



Providing Early Intervention to children with autism

Cost and funding implications of good practice

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Executive Summary

This paper assesses the impact of providing good practice Early Intervention (EI) to children with autism, focusing on those children with moderate to severe autism. The paper also assesses the level of funding required for the delivery of good practice EI and assesses this against the funding to be made available for small group interventions by the National Disability Insurance Agency (NDIA).

A set of good practice guidelines have been established for the provision of EI to children with autism. These guidelines set out the following key principles:

- programs are to be tailored to the strengths and needs of each child, with Individual Plans to be developed in collaboration with EI service providers, family members and other service providers;
- programs should address some or all of the key features of autism and have a strong focus on transition support;
- programs are to be multidisciplinary and collaborative, with assessments and programs to be provided by a number of individual service providers; and
- personnel should be specifically trained in working with children with autism. A staffing ratio of at least one professional to three children must be maintained.

There is growing evidence supporting the effectiveness of good practice EI. High quality EI that is implemented in accordance with the good practice guidelines has been shown to lead to significant improvements for children with autism in intellectual functioning, adaptive behaviour, challenging behaviours, and autism symptoms.

AEIOU is the largest specialised EI provider in Australia, combining good practice EI with specialised childcare. AEIOU's program meets the good practice guidelines, comprising an evidence-based autism-specific curriculum provided by a transdisciplinary team with a high staff-to-child ratio. The provision of EI under a model that is consistent with the good practice guidelines, such as AEIOU's program, is essential for children with moderate to severe autism.

Conversely, the provision of EI to children with moderate to severe autism in a mainstream setting (as was previously canvassed under the NDIA's Early Childhood Early Intervention framework) is not conducive to the achievement of positive outcomes. Where intervention is delivered in this environment, shortfalls in adequate staffing, training and expertise are likely to threaten developmental outcomes for children with moderate to severe autism.

Based on an assessment of the cost of delivering AEIOU's program, the cost of providing good practice EI has been estimated at \$52,379 per child per annum. Assuming that each child receives good practice EI for 20 hours per week and 47 weeks per year (in accordance with the good practice guidelines), this equates to a cost of \$55.72 per hour. It is noted that Learning for Life, another good practice EI service provider, has advised that it estimates the cost of its program at \$60 per hour.

These cost estimates are consistent with the price for the NDIA line item for specialised group early childhood interventions of \$58.53 per hour. This service involves the provision of group-based interventions with a maximum child to staff ratio of 4:1.

In addition to comparing against existing funding sources, it is also important to assess the cost against the benefits of providing good practice EI to children with moderate to severe autism. In 2013, Synergies Economic Consulting conducted a cost-benefit analysis on the provision of good practice EI to a cohort of children with autism, with the cohort being broken down into three groups – children with severe autism; children with moderate autism; and children with High Functioning Autism.

Based on an update of this analysis, the net economic benefit of providing good practice EI to children in the moderate and severe cohorts was estimated at \$1.15 million and \$1.25 million per child respectively. These results reflect the quantum of the cost savings, both for the individual and the wider community, that are achievable through the provision of good practice EI to children with moderate to severe autism.

On this basis, it is recommended that the NDIA line item for specialised group early childhood interventions be applied to accredited service providers of good practice EI to children with moderate to severe autism, noting that:

- the cost of providing good practice EI to children with moderate to severe autism is comparable to the funding provided under this NDIA line item;
- AEIOU's EI program represents a higher quality service than required under the NDIA line item, with a child to staff ratio of 2:1, as opposed to 4:1 (or 3:1 under the good practice guidelines; and
- a cost-benefit analysis has demonstrated that the provision of good practice EI to children with moderate to severe autism results in a significant net benefit to both the individual receiving the EI and the wider community.

On this basis, the application of the NDIA line item for specialised group early childhood interventions to accredited providers of good practice EI to children with moderate to severe autism clearly satisfies the 'reasonable and necessary' criteria as previously set out by the Productivity Commission.

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List of abbreviations

AEIOU	Autism Early Intervention Outcomes Units
ASD	Autism Spectrum Disorder
CARS	Childhood Autism Rating Scale
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders 5
ECEI	Early Childhood Early Intervention
EI	Early Intervention
ESDM	Early Starter Denver Model
HFA	High Functioning Autism
LEAP	Learning Experiences and Alternative Program
MSEL	Mullen Scales of Early Learning
NDIA	National Disability Insurance Agency
NDIS	National Disability Insurance Scheme
PDD-NOS	Pervasive Developmental Disorder Not Otherwise Specified
PLS	Preschool Language Scale
VABS	Vineland Adaptive Behaviour Scale

1 Introduction

Autism is a lifelong disorder that has a major impact on quality of life, with the majority of adults with autism unable to live independently or participate in the workforce.¹ Effective Early Intervention (EI) is widely recognised, including by the National Disability Insurance Agency (NDIA), as being critical to improving outcomes for individuals with autism.²

This paper assesses the impact of providing good practice EI to children with autism, focusing on those children with moderate to severe autism.³ The paper draws on Synergies' 2013 cost-benefit report, which estimated the potential net economic benefit of good practice EI for a cohort of children with autism.⁴ The paper also assesses the level of funding required for the delivery of good practice EI and assesses this against the funding to be made available for small group interventions by the NDIA.

