

Data of Japan

- National Survey on Infants and Toddlers
 - 1980, 1990, 2000, 2010 (Every 10 years)
 - Multi-level random selection of all births
 - 10,000-20,000 subjects per survey
 - 44-48 items (depending on year)
- Vital Statistics Data
 - 1979-2011
 - 100% coverage
 - Only 23 basic variables for birth certificate
 - Data on residence
- WHO Multi-country Survey
 - 2004, 2008
 - Random Selection of 10 hospitals capable of delivery of high risk births

ANALYSIS OF NATIONAL SURVEY DATA (1990, 2000,2010)

Demographic Trends in Japan from National Survey on Infants and Toddlers

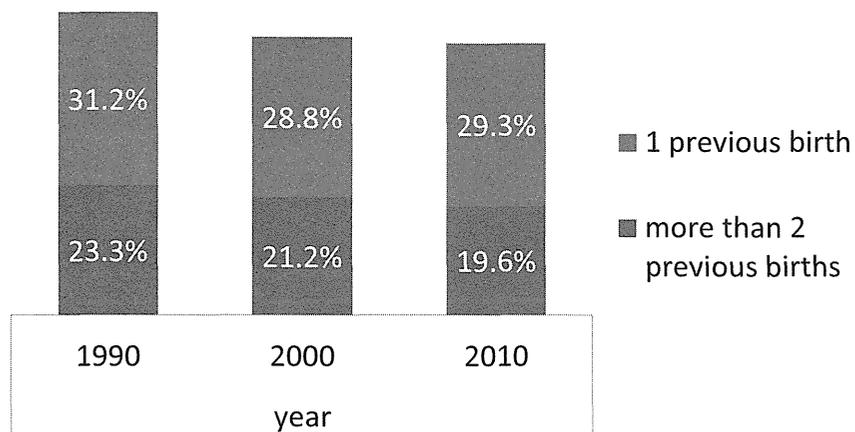
◆ Maternal Characteristics

- Maternal age
- Parity
- Height, BMI
- Smoking, drinking habits

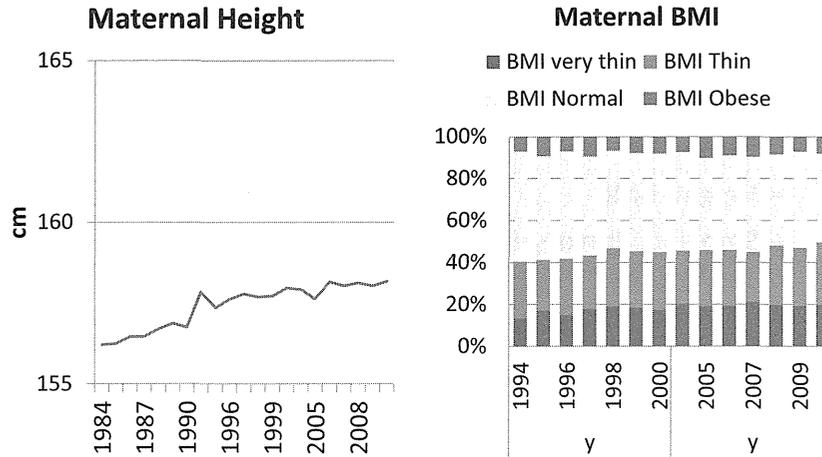
◆ Pregnancy Characteristics

- Multiplicity
- Maternal complications
- Number of antenatal visits
- Mode of delivery

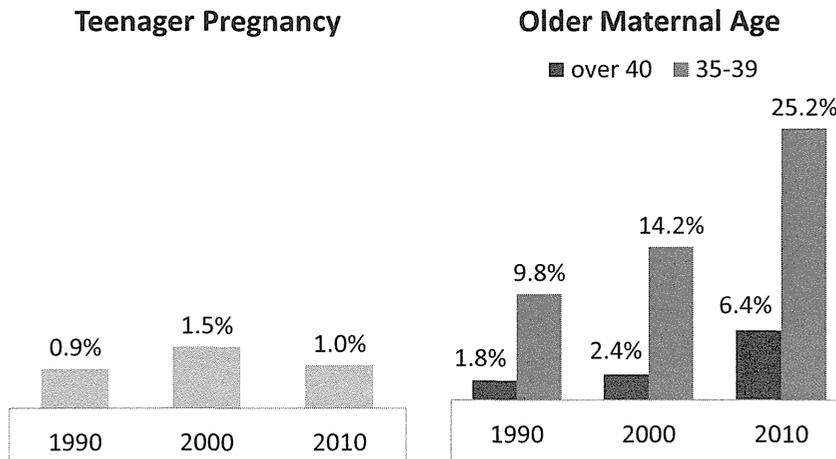
Demographic Trends in Japan: Less Previous Births



