

**National Survey of Neonatal Growth Measurement Practices**

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**Research Team**

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**Presentation Objectives**

- Describe the clinical implications of neonatal growth measurements
- Identify areas for improvement in neonatal growth measurement practices

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**Background**

- Early growth trajectories are both indicators and predictors of health
- Neonatal growth measurements are used to:
  - Assess fetal growth
  - Determine fluid and nutrition requirements
  - Calculate medication doses
  - Identify surveillance needs
  - Provide baseline criteria for postnatal growth monitoring
- Neonatal measurements are frequently inaccurate and unreliable
- Measurement errors in neonates can lead to:
  - Misclassification as SGA, AGA, or LGA
  - Incorrect clinical judgments & decision-making
  - Overlooking potentially serious health problems
  - Unnecessary referrals and evaluations



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**Purpose of Study**

- Describe neonatal nurses' growth measurement knowledge, attitudes, practice behaviors, bases of practice knowledge, and barriers and facilitators for changing practice.
- Identify any differences by nursing organization, unit type, nursing education, and years of neonatal experience.

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## Methods

- Descriptive, exploratory design with online survey using REDCap platform
- Neonatal growth measurement survey – tool previously developed and pilot tested for validity and reliability by the research team
  - Knowledge, attitude, practice behavior items developed from best practices
  - Bases of practice knowledge, barriers and facilitators items modified from Gerrish et al. (2007) *Developing EBP Questionnaire*
- Distributed through 2 neonatal nursing organizations:
  - Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) – AWHONN emailed invitation with survey link to random 5000 neonatal nursing members
  - National Association of Neonatal Nurses (NANN) - invitation with survey link posted on My NANN Community webpage (potential to reach 7000 neonatal nursing members)
- Response rate: 2.5% (n = 301 neonatal nurses)

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## Demographics n = 301

	n	%
<b>Organization membership</b>		
AWHONN	156	51.8
NANN	96	31.9
Both AWHONN & NANN	49	16.3
<b>Level of care*</b>		
Level I – well newborn	75	24.9
Level II – special care nursery	70	23.3
Level III – NICU	159	52.8
Level IV – regional NICU	47	15.6
<b>Type of unit</b>		
Well newborn – level I	75	24.9
NICU – levels II, III, IV	226	75.1
<b>Position:</b>		
RN	254	84.4
Advanced Practice Nurse	47	15.6
<b>Highest nursing degree</b>		
Associate/Diploma	30	10.0
Bachelor	152	50.5
Master	100	33.2
Doctorate	19	6.3
<b>Years of neonatal experience<sup>b</sup></b>		
0-5 years	66	21.9
6-10 years	74	24.6
11-20 years	69	22.9
21-40 years	62	20.6
<b>Unit has measurement policies/procedures</b>		
Yes	269	89.4
No/I don't know	32	10.7

Note. \*AAP defined levels of care. <sup>b</sup>Mean years of neonatal experience 18.7 ± 12.8.

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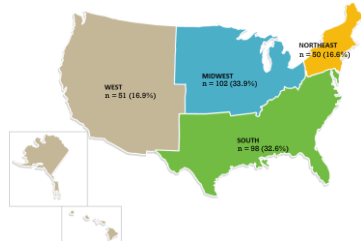
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## Geographic Distribution (n = 301)




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**Knowledge Items (n = 276): Number & Percentage Correct**

	ALL		Well Newborn		NICU		p <sup>b</sup>
	n	%	n	%	n	%	
1. An estimate is sufficient for classifying neonatal size as LGA, AGA, or SGA. (F)	234	84.8	89	88.1	175	83.7	.44
2. Being LGA or SGA does not affect postnatal growth. (F)	280	90.6	96	83.6	194	92.8	.03
3. Neonates who are LGA or SGA have serious health risks. (T)	238	86.2	96	83.6	182	87.1	.54
4. Large differences in growth measurements should be rechecked. (T)	276	100.0	87	100.0	209	100.0	1.00
5. To measure HC, the tape measure should be positioned at the maximum frontal-occipital circumference. (T)	284	95.7	88	97.0	199	95.2	.74
6. Any type of tape measure can be used to measure head circumference. (F)	219	79.4	83	79.1	166	79.4	1.00
7. A single measurement of head circumference is acceptable. (F)	158	67.3	37	59.2	121	67.9	.78
8. Head circumference reflects brain size and brain growth. (T)	198	71.0	42	62.7	154	73.7	.09
9. A neonate should be weighed in a dry, clean diaper. (F)*	177	64.1	54	80.6	123	58.9	.001
10. A single measurement of weight is acceptable. (F)	99	35.8	20	29.9	79	37.8	.31
11. Serial weight of an individual neonate should be measured on the same scale. (T)	288	93.9	81	91.0	197	94.3	.29
12. The presence of necessary equipment on the neonate should be noted when documenting weight. (T)	267	96.7	82	100.0	200	95.7	.13
13. An accurate and reliable length measurement can be obtained with a tape measure. (F)	90	32.8	11	16.4	79	37.8	.001
14. One person can obtain an accurate and reliable length measurement. (F)	111	40.2	17	25.4	94	45.0	.004
15. I understand the meaning of Frankfort plane. (T)	53	19.2	9	13.4	44	21.1	.21
16. A single measurement of length is acceptable. (F)	123	44.6	24	35.8	99	47.4	.12