The rest of this paper is structured as follows:

- section 2 provides a description of autism, its spectrum nature and provides an overview of the good practice guidelines for EI;
- section 3 assesses the key requirements for providing EI to children with moderate to severe autism; and
- section 4 assesses the cost of providing good practice EI, the funding that is required, and assesses the cost of providing good practice EI against the economic benefit that is derived.

The paper also includes an attachment which sets out the good practice guidelines for EI.

¹ Charman, T. & Howlin, P. (2003). Research into early intervention for children with autism and related disorders: Methodological and design issues. *Autism*, 7(2), pp 217-225.

² Prior, M. & Roberts, J. (2006). Early Intervention for Children with Autism Spectrum Disorders: Guidelines for Best Practice.

³ Children with autism can be separated into three broad categories – children with severe intellectual impairment (likely non-verbal and suffering from significant behavioural issues and anxieties); children with mild to moderate intellectual impairment (difficulties with language and communication, particularly in social settings); and children with High Functioning Autism (typically do not suffer from intellectual disabilities, however can experience difficulties in other areas that can adversely impact long-term outcomes in key areas).

⁴ Synergies Economic Consulting (2013). Cost-Benefit Analysis of Providing Early Intervention to Children with Autism – Estimation of the net economic benefit of early intervention for a cohort of children with autism.

2 Autism

2.1 Autism Spectrum Disorder

Autism is one of several Autism Spectrum Disorders (ASDs) and is a life-long neurobiological disorder. ASD criteria include impairments in social and communication skills and repetitive behaviours and interests.⁵ Individuals with this diagnosis show a 'spectrum' of impairments in terms of their levels of communication and social skills, repetitive behaviours, everyday life skills and intellectual functioning.

Children with an ASD diagnosis⁶ all share the social and communicative symptoms that are the core of autism, but vary in severity of symptoms and in level of functioning.⁷ It has been found that 40 to 70 per cent of individuals with ASD have a comorbid intellectual disability.⁸

The spectrum nature of ASD means there is considerable variation in the behavioural characteristics of individuals in areas such as social relatedness, adaptive behaviour, communication and cognitive functions.

Children with moderate to severe autism (i.e. children with intellectual impairment) typically have significant behavioural issues and anxieties, severe communication impairments (i.e. many children with severe autism are nonverbal) and, particularly for children with severe autism, experience significant difficulties performing basic life skills such as self-care. While there are some commonalities in terms of the symptoms for children with High Functioning Autism (HFA), the latter are less likely to exhibit the same severity of behavioural issues, have less severe communication impairments and do not exhibit the same difficulties performing basic life skills. Children with HFA typically experience difficulties adapting to different educational settings, communicating in social settings and can experience anxiety issues.

The variation in characteristics of children across the ASD spectrum has implications for the nature of treatment that is effective for different individuals. It is therefore important that where government provides support for a particular type of treatment or

⁵ American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

⁶ ASD includes Autistic Disorder, High Functioning Autism, Asperger Syndrome, and Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS).

⁷ Prior, M. & Roberts, J. (2012). Early Intervention for Children with Autism Spectrum Disorders: Guidelines for Good Practice.

⁸ Fombonne, E. (2003). Epidemiological Surveys of Autism and Other Pervasive Developmental Disorders: An Update. *Journal of Autism and Developmental Disorders*, 33(4), 365-382. Doi: 10.1023/a:1025054610557; French, L.R., Betrone, A., Hyde, K.L., & Fombonne, E. (2013). Epidemiology of autism spectrum disorders. *The Neuroscience of Autism Spectrum Disorders*, 3-24.

intervention, this support is appropriately targeted so that it is provided to those individuals that will derive the greatest benefit.

2.2 Good practice guidelines

While the importance of EI for improving outcomes for children with autism is widely acknowledged, studies have concluded there is a lack of evidence supporting many interventions that are applied.⁹

Roberts and Prior (2006) undertook a comprehensive review of the evidence on the efficacy of different types of EI for children with autism. This review formed the basis for the development of a set of guidelines for best practice EI for children with autism. These guidelines were updated in 2011 by the Commonwealth Department of Social Security, and subsequently relabelled the 'good practice guidelines', and more recently further reviewed by the NDIA. Attachment A provides a summary of these guidelines. The key principles contained within the guidelines are:

- programs, including the content and techniques applied, must be tailored to the strengths and needs of each child;
- Individual Plans are to be developed for each child in collaboration with EI service providers, the family members and other service providers;
- programs should address some or all of the key features of autism, including communication, social interaction, repetitive behaviour and restricted interests;
- programs require a strong focus on transition support, with a systematic connection and integration between the program and the next stage for the child, whether it is transition to school or another therapeutic or special education setting;
- programs are to be multidisciplinary and collaborative, with assessments and programs to be provided by a number of individual service providers, including speech pathologists, psychologists and teachers; and
- teachers, therapists and childcare personnel should be specifically trained in working with children with autism. The majority of staff should have a minimum of two years' experience in autism. A staffing ratio of at least one professional to three children must also be maintained.