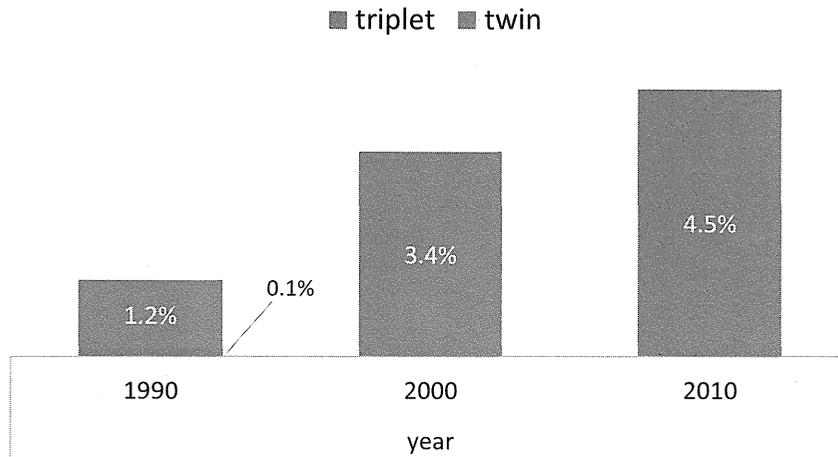
Demographic Trends in Japan: Taller and Thinner



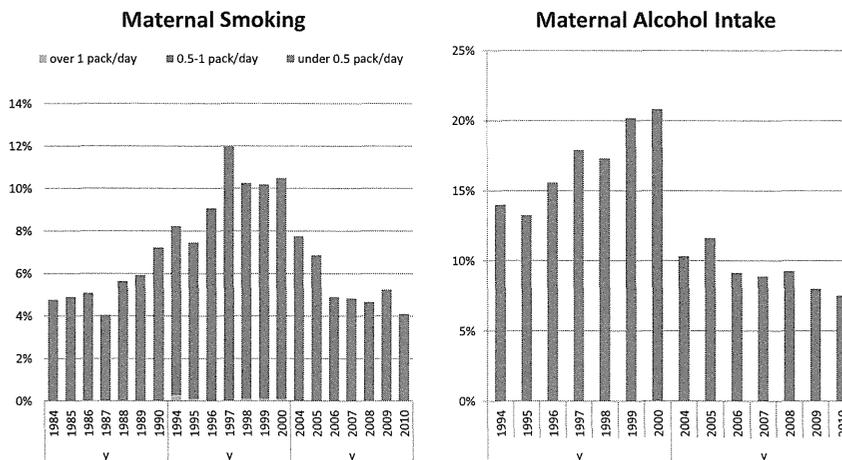
Demographic Trends in Japan: Older maternal age



