Racial and Socioeconomic Variation in Caregiver Knowledge of Safe Infant Sleep Spaces

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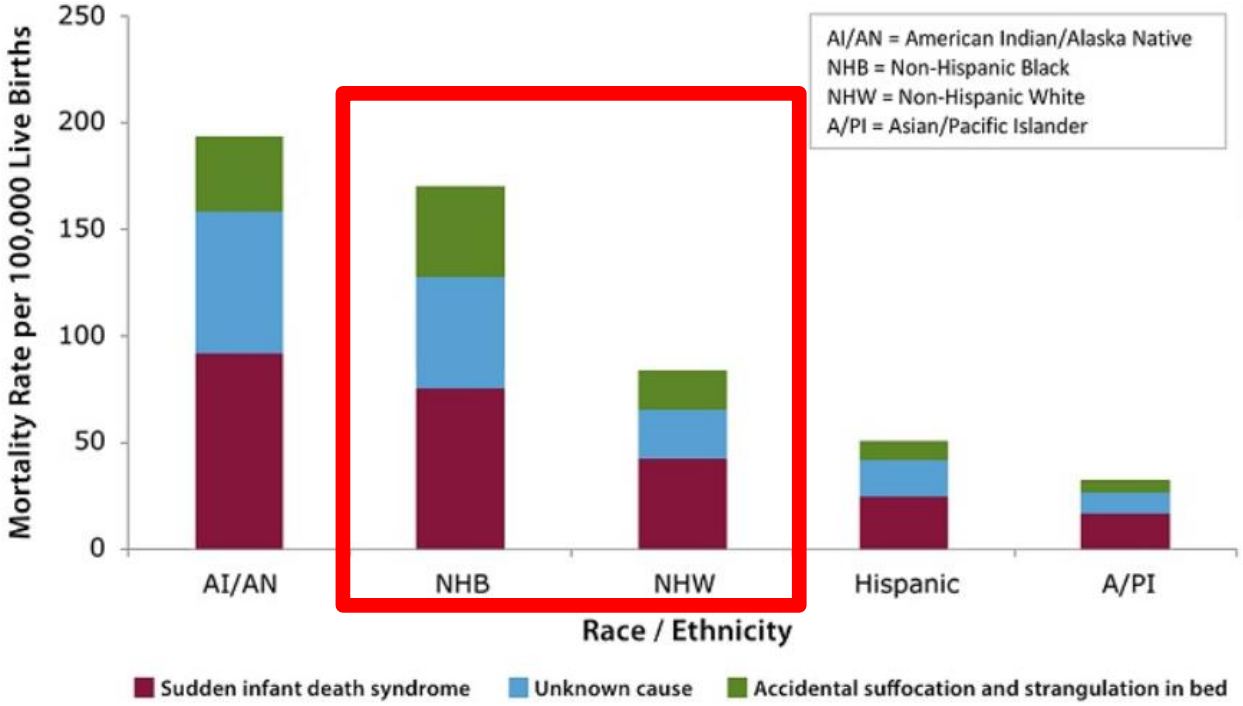
Background – Definitions

- **Sudden unexpected infant death (SUID)** is the death of an infant **less than 1 year of age** that occurs **suddenly and unexpectedly**, and whose cause of death is not immediately obvious before investigation. Most SUIDs are reported as one of three types: **SIDS**, unknown/undetermined, and accidental suffocation/strangulation
- **Sudden Infant Death Syndrome (SIDS)** is the sudden death of an infant **less than 1 year of age** that **cannot be explained** after a thorough investigation is conducted, including a complete autopsy, examination of the death scene, and a review of the clinical history.
- Approximately **3500 infants** die annually in the United States from Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS).