⁹ Prior, M. & Roberts, J. (2006). Early Intervention for Children with Autism Spectrum Disorders: Guidelines for Best Practice.

2.3 Diagnostic criteria

Robust diagnostic practices are an important part of the overall approach to the provision of effective care and education to children with autism. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) sets out the standardised criteria for the diagnosis of ASD. These criteria are set out in the box below.

Box 1 DSM-5 diagnostic criteria for Autism Spectrum Disorder

- A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history:
1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
 2. Deficits in nonverbal communicative behaviours used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
 3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behaviour to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.
- Severity is based on social communication impairments and restricted, repetitive patterns of behaviour.*
- B. Restricted, repetitive patterns of behaviour, interests, or activities, as manifested by at least two of the following, currently or by history:
1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g. simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
 2. Insistence on sameness, inflexible adherence to routines, or ritualised patterns of verbal or nonverbal behaviour (e.g. extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
 3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g. strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
 4. Hyper or hyperactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).
- Severity is based on social communication impairments and restricted, repetitive patterns of behaviour.*
- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

Source: Autism Spectrum Disorder (ASD) – Diagnostic Criteria; Centers for Disease Control and Prevention; See: <http://www.cdc.gov/ncbddd/autism/hcp-dsm.html>; DOA: 29 September 2016.

Dr Jessica Paynter has developed an assessment process to determine the appropriate levels of support for children with ASD. This process, which could be applied under the NDIS, sets out a step-by-step process to evaluating the appropriate level of support and form of treatment or intervention for children on the autism spectrum. The following table sets out the five key components of the assessment process.

Table 1 Components of the recommended assessment process

Component	Details
Full funding	<ul style="list-style-type: none"> Evidence has demonstrated that key outcome measures (adaptive behaviour, communication, cognition) are amenable to change in intensive EI programs of 20 hours or more per week that meet the good practice guidelines. Eligibility criteria for intensive EI program at full funding meeting the good practice guidelines of 20 hours per week is needs (below average) on one or more of these measures (Vineland Adaptive Behaviour Scale (VABS), Preschool Language Scale (PLS), Mullen Scales of Early Learning) combined with an ASD diagnosis verified using the Autism Diagnostic Observation Schedule (ADOS).
Partial funding	<ul style="list-style-type: none"> For partial funding (approx. 10-15 hours/week) children may fall within the average range on the PLS, VABS or MSEL but have identified needs in other areas of functioning (e.g. social skills, challenging behaviour) which present significant barriers to participation in mainstream less-intensive settings. These areas are also amenable to change in intensive EI programs and children's individual programs and goals should be based on these identified needs.
Support in mainstream settings	<ul style="list-style-type: none"> Children would be deemed to require support to attend mainstream settings if no clear needs could be identified that required intensive EI. Similarly, if at a follow-up assessment, a child who previously accessed full or partial support for intensive EI no longer showed significant needs this would signal transition to this reduced level of support and transition to a mainstream environment.
Monitoring of progress	<ul style="list-style-type: none"> At each child's placement they should have an individualised plan following from their assessment results (e.g. strengths and needs) that will be monitored regularly by their service provider, including a review when a child has met their goals, after 6 months or on parent request (whichever occurs first). Regulatory monitoring of outcomes should also be conducted as per the good practice guidelines. Repeat annual assessments should be conducted using the same measures to monitor progress and ascertain ongoing support needs.
Transition/Program completion	<ul style="list-style-type: none"> Child assessments including monitoring are recommended to be used to ascertain a child's progress toward their goals following their initial and/or 12-monthly assessments. Same standardised assessments should be used at 12 months to determine if a child continues to require the same level of support or whether they have made sufficient progress to be able to reduce their level of support, for example beginning transition to school or mainstream settings (based on the same criteria for entry). If a child continues to show needs in one or more areas, but substantially improves in cognition, language or adaptive behaviour then a reduction in program intensity would be recommended. If a child continues to show substantial needs across one or more core areas, then continuation of the full package funding of intensive EI would be recommended.

Source: Paynter, J. (2014). Assessment Proposal – Autism Spectrum Disorder Early Intervention.

2.4 Recommendations

Recommendation #1

Where diagnosis is clear cut (i.e. the child clearly has moderate to severe autism), it should be the role of the funded EI service provider to perform the initial formal assessment as per the good practice guidelines. The child would then receive intensive EI in accordance with the good practice guidelines.

Recommendation #2

Where diagnosis is uncertain, a formal assessment should be undertaken by the relevant agency using the appropriate tools and a recognised provider of autism assessments as per the process set out in Box 1. Intensive EI that is consistent with the good practice guidelines should then be provided to children who satisfy the diagnostic criteria.

