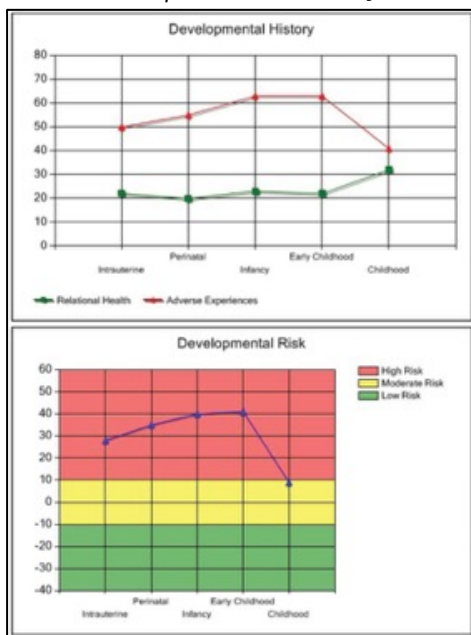


The Neurosequential Model of Therapeutics® *NMT as an Evidence-based Practice*

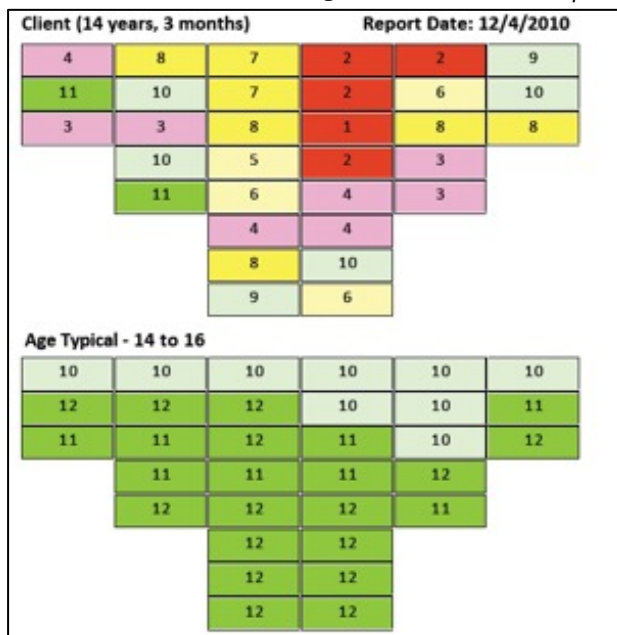
The Neurosequential Model of Therapeutics (NMT) is a developmentally sensitive, neurobiology- informed approach to clinical problem solving. NMT is not a specific therapeutic technique or intervention. It is an approach that integrates core principles of neurodevelopment and traumatology to inform work with children, families and the communities in which they live. The Neurosequential Approach has three key components – training/capacity building, assessment and then, the specific recommendations for the selection and sequencing of therapeutic, educational and enrichment activities that match the needs and strengths of the individual.

As described by Brandt and colleagues (2012) – *“The Neurosequential Model of Therapeutics (NMT) (Perry, 2006) provides an integrated understanding of the sequencing of neurodevelopment embedded in the experiences of the child, and supports biologically informed practices, programs, and policies. As a global evidence-based practice (EBP) and coupled with the NMT’s brain mapping matrix, the model supports providers in identifying specific areas for therapeutic work and in selecting appropriate therapies, including evidence-based therapies (EBTs), within a comprehensive therapeutic plan. Organized NMT-based intervention models, such as NMT therapeutic child care, can be EBTs.”*

A. Developmental History



B. Current Functioning: NMT “Brain Map”



A more detailed overview of the NMT will help articulate why NMT is an EBP. The NMT assessment process examines both past and current experience and functioning. A review of the history of adverse experiences and relational health factors helps create an estimate of the timing and severity of developmental risk that may have influenced brain development (see panel A, above). In the sample graph, both the timing and severity of risk and resilience factors are plotted (top graph, Panel A) to generate an overall developmental risk estimate (bottom graph, Panel A). In this case this individual was at high risk for developmental disruptions – with potential significant functional consequences – during the entire first five years of life.

A review of current functioning identifies problems and strengths in current functioning and helps generate a visual representation of the child’s estimated current functioning organized into a neurobiological fashion; this generates a Functional Brain Map (see below). The NMT “mapping” process helps identify various areas in the brain that appear to have functional or developmental problems; in turn, this helps guide the selection and sequencing of developmentally sensitive interventions. These interventions are designed to replicate the normal sequence of development beginning with the lowest, most abnormally functioning parts of the brain (e.g., brainstem) and moving sequentially up the brain as improvement is seen. The NMT is grounded in an awareness of the sequential development of the brain; cortical organization and functioning depend upon previous healthy organization and functioning of lower neural networks originating in the brainstem and diencephalon. Therefore, a dysregulated individual (child, youth or adult) will have a difficult time benefiting from educational, caregiving and therapeutic efforts targeted at, or requiring, “higher” cortical networks. This sequential approach is respectful of the normal developmental sequence of both brain development and functional development. Healthy development depends upon a sequential mastery of functions; and a dysregulated individual will be inefficient in mastering any task that requires relational abilities (limbic) and will have a difficult time engaging in more verbal/insight oriented (cortical) therapeutic and educational efforts.

The NMT Web-based Clinical Practice Tools (aka, NMT Metrics) help provide a structured assessment of developmental history of adverse experiences, relational health and current brain-mediated functioning. These NMT Metrics are designed to complement, not replace, existing assessment tools (e.g., CANS, CAFAS) and psychometrics (e.g., CBCL, IES, WISC, WRAT). They are designed to allow use across multiple systems using multiple assessment packages. The primary goal of the NMT Metrics and assessment is to ensure that the clinical team is organizing the client and family’s data (and planning) in a developmentally sensitive and neurobiology-informed manner.