Background – Disparity

- SUID and SIDS rates are twice as high among non-Hispanic black infants as non-Hispanic white infants.[1]

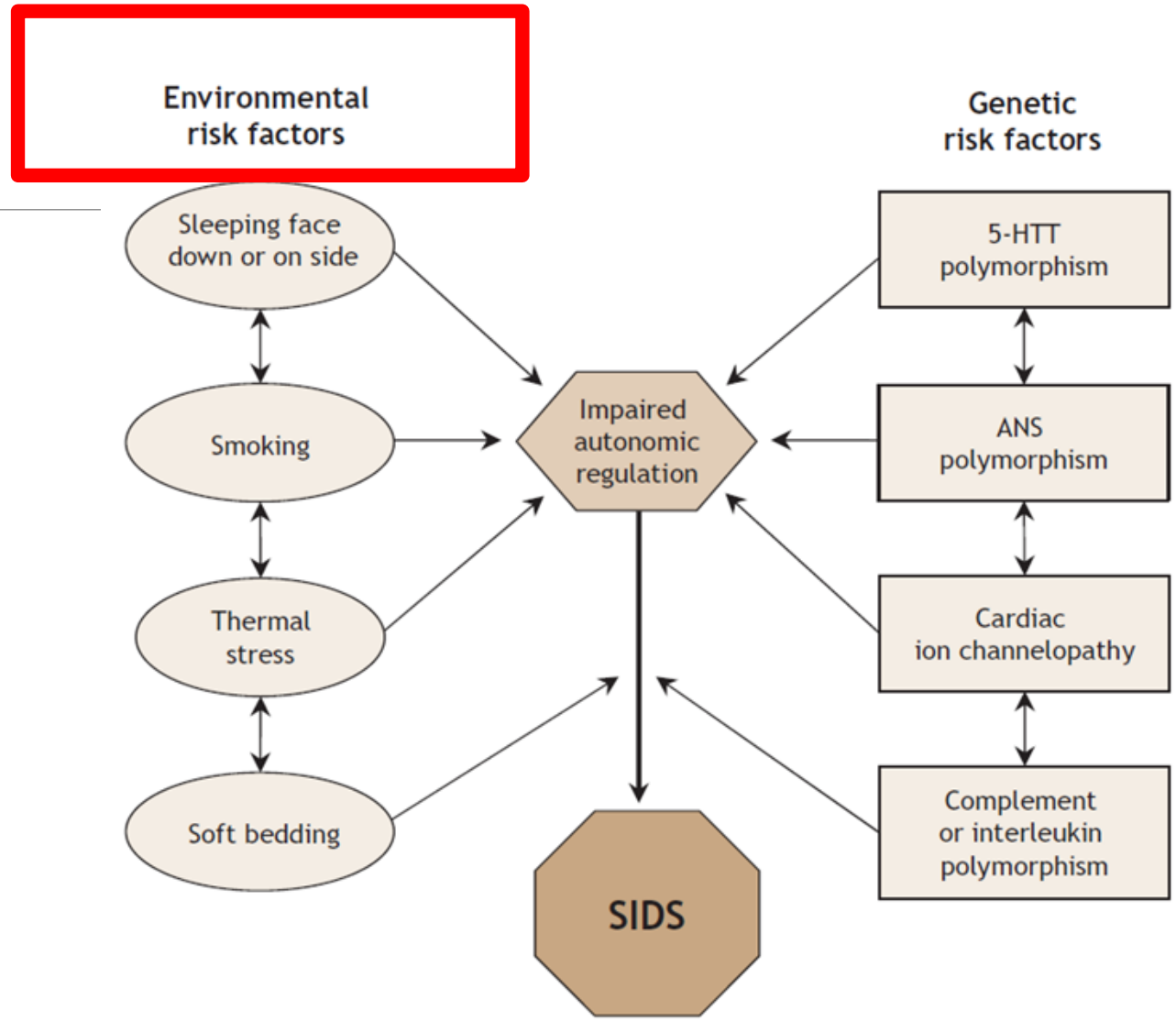
Sudden Unexpected Infant Death by Race/Ethnicity, 2011-2014



SOURCE: CDC/NCHS, National Vital Statistics System, Period Linked Birth/Infant Death Data.