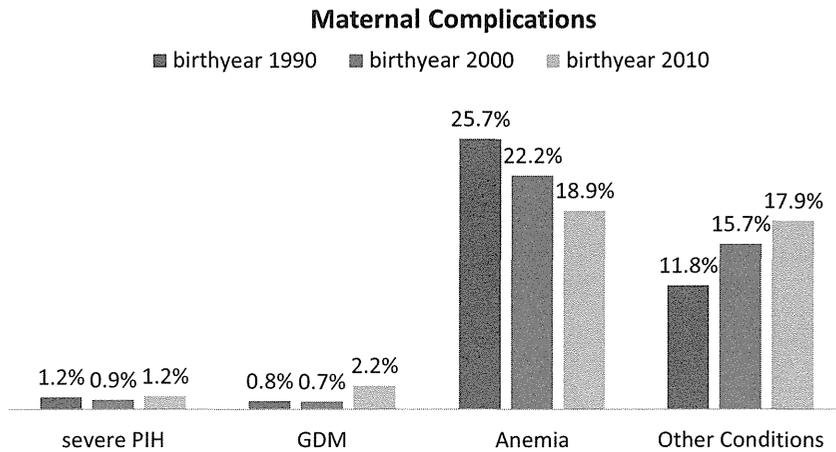
Demographic Trends in Japan: more twins



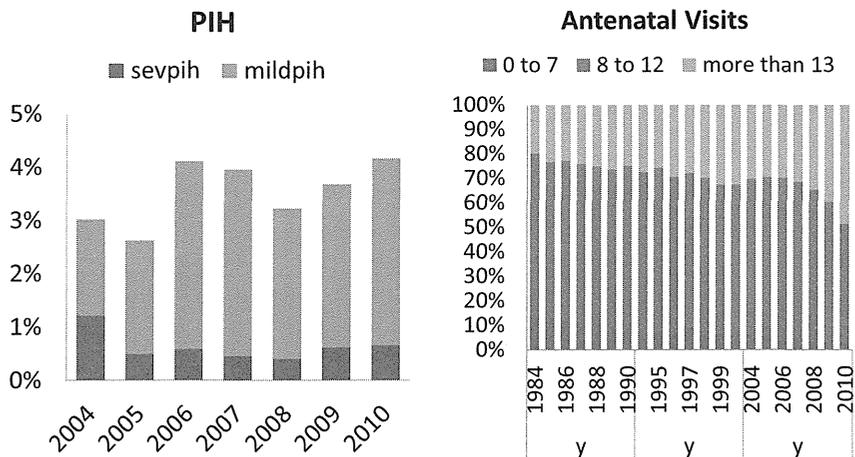
Demographic Trends in Japan: Recent decrease in smoking and alcohol intake



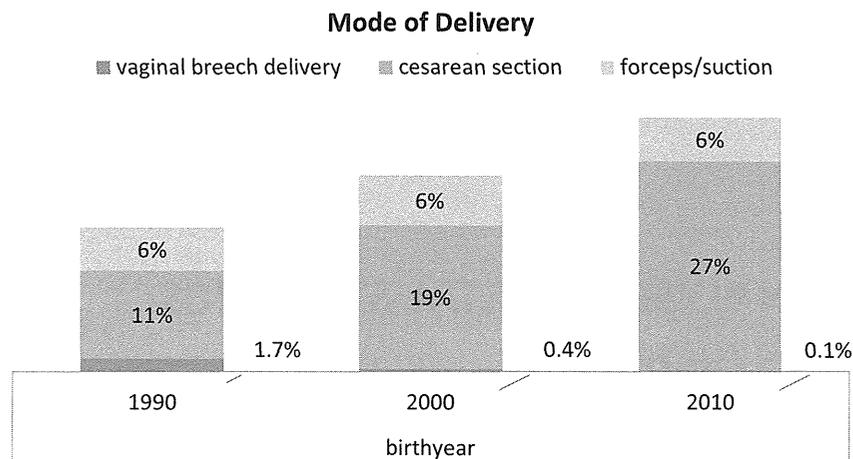
Demographic Trends in Japan: less anemia, more GDM



Demographic Trends in Japan: more antenatal visits, possible increase in PIH



Demographic Trends in Japan: more cesarean delivery, less vaginal breech



Summary

Trends in Maternal Characteristics (1990-2010)

- Taller and thinner mothers
- Older maternal age, less previous births
- More twins
- Less smoking and drinking during pregnancy
- Less anemia, more GDM, possibly more PIH
- More antenatal visits
- More cesarean sections

ANALYSIS OF VITAL STATISTICS (1979-2011)

Data of Japan

- ❑ National Survey on Infants and Toddlers
 - 1980, 1990, 2000, 2010 (Every 10 years)
 - Multi-level random selection of all births.
 - 10,000-20,000 subjects per survey.
 - Data on method of delivery, maternal complications, maternal smoking and drinking
- ❑ Vital Statistics data
 - 1979-2011 (30 years)
 - 100% coverage
 - Only 23 basic variables for birth certificate
 - Data of residence
- ❑ WHO Multi-country Survey
 - 2004, 2008
 - Random Selection of 10 hospitals capable of delivery of high risk births

