemic, also poses risks to fidelity to treatment plans and may jeopardize client outcomes.[27,106]

When used carefully and appropriately, provision of ABA services via telehealth may help to remove barriers to access and prevent delays in care.[10,27] Because best practices require that behavior technicians receive an average of 2 hours of clinical direction for every 10 hours of direct treatment, the shortage of behavior analysts can restrict families' access to ABA provided by behavior technicians.[27] Providing clinical guidance via telehealth, whether synchronously or asynchronously, can create more opportunities for families to access behavior technician services by reducing travel time for LBAs and allowing them to supervise more technicians.[27] In cases of inclement weather that makes travel difficult or public health emergencies like COVID-19, telehealth enables continuity of care for patients and their families.[27] Additionally, by reducing travel time for ABA providers, telehealth may be a valuable tool for reducing provider burnout.[27] Telehealth also offers ABA providers opportunities to connect with colleagues and nonlocal health experts, which can help to reduce isolation for ABA treatment providers in rural areas.[27]

ABA providers who have incorporated telehealth services have also described some unexpected benefits. Lee and colleagues (2015) note that the provider in a telehealth scenario often appears to the client as a face with moving lips, while the provider has wider perspective that allows them to observe a child's actions. For some children with ASD, the closeup view of a provider's face may help build rapport and support close relationships between the client and provider.[107] From the providers' perspective, however, the greater distance from the camera to the client and the rapid movement on the video can make it difficult to discern a client's facial expression cues.[107] CASP guidelines note that telehealth may be an ideal entryway for clients with ASD who are not comfortable attending an in-person social skills class.[10] Participation in social skills groups via telehealth also provides opportunities for children, adolescents, and adults with ASD in rural or remote areas to connect with typically developing peers or other individuals with ASD.[10]

CQ3. What are the facilitators and barriers to implementing ABA services via telehealth for children, adolescents, and adults and their caregivers?

Potential barriers to providing ABA via telehealth include interstate licensure challenges and other state-specific regulatory issues, privacy issues, limited access to the technological devices (e.g., smartphone, tablet, computer) needed for a telehealth visit, connectivity issues, level of comfort with technology for providers or patients, and cultural acceptance of conducting virtual visits in place of in-person visits by provider or patients.[27] Providers working with families in rural communities or low-income urban communities may encounter additional barriers to providing care via telehealth, including limited internet access or poor connectivity, limited access to the technology required for telehealth sessions, limited availability for family participation due multiple job commitments, difficulties identifying an appropriate location within the home to provide telehealth therapy due to home size or the number of family members, and limited access to therapeutic materials needed for treatment.[27]

Sipila-Thomas and Brodhead (2024) surveyed 69 behavior analysts who had supervised ABA service providers via telehealth within the past 6 months to identify specific barriers to telehealth-based behavioral supervision and the strategies used to address them.[108] The mean age of behavior analysts was 37 years and the majority of respondents were White (83%) and female (87%).[108] Internet connectivity was the most frequently cited supervisee barrier (67%), followed by distractions during the supervision meeting, such as family members or pets (36%).[108] The most frequently cited supervisor barriers were difficulties modeling or demonstrating strategies over a video connection (42%) and inability to properly observe therapist-patient interactions due to an obstruction of view or a supervisee out-of-camera view (41%).[108] The most frequently used strategies by supervisors to address barriers were setting or clarifying clear expectations with supervisees and providing training on technology and video conferencing software to the supervisee.[108] Difficulty modeling or demonstrating strategies was the most serious barrier encountered, as ineffective instructional strategies could result in poor therapist fidelity and poor treatment outcomes.[108] To reduce barriers, the authors suggest that organizations train all behavior analysts on how to provide supervision via telehealth before beginning the supervision process and then prospectively track the barriers their employees experience to inform revision of future training.[108] In their guidelines for telehealth implementation of ABA, CASP (2021) includes specific advice on camera placement to ensure optimal viewing for behavior analysts providing synchronous supervision of behavior therapists providing in-person care, or optimal recording if supervision will be provided asynchronously.[27]

Pomales-Ramos and colleagues (2023) conducted a mixed-methods examination of 388 ABA service providers' perceived barriers to delivering ABA via telehealth.[106] The average age of respondents was 34 years. Most respondents were behavior analysts (63%), followed by behavior technicians (34%) and behavior analyst assistants (3%).[106] Respondents were primarily White (79%) and female (89%).[106] The majority of respondents (85%) reported providing direct intervention with clients via telehealth, while 57% provided caregiver training via telehealth or oversaw caregiver-mediated services.[106] Using a 5-point Likert scale, clinicians rated providing direct services to patients (mean = 3.52, SD = 1.14) as more difficult than conducting assessments (mean = 3.29, SD = 1.06), and both as more difficult than providing parent-mediated interventions (mean = 2.47, SD = 1.11).[106] Barriers related to providing direct services primarily

focused on client characteristics, with respondents noting difficulties in working remotely with children who elope, exhibit challenging behaviors, or are preverbal or nonverbal.[106] A majority of respondents (84%) identified technological barriers to providing ABA through telehealth (most often connectivity issues), challenges seeing or hearing the clients, and disparities in access to technology and internet.[106] Because caregivers play a major role when ABA services are provided via telehealth, service providers noted challenges with caregiver involvement as a barrier to effective ABA.[106] Caregivers were not always available to assist due to competing work and family demands, and those who were had variable levels of experience with ABA and varied expectations of telehealth services.[106] While service providers offering ABA remotely rely on parental involvement to keep children present and engaged, some providers noted increased distractions and competing demands from caregivers.[106] The study also described ABA clinicians' experiences during the COVID-19 pandemic, when all or most services were moved to remote delivery.[106] As a result, many clinicians did not have the ability to base treatment decisions around which clients were most appropriate for telehealth services,[106] which likely exacerbated service delivery challenges.[27]

A number of ABA organizations with experience in providing services via telehealth have shared the processes and facilitators they use to minimize barriers to implementation. Frederick and colleagues (2022) provided a detailed description of training models and materials, problem-resolution strategies aimed at overcoming specific barriers, and initial outcomes across educational and medically necessary intervention models with the intent to support practitioners in identifying and overcoming client barriers to needed intervention.[109] Lee and colleagues (2015) summarized the technical systems they used to develop a telehealth service and the concerns and problems they encountered, providing detailed descriptions of equipment needs and offering guidelines for troubleshooting common problems.[107] Rodriguez and colleagues (2020) shared a treatment-selection guide designed to assist practicing behavior analysts in determining an appropriate protocol for delivering direct telehealth services to clients, with or without the assistance of the client's caregiver.[97] CASP provides detailed practice parameters for telehealth-implementation of ABA, including equipment needs, advice on setting up equipment to ensure the best experience, and decision guides for determining which clients are most likely to benefit from telehealth service of varying kinds.[27]

CQ4. What are the health equity considerations, including impact on access to ABA services, for providing these services via telehealth for children, adolescents, and adults and their caregivers?

A study by Yingling and colleagues (2021) used data from the US Department of Education's Civil Rights Data Collection, Behavior Analyst Certification Board's certificant registry and the US Census Bureau to model per-capita ratios of children with ASD to behavior analysts across 49 states and the District of Columbia (Iowa's 99 counties were excluded because the state did not report data on children with ASD in their special education counts).[22] More than half of all US counties in the sample had no behavior analysts.[22] Residence in an urban area increased access for low-income families and people of color, but affluence had the strongest relationship with access.[22] As affluence in an area increased, the odds of having at least 1 provider increased: for a 1 unit increase in affluence, there was a predicted 525% increase (OR 5.26; 95% CI, 3.57 to 7.75) in the odds of being in the highest access ASD-to-behavior analyst ratio category.[22] Given the

lack of behavior analysts in rural counties, the authors identified building capacity for telehealth as a promising approach for improving access.[22]

The support of a behavior analyst assistant or behavior technician allows a behavior analyst to take on a larger caseload and provide services to more families.[22] In a study that explored access to behavior technicians across 49 states and the District of Columbia (again, Iowa was omitted), Yingling and colleagues (2023) found that there was greater access to behavior technicians than behavior analysts, though limited availability still presented significant challenges to families outside of metropolitan statistical areas.[110] Approximately half of all counties had at least 1 practicing behavior technician (who currently had a supervisor or coordinator) and 1 behavior analyst, and many counties had 1 provider type (usually a behavior technician) but not the other.[110] More than 28% of counties did not have a behavior analyst or a practicing behavior technician.[110] Moreover, 6% of counties did not have a practicing behavior technician and bordered only counties with no practicing behavior technician, representing 2,146 children with ASD with virtually no access to ABA therapy.[110] Traveling long distances to provide supervision reduces the amount of patients any behavior analyst can treat, leading the authors to identify telehealth supervision as a viable opportunity to improve access.[110] Given the geographic distribution of behavior analysts and behavior technicians, the authors note that telehealth supervision could be the only option for meeting the medical needs of children with ASD in some rural and remote locations.[110]

The CASP 2024 practice guidelines for ABA identify telehealth delivery as a means of increasing access to therapy in light of service provider shortages, significant travel requirements, and the lack of specialty care clinicians with expertise in the patient population that can make in-person service delivery impractical or impossible.[10] Providing telehealth services removes the need for travel and theoretically provides added access to ABA professionals,[27] but it does not remove other barriers to receipt of effective ABA therapy. When direct services are provided via telehealth, behavior analysts rely more heavily on parental involvement to help keep children present and engaged.[106] In a survey of 388 ABA service providers, 85% of whom reported providing direct intervention with clients via telehealth, clinicians described challenges with delivering services when caregivers were unable to attend or engage in sessions due to other responsibilities or stressors, such as caretaking of other children or family members and work demands.[106]

Cultural considerations may also impact the safe and effective implementation of ABA services, whether in person or via telehealth.[27] Families with different cultural backgrounds may differ in how symptoms of ASD are perceived or managed, may have cultural norms that limit a family's willingness to express their opinions or disagree with healthcare professionals, and may have varying levels of acceptance of ABA or other therapies.[27,111] Language barriers may lead to miscommunication and misunderstandings.[112] Behavioral therapy should ideally be provided in the family's preferred language to obtain an accurate history and facilitate clear and comfortable communication; however, the shortage of treatment providers may limit this possibility, whether services are provided remotely or in-person.[27] Cultural and language barriers can make it challenging to ensure that families understand and consent to all aspects of treatment, and nuances in caregiver behavior may be hard to see or interpret over a video connection.[27] Fong and colleagues (2017) noted the need for more culturally diverse ABA service providers, but

identified language barriers, negative cultural perceptions, microaggressions in work and academic settings, lack of mentoring opportunities, adverse campus climates, and tokenism as barriers.[113] DuBay and colleagues (2017) observed that evidence supporting the effectiveness of parent-mediated ABA interventions comes overwhelmingly from studies of non-Hispanic White ABA providers working with White upper middle class English-speaking families.[114] Further, researchers note that even the best-intentioned ABA providers have unconscious biases and need greater guidance on how to incorporate culturally responsive research and mentorship practices to enhance diversity in the field.[115-117]

Methods

This review is based on key questions (KQs) and CQs identified by the New York State Department of Health in consultation with the Center. CQs are addressed above. Search parameters, KQs, and methodologies for identifying, assessing, and reporting evidence are described in the following sections. Additional details are available in the Evidence Based Benefit Review Advisory Committee Methods Manual online.

Key Questions

The following KQs are addressed in the clinical evidence review:

KQ1. What is the clinical effectiveness of ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers?

   a. Does clinical effectiveness vary by patient characteristics (e.g., age, sex) or condition characteristics (e.g., *DSM-5-TR* diagnosis, severity, comorbidities)?
   b. Does clinical effectiveness vary by type of ABA therapy (e.g., discrete trial training, functional communication training, pivotal response training), delivery method (e.g., in-person technician implementation with remote behavior analyst direction or in-person caregiver implementation with remote direction), telehealth modality (i.e., audiovisual or audio-only), setting (e.g., home, school, community center), target skill or behavior, frequency or duration of contact with provider, devices used, or workforce composition of the staff (e.g., credentials)?

KQ2. What are the harms of ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers?

   a. Do harms vary by patient characteristics (e.g., age, sex) or condition characteristics (e.g., *DSM-5-TR* diagnosis, severity, comorbidities)?
   b. Do harms vary by type of ABA therapy (e.g., discrete trial training, functional communication training, pivotal response training), delivery method (e.g., in-person technician implementation with remote behavior analyst direction or in-person caregiver implementation with remote direction), telehealth modality (i.e., audiovisual or audio-only), setting (e.g., home, school, community center), target skill or behavior, frequency or duration of contact with provider, devices used, or workforce composition of the staff (e.g., credentials)?

KQ3. What are the costs or cost-effectiveness studies related to providing ABA services via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers, including relative costs compared with other treatment modalities?

KQ4. What are clinical practice guideline recommendations for providing ABA services via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers?

KQ5. What are relevant Medicaid program coverage policies and health plan policies for ABA services provided via telehealth for children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers?

Eligible Studies for Key Questions 1 to 4

Table 2 summarizes the study inclusion and exclusion criteria. Further inclusion and exclusion criteria details can be found in Appendix B. This evidence review focuses exclusively on synchronous ABA interventions delivered partially or completely via telehealth and excludes interventions limited solely to asynchronous interventions. For example, studies were excluded if they consisted entirely of e-learning interventions in which parents and caregivers were given access to prerecorded training modules that they could work through at their own pace, without live interaction with ABA therapists. However, a study that combined access to prerecorded e-learning modules with live sessions with behavior analysts or behavior analyst assistants to answer questions, reinforce messages, or guide parents as they practiced skills would be considered for inclusion.

Table 2. Key Study Inclusion Criteria

Study Component	Inclusion Criteria
Populations	• Children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the DSM-5-TR, and their caregivers
Interventions	• ABA services that involved communication with a behavior analyst or behavior analyst technician or assistant, provided entirely or partly (i.e., hybrid or in-person and remote delivery) via telehealth modality
Comparators	• Head-to-head comparisons of ABA services provided via different telehealth modalities • Exclusively in-person ABA services • Standard care • Waitlist (no treatment)
Outcomes	Critical • Reduction in challenging behavior • Adaptive behavior • Autism symptom severity • Adverse effects Important • Patient acceptability and satisfaction • Caregiver acceptability and satisfaction • Patient anxiety, stress, or depression • Caregiver anxiety, stress, or depression • Cost and cost effectiveness

Study Component	Inclusion Criteria
Timing and follow up	• Outcomes collected before and at the end of the intervention • Outcomes collected at least 3 months after the end of the intervention
Setting	• Studies conducted in outpatient settings • Studies conducted in countries categorized as *very high* on the Human Development Index (KQ1–KQ2) • Studies conducted in the US or using US-based health systems data (KQ3)
Study design	KQ1–KQ2 • Randomized controlled trials • Nonrandomized comparative trials • Interrupted time series with comparison group • Controlled before-after studies KQ3 • Comparative studies and economic evaluations • Cost-effectiveness analyses • Economic modeling studies • Published within past 5 years KQ4 • Evidence-based clinical practice guidelines that provide specific treatment recommendations • Published or updated within past 5 years
Sample size	• No limit
Publication type	• Peer-reviewed publication of primary study results • Published in the English language • Ancillary publications with additional comparative follow up

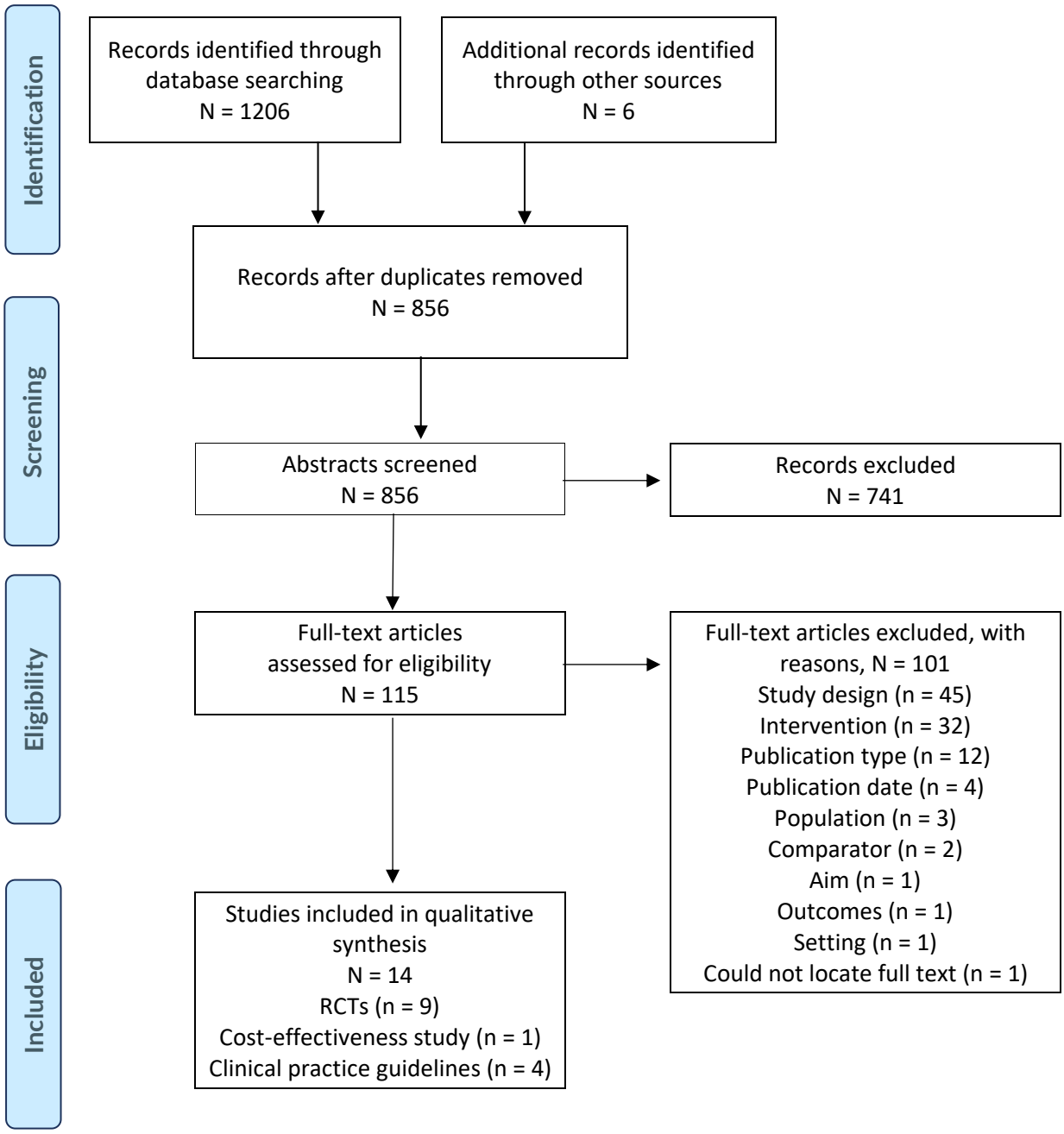
Abbreviations. ABA: applied behavior analysis; ASD: autism spectrum disorder; DSM-5-TR: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision; KQ: key question; US: United States.

Evidence and Policy Searches

We searched Ovid MEDLINE, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cumulative Index of Nursing and Allied Health Literature, PsycInfo, and other information sources for randomized controlled trials (RCTs), nonrandomized comparative trials, cost and cost-effectiveness studies, and clinical practice guidelines. While there were no date limits on clinical evidence, cost-effectiveness studies and clinical practice guidelines were only considered if they were published or updated in the last 5 years. We identified 857 potentially relevant publications for the KQs of clinical evidence, harms, cost-effectiveness, and clinical practice guidelines (Figure 2). We also searched trial registries for relevant ongoing trials. A full list of searched sources and search strategies is provided in Appendix A. We did not conduct systematic searches to identify publications to answer CQs.

Researchers from the Center for Evidence-based Policy (Center) searched 9 state Medicaid program websites, 8 private payer websites, the Medicaid State Waivers List, and the Centers for Medicare & Medicaid Services (CMS) website for local and national coverage determinations of ABA to address KQ5. Appendix A lists the search terms we used to identify relevant policies, as well as the sources we searched.

Figure 2. Prisma Diagram of Study Selection Process



Abbreviations. RCT: randomized control trial.

Screening and Inclusion

Two Center researchers used the DistillerSR systematic review software platform to screen publications identified in the searches using the detailed inclusion and exclusion criteria outlined in Appendix B. Disagreement about inclusion was resolved through discussion. Appendix C lists included studies and Appendix D lists studies excluded during full-text screening along with the

primary reason each study was excluded. Figure 2 shows the numbers of studies screened, included, or excluded at each step.

Risk of Bias Assessment

Two Center researchers assessed each included RCT for risk of bias using standard forms. Appendix E has detailed tables with criteria considered for assessing risk of bias or methodological quality. Disagreement between the researchers was resolved through discussion.

Data Abstraction

One Center researcher used a standard form to extract all data presented in tables, and a second researcher verified each data point against the original publication to ensure accuracy. One Center researcher assessed the suitability of outcome data for meta-analysis, and a second researcher reviewed outcome data and confirmed final decisions regarding meta-analysis.

Synthesis

Careful review of outcome data across the included studies was used to determine the feasibility of meta-analysis. Due to substantial differences in study design and outcome measures and variations in the amount and type of nonstudy therapy that children could be receiving simultaneously, we did not conduct a meta-analysis for any key outcomes. We provide a qualitative synthesis of the evidence, applying the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach to rate the certainty of evidence for each outcome from the data we abstracted from the trials that compared ABA provided via telehealth to in-person ABA, standard treatment, or no treatment (waitlist) for children, adolescents, and adults with a diagnosis of ASD or another neurodevelopmental disorder. Appendix E includes detailed tables with criteria considered during GRADE assessment.

Evidence Review

We identified 9 publications from 5 eligible trials with effectiveness outcomes, 1 cost-effectiveness analysis, and 4 clinical practice guidelines. We identified 2 relevant ongoing trials. The clinical evidence review is organized by KQ.

KQ1. Effectiveness

We identified 5 clinical trials reported in 9 publications that evaluated the efficacy of various ABA interventions provided via telehealth.[25,28-35] One trial focused on delivery of ABA therapy for children with fragile X syndrome,[28,29] while the remainder of studies focused on ABA for ASD populations.[25,30-35] No studies were identified that explored the use of telehealth for providing ABA to children, adolescents, or adults with other neurodevelopmental disorders. Further, all identified studies focused exclusively on ABA provided to children, with no studies including adolescent or adult populations. Table 3 describes the characteristics of included RCTs, while Table 4 summarizes outcomes of included studies. All studies described the use of telehealth for parent-mediated interventions and none included interventions in which therapists worked directly with children through a remote connection:

- Ingersoll and colleagues (2016) conducted a pilot study in which parents of children aged 19 to 73 months with ASD received access to a website with 12 online modules on naturalistic developmental behavioral interventions that they could work through at their own pace over

a 6-month period.[30,33,35] While the control group was limited to asynchronous training, the intervention group received a 30-minute session with the parent and therapist each week to discuss content from the online learning modules and answer questions, as well as a 30-minute session each week with the parent, child, and therapist where the parent provided the intervention while receiving feedback and guidance from the therapist through a video connection.[30,33,35]

- The study team led by Ingersoll subsequently conducted a clinical trial to evaluate the intervention in a larger group of parents of children aged 18 to 96 months with ASD, following the same protocol used in the pilot study.[31,32] In addition to comparing self-directed parent training with therapist-assisted parent training, the study included a no-treatment control arm that gave parents access only to the resources page of the project website.[31,32]
- Hall and colleagues conducted a study in which parents provided an intervention based on functional communication training for their children with fragile X syndrome while receiving real-time feedback from a behavior analyst, with results compared to a waitlist control.[28,29] The study recruited boys with fragile X who were aged 3 to 10 years who were reported to exhibit at least 1 form of problem behavior on a daily basis according to the parent-administered Behavior Problems Inventory.[28]
- Lindgren and colleagues (2020) conducted a study in which parents in an intervention group were trained in functional assessment and provided functional communication training for their child while receiving real-time telehealth coaching from a behavioral analyst, with results compared to a waitlist control.[25] The study recruited families of children aged 18 to 84 months with a confirmed diagnosis of ASD.[25]
- In the sole non-US study (conducted in Italy), Marino and colleagues (2020) led a research project that recruited families of children between 30 months and 10 years of age with ASD.[34] The study was divided into three 12-week blocks.[34] In the first 12 weeks, all parents were invited to attend twelve 2-hour in-person group parent training sessions on ABA, with a focus on discrete trial training and natural environment training.[34] In the second 12-week block, all enrolled children received 2 hours of in-person group behavioral therapy per week by a doctoral-level behavior analyst, with parents invited to observe.[34] In the final 12 weeks, parents were divided into either an intervention group that received 2 hours per week of tele-assisted one-on-one behavioral parent training and coaching, or a control group that received the same coaching in person.[34]

Table 3. Characteristics of Included RCTs

Study Details	Comparison and Follow Up	Parent Demographics	Child Demographics
Ingersoll et al. 2024[31] NCT02721381 Country: US Child diagnosis: ASD ABA approach: naturalistic developmental behavioral intervention	Parent-mediated intervention with therapist feedback via telehealth vs. access to asynchronous learning modules Intensity: low (1 hour/week) Treatment duration: 6 months	Intervention (N = 22) Mean age: 35.3 years (SD 4.0) Female: 77% Control (N = 24) Mean age: 35.8 years (SD 7.6) Female: 83%	Intervention (N = 22) Mean age: 47.9 months (SD 18.5) Male: 77% Control (N = 24) Mean age: 45.6 months (SD 18.6) Male: 62%

Study Details	Comparison and Follow Up	Parent Demographics	Child Demographics
No reference to allowable nonstudy treatment Ancillary study: 1 (Ingersoll et al. 2024)[32]	Longest follow up: 6 months		
Hall et al. 2020[28] NCT03510156 Country: US Child diagnosis: fragile X syndrome ABA approach: functional communication training [29]Limitations on nonstudy treatment: no more than 5 hours/week of ABA Ancillary study: 1 (Hall et al. 2022)[29]	Parent-mediated intervention with real time feedback from a behavior analyst as parent worked with child vs. waitlist control Intensity: high (initially 5 days/week, tapering to 1 or 2 days/week) Treatment duration: 12 weeks Longest follow up: 9 months	Intervention (N = 30) Mean age: 39.4 years (SD 8.1) Female: 97% Control (N = 27) Mean age: 38.5 years (SD 7.1) Female: 85%	Intervention (N = 30) Mean age: 6.6 years (SD 2.5) Male: 100% Control (N = 27) Mean age: 7.0 years (SD 2.3) Male: 100%
Lindgren et al. 2020[25] Country: US Child diagnosis: ASD ABA approach: functional communication training Limitations on nonstudy treatment: none Ancillary study: 0	Parent-mediated intervention with real-time telehealth coaching by a behavioral consultant vs. waitlist control Intensity: low (1 hour/week) Treatment duration: 12 weeks Longest follow up: 12 weeks	Intervention (N = 21) Mean age: NR Female: NR Control (N = 17) Mean age: NR Female: NR	Intervention (N = 21) Mean age: 49.7 months (SD 17.0) Male: 86% Control (N = 17) Mean age: 55.3 months (SD 17.0) Male: 82%
Marino et al. 2020[34] ISRCTN15312724 Country: Italy Child Diagnosis: ASD ABA approach: discrete trial training, natural environment training Limitations on nonstudy treatment: could not be receiving any other therapy directly related to behavioral skills Ancillary study: 0	Tele-assisted 1:1 behavioral parent training and coaching via telehealth vs. in-person (all parents in both groups first received 12 weeks of in-person group training followed by 12 weeks of therapist-provided group behavioral therapy) Intensity: low (2 hours/week)	Intervention (N = 22) Mean age: NR Female: 55% Control (N = 20) Mean age: NR Female: 55%	Intervention (N = 12) Mean age: 69.1 months (SD 22.5) Male: 83% Control (N = 11) Mean age: 69.6 months (SD 32.9) Male: 82%

Study Details	Comparison and Follow Up	Parent Demographics	Child Demographics
	Treatment duration: 12 weeks Longest follow up: 12 weeks		
Ingersoll et al. 2016[33] Country: US Child Diagnosis: ASD ABA approach: naturalistic developmental behavioral intervention Limits on nonstudy treatment: none, but asked to report hours/week Ancillary studies: 2 (Ingersoll et al. 2015; Pickard et al. 2016)[30,35]	Parent-mediated intervention with therapist feedback via telehealth vs. access to asynchronous learning modules Intensity: low (1 hour/week) Treatment duration: 6 months Longest follow up: 6 months	Intervention (N = 15) Mean age: NR Female: 100% Control (N = 13) Mean age: NR Female: 92%	Intervention (N = 15) Mean age: 41.6 months (SD 1.2) Male: 79% Control (N = 13) Mean age: 46.1 months (SD 13.2) Male: 61%

Abbreviations. ABA: applied behavior analysis; ASD: autism spectrum disorder; N: number; NR: not reported; RCT: randomized controlled trial; SD: standard deviation; US: United States.