Notes. F=False, T=True, HC=head circumference. \*p value using Fisher's exact test. \*Nude weight recommended. NICU nurses may weigh in diaper and subtract the weight of diaper, which is also acceptable.

**Attitudes: Positive Ratings<sup>a</sup>**

	Head Circumference (n = 274)		Weight (n = 281)		Length (n = 272)	
	n	%	n	%	n	%
How accurate <sup>b</sup> are your measurements?	268	96.7	279	99.3	237	87.1
How accurate <sup>b</sup> are your peers' measurements?	254	92.7	273	97.2	223	82.0
How reliable <sup>c</sup> are your measurements?	268	96.7	277	98.6	241	88.6
How reliable <sup>c</sup> are your peers' measurements?	255	93.1	275	97.9	224	82.4
How important are accurate <sup>b</sup> and reliable <sup>c</sup> measurements?	266	97.1	281	100.0	251	92.6

Notes. <sup>a</sup>For attitudes about head circumference, weight, and length measurements, five questions were asked, with answers on a scale of 1-4 (1 = not accurate/not reliable/not important to 4 = highly accurate/highly reliable/highly important); ratings of 3 or 4 were considered positive ratings. <sup>b</sup>Accuracy defined as close to the true value. <sup>c</sup>Reliability defined as closeness of repeated measurements to the same value.

**Use of EBP: Head Circumference Measurement**

	ALL		Well Newborn		NICU		p <sup>b</sup>
	n	% <sup>a</sup>	n	% <sup>a</sup>	n	% <sup>a</sup>	
Place tape measure on forehead slightly above the supraorbital ridge (n = 282)	211	72.3	48	69.6	163	73.1	.64
Place tape measure around the maximal occipital prominence (n = 292)	267	91.4	82	89.9	205	91.9	.62
Ensure plane of tape measure is the same on both sides of the head (n = 270)	211	78.2	52	80.0	159	77.6	.73
Measure two or more times before recording (n = 291)	180	61.9	35	51.5	145	65.0	.05
Record to the nearest 0.1 cm or 1/16 inch (n = 282)	84	29.8	7	9.3	47	20.8	.02

Notes. <sup>a</sup>Percentage using EBP. <sup>b</sup>p value using Fisher's exact test.

### Use of EBP: Weight Measurement

	All		Well Newborn		NICU		p <sup>b</sup>
	n	% <sup>a</sup>	n	% <sup>a</sup>	n	% <sup>a</sup>	
Weigh at the same time of day (n = 270)	129	<b>47.8</b>	25	38.5	104	90.7	.09
Use the same scale to weigh the same neonate (n = 270)	152	56.3	38	58.5	114	58.6	.77
Zero the scale before weighing (n = 270)	266	98.5	64	98.5	202	98.5	1.00
Weigh nude or with clean, dry diaper and subtract weight of diaper (n = 284)	288	98.0	72	100.0	216	97.3	.34
Weigh two or more times before recording (n = 284)	80	<b>27.2</b>	10	13.9	70	31.5	.004
Record to the nearest 10 grams or less, or 1/4 ounce or less (n = 284)	219	<b>72.8</b>	48	64.0	171	78.7	.05

Notes. <sup>a</sup>Percentage using EBP. <sup>b</sup>p value using Fisher's exact test.