Background

Environmental and Genetic Factors



From: "Sudden Infant Death Syndrome" by C.E. Hunt, 2006, *CMAJ*, 174(13), p. 1861.

Background – Purpose

- A **key risk factor** for SUID and SIDS is an **unsafe infant sleeping space**.[2]
- **Caregiver knowledge** of safe infant sleeping spaces influences the overall implementation of safe spaces and infant health outcomes.
- It remains unclear **whether caregiver knowledge differs among subgroups;** previous studies that measured knowledge were not comparative or did not publish their results. [3,4,5]
- **This study examines caregiver knowledge of safe infant sleep spaces in several scenarios for potential differences in this knowledge among different racial and socioeconomic groups.**

Methods

- Data used from a larger study led by Dr. Grzywacz and Dr. Middlemiss examining the utility and perceived safety of infant sleep spaces.
- **541 American adults** expecting a child within 5 months completed a **12-question survey**.
- Respondents recruited via Amazon Mechanical Turk (crowdsourcing internet marketplace) and were paid $0.75 for participation.
  - Qualifying factors: expecting a child within 5 months, identified as a caregiver, and responded with unique, US-based IP address

Methods

- 12 survey images depicted:
  - infants in safe and unsafe sleeping spaces
  - variations of infant positioning, objects in sleep space, and presence of blankets
  - three unique infant sleepers (Finnish Baby in a Box, New Zealand Pēpi-Pod®, Summer Infant® By-My-Side Sleeper)
  - black or white infant (6 each)

- Data analysis:
  - total score out of 12 was used **as a measure of knowledge** of safe infant sleep spaces
  - models for **both total score and individual question correctness** were examined and covariates were identified