The NMT Web-based Clinical Practice Tools (aka, NMT Metrics) help provide a structured assessment of developmental history of adverse experiences, relational health and current brain-mediated functioning. These NMT Metrics are designed to complement, not replace, existing assessment tools (e.g., CANS, CAFAS) and psychometrics (e.g., CBCL, IES, WISC, WRAT). They are designed to allow use across multiple systems using multiple assessment packages. The primary goal of the NMT Metrics and assessment is to ensure that the clinical team is organizing the client and family’s data (and planning) in a developmentally sensitive and neurobiology-informed manner.

This clinical approach helps professionals determine the strengths and vulnerabilities of the child and create an individualized intervention, enrichment and educational plan matched to his/her unique needs. The goal is to find a set of therapeutic activities that meet the child's current needs in various domains of functioning (i.e., social, emotional, cognitive and physical). An individual demonstrating significant problems in brainstem and diencephalic functions may end up with recommended activities that are primarily rhythmic, repetitive and somatosensory in nature such as music, dance, yoga, drumming, various sports, therapeutic massage or more traditional play therapy, sand tray or other art therapies. Later in the treatment process, with improved somatosensory processing and self-regulation, the treatment recommendations would shift to more relational and cognitive-behavioral focused interventions including a range of EBTs such as PCIT or TF-CBT.

NMT Training and Certification

The NMT training and capacity building component (NMT Certification) is a manualized yet flexible process that involves a minimum of 120 hours. Certification incorporates didactic teaching with web-based sessions using clinical cases presented by participating clinicians. It also incorporates multimedia and reading materials that focus on child development, neurobiology, traumatology, attachment theory and a host of related areas relevant to understanding the impact of maltreatment and other developmental insults on the developing child. The Neurosequential Network (NN) has developed an NMT training certification process for individual clinicians and organizations. This training process provides the necessary exposure to the core concepts, practical application and use of the web-based NMT Metrics to establish and maintain fidelity required for examining clinical outcomes and conducting research using the NMT Metrics as part of the evaluation package. Certified clinicians from across the world demonstrate high fidelity and inter-rater reliability when "evaluating" and scoring the same client data.

The NMT is widely applicable to a variety of clinical and educational environments and has been integrated into a variety of settings across the full life cycle – infants through adults - including therapeutic preschools, early head start programs, infant mental health, ECI programs, residential treatment centers, schools and in numerous private and outpatient clinical practices working with young children, youth and adults. Several large public child protective services and child mental health settings have become certified and routinely use the NMT to help guide clinical decision-making.

Evidence-based Practice and the NMT

Over the past decade there has been a movement toward practice accountability from federal, state and foundation funding sources demanding proof of the effectiveness for specific interventions (Austin & Roberts, 2002). This increased interest in accountability has led toward more “evidence- based” work throughout various disciplines. Similarly, evidence-based medicine (EBM) refers to aspects of medical care in which the scientific method is applied to certain parts of medical practice. It seeks to assess the quality of evidence relevant to the risks and benefits of treatments (including lack of treatment). Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients (Sackett, 1996). The NMT adheres to these principles and as this relatively “young” approach to clinical work is disseminated, an impressive body of evidence is accumulating (see references below); some of this has been published, and much of it is in the process of being prepared for publication.

There are various levels of “evidence” which are to be considered when making the designation of “evidence-based.” For example, the U.S. Preventive Services Task Force uses the following to ranking evidence about the effectiveness of treatments:

Level I: Evidence obtained from at least one properly designed randomized controlled trial. Level II-1: Evidence obtained from well-designed controlled trials without randomization.

Level II-2: Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.

Level II-3: Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled trials might also be regarded as this type of evidence.

Level III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

The Neurosequential Model of Therapeutics currently meets criteria for Level III, Level II-3, Level II-2 and Level II-1. Randomized controlled trials in several settings are underway. NMT Certification is manualized with a very strong supervision and coaching component.

The NMT has the following EBP elements:

1.) Multiple sites participating in NMT Training Certification gather data that is used to determine efficacy of the model. The NMT model in these sites is employed in therapeutic preschools, residential treatment facilities, out-patient clinical settings, and large state child welfare systems. There are several cross-validation projects underway to compare NMT Metrics with a variety of other common metrics (e.g., CAFAS, CBCL, TSC).

2.) There are multiple reports from independent groups using the NMT that have demonstrated positive outcomes.

3.) All NMT-certified sites have demonstrated improved outcomes (using both NMT and non-NMT metrics such as incident reports, restraints, changes in CAFAS). In cases where the data were collected in systematic fashion these outcomes are statistically significant when compared to previous “treatment as usual” at the same site or organization.

4.) NMT metrics have been shown to be valid (both face-, predictive- and concurrent validity have been examined) and reliable (high inter-rater reliability and Cronbach alpha Part C: = .95; Part D: = .84). There is a network wide inter-rater reliability process and ongoing “ratings meeting” to allow ongoing correction and supervision. Comparison with SPECT demonstrates high correlation of Part C items and regional changes.

5.) The Certification and training process are manualized with a robust fidelity model (including inter-rater reliability and case-auditing process).

In 2015 the Federally funded National Quality Improvement Center for Adoption/Guardianship Support and Preservation (QIC-AG: <http://qic-ag.org>) rated the NMT as LEVEL 3 Emerging Practice (see below). Using these criterion, in 2020, the NMT meets their criterion for LEVEL 2 Supported by Research Practice.