Table 4. Outcomes for Studies Comparing ABA Provided via Telehealth to Control at End of Intervention

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
Ingersoll et al., 2024[31] Ancillary: Ingersoll et al, 2024[32] RoB: Moderate	No outcomes reported	Change in child intentional communication, mean (SE) • Therapist-assisted: 0.64 (0.07) • Self-directed: 0.62 (0.07) • No-treatment control: 0.64 (0.08) • *P* = .84; therapist-assisted vs. self-directed • *P* = 1, therapist-assisted vs. no treatment Change in child expressive language at follow up 3 mo. after end of intervention (weighted composite), mean (SE) • Therapist-assisted: −0.05 (0.12) • Self-directed: 0.08 (0.12) • No-treatment control: −0.04 (0.13) • *P* = .45; therapist-assisted vs. self-directed • *P* = .93, therapist-assisted vs. no treatment Intentional communication at 9 mo., mean (SE) • Therapist-assisted: 0.72 (0.08) • Self-directed: 0.71 (0.08) • No-treatment control: 0.73 (0.09) • *P* = .93, therapist-assisted vs. self-directed	Treatment satisfaction, mean (SD) • Therapist-assisted: 6.24 (0.88) • Self-directed: 5.74 (1.16) • ***P* = .048**	Parenting stress at baseline/end of intervention, mean (SE) score on PSI • Therapist-assisted: 98.32 (4.27)/90.76 (4.39) • Self-directed: 98.46 (4.09)/92.69 (4.33) • No-treatment control: 98.06 (4.72)/97.50 (5.20) • 95% CI for effect size difference, therapist-assisted vs. self-directed: −0.17 to 0.42 (no difference) • 95% CI for effect size difference, therapist-assisted vs. no treatment: 0.17 to 0.82 (**effect in favor of intervention**) • 95% CI for effect size difference, self-directed vs. no treatment: 0.01 to 0.64 (**effect in favor of self-directed**) Parenting stress at follow up 3 mo. after end of intervention, mean (SE) • Therapist-assisted: 90.34 (4.39) • Self-directed: 92.64 (4.33)

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
		• *P* = . 93, therapist-assisted vs. no treatment *Means adjusted for baseline score*		• No-treatment control: 100.76 (5.09) • 95% CI for effect size difference, therapist-assisted vs. self-directed: –0.16 to 0.43 (no difference) • 95% CI for effect size difference, therapist-assisted vs. no treatment: 0.27 to 0.92) (**effect in favor of intervention**) • 95% CI for effect size difference, self-directed vs. no treatment: 0.15 to 0.79 (**effect in favor of self-directed**)
Hall et al., 2020[28] Ancillary: Hall et al., 2022[29] RoB: Moderate	Mean change from baseline to 12 weeks in irritability subscale of the ABC-C (*P* value for significance of difference) • Telehealth: –6.44 (**< .001**) • Waitlist: –1.35 (.263) • Mean between-group difference –5.09 (**< .001**) Mean change per year from baseline to longest follow up (mean 3.1 years) in irritability subscale of the ABC-C (*P* value for significance of difference) • Telehealth: –1.92 (**< .001**) • Waitlist: 0.68 (.859) • Mean between-group difference –1.98 (**.001**) Mean change from baseline to 12 weeks in hyperactivity/	No outcomes reported	Treatment acceptability related to functional communication training from the TARF-R at baseline, mean (SD); range for each subscale is 3 to 21 • Reasonableness: 17.9 (2.5) • Effectiveness: 16.9 (2.8) • Willingness: 18.4 (1.9) • Cost: 12.4 (2.6) • Disruptiveness to family: 12.4 (2.4) • Side effects: 7.8 (2.9) *Values other than baseline not provided, though the*	Mean change from baseline to 12 weeks in mean score on PSI (*P* value for significance of difference) • Telehealth: –3.362 (**.010**) • Waitlist: –0.734 (.318) • Mean between-group difference: –2.628 (.083) Mean change per year from baseline to longest follow up (mean 3.1 years) in mean score on PSI (*P* value for significance of difference) • Telehealth: –1.06 (.026) • Waitlist: 0.51 (.185)

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
	noncompliance subscale of the ABC-C (*P* value for significance of difference) • Telehealth: −6.66 (**<.001**) • Waitlist: −1.40 (.212) • Mean between-group difference −5.25 (**.005**) Mean change per year from baseline to longest follow up (mean 3.1 years) in hyperactivity/ noncompliance subscale of the ABC-C (*P* value for significance of difference) • Telehealth: −2.0 (**<.01**) • Waitlist: −1.05 (**.031**) • Mean between-group difference −0.96 (.186) Mean change from baseline to 12 weeks in stereotypic behavior subscale of the ABC-C (*P* value for significance of difference) • Telehealth: −2.17 (**<.001**) • Waitlist: −0.94 (.080) • Mean between-group difference −1.22 (**.042**) Mean change per year from baseline to longest follow up (mean 3.1 years) in stereotypic behavior subscale of the ABC-C (*P* value for significance of difference) • Telehealth: −0.49 (**.048**) • Waitlist: −0.03 (.890) • Mean between-group difference: −0.51 (.100)		*tool was also administered at 4, 8, and 12 weeks. Reports only that "scores on each subscale…remained stable across treatment weeks indicating that treatment acceptability remained consistently high across treatment." (pg. 9)*	• Mean between-group difference: −1.57 (**.008**)

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
Lindgren et al., 2020[25] RoB: Moderate	Mean change in percentage of problem behavior in each 5-minute observation session, mean (SD) baseline/mean (SD) 12 weeks • Telehealth: 24.81 (15.44)/ 0.35 (0.75), MD −24.46; ***P* < .001** • Waitlist: 26.75 (16.30)/ 26.70 (17.33), MD −0.05; *P* = .99 • Between-group difference: ***P* <.001** Percent achieving ≥ 80% reduction in problem behaviors at 12 weeks • Telehealth: 100% • Waitlist: 12% • Between-group difference ***P* < .001**	Mean increase in use of manding (appropriate verbal request) from baseline to 12 weeks, percent (95% CI) • Telehealth: 83.10 (70.07 to 96.14), ***P* < .001** • Waitlist: 11.25 (−4.34 to 26.84), *P* > .99	Acceptability of treatment after completion of functional communication training • Mean 6.30 (SD 0.95) on a 7-point Likert scale • Single question on the TARF-R: "How acceptable do you find the treatment to be regarding your concern about your child?" N = 35 parents (members of the intervention group + members of the waitlist group who completed treatment after the study ended)	No outcomes reported
Marino et al., 2020[34] RoB: High	MD in Home Situation Questionnaire-ASD Version (measuring severity of noncompliant behavior) from pre-phase 3 to post-phase 3 (SE) Telehealth coaching: 0.86 (0.37), ***P* = .035** In-person coaching: 0.20 (0.13), *P* = .890 Between-group difference: ***P* = .046** Between-group difference when controlling for parent gender: *P* = .477	No outcomes reported	No outcomes reported	MD in PSI/short form from pre-phase 3 to post-phase 3 (SE) • Telehealth coaching: 6.95 (1.34), ***P* = .001** • In-person coaching: −1.80 (1.44), *P* = .241 • Between-group difference: ***P* < .001** • Between-group difference when controlling for parent gender: *P* = .586
Ingersoll et al., 2016[33]	No outcomes reported	Vocabulary (MCDI), mean (SD)	Intervention acceptability at 6 mo. on a 7-point Likert scale,	Parenting Stress (FIQ), mean (SD)

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
Ancillaries: Ingersoll et al., 2015,[30] Pickard et al., 2016[35] RoB: Moderate		• Therapist-assisted: 185.11 (202.17) baseline, 202.17 (243.64) 6 mo. • Self-directed: 144.69 (146.21) baseline, 210.38 (18.746) 6 mo. • Between group difference in change over time: *P* > 0.05 Language targets (PCI) at end of intervention, mean (SD) • Therapist-assisted: 0.65 (0.52) baseline, 1.80 (1.00) 6 mo. • Self-directed: 1.36 (1.53) baseline, 1.95 (1.08) 6 mo. • Between group difference in change over time: *P* = 0.10 Language targets (PCI) at 3-month follow up, mean (SD) • Therapist-assisted: 0.65 (0.52) baseline, 1.71 (1.28) 9 mo. • Self-directed: 1.36 (1.53) baseline, 1.50 (1.81) 9 mo. • Between group difference in change over time: *P* = .08 Communication (VABS-II), mean (SD) • Therapist-assisted: 70.29 (11.28) baseline, 77.36 (13.79) 6 mo. • Self-directed: 71.50 (15.57) baseline, 75.33 (12.40) 6 mo.	where higher value indicates greater acceptability, mean (SD) • Therapist-assisted: 6.83 (0.25) • Self-directed: 6.35 (0.73) • *P* value for between-group difference: **.03**	• Therapist-assisted: 1.02 (0.46) baseline, 0.69 (0.30) 6 mo. • Self-directed: 1.24 (0.84) baseline, 1.04 (0.61) 6 mo. • Between group difference in change over time: *P* > .05

Author, Year Risk of Bias	Reduction in Challenging Behavior (Critical)	Change in Adaptive Behavior (Critical)	Caregiver Acceptability and Satisfaction (Important)	Change in Caregiver Anxiety, Stress, or Depression (Important)
		• Time x group difference: *P* = .68 Social skills (VABS-II), mean (SD) • Therapist-assisted: 70.00 (6.95) baseline, 75.71 (9.07) 6 mo. • Self-directed: 71.00 (8.05) baseline, 70.00 (7.56) 6 mo. • Time x group difference: ***P* < .05** Daily living skills (VABS-II), mean (SD) • Therapist-assisted: 75.07 (7.77) baseline, 77.00 (11.14) 6 mo. • Self-directed: 74.77 (13.79) baseline, 74.23 (10.42) 6 mo. • Time x group difference: *P* > .05 Motor skills (VABS-II), mean (SD) • Therapist-assisted: • Self-directed: • Time x group difference: P > .05		

Abbreviations. ABA: applied behavior analysis; ABC-C: Aberrant Behavior Checklist-Community; FIQ: Family Impact Questionnaire; MCDI: MacArthur-Bates Communicative Development Inventory; MD: mean difference; mo.; month; PCI: parent-child interaction; PSI: Parenting Stress Index; RoB: risk of bias; SD: standard deviation; SE: standard error; TAU: treatment as usual; TARF-R: Treatment Acceptability Rating Form-Revised; VABS-II: Vineland Adaptive Behavior Scales, Second Edition.

GRADE Summary of Effectiveness of ABA Provided via Telehealth

Table 5 presents a summary of effectiveness outcomes from RCTs comparing ABA provided via telehealth to various control groups. Appendix Table E2 provides additional information on the use of the GRADE system for rating certainty of evidence, while Appendix G provides detailed information on GRADE ratings for critical and important outcomes included in evidence review.

Table 5. Summary of Findings (GRADE) for Effectiveness of ABA Provided via Telehealth

Outcome No. of Studies Participant N	CoE	Relationship	Rationale for CoE Rating
Reduction in challenging behavior 3 studies N = 137 parents, 118 children	●○○○ Very Low	Hall et al. 2020[28] • Significant improvement compared to waitlist control in measures of child irritability (*P* < .001), hyperactivity (*P* = .005), and stereotypic behaviors (*P* = .042) at 12 weeks Lindgren et al. 2020[25] • Mean reduction in problem behaviors significant for telehealth (*P* < .001) but not waitlist (*P* = .99) Marino et al. 2020[34] • Significant reduction in severity of noncompliance at 12 weeks for telehealth (*P* = .035) but not in-person coaching (*P* = .890); between-group difference not significant when controlling for caregiver gender (*P* = .477)	Downgraded 1 level due to moderate to high risk of bias in included studies. Downgraded 2 levels for indirectness because study designs and comparators limited the usefulness and directness of data for answering this key question. Downgraded 1 level for inconsistency. Each study had different rules about the amount and type of other therapy a child could be receiving, which could be a significant confounder.
Increase in adaptive behavior 3 studies N = 112 parents, 112 children	●●○○ Low	Ingersoll et al. 2024[31] • No difference between therapist-assisted and self-directed groups in child intentional communication at 6 months (*P* = .84) or 9 months (*P* = .93); no significant difference between therapist-directed and no treatment at 6 months (*P* = 1) • No difference in child expressive language ability between therapist-assisted and self-directed (*P* = .45) or no treatment (*P* = .93) at 6 months Lindgren et al. 2020[25] • Significant increase in manding from baseline to 12 weeks for telehealth group (*P* < .001) but not waitlist group (*P* > .99) • Significance between-group difference for mean increase in manding (*P* < .001)	Downgraded 1 level for risk of bias (all studies had moderate risk of bias) and 1 level for indirectness. Two studies placed no limits on what other treatment children could be receiving simultaneously (and the remaining study did not address the topic), but analysis did not control for this potential confounder.

Outcome No. of Studies Participant N	CoE	Relationship	Rationale for CoE Rating
		Ingersoll et al. 2016[33] • No difference between therapist and self-directed for vocabulary, language targets, communication, daily living skills, or motor skills • Significant improvement in social skills for therapist-assisted group compared to self-directed (*P* < .05)	
Caregiver acceptability and satisfaction 4 studies N = 169 parents, 169 children	●●○○ Low	Ingersoll et al. 2024[31] • Higher treatment satisfaction for therapist-assisted group compared to self-directed (*P* = .048) Hall et al. 2020[28] • No active comparator. Considered reasonable (mean 17.9 on scale with max 21) and effective (16.9), with moderate disruption to family life (12.4) and minimal side effects (7.8) Lindgren et al. 2020[25] • No active comparator. Mean 6.30 on 7-point Likert scale for single question on acceptability Ingersoll et al. 2016[33] • Higher acceptability for therapist-assisted (mean 6.8 on single 7-point Likert scale question) compared to self-directed (6.35) (*P* = .03)	Downgraded 1 level for all studies having moderate risk of bias and 1 level for indirectness. No studies compared therapist assistance with parent training provided in person and via telehealth, so did not directly address whether satisfaction with providing parent-mediated ABA via telehealth was comparable or better than in-person delivery.
Decrease in caregiver stress 4 studies N = 173 parents, 154 children	●○○○ Very Low	Ingersoll et al. 2024[31] • No difference in PSI between self-directed and therapist-assisted groups at 6 or 9 months, but improvement relative to control with no treatment Hall et al. 2020[28] • Greater reduction in stress for parents in intervention group vs. control (*P* = .01) Marino et al. 2020[34] • Significant improvement in the telehealth group (*P* = .001) but not the in-person group (*P* = .241), but between-group difference not significant when controlling for gender Ingersoll et al. 2016[33] • No difference between therapist-assisted and self-directed groups in time x group analysis (*P* > .05)	Downgraded 1 level for moderate to high risk of bias in contributing studies and 2 levels for indirectness. Only 1 of 4 studies directly compared parent coaching provided via telehealth and in-person, and that study had significant methodological limitations. Studies allowed different levels of concurrent behavioral treatment and did not control for potential confounding.

Abbreviations. ABA: applied behavior analysis; PSI: Parenting Stress Index.

Relevant Ongoing Studies

We identified 2 ongoing trials that met the inclusion criteria for this review, both of which focus on parent training and evaluate telehealth delivery of interventions that are part of the ABA toolbox.[36,37] The trial "Telehealth parent-implemented intervention for young children with autism spectrum disorder" (NCT05176808), sponsored by the Kennedy Krieger Institute, is designed to test the hypothesis that telehealth-delivered naturalistic developmental behavioral intervention parent coaching is noninferior to in-person coaching for the treatment of core social-communication symptoms in toddlers with ASD.[37] With an estimated enrollment of 188 parent-child dyads, participants in both study arms will receive twice weekly coaching sessions over a 12-week period.[37] The study will measure changes in the duration of child engagement in play activities from baseline to 12 weeks and compare differences in ratings of parent effectiveness, as well as frequency and consistency in delivery of the intervention from baseline to 12 weeks.[37] Recruitment began in 2022 and the study is expected to be completed in January 2026.[37] The trial "Improving access to pivotal response treatment via telehealth parent training" (NCT04042337) is sponsored by Standford University and compares pivotal response treatment provided via telehealth to a waitlist control.[36] The study aims to enroll 40 parent-child dyads.[36] Children are eligible for inclusion if they are aged 2 to 5 years, have a diagnosis of ASD, and do not receive more than 15 hours per week of one-on-one ABA at home.[36] Weekly 60-minute parent training sessions will be delivered by a trained therapist for 12 weeks through a secure video conferencing software.[36] Measured outcomes include change in parent fidelity of pivotal response treatment from baseline to 12 weeks and change in child frequency of functional utterances from baseline to 12 weeks.[36] The study lists an estimated completion date of December 2026.[36] However, the existence of a protocol does not guarantee a future publication and there may be a significant time delay in publication even if authors choose to share results.[118,119] The characteristics of relevant ongoing clinical trials are included in Table 6.

Table 6. Characteristics of Ongoing Clinical Trials

Trial Identifier Intervention Location Estimated Completion Date Sponsor	Population Estimated N Comparison	Outcomes
NCT05176808[37] Naturalistic developmental behavioral intervention telehealth vs. in-person US January 1, 2026 Johns Hopkins University	Children aged 18 to 33 months with DSM-V diagnosis of ASD N = 188 Telehealth vs. in-person	• Duration of joint attention at baseline and 12 weeks (child) • Fidelity of implementation at baseline and 12 weeks (parent)
NCT0404233736 Improving access to pivotal response treatment via telehealth parent training US December 31, 2026 Standford University	Children aged 2 to 5 years with diagnosis of ASD N = 40 Telehealth vs. waitlist	• Change in frequency of functional utterances from baseline to 12 weeks (child) • Change in fidelity of Pivotal Response Treatment implementation from baseline to 12 weeks (parent)

Abbreviations. ASD: autism spectrum disorder; DSM-V: Diagnostic and Statistical Manual of Mental Illness, Fifth Edition; US: United States.

KQ2. Harms

Harms and Adverse Effects Reported in Clinical Studies

Quantification of physical harms or risks associated with ABA therapy provided through telehealth is complicated by the nature of ASD behaviors.[10] ABA targets behaviors such as self-injury (e.g., biting, hitting, scratching, or head-banging) and physical aggression (e.g., hitting or kicking others, throwing objects).[10] These behaviors increase risk of injury to oneself and others and are associated with harmful outcomes like social isolation, placement in restrictive settings, and emergency room visits.[10] CASP guidelines advise that appropriate safety protocols should be in place during assessment and treatment,[10] which is made more difficult in remote delivery of services.

Potential adverse effects of intensive behavioral interventions like ABA can include deterioration in adaptive behavior or increase in autism symptom severity due to treatment, but adverse event reporting is rare in ABA research.[3] In an examination of 150 research reports, Bottema-Beutel and colleagues (2022) reported that only 11 studies (7%) mentioned adverse events or adverse effects.[120] A health technology assessment by the United Kingdom's National Institute for Health Research considered evidence from 20 studies, all of which focused on in-person delivery of ABA therapy for children with ASD.[69] The authors found that adverse or unintended consequences were not addressed in the available evidence and adverse effects were not routinely collected in any of the included studies.[69] In a Cochrane review of early intensive behavioral interventions for young children with ASD, Reichow and colleagues (2018) included 5 RCTs and controlled trials, none of which reported any adverse effects on children or families.[3] However, the authors did not quantify the number of included trials that referenced adverse events. A systematic review of behavior analytic interventions for young children with intellectual disabilities by Ho and colleagues (2021) included 48 studies, the majority of which were single-case research designs.[121] Of 20 studies measuring communication outcomes, 11 measuring adaptive outcomes, and 15 measuring pre-adaptive outcomes, none reported harmful treatment effects.[121] The authors noted, however, that there were few high-quality studies and many methodological weaknesses that need to be addressed in future research.[121]

Adverse event reporting is similarly uncommon in studies focused on telehealth delivery of ABA therapy. A systematic review by Tomlinson and colleagues (2018) considered evidence related to training individuals to implement ABA procedures via telehealth; while 20 publications were included, the authors placed no limits on study designs or sample sizes.[26] Of these 20 publications, only 1 met our inclusion criteria and is included in our evidence review (the 2016 RCT by Lindgren and colleagues).[25] Despite its very broad inclusion criteria and the preponderance of case studies and case series, this review did not include any references to safety, potential harms, or adverse effects.[26] A 2019 systematic review by Ferguson and colleagues explored telehealth as a model for providing ABA to individuals with ASD; the review includes 28 studies, the majority of which were case studies or small case series.[38] Of these 28 studies, 2 met our inclusion criteria and are included in our evidence review.[25,33] The authors make no reference to adverse effects, safety, or potential harms, beyond a general reference to the prevalence of self-injurious behaviors among children with ASD.[38]

Harms Identified in Critiques of ABA Therapy

Critiques of ABA include concerns about intervention intensity (20 to 30 hours per week) for young children and the use of punishment and extinction-based procedures (such as withdrawal of attention or removal of a preferred object) to redirect behavior and prompt compliance as potential sources of harm.[122] Critics describe the focus on decreasing or eliminating stereotypic behaviors (i.e., stimming) like rocking or hand flapping as harmful to a child's psyche and well-being, suggesting it would be more appropriate to work toward a society that is more accepting of stimming behaviors.[122,123]

Kupferstein and colleagues (2018) conducted a widely cited study on the harms of ABA, reporting that 46% of 460 survey respondents met the diagnostic threshold for posttraumatic stress disorder (PTSD) after exposure to ABA-based interventions.[124] Methodological issues cloud the interpretation of results, however.[124] For example, respondents were recruited through social media and autism support groups and included individuals with self-diagnosed autism and caregivers of autistic children who completed surveys on their child's behalf.[124] The methods for defining what constituted ABA therapy were not described [124] and commentators examining the authors' methods noted that respondents were asked to choose from a list of interventions that included "ABA" without definition or explanation.[125] Further, the authors attempted to correlate measures of PTSD using a self-developed evaluation with PTSD diagnosis criteria.[125]

Harms and Adverse Effects Identified in Clinical Trials Included in the Evidence Review

Of the 5 clinical trials reported in 9 publications that evaluated the efficacy of various ABA interventions provided via telehealth, none included a section on adverse events.[25,28-35] Table 7 summarizes information regarding safety and harms that was provided in the various publications.

Table 7. Safety Information Provided in Clinical Effectiveness Studies

Lead Author, Year	Information on Adverse Events, Harms, or Safety
Project ImPACT (NCT02721381): telehealth parent-mediated intervention for children with ASD	
Ingersoll 2024[31]	One line in the Methods section stating, "no adverse events were reported for any condition" (pg. 2179) but no references to safety plans or quantification of any injuries or risks to caregivers or children.
Ingersoll 2024[32]	Methods section notes that "[p]arents rated 21 items that assessed the effectiveness, family fit, and safety of the intervention on a 7-point scale" (pg. 3610) but results are not included in the publication. No other information on adverse effects is provided.
Treatment of disruptive behaviors in fragile X syndrome (NCT03510156)	
Hall 2020[28]	General references to development of safety strategies, but no quantification of issues that arose during sessions or injuries to caregivers or children.
Hall 2022[29]	Mentions environmental modifications in relation to 1 child, whose mother was "advised to remove breakable items from the environment and to have access to the family's security camera system to be able to remove attention fully while ensuring the child's safety" (pg. 9). One other general reference to parents being "coached to make the necessary environmental modifications for safety purposes" (pg. 10) but no quantification of issues that arose during sessions or injuries to caregivers or children.

Lead Author, Year	Information on Adverse Events, Harms, or Safety
Trial of functional communication training via telehealth for young children with ASD	
Lindgren 2020[25]	Methods section includes a reference to self-injury as a problem behavior ("hand biting, head hitting, head banging, and leg hitting") as well as property destruction (pg. 5), but no reference to safety plans for parents or children or quantification of any injuries or risks to caregivers or children.
Tele-assisted behavioral intervention for families with children with ASD (ISRCTN15312724)	
Marino 2020[34]	No references to adverse events or safety of caregivers and children.
Project ImPACT pilot: telehealth parent-mediated intervention for children with ASD	
Ingersoll 2016[33]	No references to adverse events or safety of caregivers and children.
Ingersoll 2015[30]	No references to adverse events or safety of caregivers and children.
Pickard 2016[35]	No references to adverse events or safety of caregivers and children.