3 Requirements of Early Intervention

3.1 Benefits of Early Intervention

There is growing evidence supporting the effectiveness of good practice EI, both in terms of altering short-term development outcomes and improving the life-long trajectory of outcomes. High quality EI that is implemented in accordance with the good practice guidelines has been shown to lead to significant improvements for children with ASD in intellectual functioning, adaptive behaviour, challenging behaviours, and autism symptoms.¹⁰

Dawson et al (2009) conducted a study on the effectiveness of the Early Starter Denver Model (ESDM), a comprehensive developmental behavioural intervention for improving outcomes of toddlers diagnosed with ASD. After the conclusion of the two-year study period, the children in the ESDM group, which comprised of 48 children diagnosed with ASD between 18 and 30 months of age, showed significant improvements in cognitive functioning, adaptive behaviour and autism diagnosis.¹¹

Other documented evidence regarding the positive outcomes from intensive EI for children with autism has cited the following benefits:

- improvement in intellectual and educational functioning;¹²
- gains in comprehensive, receptive¹³ and expressive language skills;¹⁴
- significant improvements in behavioural symptoms to the point where some children were not classified as autistic according to the Childhood Autism Rating Scale (CARS);
- significant improvements in child-appropriate behaviour, mostly relating to sharp reductions in non-compliance;

¹⁰ Paynter, J., Scott, J., Beamish, W., Duhig, M., & Heussler, H. (2012). A pilot study of the effects of an Australian centre-based early intervention program for children with autism. *The Open Pediatric Medicine Journal*, 6, 7-14. Doi: 10.2174/18743099012060100007; Vivanti, G., et al (2014). Effectiveness and Feasibility of the Early Start Denver Model Implemented in a Group-Based Community Childcare Setting. *Journal of Autism and Developmental Disorders*, 1-14. Doi: 10.1007/s10803-014-2168-9.

¹¹ Dawson, G., et al (2009). Randomized, Controlled Trial of an Intervention for Toddlers with Autism: The Early Start Denver Model. *Pediatrics*, published online Nov 30, 2009.

¹² Lovaas, O. (1987). Behavioural Treatment and Normal Educational and Intellectual Functioning in Young Autistic Children. *Journal of Consulting and Clinical Psychology*, 55(1).

¹³ Howard, J. et al (2005). A Comparison of Intensive Behaviour Analytic and Eclectic Treatments for Young Children with Autism. *Research in Developmental Disabilities*, vol 26.

¹⁴ Swallows, G. & Graupner, T. (1999). Replicating Lovaas' Treatment and Findings: Preliminary Results. Paper presented at the meeting of the Autism Society of America, Kansas.

- reduction in the number of children requiring special schooling;¹⁵
- improvement in communication and work and play behaviours;
- improvements in imitation, fine motor skills, gross motor skills and non-verbal conceptual skills;¹⁶
- significant improvements in daily living skills, adaptive behaviour, joint attention, and social interaction;¹⁷ and
- benefits to both parents (higher level of satisfaction and less stress) and children from intensive behaviour analytic treatment.¹⁸

3.2 Providing EI to children with moderate to severe autism

AEIOU is the largest specialised EI provider in Australia. AEIOU's service delivery model combines good practice EI with specialised childcare. Delivery of EI in a specialised childcare environment maximises the ability of the child to integrate with others and improve their potential life outcomes, as well as providing important support for the family, including full employment participation and respite, with the child in a safe, regulated environment.

AEIOU's program meets the good practice guidelines for providing EI. With an evidence-based autism-specific curriculum, children aged two-and-a-half¹⁹ to six years benefit from high quality and consistent therapy where progress is monitored to identify areas of growth and where more support may be needed.

With a high staff-to-child ratio, all children are supported by a transdisciplinary team that specialises in autism-specific EI. AEIOU's teams are comprised of behaviour therapists, speech and language pathologists, occupations therapists, teachers, and facilitators who support the delivery of all therapy.

AEIOU places a priority on supporting the whole family unit, teaching children vital life skills, how to create opportunities to live more independently and with greater confidence, along with reducing challenging behaviours. AEIOU also provides regular

¹⁵ Strain, P. & Hoyson, M. (2000). The Need for Longitudinal, Intensive Social Skills Intervention: LEAP Follow-Up Outcomes for Children with Autism. *Topics in Early Childhood Special Education*, Summer 2000, vol 20.

¹⁶ Mesibov, G. (1997). Formal and Informal Measures on the Effectiveness of the TEACCH Programme. *Autism*, 1(1), pp 25-35.

¹⁷ Salt, J. et al (2002). The Scottish Centre for Autism Preschool Treatment Programme. *Autism* 6(1), pp 33-46.

¹⁸ Howard, J. et al (2005). A Comparison of Intensive Behaviour Analytic and Eclectic Treatments for Young Children with Autism. *Research in Developmental Disabilities*, vol 26.

