

Appendix 1: Neonatal Intensive Care Unit Network Neurobehavioral Scale Scoring Form

The numbering and notation on this form are used throughout the rest of the appendices in the computation of summary scores.

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Reprint requests to (B.M.L.) Infant Development Center, Women and
Infants Hospital, 79 Plain St, 2nd Fl, Providence, RI 02903. E-mail:
barry_lester@brown.edu
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emy of Pediatrics.

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ID

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Visit

Part 1: Examination

A. Preexamination Observation

1. Initial-state observation

B. Habituation (States 1 and 2)

2. Response decrement to light NNHALIT
 3. Response decrement to rattle NNHARAT
 4. Response decrement to bell NNHABEL

C. Unwrap and Supine

5. Posture (states 1–5) NNUSPOS
 6. Skin color (states 1–5) NNUSSKN
 7. Skin texture

Yes No
 NNUSTXS

Is infant in state 1, 2, 3, 4, or 5?
 If yes,

Yes No
 NNUSTXD
 NNUSTXE
 NNUSTXL
 NNUSTXC
 NNUSMOV
 NNUSTAC

a. Desquamation
 b. Excoriations/abrasions
 c. Loose skin
 d. Deep creases around the eyes and nose
 8. Movement (states 1–4)
 9. Response decrement to tactile stimulation of the foot (states 1–3)

D. Lower Extremity Reflexes (States 3–5)

If asymmetrical, describe the less-optimal side

10. Plantar grasp	<input type="checkbox"/>	NNLERPG	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEAPG
11. Babinski	<input type="checkbox"/>	NNLERBA	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEABA
12. Ankle clonus	<input type="checkbox"/>	NNLERAC	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEAAC
13. Leg resistance	<input type="checkbox"/>	NNLERLR	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEALR
14. Leg recoil	<input type="checkbox"/>	NNLERLC	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEALC
15. Power of active leg movements	<input type="checkbox"/>	NNLERAL	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEAAL
16. Popliteal angle	<input type="checkbox"/>	NNLERPA	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNLEAPA

E. Upper Extremities and Face (States 3–5)

If asymmetrical, describe the less-optimal side

17. Scarf sign	<input type="checkbox"/>	NNUEFSS	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEASS
18. Forearm resistance	<input type="checkbox"/>	NNUEFFR	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEAFR
19. Forearm recoil	<input type="checkbox"/>	NNUEFFC	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEAFC
20. Power of active arm movements	<input type="checkbox"/>	NNUEFAA	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEAAA
21. Rooting	<input type="checkbox"/>	NNUEFRT	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEART
22. Sucking	<input type="checkbox"/>	NNUEFSU					
23. Grasp of hands	<input type="checkbox"/>	NNUEFGH	↓L <input type="checkbox"/>	↑L <input type="checkbox"/>	↓R <input type="checkbox"/>	↑R <input type="checkbox"/>	NNUEAGH
24. Truncal tone	<input type="checkbox"/>	NNUEFTT					
25. Pull to sit (states 4 and 5)	<input type="checkbox"/>	NNUEFPS					

F. Upright Responses (States 3–5)

If asymmetrical, describe the less-optimal side

26. Placing	<input type="checkbox"/>	<input type="checkbox"/>	NNUPRPL	↓L 1	↑L 2	↓R 3	↑R 4	NNUPAPL
27. Stepping	<input type="checkbox"/>	<input type="checkbox"/>	NNUPRST	↓L 1	↑L 2	↓R 3	↑R 4	NNUPAST
28. Ventral Suspension	<input type="checkbox"/>	<input type="checkbox"/>	NNUPRVS					
29. Incurvation	<input type="checkbox"/>	<input type="checkbox"/>	NNUPRIN	↓L 1	↑L 2	↓R 3	↑R 4	NNUPAIN

G. Infant Prone (States 3–5)

30. Crawling	<input type="checkbox"/>	<input type="checkbox"/>	NNINPCR
31. Stimulation needed	<input type="checkbox"/>	<input type="checkbox"/>	NNINPSN
32. Head raise in prone	<input type="checkbox"/>	<input type="checkbox"/>	NNINPHR

H. Pick up Infant (States 4 and 5)

33. Cuddle in arm	<input type="checkbox"/>	<input type="checkbox"/>	NNPUICA
34. Cuddle on shoulder	<input type="checkbox"/>	<input type="checkbox"/>	NNPUICS

I. Infant Supine on Examiner's Lap (States 4 and 5)

35. Orientation: inanimate visual	<input type="checkbox"/>	<input type="checkbox"/>	NNISLIV
36. Orientation: inanimate auditory	<input type="checkbox"/>	<input type="checkbox"/>	NNISLIA
37. Orientation: inanimate visual and auditory	<input type="checkbox"/>	<input type="checkbox"/>	NNISLIB
38. Orientation: animate visual	<input type="checkbox"/>	<input type="checkbox"/>	NNISLAV
39. Orientation: animate auditory	<input type="checkbox"/>	<input type="checkbox"/>	NNISLAA
40. Orientation: animate visual and auditory	<input type="checkbox"/>	<input type="checkbox"/>	NNISLAB