safe

unsafe

Safe

Unsafe

safe

unsafe

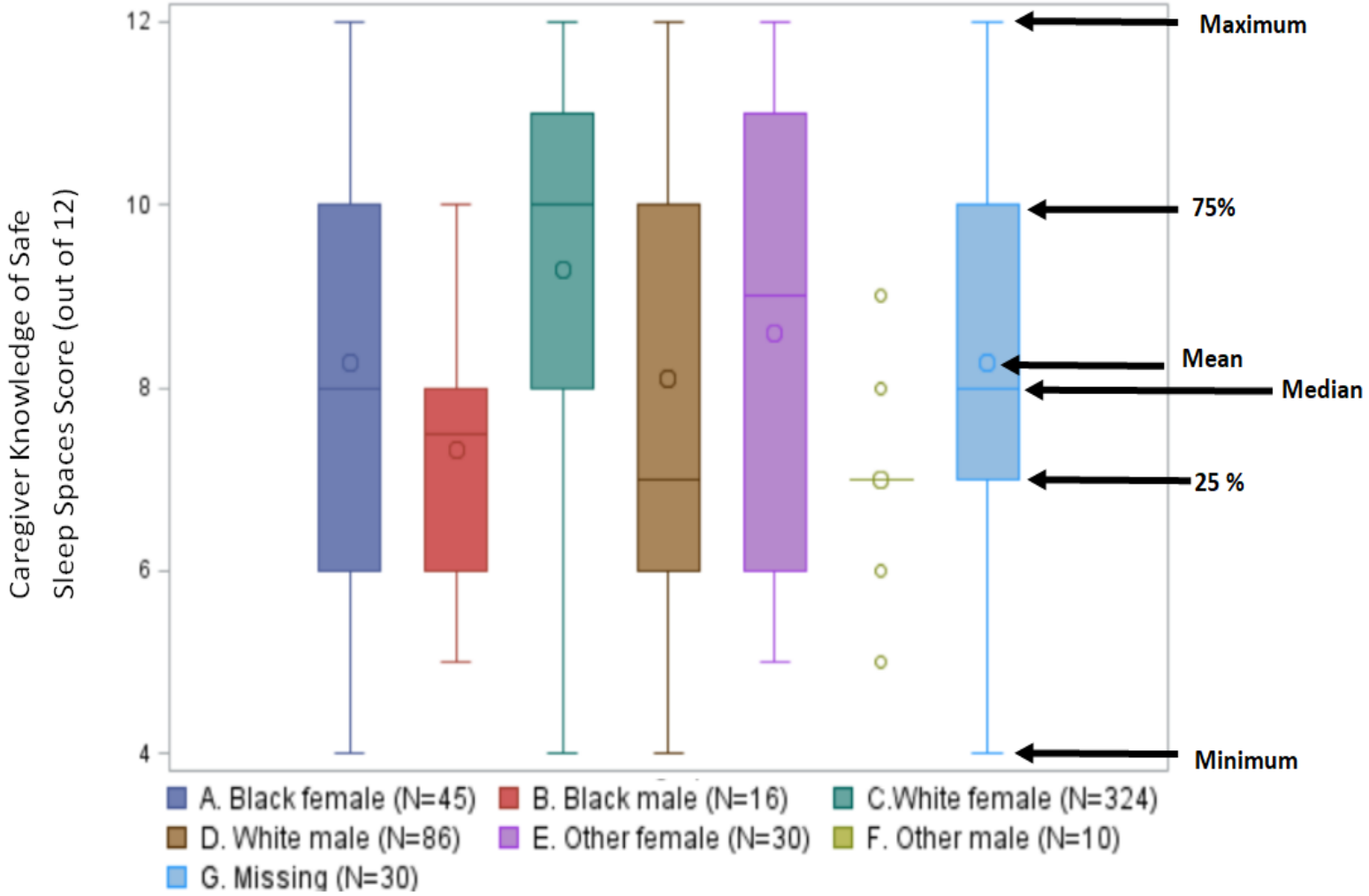
Methods

- Covariates examined:
  - Race of respondent
  - Gender of respondent
  - Respondent participation in public assistance programs (WIC, Section 8 Housing, Medicaid, CHIP, Temporary Assistance for Needy Families, Other public assistance)
  - Education level of respondent
  - Age of respondent
  - Respondent's number of children

- Additionally, for each individual image:
  - Race of infant
  - Type of sleeper depicted

Results – total score

Figure 1. Caregiver knowledge score by race and gender



Mean score was higher among white caregivers (green, brown) than black (dark blue, red) and other (purple, gold) caregivers.

Mean score was higher among female caregivers (blue, green, purple) than male caregivers (red, brown, gold).

Results – total score

Table 1. Effects of race and gender on caregiver knowledge total score

Parameter	Estimate	Std. Error	P
Intercept	8.1	0.21	<0.0001
Female caregiver	1.19	0.23	<0.0001
Black caregiver	-0.96	0.3	0.0013
Other caregiver	-0.8	0.36	0.0270

Note: education, public assistance, age, and number of children did not have a significant effect on caregiver knowledge total score and was therefore excluded from this table.

Results – individual question

q9 (Question1)		Correct	% Correct	Incorrect	% Incorrect	Total
Gender	Male	106	87.6	15	12.4	121
	Female	385	91.9	34	8.1	419
	Missing	1	100.0	0	0.0	1
Relationship	Grandmother	30	78.9	8	21.1	38
	Grandfather	4	66.7	2	33.3	6
	Aunt	62	92.5	5	7.5	67
	Uncle	7	77.8	2	22.2	9
	Cousin	7	100.0	0	0.0	7
	Sibling	5	100.0	0	0.0	5
	Friend	20	90.9	2	9.1	22
	Mother	270	93.4	19	6.6	289
	Father	87	88.8	11	11.2	98
Marital Status	Married	277	94.9	15	5.1	292
	Divorced	20	87.0	3	13.0	23
	Separated	5	83.3	1	16.7	6
	Single	96	88.9	12	11.1	108
	Living as married	79	87.8	11	12.2	90
	Widowed	3	50.0	3	50.0	6
	Missing	12	75.0	4	25.0	16
Children	Has children	378	92.0	33	8.0	411
	No children	102	89.5	12	10.5	114
	Missing	12	75.0	4	25.0	16
Race	White	378	92.0	33	8.0	411
	Black	54	88.5	7	11.5	61
	Other	36	90.0	4	10.0	40
	Missing	24	82.8	5	17.2	29
Ethnicity	Hispanic/Latino	43	89.6	5	10.4	48
	Not Hispanic/Latino	437	91.6	40	8.4	477
	Missing	12	75.0	4	25.0	16
Public Asst.	WIC only	34	91.9	3	8.1	37
	Some public asst.	154	92.8	12	7.2	166