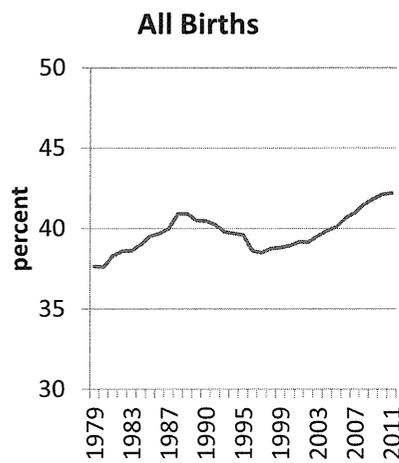
Analysis plan

- Trends in maternal characteristics and complications that could attribute to earlier spontaneous labor or medically needed urgent delivery
- Trends in timing of delivery that could reflect decision of elective delivery

Analysis plan

- Trends in maternal characteristics and complications that could attribute to earlier spontaneous labor or medically needed urgent delivery
- Trends in timing of delivery that could reflect decision of elective delivery
 - Percentage of births during **regular working hours** (defined by births during 9AM-5PM on weekdays)
 - Difference in timing of birth by **access to care** (residence)

Trend of Births during Regular Work Hours (Weekdays 9° -17°)

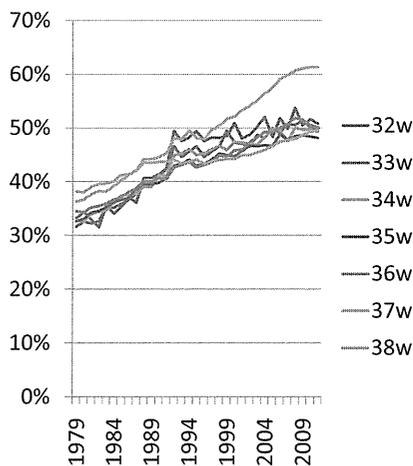


➤ Overall

- Birth rate 2 times compared to non-work hours
- apx 40% born during work hours (25%)

➤ z-shape trend ?

Trend of Births during regular work hours by gestational length

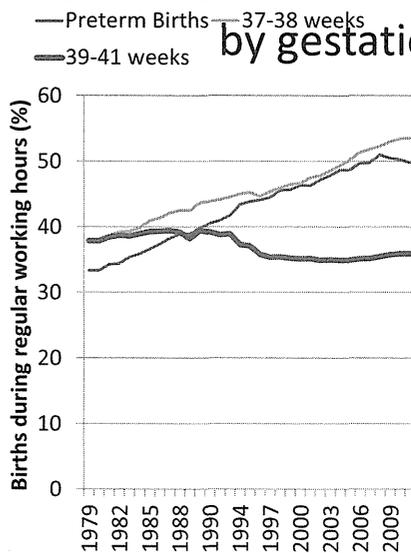


- Scheduled deliveries have increased at every week under 39 weeks

- Largest increase for births at 37 weeks.

- Largest percentage of births at work hours is also at 37 weeks.

Trend of Births during regular work hours by gestational length



- Scheduled deliveries at full term declined during 1992-1997 and has kept stable at 35% (1.5 times more birth during work hours)
- Increase in scheduled deliveries mostly attributable to increase at preterm and early term

Summary

Deliveries during working hours

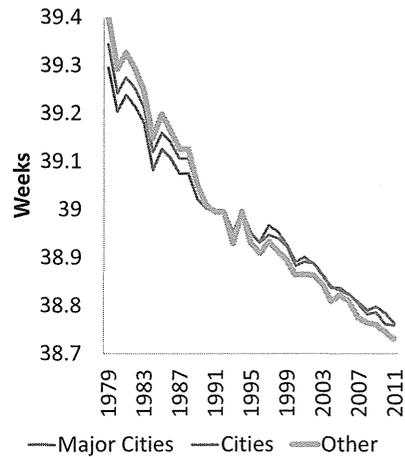
Overall, twice more deliveries during work hours compared to off-duty hours.

