

CO-SLEEPING MOTHERS MORE COMPLIANT WITH BACK-TO- SLEEP RECOMMENDATIONS

**Analysis of the 1998-1999 Oregon PRAMS
Data Set**

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Abstract

Background: Reduction of prone infant sleep position has been the main public health effort to reduce the incidence of Sudden Infant Death Syndrome (SIDS). Co-sleeping is a proposed, and controversial, risk factor for SIDS; non-standard sleep surfaces and non-maternal co-sleepers have also been proposed. Conversely, co-sleeping may enhance bonding and breastfeeding.

Study Question: This study was intended to identify important determinants of prone sleep positioning among Oregon women.

Methods: Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) surveys a stratified random sample of women after a live birth. In 1998-1999, 1867 women completed the survey (64.0% response). Fifty-three women were excluded from analysis, as their babies were no longer alive or living with them. Of the remaining women, 1732 answered the sleep position question (97.5%) and 1758 answered the co-sleeping question (99%). Lateral and supine sleep responses were combined. Change-in-point-estimate logistic regression was utilized for model building.

Results: Overall, 9.2% of the respondents “usually” chose prone infant sleep position, while 24.2% chose side and 66.5% chose supine positioning. Co-sleeping was common; 18.8% never, 38.7% sometimes, 16.1% almost always and 26.5% always co-slept. Never co-sleeping with one’s infant was a significant predictor of prone position; these women more often chose prone position (13.5%) than women sometimes co-sleeping (9.1%), almost always co-sleeping (5.7%) or always co-sleeping (6.1%). Compared to women who almost always or always co-slept, women who never or sometimes co-slept were more likely to choose prone sleep position, ORa = 2.10 (95% CI 1.02, 4.30) after controlling for breastfeeding at four weeks and WIC enrollment, the only identified confounders.

Conclusions: Co-sleeping women are more likely to follow back-to-sleep recommendations. Non-co-sleeping women may be seeking uninterrupted sleep, as prone position is associated with fewer infant awakenings.

Public Health Implications: Studies of the role of co-sleeping in SIDS risk must adjust for infant sleep position, as well as sleep surface and relationship to co-sleeper; not controlling for sleep position may diminish or mask a true risk. Similarly, studies of the risk of sleep position need to adjust for co-sleeping. Given the popularity of co-sleeping, accurate estimates of risks and benefits are needed.

Background

- **Co-sleeping (bed-sharing) is common in many cultures**
- **Co-sleeping is controversial in the United States**
 - Some believe it is a risk factor for SIDS
 - Others believe that only infants of smoking mothers are at risk
 - Co-sleeping may facilitate breastfeeding and infant-mother bonding
- **Bed-sharing prevalence is rising in the United States¹**
 - “Usual bed-sharing” rose from 5.5% in 1993 to 12.8% in 2000.
 - Blacks and Asians bed-share much more frequently than non-Hispanic whites.
 - Other determinants of co-sleeping are maternal age < 18, low income, living in the South, infants < 8 weeks old, and normal birthweight infants.
- **Maternal smoking is a significant risk factor for SIDS, but it has not been possible to distinguish between prenatal and postnatal smoking, as these are highly correlated.**

1. M Willinger, C-W Ko, HJ Hoffman, RC Kessler, MJ Corwin. Trends in infant bed sharing in the United States, 1993-2000: The National Infant Sleep Position Study. Arch Pediatr Adolesc Med 2003;157:43-49.

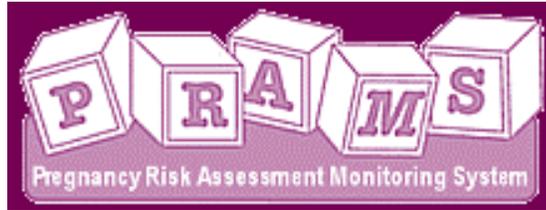
Methods

OREGON PREGNANCY RISK ASSESSMENT MONITORING SYSTEM (PRAMS)