SAFE	CORR	INCORR
	492	49
	90.94%	9.06%

Ethnicity	Hispanic/Latino	43	89.6	5	10.4	48
	Not Hispanic/Latino	437	91.6	40	8.4	477
	Missing	12	75.0	4	25.0	16
Public Asst.	WIC only	34	91.9	3	8.1	37
	Some public asst.	154	92.8	12	7.2	166
	No public asst.	291	90.7	30	9.3	321
	Missing	13	76.5	4	23.5	17
Education	Minimal Education	39	81.3	9	18.8	48
	Intermediate Education	184	90.2	20	9.8	204
	Bachelor's	193	93.7	13	6.3	206
	Advanced Education	63	95.5	3	4.5	66
	Missing	13	76.5	4	23.5	17

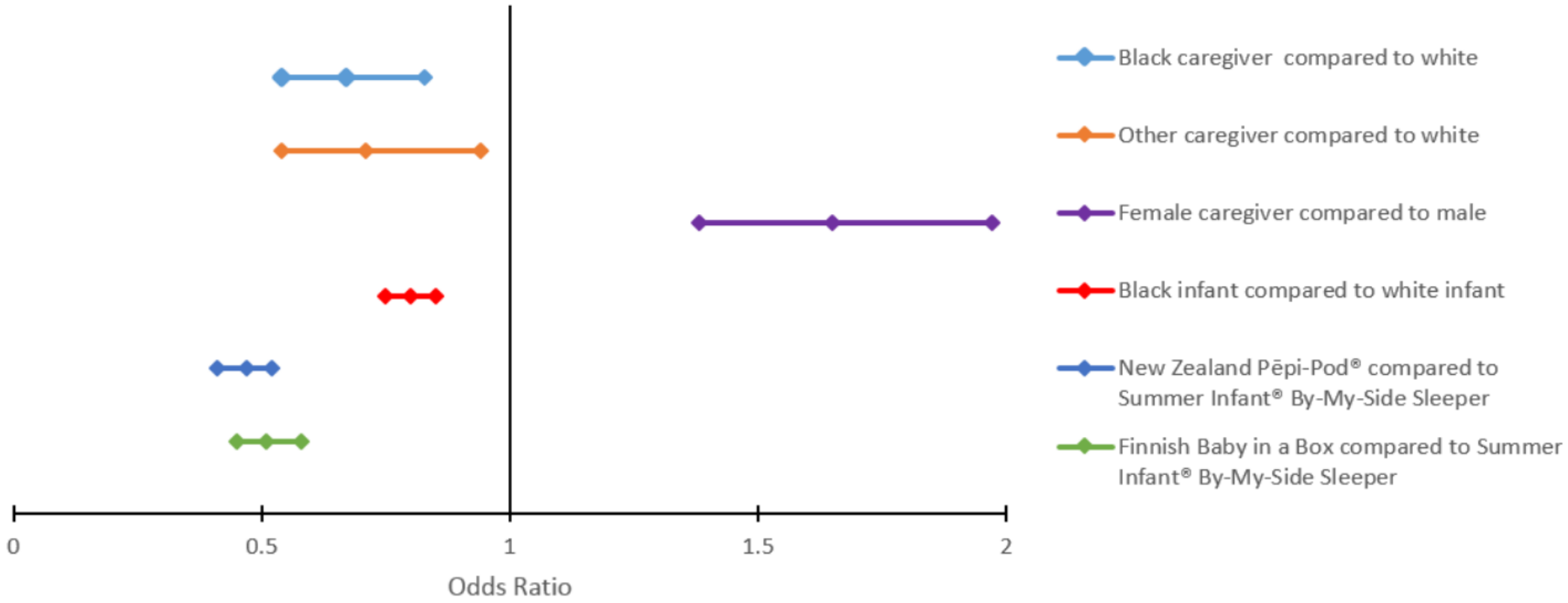
Results – individual question

Table 2. Effects of selected characteristics of images on individual question correctness

Parameter	Estimate	Lower CL	Upper CL	ChiSq	ProbChiSq
Intercept	1.36	1.20	1.53	259.32	<0.0001
Black infant	-0.23	-0.34	-0.11	14.49	0.0001
New Zealand Pēpi-Pod®	-0.77	-0.91	-0.62	102.25	<0.0001
Finnish Baby in a Box	-0.68	-0.83	-0.53	79.25	<0.0001
Female caregiver	0.50	0.37	0.63	54.09	<0.0001
Black caregiver	-0.41	-0.58	-0.24	21.83	<0.0001
Other caregiver	-0.34	-0.55	-0.13	10.37	0.0013

Note: education, public assistance, age, and number of children did not have a significant effect on caregiver knowledge total score and was therefore excluded from this table.

Results – individual question



Key Findings

- Black respondents scored significantly lower than white respondents on total score
- Education level and participation in public assistance, measures of socioeconomic status, were not significantly related to score.
- Females scored significantly higher than males.
- Question more likely to be answered correctly if infant in image was white or if infant was depicted in Summer Infant® By-My-Side Sleeper.

Discussion

- **Race was a predictor** of caregiver knowledge score but **socioeconomic status was not**.
  - first study to show disparity in knowledge between white and black caregivers
  - difference may be **one factor in the overall disparity** between black and white infant deaths due to SUID and SIDS