¹⁹ Two years in South Australia.

training and support to parents and carers, along with tools to achieve therapy goals in the home. The box below provides a summary of AEIOU's curriculum.

Box 2 Overview of AEIOU's curriculum

AEIOU 's curriculum, which is consistent across all of its centres, is designed to support children to meet important development milestones. It is evidence-based, which means the tactics and strategies employed have been researched and reviewed by experts in the field of EI.

AEIOU works to develop a sound understanding of each child's unique sensibilities, emphasising collaboration with the child and parents and carers to achieve optimal outcomes.

AEIOU's curriculum is organised into 11 learning areas or domains:

- Classroom attending skills
- Echoics
- Visual perception
- Social skills
- Play skills
- Expressive language skills
- Receptive language skills
- Self-help skills
- Intraverbal skills
- Imitation skills
- Academic skills.

Within the AEIOU curriculum there are seven levels of goals to support the continuation of skill development. Each domain is split into a hierarchy of skills and children are supported to meet 'prerequisite' skills. To ensure they do not skip ahead to another level, missing a core learning or development skill, AEIOU's approach to goal-driven planning means we are teaching developmentally appropriate goals.

At every step, data is collected for each individual child. AEIOU's program coordinators work with the therapy and teaching teams in each classroom for fidelity measures, monitoring each child's progress and identifying areas where more support may be needed, while also reviewing progress for the group and the organisation at large.

Parents are regularly updated and participate in one-on-one meetings on a bi-annual basis (more often if required) to ensure they are up to date with their child's progress, with opportunity to review individual goals.

Source: 'Our curriculum'; AEIOU; See: <https://aeiou.org.au/our-curriculum>; DOA: 23 September 2016.

The specific symptoms and behavioural issues exhibited by children with moderate to severe autism necessitate the provision of EI that is consistent with the good practice guidelines. In accordance with these guidelines, AEIOU's program ensures that intervention is provided by childcare providers and support staff with strong capabilities and experience in caring for children with autism. AEIOU's curriculum content is tailored to the strengths and needs of individual children.

3.3 Inappropriateness of ECEI framework

Mainstream childcare settings are not conducive to the provision of good practice EI to children with moderate to severe autism. Where intervention is delivered in this

environment, as is proposed under the NDIA's Early Childhood Early Intervention (ECEI) framework for the provision of early learning and care, shortfalls in adequate staffing, training and expertise are likely to prevent EI from being provided in a manner that is consistent with these guidelines, threatening developmental outcomes for children with moderate to severe autism.

There is some evidence supporting the provision of EI in mainstream settings to children with autism without intellectual impairment (i.e. HFA). For example, a Swedish study published in 2011 that assessed the efficacy of EI provided in an inclusive environment to a cohort of 208 preschool-aged children with autism found that a sub-group of children with normal cognitive functioning exhibited a significant improvement in adaptive behavioural functioning. It is important to note that the improvement in adaptive behaviour scores was confined to those children without intellectual impairment, with no improvement observed for those children with intellectual impairment.²⁰

Another study conducted on the application of the Learning Experiences and Alternative Program (LEAP) in mainstream preschool classes found that, where teachers were provided with intensive training and coaching in the implementation of LEAP strategies over a two-year period, positive results were achieved in relation to the fidelity of implementation and improvements in children with autism. In addition to noting the prolonged period of training and coaching for teachers and support staff that was necessary to achieve these results, it is important to recognise that the study comprised mostly of children with mild to moderate autism as opposed to moderate to severe autism.²¹

In summary, while there is some evidence that the NDIA's ECEI framework may, in some cases, be appropriate for children with autism without intellectual impairment (i.e. HFA), the evidence from the Swedish and LEAP studies cannot be applied to EI programs delivered to children with moderate to severe autism in mainstream settings. The application of this model to children with moderate to severe autism is inconsistent with the body of evidence which indicates that this is likely to result in sub-optimal outcomes for children and their families, in addition to posing a considerable risk to their typically developing peers and childcare professionals.

Enabling children with autism to participate in an inclusive society through improved social behaviour, better education and employment outcomes and increased living

²⁰ Fernell, E., et al (2011). Early intervention in 208 Swedish preschoolers with autism spectrum disorder. A prospective naturalistic study. *Research in Developmental Disabilities*, 32, pp 2092-2101.

²¹ Strain, P.S. & Bovey, E.H. (2011). Randomized, Controlled Trial of the LEAP Model of Early Intervention for Young Children with Autism Spectrum Disorders. *Topics in Early Childhood Special Education*, 31:133.

independence is the ultimate goal of the provision of EI to children with autism. In order to achieve this objective for children with moderate to severe autism, EI services need to be provided in an autism-specific environment that enables highly trained and experienced staff to deliver evidence-based practices commensurate with the good practice guidelines.