Abbreviation. ASD: autism spectrum disorder.

KQ3. Cost Effectiveness

We identified 1 study that addressed the programmatic costs and cost effectiveness of ABA delivered via telehealth.[39] Cidav and colleagues (2024) conducted a review of costs associated with the Project ImPACT program to inform funding and policy decision making to enhance early intervention options for young children with autism.[39] The authors estimated implementation and intervention costs using a time-driven activity-based costing approach in which they created process maps for both implementation and intervention stages.[39] Using a payer perspective, the authors determined resource use and costs per unit procedure in the first year of the program.[39] They estimated total implementation costs per clinician and per site, intervention costs per child, and created estimates of total hours spent and associated costs for implementation strategies and intervention activities.[39]

Cidav and colleagues (2023) described an ongoing RCT in which participants were randomized to a 'low-dose' version of the intervention with 1 hour per week of therapist contact over a 6-month period (24 sessions in total), a 'high-dose' version with 4 hours of therapist contact per week (96 sessions in total), or treatment as usual.[39] Clinicians assigned to the treatment-as-usual group met with families virtually for 1 to 3 hours each week to deliver standard early intervention using play-based therapeutic interactions.[39] While the trial initially provided services in person, the protocol transitioned to telehealth during the COVID-19 pandemic.[39] Although clinical outcomes from the trial would be of interest for the treatment efficacy questions posed in KQ1, results have not yet been published and the study by Cidav and colleagues focuses solely on cost effectiveness.[39]

For the virtually conducted, low-dose version of Project ImPACT delivered over 6 months, Cidav and colleagues reported a per-child intervention cost of $2,576 (21 hours of personnel time at $125 per hour), of which 1% was attributable to expenses for Project ImPACT manuals and the remaining costs associated with clinician (98%) and clinic leader (1%) time.[39] For the virtually delivered, high-dose version of Project ImPACT delivered over 6 months, the per-child cost was $9,650 (77 hours of personnel time at $125 per hour).[39] The primary cost was related to Project ImPACT delivery to caregivers (89%), followed by assessment of a child's ImPACT eligibility

(10%).[39] The highest cost ImPACT delivery actions were conducting caregiver coaching sessions (68%), followed by completing administrative work (17%), conducting developmental assessments (10%), and conducting case reviews (5%).[39]

The authors identified significant travel costs associated with in-home delivery of Project ImPACT, estimating that the cost of delivering Project ImPACT in-home would be almost twice as much as the cost of delivering it virtually.[39] Based on these findings, the authors suggested that early intervention systems may be able to increase the number of families served, especially in rural and underserved areas, and decrease program costs by using innovative models of service delivery, such as combining face-to-face interactions with telehealth sessions.[39]

KQ4. Clinical Practice Guidelines and Recommendations

We identified 2 clinical practice guidelines and 2 practice recommendations that address the topic of telehealth for provision of ABA therapy (Table 8). All 4 publications provide expert guidance and recommendations but are not formal guidelines supported by a systematic review of the evidence. Therefore, guideline methodologic quality was not assessed.

The American Academy of Pediatrics published clinical guidance regarding the evaluation and management of children with ASD in 2020.[41] ABA is one of the only evidence-based interventions for ASD.[41] The guidance refers to telehealth in passing as an option for providing caregiver training for parent-mediated interventions but provides no additional detail on determining when telehealth training is appropriate.[41]

The Association of Applied Behavior Analysts published guidance in 2020 that focuses primarily on navigating state rules and billing practices for telehealth during the COVID-19 pandemic.[40] They note the need for HIPAA-compliant technology for ABA provided via telehealth and encourage providers to enable all encryption and privacy features.[40] Further, they stipulate that ABA should only be implemented via telehealth if both practitioners and clients have the necessary skills, although they do not define what those skills should be.[40]

CASP's 2024 practice guidelines for ABA for treatment of ASD include a dedicated section on telehealth, including synchronous, asynchronous, and hybrid modalities.[10] Synchronous telehealth video modalities can be used to provide direct care to patients who have the skills to benefit and may also be used to provide caregiver coaching and clinical supervision of technicians working in-person with patients.[10] Hybrid models that incorporate a mix of in-person and telehealth services can be implemented to reduce travel time, support patient and family preferences, provide continued services in the face of travel restrictions (such as those imposed by the COVID-19 pandemic), and provide additional coaching and support to families to supplement in-person treatment.[10] Discussion of asynchronous modalities is limited to reviewing a patient's treatment progress and providing clinical oversight through review of recorded treatment sessions.[10] The practice parameters also identify telehealth as a modality appropriate for introducing social skills instruction for individuals with ASD who do not have access to typically developing peers or those who are more comfortable practicing social skills over video rather than in person.[10]

During 2021, in the midst of the COVID-19 pandemic, CASP released practice parameters for telehealth implementation of ABA.[27] When delivered appropriately, telehealth is identified as a

means of increasing access to ABA services for those in underserved areas, avoiding service disruptions, and increasing continuity of care for those who have access issues related to personal circumstances, weather emergencies, or public health events like COVID-19.[27] The guidelines note that telehealth service delivery models should be selected based on the individual patient's needs, strengths, preferences, caregiver availability, and environmental support available.[27] The CASP practice parameters state that synchronous or asynchronous telehealth approaches can be used for providing remote clinical oversight of in-person direct services, though synchronous models are identified as most appropriate for providing direct services to patients or caregiver-mediated services, in which the behavior analyst provides the caregiver with instructions, feedback, and coaching to implement ABA procedures.[27] Caregiver-implemented services are a helpful approach for families living in underserved communities or those who are waiting to access treatment and could benefit from caregiver training until a higher level of services is available.[27] Discussion of asynchronous approaches to caregiver training is limited to caregiver reports of progress toward goals and review of videos of caregiver-child interactions.[27]

Table 8. Professional Recommendations on Telehealth for ABA

Author (Year)	Guideline or Practice Parameters	Appropriate Uses of Telehealth Delivery
Council of Autism Service Providers (2024)[10]	Applied behavior analysis practice guidelines for the treatment of autism spectrum disorder, third edition	• Synchronous direct service delivery to patients with the requisite skills to benefit from therapy delivered via telehealth • Synchronous provision of caregiver coaching • Synchronous or asynchronous provision of remote clinical supervision of technicians delivering in-person therapy • Asynchronous review of patient treatment progress
Council of Autism Service Providers (2021)[27]	Practice parameters for telehealth-implementation of applied behavioral analysis, second edition	• Synchronous or asynchronous remote monitoring of in-person direct services • Synchronous direct services for patients with the requisite skills to benefit (see CQ1 for additional details) • Synchronous 1:1 sessions with treatment providers or group social skills sessions • Synchronous provision of caregiver coaching, which may be combined with asynchronous reviews of videos or reports provided by caregivers
American Academy of Pediatrics (Hyman 2020)[41]	Identification, evaluation, and management of children with autism spectrum disorder	• ABA is identified as one of the few evidence-based interventions for ASD • Notes only that training sessions for parent-mediated treatment "may be delivered in the home, clinic, school, or other community settings or remotely by telehealth" (pg. 23)

Author (Year)	Guideline or Practice Parameters	Appropriate Uses of Telehealth Delivery
		• Provides no additional information on considerations for providing ABA services via telehealth
Association of Professional Behavior Analysts (2020)[40]	Guidelines for practicing applied behavior analysis during the COVID-19 pandemic	• Within the context of the COVID-19 pandemic, practitioners should carefully weigh the harms of continuing in-person services, delivering services via telehealth, or stopping services entirely • ABA services should only be provided remotely using HIPAA compliant technologies • ABA procedures are appropriate for telehealth delivery "provided that the practitioners and clients involved have the necessary skills," although those skills are not defined

Abbreviations. ABA: applied behavior analysis; ASD: autism spectrum disorder; COVID-19: coronavirus disease-2019; CQ: contextual question; HIPAA: Health Insurance Portability and Accountability Act.

KQ5. Coverage Policies

We reviewed coverage policies for 8 health plans and 9 state Medicaid agencies to determine whether ABA services were covered for children, adolescents, and adults; what diagnoses were eligible for ABA therapy; and whether they covered ABA therapy via telehealth. New York's Medicaid managed care plans were required to cover ABA therapy as of January 1, 2023.

Eligible Age

For the 8 health plans, only MetroPlusHealth's policy includes an age restriction stating that for Medicaid coverage, ABA therapy is only available to individuals under the age of 21. Aetna's policy uses the term "child" but does not list a specific age restriction.[126] Healthfirst's ABA policy uses the term "child" and states that "there is insufficient evidence supporting the efficacy of ABA service initiated past the age of 13."[49(p4)] The other health plans do not specify age restrictions.

Among the 9 Medicaid plans, California,[127] New Jersey,[128] Pennsylvania,[129] and Texas[67] limit ABA therapy to individuals under age 21. Florida Medicaid covers ABA for individuals under 21 years of age[130]; ABA may be covered for individuals over age 21 through their iBudget waiver that provides home and community-based services to individuals with developmental disabilities who live at home but meet the level of care criteria for placement in an institutional facility.[131] Oregon Medicaid policy allows both intensive and focused ABA for individuals up to age 12; individuals ages 13 and over are not eligible for intensive ABA but may be eligible for targeted ABA interventions to address unmanageable behaviors.[132] Oregon's policy does not include an upper age limit.[132] Washington Medicaid's ABA services policy does not have an age restriction, but includes a note that "when a client is diagnosed with autism at age 21 or older, the [Center of Excellence] provider completing the diagnostic evaluation and ordering ABA services must be a neurologist, psychiatrist, or psychologist."[68(p17)]

Eligible Diagnoses

All policies cover ABA for individuals with an ASD diagnosis. California Medicaid covers behavioral health treatments (including ABA) for children with ASD as well as "children for whom a physician or psychologists determines it is medically necessary regardless of diagnosis."[133, para. 3] Washington Medicaid covers ABA for individuals with ASD diagnoses or other intellectual or developmental disabilities "for which there is evidence that ABA is effective."[68(p21)]

We found 5 health plans and 2 state Medicaid agencies listing specific ICD-10-CM codes that are eligible for ABA therapy (Table 9).

Table 9. Diagnosis Codes Eligible for ABA Services by Health Plan and Medicaid Agency

ICD-10-CM Code Description No. of Plans Allowing Coverage	Aetna[126]	Anthem[134]	Cigna (via Evernorth)[46]	Healthfirst[49]	Metroplus Health[50]	New Jersey[128]	Oregon[132]
F84.0 Autistic disorder N = 7	√	√	√	√	√	√	√
F84.2 Rett syndrome N = 4	√	√	–	–	√	√	–
F84.3 Other childhood disintegrative disorder N = 6	√	√	√	√	–	√	√
F84.5 Asperger syndrome N = 6	√	√	√	√	–	√	√
F84.8 Other pervasive developmental disorders N = 6	√	√	√	√	–	√	√
F84.9 Pervasive developmental disorder, unspecified N = 6	√	√	√	√	–	√	√

Notes. There are 2 sources for diagnostic criteria for psychological conditions: the Diagnostic and Statistical Manual of Mental Disorders (DSM) published by the American Psychiatric Association and the International Classification of Diseases (ICD) published by the world health organization.[135] In 2013, the American Psychiatric Association published version 5 of the DSM which brought several diagnoses (autistic disorder, Asperger syndrome, childhood disintegrative disorder, Rett syndrome, and pervasive developmental disorder unspecified) under a single diagnostic category: autism spectrum disorder.[136] The separate diagnoses remain in the ICD-10 system however and are cited in coverage policies so we included them in our report. Table only includes health plans and state Medicaid agencies where we could identify policy language specifying which ICD-10-CM codes were eligible for ABA therapy. √ indicates the diagnosis is eligible for ABA services. – indicates the diagnosis is not eligible for ABA services. Aetna's policy specifically states that individuals with a diagnosis of Down Syndrome without a co-occurring ASD diagnosis are not eligible for ABA therapy.
Abbreviations: ABA: applied behavioral analysis; ASD: autism spectrum disorder; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification; No.: number.

Health Plan Coverage

We identified policies related to telehealth delivery of ABA therapy for 7 of the 8 health plans; we were unable to identify any information about telehealth delivery of ABA for Molina Healthcare. All 7 of the plans allowed telehealth delivery of some ABA treatments, although coverage varied.

We identified a 2023 press release from the ABA Coding Coalition that stated Aetna had chosen to end telehealth coverage of ABA treatment previously allowed during the COVID-19 public health emergency.[42] During the pandemic, Aetna allowed telehealth coverage for current procedural terminology (CPT) codes 97151, 97153, 97155, 97156, and 97157; they did not allow coverage of CPT codes 97152 (behavior identification-supporting assessment administered by technician) or 97154 (group adaptive behavior treatment by technician).[42] After the ABA Coding Coalition requested that telehealth delivery of ABA therapy continue to be allowed and that Aetna allow telehealth delivery of code 97152, Aetna agreed to continue to allow telehealth delivery of ABA therapy but did not add telehealth coverage of code 97152.[42]

Anthem issued a policy on allowed virtual services that applied to its commercial coverage in the states of Colorado, Connecticut, Georgia, Indiana, Kentucky, Missouri, Nevada, Ohio, and Wisconsin; under that policy, all ABA therapy codes are allowed virtual services.[44] No other relevant policy language was identified, including a search of the Anthem Medicaid Managed Care site for New York state.

Cigna's national commercial coverage policy for ABA therapy (via Evernorth) allows ABA therapy to occur in-person, via telehealth, or as a hybrid model.[46] Their policy states that determination of the modality of treatment delivery should take the patient's individual characteristics, the treatment plan, the participation of parents or caregivers, the patient's home environment, the availability of necessary technology, and the "evidence of efficacy and safety" into consideration.[46(p17)] Cigna allows all ABA CPT codes to be provided via telehealth.[45]

We were unable to identify a specific policy allowing telehealth delivery of ABA services for Fidelis Care Medicaid managed care organization. The Fidelis Care ABA coverage policy does not mention telehealth.[47] However, Fidelis Care published a document listing the adopted clinical practice and preventive health guidelines used "to support network providers in the provision of high quality care and reduce unnecessary variation in care."[48(p1)] That document lists the CASP 2021 document *Practice Parameters for Telehealth-Implementation of Applied Behavioral Analysis* as an adopted plan guideline, implying that at least some ABA therapies are allowed to be delivered via telehealth.[48]

We were unable to identify an ABA policy for Heathfirst's Medicaid line of business. Healthfirst's ABA policy for its commercial line of business has outdated information stating that ABA services are not covered by New York Medicaid Managed Care (dated 2022). [49] Regarding telehealth, this policy states that "[a]t-home or community-based ABA services are preferred. However, in limited and unusual circumstances, and if they cannot be delivered in person, they may be delivered fully or partially via telehealth. It is expected that given the nature of ASD that such services would be limited in duration (typically no more than two hours/day). A parent or responsible adult must be collaborating with the telehealth-enabled provider in the same space

as the child."[49(p3)] MetroPlusHealth's ABA coverage policy applies to its entire line of businesses (including commercial, Medicaid and Children's Health Insurance Plans [CHIP]).[50] Regarding telehealth delivery of services, the policy states "[b]est practices dictate that in-person services are preferred to telehealth services. Requests for synchronous telehealth will be reviewed for medical necessity on a case-by-case basis. We expect….providers to provide these services in a manner consistent with [Behavior Analyst Certification Board] ethical standards, and [Department of Health] telehealth guidelines. We reserve the right to retrospective review of services delivered using telehealth."[50(p9)]

UnitedHealthcare includes all ABA codes on its list of audio-visual telehealth-eligible services,[51] but does not list the codes in its list of audio-only eligible code list.[52] We did not identify any additional policy language related to telehealth delivery of ABA therapy for UnitedHealthcare.

Medicaid Coverage

Our review of 9 state Medicaid agency policies indicates that all 9 states allow some ABA therapy services to be provided via telehealth, but the allowable services varied.

California

We were unable to identify a policy that provided detailed information about telehealth delivery of ABA therapy for California Medicaid, Medi-Cal. Medi-Cal has a general telehealth policy that allows any covered benefit or services to be provided by telehealth unless the service requires "the in-person presence of the patient for any reason."[53(p8)] A 2023 bulletin on behavioral health treatments, including ABA therapy, for members under the age of 21 does not mention telehealth.[54] However, the California Department of Health Care Services maintains a Medi-Cal telehealth utilization dashboard, and we found that 2 ABA therapy CPT codes were listed among the "most common outpatient mild-to-moderate mental health services delivered via telehealth" between 2019 and 2022.[55] Those codes were 97155 (adaptive behavior treatment by physician or other qualified provider) with 155,267 telehealth visits recorded, and 97153 (adaptive behavior treatment by technician) with 99,280 telehealth visits recorded.[55] Because the California telehealth utilization dashboard does not include data after 2022, it is difficult to determine whether telehealth delivery of ABA continued after the end of the COVID-19 public health emergency.[55]

Florida

Florida Medicaid only allows a lead analyst to provide parent training via telehealth and limits the service to a maximum of 2 hours per week.[58,59]

Massachusetts

MassHealth issued a bulletin during the COVID-19 public health emergency allowing all ABA therapy services to be provided via telehealth.[60] We were unable to identify a change to that policy and MassHealth's general telehealth policy allows for all services to be delivered via telehealth if the provider determines it is clinically appropriate to do so.[57] The MassHealth fee schedule for ABA therapy does not include any information on telehealth delivery of services.[56]

New Jersey

We were unable to identify a policy that provided detailed information about telehealth delivery of ABA therapy for New Jersey Medicaid. The New Jersey Medicaid managed care contract states that managed care organizations are required to provide ABA therapy for individuals with an ASD diagnosis and that telemedicine and telehealth services are approved modes of delivery care.[61] The New Jersey Medicaid fee schedule does not list any modifiers indicating telehealth availability for the ABA therapy codes.[62]

North Carolina

North Carolina Medicaid allows CPT codes 97151 through 97157 to be provided through audio-video telehealth.[63] The policy also allows the family training codes (97156 and 97157) to be provided via audio-only telehealth if there is a reason the services cannot be provided in person or via audio-visual telehealth.[63]

Oregon

Oregon Medicaid's behavioral health fee schedule allows CPT codes 97151 through 97157 and CPT codes 99366 and 99368 to be delivered via audio-visual telehealth.[64] We did not identify other relevant policy language.

Pennsylvania

Pennsylvania Medicaid provides ABA therapy as part of its intensive behavioral health services benefit.[65] A provider guide for these services specifically allows supervision of staff who provide ABA services through audio-video telehealth.[65] The guide also states that "[s]ome behavioral health services may be appropriate to be provided primarily through telehealth, while other services will require ongoing in-person delivery for a significant portion of all of the services. Providers and practitioners should carefully consider the clinical appropriateness of telehealth delivery for such services, including, but not limited to….intensive behavioral health services."[65(p154)]

Texas

Texas Medicaid allows licensed behavior analysts to deliver some services via audio-visual telehealth but does not allow licensed assistant behavior analysts or registered behavior technicians to deliver services through telehealth.[67] Texas Medicaid allows CPT codes 97151, 97155, 97156, 97158, and 99366 to be provided via audio-visual telehealth.[67]

Washington

Washington Medicaid allows certain ABA services to be provided via audio-visual telehealth if the licensed behavior analyst therapist determines that the quality of the service or the outcome of the ABA treatment plan will not be adversely affected.[68] Washington Medicaid allows CPT codes 97155, 97156, 97157, 99366, and 99368 to be provided via telehealth.[68]

Discussion

This evidence review identified 9 publications from 5 eligible trials with effectiveness outcomes,[25,28-35] 1 cost-effectiveness analysis,[39] and 4 clinical practice guidelines or recommendations.[10,27,40,41] It was challenging to identify clinical evidence to address the key questions due to the nature of ABA research, which overwhelmingly relies on single case studies

or small case series and rarely includes control groups.[26,38] Of 5 trials included in this evidence review, 4 recruited children with ASD[25,31,34,35] and 1 recruited boys with fragile X syndrome,[28] which shares many features of ASD. No studies involved adolescents or adults, and none included use of ABA for any other neurodevelopmental disorders. All studies focused on telehealth for providing professional guidance on parent-mediated interventions, where the behavior analyst provided the caregiver with instructions, feedback, and coaching to implement ABA procedures.[25,28,31,34,35] No controlled trials were identified in which telehealth was used to provide direct services to clients. Likewise, no controlled trials were identified in which telehealth was used synchronously or asynchronously for behavior analysts to provide oversight and coaching for behavior analyst assistants or behavior technicians providing in-person therapy.

Although a direct comparison of in-person and telehealth services would best address the key questions, only 1 of the 5 included trials used this study design.[34] The 2016 pilot study by Ingersoll and colleagues[33] and the subsequent full-scale trial from the same group[31] compared self-directed asynchronous learning with no therapist contact to self-directed learning combined with a low dose of therapist support (1 hour per week over 6 months). Trials by Hall and colleagues (2020)[28] and Lindgren and colleagues (2020)[25] both compared parent-mediated interventions with synchronous coaching from a behavior analyst to a waitlist control. Hall and colleagues focused on boys with fragile X syndrome and provided a level of therapy on par with professional guidance (CASP), with caregivers receiving up to 5 days per week of telehealth services.[28] Lindgren and colleagues, in contrast, offered parents 1 hour per week of coaching for parent-delivered therapy over 12 weeks.[25] Though Marino and colleagues (2020) provided a head-to-head comparison of in-person parent coaching and telehealth parent coaching, the study had significant methodological limitations that impact confidence in interpretation of results.[34] Specifically, the study included significant in-person training and coaching for all enrolled families before participants were split into separate treatment arms, making it difficult to isolate the effect, if any, of the parent-coaching portion of the treatment protocol.[34] Further, the study included multiple parents per child and the assessment of changes in child behavior was conducted at the parent level, rather than the child level (meaning individual children were counted multiple times in the analysis).[34]

Outcomes equivalent to in-person care would support the use of telehealth to provide training and coaching for parent-mediated interventions. The sole study to include this comparison reported no between-group differences in parenting stress when controlling for parent gender.[34] Unsurprisingly, the 2 studies that compared telehealth parent coaching with no treatment found an effect in favor of telehealth for reduction in challenging behaviors.[25,28] The 2 studies that compared self-directed parent education with or without therapist assistance found no differences in adaptive behavior measures (child intentional communication and language skills) or levels of parenting stress,[31,33] but a 2024 trial did find significant improvement in child social skills for a therapist-assisted group compared to a self-directed group.[31] Caregivers were in general highly satisfied with telehealth interventions.[25,28,31,33] Moderate to high risk of bias across studies, small sample sizes, treatment intensity that was generally far lower than professional recommendations, and methodological issues that impacted the ability of these studies to address the key questions led to low to very low certainty of evidence across outcomes.[25,28,31,33,34]

Harms or adverse effects related to ABA therapy generally[3] or ABA therapy provided via telehealth in particular[26,38] are rarely addressed in the literature and the trials included in this evidence review were no exception. Only 1 of the 5 included trials reported on adverse effects, with no adverse events reported.[31] The remaining studies did not report on safety outcomes for children or their caregivers, did not describe safety plans, and did not refer to measurement of adverse effects.[25,28,33,34] Only 1 cost-effectiveness study was identified, and it reported significant cost savings for services provided via telehealth due to a reduction in travel costs.[39]

We identified 2 guidelines and 2 professional recommendations. The American Academy of Pediatrics statement on ABA provided only a passing reference to telehealth and offered no specific guidance or advice on its application.[41] The Association of Applied Behavior Analysts supported the use of telehealth for providing ABA services, particularly in the era of COVID-19 restrictions.[40] Guidelines highlighted the need for HIPAA-compliant technology and advised that telehealth modalities should only be used when both clients and providers possess the necessary skills for safe and productive sessions.[40] In publications from 2021 and 2024, CASP offered detailed guidance on assessing which clients are appropriate candidates for telehealth and how telehealth should be incorporated into practice.[10,27] While 2 of the 5 studies included in this evidence review incorporated asynchronous training to prepare caregivers to implement ABA therapy modalities with their children,[31,33] CASP does not endorse this approach, instead describing asynchronous telehealth as an appropriate modality only for clinical supervision of behavior technicians providing in-person therapy or review of patient treatment progress.[27] Among the 8 health plans and 9 state Medicaid agencies we reviewed for information on ABA services, all except Molina allowed some level of telehealth delivery of ABA treatments, although coverage details varied by health plan and state Medicaid agency.

Though synchronous telehealth delivery of ABA services appears to be a promising model for increasing access to ABA therapy for families in rural or low-resource areas, overall, there was little evidence from controlled trials to provide direct support for the model. Further, while telehealth delivery of ABA could increase the availability of behavior analysts and behavior technicians for treatment, decrease travel time, and address some issues that contribute to provider burnout, telehealth is not an appropriate modality for all clients or all families.[10,27] Telehealth services require families to have access to a secure internet connection and the required technology, which can limit access to telehealth for some families based on social or geographic characteristics.[10] Provision of direct services via telehealth requires some technological skill on the part of the patient or caregiver and a baseline level of attention, receptive language skills, and self-control for patients to participate meaningfully in telehealth therapy.[27] Direct services may require a significant commitment from caregivers who may have physical limitations or competing commitments that make it difficult to manage patient behaviors.[27] Parent-mediated interventions similarly require a significant level of commitment on the part of caregivers, some basic technological skills, and an ability to understand and implement therapies with fidelity under the guidance of a therapist who is not able to provide hands-on demonstrations.[27] Nonetheless, the significant shortage of behavior analysts in New York and throughout the US[22,23,110,137] highlights the potential advantages of implementing telehealth strategies, with careful consideration of the risks and benefits, careful assessment of patient suitability, and strict quality control to ensure fidelity of implementation.[27]

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Appendix A. Search Methods

Clinical Evidence Sources and Search Strategies

We searched selected bibliographic databases and grey literature sources using key words such as *applied behavior analysis*, *ABA therapy*, *early intensive behavior intervention*, *telehealth*, *telemedicine*, *teletherapy*, *and videoconferencing* to identify randomized controlled trials, nonrandomized comparative trials, cost-effectiveness studies, and clinical practice guidelines. We did not use date limits, but we did limit search results to publications available in the English language. An information specialist constructed and executed all searches. A second information specialist peer reviewed the Ovid MEDLINE search strategy. Searches were conducted January 6, 2025 through January 20, 2025. The Ovid MEDLINE search strategy was updated on March 17, 2025.