  - agrees with previous study that showed no significant variation in caregiver knowledge among different socioeconomic groups[5]

Discussion

- In addition to respondent race and gender, **sleeper type and infant race** significantly affected individual question correctness.
  - **potential biases** may include familiarity with Summer Infant® sleeper or belief that black infants are at higher risk in sleep spaces due to personal experience or other reasons
- First study to evaluate responses to **images instead of text** as a measure of knowledge of safe infant sleep spaces.
  - images reduce potential for confusing or unknown vocabulary to affect response and therefore increase response accuracy
- **Lower scores among black and male respondents** suggest that theses populations should be targeted for increased and/or enhanced safe infant sleep education.

Moving Forward…

- looking at the interaction between perceived safety and utility of infant sleepers
- what sleepers are most effective for reducing sleep-related infant deaths in the populations are impacted most
- upcoming American Journal of Public Health Brief Report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New Jersey gives out free baby boxes in move to lower infant mortality rates

By Tal Trachtman Alroy, CNN

Updated 6:30 PM ET, Thu January 26, 2017

References

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2. AAP Task Force on SUID, SIDS and other sleep-related infant deaths: updated 2016 recommendations for a safe infant sleeping environment. *Pediatrics*. 2016; 138:e20162938.

3. Hutton JS, Gupta R, Gruber R, et al. Randomized Trial of a Children's Book Versus Brochures for Safe Sleep Knowledge and Adherence in a High-Risk Population. *Acad Pediatrics*. 2017; in press.

4. Moon RY, Oden RP, Joyner BL, and Ajao TI. Qualitative Analysis of Beliefs and Perceptions about SIDS in African-American Mothers. *J Pediatrics.* 2010; 157:92-7.

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Questions?