- Full term births
 - Birth during work hours **declined between 1992-1997**
 - Since, stably **1.5** times more deliveries during work hours
- Early term and preterm births
 - Birth rate during work hours **continues to increase**
 - Currently **3** times more deliveries during work hours
 - **Deliveries at 37 weeks are most likely to be scheduled**, with 4.5 times more deliveries during work hours
- Possible interpretation: High risk pregnancies are being scheduled for delivery, low risk pregnancies are becoming more preferred to wait until spontaneous labor.
- Waiting until term to terminate pregnancies with non-urgent medical conditions, leading to most scheduled deliveries at 37 weeks.

Difference in Trends of Average Gestational length by mother's residence

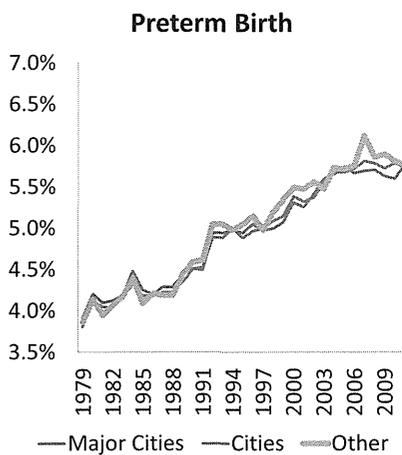
Definition and categorization

- ◆ Major City (19 cities)
 - over 1,000,000 residents
- ◆ City
 - over 50,000 residents
 - over 60% live in the urban district
 - over 60% work in the industry
- ◆ Other



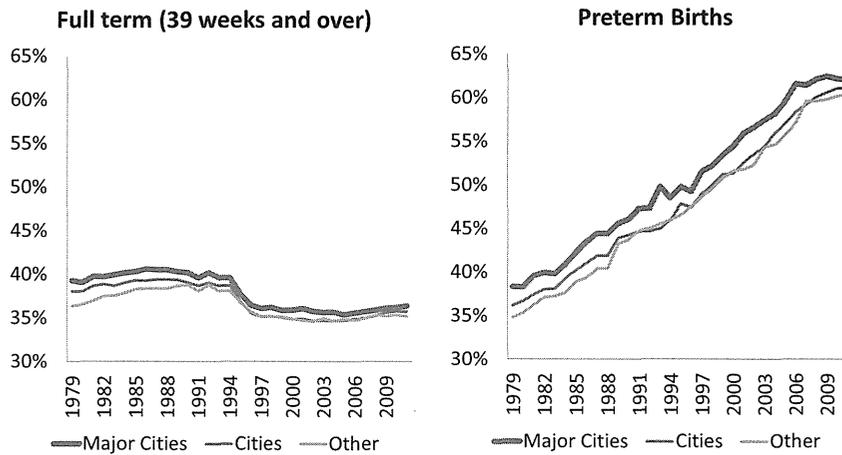
Gestational length dropped more in smaller towns and cities(4.5days), compared to major cities (3.5 days).

Difference in Trends of Gestational length by mother's residence



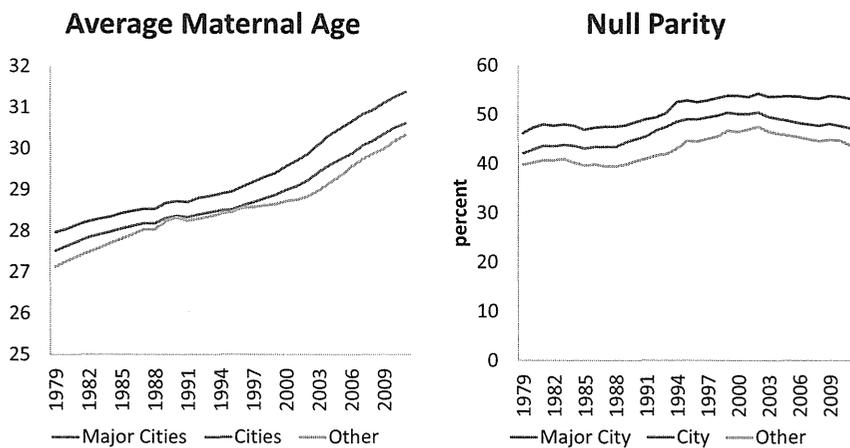
➤ Preterm birth rate increased more in smaller towns and cities, compared to major cities.

Difference in Trends of Delivery during working hours by mother's residence



Major cities tend to have more scheduled deliveries.
For full term births, the difference by residence has narrowed.