J. Infant Spin (States 3–5)

If asymmetrical, describe the less-optimal side

41. Tonic deviation of head and eyes	<input type="checkbox"/>	<input type="checkbox"/>	NNSPNTD	↓L 1	↑L 2	↓R 3	↑R 4	NNSPATD
42. Nystagmus	<input type="checkbox"/>	<input type="checkbox"/>	NNSPNNY					

K. Infant Supine in Crib (States 3–5)

If asymmetrical, describe the less-optimal side

43. Defensive movements	<input type="checkbox"/>	<input type="checkbox"/>	NNSCRDR					
44. Asymmetrical tonic neck reflex	<input type="checkbox"/>	<input type="checkbox"/>	NNSCRTN	↓L 1	↑L 2	↓R 3	↑R 4	NNSCATN
45. More reflex	<input type="checkbox"/>	<input type="checkbox"/>	NNSCRM R	↓L 1	↑L 2	↓R 3	↑R 4	NNSCAMR

L. Summary Items

46. Orientation: handling procedures	Yes	No	NNSIOST					
Was infant in State 4 or 5?	<input type="checkbox"/>	<input type="checkbox"/>						
If yes,	Yes	No						
a. Repeated time out	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOTO					
b. Hand-holding/ventral pressure	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOHV					
c. Auditory stimulation (voice or rattle)	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOAS					
d. Jiggling/vertical rocking	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOJR					
e. Covering/wrapping	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOCW					
f. Swaddling	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOSW					
g. Rocking/walking	<input type="checkbox"/>	<input type="checkbox"/>	NNSIORW					
h. Sucking/pacifier	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOSP					
i. Other	<input type="checkbox"/>	<input type="checkbox"/>	NNSIOOT					
47. Alertness (states 4 and 5)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIALR
48. General tone/predominant tone (states 4 and 5)						<input type="checkbox"/>	<input type="checkbox"/>	NNSITON
49. Motor maturity (states 4 and 5)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIMOT
50. Consolability with intervention (states 6 to 4–1)						<input type="checkbox"/>	<input type="checkbox"/>	NNSICON
51. Peak of excitement (all states)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIEXC
52. Rapidity of build-up (all states with state 6 at least 15 seconds)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIRAP
53. Irritability (all states)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIRRT
54. Spontaneous activity (states 3–5)						<input type="checkbox"/>	<input type="checkbox"/>	NNSISPO
55. Elicited activity (states 3–5)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIACT
56. Tremulousness (all states)						<input type="checkbox"/>	<input type="checkbox"/>	NNSITRE
57. Amount of startle during exam (states 3–6)						<input type="checkbox"/>	<input type="checkbox"/>	NNSISTA
58. Lability of skin color (as infant moves from states 1 to 6)						<input type="checkbox"/>	<input type="checkbox"/>	NNSISKN
59. Lability of states (all states)						<input type="checkbox"/>	<input type="checkbox"/>	NNSILAB
60. Self-quieting activity (states 6 and 5–1)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIQUI
61. Hand-to-mouth facility (all states)						<input type="checkbox"/>	<input type="checkbox"/>	NNSIHMD
62. First predominant state						<input type="checkbox"/>	<input type="checkbox"/>	NNSIFPR
63. Second predominant state						<input type="checkbox"/>	<input type="checkbox"/>	NNSISPR
64. Postexamination-state observation						<input type="checkbox"/>	<input type="checkbox"/>	NNSIPEX
65. Order of administration						<input type="checkbox"/>	<input type="checkbox"/>	NNSIORD

Part II: Stress/abstinence scale

M. Physiological

	Yes	No	
66. Labored breathing	<input type="checkbox"/>	<input type="checkbox"/>	NNPHLAB
67. Nasal flaring	<input type="checkbox"/>	<input type="checkbox"/>	NNPHNAS

N. Autonomic

	Yes	No	
68. Sweating	<input type="checkbox"/>	<input type="checkbox"/>	NNAUSWE
69. Spit-up	<input type="checkbox"/>	<input type="checkbox"/>	NNAUSPT
70. Hiccoughing	<input type="checkbox"/>	<input type="checkbox"/>	NNAUHIC
71. Sneezing	<input type="checkbox"/>	<input type="checkbox"/>	NNAUSNZ
72. Nasal stuffiness	<input type="checkbox"/>	<input type="checkbox"/>	NNAUSTF
73. Yawning	<input type="checkbox"/>	<input type="checkbox"/>	NNAUYAW