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### Use of EBP: Length Measurement

	All		Well Newborn		NICU		p <sup>b</sup>
	n	% <sup>a</sup>	n	% <sup>a</sup>	n	% <sup>a</sup>	
Use a length board (n = 283)	85	<b>19.4</b>	4	6.0	51	23.6	.001
Measure with another person assisting (n = 283)	71	<b>25.1</b>	6	9.0	65	30.1	<.001
Position head in the Frankfort plane (n = 270)	9	<b>3.3</b>	3	4.6	6	2.9	.48
Position legs side by side (n = 270)	138	<b>50.4</b>	27	41.5	109	83.2	.12
Measure from the crown to the heels of both feet (n = 283)	84	<b>19.1</b>	8	11.9	46	21.3	.11
Measure two or more times before recording (n = 283)	112	<b>39.6</b>	20	29.9	92	42.6	.07
Record to the nearest 0.1 cm or 1/16 inch (n = 283)	83	<b>17.6</b>	5	6.7	48	21.2	.003

Notes. <sup>a</sup>Percentage using EBP. <sup>b</sup>p value using Fisher's exact test.

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### Bases of Practice Knowledge (n = 271): Ranking by Mean Score

Rank	Item <sup>a</sup>	n	Mean ± SD
	<b>How often do you base your neonatal growth measurement practices on:</b>		
1	Information I get from clinical practice guidelines	270	4.2 ± 0.7
2	Information I get from unit policies/procedures	269	4.2 ± 0.7
3	Information I learned in unit orientation	270	3.8 ± 0.9
4	Information I get from attending in-service training/conferences	270	3.8 ± 0.9
5	Information I get from my professional nursing organization	270	3.7 ± 1.0
6	Information I learned in my nursing education	270	3.7 ± 0.9
7	What physicians discuss with me	270	3.6 ± 1.0
8	My personal experience of caring for neonates over time	271	3.4 ± 1.1
9	What has worked for me for years	270	3.4 ± 1.0
10	Information I get from journal articles	270	3.4 ± 0.9
11	Information my fellow nurses share	270	3.3 ± 0.8
12	Information I get from textbooks	270	3.2 ± 1.0
13	The ways I have always done it	270	3.1 ± 1.0
14	Information I get from product/equipment literature	270	3.1 ± 1.1
15	Information I get from equipment company representatives	270	2.9 ± 1.1
16	My intuition about what seems to be right for the neonate	271	2.8 ± 1.3
17	Information I get from the internet	270	2.3 ± 0.8

Note. <sup>a</sup>Each item is scored as follows: 1 = never, 2 = rarely, 3 = sometimes, 4 = mostly, 5 = always.

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### Barriers to EBP (n = 270): Ranking by Frequency

Rank	Item	n	%
	<b>What are the barriers to changing growth measurement practices on the basis of evidence:</b>		
1	There are no barriers to changing practice in my unit.	106	39.3
2	The culture of my team is not receptive to changing practice.	90	33.3
3	There are insufficient resources to change practice.	88	32.6
4	I lack the authority in the unit to change practice.	75	27.8
5	There are other barriers to EBP in my unit.	36	13.3
6	There is insufficient time at work to implement changes in practice.	30	11.1
7	I do not feel confident about beginning to change my practice.	5	1.9

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### Facilitators for EBP (n = 270): Ranking by Frequency

Rank	Item	n	%
	<b>What are the factors that facilitate or support changing growth measurement practices on the basis of evidence:</b>		
1	Nurse managers are supportive of my changing practice.	189	70.0
2	Unit educators are supportive of my changing practice.	185	68.5
3	Nursing colleagues are supportive of my changing practice.	158	58.5
4	Physicians with whom I work are supportive of my changing practice.	153	56.7
5	Advanced practice nurses are supportive of my changing practice.	117	43.3
6	Dietitians are supportive of my changing practice.	74	27.4
7	There are other factors that support evidence-based practice in my unit.	35	13.0
8	There is no support for changing practice.	19	7.0

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### Limitations

- Response rate lower than expected
- Included only AWHONN & NANN members
- Almost 40% had an advanced degree; majority of neonatal nurses in practice are likely BSN nurses
- Sample had a mean 18.7 years experience, which is likely more than in most neonatal units
- Survey asked about practice behaviors first, which may have influenced their answers to knowledge questions

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### What are the clinical implications?

- Significant knowledge gaps exist
- Most neonatal nurses think measurements are accurate & reliable
- Growth measurement methods vary widely
- There are many areas for improvement, especially related to length measurement
- Neonatal size for gestational age may be misclassified
- Potential for errors in calculating fluid needs, nutritional needs, and medication doses
- Postnatal growth patterns are difficult to interpret if birth measurements are incorrect




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### What can PENS nurses do?



- Develop interventions & targeted implementation strategies to optimize:
  - Growth monitoring
  - Clinical decision-making
- Collaborate with neonatal nursing experts from AWHONN & NANN
- Partner with neonatal nurse managers & unit educators
- Promote the use of clinical practice guidelines
- Recommend EBP changes to unit policies & procedures

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