- **Collects data on maternal attitudes and experiences prior to, during, and immediately after pregnancy for a sample of Oregon women.**
 - **Monthly sample from birth certificates**
 - **Analysis using first year dataset: Nov. 1998-Oct. 1999**
 - **Mixed mode:**
 - 1st mailing
 - 2nd mailing if no response
 - Computer-assisted telephone interview if no response
 - **Stratified, random within strata, over-sampling of first five strata to ensure adequate subgroup sample size**
 - Hispanics
 - Non-Hispanic (NH) blacks
 - NH Asians & Pacific Islanders
 - NH American Indians & Alaskan Natives
 - NH whites with LBW babies
 - NH whites with NBW babies
 - **Weighted 1) to reflect Oregon's population, 2) for non-response, and 3) for non-coverage**
 - **Odds ratios determined via binary logistic regression, using SUDAAN 8.0.2**
 - **Model building: “change-in-point-estimate” method²**
2. S Greenland. Modeling and variable selection in epidemiologic analysis. Am J Public Health 1989;79:340-349.

METHODS

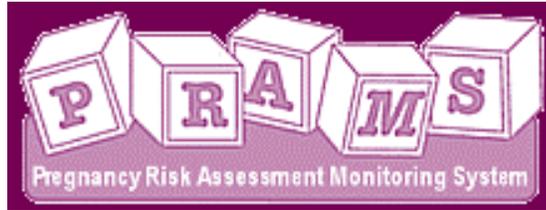
OREGON PRAMS



- **2919 surveys mailed November 1998-October 1999**
- **1867 surveys completed**
 - 1308 – first mailing
 - 230 – second mailing
 - 329 – telephone
 - 64.0% unweighted response
 - **73.5% response weighted for strata – more appropriate measure given the complex sampling design**
- **53 respondents excluded – babies were no longer alive and/or no longer living with them**
- **38 respondents excluded – did not indicate whether or not their babies were alive and living with them**
- **1776 eligible for analysis**

METHODS

OREGON PRAMS



61. How do you put your new baby down to sleep *most* of the time?
Check one answer.
- On his or her side
 - On his or her back
 - On his or her stomach

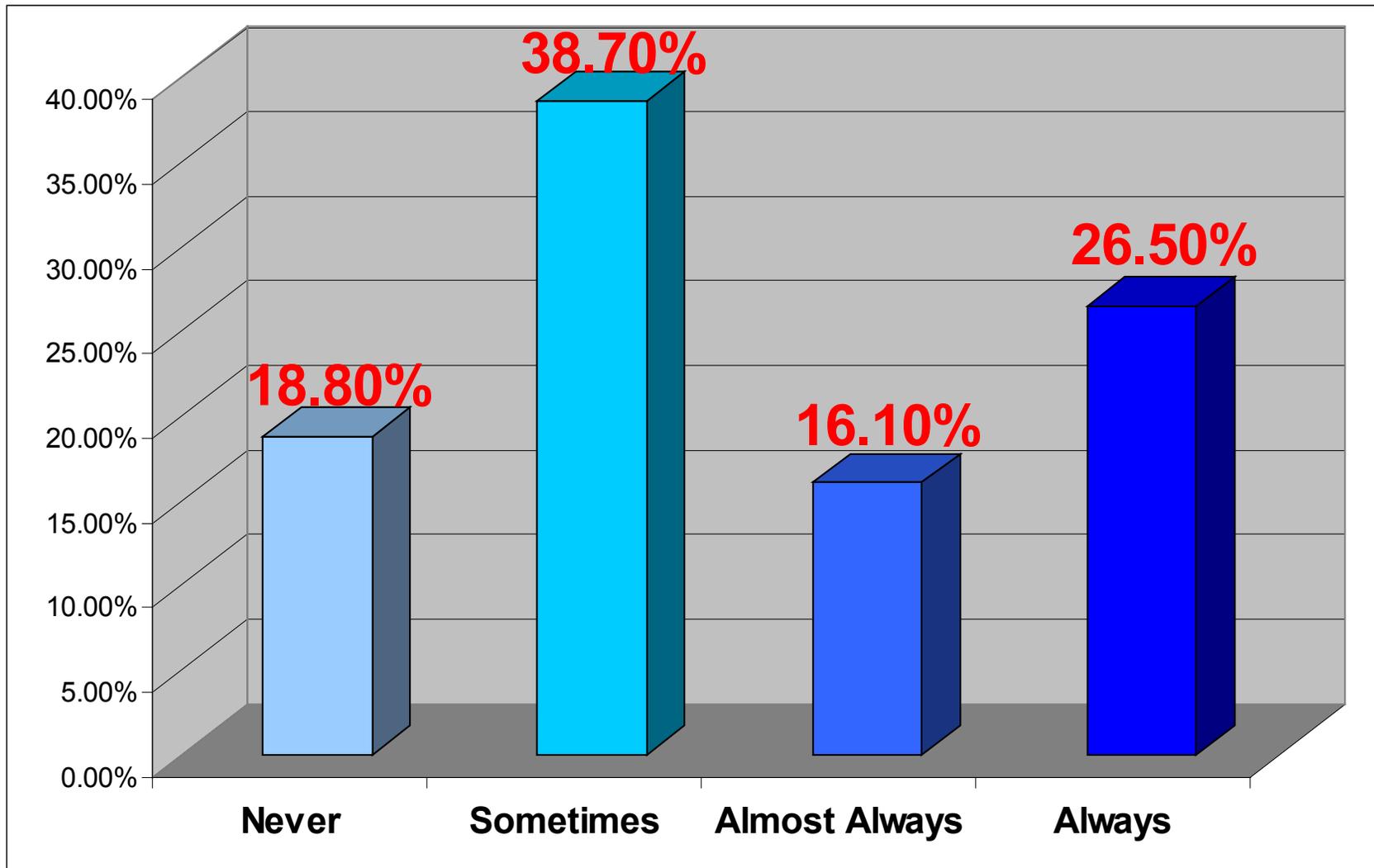
- **44 excluded because they did not answer the sleep position question**
- **1732 (97.5% of those eligible) included in the analysis**
- **Side-sleeping and back-sleeping combined for purposes of analysis**

62. How often does your new baby sleep in the same bed with you?
Check only one.
- Always
 - Almost always
 - Sometimes
 - Never

- **1758 (99% of those eligible) answered the co-sleeping question**

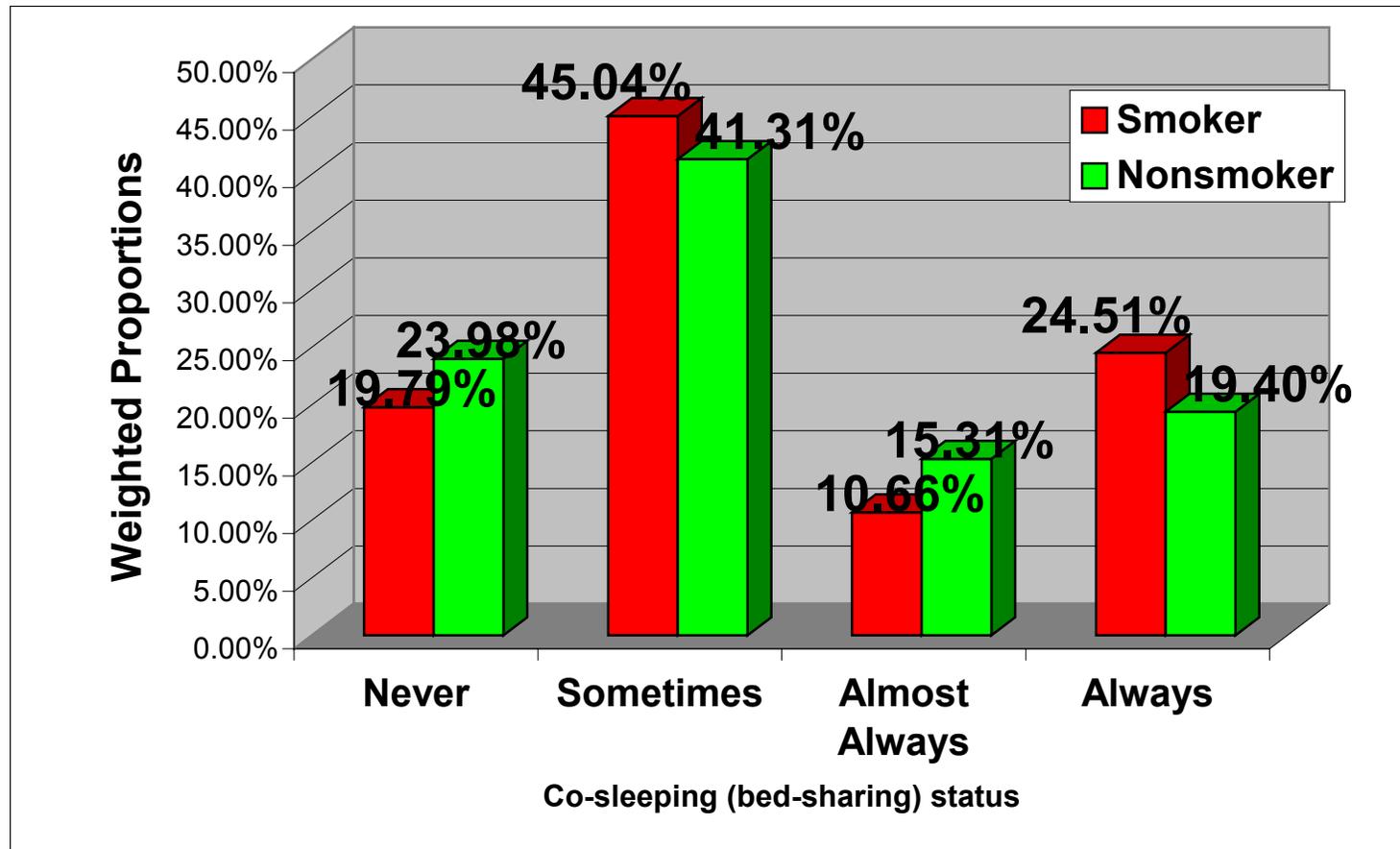
RESULTS

PREVALENCE OF BED-SHARING IN OREGON (WEIGHTED PROPORTIONS)



RESULTS

PREVALENCE OF BED-SHARING BY 3RD TRIMESTER SMOKING STATUS

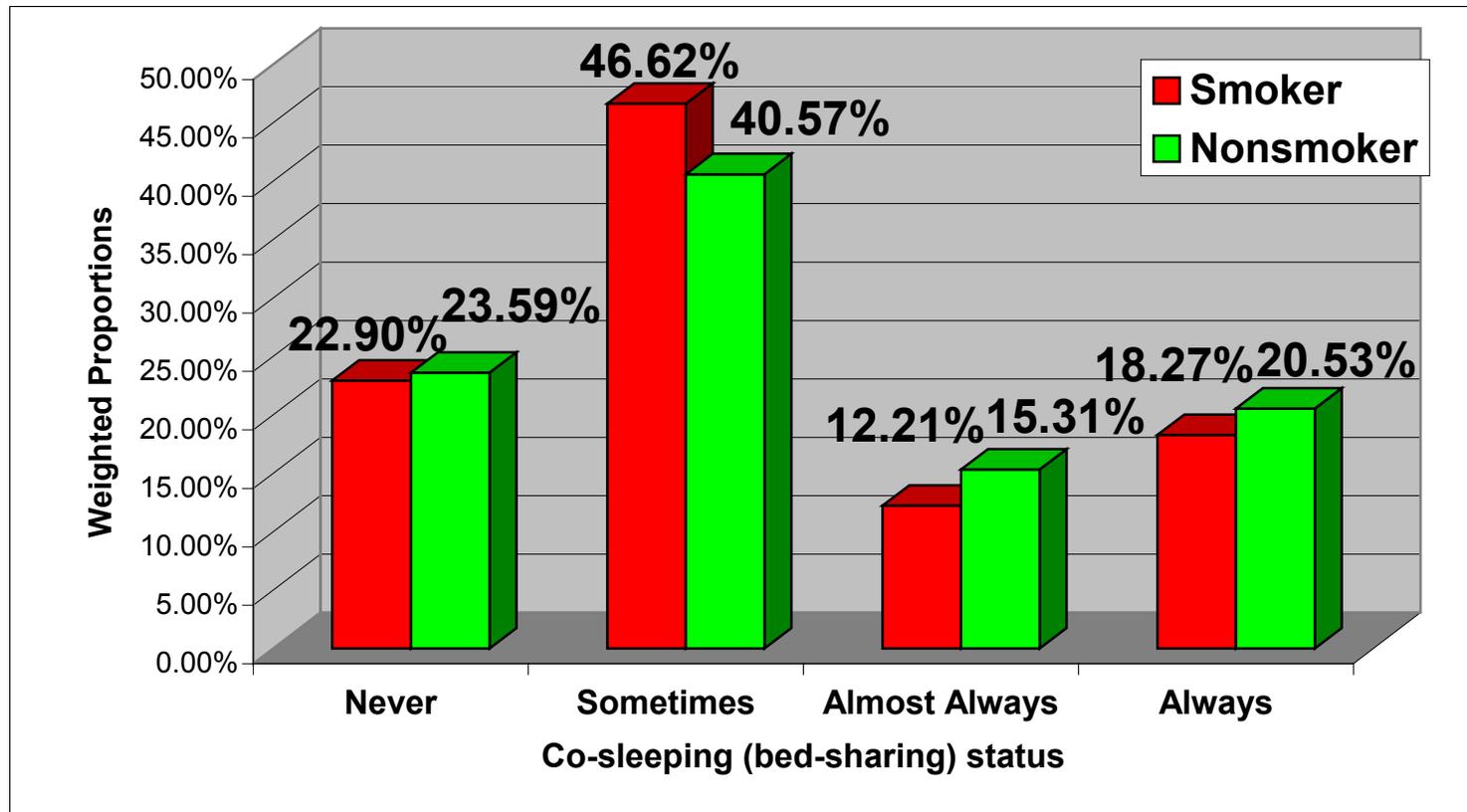


CROSSTABS SMOKERS VS. NONSMOKERS $p = .3835$

12.9% OF THE RESPONDENTS SMOKED DURING THE THIRD TRIMESTER

RESULTS

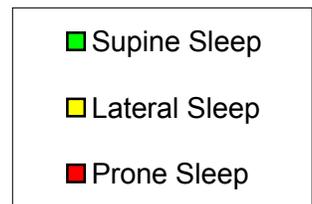
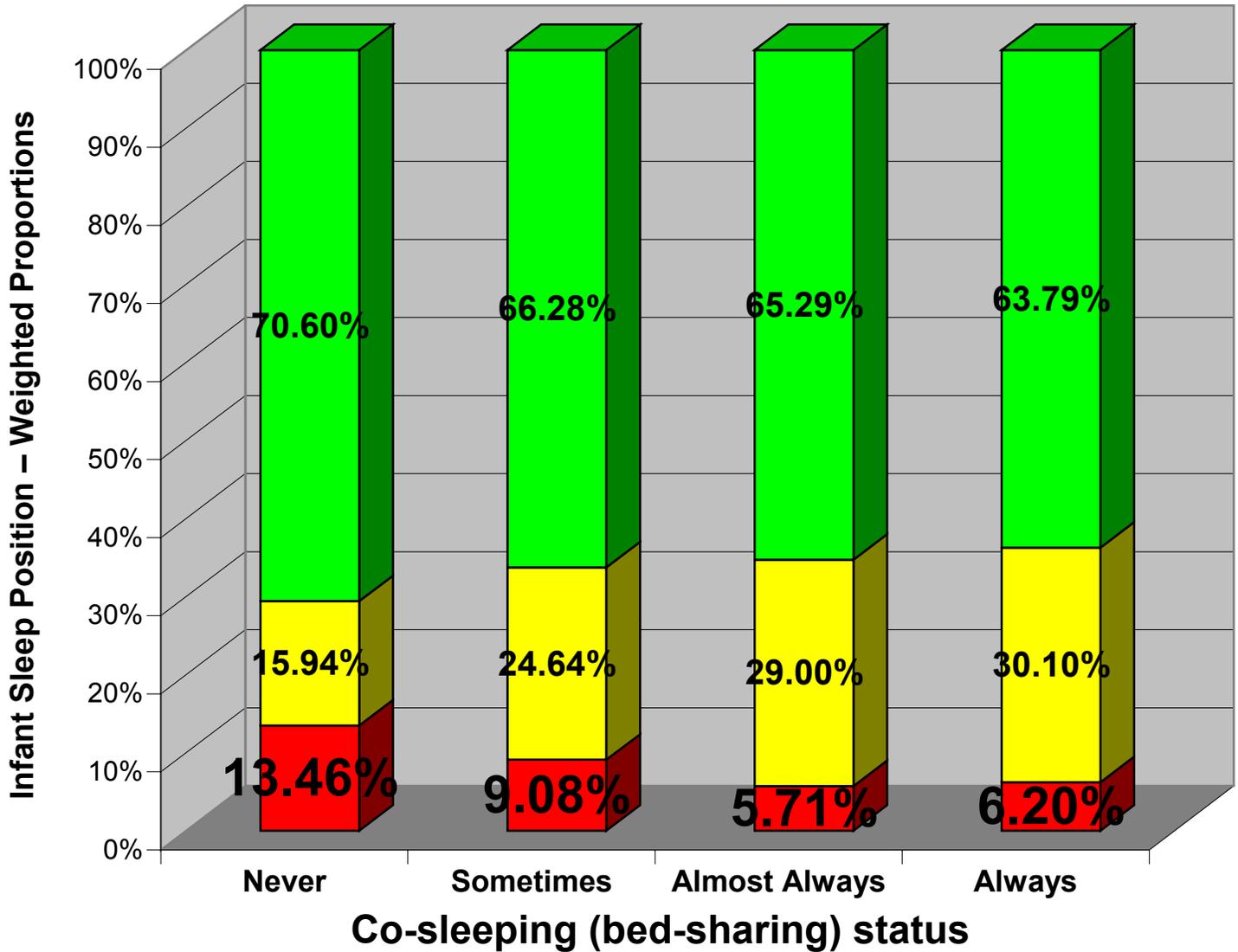
PREVALENCE OF BED-SHARING BY CURRENT SMOKING STATUS



CROSSTABS SMOKERS VS. NONSMOKERS $p = .5945$
20.3% OF THE RESPONDENTS WERE CURRENT SMOKERS

RESULTS

DISTRIBUTION OF INFANT SLEEP POSITION BY CO-SLEEPING STATUS



Results

CO-SLEEPING STATUS AND PRONE INFANT SLEEP CRUDE ODDS RATIO

	n*	Prone Sleep †	Univariable OR (95% CI) ‡
Total Sample	1763	9.2%	
Never	330	13.5%	2.46 (1.21 – 5.02)
Sometimes	680	9.1%	1.58 (0.81 – 3.09)
Almost Always/Always	748	5.9%	Referent

* Unweighted number of respondents (excluding those who did not know or did not respond)

† Weighted prevalence

‡ Univariable logistic regression

CO-SLEEPING STATUS AND PRONE INFANT SLEEP ADJUSTED ODDS RATIO

	Multivariable OR (95% CI) §
Never	2.75 (1.15 – 6.54)
Sometimes	1.84 (0.85 – 3.96)
Almost Always/Always	Referent

§ Confounders identified by the “change-in-point-estimate method” of multivariable binary logistic regression were breastfeeding status at 4 weeks and WIC enrollment status.

Discussion

- **In Oregon, women who never co-sleep are at significantly increased risk of choosing prone infant sleep position.**
- **Co-sleeping is as frequent among smoking mothers as among nonsmokers.**
- **Case series³⁻⁸ cannot resolve the controversy over co-sleeping and SIDS, *without knowledge of the prevalence of co-sleeping in the population at risk.***
- **Not all studies on co-sleeping and SIDS have differentiated between the parental bed and other sleep surfaces (e.g. mattresses on the floor, couches, etc.) or other co-sleepers (e.g. siblings), while other studies have found these to be significant determinants of risk.⁹**

3. C James, H Klenka, D Manning. Sudden infant death syndrome: bed sharing with mothers who smoke. *Arch Dis Child* 2003;88:112-113.
4. S Nakamura, M Wind, MA Danello. Review of hazards associated with children placed in adult beds. *Arch Pediatr Adolesc Med* 1999;53:1019-1023.
5. DA Drago, AL Dannenberg. Infant mechanical suffocation deaths in the United States, 1980-1997. *Pediatrics* 1999;103:e59.
6. JS Kemp, B Unger, D Wilkins, et. al. Unsafe sleep practices and an analysis of bedsharing among infants dying suddenly and unexpectedly: results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics* 2000;106:e41. <http://www.pediatrics.org/cgi/content/full/106/3/e41> Accessed 03/27/03
7. B Unger, JS Kemp, D Wilkins, et. al. Racial disparity and modifiable risk factors among infants dying suddenly and unexpectedly. *Pediatrics* 2003;111(e127):e127-131. <http://www.pediatrics.org/cgi/content/full/111/2/e127> Accessed 03/29/03.
8. JR Thogmartin, CF Jr Siebert, WA Pellam. Sleep position and bed-sharing in sudden infant deaths: an examination of autopsy findings. *J Pediatr* 2001;138:212-7.
9. FR Hauck, SM Herman, M Donovan, et. al. Sleep environment and the risk of Sudden Infant Death Syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics* 2003;111:1207-1214

Discussion

- **7 major studies about SIDS and co-sleeping**
 - 1 did not adjust for current maternal smoking but found no risk for infants sleeping in beds with adults.⁹
 - 1 did not report separate adjusted OR for smoking and non-smoking mothers although stating that infants of nonsmoking mothers were at lower risk.¹⁰
 - 5 report the OR for both smokers and non-smokers
 - **Among smoking mothers**: 4 of the 5 studies found an increase in SIDS among co-sleeping infants;¹¹⁻¹⁵ 1 did not.¹⁵
 - **Among non-smoking mothers**: 0 of the 5 studies found an increase in SIDS among co-sleeping infants, except possibly very young infants.¹⁴
- **It is generally agreed that co-sleeping is a risk factor for SIDS among smoking mothers, OR 4.5 – 17.7.**
- **If co-sleeping increases the risk of SIDS only for smoking mothers, it is unlikely that SIDS is caused by overlay asphyxiation.**

9. op. cit.

10. C McGarvey, M McDonnell, A Chong, M O'Regan, T Matthews. Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Arch Dis Child* 2003;88:1058-1064.

11. RKR Scragg, EA Mitchell, AW Stewart, et. al. Infant room-sharing and prone sleep position in sudden infant death syndrome. *Lancet* 1996;347:7-12.

12. EA Mitchell, PG Tuohy, JM Brunt, et. al. Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. *Pediatrics* 1997;100:835-840.

13. PS Blair, PJ Fleming, IJ Smith, et. al. Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. *Br Med J* 1999;319:1457-62.

14. RG Carpenter, LM Irgens, PS Blair, et. al. Sudden unexplained infant death in 20 regions in Europe: case control study. *Lancet* 2004;363:185-191.

16. H Klonoff-Cohen, SL Edelstein. Bed sharing and the sudden infant death syndrome. *Br Med J* 1995;311:1269-1272.

Conclusions

- **Co-sleeping is very common in Oregon, as elsewhere.**
- **Frequent co-sleeping mothers in our study are significantly less likely to put their babies to bed on their stomachs than those who never co-sleep.**
- **Co-sleeping in Oregon is as common among smoking mothers as nonsmoking mothers.**

Recommendations

- **Greater public health efforts are needed to discourage smoking mothers from co-sleeping.**
- **Co-sleeping mothers should be encouraged to eliminate SIDS risks related to sleep surfaces: couches and chairs, heavy quilts or bedding, pillows near the infant, co-sleepers other than the parents.**
- **Additional research is needed on the motivations for co-sleeping and the risks and benefits of bed-sharing in adult beds by parents and infants, particularly regarding modifying variables (e.g. infant age, duration and frequency of co-sleeping).**