Bibliographic Database Sources

- Cochrane Central Register of Controlled Trials (CENTRAL)
- Cochrane Database of Systematic Reviews (CDSR)
- Cumulative Index of Nursing and Allied Health Literature (CINAHL)
- Ovid MEDLINE
- Ovid PsycInfo

Evidence Synthesis Sources

- Agency for Healthcare Research and Quality (AHRQ)
- Canada's Drug Agency
- Epistemonikos
- Health Quality Ontario
- Institute for Clinical and Economic Review (ICER)
- Institute for Health Quality and Efficiency in Health Care
- International Health Technology Assessment (HTA) Database
- National Institute for Health and Care Excellence (NICE)
- Oregon Health Evidence Review Commission (HERC)
- Veterans Administration Evidence Synthesis Program (ESP)
- Washington State Health Technology Assessment

Clinical Practice Guideline Sources

- American Academy of Child and Adolescent Psychiatry (AACAP)
- American Academy of Family Physicians (AAFP)
- American Academy of Pediatrics (AAP)
- American Medical Association (AMA)
- American Professional Society of ADHD and Related Disorders (APSARD)
- American Psychiatric Association (APA)
- American Psychological Association (APA)
- Association for Behavior Analysis International (ABAI)
- Canadian Pediatric Society
- Council of Autism Service Providers (CASP)
- Guidelines International Network (GIN) International Guidelines Library

- Scottish Intercollegiate Guidelines Network (SIGN)
- Society for Developmental and Behavioral Pediatrics (SDBP)
- Veterans Administration/Department of Defense Clinical Practice Guidelines

Clinical Trial Sources

- ClinicalTrials.gov
- ScanMedicine

Ovid MEDLINE ALL Search Strategy

1946 to January 17, 2025 (and March 14, 2025)
Dates searched (number of results): January 20, 2025 (363); March 17, 2025 (9 results)

1	exp neurodevelopmental disorders/
2	((cognitive* or development* or intellect* or mental* or neurodevelopment* or processing) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,kf.
3	((articulat* or communicat* or disarticulat* or fluen* or language* or misarticulat* or sound* or speech* or verbal*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,kf.
4	stammer*.ti,ab,kf.
5	stutter*.ti,ab,kf.
6	autis*.ti,ab,kf.
7	asperger*.ti,ab,kf.
8	kanner*.ti,ab,kf.
9	rett.ti,ab,kf.
10	(pervasive adj3 child*).ti,ab,kf.
11	pdd nos.ti,ab,kf.
12	((attention deficit* or behavior* or conduct or hyperactiv* or hyperkineti* or oppositional defiant*) adj3 (disorder* or dysfunction* or syndrom*)).ti,ab,kf.
13	(addh or adhd).ti,ab,kf.
14	sluggish cognitive tempo.ti,ab,kf.
15	((learn* or read*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,kf.
16	dyslexi*.ti,ab,kf.
17	(word adj blind*).ti,ab,kf.
18	dyscalculi*.ti,ab,kf.
19	((coordinat* or motor* or movement*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,kf.
20	dyspraxi*.ti,ab,kf.
21	tic?.ti,ab,kf.
22	tour?ette*.ti,ab,kf.
23	or/1-22
24	behavior therapy/
25	applied behavior analysis/
26	early intervention, educational/

27	(applied behavio?r* adj3 (analy* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
28	(aba adj3 (approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
29	(behavio?r* analy* adj3 (appli* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
30	(early behavio?r* adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
31	(early intervention therap* or EIBI).ti,ab,kf.
32	lovaas.ti,ab,kf.
33	young autism project.ti,ab,kf.
34	((naturalistic behavio?r* or naturalistic developmental behavio?r*) adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
35	(comprehensive behavio?r* adj3 (analy* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
36	(intens* behavio?r* adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
37	(denver method* or denver model* or ESDM or ESDM-I or ESDM-PD or P-ESDM).ti,ab,kf.
38	((discrete trial or functional communicat* or natural* environment* or pivotal response) adj3 (approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,kf.
39	prrfct match.ti,ab,kf.
40	((certif* or licens* or register*) adj2 (behavio?r* analy* or behavio?r* technician?)).ti,ab,kf.
41	or/24-40
42	exp telecommunications/
43	mobile applications/
44	web browser/
45	(telebehavio?ral health* or tele-behavio?ral health* or tele behavio?ral health*).ti,ab,kf.
46	(telecare* or tele-care* or tele care*).ti,ab,kf.
47	(telecoach* or tele-coach* or tele coach*).ti,ab,kf.
48	(telecommunicat* or tele-communicat* or tele communicat*).ti,ab,kf.
49	(teleconferenc* or tele-conferenc* or tele conferenc*).ti,ab,kf.
50	(teleconsult* or tele-consult* or tele consult*).ti,ab,kf.
51	(telecounsel* or tele-counsel* or tele counsel*).ti,ab,kf.
52	(telehealth* or tele-health* or tele health*).ti,ab,kf.
53	(telehomecare* or tele-homecare* or tele homecare*).ti,ab,kf.
54	(teleinterven* or tele-interven* or tele interven*).ti,ab,kf.
55	(telemedic* or tele-medic* or tele medic*).ti,ab,kf.
56	(telemental health* or tele-mental health* or tele mental health*).ti,ab,kf.
57	(telemonitor* or tele-monitor* or tele monitor*).ti,ab,kf.
58	(telenurs* or tele-nurs* or tele nurs*).ti,ab,kf.
59	(telepharmac* or tele-pharmac* or tele pharmac*).ti,ab,kf.
60	(telepractic* or tele-practic* or tele practic*).ti,ab,kf.

61	(telepsychiatr* or tele-psychiatr* or tele psychiatr*).ti,ab,kf.
62	(telepsycholog* or tele-psycholog* or tele psycholog*).ti,ab,kf.
63	(telepsychotherap* or tele-psychotherap* or tele psychotherap*).ti,ab,kf.
64	(telerehab* or tele-rehab* or tele rehab*).ti,ab,kf.
65	(teletherap* or tele-therap* or tele therap*).ti,ab,kf.
66	(mhealth* or m-health* or m health*).ti,ab,kf.
67	(econsult* or e-consult* or e consult*).ti,ab,kf.
68	(ehealth* or e-health* or e health*).ti,ab,kf.
69	((audio or audiovisual* or audio-visual* or digital* or internet or online* or on-line* or phone? or telephon* or tele-phon* or remote* or video* or virtual* or web) adj3 (care or communicat* or conferenc* or consult* or counsel* or deliver* or health* or intervention* or medicine or monitor* or prescrib* or psychiatr* or psycholog* or psychotherap* or rehab* or therap* or treat* or visit?)).ti,ab,kf.
70	(electronic mail* or email* or e-mail* or e mail*).ti,kf.
71	(android or cellphone? or cell-phone? or iphone? or i-phone? or ipad? or i-pad? or mobile device? or mobile phone? or smartphone? or smart-phone?).ti,ab,kf.
72	(instant messag* or sms or text*).ti,kf.
73	(videoconferenc* or video-conferenc*).ti,ab,kf.
74	(webcast* or web-cast* or web cast* or webinar*).ti,ab,kf.
75	(facetim* or face-tim* or face tim* or google meet* or goto meeting or go-to meeting or go to? meeting or goto webinar or go-to webinar or go to? webinar or microsoft teams or skype or webex or web-ex or web ex or zoom).ti,ab,kf.
76	(digital app* or electronic app* or mobile app* or smartphone app* or smart-phone app* or smart phone app* or software app*).ti,ab,kf.
77	(smartwatch* or smart-watch* or smart watch*).ti,ab,kf.
78	((wearable or wireless) adj2 device?).ti,ab,kf.
79	or/42-78
80	and/23,41,79
81	(baboon? or bovine? or canine? or cat? or chimpanzee? or cow? or dog? or feline? or goat? or hens or macque? or mice or monkey? or (mouse adj2 model?) or murine? or ovine or pig? or porcine or (non-human adj2 primate?) or sheep or rabbit? or rat? or rattus or rhesus or rodent? or zebrafish).ti.
82	80 not 81
83	limit 82 to english language

Cochrane Database of Systematic Reviews (CDSR) and Cochrane Central Register of Controlled Trials (CENTRAL) via the Cochrane Library Search Strategy

CDSR: Issue 1 of 12, January 2025
CENTRAL: Issue 12 of 12, December 2024
Date searched (number of results): January 20, 2025 (178)

#1	[mh "neurodevelopmental disorders"]
#2	((cognitive*:ti,ab,kw OR development*:ti,ab,kw OR intellect*:ti,ab,kw OR mental*:ti,ab,kw OR neurodevelopment*:ti,ab,kw OR processing:ti,ab,kw) NEAR/3 (deficien*:ti,ab,kw OR

	delay*:ti,ab,kw OR disabilit*:ti,ab,kw OR disorder*:ti,ab,kw OR dysfunction*:ti,ab,kw OR impair*:ti,ab,kw))
#3	((articulat*:ti,ab,kw OR communicat*:ti,ab,kw OR disarticulat*:ti,ab,kw OR fluen*:ti,ab,kw OR language*:ti,ab,kw OR misarticulat*:ti,ab,kw OR sound*:ti,ab,kw OR speech*:ti,ab,kw OR verbal*:ti,ab,kw) NEAR/3 (deficien*:ti,ab,kw OR delay*:ti,ab,kw OR disabilit*:ti,ab,kw OR disorder*:ti,ab,kw OR dysfunction*:ti,ab,kw OR impair*:ti,ab,kw))
#4	stammer*:ti,ab,kw
#5	stutter*:ti,ab,kw
#6	autis*:ti,ab,kw
#7	asperger*:ti,ab,kw
#8	kanner*:ti,ab,kw
#9	rett:ti,ab,kw
#10	(pervasive:ti,ab,kw NEAR/3 child*:ti,ab,kw)
#11	"pdd nos":ti,ab,kw
#12	(((attention NEXT deficit*):ti,ab,kw OR behavior*:ti,ab,kw OR conduct:ti,ab,kw OR hyperactiv*:ti,ab,kw OR hyperkineti*:ti,ab,kw OR (oppositional NEXT defiant*):ti,ab,kw) NEAR/3 (disorder*:ti,ab,kw OR dysfunction*:ti,ab,kw OR syndrom*:ti,ab,kw))
#13	(addh:ti,ab,kw OR adhd:ti,ab,kw)
#14	"sluggish cognitive tempo":ti,ab,kw
#15	((learn*:ti,ab,kw OR read*:ti,ab,kw) NEAR/3 (deficien*:ti,ab,kw OR delay*:ti,ab,kw OR disabilit*:ti,ab,kw OR disorder*:ti,ab,kw OR dysfunction*:ti,ab,kw OR impair*:ti,ab,kw))
#16	dyslexi*:ti,ab,kw
#17	(word:ti,ab,kw NEXT blind*:ti,ab,kw)
#18	dyscalculi*:ti,ab,kw
#19	((coordinat*:ti,ab,kw OR motor*:ti,ab,kw OR movement*:ti,ab,kw) NEAR/3 (deficien*:ti,ab,kw OR delay*:ti,ab,kw OR disabilit*:ti,ab,kw OR disorder*:ti,ab,kw OR dysfunction*:ti,ab,kw OR impair*:ti,ab,kw))
#20	dyspraxi*:ti,ab,kw
#21	tic?:ti,ab,kw
#22	tour?ette*:ti,ab,kw
#23	(OR #1-#22)
#24	[mh ^"behavior therapy"]
#25	[mh ^"applied behavior analysis"]
#26	[mh ^"early intervention, educational"]
#27	((applied NEXT behavio?r*):ti,ab,kw NEAR/3 (analy*:ti,ab,kw OR approach*:ti,ab,kw OR assessment*:ti,ab,kw OR evaluat*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#28	(aba:ti,ab,kw NEAR/3 (approach*:ti,ab,kw OR assessment*:ti,ab,kw OR evaluat*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#29	((behavio?r* NEXT analy*):ti,ab,kw NEAR/3 (appli*:ti,ab,kw OR approach*:ti,ab,kw OR assessment*:ti,ab,kw OR evaluat*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR

	program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#30	((early NEXT behavio?r*):ti,ab,kw NEAR/3 (analy*:ti,ab,kw OR approach*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#31	(("early intervention" NEXT therap*):ti,ab,kw OR EIBI:ti,ab,kw)
#32	lovaas:ti,ab,kw
#33	"young autism project":ti,ab,kw
#34	(((naturalistic NEXT behavio?r*):ti,ab,kw OR ("naturalistic developmental" NEXT behavio?r*):ti,ab,kw) NEAR/3 (analy*:ti,ab,kw OR approach*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#35	((comprehensive NEXT behavio?r*):ti,ab,kw NEAR/3 (analy*:ti,ab,kw OR approach*:ti,ab,kw OR assessment*:ti,ab,kw OR evaluat*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#36	((intens* NEXT behavio?r*):ti,ab,kw NEAR/3 (analy*:ti,ab,kw OR approach*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#37	((denver NEXT method*):ti,ab,kw OR (denver NEXT model*):ti,ab,kw OR ESDM:ti,ab,kw OR ESDM-I:ti,ab,kw OR ESDM-PD:ti,ab,kw OR P-ESDM:ti,ab,kw)
#38	(("discrete trial":ti,ab,kw OR (functional NEXT communicat*):ti,ab,kw OR (natural* NEXT environment*):ti,ab,kw OR "pivotal response":ti,ab,kw) NEAR/3 (approach*:ti,ab,kw OR interven*:ti,ab,kw OR model*:ti,ab,kw OR program*:ti,ab,kw OR service*:ti,ab,kw OR therap*:ti,ab,kw OR train*:ti,ab,kw OR treat*:ti,ab,kw))
#39	"prrfct match":ti,ab,kw
#40	((certif*:ti,ab,kw OR licens*:ti,ab,kw OR register*:ti,ab,kw) NEAR/2 ((behavio?r* NEXT analy*):ti,ab,kw OR (behavio?r* NEXT technician?):ti,ab,kw))
#41	(OR #24-#40)
#42	[mh telecommunications]
#43	[mh ^"mobile applications"]
#44	[mh ^"web browser"]
#45	((telebehavio?ral NEXT health*):ti,ab,kw OR (tele-behavio?ral NEXT health*):ti,ab,kw OR (tele NEXT behavio?ral NEXT health*):ti,ab,kw)
#46	(telecare*:ti,ab,kw OR tele-care*:ti,ab,kw OR (tele NEXT care*):ti,ab,kw)
#47	(telecoach*:ti,ab,kw OR tele-coach*:ti,ab,kw OR (tele NEXT coach*):ti,ab,kw)
#48	(telecommunicat*:ti,ab,kw OR tele-communicat*:ti,ab,kw OR (tele NEXT communicat*):ti,ab,kw)
#49	(teleconferenc*:ti,ab,kw OR tele-conferenc*:ti,ab,kw OR (tele NEXT conferenc*):ti,ab,kw)
#50	(teleconsult*:ti,ab,kw OR tele-consult*:ti,ab,kw OR (tele NEXT consult*):ti,ab,kw)
#51	(telecounsel*:ti,ab,kw OR tele-counsel*:ti,ab,kw OR (tele NEXT counsel*):ti,ab,kw)
#52	(telehealth*:ti,ab,kw OR tele-health*:ti,ab,kw OR (tele NEXT health*):ti,ab,kw)
#53	(telehomecare*:ti,ab,kw OR tele-homecare*:ti,ab,kw OR (tele NEXT homecare*):ti,ab,kw)
#54	(teleinterven*:ti,ab,kw OR tele-interven*:ti,ab,kw OR (tele NEXT interven*):ti,ab,kw)

#55	(telemedic*:ti,ab,kw OR tele-medic*:ti,ab,kw OR (tele NEXT medic*):ti,ab,kw)
#56	((telemental NEXT health*):ti,ab,kw OR ("tele-mental" NEXT health*):ti,ab,kw OR ("tele mental" NEXT health*):ti,ab,kw)
#57	(telemonitor*:ti,ab,kw OR tele-monitor*:ti,ab,kw OR (tele NEXT monitor*):ti,ab,kw)
#58	(telenurs*:ti,ab,kw OR tele-nurs*:ti,ab,kw OR (tele NEXT nurs*):ti,ab,kw)
#59	(telepharmac*:ti,ab,kw OR tele-pharmac*:ti,ab,kw OR (tele NEXT pharmac*):ti,ab,kw)
#60	(telepractic*:ti,ab,kw OR tele-practic*:ti,ab,kw OR (tele NEXT practic*):ti,ab,kw)
#61	(telepsychiatr*:ti,ab,kw OR tele-psychiatr*:ti,ab,kw OR (tele NEXT psychiatr*):ti,ab,kw)
#62	(telepsycholog*:ti,ab,kw OR tele-psycholog*:ti,ab,kw OR (tele NEXT psycholog*):ti,ab,kw)
#63	(telepsychotherap*:ti,ab,kw OR tele-psychotherap*:ti,ab,kw OR (tele NEXT psychotherap*):ti,ab,kw)
#64	(telerehab*:ti,ab,kw OR tele-rehab*:ti,ab,kw OR (tele NEXT rehab*):ti,ab,kw)
#65	(teletherap*:ti,ab,kw OR tele-therap*:ti,ab,kw OR (tele NEXT therap*):ti,ab,kw)
#66	(mhealth*:ti,ab,kw OR m-health*:ti,ab,kw OR (m NEXT health*):ti,ab,kw)
#67	(econsult*:ti,ab,kw OR e-consult*:ti,ab,kw OR (e NEXT consult*):ti,ab,kw)
#68	(ehealth*:ti,ab,kw OR e-health*:ti,ab,kw OR (e NEXT health*):ti,ab,kw)
#69	(((audio OR audiovisual* OR audio-visual* OR digital* OR internet OR online* OR on-line* OR phone OR telephon* OR tele-phon* OR remote* OR video* OR virtual* OR web) NEAR/3 (care OR communicat* OR conferenc* OR consult* OR counsel* OR deliver* OR health* OR intervention* OR medicine OR monitor* OR prescrib* OR psychiatr* OR psycholog* OR psychotherap* OR rehab* OR therap* OR treat* OR visit*))):ti,ab,kw
#70	((electronic NEXT mail*) OR email* OR e-mail* OR (e NEXT mail*)):ti,kw
#71	(android:ti,ab,kw OR cellphone*:ti,ab,kw OR cell-phone*:ti,ab,kw OR iphone*:ti,ab,kw OR i-phone*:ti,ab,kw OR ipad*:ti,ab,kw OR i-pad*:ti,ab,kw OR (mobile NEXT device*):ti,ab,kw OR (mobile NEXT phone*):ti,ab,kw OR smartphone*:ti,ab,kw OR smart-phone*:ti,ab,kw)
#72	((instant NEXT messag*) OR sms OR text*):ti,kw
#73	(videoconferenc*:ti,ab,kw OR video-conferenc*:ti,ab,kw)
#74	(webcast*:ti,ab,kw OR web-cast*:ti,ab,kw OR (web NEXT cast*):ti,ab,kw OR webinar*:ti,ab,kw)
#75	(facetim*:ti,ab,kw OR face-tim*:ti,ab,kw OR (face NEXT tim*):ti,ab,kw OR (google NEXT meet*):ti,ab,kw OR "goto meeting":ti,ab,kw OR "go-to meeting":ti,ab,kw OR (go NEXT to? NEXT meeting):ti,ab,kw OR goto webinar:ti,ab,kw OR go-to webinar:ti,ab,kw OR (go NEXT to? NEXT webinar):ti,ab,kw OR "microsoft teams":ti,ab,kw OR skype:ti,ab,kw OR webex:ti,ab,kw OR web-ex:ti,ab,kw OR "web ex":ti,ab,kw OR zoom:ti,ab,kw)
#76	((digital NEXT app*):ti,ab,kw OR (electronic NEXT app*):ti,ab,kw OR (mobile NEXT app*):ti,ab,kw OR (smartphone NEXT app*):ti,ab,kw OR (smart-phone NEXT app*):ti,ab,kw OR ("smart phone" NEXT app*):ti,ab,kw OR (software NEXT app*):ti,ab,kw)
#77	(smartwatch*:ti,ab,kw OR smart-watch*:ti,ab,kw OR (smart NEXT watch*):ti,ab,kw)
#78	((wearable:ti,ab,kw OR wireless:ti,ab,kw) NEAR/2 device?:ti,ab,kw)
#79	[OR #42-#78]
#80	[AND #23, #41, #79]

CINAHL Plus with Full Text

Date searched (number of results): January 20, 2025 (388)

S1	(MH "mental disorders diagnosed in childhood+")
S2	(((TI cognitive* OR AB cognitive*) OR (TI development* OR AB development*) OR (TI intellect* OR AB intellect*) OR (TI mental* OR AB mental*) OR (TI neurodevelopment* OR AB neurodevelopment*) OR (TI processing OR AB processing)) N3 ((TI deficien* OR AB deficien*) OR (TI delay* OR AB delay*) OR (TI disabilit* OR AB disabilit*) OR (TI disorder* OR AB disorder*) OR (TI dysfunction* OR AB dysfunction*) OR (TI impair* OR AB impair*)))
S3	(((TI articulat* OR AB articulat*) OR (TI communicat* OR AB communicat*) OR (TI disarticulat* OR AB disarticulat*) OR (TI fluen* OR AB fluen*) OR (TI language* OR AB language*) OR (TI misarticulat* OR AB misarticulat*) OR (TI sound* OR AB sound*) OR (TI speech* OR AB speech*) OR (TI verbal* OR AB verbal*)) N3 ((TI deficien* OR AB deficien*) OR (TI delay* OR AB delay*) OR (TI disabilit* OR AB disabilit*) OR (TI disorder* OR AB disorder*) OR (TI dysfunction* OR AB dysfunction*) OR (TI impair* OR AB impair*)))
S4	(TI stammer* OR AB stammer*)
S5	(TI stutter* OR AB stutter*)
S6	(TI autis* OR AB autis*)
S7	(TI asperger* OR AB asperger*)
S8	(TI kanner* OR AB kanner*)
S9	(TI rett OR AB rett)
S10	((TI pervasive OR AB pervasive) N3 (TI child* OR AB child*))
S11	(TI "pdd nos" OR AB "pdd nos")
S12	(((TI "attention deficit*" OR AB "attention deficit*") OR (TI behavior* OR AB behavior*) OR (TI conduct OR AB conduct) OR (TI hyperactiv* OR AB hyperactiv*) OR (TI hyperkineti* OR AB hyperkineti*) OR (TI "oppositional defiant*" OR AB "oppositional defiant*")) N3 ((TI disorder* OR AB disorder*) OR (TI dysfunction* OR AB dysfunction*) OR (TI syndrom* OR AB syndrom*)))
S13	((TI addh OR AB addh) OR (TI adhd OR AB adhd))
S14	(TI "sluggish cognitive tempo" OR AB "sluggish cognitive tempo")
S15	(((TI learn* OR AB learn*) OR (TI read* OR AB read*)) N3 ((TI deficien* OR AB deficien*) OR (TI delay* OR AB delay*) OR (TI disabilit* OR AB disabilit*) OR (TI disorder* OR AB disorder*) OR (TI dysfunction* OR AB dysfunction*) OR (TI impair* OR AB impair*)))
S16	(TI dyslexi* OR AB dyslexi*)
S17	((TI word OR AB word) W1 (TI blind* OR AB blind*))
S18	(TI dyscalculi* OR AB dyscalculi*)
S19	(((TI coordinat* OR AB coordinat*) OR (TI motor* OR AB motor*) OR (TI movement* OR AB movement*)) N3 ((TI deficien* OR AB deficien*) OR (TI delay* OR AB delay*) OR (TI disabilit* OR AB disabilit*) OR (TI disorder* OR AB disorder*) OR (TI dysfunction* OR AB dysfunction*) OR (TI impair* OR AB impair*)))
S20	(TI dyspraxi* OR AB dyspraxi*)
S21	(TI tic# OR AB tic#)
S22	(TI tour#ette* OR AB tour#ette*)
S23	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22
S24	(MH "behavior therapy")

S25	(MH "applied behavior analysis")
S26	(MH "early childhood intervention")
S27	((TI "applied behavio#r*" OR AB "applied behavio#r*") N3 ((TI analy* OR AB analy*) OR (TI approach* OR AB approach*) OR (TI assessment* OR AB assessment*) OR (TI evaluat* OR AB evaluat*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S28	((TI aba OR AB aba) N3 ((TI approach* OR AB approach*) OR (TI assessment* OR AB assessment*) OR (TI evaluat* OR AB evaluat*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S29	((TI "behavio#r* analy*" OR AB "behavio#r* analy*") N3 ((TI appli* OR AB appli*) OR (TI approach* OR AB approach*) OR (TI assessment* OR AB assessment*) OR (TI evaluat* OR AB evaluat*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S30	((TI "early behavio#r*" OR AB "early behavio#r*") N3 ((TI analy* OR AB analy*) OR (TI approach* OR AB approach*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S31	((TI "early intervention therap*" OR AB "early intervention therap*") OR (TI EIBI OR AB EIBI))
S32	(TI lovaas OR AB lovaas)
S33	(TI "young autism project" OR AB "young autism project")
S34	(((TI "naturalistic behavio#r*" OR AB "naturalistic behavio#r*") OR (TI "naturalistic developmental behavio#r*" OR AB "naturalistic developmental behavio#r*")) N3 ((TI analy* OR AB analy*) OR (TI approach* OR AB approach*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S35	((TI "comprehensive behavio#r*" OR AB "comprehensive behavio#r*") N3 ((TI analy* OR AB analy*) OR (TI approach* OR AB approach*) OR (TI assessment* OR AB assessment*) OR (TI evaluat* OR AB evaluat*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S36	((TI "intens* behavio#r*" OR AB "intens* behavio#r*") N3 ((TI analy* OR AB analy*) OR (TI approach* OR AB approach*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))
S37	((TI "denver method*" OR AB "denver method*") OR (TI "denver model*" OR AB "denver model*") OR (TI ESDM OR AB ESDM) OR (TI ESDM-I OR AB ESDM-I) OR (TI ESDM-PD OR AB ESDM-PD) OR (TI P-ESDM OR AB P-ESDM))
S38	(((TI "discrete trial" OR AB "discrete trial") OR (TI "functional communicat*" OR AB "functional communicat*") OR (TI "natural* environment*" OR AB "natural* environment*") OR (TI "pivotal response" OR AB "pivotal response")) N3 ((TI approach* OR AB approach*) OR (TI interven* OR AB interven*) OR (TI model* OR AB model*) OR (TI program* OR AB program*) OR (TI service* OR AB service*) OR (TI therap* OR AB therap*) OR (TI train* OR AB train*) OR (TI treat* OR AB treat*)))