3.4 Consideration of ‘reasonable and necessary’

In its 2011 inquiry report on ‘Disability Care and Support’, the Productivity Commission stated that supports funded under the NDIS need to be ‘reasonable and necessary’.²² The Commission identified four key guidelines to be applied in considering whether a proposal satisfied this requirement. These guidelines, and the extent to which each are satisfied by the provision of good practice EI to children with moderate to severe autism, are as follows:

- benefit to the participant – as set out in section 3.1 and 3.2 above, there is a strong body of evidence in support of the benefits for providing good practice EI to children with autism. Furthermore, a cost-benefit analysis previously conducted by Synergies on the provision of good practice EI to a cohort of children with autism revealed a significant net benefit from the provision of good practice EI, particularly for children with moderate to severe autism (see section 4.3.2);
- appropriateness of the support or service request – the good practice guidelines for the provision of EI to children with autism (see section 2.2) have been accepted as the appropriate clinical guidelines for the provision of intervention therapy to children with autism;
- appropriateness of the provider – as discussed in section 3.2, AEIOU staff are experienced at providing EI and childcare services to children with autism. AEIOU’s program is consistent with each of the good practice guidelines; and
- cost effectiveness considerations – the results of the cost-benefit analysis conducted by Synergies demonstrate that, in addition to delivering a significant net benefit to the individual receiving the treatment, the provision of good practice EI to children with autism also delivers a significant net economic benefit to society, largely through avoided care costs due to increased living independence.

²² Productivity Commission (2011). Disability Care and Support. Inquiry Report – Volume 1.

Based on these considerations, the provision of good practice EI to children with moderate to severe autism in accordance with AEIOU's program constitutes 'reasonable and necessary' support, as defined by the Productivity Commission.

3.5 Recommendations

Recommendation #1

Children with moderate to severe autism to receive a core package for the provision of EI as per the good practice guidelines with a progress review to be conducted after 12 months as specified in the assessment process set out in section 2. Where this indicates continued intensive EI is necessary, good practice EI is to continue to be provided to the child for another 12 months. Where the assessment indicates intensive EI is no longer required, the child can begin transition to a mainstream package.

Recommendation #2

Children with HFA receive a mainstream package with the potential to move to an intensive EI package consistent with the good practice guidelines if problems or challenges become apparent.

Recommendation #3

Where a child is to transition from good practice EI to a mainstream school or special education unit, it is necessary for the child and their family to be provided with individualised support. It is recommended that a transition support package should include:

- Training for teachers, teacher's aids and school support staff, for strategies to use with each individual child;
- In-class observation of the child and the teacher; and
- Coaching and modelling on the floor with the teacher.

The time committed for each of these activities will be planned on an 'as needs' basis for each child. The NDIA funding offered for this service is \$175 per hour – professional therapist rate, which is a total of \$1,750 per child on their transition from good practice EI (assuming a 10-hour transition support package).

4 Cost and funding requirements

This section sets out the factors that need to be taken into consideration in assessing the cost of providing good practice EI under the NDIS and the funding that is required to provide good practice EI to children with moderate to severe autism.

4.1 Implications of competitive funding model and capacity

The framework through which funding is to be provided under the NDIS represents a significant change in the manner in which government funding is to be provided to organisations providing services to children with developmental disabilities.

In the past, organisations providing good practice EI to children with autism have received grant or block funding from governments as contributions to the cost of providing services. This has provided these organisations with certainty regarding the amount of funding to be provided and the services that it will be capable of providing. The NDIS funding framework represents a more competitive funding model, with organisations provided with funding based on their level of service provision. This means that were an organisation to experience a decline in the number of participants, the funding provided to the organisation would decline. As the majority of the costs of providing good practice EI are fixed, service providers will be exposed to a potential funding shortfall. This needs to be taken into consideration in the assessment of the funding that is required.

In addition, the reduced certainty associated with the provision of funding under the NDIS represents a disincentive for organisations to invest in creating additional capacity. The provision of this incentive is important to ensure that service availability keeps pace with future demand growth.

This further emphasises the need for the funding provided to these organisations being sufficient to protect service providers from shortfalls in funding due to the periodic underutilisation of capacity in addition to ensuring the appropriate incentives exist to invest in expanding service capacity.

4.2 Cost and funding requirement

4.2.1 Funding required for the delivery of good practice EI

The cost of AEIOU's program has been used to assess the funding required to provide good practice EI to children with moderate to severe autism. In considering the cost of the AEIOU program, it is important to take into consideration that the service provided by the program is two-fold:

- intensive EI consistent with the good practice guidelines; and
- a comprehensive full-time childcare service (appropriate for children with moderate to severe autism).

AEIOU's childcare professionals meet all necessary accreditations and requirements for the delivery of childcare services.

To ascertain the cost of the EI component of AEIOU's program, it is necessary to distinguish between the cost of providing childcare services and the cost of providing good practice EI. The following table identifies the cost incurred in providing each service on a per child basis and under different capacity utilisation scenarios.

Table 2 Annual cost of AEIOU program at different levels of capacity utilisation

Cost	96%	90%	85%	80%
Total cost per child	\$58,971	\$59,835	\$61,596	\$63,576
Childcare cost per child	\$10,874	\$10,827	\$11,001	\$11,197
EI cost per child	\$48,097	\$49,008	\$50,595	\$52,379

Note: AEIOU's facilities are considered to be at full capacity at 96% utilisation.

