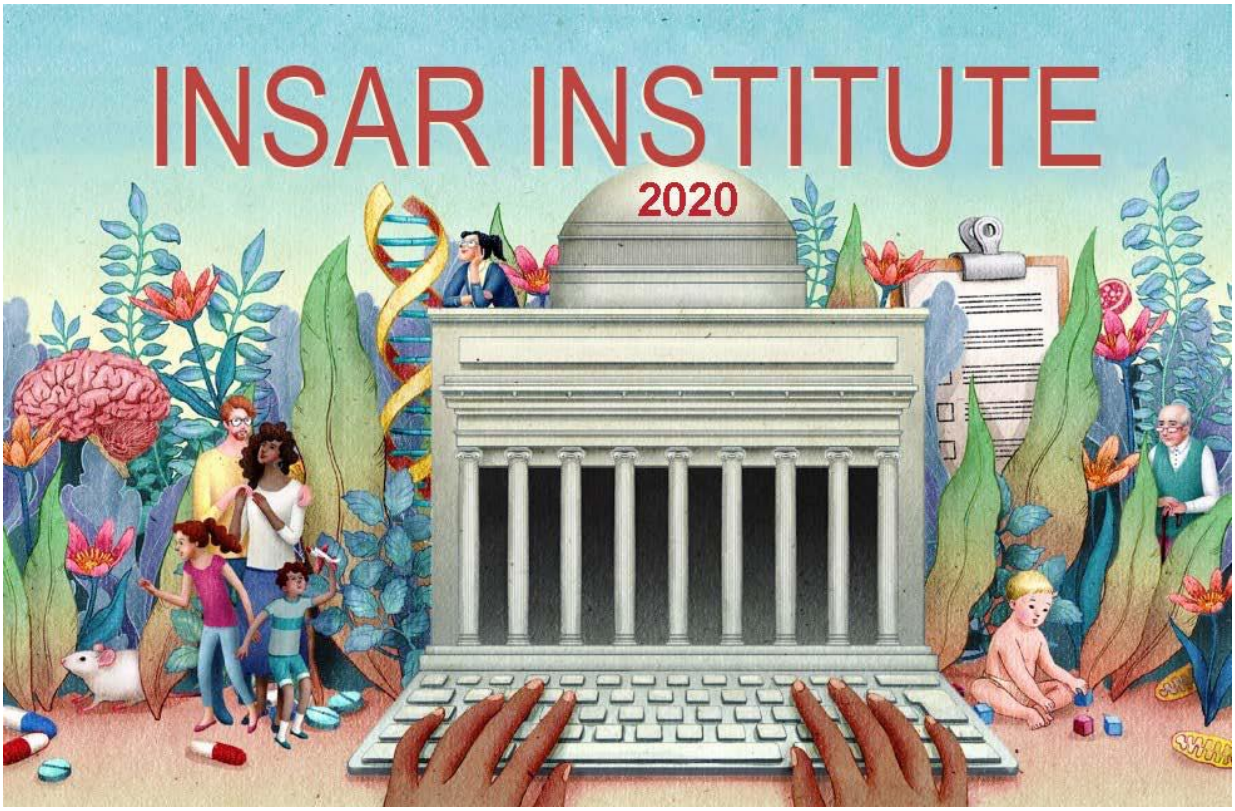

SESSION II: Development and early intervention science in autism

Jonathan Green, MD
June 18, 2020 // 8:00 am EDT

Course Materials

The purpose of these materials is to help provide an introduction to the INSAR Institute session on understanding barriers and facilitators that influence autistic individuals' transition through different life stages. The materials were designed to prepare students and trainees who are unfamiliar with this research with the general background to get the most educational benefit from the session. Toward this objective, we have prepared the following: (1) learning objectives for this session, (2) key terms and concepts, (3) a selection of recommended resources for further learning. These materials could be considered supplemental resources for this session.