S39	(TI "prrfct match" OR AB "prrfct match")
S40	(((TI certif* OR AB certif*) OR (TI licens* OR AB licens*) OR (TI register* OR AB register*)) N2 ((TI "behavio#r* analy*" OR AB "behavio#r* analy*") OR (TI "behavio#r* technician#" OR AB "behavio#r* technician#")))
S41	S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40
S42	(MH telecommunications+)
S43	(MH "mobile applications")
S44	(MH "web browsers")
S45	((TI "telebehavio#ral health*" OR AB "telebehavio#ral health*") OR (TI "tele-behavio#ral health*" OR AB "tele-behavio#ral health*") OR (TI "tele behavio#ral health*" OR AB "tele behavio#ral health*"))
S46	((TI telecare* OR AB telecare*) OR (TI tele-care* OR AB tele-care*) OR (TI "tele care*" OR AB "tele care*"))
S47	((TI telecoach* OR AB telecoach*) OR (TI tele-coach* OR AB tele-coach*) OR (TI "tele coach*" OR AB "tele coach*"))
S48	((TI telecommunicat* OR AB telecommunicat*) OR (TI tele-communicat* OR AB tele-communicat*) OR (TI "tele communicat*" OR AB "tele communicat*"))
S49	((TI teleconferenc* OR AB teleconferenc*) OR (TI tele-conferenc* OR AB tele-conferenc*) OR (TI "tele conferenc*" OR AB "tele conferenc*"))
S50	((TI teleconsult* OR AB teleconsult*) OR (TI tele-consult* OR AB tele-consult*) OR (TI "tele consult*" OR AB "tele consult*"))
S51	((TI telecounsel* OR AB telecounsel*) OR (TI tele-counsel* OR AB tele-counsel*) OR (TI "tele counsel*" OR AB "tele counsel*"))
S52	((TI telehealth* OR AB telehealth*) OR (TI tele-health* OR AB tele-health*) OR (TI "tele health*" OR AB "tele health*"))
S53	((TI telehomecare* OR AB telehomecare*) OR (TI tele-homecare* OR AB tele-homecare*) OR (TI "tele homecare*" OR AB "tele homecare*"))
S54	((TI teleinterven* OR AB teleinterven*) OR (TI tele-interven* OR AB tele-interven*) OR (TI "tele interven*" OR AB "tele interven*"))
S55	((TI telemedic* OR AB telemedic*) OR (TI tele-medic* OR AB tele-medic*) OR (TI "tele medic*" OR AB "tele medic*"))
S56	((TI "telemental health*" OR AB "telemental health*") OR (TI "tele-mental health*" OR AB "tele-mental health*") OR (TI "tele mental health*" OR AB "tele mental health*"))
S57	((TI telemonitor* OR AB telemonitor*) OR (TI tele-monitor* OR AB tele-monitor*) OR (TI "tele monitor*" OR AB "tele monitor*"))
S58	((TI telenurs* OR AB telenurs*) OR (TI tele-nurs* OR AB tele-nurs*) OR (TI "tele nurs*" OR AB "tele nurs*"))
S59	((TI telepharmac* OR AB telepharmac*) OR (TI tele-pharmac* OR AB tele-pharmac*) OR (TI "tele pharmac*" OR AB "tele pharmac*"))
S60	((TI telepractic* OR AB telepractic*) OR (TI tele-practic* OR AB tele-practic*) OR (TI "tele practic*" OR AB "tele practic*"))
S61	((TI telepsychiatr* OR AB telepsychiatr*) OR (TI tele-psychiatr* OR AB tele-psychiatr*) OR (TI "tele psychiatr*" OR AB "tele psychiatr*"))

S62	((TI telepsycholog* OR AB telepsycholog*) OR (TI tele-psycholog* OR AB tele-psycholog*) OR (TI "tele psycholog*" OR AB "tele psycholog*"))
S63	((TI telepsychotherap* OR AB telepsychotherap*) OR (TI tele-psychotherap* OR AB tele-psychotherap*) OR (TI "tele psychotherap*" OR AB "tele psychotherap*"))
S64	((TI telerehab* OR AB telerehab*) OR (TI tele-rehab* OR AB tele-rehab*) OR (TI "tele rehab*" OR AB "tele rehab*"))
S65	((TI teletherap* OR AB teletherap*) OR (TI tele-therap* OR AB tele-therap*) OR (TI "tele therap*" OR AB "tele therap*"))
S66	((TI mhealth* OR AB mhealth*) OR (TI m-health* OR AB m-health*) OR (TI "m health*" OR AB "m health*"))
S67	((TI econsult* OR AB econsult*) OR (TI e-consult* OR AB e-consult*) OR (TI "e consult*" OR AB "e consult*"))
S68	((TI ehealth* OR AB ehealth*) OR (TI e-health* OR AB e-health*) OR (TI "e health*" OR AB "e health*"))
S69	(((TI audio OR AB audio) OR (TI audiovisual* OR AB audiovisual*) OR (TI audio-visual* OR AB audio-visual*) OR (TI digital* OR AB digital*) OR (TI internet OR AB internet) OR (TI online* OR AB online*) OR (TI on-line* OR AB on-line*) OR (TI phone# OR AB phone#) OR (TI telephon* OR AB telephon*) OR (TI tele-phon* OR AB tele-phon*) OR (TI remote* OR AB remote*) OR (TI video* OR AB video*) OR (TI virtual* OR AB virtual*) OR (TI web OR AB web)) N3 ((TI care OR AB care) OR (TI communicat* OR AB communicat*) OR (TI conferenc* OR AB conferenc*) OR (TI consult* OR AB consult*) OR (TI counsel* OR AB counsel*) OR (TI deliver* OR AB deliver*) OR (TI health* OR AB health*) OR (TI intervention* OR AB intervention*) OR (TI medicine OR AB medicine) OR (TI monitor* OR AB monitor*) OR (TI prescrib* OR AB prescrib*) OR (TI psychiatr* OR AB psychiatr*) OR (TI psycholog* OR AB psycholog*) OR (TI psychotherap* OR AB psychotherap*) OR (TI rehab* OR AB rehab*) OR (TI therap* OR AB therap*) OR (TI treat* OR AB treat*) OR (TI visit# OR AB visit#)))
S70	((TI "electronic mail*") OR (TI email*) OR (TI e-mail*) OR (TI "e mail*"))
S71	((TI android OR AB android) OR (TI cellphone# OR AB cellphone#) OR (TI cell-phone# OR AB cell-phone#) OR (TI iphone# OR AB iphone#) OR (TI i-phone# OR AB i-phone#) OR (TI ipad# OR AB ipad#) OR (TI i-pad# OR AB i-pad#) OR (TI "mobile device#" OR AB "mobile device#") OR (TI "mobile phone#" OR AB "mobile phone#") OR (TI smartphone# OR AB smartphone#) OR (TI smart-phone# OR AB smart-phone#))
S72	((TI "instant messag*") OR (TI sms) OR (TI text*))
S73	((TI videoconferenc* OR AB videoconferenc*) OR (TI video-conferenc* OR AB video-conferenc*))
S74	((TI webcast* OR AB webcast*) OR (TI web-cast* OR AB web-cast*) OR (TI "web cast*" OR AB "web cast*") OR (TI webinar* OR AB webinar*))
S75	((TI facetim* OR AB facetim*) OR (TI face-tim* OR AB face-tim*) OR (TI "face tim*" OR AB "face tim*") OR (TI "google meet*" OR AB "google meet*") OR (TI "goto meeting" OR AB "goto meeting") OR (TI "go-to meeting" OR AB "go-to meeting") OR (TI "go to# meeting" OR AB "go to# meeting") OR (TI "goto webinar" OR AB "goto webinar") OR (TI "go-to webinar" OR AB "go-to webinar") OR (TI "go to# webinar" OR AB "go to# webinar") OR (TI "microsoft teams" OR AB "microsoft teams") OR (TI skype OR AB skype) OR (TI webex OR AB webex) OR (TI web-ex OR AB web-ex) OR (TI "web ex" OR AB "web ex") OR (TI zoom OR AB zoom))
S76	((TI "digital app*" OR AB "digital app*") OR (TI "electronic app*" OR AB "electronic app*") OR (TI "mobile app*" OR AB "mobile app*") OR (TI "smartphone app*" OR AB "smartphone app*") OR

	(TI "smart-phone app*" OR AB "smart-phone app*") OR (TI "smart phone app*" OR AB "smart phone app*") OR (TI "software app*" OR AB "software app*"))
S77	((TI smartwatch* OR AB smartwatch*) OR (TI smart-watch* OR AB smart-watch*) OR (TI "smart watch*" OR AB "smart watch*"))
S78	(((TI wearable OR AB wearable) OR (TI wireless OR AB wireless)) N2 (TI device# OR AB device#))
S79	S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78
S80	S23 AND S41 AND S79
S81	S23 AND S41 AND S79 Limiters - English Language; Source Type: Academic Journal

PsycInfo

1806 to January 2025 Week 2
Date searched (number of results): January 20, 2025 (246)

1	exp neurodevelopmental disorders/
2	((cognitive* or development* or intellect* or mental* or neurodevelopment* or processing) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,id.
3	((articulat* or communicat* or disarticulat* or fluen* or language* or misarticulat* or sound* or speech* or verbal*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,id.
4	stammer*.ti,ab,id.
5	stutter*.ti,ab,id.
6	autis*.ti,ab,id.
7	asperger*.ti,ab,id.
8	kanner*.ti,ab,id.
9	rett.ti,ab,id.
10	(pervasive adj3 child*).ti,ab,id.
11	pdd nos.ti,ab,id.
12	((attention deficit* or behavior* or conduct or hyperactiv* or hyperkineti* or oppositional defiant*) adj3 (disorder* or dysfunction* or syndrom*)).ti,ab,id.
13	(addh or adhd).ti,ab,id.
14	sluggish cognitive tempo.ti,ab,id.
15	((learn* or read*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,id.
16	dyslexi*.ti,ab,id.
17	(word adj blind*).ti,ab,id.
18	dyscalculi*.ti,ab,id.
19	((coordinat* or motor* or movement*) adj3 (deficien* or delay* or disabilit* or disorder* or dysfunction* or impair*)).ti,ab,id.
20	dyspraxi*.ti,ab,id.
21	tic?.ti,ab,id.

22	tour?ette*.ti,ab,id.
23	or/1-22
24	behavior therapy/
25	applied behavior analysis/
26	early childhood education/
27	(applied behavio?r* adj3 (analy* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
28	(aba adj3 (approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
29	(behavio?r* analy* adj3 (appli* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
30	(early behavio?r* adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
31	(early intervention therap* or EIBI).ti,ab,id.
32	lovaas.ti,ab,id.
33	young autism project.ti,ab,id.
34	((naturalistic behavio?r* or naturalistic developmental behavio?r*) adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
35	(comprehensive behavio?r* adj3 (analy* or approach* or assessment* or evaluat* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
36	(intens* behavio?r* adj3 (analy* or approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
37	(denver method* or denver model* or ESDM or ESDM-I or ESDM-PD or P-ESDM).ti,ab,id.
38	((discrete trial or functional communicat* or natural* environment* or pivotal response) adj3 (approach* or interven* or model* or program* or service* or therap* or train* or treat*)).ti,ab,id.
39	prrfct match.ti,ab,id.
40	((certif* or licens* or register*) adj2 (behavio?r* analy* or behavio?r* technician?)).ti,ab,id.
41	or/24-40
42	exp "telecommunications media"/
43	exp telemedicine/
44	exp "mobile applications"/
45	exp "mobile devices"/
46	(telebehavio?ral health* or tele-behavio?ral health* or tele behavio?ral health*).ti,ab,id.
47	(telecare* or tele-care* or tele care*).ti,ab,id.
48	(telecoach* or tele-coach* or tele coach*).ti,ab,id.
49	(telecommunicat* or tele-communicat* or tele communicat*).ti,ab,id.
50	(teleconferenc* or tele-conferenc* or tele conferenc*).ti,ab,id.
51	(teleconsult* or tele-consult* or tele consult*).ti,ab,id.
52	(telecounsel* or tele-counsel* or tele counsel*).ti,ab,id.
53	(telehealth* or tele-health* or tele health*).ti,ab,id.
54	(telehomecare* or tele-homecare* or tele homecare*).ti,ab,id.
55	(teleinterven* or tele-interven* or tele interven*).ti,ab,id.

56	(telemedic* or tele-medic* or tele medic*).ti,ab,id.
57	(telemental health* or tele-mental health* or tele mental health*).ti,ab,id.
58	(telemonitor* or tele-monitor* or tele monitor*).ti,ab,id.
59	(telenurs* or tele-nurs* or tele nurs*).ti,ab,id.
60	(telepharmac* or tele-pharmac* or tele pharmac*).ti,ab,id.
61	(telepractic* or tele-practic* or tele practic*).ti,ab,id.
62	(telepsychiatr* or tele-psychiatr* or tele psychiatr*).ti,ab,id.
63	(telepsycholog* or tele-psycholog* or tele psycholog*).ti,ab,id.
64	(telepsychotherap* or tele-psychotherap* or tele psychotherap*).ti,ab,id.
65	(telerehab* or tele-rehab* or tele rehab*).ti,ab,id.
66	(teletherap* or tele-therap* or tele therap*).ti,ab,id.
67	(mhealth* or m-health* or m health*).ti,ab,id.
68	(econsult* or e-consult* or e consult*).ti,ab,id.
69	(ehealth* or e-health* or e health*).ti,ab,id.
70	((audio or audiovisual* or audio-visual* or digital* or internet or online* or on-line* or phone? or telephon* or tele-phon* or remote* or video* or virtual* or web) adj3 (care or communicat* or conferenc* or consult* or counsel* or deliver* or health* or intervention* or medicine or monitor* or prescrib* or psychiatr* or psycholog* or psychotherap* or rehab* or therap* or treat* or visit?)).ti,ab,id.
71	(electronic mail* or email* or e-mail* or e mail*).ti,id.
72	(android or cellphone? or cell-phone? or iphone? or i-phone? or ipad? or i-pad? or mobile device? or mobile phone? or smartphone? or smart-phone?).ti,ab,id.
73	(instant messag* or sms or text*).ti,id.
74	(videoconferenc* or video-conferenc*).ti,ab,id.
75	(webcast* or web-cast* or web cast* or webinar*).ti,ab,id.
76	(facetim* or face-tim* or face tim* or google meet* or goto meeting or go-to meeting or go to? meeting or goto webinar or go-to webinar or go to? webinar or microsoft teams or skype or webex or web-ex or web ex or zoom).ti,ab,id.
77	(digital app* or electronic app* or mobile app* or smartphone app* or smart-phone app* or smart phone app* or software app*).ti,ab,id.
78	(smartwatch* or smart-watch* or smart watch*).ti,ab,id.
79	((wearable or wireless) adj2 device?).ti,ab,id.
80	or/42-79
81	and/23,41,80
82	(baboon? or bovine? or canine? or cat? or chimpanzee? or cow? or dog? or feline? or goat? or hens or macque? or mice or monkey? or (mouse adj2 model?) or murine? or ovine or pig? or porcine or (non-human adj2 primate?) or sheep or rabbit? or rat? or rattus or rhesus or rodent? or zebrafish).ti.
83	81 not 82
84	limit 83 to english language
85	limit 84 to ("0100 journal" or "0110 peer-reviewed journal" or "0120 non-peer-reviewed journal" or "0130 peer-reviewed status unknown" or "0500 electronic collection")

Policy Sources and Search Terms

We searched the websites for 8 health plans listed below to identify coverage policies related to ABA therapy provided via telehealth. We also conducted an internet search using the terms *does [company name] cover ABA provided via telehealth.* In addition, we searched the websites of the 9 state Medicaid programs listed below for policy manuals, provider bulletins, and relevant fee schedules to identify policies related to coverage of ABA therapy provided via telehealth. Searches were conducted between March 10, 2025, and March 13, 2025, and updated June 20, 2025.

State Medicaid Programs

- California Medicaid
- Florida Medicaid
- Massachusetts Medicaid
- New Jersey Medicaid
- North Carolina Medicaid
- Oregon Medicaid and the HERC coverage guidance (including topics under consideration)
- Pennsylvania Medicaid
- Texas Medicaid
- Washington Medicaid and the Washington Health Technology Assessment Program coverage determinations (including topics under consideration)

Health Plans

- Aetna
- Anthem Blue Cross and Blue Shield
- Cigna
- Fidelis Care
- Healthfirst
- MetroPlusHealth
- Molina Healthcare
- UnitedHealthcare

Appendix B. Detailed Inclusion and Exclusion Criteria

Table B1. Key Study Inclusion Criteria

Study Component	Inclusion	Exclusion
Populations	Children, adolescents, and adults with a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR*, and their caregivers Neurodevelopmental conditions in the *DSM-5-TR* include: • Intellectual developmental disorders • Communication disorders (e.g., language disorder, speech disorder, fluency disorder) • ASD • Attention deficit/hyperactivity disorder • Learning disorders, (e.g., dyslexia) • Motor disorders, (e.g., developmental coordination disorder, dyspraxia, tic disorders) • Other specified or unspecified neurodevelopmental disorders	Individuals without a diagnosis of ASD or other neurodevelopmental disorder that appears in the *DSM-5-TR* by a qualified health care practitioner (e.g., physician, psychologist) Individuals with a self-reported diagnosis
Interventions	ABA services that involved communication with a behavior analyst or behavior analyst technician or assistant, provided entirely or partly (i.e., hybrid of in-person and remote delivery) via synchronous or asynchronous telehealth modality, including: • In-person ABA services provided by a behavior analyst assistant with remote clinical direction by a behavior analyst • Provider (e.g., behavior analyst, behavior analyst assistant) delivering remote ABA services directly to patient • Behavior analyst providing remote coaching and feedback to a caregiver, who implements the treatment protocol for the patient under the observation of the behavior analyst • Behavior analyst teaching caregiver behavioral strategies and responding to questions from caregiver remotely, without patient present	ABA services with no telehealth component
Comparators	Head-to-head comparisons of ABA services provided via different telehealth modalities Exclusively in-person ABA services Standard care	None listed

Study Component	Inclusion	Exclusion
	Waitlist (no treatment)	
Outcomes	Critical Reduction in challenging behavior (e.g., direct observation in change in frequency or duration of behavior or use of standard measures, such as the Aberrant Behavior Checklist, Child Behavior Checklist, Home Situations Questionnaire – Autism Spectrum Disorder, Questions About Behavioral Function) Adaptive behavior (e.g., academic or conceptual performance, functional or practical skills, or social skills evaluated by direct observation or use of standard measures, such as the Adaptive Behavior Assessment System, Clinical Global Impression – Improvement Subscale, Direct Behavior Ratings, Social Skills Improvement System, or Vineland Adapted Behavior Scales) Autism symptom severity (assessed with validated measures, such as the Autism Diagnostic Interview – Revised, Autism Diagnostic Observation Schedule) Adverse effects (e.g., harm inflicted on self or others, worsening of challenging behaviors, deterioration of adaptive behaviors) Important Patient acceptability and satisfaction (evaluated with validated measures) Caregiver acceptability and satisfaction (evaluated with validated measures, such as the Parent Satisfaction Questionnaire or Telehealth Caregiver Satisfaction Survey) Patient anxiety, stress, or depression (evaluated with validated measures, such as the Depression Anxiety Stress Scale) Caregiver anxiety, stress, or depression (evaluated with validated measures, such as the Autism Parenting Stress Index, Parental Stress Index, Parental	None listed

Study Component	Inclusion	Exclusion
	Stress Scale, or Stress Index for Parents of Adolescents) Cost and cost effectiveness	
Timing and follow up	Outcomes collected before and at the end of the intervention Outcomes collected at least 3 months after the end of the intervention	None listed
Setting	Studies conducted in outpatient settings (e.g., home, community center, school, clinic remote from provider) Studies conducted in countries categorized as *very high* on the Human Development Index (KQ1–KQ2) Studies conducted in US, or using US-based health systems data (KQ3)	Sessions conducted in inpatient setting Sessions conducted in a laboratory setting Studies conducted in countries not categorized as *very high* on the Human Development Index (KQ1–KQ2) Studies not conducted in US, or not using US-based health systems data (KQ3)
Study design	KQ1–KQ2 Randomized controlled trials Nonrandomized comparative trials Interrupted time series with comparison group Controlled before-after studies KQ3 Comparative studies and economic evaluations Cost-effectiveness analyses Economic modeling studies Published within past 5 years KQ4 Evidence-based clinical practice guidelines that provide specific treatment recommendations Published or updated within past 5 years	Studies without extractable data Studies without a valid comparison group Retrospective studies Uncontrolled before-after studies (including single-case experimental designs)
Sample size	No limit	None listed
Publication type	Peer-reviewed publication of primary study results Published in the English language Ancillary publications with additional comparative follow up	Abstracts, conference proceedings, posters, editorials, and letters Studies not formally peer reviewed (i.e., preprint publications) Studies published in languages other than English Studies that cannot be found Duplicate publications of the same study not reporting different outcomes or follow-up times, or single-site reports from published multicenter studies

Abbreviations. ABA: applied behavior analysis; ASD: autism spectrum disorder; DSM-5-TR: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision; KQ: key question; US: United States.

Appendix C. Included Studies

Table C1. Included Studies by Key Question

Primary Publication From Included Trial	Publications Reporting Additional Results
KQ1–KQ2	
Ingersoll B, Frost KM, Straiton D, et al. Telehealth coaching in Project ImPACT indirectly affects children's expressive language ability through parent intervention strategy use and child intentional communication: an RCT. *Autism research: Official Journal of the International Society for Autism Research.* 2024;17(10):2177-2187.	Ingersoll B, Frost KM, Straiton D, et al. Relative efficacy of self-directed and therapist-assisted telehealth models of a parent-mediated intervention for autism: examining effects on parent intervention fidelity, well-being, and program engagement. J Autism Dev Disord. 2024;54(10):3605-3619.
Hall SS, Monlux KD, Rodriguez AB, Jo B, Pollard JS. Telehealth-enabled behavioral treatment for problem behaviors in boys with fragile X syndrome: A randomized controlled trial. *Journal of Neurodevelopmental Disorders.* 2020;12(1):31.	Hall SS, Rodriguez AB, Jo B, Pollard JS. Long-term follow up of telehealth-enabled behavioral treatment for challenging behaviors in boys with fragile X syndrome. Journal of Neurodevelopmental Disorders. 2022;14(1):53.
Lindgren S, Wacker D, Schieltz K, et al. A randomized controlled trial of functional communication training via telehealth for young children with autism spectrum disorder. *Journal of Autism and Developmental Disorders.* 2020;50(12):4449-4462.	None identified
Marino F, Chila P, Failla C, et al. Tele-Assisted Behavioral intervention for families with children with autism spectrum disorders: a randomized control trial. *Brain Sciences*. 2020;10(9):18.	None identified
Ingersoll B, Wainer AL, Berger NI, et al. Comparison of a self-directed and therapist-assisted telehealth parent-mediated intervention for children with ASD: a pilot RCT. *J Autism Dev Disord.* 2016;46(7):2275-84.	Ingersoll B, Berger NI. Parent engagement with a telehealth-based parent-mediated intervention program for children with autism spectrum disorders: predictors of program use and parent outcomes. Journal of Medical Internet Research. 2015;17(10):e227. Pickard KE, Wainer AL, Bailey KM, Ingersoll BR. A mixed-method evaluation of the feasibility and acceptability of a telehealth-based parent-mediated intervention for children with autism spectrum disorder. Autism. 2016;20(7):845-55.
KQ3	
Cidav Z, Mandell D, Ingersoll B, Pellecchia M. Programmatic costs of Project ImPACT for children with autism: a time-driven activity based costing study. *Adm Policy Ment Health.* 2023;50(3):402-416.	NA
KQ4	
Council of Autism Service Providers. Applied behavior analysis practice guidelines for the	NA

Primary Publication From Included Trial	Publications Reporting Additional Results
treatment of autism spectrum disorder, third edition. 2024.	
Council of Autism Service Providers. Practice parameters for telehealth-implementation of applied behavioral analysis, second edition. 2021.	NA
Association of Applied Behavior Analysts. Guidelines for practicing applied behavior analysis during the COVID-19 pandemic. April 9, 2020.	NA
Hyman SL, Levy SE, Myers SM. Identification, Evaluation, and Management of Children With Autism Spectrum Disorder. *Pediatrics*. 2020;145(1):e201923447.	NA

Abbreviations. ASD: autism spectrum disorder; NA: not applicable; RCT: randomized controlled trial.

Appendix D. Excluded Studies With Primary Reason for Exclusion

Table D1. Studies Excluded in Full Text Screening With Primary Reason for Exclusion

Reference Information	Primary Reason for Exclusion	Justification
American Academy of Child and Adolescent Psychiatry Committee on Telepsychiatry. Clinical update: telepsychiatry with children and adolescents. *J Am Acad Child Adolesc Psychiatry*. 2017;56(10):875-893.	Population	Telepsychiatry generally, nothing about autism or ABA.
American Professional Society of ADHD and Related Disorders. Guidelines for adults with ADHD. 2024. Accessed January 8, 2025.	Unable to locate	Guideline in development and not yet released.
APA Task Force on Telepsychology. APA guidelines for the practice of telepsychology. American Psychological Institute. August 2024. Accessed January 8, 2025.	Population	Guidelines for telepsychiatry, which is not ABA therapy. No mention of autism or ABA therapy.
Araiba S, Čolić M. Preliminary practice recommendations for telehealth direct applied behavior analysis services with children with autism. *J Behav Educ*. 2022:1-35. doi: 10.1007/s10864-022-09473-6	Study design	Not an interventional study. Authors position this publication as 'preliminary practice recommendations' but do not represent a professional group.
Aranki J, Wright P, Pompa-Craven P, Lotfizadeh AD. Acceptance of telehealth therapy to replace in-person therapy for autism treatment during COVID-19 pandemic: An assessment of patient variables. *Telemedicine and e-Health*. 2022;28(9):1342-1349.	Study design	Retrospective study, noninterventional, compares outcomes obtained from medical records for children who had been receiving in-person ABA therapy prior to COVID-19 pandemic for those who accepted telehealth and those who declined telehealth.
Azzano A, Vause T, Ward R, et al. Telehealth parent training for a young child at risk for autism spectrum disorder. *Behavioral Interventions*. 2023;38(1):140-158.	Intervention	N = 3. Therapists were not behavior analysts or behavior analyst assistants.
Barbaresi WJ, Campbell L, Diekroger EA, et al. Society for Developmental and Behavioral Pediatrics clinical practice guideline for the assessment and treatment of children and adolescents with complex attention-deficit/hyperactivity disorder. *J Dev Behav Pediatr*. 2020. 41 Suppl 2S:S35-s57	Intervention	Does not address ABA or telehealth.
Barkaia A, Stokes TF, Mikiashvili T. Intercontinental telehealth coaching of therapists to improve verbalizations by children with autism. *J Appl Behav Anal*. 2017;50(3):582-589.	Study design	N = 3. Noncomparative study.