Source: Data provided by AEIOU.

Given the move to a competitive funding model under the NDIS (see above), it is likely EI service providers will be required to maintain financial viability at service levels below full capacity. A cost analysis undertaken by AEIOU has indicated that once capacity utilisation falls below 80 per cent, service providers have greater control over their cost structures (primarily due to the ability to adjust staffing levels). Funding should therefore be provided in accordance with the cost of service provision at this level of capacity utilisation.

Based on the cost of AEIOU's program, this results in an estimate for the cost of good practice EI of \$52,379 per annum. Assuming that each child receives good practice EI for 20 hours per week and 47 weeks per year (in accordance with the good practice guidelines), this equates to a cost of \$55.72 per hour.

4.3 Comparison to alternative funding sources

4.3.1 NDIA line item

The price for the NDIA line item for specialised group early childhood interventions is \$58.53 per hour. This service involves the provision of group-based specialist

interventions to assist a child with disability or developmental delay and their family in home, care, community and education settings. The maximum child to staff ratio is 4:1.²³

As demonstrated above, the cost of delivering good practice EI to children with moderate to severe autism (based on AEIOU's program) is \$55.72 per hour. In addition to being less than the NDIA line item, it is important to note that the EI component of AEIOU's service involves a child to staff ratio of 2:1, as opposed to the 4:1 required under the NDIA line item and 3:1 in the good practice guidelines.

4.3.2 Comparison to the benefits of good practice EI

Synergies Economic Consulting has previously developed a framework to estimate the net economic benefit of good practice EI and applied this framework to a cohort of children with autism.²⁴ In applying the framework, the economic benefit of the provision of good practice EI was quantified separately for children with severe intellectual impairment (i.e. severe autism); mild to moderate intellectual impairment (i.e. moderate autism); and no intellectual impairment (i.e. HFA).

The table below presents the results of the application of the framework to children with moderate and severe autism. The benefit estimates have been inflated to 2016 dollars²⁵ and the cost of good practice EI has been updated to reflect the estimated cost of AEIOU's program assuming a capacity utilisation rate of 80 per cent.

Table 3 Lifetime economic benefit of good practice EI for a cohort of children with autism

Group	Ave. benefit per child	Cost of EI per child	Net benefit per child	Cost Benefit Ratio
Severe autism	\$1,351,240	\$104,758	\$1,246,482	12.9
Moderate autism	\$1,251,457	\$104,758	\$1,146,699	11.9
HA	\$770,481	\$104,758	\$665,723	7.4

Note: Lifetime benefit estimates were calculated using a real social discount rate of 3 per cent. The purpose of a discount rate is to determine the Present Value of benefits and costs which are to be incurred in the future, thereby allowing policy makers to compare cashflows across different time horizons. A real discount rate of 3 per cent is consistent with the rate used by the Australian Institute of Health and Welfare.

Source: Synergies modelling.

An assessment of the breakdown of the estimated lifetime benefit of good practice EI for each group within the cohort of children with autism reveals that a significant proportion of the total benefits are accounted for by avoided costs associated with future caring requirements. This benefit is of particular significant for individuals with

²³ National Disability Insurance Agency (2016). NDIS Price Guide – VIC/NSW/QLD/TAS. Valid from 1 July 2016.

²⁴ The framework estimates the economic benefit of EI focusing on five key areas – education, employment, living independence, healthcare and quality of life.

²⁵ With the exception of the cost associated with the reduced quality of life for individuals with autism. Due to the uncertain nature of this estimate, a conservative approach is adopted.

moderate to severe autism, which resulted in the average benefit per child being greater for children with intellectual impairment than for children with HFA.

This reflects the differences that exist in terms of the outcomes from good practice EI for children with moderate to severe autism as opposed to children with HFA, in addition to demonstrating the quantum of the cost savings, both for the individual and the wider community, that are achievable through the provision of good practice EI to children with moderate to severe autism.

4.3.3 Comparison to alternative good practice EI service providers

Learning for Life provides Applied Behavioural Analysis therapy to children with autism. The program involves the provision of a minimum of 25 hours of home-based intervention per week and is consistent with the good practice guidelines. Learning for Life estimates the cost of providing good practice EI under its model at \$60 per hour.²⁶ This is comparable to the cost of delivering good practice EI under the AEIOU program.

4.3.4 Summary

Based on the above analysis, it is recommended that the NDIA line item for specialised group early childhood interventions be applied to accredited service providers of good practice EI to children with moderate to severe autism, noting that:

- the cost of providing good practice EI to children with moderate to severe autism is comparable to the funding provided under this NDIA line item;
- AEIOU's EI program represents a higher quality service than required under the NDIA line item, with a child to staff ratio of 2:1, as opposed to 4:1 (or 3:1 under the good practice guidelines; and
- a cost-benefit analysis has demonstrated that the provision of good practice EI to children with moderate to severe autism results in a significant net benefit to both the individual receiving the EI and the wider community.