QIC- AG Level of Evidence

The interventions and programs were identified from multiple sources that use various scales and levels for rating the evidence. Given the variations among the existing scales, the QIC-AG developed a six-level Evidence Rating Scale or “crosswalk” that enabled the project to approximate the level of evidence for each intervention by using one or more of the following three methods: 1) a review conducted by one or more credible evidence-based review organizations, 2) information provided by the developer or purveyor of the intervention, or 3) additional information about the intervention that was obtained from searches conducted by QIC-AG staff.

The QIC-AG developed and adapted the following Evidence Scale to ensure consistency and utility for the QIC-AG.

- LEVEL 6: Failed to Prove Positive Effect. Interventions in this level have been tested in studies but have not established positive findings.
- LEVEL 5: Better Practice. Interventions in this level constitute guidelines or practices primarily driven by clinical wisdom, guild organizations, or other consensus approaches that do not include systematic research evidence.
- LEVEL 4: Promising Practice. Interventions in this level are recognized by professionals and organizations in the field to have demonstrated an impact. This level of includes promising practices and acceptable treatments that have some research evidence or a record of clinical experience from experts or other respected authorities. Rigor of evaluation is low. Interventions appear to produce desired results and have shown promise in improving client outcomes in studies using non-experimental design.
- LEVEL 3: Emerging Practice. Interventions in this level are supported and acceptable treatments with positive evidence from studies at the middle levels of the research hierarchy pyramid, including non-randomized studies, which are also referred to as quasi-experimental studies; observational studies; correlation studies; and comparative studies. Examples include panel studies, cohort studies, and case-control studies.
- LEVEL 2: Supported by Research. Interventions in this level are supported with positive evidence from two or more quasi-experimental studies or at least one randomized controlled trial. Evidence at this level indicates a strong likelihood that intervention produces the desired effects, but the evidence has not risen to the level of proving cause-and-effect.
- LEVEL 1: Effective and Proven by Research. Interventions in this level are well-supported with positive evidence from two or more randomized controlled trials (RCTs). RCTs are the “gold standard” in research, indicating a high level of evaluation rigor. However, given the high cost of conducting RCTs, fewer interventions have been evaluated using this design.

Austin, D. M. & Roberts, A. R. (2002). Clinical social work research in the 21st century: Future, present, and past. In A. R. Roberts & G. J. Greene (Eds.), Social workers' desk reference (pp. 822-828). New York: Oxford University Press.

Sackett, D.L. et al. (1996) Evidence based medicine: what it is and what it isn't. BMJ 312 (7023).

Summary of Selected Reports and Publications related to NMT as “EBP”

Rationale for a neurodevelopmental approach to maltreated children

Perry, B.D. (1994) Neurobiological sequelae of childhood trauma: Post traumatic stress disorders in children. In Catecholamine Function in Post-Traumatic Stress Disorder: Emerging Concepts (M Murburg, Ed.) pp. 253-276 American Psychiatric Press, Washington, DC

Perry, B.D., Pollard, R., Blakely, T., Baker, W., & Vigilante, D. (1995) Childhood trauma, the neurobiology of adaptation and 'use-dependent' development of the brain: How “states” become “traits”. *Infant Mental Health J*, 16 (4): 271-291

Glaser, D. (2000) Child abuse and neglect and the brain: a review *J. Child Psychol. Psychiat.* 41:1, 97-116

Perry, B.D. (2001) The neuroarcheology of childhood maltreatment: the neurodevelopmental costs of adverse childhood events. In: *The Cost of Maltreatment: Who Pays? We All Do.* (K. Franey, R. Geffner & R. Falconer, Eds.), pp. 15-37 Family Violence and Sexual Assault Institute, San Diego

Read, J., Perry, B.D., Moskowitz, A. & Connolly, J. (2001) The contribution of early traumatic events to schizophrenia in some patients: a traumagenic neurodevelopmental model. *Psychiatry* 64 (4) 319-345

Perry, B.D. (2002) Childhood experience and the expression of genetic potential: what childhood neglect tells us about nature and nurture. *Brain and Mind* 3: 79-100

Anda, R.F., Felitti, R.F., Walker, J., Whitfield, C., Bremner, D.J., Perry, B.D., Dube, S.R., Giles, W.G. (2006) The enduring effects of childhood abuse and related experiences: a convergence of evidence from neurobiology and epidemiology, *European Archives of Psychiatric and Clinical Neuroscience*, 256 (3) 174 - 186

Perry, B.D. & Szalavitz, M. (2007) *The Boy Who Was Raised As A Dog: And Other Stories from a Child Psychiatrist's Notebook; What Traumatized Children Can Teach Us About Life, Loss and Healing.* Basic Books, New York

Perry, B.D. (2008) Child maltreatment: the role of abuse and neglect in developmental psychopathology. In *Textbook of Child and Adolescent Psychopathology* In (Theodore P. Beauchaine & Stephen P. Hinshaw, Eds) pp. 93-128, Wiley, New York

Gibson, J. (2012) Keeping the child in mind: Learning about childhood trauma from personal experience and neuroscience. *Refocus: The Residential Child Care Project Newsletter* 18: 1-8

Twardowz, S. & Lutzker, J.R. (2012) Child maltreatment and the developing brain: a review of neuroscience perspectives. *Aggression and Violent Behavior* 15: 59-68.