Difference in Trends of Maternal Characteristics by mother's residence



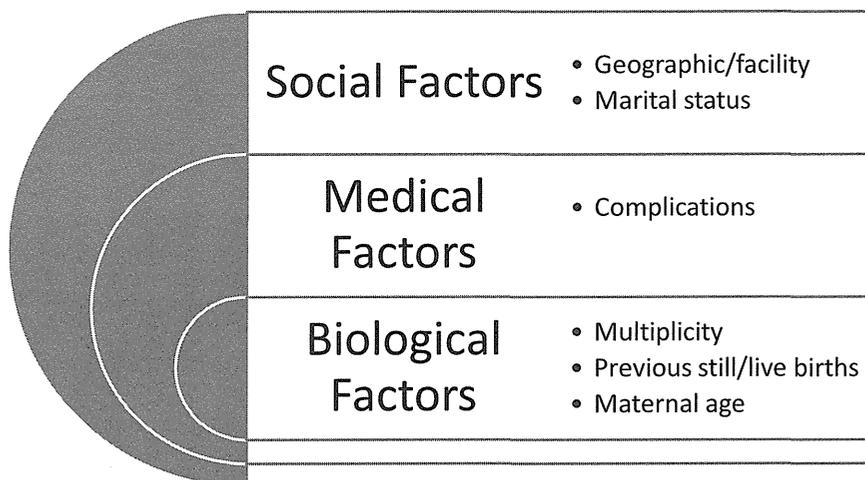
Major cities tend to have older, nullparous mothers.
Trend is similar between categories of residence.

Summary

Differences by mother's residence

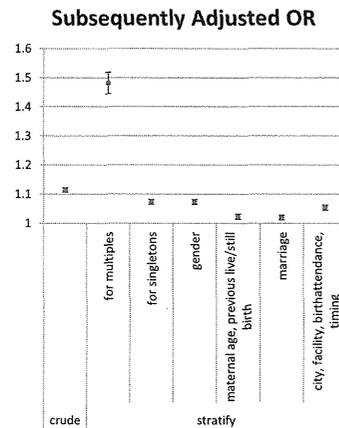
- Gestational Length
 - Dropped more in smaller cities and towns
 - Shorter in smaller cities and towns since 1990
 - Preterm birth higher in smaller cities and towns since 1990
- Scheduled Delivery
 - More frequent in major cities
 - For full term births, the difference has narrowed
- Maternal Characteristics
 - Older, more nulliparous mothers in major cities
 - Trend is similar between categories of residence

Using multiple regression models to evaluate effects on gestational length



Multivariate logistic model for Preterm with subsequent adjustment (1995-2010)

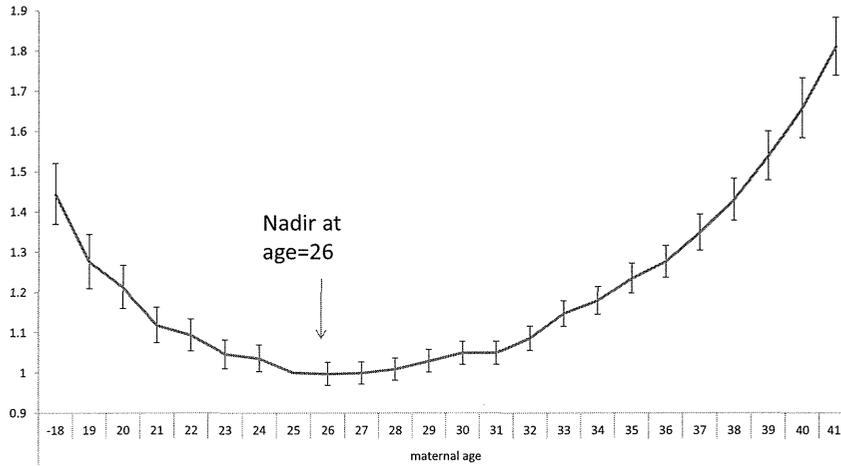
		OR	95%CI	
crude		1.114	1.106	1.122
stratify	for multiples	1.482	1.446	1.519
	for singletons	1.073	1.065	1.082
For Singletons				
Biological	Adj for gender	1.073	1.065	1.082
	+ maternal age, previous live/still births	1.023	1.015	1.032
Social	marriage	1.019	1.011	1.028
Other	City, Facility, timing, birthplace	1.054	1.048	1.063