Reference Information	Primary Reason for Exclusion	Justification
Batton B, Kaplan R, Ellis K, Schmidt C, Nudelman E. Telehealth training in principles of applied behavior analysis for caregivers of young children with autism spectrum disorders during the COVID-19 pandemic. *Educ Treat Children*. 2022;45(3):299-303.	Intervention	N = 3. Coaching for parents on a wait-list for services. Not ABA.
Bearss K, Burrell TL, Challa SA, et al. Feasibility of parent training via telehealth for children with autism spectrum disorder and disruptive behavior: a demonstration pilot. *J Autism Dev Disord*. 2018;48(4):1020-1030.	Study design	Noncomparative study.
Belisle J, Burke R, Clark L, et al. Developing remote delivery of language and cognitive training for use with children with autism: a technological report. *Behav Anal Pract*. 2021;14(2):434-444.	Publication type	Not an interventional study (narrative review).
Blackman AL, Jimenez-Gomez C, Shvarts S. Comparison of the efficacy of online versus in-vivo behavior analytic training for parents of children with autism spectrum disorder. *Behav Anal Res Pract*. 2020;20(1):13-23.	Intervention	Self-directed online training vs. in-person training. No groups met our minimum enrollment of 10. No opportunity for parents to practice techniques with children under behavior analyst supervision and no child-related outcomes measured.
Bordini D, Moya AC, Asevedo G, et al. Exploring the acquisition of social communication skills in children with autism: preliminary findings from applied behavior analysis (ABA), parent training, and video modeling. *Brain Sci*. 2024;14(2):09.	Setting	Not a high HDI country (Brazil).
Bordini D, Paula CS, Cunha GR, et al. A randomised clinical pilot trial to test the effectiveness of parent training with video modelling to improve functioning and symptoms in children with autism spectrum disorders and intellectual disability. *J Intellectual Disability Res*. 2020;64(8):629-643.	Intervention	Group video-based training provided in person. Further, study conducted in a non-HDI country (Brazil).
Canadian Agency for Drugs and Technologies in Health (CADTH). Inter-jurisdictional medical licensing to support telemedicine. 2020. Accessed December 31, 2024.	Wrong aim	CADTH report on inter-jurisdictional medical licensing to support telemedicine. Not specific to ABA.
Center for Evidence-based Policy. Applied behavior analysis for autism spectrum disorders. Oregon Health	Publication type	CEbP report, not an RCT and doesn't reference telehealth.

Reference Information	Primary Reason for Exclusion	Justification
Evidence Review Commission (HERC). 2014. Accessed January 7, 2025.		
Center for Evidence-based Policy. Applied behavioral analysis and other behavioral therapies for the treatment of autism spectrum disorder. Washington State Health Care Authority. 2011. Accessed January 7, 2025.	Publication type	CEbP report, not an RCT and doesn't reference telehealth.
Clark B, Bélanger SA. ADHD in children and youth: part 3-Assessment and treatment with comorbid ASD, ID, or prematurity. *Paediatr Child Health*. 2018;23(7):485-490.	Publication date	Does not meet the 5-year requirement for guidelines inclusion.
Coghill D, Banaschewski T, Cortese S, et al. The management of ADHD in children and adolescents: bringing evidence to the clinic: perspective from the European ADHD Guidelines Group (EAGG). *Eur Child Adolesc Psychiatry*. 2023. 32:1337-1361	Intervention	Does not address ABA or telehealth.
Cortese S, Asherson P, Sonuga-Barke E, et al. ADHD management during the COVID-19 pandemic: guidance from the European ADHD Guidelines Group. *Lancet Child Adolesc Health*. 2020. 4:412-414	Intervention	Does not address ABA or telehealth.
D'Agostino S, Douglas SN, Horton E. "Inclusive preschool practitioners' implementation of naturalistic developmental behavioral intervention using telehealth training": Correction. *J Autism Dev Disord*. 2021;51(12):4456-4458.	Publication type	N = 6. Not ABA and not an interventional study.
Dai YG, Thomas RP, Brennan L, et al. Development and acceptability of a new program for caregivers of children with autism spectrum disorder: online parent training in early behavioral intervention. *J Autism Dev Disord*. 2021;51(11):4166-4185.	Intervention	Asynchronous e-learning with no interaction with behavior analysts.
Dai YG, Thomas RP, Brennan LL, et al. An initial trial of OPT-In-Early: an online training program for caregivers of autistic children. *Autism*. 2023;27(6):1601-1615.	Intervention	Parents were not trained in providing ABA. Training was not provided via telehealth and was not provided by a behavior analyst.
Davis TN, Gerow S, Wicker M, et al. Utilizing telehealth to coach parents to implement trial-based functional analysis and treatment. *J Behav Educ*. 2022:1-23.	Study design	N = 3. Noncomparative study. Intervention was not ABA.

Reference Information	Primary Reason for Exclusion	Justification
Drapalik KN, Grodberg D, Ventola P. Feasibility and acceptability of delivering pivotal response treatment for autism spectrum disorder via telehealth: pilot pre-post study. *JMIR Pediatr Parent*. 2022;5(3):e32520.	Intervention	Online asynchronous parent training course. Pilot trial of a telehealth mental health service meant to help parents who were waiting for services or seeking to supplement existing services. No child-related outcomes.
Duenas AD, D'Agostino SR. Experiences of service providers in the expedited delivery of ABA therapy via telehealth during the COVID-19 pandemic: reflections and considerations for the future. *Behav Anal Res Pract*. 2022;22(3):265-282.	Study design	Survey-based study. No intervention, no comparators.
Ellison KS, Guidry J, Picou P, Adenuga P, Davis TE, 3rd. Telehealth and autism prior to and in the age of COVID-19: a systematic and critical review of the last decade. *Clin Child Fam Psychol Rev*. 2021;24(3):599-630.	Study design	Systematic review.
Exline E, McGinnis K, Garza SR, Gerow S, Sulak TN, Austin M. Progressive Functional Analysis and Function-Based Intervention Via Telehealth: A Replication and Extension. *Behav Modif*. 2025;49(1):49-80.	Study design	No control group.
Feldman ME, Charach A, Bélanger SA. ADHD in children and youth: part 2-Treatment. *Paediatr Child Health*. 2018;23(7):462-472.	Intervention	Does not mention ABA.
Ferguson J, Craig EA, Dounavi K. Telehealth as a model for providing behaviour analytic interventions to individuals with autism spectrum disorder: a systematic review. *J Autism Dev Disord*. 2019;49(2):582-616.	Study design	Systematic review.
Ferguson J, Dounavi K, Craig EA. The impact of a telehealth platform on ABA-based parent training targeting social communication in children with autism spectrum disorder. *J Dev Physical Disab*. 2022;34(6):1089-1120.	Study design	N = 6 parent-child dyads. Not a comparative study.
Ferguson JL, Majeski MJ, McEachin J, Leaf R, Cihon JH, Leaf JB. Evaluating discrete trial teaching with instructive feedback delivered in a dyad arrangement via telehealth. *J Appl Behav Anal*. 2020;53(4):1876-1888.	Study design	N = 6. Noncomparative study.

Reference Information	Primary Reason for Exclusion	Justification
Fisher WW, Luczynski KC, Blowers AP, et al. A randomized clinical trial of a virtual-training program for teaching applied-behavior-analysis skills to parents of children with autism spectrum disorder. *J Appl Behav Anal*. 2020;53(4):1856-1875.	Intervention	Asynchronous learning via a series of educational modules. In the clinicaltrials.gov record, there is a second part where a virtual ABA tutor helped parents implement a tailored treatment plan, but that is not covered in this publication.
Franz L, Howard J, Viljoen M, et al. Pragmatic adaptations of telehealth-delivered caregiver coaching for children with autism in the context of COVID-19: perspectives from the United States and South Africa. *Autism*. 2022;26(1):270-275.	Intervention	Not a clinical trial specifically testing ABA via telehealth. This is a reflection on changes to treatment during COVID-19.
Gauert S, Rittenhouse-Cea H, Rittenhouse-Shaw K. Parent implementation of DTT following telehealth instruction. *J Autism Dev Diosord*. 2023;53(10):3980-3986.	Study design	Training was provided by behavior analysts, but N = 3 and no comparator group.
Gengoux GW, Shahabuddin A, Schwartzman J, et al. Pivotal response treatment: application to new populations and service-delivery models. *J Am Acad Child Adolesc Psychiatry*. 2020;59(10):S271-S272.	Publication type	Conference abstract.
Gentile M, Messineo L, La Guardia D, et al. A parent-mediated telehealth program for children with autism spectrum disorder: promoting parents' ability to stimulate the children's learning, reduce parenting stress, and boost their sense of parenting empowerment. *J Autism Dev Disord*. 2022;52(12):5285-5300.	Study design	Noncomparative study, but intervention is exactly what we're looking for.
Gerow S, Kirkpatrick M, McGinnis K, et al. Evaluation of a telehealth ABA program for caregivers of children with ASD. *Behav Modif*. 2023;47(2):349-379.	Study design	No comparator.
Hatef E, Wilson RF, Hannum SM, et al. Use of telehealth during the COVID-19 era. Agency for Healthcare Research and Quality (AHRQ). 2023. Accessed December 31, 2024.	Intervention	General review of use of telehealth during COVID-19, nothing specific to ABA and wrong publication type.
Hay-Hansson A, Eldevik S, Stromgren B. Videoconference to supervise early intensive behavioral intervention: A preliminary evaluation of acceptability. *Behavioral Interventions*. 2023;38(2):524-536.	Intervention	Not a comparative study. Test of the acceptability of videoconferencing on supervision in EIBI programs.

Reference Information	Primary Reason for Exclusion	Justification
Heitzman-Powell LS, Buzhardt J, Rusinko LC, Miller TM. Formative evaluation of an ABA outreach training program for parents of children with autism in remote areas. *Focus Autism Other Dev Disabl*. 2014;29(1):23-38.	Study design	N = 7. Noncomparative study.
Hoffmann AN, Bogoev BK, Sellers TP. Using telehealth and expert coaching to support early childhood special education parent-implemented assessment and intervention procedures. *Rural Special Education Quarterly*. 2019;38(2):95-106.	Study design	N = 4. Noncomparative study.
Howe E Riggleman S, Passmore A. Evidence-based practices via remote service delivery for early intervention in rural communities. *Rural Special Education Quarterly*. 2023;42(4):202-212.	Publication type	General review. Not specific to autism.
Ingersoll B, Shannon K, Berger N., et al. Self-directed telehealth parent-mediated intervention for children with autism spectrum disorder: examination of the potential reach and utilization in community settings. *J Med Internet Res*. 2017. 19:e248	Intervention	Restricts analysis to parents in the self-directed groups only.
Inoue M, Tatsumi A, Fukuzaki T. Effectiveness of the internet based parent education program on applied behavior analysis for parents of children with autism spectrum disorder. *Brain Dev*. 2022;44(10):655-663.	Intervention	Not ABA therapy. Nine online modules for parents to complete. No comparator group.
Ip A, Zwaigenbaum L, Brian JA. Post-diagnostic management and follow-up care for autism spectrum disorder. *Paediatr Child Health*. 2019. 24:461-477	Publication date	Does not meet the 5-year requirement for guidelines inclusion.
Jimenez-Gomez C, Dabney H, DeVries J, et al. Adaptation of the research unit on behavioral interventions caregiver training program for remote group delivery: Preliminary analysis of clinical outcomes. *Behav Anal Res Pract*. 2023;23(3):207-212.	Intervention	Not ABA. "Clinicians" delivered the group training via Zoom, but what constituted a clinician or what training or licensing they had is not described.
Kingsdorf S, Pancocha K, Vadurova H, Dosedel T. Piloting an e-learning applied behavior analysis course for caregivers of children with autism in the Czech Republic. *J Behav Educ*. 2022:1-32.	Study design	Asynchronous e-learning. Outcome was parental self-efficacy. No part of the intervention involved working with children and no child outcomes are collected or reported.

Reference Information	Primary Reason for Exclusion	Justification
Kingsdorf S, Pančocha K. Looking at Europe's recent behavioral telehealth practices for children and families impacted by neurodevelopmental disabilities. *Int J Dev Disabil*. 2023;69(2):147-162.	Publication type	Narrative review.
Knopp K, Ferguson JL, Piazza J, et al. A comparison between direct telehealth and in-person methods of teaching expressive labels to children diagnosed with autism spectrum disorder. *Behav Modif*. 2023;47(2):432-453.	Population	N = 3.
Kunze M, Wei Q, Bacon-Yates A, Pompan E, Lockwood H, Witthuhn N. Promoting Reciprocal Relationships with Flexibility, Coaching, and Teaching (PRRFCT Match): a virtual parent-mediated intervention package for young children with developmental disabilities. *J Autism Dev Disord*. 2024;15:15.	Study design	Noncomparative study.
Kunze MG, Machalicek W, Wei Q, et al. Coaching via telehealth: caregiver-mediated interventions for young children on the waitlist for an autism diagnosis using single-case design. *J Clin Med*. 2021;10(8):13.	Intervention	N = 6. Noncomparative.
Lamash L, Little L, Hen-Herbst L. Telehealth interventions to promote health and behavior-related outcomes in adolescents with autism spectrum disorder. *J Autism Dev Disord*. 2023;53(1):405-423.	Study design	Systematic review.
Landau-Taylor J, McGivney C, Christiansen A. Access to care after autism diagnosis during the COVID-19 pandemic: a quality improvement project. *J Dev Behav Pediatr*. 2023;44(2):e73-e79.	Study design	Chart review for quality improvement project.
Larsen A, Schieltz KM, Barrett A, O'Brien MJ. A retrospective analysis of therapists' coaching behavior when directing parents to conduct behavioral assessments and treatments via telehealth. *Behav Modif*. 2023;47(1):154-184.	Study design	Retrospective study, not comparative, N = 7 parent-child dyads.

Reference Information	Primary Reason for Exclusion	Justification
Lee JF, Schieltz KM, Suess AN, et al. Guidelines for developing telehealth services and troubleshooting problems with telehealth technology when coaching parents to conduct functional analyses and functional communication training in their homes. *Behav Anal Pract*. 2015;8(2):190-200.	Study design	Not an interventional study. Overview of lessons learned.
Lerman DC, O'Brien MJ, Neely L, et al. Remote coaching of caregivers via telehealth: Challenges and potential solutions. *J Behav Educ*. 2020;29(2):195-221.	Study design	Case studies.
Lindgren NA, Higbee TS, Osos JA, et al. Comparing the effectiveness of discrete trial training delivered via telehealth and in-person on skill acquisition. *Behav Anal Pract*. 2024;17(3):783-795.	Intervention	N = 3. Did not randomize participants to in-person or telehealth—every child received both treatments.
Lindgren S, Wacker D, Suess A, et al. Telehealth and autism: treating challenging behavior at lower cost. *Pediatrics*. 2016. 137:S167-S175	Publication date	Does not meet the 5-year requirement for inclusion in cost effectiveness analysis.
Machalicek W, Lequia J, Pinkelman S, et al. Behavioral telehealth consultation with families of children with autism spectrum disorder. *Behavioral Interventions*. 2016;31(3):223-250.	Study design	N = 3. Noncomparative.
Mattson SL, Higbee TS, Aguilar J, et al. Creating and sharing digital ABA instructional activities: a practical tutorial. *Behav Anal Pract*. 2020;13(4):772-798.	Publication type	Overview and advice for therapists in the COVID era, not an interventional study.
McAloon J, de la Poer Beresford K. Online behavioral parenting interventions for disruptive behavioral disorders: A PRISMA based systematic review of clinical trials. *Child Psychiatry Hum Dev*. 2023;54(2):379-396.	Study design	Systematic review. Does not provide enough detail to even know if any of the included studies involve telehealth or ABA.
McDuffie A, Machalicek W, Oakes A, et al. Distance video-teleconferencing in early intervention: pilot study of a naturalistic parent-implemented language intervention. *Topics in Early Childhood Special Education*. 2013;33(3):172-185.	Study design	N = 8. Noncomparative. Not really ABA.
McGarry E, Vernon T, Baktha A. Brief report: a pilot online Pivotal Response Treatment training program for parents of toddlers with autism spectrum disorder. *J Autism Dev Disord*. 2020;50(9):3424-3431.	Study design	N = 11. Noninterventional.

Reference Information	Primary Reason for Exclusion	Justification
McIntyre LL, Neece CL, Sanner CM, et al. Telehealth delivery of a behavioral parent training program to Spanish-speaking Latinx parents of young children with developmental delay: applying an implementation framework approach. *School Psych Rev*. 2022;51(2):206-220.	Intervention	Noncomparative study, not delivering ABA therapy, not delivered by behavior analysts.
McLay L, Emerson LM, Waddington H, et al. Telehealth-delivered naturalistic developmental behavioural intervention with and without caregiver acceptance and commitment therapy for autistic children and their caregivers: protocol for a multi-arm parallel group randomised clinical trial. *BMJ Open*. 2023;13(5):e071235.	Publication type	Study protocol.
Monlux KD, Pollard JS, Bujanda Rodriguez AY, Hall SS. Telehealth delivery of function-based behavioral treatment for problem behaviors exhibited by boys with fragile X syndrome. *J Autism Dev Disord*. 2019;49(6):2461-2475.	Study design	N = 10, no control group.
National Institute for Health and Care Excellence. Autism spectrum disorder in adults: diagnosis and management. 2021. Accessed January 7, 2025.	Intervention	No reference to ABA or telehealth.
National Institute for Health and Care Excellence. Autism spectrum disorder in under 19s: support and management. 2021. Accessed January 7, 2025.	Intervention	Nothing on ABA and nothing on telehealth.
Neely LC, Carnett A, Hansen S, et al. Iterative development of caregiver-implemented behavioral intervention via telehealth: a focus on feasibility. *Perspectives of the ASHA Special Interest Groups*. 2022;7(2):295-309.	Study design	Noninterventional study. Intervention was asynchronous online training.
Nohelty K, Bradford CB, Hirschfeld L, et al. Effectiveness of telehealth direct therapy for individuals with autism spectrum disorder. *Behav Anal Pract*. 2022;15(3):643-658.	Study design	N = 7. Noncomparative study.
Nohelty K, Hahs AD, Rodriguez KA, et al. Assessing the social validity of telehealth-based applied behavior analysis services for autism spectrum disorder. *Behavioral Interventions*. 2023;38(3):590-610.	Comparator	No comparator.

Reference Information	Primary Reason for Exclusion	Justification
Ousley CL, Raulston TJ, Gilhuber CS. Telecoaching for Parents of Young Autistic Children Using Strength-Based Video Feedback. *J Autism Dev Disord.* 2023;08:08.	Study design	N = 5. Noncomparative study.
Pellegrino AJ, DiGennaro Reed FD. Using telehealth to teach valued skills to adults with intellectual and developmental disabilities. *J Appl Behav Anal.* 2020;53(3):1276-1289.	Study design	N = 2. Noncomparative study.
Peterson KM, Piazza CC, Luczynski KC, et al. Virtual-care delivery of applied-behavior-analysis services to children with autism spectrum disorder and related conditions. *Behav Anal Res Pract*. 2017;17(4):286-297.	Publication type	General review, not an interventional study.
Pollard JS, LeBlanc LA, Griffin CA, Baker JM. The effects of transition to technician-delivered telehealth ABA treatment during the COVID-19 crisis: a preliminary analysis. *J Appl Behav Anal.* 2021;54(1):87-102.	Study design	Noncomparative study
Pomales-Ramos A, Tokish H, Howard M, Straiton D, Ingersoll B. A mixed-methods examination of clinicians' perceived barriers to telehealth delivered applied behavior analysis. *Front Psychol.* 2023;14:1173644.	Study design	Not a child-focused intervention. Clinicians' perceived barriers to ABA via telehealth is relevant for CQs.
Pompa-Craven P, Tierman E, Martino J, et al. Caregiver satisfaction with delivery of telehealth autism services. *Adv Neurodev Disord*. 2022;6(2):196-205.	Study design	Survey of parents. Not an intervention, no comparator.
Pringsheim T, Okun MS, Müller-Vahl K, et al. Practice guideline recommendations summary: treatment of tics in people with Tourette syndrome and chronic tic disorders. *Neurology*. 2019;92(19):896-906.	Intervention	References 1 study on telehealth delivery of comprehensive behavioral intervention for tics, but this is not ABA.
Rodriguez KA. Maintaining treatment integrity in the face of crisis: a treatment selection model for transitioning direct ABA services to telehealth. *Behav Anal Pract*. 2020;13(2):291-298.	Study design	Tools for practitioners. Not an interventional study.
Rooks-Ellis DL, Howorth SK, Boulette S, et al. Effects of a parent training using telehealth: Equity and access to early intervention for rural families. *Journal of Childhood, Education & Society*. 2020;1(2):141-166.	Intervention	Early Start Denver model, not ABA; noncomparative study design.

Reference Information	Primary Reason for Exclusion	Justification
Russell KM, Ingersoll B. Factors related to parental therapeutic self-efficacy in a parent-mediated intervention for children with autism spectrum disorder: a mixed methods study. *Autism*. 2021. 25:971-981	Outcomes	Combines participants from a pilot and full-scale trial. Does not include any outcomes of interest for our purposes (does not explore self-directed vs. therapist-assisted) and mostly identifies themes from parent surveys.
Schieltz KM, O'Brien MJ, Tsami L, Call NA, Lerman DC. Behavioral assessment and treatment via telehealth for children with autism: from local to global clinical applications. *Int J Environ Res Public Health*. 2022;19(4).	Intervention	Not a comparative study. All participants received the same intervention. Compares completers and non-completers.
Scottish Intercollegiate Guidelines Network (SIGN). Assessment, diagnosis and interventions for autism spectrum disorders. 2016. Accessed March 5, 2024.	Intervention	Does discuss ABA but does not reference virtual or telehealth delivery.
Simcoe K, Stainbrook JA, Chazin KT, et al. Use of telemediated caregiver coaching to increase access to naturalistic developmental behavioral interventions within a statewide early intervention system. *Autism*. 2025;29(1):207-221.	Intervention	Not ABA. Not a comparative study.
Sipila-Thomas ES, Brodhead MT. A survey of barriers experienced while providing supervision via telehealth: Implications for future research and practice. *Behav Anal Pract*. 2024;17(1):70-86.	Study design	Survey-based study. No intervention and no comparator.
Sivaraman M, Fahmie TA. A systematic review of cultural adaptations in the global application of ABA-based telehealth services. *J Appl Behav Anal*. 2020;53(4):1838-1855.	Study design	Systematic review.
Snijder MI, Dietz C, van Andel M, et al. Social Communication Program supported by E-health (SCOPE) for infants and toddlers at elevated likelihood of autism spectrum disorder: Study design of a cluster randomized controlled trial. *BMC Psychiatry*. 2022;22(1):772.	Publication type	Protocol. Not an ABA intervention.
Subramaniam S, Brunson LY, Cook JE, et al. Maintenance of parent-implemented discrete-trial instruction during videoconferencing. Journal of Behavioral Education. 2017;26(1):1-26.	Study design	N = 4. Noncomparative.

Reference Information	Primary Reason for Exclusion	Justification
Suess AN, Romani PW, Wacker DP, et al. Evaluating the treatment fidelity of parents who conduct in-home functional communication training with coaching via telehealth. *J Behav Educ*. 2014;23(1):34-59.	Study design	N = 3. Retrospective review. Noncomparative.
Suess AN, Wacker DP, Schwartz JE, et al. Preliminary evidence on the use of telehealth in an outpatient behavior clinic. *J Appl Behav Anal*. 2016;49(3):686-692.	Study design	N = 5. Noncomparative study.
Sullivan AD, Forehand R, Acosta J, et al. COVID-19 and the acceleration of behavioral parent training telehealth: Current status and future directions. *Cogn Behav Pract*. 2021;28(4):618-629.	Study design	Narrative overview. Not about ABA.
Togashi K, Minagawa Y, Hata M, et al. Evaluation of a telehealth parent-training program in Japan: Collaboration with parents to teach novel mand skills to children diagnosed with autism spectrum disorder. *Behav Anal Pract*. 2023;16(3):783-794.	Intervention	N = 4. No comparator group. Parents were taught about behavioral skills training generally, not ABA specifically.
Tomlinson SR, Gore N, McGill P. Training individuals to implement applied behavior analytic procedures via telehealth: a systematic review of the literature. *J Behav Educ*. 2018;27(2):172-222.	Study design	Systematic review.
Tsami L, Lerman D, Toper-Korkmaz O. Effectiveness and acceptability of parent training via telehealth among families around the world. *J Appl Behav Anal*. 2019;52(4):1113-1129.	Study design	N = 11. Non-comparative.
Vanegas SB, Duenas AD, Kunze M, et al. Adapting parent-focused interventions for diverse caregivers of children with intellectual and developmental disabilities: lessons learned during global crises. *Journal of Policy and Practice in Intellectual Disabilities*. 2023;20(1):45-57.	Publication type	Narrative review.
Vismara LA, McCormick CE, Wagner AL, Monlux K, Nadhan A, Young GS. Telehealth parent training in the Early Start Denver Model: Results from a randomized controlled study. *Focus Autism Other Dev Disabl*. 2018;33(2):67-79.	Intervention	Early Start Denver model, not ABA; providers were not behavior analysts.

Reference Information	Primary Reason for Exclusion	Justification
Wacker DP, Lee JF, Dalmau YC, et al. Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism. *J Develop Physical Disabl*. 2013;25(1):35-48.	Comparator	Not an RCT or comparative study.
Wolraich ML, Hagan JF, Jr., Allan C, et al. Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*. 2019;144(4).	Publication date	Does not meet the 5-year requirement for guidelines inclusion.
Wood de Wilde H, Kojovic N, Robertson C, et al. Remote intensive intervention for young children on the autism spectrum during COVID-19: the experience of caregivers and service providers. *Adv Neurodev Disord*. 2024;8(2):338-354.	Intervention	Takes advantage of the COVID-19 pandemic to track progress of telehealth intervention in the context of an existing longitudinal study. Children were receiving varying interventions and it is unclear if any were actually ABA. Not delivered by behavior analysts.
Yi Z, Dixon MR. Developing and enhancing adherence to a telehealth ABA parent training curriculum for caregivers of children with autism. *Behav Anal Pract*. 2021;14(1):58-74.	Study design	Primarily a description of development of a telehealth training curriculum. Does contain results of an RCT that tested the intervention but N = 7 in each arm.