Burnell, A. & Vaughn, J. (2012) Family Future's Neuro-sequential approach to the assessment and treatment of traumatised children: Neuro-physiological psychotherapy (NPP) in UNA CASA PER UN PO'- Esperienze di casa-famiglia, a cura di Wanda Grosso. *Quaderni di Psicoterapia Infantile*, Borla, Roma 2012

Ungar, M & Perry, B.D. (2012) Violence, trauma and resilience. In (R. Alaggia & C. Vine, Eds) *Cruel but Not Unusual: Violence in Canadian Families* pp. 195-235, WLU Press, Waterloo, CA

Read, J., Fosse, R., Moskowitz, A. & Perry, B.D. (2014) Traumagenic neurodevelopmental model of psychosis revisited, *Neuropsychiatry* 4 (1): 1-15

Tronick, E. & Perry, B.D. (2015) The multiple levels of meaning making and the first principles of changing meanings in development and therapy in *Handbook of Somatic Psychotherapy* (H. Weiss et al., Eds) pp 345-355 North Atlantic Books, Berkeley CA

Beeghly, M., Perry, B.D., & Tronick, E.. (2016) "Self-Regulatory Processes in Early Development." *Oxford Handbooks Online*. 2016-02-11. Oxford University Press.
<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199739134.001.0001/oxfordhb-9780199739134-e-3>>

Perry, B.D. (2017) Trauma- and stress-related disorders in *Textbook of Child and Adolescent Psychopathology: Third Edition* in (Theodore P. Beauchaine and Stephen P. Hinshaw, Eds) Wiley, New York pp 683-705

Lucero, I. (2018) Written in the body? Healing the epigenetic molecular wounds of complex trauma through empathy and kindness. *Journal of Child & Adolescent Trauma*
<https://doi.org/10.1007/s40653-018-0205-0>

Core elements of the Neurosequential Model of Therapeutics

Perry, B.D. (2006) The Neurosequential Model of Therapeutics: Applying principles of neuroscience to clinical work with traumatized and maltreated children In: *Working with Traumatized Youth in Child Welfare* (Nancy Boyd Webb, Ed.), pp. 27-52, The Guilford Press, New York

Perry, B.D. & Hambrick, E. (2008) The Neurosequential Model of Therapeutics. *Reclaiming Children and Youth*, 17 (3) 38-43

Perry, B.D. (2009) Examining child maltreatment through a neurodevelopmental lens: clinical application of the Neurosequential Model of Therapeutics. *Journal of Loss and Trauma* 14: 240-255

Perry, B.D. & Dobson, C.D. (2009) Surviving childhood trauma: the role of relationships in prevention of, and recovery from, trauma-related problems. *Counselling Children and Young People: Journal of CCYP*, a division of British Association for Counseling and Psychotherapy, March, 2009 28-31

Ludy-Dobson, C. & Perry, B.D. (2010) The role of healthy relational interactions in buffering the impact of childhood trauma in *Working with Children to Heal Interpersonal Trauma* (Eliana Gil, Ed.) pp 26-44 The Guilford Press, New York

Prasad, N. (2011) Using a neurodevelopmental lens when working with children who have experienced maltreatment: A review of the literature of Bruce Perry. *Children, Young People and Families Research and Program Development*, Social Justice Unit, UnitingCare, Paramatta, NSW, 1-17

Gaskill, R. L. & Perry, B.D. (2012) Child sexual abuse, traumatic experiences and their effect on the developing brain in *Handbook of Child Sexual Abuse: Identification, Assessment and Treatment* (P. Goodyear-Brown, Ed) pp. 29-49 John Wiley & Sons, Hoboken

MacKinnon, L. (2012) The Neurosequential Model of Therapeutics: An interview with Bruce Perry. *The Australian & New Zealand Journal of Family Therapy*, 33:3 pp 210-218
doi:10.1017/aft.2012.26

Gaskill, R.L. & Perry, B.D. (2014) Using the Neurosequential Model of Therapeutics to guide play therapy with maltreated children. In *Play and Creative Arts Therapy for Attachment Trauma* (C. Malchiodi & D. Crenshaw, Eds) 178-194, Guilford Press, New York

Perry, B.D., Hambrick, E. & Perry, R.D (2016) A neurodevelopmental perspective and clinical challenges. In *Trauma Related to Intercountry and Transracial Adoptions* (Rowena Fong & Ruth McCoy, Eds) pp 126 – 153, Columbia University Press, New York

Perry, B.D., Davis, G., Griffin, E., Perry, J.A. & Perry, R.D. (2018) The impact of neglect, trauma and maltreatment on neurodevelopment: Implications for the juvenile justice system in *The Wiley-Blackwell Handbook of Forensic Neuroscience* (Anthony R. Beech, Adam J. Carter, Ruth E. Mann & Pia Rotshtein Eds.) pp 814-816, John Wiley & Sons Ltd, London

Perry, B.D. (2020) The Neurosequential Model: a developmentally-sensitive, neuroscience-informed approach to clinical problem solving in (Janise Mitchell, Joe Tucci & Ed Tronick, Eds), *The Handbook of Therapeutic Child Care: Evidence-informed Approaches to Working with Traumatized Children in Foster, Relative and Adoptive Care.* pp 137-158, Jessica Kingsley, London

Application and outcomes using the Neurosequential Model

Jackson, A., Frederico, M., Tanti, C. & Black, C. (2009) Exploring outcomes in a therapeutic service response to the emotional and mental health needs of children who have experienced abuse and neglect in Victoria, Australia. *Child and Family Social Work*, 14: 198-212. (NMT contributes to Take Two Berry Street clinical model; early-certification in NMT)

Bryson, S., Akin, B., Moore, T. & O'Brien, M. (2010) Youthville Trauma Recovery Center Evaluation, Year One Report to Office of Child Welfare and Children's Mental Health, University of Kansas School of Social Welfare. Lawrence, KS (Improved outcomes for clients served in Year 1 of NMT based Trauma Recovery Center)

Eide-Midsand, N. (2010) Behind a dark gaze, Part 1: Behavioral problems as an expression of the brain's response system to stress and danger. *Tidsskrift for Norsk Psykologforening* 47: 1098-1102.

Eide-Midsand, N. (2011) Behind a dark gaze, Part 2: Therapy with a five-year-old in view of recent findings in brain research. *Tidsskrift for Norsk Psykologforening* 48: 144-149.

Barfield, S., Gaskill, R., Dobson, C. & Perry, B.D. (2011) Neurosequential Model of Therapeutics® in a Therapeutic Preschool: Implications for Work with Children with Complex Neuropsychiatric Problems. *International Journal of Play Therapy*. Online First Publication, October 31, 2011. Doi:10.1037/a0025955

Zarnegar, Z. (2011) Learning the dance of connection: helping a foster mother and a child with Fetal Alcohol Spectrum Disorder. *Zero to Three Journal*, July 2011, 26-30

Mackenzie, J. (2012) Using a trauma-based approach to promote the education of troubled adolescents. Presented at: 3rd International Conference on Violence in the Health

Sector, Vancouver, BC (frequency of restraints and floor holds significantly decreased following introduction of NMT related practices)

Grove, T. (2012) Outcomes from a pilot project examining the NMT in a residential treatment center. Report to Shaw Foundation (NMT Grant to St. Aemelian-Lakeside), Milwaukee, WI (Positive outcomes included higher percentage of responders to Tx and larger drops in CAFAS scores with NMT-guided intervention).

Hansen, L. & Lusk, R. Sensorimotor intervention for children who have experienced trauma: a pilot study. Pp. 1-64 Lambert Academic Publishing, (2012) (The study incorporated the principles of NMT in interventions with children who experienced complex trauma. Following the intervention, significant results were found, including improvements in positive behavior and emotional regulation.)

Perry, B.D. & Dobson, C. (2013) Application of the Neurosequential Model (NMT) in maltreated children. In *Treating Complex Traumatic Stress Disorders in Children and Adolescents*, (J. Ford & C. Courtois, Eds) Guilford Press, New York, pp. 249-260.

Anich, Z. & King, E. (2013) Trauma, neuroscience and SEBN: an evaluation of training. Presentation at: Annual Conference for Educational Psychologists in Scotland (Overview of NMT training process and implementation in Sound Lanarkshire Council Psychological Service).

Perry, B.D. (2014) The Neurosequential Model of Therapeutics in young children. In *Infant and Early Childhood Mental Health: Core Concepts and Clinical Practice*. (K. Brandt, B.D. Perry, S. Seligman & E. Tronick, Eds) American Psychiatric Press, Washington DC, pp. 21-54.

Sori, C.F. & Schnur, S. (2013) Integrating a neurosequential approach in the treatment of traumatized children: an interview with Eliana Gil, Part II *The Family Journal: Counseling and Therapy for Couples and Families* xx(x) pp. 1-8 DOI: 10.1177/1066480713514945

Cross, D.R. & Purvis, K.B. (2013) Non-pharmacological interventions for children and youth in care. (<http://texascasa.org/wp-content/uploads/2013/11/Non-pharmacological-Interventions-Dr.-Purvis.pdf>)

Perry, B.D. (2013) A conversation about trauma assessment and intervention Casey Practice Digest, 4: June 2013 pp. 5-8

Clark, D. & Palinkas, J. (2013) Comparing parent perceptions of two programs for young children exposed to domestic violence: Neurosequential Model of Therapeutics (NMT) and psycho-educational play therapy. Mount Royal University, Centre for Child Well-Being, Calgary (Both interventions resulted in improvements overall; Achenbach overall scores in NMT-informed groups demonstrated superior improvement in comparison to the psychoeducational play therapy groups.)

Zarnegar, Z., Hambrick, E., Perry, B.D., Azen, S. & Peterson, A. (2016) Clinical improvements in adopted children with Fetal Alcohol Spectrum Disorders through neurodevelopmentally-informed clinical interventions: a pilot study. *Clinical Child Psychology and Psychiatry* 1-17 DOI: 10.1177/1359104516636438 (A case series in young children with Fetal Alcohol Spectrum disorder. Significant improvement in ASQ, PSI and BDI following NMT assessment and NMT-directed therapeutic intervention.)

Clark, D. & Palinkas, J. (2014) Adaptive functioning of children exposed to domestic violence: parent perceptions of the Neurosequential Model of Therapeutics and a psychoeducational play therapy model. Executive Summary for YWCA Calgary, Mount Royal Centre for Child Well-Being, Calgary

Wang, E., Wilkes, T.C., Perry, B.D. & McMaster, F. (2015) Open trial of the Neurosequential Model of Therapeutics (NMT) approach in a clinical setting. 28th Annual

Sebastian Littman Research Day, University of Calgary (CAFAS scores showed a significant reduction of 59% ($t = 10.97$, $p < 0.001$). Cortical Modulation Ratio showed a 45% increase ($t = 8.510$; $p < 0.001$). There was a negative correlation between baseline Cortical Modulation Ratio and Post CAFAS scores ($r = 0.533$, $p = 0.031$.)

De Nooyer, K.M. and Lingard, M. (2016) Applying principles of the Neurosequential Model of Therapeutics across an adolescent day program and inpatient unit. *Australasian Psychiatry* 2016 Jul 12, pp 1-4, PMID: 27406931 DOI: 10.1177/1039856216658824

Steinkopf, H., Bræin, M.K. & Nordanger, D. Ø. (2017) Kartlegging av barn med "The Neurosequential Model of Therapeutics" *Journal of the Norwegian Psychological Association (TIDSSKRIFT FOR NORSK PSYKOLOGFORENING 2017 S. 958–969 FAGFELLEVDERT)*

Patti, M.S., Grappolini, C. & Luberti, R. (2017) Gli effetti della violenza e della trascuratezza sullo sviluppo emotivo, cognitivo e neurobiologico del bambino. *Il Neurosequential Model of Therapeutics di Bruce Perry in Violenza Assistita, Separazioni Traumatiche, Maltrattamenti Multipli: Percorsi di protezione e di cura con bambini e adulti.* (Roberta Luberti & Caterina Grappolini, Eds) Erickson, Trento (ITALY) pp 115-131.

Gaskill, R.L. & Perry, B.D. (2017) A neurosequential therapeutics approach to guided play, play therapy, and activities for children who won't talk in *What to Do When Children Clam Up in Psychotherapy: Interventions to Facilitate Communication* (Cathy A. Malchiodi and David A. Crenshaw, Eds) pp 38-66

Walter, S. (2017) Early experience in the Neurosequential Model in Education (NME). *Canadian Journal for Teacher Research.*

(<http://www.teacherresearch.ca/blog/article/2016/10/30/314-early-experiences-in-the-neurosequential-model-in-education>. Retrieved 10/18/17).

Ryan, K., Lane, S.J. & Powers, D. (2017) A multidisciplinary model for treating complex trauma in early childhood. *International Journal of Play Therapy* 26, No.2: 111-123
<http://dx.doi.org/10.1037/pla0000044> (Description of a model based upon NMT and using NMT metrics as central component of the clinical approach).

Raftl, G.C., Rudman, E.R. & Roberts, N. (2017) Integration of a neuro-developmental, attachment and trauma-informed (NATI) approach and positive behaviour support: Towards a framework for trauma-informed positive behaviour support (TI-PBS). SAL Consulting.

Hambrick, E., Brawner, T., Perry, B.D., Wang, E., Griffin, G., DeMarco, T., Capparelli, C., Grove, T., Maikoetter, M., O'Malley, D., Paxton, D., Freedle, L., Friedman, J., Mackenzie, J., Perry, K.M., Cudney, P., Hartman, J., Kuh, E., Morris, J., Polales, C. & Strother, M. (2018) Restraint and critical incident reduction following introduction of the Neurosequential Model of Therapeutics (NMT). *Residential Treatment for Children & Youth*, doi/full/10.1080/0886571X.2018.1425651 (Reduction of restraints (more than 60%, $P < 0.001$) and critical incidents (50%, $p < 0.005$) following introduction of the NMT; 10 sites, 3 countries, avg. duration of observation was over 60 months, 2700 clients with estimated \$1.5 million savings.)

Perry, B.D. & Jackson, A. (2018) Trauma-informed Leadership in Leadership in Child and Family Practice (Margarita Frederico, Nadine Cameron, Maureen Long, Eds). Routledge Academic, London & NY pp. 125-142

Perry, B.D. & Ablon, J.S. (2019) Viewing Collaborative Problem Solving Through a Neurodevelopmental Lens in (Stuart Ablon, Michael Hone & Alisha Pollastri, Eds) *Collaborative Problem Solving: An Evidence-based Approach to Implementation Across Settings.* Springer, Boulder

Topitzes, J., Grove, T. Meyer, E.E. & Sprague, C.M. (2019) Trauma-responsive child welfare service: a mixed methods study assessing safety, stability and permanency. *Journal of Child Custody* 16:3, 291-312 (NMT was an element for the most challenging clients; based upon feedback from users and results, authors recommend future trauma-responsive child welfare include widely administered NMT assessments).

Mason, C. (2018) The Neurosequential Model of Therapeutics. CAYA Section Connection. 2-4.

Resource Development Associates (2018) San Mateo County Adult NMT Pilot: Fiscal Year 2017-2018 Evaluation Report (*NMT implementation for adult MHS tracked. Most consumers demonstrated improved functioning. Providers and consumers reported positive impact of NMT certification process*).

Mason, C. (2018) The Neurosequential Model of Therapeutics: Helping clients move beyond trauma. *The New Social Worker*, Winter 2019, pp 20-23.

Mason, C., Kelly, B.L., & McConchie, V. (in press, 2020). Applying principles of neuroscience to trauma treatment: Introducing students to the Neurosequential Model of Therapeutics. *Journal of Teaching in Social Work*. (This describes the integration of NMT certification into graduate training in the master's program in social work at Loyola School of Social Work).

Jackson, A., Frederico, M., Cox, A. & Black, C. (2019) The treatment of trauma: the Neurosequential Model and "Take Two". In *Approaches to Psychic Trauma: Theory and Practice* (ed. Bernd Huppertz) Rowman & Littlefield Press, Lanham, Maryland. pp 423-456.

Frederico, M., Jackson, A., Black, C. & Pawsey, R. & Cox, A. (2019) Take Two: Implementing a therapeutic service for children who have experienced abuse and neglect: beyond evidence-informed practice. *Child Abuse Review* 28: 225-239 doi.org/10.1002/car.2563

(The program's practice framework and the subsequent contribution of the Neurosequential Model of Therapeutics (NMT) is described)

Freedle, L. R. (2019). Making connections: Sandplay therapy and the Neurosequential Model of Therapeutics®, *Journal of Sandplay Therapy* XXVIII (1)

Rolock, N., Diamant-Wilson, R., White, K., Cho, Y., & Fong, R. (2019). Evaluation results from Tennessee-Final evaluation report. In Rolock, N. & Fong, R. (Eds.). *Supporting adoption and guardianship: Evaluation of the National Quality Improvement Center for Adoption and Guardianship Support and Preservation (QIC-AG)-Final evaluation report*. (pp. 9-1 – 9-66). Washington, DC: Department of Health and Human Services, Administration for Children and Families, Children's Bureau. This analysis found the NMT group had statistically significant positive changes outcome measures (see Rolock et al., 2019, above) compared to the existing program interventions for children in adoptive and guardianship settings where there was a risk for breakdown of placement. Further analysis of adherence to NMT-derived treatment recommendations found that when more than 50% of the NMT recommendations for treatment were followed through with acceptable fidelity more statistically significant improvements in more outcome measures were demonstrated (Rolock, N. et al., in preparation).

Cox, A., Perry, B.D. & Frederico, M. (in press, 2020) Resourcing the system and enhancing relationships: pathways to positive outcomes for children impacted by abuse and neglect. *Child Welfare*. Special edition "Global Perspectives on Neglect and Child Protection". (This paper demonstrates bringing together clinical services, research and training in a loop of evidence-informed and evidence-generating practice utilising the Neurosequential Model of Therapeutics (NMT) to improve assessment and intervention for children impacted by abuse and neglect. Data of clients of Take Two (n=677) between 2010 -2017 were analysed. Repeat measure analysis found children demonstrated statistically significant improvement.)

Reports/ Theses/ Dissertations examining the NMT or Using NMT Core Dataset

Hansen, L. (2011) Evaluating a Sensorimotor Intervention in Children who have Experienced Complex Trauma: A Pilot Study. Thesis: Honors Projects, Illinois Wesleyan University. Paper 151 http://digitalcommons.iwu.edu/psych_honproj/151

Eichler, E. (2012) Talking through the body: a comparative study of cognitive-behavioral and attachment- based treatments for childhood trauma. Thesis: Masters of Social Work, Smith College

Holcomb, M. C. (2014) The clinical implications of dissolutioned adoption: a theoretical intersection of the neurosequential model of therapeutics and attachment theory. Thesis: Masters of Social Work, Smith College. Theses, Dissertations, and Projects. Paper 791

Caplis, C.F. (2014) Feasibility and perceived efficacy of the Neurosequential Model of Therapeutics. Dissertation: Doctorate in Psychology, Antioch University: New England

Taylor, M. (2014) Not in isolation: the importance of relationships and healing in childhood trauma Report on 2013 Creswick Fellowship for the Creswick Foundation. Berry Street, Melbourne VIC, AU

Sando-Pederson, A. M. (2015) A discussion of the Neurosequential Model of Therapeutics based upon a study of how early trauma affects the development of the brain. Master's thesis, University of Copenhagen (DK)

Whyde, J. & Boldman-Buzard, J. (2017) Building Better Lives: Promoting Healthy Children, Strong Families and Thriving Communities. Franklin County Family and Children First Council. Columbus OH. (Report on the introduction of the Neurosequential Model into Franklin County schools and related systems. Outcome from sample elementary schools (e.g., decrease in suspensions from 149 to 12 per year following the introduction of the NME).

Albright, J.G. (2017) Art therapy as a bottom-up processing intervention in the contextual framework of the Neurosequential Model of Therapeutics. Dissertation: Doctorate in Art Therapy, Mount Mary University, Milwaukee, WI

Felker, P. (2017) The relationships between adverse events, relational health events, and adaptive dissociation in clinical sample of adolescents. Dissertation: Doctorate in Social Work. Widener University, Chester, PA.

Research Reports (Using NMT Core Dataset)

Hambrick, E. P., Brawner, T. W., & Perry, B. D. (2017, August). Does the timing of exposure to trauma matter in terms of children's developmental outcomes? The relative contribution of trauma exposure and relational poverty perinatally, during infancy, and during early childhood to preadolescent functioning. Presented at 2017 American Psychological Association Annual Meeting, Division 53, Washington, DC

Brawner, T. W., Perry, B. D., & Hambrick, E. P. (2017, August). Analytical challenges in making generalizable statistical inferences using datasets comprising children multiply exposed to trauma. Presented at 2017 American Psychological Association Annual Meeting, Division 56, Washington, DC

Hambrick, E., Brawner, T., & Perry, B. (2018). Examining developmental adversity and connectedness in child welfare-involved children. *Children Australia*, 43(2), 105-115.
doi:10.1017/cha.2018.21

Hambrick, E. P., Brawner, T. W., Perry, B. D., Hofmeister, C., & Collins, J. (2018, October). Beyond the ACE score. Poster presented at the 2018 National Conference in Clinical Child and Adolescent Psychology, Kansas City, MO.

Hambrick, E.P., Brawner, T., Perry, B.D., Brandt, K., Hofeister, C. & Collins, J. (2018) *Beyond the ACE Score: Examining relationships between timing of developmental adversity, relational health and developmental outcomes in children*. *Archives of Psychiatric Nursing* doi.org/10.1016/j.apnu.2018.11.001

Hambrick, E.P., Brawner, T. & Perry, B.D. (2019) *Timing of early-life stress and the development of brain-related capacities*. *Front. Behav. Neurosci.* 13:183 doi.org/10.3389/fnbeh.2019.00183

Evidence- based practice and the NMT

Barfield, S. (2004) Best practices in early childhood mental health programs for preschool – age children. Report to Kansas Department of Social and Rehabilitation Service, Division of Health Care Policy. University of Kansas School of Social Welfare, Children’s Mental Health Research Group. (NMT labeled as “Promising Practice”)

Brandt, K., Diel, J., Feder, J. & Lillas, C. (2012) A problem in our field. *Journal of Zero to Three*; 32(4), 42- 45 (NMT recognized as Evidence-based Practice or EBP)

Lillas, C., Feder, J., Diel, J. & Brandt, K. (2013) Evidence-based treatments and evidence-based practices in the infant-parent mental health field. In *Infant and Early Childhood Mental Health: Core Concepts and Clinical Practice*. (K. Brandt, B.D. Perry, S. Seligman & E. Tronick, Eds) American Psychiatric Press, Washington DC pp. 281-293

Southwell, J. (2014) Evaluation of Boys Town’s Expressive Therapies Intervention 2012-2014 (The conceptual framework based, in part, on the NMT. A substantial majority of preschool children entered therapy in the clinical or borderline clinical symptom ranges for internalising (67%) and externalising problems (70%) and at exit from therapy, just 13% remained in the clinical or borderline clinical ranges on either of these measures. www.Boystown.com.au)

Practice, Program & Policy Implications

Walker, R. (2009) Translating neurodevelopment to practice: how to go from fMRI to a home visit. *Journal of Loss and Trauma*, 14, 256-265

Ferris, M. (2011) Increasing the accessibility of trauma-focused services: strategies for working with youth difficult to engage in services. Wilder Research, March 2011 Wilder Foundation, St. Paul, MN

Wilcox, K (2012) Kids and trauma recovery: practice reflections from the recent Bruce Perry tours. *Issues in Good Practice* 50:4-5. Australian Domestic & Family Violence Clearinghouse, University of New South Wales, Sydney

Furnivall, J., McKenna, M., McFarlane, S. & Grant, E. (2012) Attachment matters for all- an attachment mapping exercise for Children's Services in Scotland. CELCIS Report commissioned by the Scottish Government (www.celcis.org) pp. 1-68

American Association of Children's Residential Centers (2012) Redefining residential: creating non- coercive environments. Position Papers of the AACRC

Perry, B.D. & Jackson, A. (2014) Long and winding road: from neuroscience to policy, program and practice. *Insight: Victorian Council of Social Services Journal* 9: 4-8

Tomer, J.F (2014) Adverse childhood experiences, poverty and inequality: Toward an understanding of the connections and cures. *World Economic Review* 3: 20-36

Ayala, K. & Grove, T. (2015) Implementing the Neurosequential Model of Therapeutics. *Focus: Newsletter of the Foster Family-based Treatment Association* 21:2 1-5

Andriola, T.R. (2016) Juvenile Justice Reform in New York State, *Journal of Infant, Child, and Adolescent Psychotherapy*, 15:3, 237-243, DOI:10.1080/15289168.2016.1214443 (*NMT listed as Evidence-based Practice or EBP*)

Other Recognitions

The Minister of Human Services and the Alberta government selected The Preadolescent Treatment Program at Hull Services in Calgary (an NMT Flagship Program) as one of three best practice sites in Alberta (2014).

The Center for the Study of Social Policy (CSSP), a national think tank based in Washington, D.C., has selected Saint A's trauma informed care work (using the NMT as a core element) as one of 15 exemplary initiatives that are innovative in helping youth thrive. SaintA (an NMT Flagship Program based in Milwaukee, WI) was selected out of 136 applications submitted from across the nation. (2014)

Take Two of Berry Street ((an NMT Flagship Program in Melbourne, VIC, AU) was recommended for the exceptional rating of 'extensive achievement' (EA) regarding assessment

during the 2015 biennial quality accreditation cycle in relation to national health standards (Australia). This rating was based upon the use of the NMT and in particular the NMT Fidelity process and cross-organization benchmarking allowed by the NMT fidelity exercises.

In 2015 the Federally funded National Quality Improvement Center for Adoption/Guardianship Support and Preservation (QIC-AG: <http://qic-ag.org>) rated the NMT as Level 3 Promising Practice (see above) and in 2016 NMT was selected as the emerging best-practice framework to include in an RCT in one of the primary Phases of this five-year program project dedicated to the development of best practices in Child Welfare.

In 2016 the Ministry of Human Services in Alberta, Canada (Alberta Humans Services) formally announced that they would be using the Neurosequential Model of Therapeutics (NMT) as the practice framework to support therapeutic work with at-risk, maltreated and traumatized children and youth.

Health & Medicine Policy Research Group (2017) The Parent-child dyad in the context of child development and child health. The Illinois ACEs Response Collaborative. (NMT included in list of key emerging practices).

In 2020, the Ohio Children's Alliance recognized the NMT as an approved Qualified Residential Treatment Program (QRTP) for IV-E funding in Ohio under the new Families First Prevention Services Act (FFPSA).

Books

Perry, Bruce D. & Szalavitz, M. (2017) *The Boy Who Was Raised as A Dog: And Other Stories from a Child Psychiatrist's Notebook: What Traumatized Children Can Teach Us About Life, Loss and Healing: Revised and Updated*. Basic Books, New York

Proceedings of the 2nd International Neurosequential Model Symposium: Banff, Alberta Canada, June 8-10, 2016. Eds. Emily T. Perry, Gene Griffin, Michelle Maikoetter, Steve Graner, Jana L. Rosenfelt & Bruce D. Perry. Houston, TX, The ChildTrauma Academy Press, 2018, Print ePub: (ASIN: B07D34S68C) (Over 30 contributions focusing on NMT, NME and related trauma-informed approaches. Outcomes and implementation in educational, therapeutic and community settings are described).

The Neurosequential Model Network

[Neurosequential.com](https://www.neurosequential.com)

[BDPerry.com](https://www.bdperry.com)

[Handouts](#)

<https://www.bdperry.com/handouts>



@BDPerry

@Neurosequential