In collaboration with Professor Jonathan Green, these materials were developed by **Jiedi Lei, MSc.** (PhD student at Centre for Applied Autism Research, University of Bath, UK; jl3125@bath.ac.uk), **Nicholas Fears, Ph.D.** (Postdoctoral Research Associate in Physical Therapy at the University of North Texas Health Sciences Center, USA; Nicholas.Fears@unthsc.edu), and **Sowmyashree Kaku, MD., PhD.** (Senior Research Associate and Child Psychiatrist at Center for Advanced Research and Excellence in Autism and Developmental Disorders at the St. Johns National Academy of Health Sciences,

Bangalore, India; sowmeey@gmail.com). Feel free to contact us with questions/comments. Register for this course and other sessions in this series at: https://www.autism-insar.org/general/custom.asp?page=SILanding.

Learning Objectives and Key Readings

The INSAR Institute for Autism Research was established in direct response to requests from students and trainees for multidisciplinary training opportunities. The INSAR Institute priorities are to provide a (1) freely available, (2) multidisciplinary training platform for young scientists and others from various backgrounds, that (3) allows for international participation. The overarching goal of the INSAR Institute is to expose junior scientists to topics they are not currently engaged in, with the hope that basic scientists and clinical scientists may learn from each other to ultimately advance the understanding of autism.

The current session, Development and early intervention science in autism, is led by Professor Jonathan Green. A team of trainees who worked in tandem to prepare this handout and the web presentation. *At the conclusion of this session, participants will be able to:*

1. **Understand** state of the art early intervention science in autism.
   We will:
   a. *Describe* early intervention science as an area which has seen variable but improving standards of design and reporting in recent years.
   b. *Describe* the current autism intervention research landscape, including a mechanistic focus across both psychosocial and biological treatments.

Key reading for objective 1:

Green, J & Garg, S 2018, 'The state of autism intervention science: process, target psychological and biological mechanisms and future prospects', Journal of Child Psychology and Psychiatry and Allied Disciplines, vol. 59, no. 4, pp. 424-443. https://doi.org/10.1111/jcpp.12892

French, L., & Kennedy, E. M. (2018). 'Annual Research Review: Early intervention for infants and young children with, or at-risk of, autism spectrum disorder: a systematic review', Journal of Child Psychology and Psychiatry, vol. 59, no. 4, 444-456. https://doi.org/10.1111/jcpp.12828

2. **Adopt** a developmental approach to early intervention.
   We will:
   a. *Discuss* a case study of a UK based developmental science approach to parent-mediated early intervention.
   b. *Describe* an intervention for infants in the first year at increased familial risk of ASD through the 'iBASIS' trial of intervention for infants
   c. *Discuss* study design and long-term developmental follow-up

d. *Identify* links between intervention development and trials' findings to the basic science background.
e. *Illustrate* a global perspective by showcasing how this line of work has been adapted for use in low- and medium-income countries. An overview of the process of adaptation and testing in the context of global health will be provided.

Key readings for objective 2:

Pickles, A, Le Couteur, A, Leadbitter, K, Salomone, E, Cole-Fletcher, R, Tobin, H, Gammer, I, Lowry, J, Vamvakas, G, Byford, S, Aldred, C, Slonims, V, McConachie, H, Howlin, P, Parr, JR, Charman, T & Green, J 2016, 'Parent-mediated social communication therapy for young children with autism (PACT): long-term follow-up of a randomised controlled trial', The Lancet, vol. 388, no. 10059, pp. 2501-2509. https://doi.org/10.1016/S0140-6736(16)31229-6

Green, J, Pickles, A, Pasco, G, Bedford, R, Wan, MW, Elsabbagh, M, Slonims, V, Gliga, T, Cheung, C, Charman, T, Johnson, M & Team BASIS 2017, 'Randomised trial of a parent-mediated intervention for infants at high risk for autism: longitudinal outcomes to age 3 years', Journal of Child Psychology and Psychiatry, vol. 58, no. 12, pp. 1330-1340. https://doi.org/10.1111/jcpp.12728, https://doi.org/10.1111/jcpp.12728