Abbreviations. ABA: applied behavior analysis; CADTH: Canadian Agency for Drugs and Technology; COVID: coronavirus disease; CEbP: Center for Evidence-based Policy; CQs: contextual questions; EIBI: early intensive behavioral intervention; ESDM: Early Start Denver model; HDI: human development index; NICE: National Institute for Health and Care Excellence (UK); RCT: randomized clinical trial.

Appendix E. Additional Methods

Participant Characteristics and Association With Outcomes

When discussing risk and protective factors or variables in statistical models in Center research products, in almost all cases, we are referring to associations of participant characteristics with outcomes, and not causation of outcomes. This is important because participant characteristics, such as race and ethnicity, serve as proxy or surrogate measures for underlying etiological factors not measured or evaluated in analyses. Etiological factors that might cause differences in outcomes for subgroups of participants could include systemic racism or other forms of systemic discrimination, stress, poverty, housing instability, or epigenetics. For example, by describing any differences in outcomes by race and ethnic groups, we are noting observed associations; these associations are not caused by biological determinants of being Black, White, or Hispanic.

Risk of Bias

Table E1. Risk-of-Bias Assessment: Randomized Controlled Trials

Domain	Domain Elements[a]
Randomization	• An appropriate method of randomization is used to allocate participants or clusters to groups, such as a computer random number generator • Baseline characteristics between groups or clusters are similar
Allocation concealment	• An adequate concealment method is used to prevent investigators and participants from influencing enrollment or intervention allocation
Intervention	• Intervention and comparator intervention applied equally to groups • Cointerventions appropriate and applied equally to groups • Control selected is an appropriate intervention
Outcomes	• Outcomes are measured using valid and reliable measures • Investigators use single outcome measures and do not rely on composite outcomes; outcome of interest can be calculated from composite outcome • The trial has an appropriate length of follow up and groups are assessed at the same time points • Outcome reporting of entire group or subgroups is not selective
Masking (blinding) of investigators and participants	• Investigators and participants are unaware (masked or blinded) of intervention status
Masking (blinding) of outcome assessors	• Outcome assessors are unaware (masked or blinded) of intervention status
Intention-to-treat analysis	• Participants are analyzed based on random assignment (intention-to-treat analysis)
Statistical analysis	• Participants lost to follow up unlikely to significantly bias results (i.e., complete follow up of ≥ 80% of participants overall and nondifferential, ≤ 10% difference between groups) • The most appropriate summary estimate (e.g., risk ratio, hazard ratio) is used • Paired or conditional analysis used for crossover RCT • Clustering appropriately accounted for in a cluster-randomized trial (e.g., use of an intraclass correlation coefficient)

Other biases (as appropriate)	• List others in table footnote and describe, such as:
	  ○ Sample size adequacy
	  ○ Interim analysis or early stopping
	  ○ Recruitment bias, including run-in period used inappropriately

Domain	Domain Elements[a]
	• Use of unsuitable crossover intervention in a crossover RCT
Interest disclosure	• Disclosures of interest are provided for authors/funders/commissioners of study • Interests are unlikely to significantly affect study validity
Funding	• There is a description of source(s) of funding • Funding source is unlikely to have a significant impact on study validity

Notes. [a] The elements included in each domain are assessed and rated as yes, no, unclear, or not applicable based on the performance and documentation of individual elements in each domain. The overall risk of bias for a study is assessed as high, moderate, or low based on the assessment of how well overall study methods and processes were performed to limit bias and ensure validity.
Abbreviation. RCT: randomized controlled trial.

GRADE

Table E2. GRADE System for Rating the Certainty of Evidence for Outcomes

GRADE Rating	Plain Language Description	Detailed Category Description
High	New research is very unlikely to change our understanding of the relationship between this outcome and the health technology.	Center researchers are very confident that the estimate of the effect of the intervention on the outcome lies close to the true effect. Typical sets of studies are randomized controlled trials with few or no limitations, and the estimate of effect is likely stable.
Moderate	New research may change our understanding of the relationship between this outcome and the health technology.	Center researchers are moderately confident in the estimate of the effect of the intervention on the outcome. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is different. Typical sets of studies are randomized controlled trials with some limitations or well-performed nonrandomized studies with additional strengths that guard against potential bias and have large estimates of effects.
Low	New research is likely to change our understanding of the relationship between this outcome and the health technology.	Center researchers have little confidence in the estimate of the effect of the intervention on the outcome. The true effect may be substantially different from the estimate of the effect. Typical sets of studies are randomized controlled trials with serious limitations or nonrandomized studies without special strengths.
Very low	New research is very likely to change our understanding of the relationship between this outcome and the health technology.	Center researchers have no confidence in the estimate of the effect of the intervention on the outcome. The true effect is likely to be substantially different from the estimate of effect. Typical sets of studies are nonrandomized studies with serious limitations or inconsistent results across studies.
Not applicable	There is no research to report.	Center researchers did not identify any eligible articles.

Source. Cochrane Handbook for Systematic Reviews of Interventions.[138]
Abbreviation. GRADE: Grading of Recommendations, Assessment, Development, and Evaluations.

Appendix F. Risk of Bias Assessment

Table F1. Risk of Bias in 5 RCTs of Telehealth for ABA, Part 1

Study Lead Author, Year	Appropriate Randomization Method	Adequate Allocation Concealment Method	Blinding of Study Analysts	Appropriate Length of Follow Up	Single Outcome Measures Reported	Intention-to-Treat Analysis	Most Appropriate Summary Statistic Used	Similar Between-Group Baseline Characteristics
Ingersoll 2024[31]	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Yes
Hall 2020[28]	Yes	Unclear	No	Yes	Yes	No	No	Yes
Lindgren 2020[25]	Yes	Unclear	Unclear	Yes	Yes	Yes	Yes	Yes
Marino 2020[34]	Yes	Unclear	No	Yes	Yes	No	No	Unclear
Ingersoll 2016[33]	Yes	No	Unclear	Yes	Yes	Yes	Yes	Yes

Table F1. Risk of Bias in 5 RCTs of Telehealth for ABA, Part 2

Study Lead Author, Year	Loss to Follow up Unlikely to Bias Results	Disclosures of Interest for All Authors	Description of Funding Source	Results Applicable to Purpose of Report	Overall Risk of Bias
Ingersoll 2024[31]	Yes	Yes	Yes	Yes	Moderate Downgraded for questions about allocation concealment, recruitment below sample size requirements. Use of undergrads for coding introduces some issues as well.
Hall 2020[28]	Yes	Yes	Yes	Yes	Moderate Allocation concealment and blinding of analysts is not referenced, but not expected to create significant bias. Authors take a modified intent-to-treat approach, rather than analyzing all subjects randomized; this is not considered a critical error because only 2 people were omitted from the intervention group and 1 from the control group, but it is not best practice. Appropriate length of intervention within the constraints of an RCT, but would benefit from longer follow up to determine whether effects of intervention persist beyond the end of the

Study Lead Author, Year	Loss to Follow up Unlikely to Bias Results	Disclosures of Interest for All Authors	Description of Funding Source	Results Applicable to Purpose of Report	Overall Risk of Bias
					treatment period. Lacking detailed data on observations of problem behaviors.
Lindgren 2020[25]	Yes	Yes	Yes	Yes	Moderate Overall, well done study. Only areas of concern are small sample sizes and lack of information on blinding of individuals who code problem behaviors.
Marino 2020[34]	No	Yes	Yes	No	High Randomization and blinding seems adequate. Lack of ITT, lack of detail that leaves the reader to make assumptions about what information is being included in tables or analyses. Lack of detail on the intervention and control (not clear if children were part of the process or if sessions were parent and ABA therapist only). Does not address important issues, like the fact that both groups had significant in-person (presumably) training in ABA prior to the study phase that's being analyzed here and how that might impact the effectiveness of the telehealth training. Key issues that impact generalizability of findings.
Ingersoll 2016[33]	Yes	Yes	Yes	Yes	Moderate Questions about allocation concealment and blinding raise risk of bias. In particular, there is no confirmation that individuals who rated videos of parent-child interactions were blinded to group assignment. Data from parent-child interaction videos is also limited to completers (not ITT).

Abbreviation. ITT: intention-to treat (in which all participants randomized in a trial are included in analysis as part of the group to which they were originally randomized).

Appendix G. GRADE

Table G1. GRADE Profile
Abstinence and Retention Outcomes Related to Telehealth for ABA

Outcome	Number of Participants and Studies	Study Design	Factors that May Decrease Certainty of Evidence				Summary of Results	CoE
			Risk of Bias	Inconsistency	Indirectness	Imprecision		
Reduction in challenging behavior	3 studies[25,28,34] N = 137 parents, 118 children	RCTs	Serious (-1) 2 of 3 RCTs rated moderate RoB and 1 high RoB	Serious (-1) Two studies show significant improvements for the group receiving telehealth training/coaching compared to waitlist; 1 study did not show a difference, but had significant methodological issues and is not comparable to the other 2 studies. However, each study had different rules about the amount and type of other therapy a child could be receiving, which could be a significant confounder.	Serious (-1) Two studies with usable information compare ABA parent training provided via telehealth to no treatment at all, so does not answer the question of whether telehealth is comparable to traditional ABA delivery. One study does compare telehealth to in-person, but had significant methodological problems that limit interpretation of outcomes.	No serious Standard scales used to assess outcomes and reasonable spread of data.	All studies had moderate to high risk of bias, study designs limit the usefulness and directness of data for answering this question. Each study had different rules about the amount and type of other therapy a child could be receiving, which could be a significant confounder.	●○○○ Very Low
Adaptive behavior	3 studies[25,31,33]	RCTs	Serious (-1)	No serious	Serious (-1)	No serious.	All studies had moderate risk of	●●○○ Low

Outcome	Number of Participants and Studies	Study Design	Factors that May Decrease Certainty of Evidence				Summary of Results	CoE
			Risk of Bias	Inconsistency	Indirectness	Imprecision		
	N = 112 parents 112 children		All 3 studies had moderate RoB	Two of 3 studies compare self-directed parent training without therapist coaching to self-directed parent training with therapist coaching, while 1 compares behavior analyst coaching to waitlist control. Findings make sense within the context of study design and do not contradict one another.	None of the 3 studies compare parent training with telehealth coaching to parent training with in-person coaching, so does not directly address the question of interest.	Uses standard tools and methodology to measure outcomes.	bias. 2 studies placed no limits on what other treatment children could be receiving simultaneously (and the remaining study does not address the topic), but analysis does not control for this potential confounder. No studies compared parent coaching provided via telehealth to parent coaching provided in person.	
Caregiver acceptability and satisfaction	4 studies[25,28,31,33] N = 169 parents, 169 children	RCTs	Serious (-1) All 4 studies are rated moderate RoB	No serious 2 of 4 studies had a waitlist control and so no active comparator, but found high satisfaction; in 2 studies that compared self-directed treatment without therapist assistance to self-directed	Serious (-1) Does not directly compare therapist assistance with parent training provided in person and via telehealth, so does not directly answer the question of interest.	No serious Uses standard measures of satisfaction with treatment and confidence intervals are reasonable.	Downgraded 1 level for all studies having moderate risk of bias and 1 level for indirectness.	●●○○ Low

Outcome	Number of Participants and Studies	Study Design	Factors that May Decrease Certainty of Evidence				Summary of Results	CoE
			Risk of Bias	Inconsistency	Indirectness	Imprecision		
				treatment plus therapist assistance, satisfaction was higher in the group that had therapist assistance.				
Caregiver stress	4 studies[28,31,33,34] N = 173 parents, 154 children	RCTs	Serious (-1) 3 of 4 studies rated moderate RoB, 1 rated high.	Serious (-1) Different study designs, but generally consistent findings. Studies allowed different levels of concurrent behavioral treatment and do not control for potential confounding.	Serious (-1) Only 1 of 4 studies directly compare parent coaching provided via telehealth and in-person, and that study had significant methodological limitations.	No serious Uses standard measures of parenting stress, with reasonable confidence intervals.	Downgraded 1 level for moderate to high risk of bias in contributing studies and 2 levels for indirectness. Study designs limit the usefulness and directness of data for answering this question.	●○○○ Very Low

Abbreviations. ABA: applied behavior analysis; RCT: randomized controlled trial; RoB: risk of bias.

Appendix H. Description of Coverage Policies

Table H1. Excerpted Policy Language

<table>
<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td colspan="2">Health plans</td></tr>
<tr><td>Aetna

Aetna. Approved behavioral health telemedicine services. 2021[43]</td><td>Approved behavioral health telemedicine services; televideo only
<table>
<tr><th>Code</th><th>Service Description</th></tr>
<tr><td>97151</td><td>Behavior identification assessment, administered by a qualified healthcare professional, face-to-face with patient and/or guardians administering assessments and discussing findings and recommendations. Includes non-face-to-face analyzing of past data, scoring/interpreting the assessment, and preparing the report/treatment plan</td></tr>
<tr><td>97153</td><td>Adaptive behavior treatment by protocol, administered by a technician under the direction of a physician or other qualified healthcare professional, face-to-face with 1 patient, each 15 minutes</td></tr>
<tr><td>97155</td><td>Adaptive behavior treatment with protocol modification, administered by a qualified healthcare professional, which may include simultaneous direction of a technician working face-to-face with a patient</td></tr>
<tr><td>97156</td><td>Family adaptive behavior treatment guidance administered by a qualified healthcare professional, with parent/guardian</td></tr>
<tr><td>97157</td><td>Multiple-family group adaptive behavior treatment guidance, administered by qualified healthcare professional, with multiple sets of parents/guardians</td></tr>
</table>
CPT code 97152 not covered for telehealth</td></tr>
<tr><td>Anthem

Anthem. Allowed virtual services in addition to CPT appendix P. 2024[44]</td><td>For Anthem commercial plans in Colorado, Connecticut, Georgia, Indiana, Kentucky, Missouri, Nevada, Ohio, and Wisconsin

This list of CPT®/HCPCS codes serves as a supplement to the list of CPT/HCPCS codes in the Related Coding section of the Virtual Visits policy and represents additional appropriate codes currently eligible for reimbursement unless provider or state contract language or state or federal requirements or mandates indicate otherwise. Eligible code list is subject to change (updated on February 17, 2024).
<table>
<tr><th>CPT/HCPCS Codes</th><th>Code Description</th></tr>
</table></td></tr>
</table>

Health Plan or State	Policy Language	
	0362T	Behavior identification supporting assessment, each 15 minutes of technician's face-to-face with a patient, requiring the following components: administration by the physician or other qualified healthcare professional who is on site; with the assistance of two or more technicians; for a patient who exhibits destructive behavior; completing in an environment that is customized to the patient's behavior
	0373T	Adaptive behavior treatment with protocol modification, each 15 minutes of technicians' time face-to-face with a patient, requiring the following components: administration by the physician or other qualified healthcare professional who is on site; with the assistance of two or more technicians; for a patient who exhibits destructive behavior; completion in an environment that is customized to the patient's behavior
	97151	Behavior identification assessment, administered by a physician or other qualified healthcare professional, each 15 minutes of the physician's or other qualified healthcare professional's time face-to-face with patient and/or guardian(s)/caregiver(s) administering assessments and discussing findings and recommendations, and non-face-to-face analyzing past data, scoring/interpreting the assessment, and preparing the report/treatment plan
	97152	Behavior identification-supporting assessment, administered by 1 technician under the direction of physician or other qualified healthcare professional, face-to-face with the patient, each 15 minutes
	97153	Adaptive behavior treatment by protocol, administered by technician under the direction of a physician or other qualified healthcare professional, face-to-face with 1 patient, each 15 minutes
	97154	Group adaptive behavior treatment by protocol, administered by technician under the direction of a physician or other qualified healthcare professional, face-to-face with two or martinets, each 15 minutes
	97155	Adaptive behavior treatment with protocol modification, administered by physician or other qualified healthcare professional, which may include simultaneous direction of technician, face-to-face with 1 patient, each 15 minutes
	97156	Family adaptive behavior treatment guidance, administered by physician or other qualified healthcare professional (with or without the patient present), face-to-face with guardian(s)/caregiver(s), each 15 minutes
	97157	Multiple-family group adaptive behavior treatment guidance, administered by a physician or other qualified healthcare professional (without the patient present), face-to-face with multiple sets of guardians/caregivers, each 15 minutes
	97158	Group adaptive behavior treatment with protocol modification, administered by physician or other qualified healthcare professional, face-to-face with multiple patients, each 15 minutes

Health Plan or State	Policy Language
Cigna (through Evernorth) Evernorth. Intensive behavioral interventions. 2025[46] Evernorth. Autism resource guide for behavioral health providers. 2023[45]	*Only excerpted information related to telehealth.* *From Intensive Behavioral Interventions* Treatment Modality ABA treatment may be rendered via traditional in-person service delivery, telehealth, or a hybrid of in-person and telehealth service modalities. The modality selected for delivery of ABA services to individuals is determined based on a variety of factors, including but not limited to: a. individual characteristics b. treatment plan c.caregiver participation d. environment e. evidence of efficacy and safety f. Technological requirements ABA Coding Coalition. Reporting CPT® Codes for Telehealth Delivery of Adaptive Behavior (ABA) Services. April 2020. Accessed Oct 2024. Available at URL address: https://abacodes.org/wpcontent/uploads/2020/05/ABACC-Reporting-CPT-Telehealth-Delivery.pd *From Autism Resource Guide for Behavioral Health Providers* TELEHEALTH All ABA CPT codes are covered telehealth services Codes listed: 97151, 97152, 97153, 97154, 97155, 97156, 97157, 97158, 0362T, 0373T
Fidelis Care Fidelis Care. Clinical policy: clinical and preventive health guidelines reference number CP.FC.43[48]	**Description** Fidelis Care adopts clinical and preventive health guidelines to support network providers in the provision of high quality care and reduce unnecessary variation in care. Adopted guidelines also provide the clinical platform for our Disease and Care Management Programs. Clinical and preventative guidelines are developed from evidence-based medicine and rigorous review of published medical literature; or by professional standards in the absence of evidence-based medicine; or by expert opinion in the absence of professional standards. Guideline adoption considers the unique characteristics of Fidelis Care's membership as well as the composition of our provider network. Fidelis is committed to ensuring compliance with the Mental Health Parity and Addiction Equity Act ("MHPAEA" or "parity"). Fidelis has adopted parity compliance non-quantitative treatment limitation (NQTL) testing policies and procedures for medical necessity criteria and clinical coverage guidelines. All medical necessity and clinical coverage guidelines described in this policy also comply with NQTL policies adopted by Fidelis. **Policy/Criteria** Clinical and preventative guidelines are reviewed and updated at least every two years and more frequently when updates are released by the issuing entity. Fidelis Care's Utilization Management Sub-Committee (UMSC) reviews adopted guidelines for appropriateness and applicability to our member and provider network. The Clinical and

<table>
<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td></td><td>Preventative Guidelines Report is brought to UMSC at least every two years for review. The report includes: adopted guidelines, medical source of the guideline, provider type the guideline targets and the status of guidelines (changed/unchanged). The report also includes measures for monitoring provider adherence to the adopted guidelines. Per NYSDOH in collaboration with OMH, OASAS, and OCFS, Fidelis Care will adopt, disseminate, and implement an additional set of clinical guidelines for children with behavioral health needs, the listing of these guidelines can be found in Attachment A. These guidelines will be disseminated to the behavioral health provider network in collaboration with the Regional Planning Consortiums and provider clinical training initiatives lead by State partners in collaboration with McSilver/MCTAC/CTAC. The Regional Planning Consortiums are facilitated by a state contractor and are made up of a variety of provider types, such as hospitals, PCPs, and BH providers, primarily focused on cross functional behavioral health planning in each region. Board members are elected each year, and are elected through voting- and the active board members are listed by region on the website http://clmhd.org/rpc/. All behavioral health clinical guidelines will be parity compliant as evidenced by the testing of these guidelines in Fidelis' Medical Necessity and Clinical Coverage Guidelines NQTL Policy
Attachment A:

Adopted Clinical Practice and Preventive Health Guidelines
<table><tr><th>Behavioral Health Conditions/Diseases</th><th>Guideline Title</th><th>Recognized Source</th><th>URL</th><th>Review/Update</th></tr></table></td></tr>
</table>

Health Plan or State	Policy Language				
	Autism	Practice Parameters for Telehealth-Implementation of Applied Behavior Analysis, 2nd edition (2021)	The Council of Autism Service Providers (CASP)	https://casproviders1.wpengine.com/wp-content/uploads/2021/12/Final-Copy-Practice-Parameters-Telehealth-ABA-AMA-References-12.2.2199.pdf	March 2024
Healthfirst Healthfirst. Healthfirst policy for the authorization of applied behavioral analysis (ABA) services. 2022[49]	*Only excerpted information related to telehealth.* 15. At-home or community-based ABA services are preferred. However, in limited and unusual circumstances, and if they cannot be delivered in person, they may be delivered fully or partially via telehealth. It is expected that given the nature of ASD that such services would be limited in duration (typically no more than two hours/day). A parent or responsible adult must be collaborating with the telehealth-enabled provider in the same space as the child.				
MetroPlus Health MetroPlus Health. Adaptive behavior treatment (ABT) for applied behavior analysis (ABA) therapy. 2022[50]	*Only excerpted information related to telehealth.* **1. POLICY DESCRIPTION:** This policy describes the conditions under which MetroPlus will cover Applied Behavior Analysis (ABA) for autism spectrum and related disorders. **2. RESPONSIBLE PARTIES:** Behavioral Health Policy Subcommittee (BHPS) MetroPlus' Utilization Management Department Sr. Director of Children's Special Services Vice President of Behavioral Health **DEFINITIONS:** Telehealth: The use of approved telecommunication and web based methods to provide assessment, supervision, parent training, and consultation to a member across distance. This may include the use of synchronous (e.g., live face to face in real time) methods, allowing for interactive audio and visual communication between the qualified healthcare professional, staff and parent or member. **3. POLICY:** 6. Best practices dictate in-person services are preferred to telehealth services. Requests for synchronous telehealth will be reviewed for medical necessity on a case-by-case basis. We expect that providers to provide these services in a				

Health Plan or State	Policy Language
	manner consistent with BACB ethical standards, and DOH telehealth guidelines. We reserve the right to retrospective review of services delivered using telehealth.
Molina Healthcare	*We were unable to identify a policy addressing ABA therapy provided via telehealth for Molina Healthcare.*
UnitedHealthcare UnitedHealthcare. Telehealth-eligible service code list. 2025[51] UnitedHealthcare. Telehealth audio only code list. 2025[52]	*From Telehealth-eligible Service Code List* ABA codes on list include: 0362T, 0373T, 97151, 97152, 97153, 97154,97155, 97156, 97157, 97158 *From Telehealth Audio Only Code List* No ABA codes listed in this document
Medicaid	
California California Department of Health Care Services. Medicine: telehealth policy manual. 2023[53]	Reimbursable Telehealth Services Medi-Cal covered benefits or services, identified by CPT or HCPCS codes and subject to all existing Medi-Cal coverage and reimbursement policies, including any Treatment Authorization Request (TAR) requirements, may be provided via a telehealth modality, as outlined in this section, only if all of the following are satisfied: g. The treating health care provider at the distant site believes that the benefits or services being provided are clinically appropriate based upon evidence-based medicine and/or best practices to be delivered via telehealth; h. The benefits or services delivered via telehealth meet the procedural definition and components of the CPT or HCPCS code(s), as defined by the American Medical Association (AMA), associated with the Medi-Cal covered service or benefit, as well as any extended guidelines as described in this section of the Medi-Cal provider manual; i. The benefits or services provided via telehealth meet all laws regarding confidentiality of health care information and a patient's right to his or her medical information. Covered benefits or services provided via a telehealth modality are reimbursable when billed in 1 of 2 ways: j. For services or benefits provided via synchronous, interactive audio and visual telecommunications systems, the health care provider bills with modifier 95. k. For services or benefits provided via asynchronous store and forward telecommunications systems, the health care provider bills with modifier GQ. l. For services or benefits provided via synchronous telephone or other real-time interactive audio-only telecommunications systems, the health care provider bills with modifier 93. Examples of Services Not Appropriate for Telehealth Certain types of benefits or services that would not be expected to be appropriately delivered via telehealth include, but are not limited to, benefits or services that are performed in an operating room or while the patient is under anesthesia, require direct visualization or instrumentation of bodily

<table>
<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td></td><td>structures, involve sampling of tissue or insertion/removal of medical devices and/or otherwise require the in-person presence of the patient for any reason</td></tr>
<tr><td>Florida

Florida Agency for Health Care Administration. Behavior analysis services coverage policy. 2024[58]

Florida Agency for Health Care Administration. Behavior analysis fee schedule January 1, 2025[59]</td><td>Only excerpted information related to telehealth.

From Behavior Analysis Services Coverage Policy

4.2.2 Behavior Analysis Interventions
Florida Medicaid covers up to 40 hours per week of BA intervention services as indicated in the recipient's prior-authorized behavior plan. These services must be delivered to reduce maladaptive behaviors and assist the recipient reach the best possible functional level for that individual.

The recipient's parent or guardian should participate in treatment when possible and clinically appropriate. The provider must make every effort to accommodate parental participation and must document those efforts in treatment plan updates. If parent or guardian participation is not possible, the treatment plan and session notes must document the reasons for non-participation. Documentation should also explain potential impacts of non-participation and how potential impacts are being mitigated.

Services include:
m. Family adaptive behavior treatment guidance – parent, guardian, and/or caregiver training on the implementation of the behavior plan and intervention strategies
• The recipient may or may not be present depending upon clinical appropriateness.
• The recipient may receive behavior analysis services from 1 rendering provider within a provider group, while the parent, guardian, and/or caregiver receives family adaptive behavior treatment guidance from a second rendering provider within the same provider group.
• Services may be provided by Lead Analyst or BCaBA
• The Lead Analyst may provide up to two hours per week of training to parents or guardians via telemedicine in accordance with Rule 59G-1.057, Florida Administrative Code, (F.A.C.).