On this basis, the application of the NDIA line item for specialised group early childhood interventions to accredited providers of good practice EI to children with moderate to severe autism clearly satisfies the 'reasonable and necessary' criteria as set out in section 3.4.

²⁶ Based on discussions with Learning for Life.

4.4 Recommendations

Recommendation

Reasonable funding for good practice EI for children with moderate to severe autism is as per line item 16003 applied to the number of hours of intensive EI defined (20 hours per week, 48 weeks per year with 5 public holidays).

A Good practice guidelines for Early Intervention

Good Practice Guidelines

Assessment for Intervention Planning

Assessment of individual child strengths and needs in all relevant areas (e.g. communication, cognitive development) should guide EI content and provide information about the best techniques for an individual child.

Individualised programming based on strengths and needs

Individual Plans (IP) are to be developed, with the basic goals being to document:

- the child's strengths and needs
- goals for EI, identified through a collaborative process with those involved with the child, including the family
- information about how these goals will be achieved and monitored.

Every child receiving EI should have an IP developed by all those involved, including family, EI providers, preschool or childcare services. IPs should be developed at least annually and reviewed at least every six months.

Review, evaluation and adjustment of program

EI programs need to be evaluated regularly to ensure that they continue to meet the needs of the child. This process involves a review of the IP goals, review of the child's skills and needs to ensure that the program is relevant, and collaborative development of revised/new goals, as appropriate.

Key elements of effective interventions for children with autism

1. Relevant program content

Within this element there are five basic skills domains:

- Ability to attend to elements of the environment
- Ability to imitate others
- Ability to comprehend and use language or alternative communication
- Ability to play appropriately with toys
- Ability to engage socially with others.

Programs should address some or all of the key features of autism, including communication, social interaction, repetitive behaviour and restricted interests. Associated features of autism such as sensory processing difficulties, anxiety, and intellectual disability/learning difficulties are additional important issues needing attention.

2. Highly supportive teaching environments and generalisation strategies

Core skills are taught in a highly supporting teaching environment and then systematically generalised to more complex, natural environments and to a wider range of people. Utilisation of appropriate environmental supports, structured teaching, and visual supports to assist with learning and generalisation.

3. Predictability and routine

Routines are established within and between sessions which are supported visually where appropriate and extended into family and other settings.

4. Functional approach to challenging behaviours

Focus on the prevention of problem behaviour by increasing interest and motivation, structuring the environment, and increasing positive behaviour support including teaching alternative appropriate skills, and communication strategies to replace problem behaviours.

5. Transition support

There should be systematic connection and integration between the EI programs and the next stage for the child, whether it is transition to school or to another therapeutic or special education setting. Transition supports for children with autism can include:

- Assisting the child to learn appropriate skills (e.g. school readiness)
- Collaboration and communication with new settings (e.g. schools) about the child's current skills and needs
- Actively supporting transition to a new environment through visits, visual supports and stories where appropriate.

6. Family involvement

Families should be meaningfully involved in assessment, and in program development and implementation. Families should be supported to utilise strategies taught as part of the interventions at home, and empowered to encourage communication, social interaction and effective behaviour management at home and in the community.

7. Use of visual supports

Provision of augmentative communication methods for expressive and receptive communication, and use of visually cued instruction to provide the child with a predictable and readily understood environment.

8. Multi-disciplinary collaborative approach

Effective programs are multidisciplinary and collaborative. Assessments and programs are provided by a number of individual service providers, such as speech pathologists, psychologists and teachers, who need to communicate and collaborate with each other to develop goals, provide intervention and evaluate progress.

9. Additional elements

Interventions reflecting good practice are also characterised by:

- Inclusion of typically developing peers
- Promotion of independent functioning throughout the intervention programs
- Incorporation of obsessions and rituals into programs to engage the child and reinforce responses.

10. Staffing

Teachers, therapists, and child care personnel should be specifically trained in working with children with autism and have knowledge and skills required for their special needs. The majority of staff in a service should have a minimum of two years' experience and expertise in autism.

Practitioners need to provide evidence of continuing professional development in autism as well as experience gained through previous work settings that enables them to provide evidence-based EI for children with autism. It is also important to consider staffing ratios. Implementation of individual child goals in a small group context is not feasible with less than two adults for six children.

11. Research and evaluation of programs

Evaluation of EI outcomes should be built into EI programs using systematic assessment of the child's social, cognitive and adaptive functioning before, during and at the end of the program.

12. Interventions for infants

Very early therapeutic intervention is likely to improve developmental and adaptive outcomes so it will be necessary to develop, implement and evaluate interventions.

13. Information that families need

Families should ask for more than personal stories and testimonials of treatment success when deciding which intervention programs would be safe and beneficial for their child.

Source: Prior, M. & Roberts, J. (2012). Early Intervention for Children with Autism Spectrum Disorders: 'Guidelines for Good Practice' 2012.