O. Central Nervous System

	Yes	No	
74. Abnormal sucking	<input type="checkbox"/>	<input type="checkbox"/>	NNCNASU
75. Choreiform movements	<input type="checkbox"/>	<input type="checkbox"/>	NNCNCHO
76. Athetoid postures and movements	<input type="checkbox"/>	<input type="checkbox"/>	NNCNATH
77. Tremors			
a. Low frequency/ high amplitude	<input type="checkbox"/>	<input type="checkbox"/>	NNCNTRL
b. High frequency/ low amplitude	<input type="checkbox"/>	<input type="checkbox"/>	NNCNTRH
78. Cogwheel movements	<input type="checkbox"/>	<input type="checkbox"/>	NNCNCOG
79. Startles	<input type="checkbox"/>	<input type="checkbox"/>	NNCNSTA
80. Hypertonia	<input type="checkbox"/>	<input type="checkbox"/>	NNCNHYP
81. Back arching	<input type="checkbox"/>	<input type="checkbox"/>	NNCNBAR
82. Fisting	<input type="checkbox"/>	<input type="checkbox"/>	NNCNFST
83. Cortical thumb	<input type="checkbox"/>	<input type="checkbox"/>	NNCNCTH
84. Myoclonic jerks	<input type="checkbox"/>	<input type="checkbox"/>	NNCNJRK
85. Generalized seizures	<input type="checkbox"/>	<input type="checkbox"/>	NNCNSEZ
86. Abnormal posture	<input type="checkbox"/>	<input type="checkbox"/>	NNCNAPO

P. Skin

	Yes	No	
87. Pallor	<input type="checkbox"/>	<input type="checkbox"/>	NNSKPAL
88. Mottling	<input type="checkbox"/>	<input type="checkbox"/>	NNSKMOT
89. Paroxysmal cyanosis	<input type="checkbox"/>	<input type="checkbox"/>	NNSKPCY
90. Overall cyanosis	<input type="checkbox"/>	<input type="checkbox"/>	NNSKOCY
91. Circumoral cyanosis	<input type="checkbox"/>	<input type="checkbox"/>	NNSKCCY
92. Periocular cyanosis	<input type="checkbox"/>	<input type="checkbox"/>	NNSKRKY

Q. Visual

	Yes	No	
93. Gaze aversion during orientation	<input type="checkbox"/>	<input type="checkbox"/>	NNVIAVR
94. Pull down during orientation	<input type="checkbox"/>	<input type="checkbox"/>	NNVIPUL
95. Fuss/cry during orientation	<input type="checkbox"/>	<input type="checkbox"/>	NNVICRY
96. Obligatory following during orientation	<input type="checkbox"/>	<input type="checkbox"/>	NNVIFOL
97. Endpoint nystagmus during orientation	<input type="checkbox"/>	<input type="checkbox"/>	NNVIENY
98. Sustained spontaneous nystagmus	<input type="checkbox"/>	<input type="checkbox"/>	NNVISNY
99. Visual locking	<input type="checkbox"/>	<input type="checkbox"/>	NNVILOC
100. Hyperalertness	<input type="checkbox"/>	<input type="checkbox"/>	NNVIHYP
101. Setting-sun sign	<input type="checkbox"/>	<input type="checkbox"/>	NNVISUN
102. Roving eye movements	<input type="checkbox"/>	<input type="checkbox"/>	NNVIEYE
103. Strabismus	<input type="checkbox"/>	<input type="checkbox"/>	NNVISTR
104. Tight blinking	<input type="checkbox"/>	<input type="checkbox"/>	NNVIBLN
105. Other abnormal eye signs	<input type="checkbox"/>	<input type="checkbox"/>	NNVIOTH

R. Gastrointestinal

	Yes	No	
106. Gagging/choking	<input type="checkbox"/>	<input type="checkbox"/>	NNGACHK
107. Loose or watery stools	<input type="checkbox"/>	<input type="checkbox"/>	NNGASTL
108. Excessive gas or bowel sounds	<input type="checkbox"/>	<input type="checkbox"/>	NNGAGAS

S. State

	Yes	No	
109. High-pitched cry	<input type="checkbox"/>	<input type="checkbox"/>	NNSTHCR
110. Monotone-pitch cry	<input type="checkbox"/>	<input type="checkbox"/>	NNSTMCR
111. Weak cry	<input type="checkbox"/>	<input type="checkbox"/>	NNSTWCR
112. No cry	<input type="checkbox"/>	<input type="checkbox"/>	NNSTNCR
113. Extreme irritability	<input type="checkbox"/>	<input type="checkbox"/>	NNSTIRR
114. Abrupt state changes	<input type="checkbox"/>	<input type="checkbox"/>	NNSTCHN
115. Inability to achieve quiet, awake state (4)	<input type="checkbox"/>	<input type="checkbox"/>	NNSTQUA

NNXAMIN Examiner: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> First Last	NNXAMDT Date of exam: <input type="text"/> <input type="text"/> <input type="text"/> Month Day Year
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**Appendix 1: Neonatal Intensive Care Unit Network Neurobehavioral Scale
Scoring Form**
Pediatrics 2004;113;690

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