From Behavior Analysis Fee Schedule

<table>
<tr><th>Service</th><th>Code</th><th>Modifier</th><th>Reimbursement</th><th>Description</th></tr>
<tr><td>Family training via telemedicine</td><td>97156</td><td>GT</td><td>$19.05 per 15 minutes</td><td>Service provided by a Lead Analyst; Florida Medicaid reimburses up to 2 hours per week</td></tr>
</table>
</td></tr>
</table>

Health Plan or State	Policy Language
Massachusetts MassHealth. Applied behavior analysis provider frequently asked questions. 2020[60] Commonwealth of Massachusetts Office of Medicaid. All provider bulletin 379: access to health through telehealth options. 2023[57]	*From Applied Behavioral Analysis Provider Frequently Asked Questions (2020)* **Telehealth Questions** **Can all Applied Behavior Analysis (ABA) codes be used via telehealth?** Yes, all ABA codes/services can be conducted via telehealth. **Does MBHP cover secondary benefits for telehealth if the primary insurer does not cover services provided via telehealth?** During the state of emergency, most commercial insurers are allowing telehealth to be used to deliver services. If commercial insurers deny claims due to telehealth modality, providers should follow the usual and customary procedures and submit an Explanation of Benefits from the member's primary insurer to MBHP. **What if my agency does not have a dedicated telehealth platform?** As stated in All Provider Bulletin 289, during the State of Emergency, "MassHealth is not imposing specific requirements for technologies used to deliver services via telehealth and will allow reimbursement for MassHealth covered services delivered through telehealth so long as such services are medically necessary and clinically appropriate and comport with the guidelines set forth in Appendix A to this bulletin." Services can be delivered over the phone, via live video, or through a formal telehealth platform. The Bulletin, with accompanying appendix, is available at: https://www.mass.gov/files/documents/2020/03/13/All-289.pdf. **Can services be provided via telehealth effective immediately?** Yes. As noted in MassHealth Bulletin 289 "Providers will be able to bill MassHealth for these services delivered via Telehealth beginning April 1, 2020, for dates of service on or beginning March 12, 2020." **Can we begin to utilize telehealth codes under a Member's current authorization?** Yes. Providers should follow the usual and customary procedures for obtaining authorization for services. Telehealth is a modality for providing the service, which should be indicated by the use of 02 as the place of service (POS). **What are the modifiers for ABA telehealth?** No modifiers are required, but providers do need to use POS 02. *From All Provider Bulletin 379: Access to Health Through Telehealth Options* A. Coverage of Services Provided via Telehealth As under All Provider Bulletin 355, Section B of this bulletin identifies specific categories of service that MassHealth has deemed inappropriate for delivery via any telehealth modality. Except for those services identified in Section B in

Health Plan or State	Policy Language
	this bulletin, and notwithstanding any regulation to the contrary, including the physical-presence requirement at 130 CMR 433.403(A)(2), a MassHealth-enrolled provider may deliver medically necessary MassHealth-covered services on an outpatient basis to a MassHealth member via the telehealth modalities of audio-only, live video, and asynchronous visits, if: n. the provider has determined that it is clinically appropriate to deliver such service via telehealth, including the telehealth modality and technology employed, including obtaining member consent; o. such service is payable under that provider type; p. the provider satisfies all requirements set forth in this bulletin, including in Appendix A, and any applicable program-specific bulletin; q. the provider delivers those services in accordance with all applicable laws and regulations (including M.G.L. c. 118E, § 79 and MassHealth program regulations); and r. the provider is appropriately licensed or credentialed to deliver those services. MassHealth will continue to monitor telehealth's impacts on quality of care, cost of care, patient and provider experience, and health equity to inform the continued monitoring and iteration of its telehealth policy. Based on the results of this monitoring, and its analysis of relevant data and information, MassHealth may adjust its coverage policy, including by imposing limitations on the use of certain telehealth modalities for various covered services or provider types.
New Jersey New Jersey Division of Medical Assistance. Contract between state of New Jersey Department of Human Services Division of Medical Assistance and Health Services and contractor. 2024[61] Optum. New Jersey Family Care ABA provider orientation. 2022[139]Optum. New Jersey Family Care ABA provider orientation. 2022[139]	*Only excerpted information related to ASD and telehealth.* *From Contract Between State of New Jersey Department of Human Services Division of Medical Assistance and Health Services and Contractor* **Autism Spectrum Disorder**. For all beneficiaries with an Autism Spectrum Disorder (ASD) diagnosis, the Contractor shall provide Applied Behavioral Analysis (ABA) (beginning April 1, 2020), augmentative and alternative communication services and devices, Sensory Integration (SI) services, allied health services (physical therapy, occupational therapy and speech therapy), and Developmental Relationship based services including but not limited to DIR, DIR-Floortime and the Greenspan approach therapy (beginning July 1, 2020). In addition, the Contractor shall make appropriate referrals to the Department of Children and Families' (DCF) Children's System of Care (CSOC). CSOC is responsible for the provision of "Clinical Interventions" and "Skill Acquisition and Capacity Building" services that may be beneficial in the treatment of ASD. The Contractor shall work with DCF to ensure individuals with ASD receive the proper, medically necessary services required to treat their ASD diagnosis. This may include making or receiving referrals as well as participation in a CSOC multidisciplinary team meeting to address the individual's needs. **X. Telemedicine, Teledentistry and Telehealth** – Telemedicine and telehealth are approved modes of delivering service under NJ FamilyCare. Contractor shall require its health care providers who use telemedicine, teledentistry or engage in telehealth to meet all existing laws, rules and regulations governing the service being provided as well as the requirements listed in P.L.2017, c.117 (C.45:1-61 et al).

Health Plan or State	Policy Language
	1. Telehealth is the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. New Jersey law requires NJ FamilyCare MCOs to provide coverage and payment for health care services delivered to a Medicaid recipient through telemedicine, teledentistry or telehealth. Unless specifically prohibited or limited by federal or State law, a health care provider who establishes a proper provider-patient relationship with a patient may remotely provide health care services to a patient through the use of telehealth, as necessary, to support and facilitate the provision of health care services to patients. 2. Contractors shall authorize and reimburse for any service provided by a health care provider who is validly licensed, certified, or registered with the Department of Health (annually) to provide such services in the State of New Jersey so long as either the provider or patient are located in New Jersey at the time the services were provided. Services must be provided in compliance with existing requirements under law or regulation. Reimbursement payments under this section may be provided either to the individual practitioner who delivered the reimbursable services, or to the agency, facility, or organization that employs the individual practitioner who delivered the reimbursable services, as appropriate. 3. The Contractor may not limit coverage of services that are delivered by participating health care providers or charge any deductible, copayment, or coinsurance for a health care service, delivered through telemedicine, teledentistry or telehealth, in an amount that exceeds the deductible, copayment, or coinsurance amount that is applicable to an inperson consultation. Services must be provided in compliance with existing requirements under law or regulation. 4. To qualify for reimbursement, the provision of telehealth, telemedicine, or teledentistry requires: a. Providers must be validly licensed to practice in the State of NJ. b. Telemedicine and teledentistry services shall be provided using interactive, real-time, twoway communication technologies with proper encryption. Teledentistry may only be provided as a synchronous, real-time encounter. c. Providers may use asynchronous store-and-forward technology to allow for the electronic transmission of images, diagnostics, data, and medical information. d. Providers may use interactive, real-time, two-way audio in combination with asynchronous store-and-forward technology, without video capabilities, if, after accessing and reviewing the patient's medical records, the provider determines that the provider is able to meet the same standard of care as if the health care services were being provided in person. e. The identity, professional credentials, and contact information of a health care provider providing telemedicine, teledentistry or telehealth services shall be made available to the patient during and after the provision of services. The contact information shall enable the patient to contact the health care provider, or a substitute health care provider authorized to act on behalf of the provider who provided services, for at least 72 hours following the provision of services. f. Any health care provider providing health care services using telemedicine, teledentistry or telehealth shall be subject to the same standard of care or practice standards as are applicable to in-person settings.

Health Plan or State	Policy Language
	g. If telemedicine, teledentistry or telehealth services would not be consistent with this standard of care, the health care provider shall direct the patient to seek in-person care. h. Diagnosis, evaluation, treatment, and consultation recommendations, including discussions regarding the risk and benefits of the patient's treatment options, which are made through the use of telemedicine, teledentistry or telehealth, including the issuance of a prescription based on a telemedicine, teledentistry or telehealth encounter shall be held to the same standard of care or practice standards as are applicable to in-person settings. i. The prescription of Schedule II controlled dangerous substances through the use of telemedicine, teledentistry or telehealth shall be authorized only after an initial in-person examination of the patient, as provided by regulation, and a subsequent in-person visit with the patient shall be required every three months for the duration of time that the patient is being prescribed the Schedule II controlled dangerous substance. j. An initial in-person visit is not required when a health care provider is prescribing a stimulant which is a Schedule II controlled dangerous substance for use by a minor patient under the age of 18, provided that the health care provider is using interactive, real-time, two-way audio and video technologies when treating the patient and the health care provider has first obtained written consent for the waiver of these in-person examination requirements from the minor patient's parent or guardian. k. A health care provider who engages in telemedicine, teledentistry or telehealth shall maintain a complete record of the patient's care, and shall comply with all applicable State and federal statutes and regulations for recordkeeping, confidentiality, and disclosure of the patient's medical record. l. Prior to initiating contact with a patient for the purpose of providing services, the provider must determine they are able to provide the same standard of care using telemedicine, teledentistry or telehealth. m. Teledentistry may only be utilized by Members who are homebound, or are enrolled as IDD or MLTSS Below from Optum New Jersey Family Care ABA Provider Orientation **ABA virtual visits** Optum allows BCBAs/Licensed BH Clinicians within contracted ABA practices to conduct ABA supervision and/or caregiver training via telehealth. s. In order to provide supervision and/or caregiver training services via telehealth, you must be an approved Optum virtual visits provider who has attested to meeting the requirements specific to providing these services: t. You can complete and submit a virtual visits attestation on our virtual visits page of Provider Express and will be notified of approval or denial Once approved as a virtual visits provider, please be sure to alert the Optum Care Advocate that the ABA supervision and caregiver training services will be provided virtually when completing the authorization process. u. After receiving authorizations, to bill for the virtual ABA Supervision of Behavior Technicians and Family Training and Guidance:

Health Plan or State	Policy Language
	Simply include the same procedure code you would use for an in-person service, 97155 or 97156, on your claim with the "02" place of service code to let us know the service was provided via telehealth.
North Carolina North Carolina Medicaid. Research-based behavioral health treatment (RB-BHT) for autism spectrum disorder (ASD). 2023[63]	*Only excerpted information related to telehealth.* **3.0 When the Procedure, Product, or Service Is Covered** 3.1 General Criteria Covered Medicaid shall cover the procedure, product, or service related to this policy when medically necessary, and: a. the procedure, product, or service is individualized, specific, and consistent with symptoms or confirmed diagnosis of the illness or injury under treatment, and not in excess of the beneficiary's needs; b. the procedure, product, or service can be safely furnished, and no equally effective and more conservative or less costly treatment is available statewide; and c. the procedure, product, or service is furnished in a manner not primarily intended for the convenience of the beneficiary, the beneficiary's caretaker, or the provider. 3.1.1 Telehealth Services As outlined in Attachment A, select services within this clinical coverage policy may be provided via telehealth. Services delivered via telehealth must follow the requirements and guidance set forth in Clinical Coverage Policy 1-H: Telehealth, Virtual Patient Communications, and Remote Patient Monitoring. 3.1.2 Telephonic Services As outlined in Attachment A, select services within this clinical coverage policy may be provided via the telephonic, audio-only communication method. Telephonic services may be transmitted between a patient and provider in a manner that is consistent with the CPT code and definition for those services. This service delivery method is reserved for circumstances when: a. the caregiver's physical or behavioral health status prevents them from participating in in-person or telehealth services; or b. access issues (e.g., transportation, telehealth technology) prevent the caregiver from participating in in-person or telehealth services. Refer to Subsection 3.2.5 for Telephonic-Specific Criteria; Subsections 5.1 and 5.2 for Prior Approval requirements; and Subsection 7.1 for Compliance requirements. 3.2.5 Telephonic-Specific Criteria a. Providers shall ensure that services can be safely and effectively delivered using telephonic, audio-only communication; b. Providers shall consider the caregiver's abilities to participate in services provided using telephonic, audio-only communication; c. Delivery of services using telephonic, audio-only communication must conform to professional standards of care including but not limited to ethical practice, scope of practice, and other relevant federal, state and institutional policies and requirements including Practice Act and Licensing Board rules; d. Providers shall obtain and document verbal or written consent. In extenuating circumstances when consent is unable to be obtained, this should be documented;

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e. Providers shall verify the caregiver's identity using two points of identification before initiating a telephonic, audio-only encounter; and
f. Providers shall ensure that the beneficiary and caregivers' privacy and confidentiality is protected.
Transition and discharge planning from a treatment program must document a written plan that specifies details for monitoring and followup as appropriate for the beneficiary and family or caregiver.
The treatment plan is not to be used to provide respite, day care, or educational services and is not to be used to reimburse a parent for participating in a treatment program. The treatment or discharge plan must be available to a health plan upon request. A unit of service is defined according to the Current Procedural Terminology (CPT) approved code set unless otherwise specified.
D. Modifiers
Non-Telehealth Claims: Provider(s) shall follow applicable modifier guidelines.
Telehealth Claims: Modifier GT must be appended to the CPT or HCPCS code to indicate that a service has been provided via interactive audio-visual communication. This modifier is not appropriate for virtual patient communications or remote patient monitoring.
Telephonic Claims: Modifier KX must be appended to the CPT or HCPCS code to indicate that a service has been provided via telephonic, audio-only communication.

<table>
<tr><th colspan="2">CPT Code(s)</th><th>Telehealth Billable Services (with GT modifier)</th><th>Telephonic Billable Services (with KX modifier)</th></tr>
<tr><td>97151</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>No</td></tr>
<tr><td>97152</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>No</td></tr>
<tr><td>97153</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>No</td></tr>
<tr><td>91754</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>No</td></tr>
<tr><td>97155</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>No</td></tr>
<tr><td>97156</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>If the criteria in 3.1.2 and 3.2.5 are met, the following services may be offered via telephonic modality</td></tr>
<tr><td>97157</td><td>1 unit = each 15-minute increment</td><td>Yes</td><td>If the criteria in 3.1.2 and 3.2.5 are met, the following services</td></tr>
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<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
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<tr><td></td><td></td><td></td><td>may be offered via telephonic modality</td></tr>
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</td></tr>
<tr><td>Oregon

Oregon Health Authority. February 2025 behavioral health fee schedule. 2025[64]</td><td>
<table>
<tr><th>Code</th><th>Description</th><th>Rate</th><th>Unit</th><th>Allowed Modifiers</th><th>Rendered by</th></tr>
<tr><td>97151</td><td>Behavior identification assessment and plan of care, each 15 minutes</td><td>$20.85</td><td>15 minutes</td><td>GT</td><td>BCBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>97152</td><td>Behavior identification-supporting assessment, administered by 1 technician, each 15 minutes</td><td>$19.81</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, BAI, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>97153</td><td>Behavior treatment by protocol administered by technician, each 15 minutes</td><td>$14.70</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, BAI, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>97154</td><td>Group behavior treatment by protocol administered by technician, each 15 minutes, per recipient</td><td>$13.72</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, BAI, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>97155</td><td>Behavior treatment with protocol modification administered by physician or other qualified health care professional, each 15 minutes</td><td>$32.07</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>97156</td><td>Family behavior treatment guidance administered by qualified health care</td><td>$32.07</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
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<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>professional, each 15 minutes, single family</td><td></td><td></td><td></td><td></td></tr>
<tr><td>97157</td><td>Family behavior treatment guidance administered by qualified health care professional, 15 minutes, per family</td><td>$8.68</td><td>15 minutes</td><td>GT</td><td>BCBA, BCaBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>99366</td><td>Medical team conference with patient and/or family and nonphysician health care professionals, 30 minutes or more</td><td>$37.10</td><td>30 minutes</td><td>GT</td><td>BCBA, BCaBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
<tr><td>99368</td><td>Medical team conference with nonphysician health care professionals, 30 minutes or more</td><td>$29.46</td><td>30 minutes</td><td>GT</td><td>BCBA, BCaBA, Physician, Psychologist, legislatively approved licensed healthcare professional*</td></tr>
</table>
GT modifier =
VIA INTERACTIVE SIMULTANEOUS AUDIO AND TELECOMMUNICATION SYSTEMS
</td></tr>
<tr><td>Pennsylvania

Pennsylvania Department of Human Services. Title 55 human services chapter 5240 intensive behavioral health services regulatory compliance guide. 2022[65]

Pennsylvania Department of Human Services, Office of Mental Health and Substance Abuse Services Bulletin. Revised guidelines for the delivery of behavioral health</td><td>Only excerpted information related to telehealth.

From Intensive Behavioral Health Services Regulatory Compliance Guide

Regulation: § 5240.82. Supervision of staff who provide ABA services.
(g) Face-to face supervision may be delivered through secure, real-time, two-way audio and video transmission that meets technology and privacy standards required by the Health Insurance Portability and Accountability Act [HIPAA] of 1996 (Pub.L. No. 104-191)
Discussion: OMHSAS interprets regulation to mean that face-to-face supervision may include the use of HIPAA-compliant audio-video communication products. Face-to-face supervision may not include supervision conducted using audio-only telephone conversation.

OMHSAS-21-22 REVISED GUIDELINES FOR THE DELIVERY OF BEHAVIORAL HEALTH SERVICES THROUGH TELEHEALTH
.</td></tr>
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Health Plan or State	Policy Language
services through telehealth. 2022[66]	Some behavioral health services may be appropriate to be provided primarily through telehealth, while other services will require ongoing in-person delivery for a significant portion of or all of the services. Providers and practitioners should carefully consider the clinical appropriateness of telehealth delivery for such services, including, but not limited to: Partial Hospitalization, Intensive Behavioral Health Services (IBHS), Family Based Mental Health, Assertive Community Treatment (ACT), or if the beneficiary is in a residential facility or inpatient setting. *From Revised Guidelines for the Delivery of Behavioral Health Services Through Telehealth* **Determining Appropriateness for Telehealth Delivery of Services** Licensed practitioners and provider agencies delivering services through telehealth must have policies that ensure that services are delivered using telehealth only when it is clinically appropriate to do so and that licensed practitioners are complying with standards of practice set by their licensing board for telehealth where applicable. Factors to consider include, but are not limited to: The preference of the individual served and/or the preference of parents or guardians Whether there is an established relationship with the service provider and the length of time the individual has been in treatment v. Level of acuity needed for care w. Risk of harm to self or others x. Age of a minor child y. Ability of the individual served to communicate, either independently or with accommodation such as an interpreter or electronic communication device z.Any barriers to in-person service delivery for the individual aa. Access to technology of the individual served bb. Whether privacy for the individual served could be maintained if services are delivered using telehealth cc. Whether the service relies on social cueing and fluency The preference of the individual served and/or their parents or legal guardian(s), as applicable, should be given high priority when making determinations of the appropriateness of the telehealth delivery. However, no service should be provided through telehealth when, in the best clinical judgement of the licensed practitioner, it is not clinically appropriate. When the use of telehealth is not clinically appropriate, the licensed practitioner or provider agency must offer the services in-person. If the individual disagrees with the clinical determination, the licensed practitioner or provider agency may refer the individual to other in-network providers or the managed care organization.
Texas Texas Medicaid. Provider procedures manual children's services handbook. 2025[67]	*Only excerpted information related to telehealth.* **2.3.12.1 Telehealth Service Delivery** Some service delivery to children or youth and to the parents or caregivers may be delivered remotely. It is the LBA's responsibility to ensure that remotely delivered telehealth services are within scope of practice, are not contraindicated for the child or youth, family, or particular situation, are clinically appropriate and effective, and are in

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<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td></td><td>compliance with Texas licensure and standards for telehealth as well as follow all Medicaid, Texas Health Steps-CCP and the Medicaid Autism Services requirements.
ABA evaluation and treatment services may only be delivered via telehealth using synchronous audiovisual technology. The following procedure codes may be delivered via telehealth:

<table>
<tr><th>Procedure Codes</th><th>Required Modifier to Designate Remote Delivery</th></tr>
<tr><td>97151</td><td>95</td></tr>
<tr><td>97155</td><td>95</td></tr>
<tr><td>97156</td><td>95</td></tr>
<tr><td>97158</td><td>95</td></tr>
<tr><td>99366</td><td>95</td></tr>
</table>

LaBAs and RBTs may not deliver any service remotely. Reimbursable remote delivery services must include synchronous audiovisual interaction between the distant site provider and the child or youth or parent or caregiver in another location.
Procedure code 97156 is used by the LBA (or as delegated to an LaBA) for guiding the parents or caregivers (with or without the child or youth with ASD present) to use the ABA treatment plan protocols to reinforce adaptive behaviors for durability and generalizability. LBAs may delegate parent or caregiver teaching to LaBAs working under their supervision. LaBAs may not deliver services remotely via telehealth

LBA: licensed behavior analyst
LaBA: licensed assistant behavior analyst
RBT: registered behavior technician</td></tr>
<tr><td>Washington

Washington State Health Care Authority. Applied behavior analysis (ABA) billing guide. 2025[68]</td><td>Only excerpted information related to telehealth.

Which services may be provided via telemedicine?
Applied Behavior Analysis (ABA) services delivered using telemedicine may be reimbursed by HCA when billed in accordance with the rules regarding telemedicine and store-and-forward technology as outlined in WAC 182-501-0300 and HCA's published billing instructions for ABA and telemedicine services.

LBATs who use telemedicine are responsible for determining if telemedicine can be performed without compromising the quality of the service, or the outcome of the ABA therapy treatment plan.</td></tr>
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<table>
<tr><th>Health Plan or State</th><th>Policy Language</th></tr>
<tr><td></td><td>HCA allows the following services to be performed via telemedicine:
<table>
<tr><th>CPT Code</th><th>Short Description</th></tr>
<tr><td>99366</td><td>Team conference with patient by healthcare professional</td></tr>
<tr><td>99368</td><td>Team conference without patient by healthcare professional</td></tr>
<tr><td>97155</td><td>Adaptive behavior treatment physician or qualified health provider</td></tr>
<tr><td>97156</td><td>Family adaptive behavior treatment guidance by physician or qualified health provider</td></tr>
<tr><td>97157</td><td>Multiple family adaptive behavior treatment guidance</td></tr>
</table></td></tr>
</table>

Abbreviations. ABA: applied behavior analysis; ACT: assertive community treatment; AMA: American Medical Association; ASD: autism spectrum disorder; BACB: Behavior Analyst Certification Board; BAI: behavior analysis; BCaBA: board certified assistant behavior analyst; BCBA: board certified behavior analyst; BH: behavioral health; BHPS: behavioral health policy subcommittee; CASP: Council of Autism Service Providers; CCP: comprehensive care program (Texas); CMR: code of Massachusetts Regulations; CPT: current procedural terminology; CSOC: children's system of care; CTAC: Community Technical Assistance Center of New York; DCF: Department of Children and Families (New Jersey); DIR: developmental, individual-difference, relationship based; DOH: Department of Health; FAC: Florida administrative code; HCA: Health Care Authority (Washington); HCPCS: healthcare common procedure coding system; HIPAA: Health Insurance Portability and Accountability Act; IBHS: intensive behavioral health services; LBA: licensed behavior analyst; LaBA: licensed assistant behavior analyst; LBAT: licensed behavioral analyst therapist; MCO: managed care organization; MCTAC: Managed Care Technical Assistance Center of New York; MGL: Massachusetts general laws; MHPAEA: Mental Health Parity and Addiction Equity Act; NQTL: non-quantitative treatment limitation; NYSDOH: New York State Department of Health; OASAS: Office of Addiction Services and Supports (New York); OCFS: Office of Children and Family Services (New York); OMH: Office of Mental Health (New York); OMHSAS: Office of Mental Health and Substance Abuse Services (Pennsylvania); PCP: primary care provider; RBT: registered behavior technician; RCT: randomized controlled trial; SI: sensory integration; TAR: treatment authorization request (California); UMSC: utilization management subcommittee; WAC: Washington administrative code.

Appendix I. Relevant Codes

Table I1. Applicable Codes for ABA for Autism Spectrum Disorder

Code	Description
ICD-10-CM codes	
F84.0	Autistic disorder
F84.2	Rett syndrome
F84.3	Other childhood disintegrative disorder
F84.5	Asperger syndrome
F84.8	Other pervasive developmental disorders
F84.9	Pervasive developmental disorder, unspecified
CPT codes	
0362T	Behavior identification supporting assessment, each 15 minutes of technician's face-to-face with a patient, requiring the following components: administration by the physician or other qualified healthcare professional who is on site; with the assistance of two or more technicians; for a patient who exhibits destructive behavior; completing in an environment that is customized to the patient's behavior
0373T	Adaptive behavior treatment with protocol modification, each 15 minutes of technicians' time face-to-face with a patient, requiring the following components: administration by the physician or other qualified healthcare professional who is on site; with the assistance of two or more technicians; for a patient who exhibits destructive behavior; completion in an environment that is customized to the patient's behavior
97151	Behavior identification assessment, administered by a physician or other qualified healthcare professional, each 15 minutes of the physician's or other qualified healthcare professional's time face-to-face with patient and/or guardian(s)/caregiver(s) administering assessments and discussing findings and recommendations, and non-face-to-face analyzing past data, scoring/interpreting the assessment, and preparing the report/treatment plan
97152	Behavior identification-supporting assessment, administered by 1 technician under the direction of physician or other qualified healthcare professional, face-to-face with the patient, each 15 minutes
97153	Adaptive behavior treatment by protocol, administered by technician under the direction of a physician or other qualified healthcare professional, face-to-face with 1 patient, each 15 minutes
97154	Group adaptive behavior treatment by protocol, administered by technician under the direction of a physician or other qualified healthcare professional, face-to-face with two or more patients, each 15 minutes
97155	Adaptive behavior treatment with protocol modification, administered by physician or other qualified healthcare professional, which may include simultaneous direction of technician, face-to-face with 1 patient, each 15 minutes
97156	Family adaptive behavior treatment guidance, administered by physician or other qualified healthcare professional (with or without the patient present), face-to-face with guardian(s)/caregiver(s), each 15 minutes
97157	Multiple-family group adaptive behavior treatment guidance, administered by a physician or other qualified healthcare professional (without the patient present), face-to-face with multiple sets of guardians/caregivers, each 15 minutes

Code	Description
97158	Group adaptive behavior treatment with protocol modification, administered by physician or other qualified healthcare professional, face-to-face with multiple patients, each 15 minutes
99366	Medical team conference with interdisciplinary team of health care professionals, face-to-face with patient and/or family, 30 minutes or more; participation by non-physician qualified health care professional
99368	Medical team conference with interdisciplinary team of health care professionals, face-to-face without patient and/or family, 30 minutes or more; participation by non-physician qualified health care professional

Abbreviations. CPT: Current Procedural Terminology; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification.