

# Assessment: The Newborn

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## KEYWORDS

- Neonate • Assessment • Neurobehavioral • Temperament
- Socioemotional impairment

## KEY POINTS

- Neonatal neurobehavioral assessment is a key mechanism by which neonates with central nervous system and neurobehavioral disturbances are identified.
- Neonates with highly reactive and dysregulated neurobehavioral profiles are at greater risk of temperamental difficulties by late infancy.
- The NICU Network Neurobehavioral Scale and the Neonatal Behavioral Assessment Scale show significant associations with externalizing, internalizing, and emotion-regulation problems in early-to-middle childhood, suggesting that neonatal screening measures capture early physiologic and neurobehavioral markers related to longer-term differences in early mental health.
- Psychiatric services should be embedded in wraparound longitudinal care for at-risk newborns to support socioemotional development in the context of the caregiver-infant relationship.

## INTRODUCTION

Neonatal neurobehavioral assessment has become a standardized and common component of clinical care provided to newborn infants.<sup>1</sup> Early editions of neonatal neurobehavioral assessments date back to the 1900s<sup>2</sup> and primarily emphasized

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the evaluation of central nervous system (CNS) organization and maturation.<sup>3–6</sup> More recent assessments include items that focus on newborn neurobehavioral development, relating the developing nervous system to functional behavior in the postnatal environment.<sup>2,7</sup> Strength-based neurobehavioral measures highlight the importance of assessing infant capabilities according to the infant's developmental milieu.<sup>2,4,8,9</sup> Neonatal neurobehavioral assessments not only guide clinical decisions regarding care in the neonatal intensive care unit (NICU) but also help to determine which infants will need longer-term support via targeted therapeutic interventions and the early involvement of specialist developmental services following hospital discharge.<sup>4,5,8,10,11</sup>

To determine the clinical utility of neonatal screening measures, a growing body of evidence has begun to document the extent to which neonatal assessment predicts long-term cognitive and motor outcomes.<sup>12–14</sup> However, less is known regarding the utility of neonatal assessments for the identification of infants at risk of socioemotional impairments. As such, this article provides an overview of empirical studies linking newborn neurobehavioral assessments to socioemotional outcomes in early childhood. Given that existing reviews have already highlighted strong associations between newborn neurologic assessments and later neurodevelopmental impairments,<sup>12,15</sup> this article focuses on neurobehavioral assessments only.

## ASSESSMENT OF THE NEWBORN

The initial mechanism by which newborns, defined as infants in the first 28 days of life, are identified as having disturbances in CNS and neurobehavioral development is through routine clinical assessment in neonatal care units.<sup>5</sup> In addition to detailed physical and neurologic examinations, several standardized assessments are widely available to clinicians and researchers that provide a comprehensive evaluation of the newborn's neurobehavioral capabilities. Newborn assessments typically have at least 1 of 3 primary objectives:

1. To identify high-risk infants with CNS and neurobehavioral disturbances in need of treatment and/or intervention
2. To evaluate developmental progress in response to NICU interventions and family-centered therapies
3. To prognosticate longer-term neurodevelopmental outcomes.<sup>5,8,16</sup>

Due to the recent increase of family-centered approaches in neonatal care, an additional objective included in some assessments concerns the evaluation of the infant in the context of the parent-infant dyad to promote infant health and the caregiving relationship.<sup>14,17</sup>

### *Neonatal Neurobehavioral Assessments*

**Table 1** provides a general description of established neonatal neurobehavioral assessments. Variation exists across the assessments in terms of the domains examined, test construction, and differences in administration approaches regarding infant observation and/or manipulation or handling.<sup>4,16</sup> Most measures, however, have a dual emphasis on the assessment of CNS functions and the neurobehavioral profile.<sup>2,6</sup> Systematic assessment of neonatal CNS maturity and organization involves the evaluation of primitive reflexes, spontaneous or elicited movements, and sensory behaviors.<sup>2,4,8</sup> Reflexive and sensory behaviors undergo rapid sequential changes in the neonatal period<sup>4,9</sup> and, as such, they are useful neurophysiological constructs to discriminate compromised CNS function in high-risk versus healthy neonates. In

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