Rahman, A, Divan, G, Hamdani, SU, Vajaratkar, V, Taylor, C, Leadbitter, K, Aldred, C, Minhas, A, Cardozo, P, Emsley, R, Patel, V & Green, J 2016, 'Effectiveness of the parent-mediated intervention for children with autism spectrum disorder in south Asia in India and Pakistan (PASS): a randomised controlled trial', The Lancet Psychiatry, vol. 3, no. 2, D-15-00305RZ, pp. 128-136. https://doi.org/10.1016/S2215-0366(15)00388-0

Divan, G, Vajaratkar, V, Cardozo, P, Huzurbazar, S, Verma, M, Howarth, E, Emsley, R, Taylor, C, Patel, V & Green, J 2019, 'The Feasibility and Effectiveness of PASS Plus, A Lay Health Worker Delivered Comprehensive Intervention for Autism Spectrum Disorders: Pilot RCT in a Rural Low and Middle Income Country Setting', Autism research : official journal of the International Society for Autism Research. https://doi.org/10.1002/aur.1978

3. **Explore** integrated service provision for autism as an enduring condition in development.
   We will:
   a. *Explore* ideas about how to embed developmental interventions within an integrated care model for autism and testing, by examining theoretical perspectives from other enduring health conditions.
   b. *Discuss* self-management, case management and stepped care.

Key readings for objective 3:

Green, J 2019, 'Editorial Perspective: Delivering autism intervention through development'. Journal of Child Psychology and Psychiatry, Journal of Child Psychology and Psychiatry. https://doi.org/10.1111/jcpp.13110.

Green, J 2012, 'Editorial: Science, implementation, and implementation science', Journal of Child Psychology and Psychiatry and Allied Disciplines, vol. 53, no. 4, pp. 333-336. https://doi.org/10.1111/j.1469-7610.2012.02531.x

Taylor SJC, Pinnock H, Epiphaniou E, Pearce G, Parke HL, Schwappach A, et al. A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions: PRISMS – Practical systematic Revlew of Self-Management Support for long-term conditions. Health Serv Deliv Res 2014;2(53). DOI: 10.3310/hsdr02530

Bower P, and Gilbody S. Stepped care in psychological therapies: access, effectiveness and efficiency; narrative literature review. British Journal of Psychiatry (2005) 186, 11-17. DOI: 10.1192/bjp.186.1.11

Archer J, Bower P, Gilbody S, Lovell K, Richards D, Gask L, Dickens C, Coventry P. Collaborative care for depression and anxiety problems. Cochrane Database of Systematic Reviews 2012, Issue 10. Art. No.: CD006525. DOI: 10.1002/14651858.CD006525.pub2

Key Terms

Adaptive Behavior: Adaptive behavior is best understood as the degree to which people are able to function and maintain themselves independently and meet cultural expectations for personal and social responsibility at various ages. As such, adaptive behavior involves the person's physical skills, cognitive ability, affect, motivation, culture, socioeconomic status, family, and environment. Autistic people often demonstrate a discrepancy between intellectual potential and consistently-displayed adaptive skills.

Autism Spectrum Disorder:
→ **Diagnostic criteria:** The two core diagnostic criteria for autism described by Diagnostic Statistical Manual-5 are as follows -

1) **Restricted, Repetitive Behaviors, Interests, or Activities:** Repetitive behaviors occur over and over or are stereotyped. They can involve motor movements, use of objects, or speech. Restricted interests are highly restricted, fixated interests that are atypical in intensity or focus. There may be an insistence on sameness of activities or inflexible adherence to routines.
2) **Social Communication:** Social communication is a broad term that describes verbal and nonverbal behaviors used to interact with others. Examples include, but are not limited to, speech, prosody, gestures, and facial expressions. These behaviors can be used to initiate or respond to joint attention, to share emotion with others, or to signal when one person wants the attention of another person, and many other uses.

Difficulties with social communication are a diagnostic characteristic of autism. (More information: https://www.cdc.gov/ncbddd/autism/hcp-dsm.html)

→ **Heterogeneity in autism:** Autism spectrum disorder has been associated with many environmental and genetic risk factors (e.g., autism has been associated with more than 500 genetic risk factors). Similarly, there is a wide range of clinical phenotypes. Several researchers suggest that biomarker approaches that stratify the autism population into clinically and biologically meaningful subgroups may be helpful.

Biological mechanism: A multi-faceted term, biological mechanism can have 3 distinct meanings. One definition provided by Nicholson (2011) is as follows: *'It may refer to a philosophical thesis about the nature of life and biology ('mechanicism'), to the internal workings of a machine-like structure ('machine mechanism'), or to the causal explanation of a particular phenomenon ('causal mechanism').' More information can be found here:* https://pubmed.ncbi.nlm.nih.gov/22326084/

Blinding: Blinding is way to prevent researchers, doctors and patients in a clinical trial from knowing which study group each patient is in so they cannot influence the results. The best way to do this is by sorting patients into study groups randomly. The purpose of 'blinding' or 'masking' is to protect against bias. In a single-blind study, patients do not know which study group they are in (for example whether they are taking the experimental drug or a placebo). In a double-blind study, neither the patients nor the researchers/doctors know which study group the patients are in. In a triple-blind study, the patients, clinicians and the people carrying out the statistical analysis do not know which treatment patients had. *Source:* https://www.nice.org.uk/Glossary?letter=B

Cochrane review: Cochrane Review is a specific format of conducting a systematic review to address a clearly formulated question, and is recognised as the highest standard in evidence-based healthcare. Typically, Cochrane Reviews investigate the effects of interventions for prevention, treatment and rehabilitation, and also can assess the accuracy of a diagnostic test for a given condition in a specific patient group and setting. Unlike other systematic reviews, each Cochrane review is updated regularly to ensure that treatment decisions can be based on the most up-to-date and reliable evidence. *Source and for more information:* https://www.cochranelibrary.com/about/about-cochrane-reviews

CONSORT Diagram: CONSORT diagram is a flowchart of the progress through the phases of a parallel randomised trial of two groups (that is, enrolment, intervention allocation, follow-up, and data analysis). *Source and for more information:* http://www.consort-statement.org/consort-statement/flow-diagram

Diagnostic Stability: Diagnostic stability is the degree to which a particular diagnosis remains consistent across multiple assessments over time.

Early intensive behavioral intervention (EIBI): Early intensive behavior intervention is a treatment approach that is based upon the principles of applied behavior analysis (ABA) and the research of Ivar Lovaas and colleagues at the UCLA Young Autism Project. The EIBI approach has been extensively studied and actively debated in the scientific literature, popular media, and policy arena. *Source and for more information:* https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1698-3_594

Intellectual disability: A neurodevelopmental disorder defined by limitations in cognitive abilities that affect both intellectual and adaptive functioning. Ability to learn, problem solve, and reason are all involved in intellectual functioning, which is generally quantified using an intelligence quotient (IQ) test. Intellectual disability is defined as an IQ ≤ 70 and reduced adaptive functioning. Adaptive functioning is typically measured using standardized questionnaires or interviews completed by caregivers and/or teachers. Skills that are necessary for day-to-day functioning, such as communication and practical skills, make up the adaptive functioning domain. At least one-third of autistic people have co-occurring intellectual disability.

Integrated care model: Integrated care, also known as integrated health, coordinated care, comprehensive care, seamless care, or transmural care, is a worldwide trend in health care reforms and new organisational arrangements focusing on more coordinated and integrated forms of care provision. It is care that is planned with people who work together to understand the service user and their carer(s), puts them in control and coordinates and delivers services to achieve the best outcomes. *Source and for more information:* https://www.hee.nhs.uk/our-work/integrated-care

IQ: Intelligence quotient (IQ) was originally the ratio of mental age to chronological age. The term “mental age,” popularized by early tests of intelligence, referred to the age of the children in the standardization sample whose performance the testee matched. Most tests of intelligence no longer use this ratio, and IQ instead refers to a person’s ability relative to available norms, which are usually age-based. By convention, IQ scores have a mean of 100 and a standard deviation of 15. Thus, about 95% of people fall within two standard deviations of the mean (i.e., 70–130). People with scores above 120 are generally considered of superior intelligence. When IQ falls below 70, it can be used in conjunction with adaptive behavior to determine level of intellectual disability.

→ **Non-verbal IQ (NVIQ):** A person’s NVIQ is assessed through performance on one or more tests involving the use of thinking and problem-solving skills in a way that does not require language (i.e., i.e. non-verbal abilities). This type of intelligence involves manipulating or problem solving about visual information and may vary in the amount of internalized, abstract, or conceptual reasoning and motor skills that are required to complete a task (e.g., creating specific block designs or pattern matching). *Source and for more information:* https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1698-3_354

→ **Verbal IQ (VIQ):** A person’s verbal intelligence is assessed through performance on one or more tests involving receptive and/or expressive spoken language (i.e., verbal abilities). While

these tests assess a limited range of specific verbal abilities, they are also intended to estimate, or to contribute to an estimation of, a person's general intelligence.

Longitudinal Research: Longitudinal research refers to the analysis of data collected at multiple points in time.

PACT: The Pre-school Autism Communication Trial was a Medical Research Council randomised controlled trial that ran between 2006 and 2010. It tested a parent-mediated communication-based intervention for young children with autism. The trial was a major scientific success and constitutes one of the largest autism intervention studies completed internationally. *Source and for more information:* http://research.bmh.manchester.ac.uk/pact/about/

Parent-mediated Intervention: In parent-mediated therapy, parents learn therapy techniques from professionals and provide specific therapies to their own child. This approach gives children with autism spectrum disorder (ASD) opportunities for reinforcement and training throughout the day. Parents can also conduct some therapies with children who are at risk of autism but are too young to be diagnosed. *For more information:* https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31229-6/fulltext

PASS Plus: The Parent-mediated intervention for Autism Spectrum Disorders in South Asia (PASS) study is an adaptation and implementation of the PACT (Pre-school Autism Communication Trial) intervention in Pakistan and Southern India. It is a two year project funded by the Autism Speaks Global Autism Public Health initiative. PASS involves culturally adapting and assessing the feasibility, acceptability and effectiveness of the PACT intervention in South Asian local settings. *Source and for more information*: http://research.bmh.manchester.ac.uk/pact/PASS/

Phenotype: A phenotype is a characteristic of an organism or individual that can be observed. In psychiatry, the term is often used to refer to a set of behaviors that constitute a categorical diagnosis. *Source and for more information:* https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1698-3_1324

Prodrome: In medicine, a **prodrome** is an early sign or symptom (or set of signs and symptoms) that often indicates the onset of a disorder or condition before more diagnostically specific signs and symptoms develop.

RCT: A Randomised Controlled Trial (RCT) is a study in which a number of similar people are randomly assigned to 2 (or more) groups to test a specific drug, treatment or other intervention. One group (the experimental group) has the intervention being tested, the other (the comparison or control group) has an alternative intervention, a dummy intervention (placebo) or no intervention at all. The groups are followed up to see how effective the experimental intervention was. Outcomes are measured at specific times and any difference in response between the groups is assessed statistically. This method is also used to reduce bias. *Source*: https://www.nice.org.uk/glossary?letter=r

Supplemental Resources

If you would like to find out more about Professor Jonathan Green's research and other similar works, he will be presenting at the Autism Research into Practice symposium on Friday 26th June. Please see information below: