Prospective Cohort Study of Thai Children

EFFECT OF PASSIVE SMOKING DURING PREGNANCY ON TOOTH ERUPTION IN INFANTS

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CONTENTS

ABBREVIATION

- BW Birth Weight
- DTE Delayed first Tooth Eruption
- GA Gestational Age
- PCTC Prospective Cohort study of Thai Children
- PS Passive Smoking

INTRODUCTION

- DTE: problems / dental development
  - hold space
  - align into correct position
  - chew and speak
- Influence factors

INTRODUCTION

- Passive smoking
- Negative effect
- Common in Thai males
- High prevalence (29.8%) of PS

OBJECTIVE

To examine the association between passive smoking during pregnancy and the time of first tooth eruption in Thai infants

METHODS – Study Design

- Part of PCTC
- Large birth cohort study: > 4,000 infants, 5 sites in Thailand
- October 15, 2000 and September 14, 2002

METHODS

Inclusion criteria:

- accessible year-round
- 800 to 900 newborns on average each year
- intend to live 5 years
- long-term commitment with the project

METHODS

- Informed consent
- The National Ethics Committee of the Ministry of Public Health of Thailand
- Khon Kaen University Ethics Committee for Human Research

METHODS – Data collection

- Family members
- In-person interview, diary records, medical records
- Secondary data – community and demographic variables

METHODS – Independent variables and outcomes

Independent variables

- PS pregnancy: Yes/No

Outcomes

- Time to eruption of the first tooth

METHODS – Potential bias & confounders

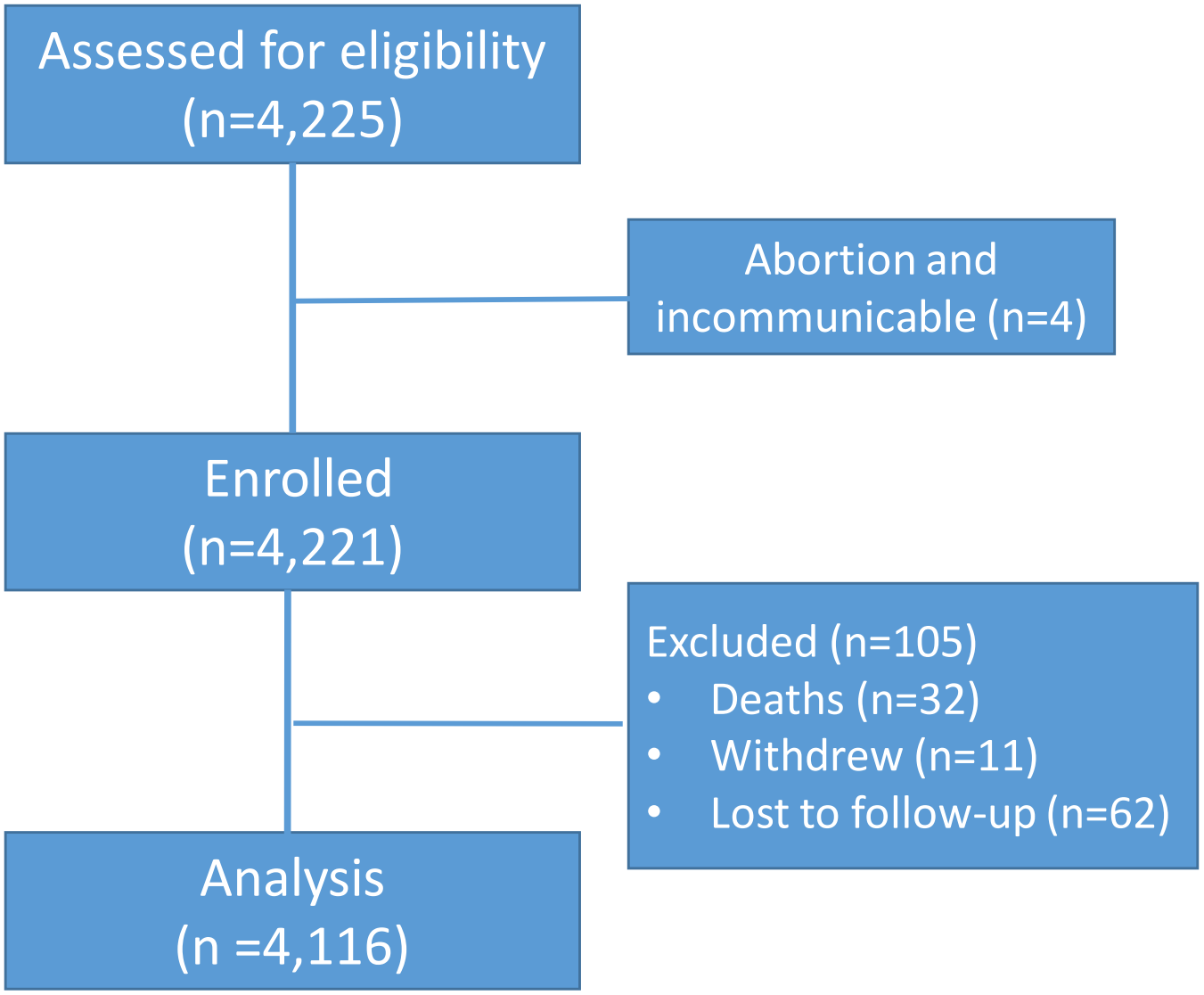
- Mother's age, education level, income
- Alcohol consumption
- Child's gender
- BW, GA
- Study site

METHODS – Statistical Analysis

- Description analysis
- Cox proportional regression
- Stata SE 12.0

p-value < .05

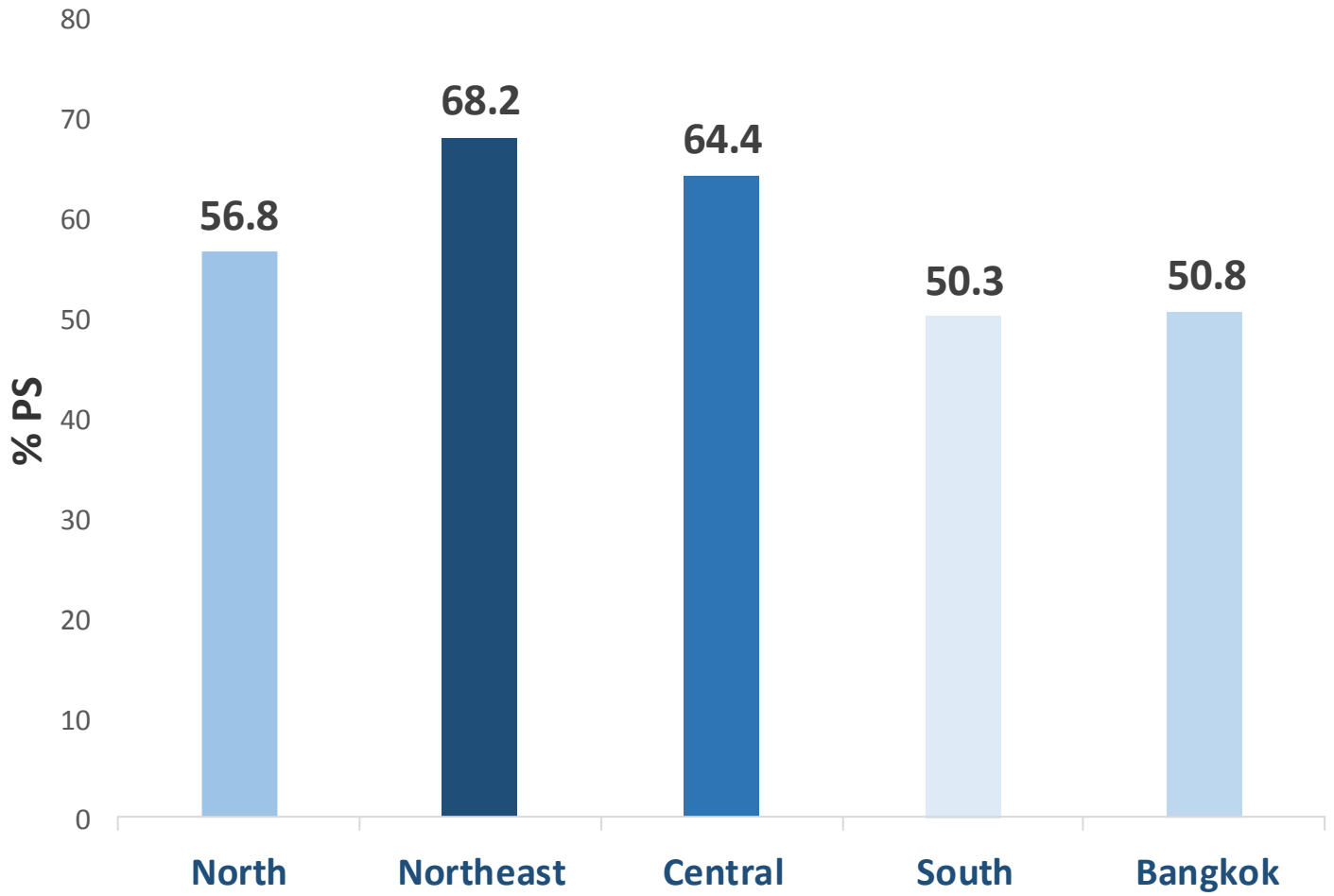
RESULTS – Inclusion flow chart



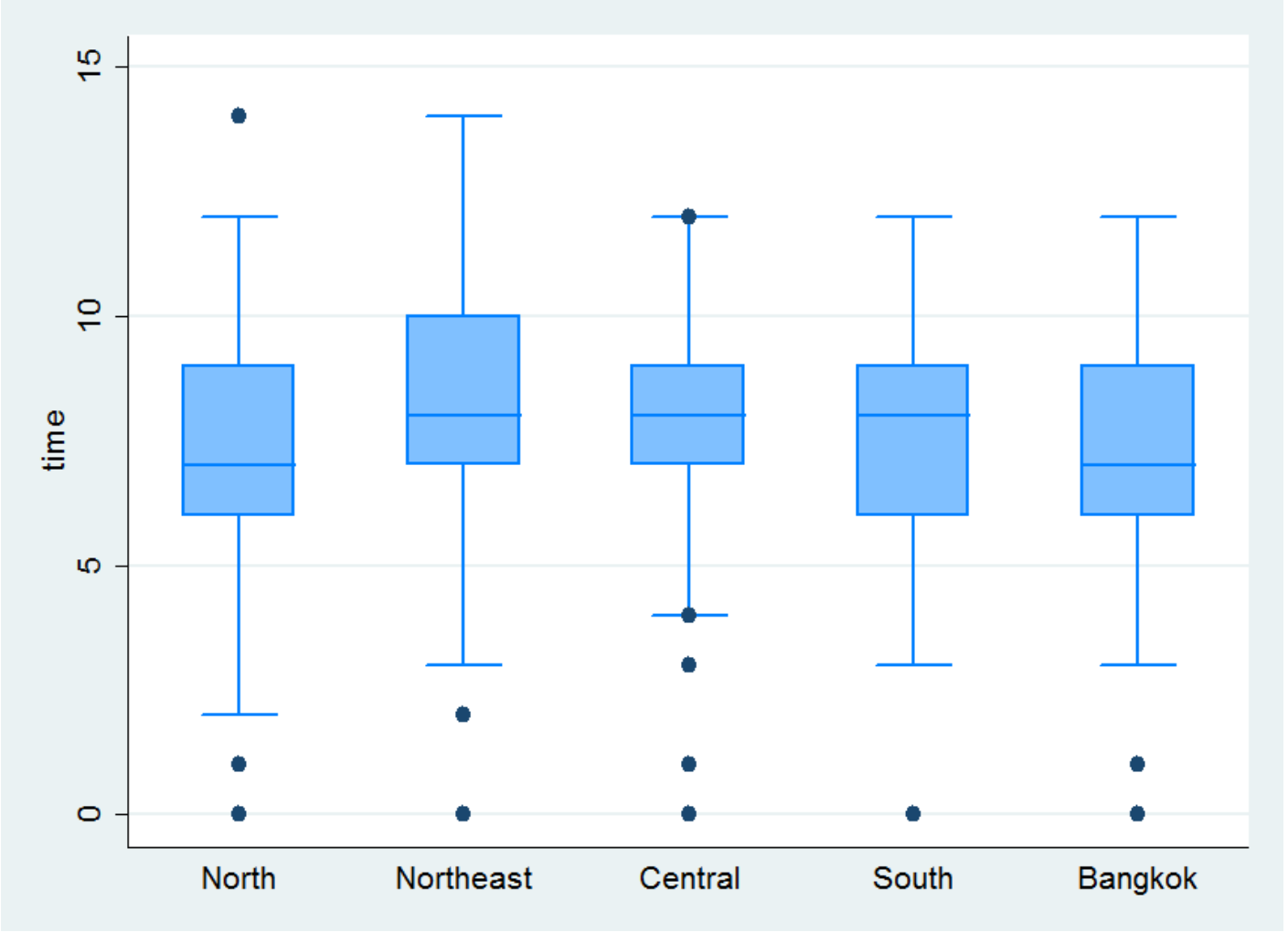
RESULTS – Demographic Characteristics

Characteristics	Total (n=4,116)	Sites (%)				
		North (n=759)	Northeast (n=1,061)	Central (n=853)	South (n=772)	Bangkok (n=671)
Mother's age (mean ± SD)	27.0 ± 6.2	26.3 ± 6.1	27.5 ± 6.5	24.9 ± 5.5	27.4 ± 6.3	29.3 ± 5.9
Education (Primary School)	1,925	60.7	59.8	59.9	28.1	15.2
Alcohol drinking	152	3.0	1.1	3.5	2.3	10.4
Females (Infants)	2,040	52.3	47.5	51.1	49.4	49.6
Low BW	515	8.2	19.8	12.2	14.3	4.3
Preterm birth	558	10.0	17.5	20.8	9.6	6.7

RESULTS – Percentage of PS in pregnant women



RESULTS – Median time of first tooth eruption

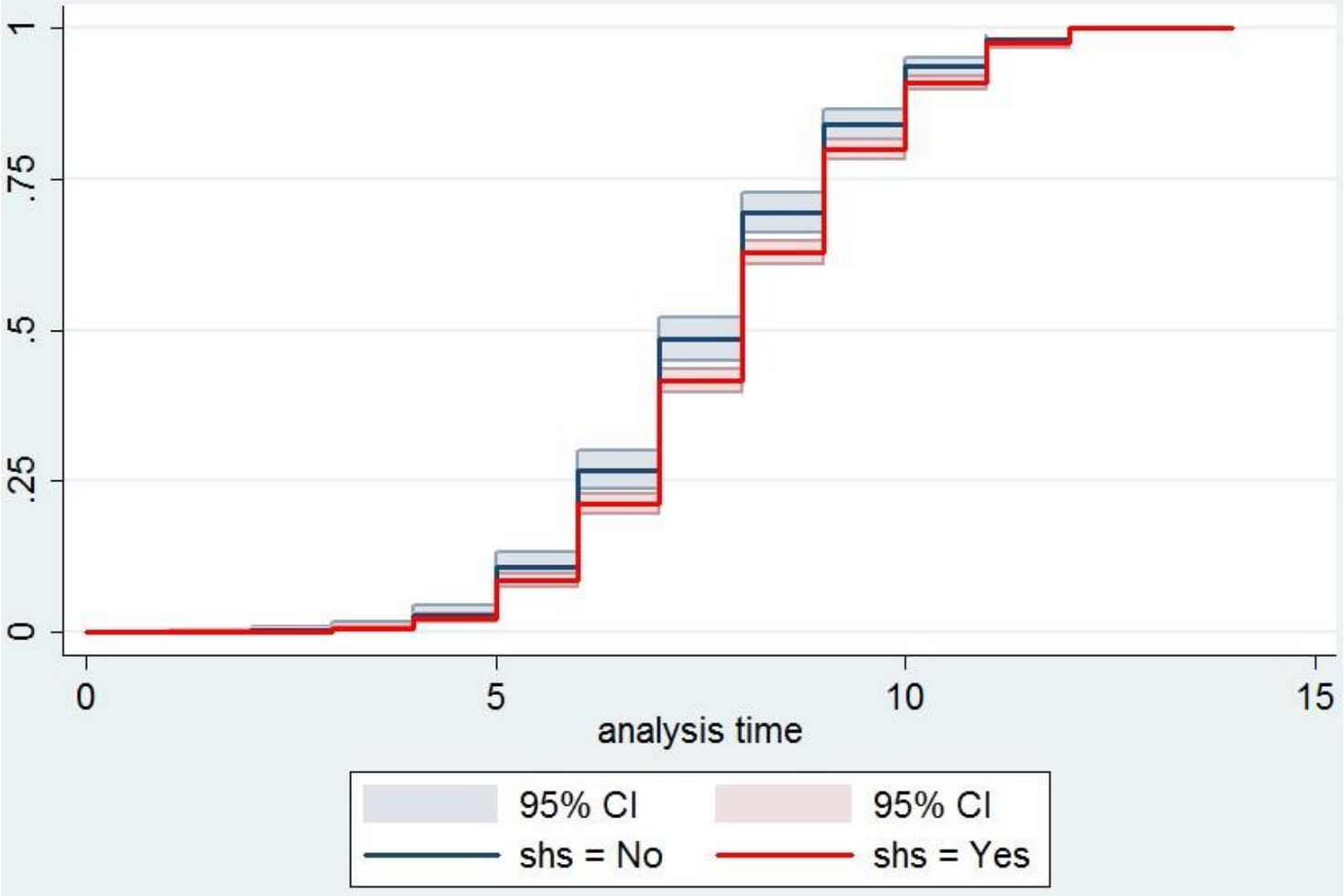


RESULTS – HR of having first tooth eruption

Factors	Crude HR (95% CI)	P-value	Adjusted HR* (95% CI)	P-value
Passive smoking		0.090		0.120
No	1.00		1.00	
Yes	0.93 (0.86 to 1.01)		0.94 (0.86 to 1.02)	
Child's gender		< 0.001		< 0.001
Female	1.00		1.00	
Male	1.14 (1.07 to 1.22)		1.16 (1.08 to 1.25)	
Birth weight		< 0.001		0.002
Normal BW	1.00		1.00	
Low BW	0.83 (0.75 to 0.92)		0.84 (0.75 to 0.94)	

**HR adjusted for child's gender, maternal age, mothers' education level, income, BW, GA, and alcohol drinking during pregnancy, and stratifying by study site.*

RESULTS – Hazard rate curve



Difference in the probability of having erupted tooth between PS group and non-PS group

DISCUSSION

- Earlier time of first tooth eruption in infants of non-PS mothers
- Consistent with other previous studies

DISCUSSION

Birth weight → lack of vitamin D absorption

Gender →
- differences in sexual maturity
- embryologic timing

DISCUSSION – Strength

- Strongest observational design
- Multiple risk factors
- Large birth cohort study
- National representative
- Minimal loss to follow-up

DISCUSSION – Limitation

- Information bias – trained and calibrated the interviewers
- Potential confounding factors – adjusting
- Residual confounders (e.g. breast feeding, parental systematic diseases)
- Causal inferences – suspect
- Missing values – comparing missing group and completed group

→ “missing at random”

CONCLUSION

- PS in Thai pregnant women has an effect on the time of the first tooth eruption in infants.
- Many problems in the dental and nutritional development of infants
- Further studies

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REFERENCES

1. Sajjadian N, Shajari H, Jahadi R, Barakat MG, Sajjadian A. Relationship between birth weight and time of first deciduous tooth eruption in 143 consecutively born infants. Pediatrics and neonatology. 2010;51(4):235-7.
2. Kutesa A, Nkamba EM, Muwazi L, Buwembo W, Rwenyonyi CM. Weight, height and eruption times of permanent teeth of children aged 4-15 years in Kampala, Uganda. BMC oral health. 2013;13:15.
3. Lee MM, Low WD, Chang KS. Eruption of the permanent dentition of Southern Chinese children in Hong Kong. Archives of oral biology. 1965;10(6):849-61.
4. Adler P. Effect of some environmental factors on sequence of permanent tooth eruption. Journal of dental research. 1963;42:605-16.
5. Moslemi M. An epidemiological survey of the time and sequence of eruption of permanent teeth in 4-15-year-olds in Tehran, Iran. International journal of paediatric dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children. 2004;14(6):432-8.
6. Viscardi RM, Romberg E, Abrams RG. Delayed primary tooth eruption in premature infants: relationship to neonatal factors. Pediatric dentistry. 1994;16(1):23-8.
7. Cornelius MD, Day NL. The effects of tobacco use during and after pregnancy on exposed children. Alcohol research & health : the journal of the National Institute on Alcohol Abuse and Alcoholism. 2000;24(4):242-9.
8. Bastos JL, Peres MA, Peres KG, Barros AJ. Infant growth, development and tooth emergence patterns: A longitudinal study from birth to 6 years of age. Archives of oral biology. 2007;52(6):598-606.
9. Little J, Cardy A, Munger RG. Tobacco smoking and oral clefts: a meta-analysis. Bulletin of the World Health Organization. 2004;82(3):213-8.
10. Little J, Cardy A, Arslan MT, Gilmour M, Mossey PA. Smoking and orofacial clefts: a United Kingdom-based case-control study. The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association. 2004;41(4):381-6.
11. Kieser JA, Groeneveld HT, da Silva P. Delayed tooth formation in children exposed to tobacco smoke. The Journal of clinical pediatric dentistry. 1996;20(2):97-100.
12. Rantakallio P, Makinen H. The effect of maternal smoking on the timing of deciduous tooth eruption. Growth. 1983;47(2):122-8.
13. CDC. Current Tobacco Use and Secondhand Smoke Exposure Among Women of Reproductive Age — 14 Countries, 2008–2010 [cited 2013 6 April]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6143a4.htm#tab.
14. Sangsupawanich P, Chongsuvivatwong V, Mo-Suwan L, Choprapawon C. Relationship between atopic dermatitis and wheeze in the first year of life: analysis of a prospective cohort of Thai children. Journal of investigational allergology & clinical immunology : official organ of the International Association of Asthmology. 2007;17(5):292-6.
15. Tengtrisorn S, Singha P, Chuprapawan C. Prevalence of abnormal vision in one-year-old Thai children, based on a prospective cohort study of Thai children (PCTC). Journal of the Medical Association of Thailand = Chotmaihet thangphaet. 2005;88 Suppl 9:S114-20.
16. Hypocalcemia [cited 2013 July 26]. Available from: http://www.allinahealth.org/mdex/ND7884G.HTM.
17. Seow WK. Oral complications of premature birth. Australian dental journal. 1986;31(1):23-9.
18. Jain A, Agarwal R, Sankar MJ, Deorari AK, Paul VK. Hypocalcemia in the newborn. Indian journal of pediatrics. 2008;75(2):165-9.
19. Jain A, Agarwal R, Sankar MJ, Deorari A, Paul VK. Hypocalcemia in the newborn. Indian journal of pediatrics. 2010;77(10):1123-8.
20. Tobacco Smoke Delays Tooth Growth In Children [cited 2013 July 26]. Available from: http://www.agd.org/consumer/topics/tobacco/second.hand.smoke.html.
21. Aine L, Backstrom MC, Maki R, Kuusela AL, Koivisto AM, Ikonen RS, et al. Enamel defects in primary and permanent teeth of children born prematurely. Journal of oral pathology & medicine : official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology. 2000;29(8):403-9.
22. Robles MJ, Ruiz M, Bravo-Perez M, Gonzalez E, Penalver MA. Prevalence of enamel defects in primary and permanent teeth in a group of schoolchildren from Granada (Spain). Medicina oral, patologia oral y cirugia bucal. 2013;18(2):e187-93.
23. DeRoo LA, Gaudino JA, Edmonds LD. Orofacial cleft malformations: associations with maternal and infant characteristics in Washington State. Birth defects research Part A, Clinical and molecular teratology. 2003;67(9):637-42.
24. Niswander JD, Sujaku C. Dental eruption, stature, and weight of Hiroshima children. Journal of dental research. 1960;39:959-63.
25. Peedikayil FC. Delayed Tooth Eruption. e-Journal of Dentistry.1(4).
26. Fadavi S, Punwani IC, Adeni S, Vidyasagar D. Eruption pattern in the primary dentition of premature low-birth-weight children. ASDC journal of dentistry for children. 1992;59(2):120-2.
27. Lawoyin TO, Lawoyin DO, Lawoyin JO. Epidemiological study of some factors related to deciduous tooth eruption. African dental journal : official publication of the Federation of African Dental Associations = Journal dentaire africain / FADA. 1996;10:19-23.
28. Krumholt L, Roed-Petersen B, Bindborg JJ. Eruption times of the permanent teeth in 622 Ugandan children. Archives of oral biology. 1971;16(11):1281-8.

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