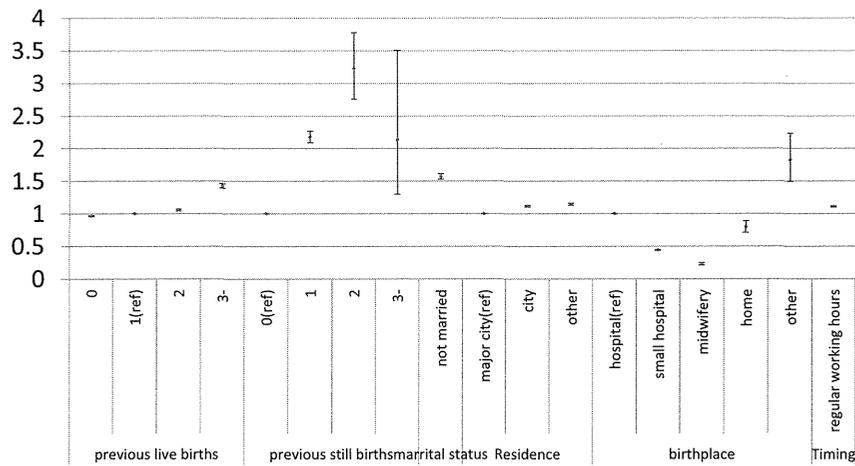
Multivariate logistic model for Preterm with subsequent adjustment (1995-2010)

		Vital Statistics			Infant Survey		
Confounder s Adjusted for to calculate effect of time on Preterm birth rate		OR	95%CI		OR	95%CI	
Crude		1.114	1.106	1.122	1.042	1.009	1.077
stratify	for multiples	1.482	1.446	1.519	1.473	1.327	1.634
	for singletons	1.073	1.065	1.082	0.969	0.934	1.005
For Singletons							
Biological	Infant gender	1.073	1.065	1.082	0.972	0.937	1.008
	maternal age, previous live/still births	1.023	1.015	1.032	0.89	0.857	0.924
	BMI category				0.888	0.855	0.922
Social	marriage	1.019	1.011	1.028			
	Smoking, alcohol				0.897	0.863	0.932
medical	maternal complications				0.991	0.953	1.031
	City, Facility, timing, birthplace	1.054	1.048	1.063			

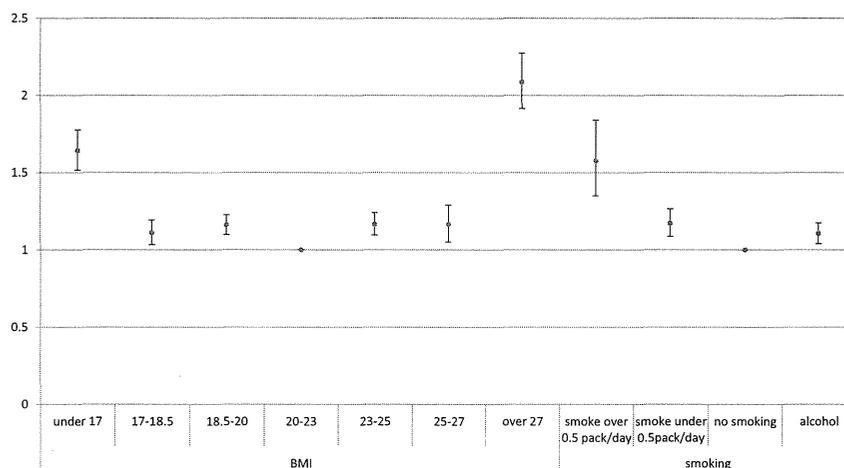
Estimated Effects of maternal age



Estimated Effects of other confounders



Estimated Effects of other confounders



Overall Summary of trends in Japan

Maternal Characteristics

- Increase in twins
 - older maternal age
 - # of previous births/stillbirths
- play substantial role in shortening gestational length.

Mothers living in major cities are more likely to be older and nulliparous, but with lower risk of preterm birth

Scheduled Deliveries

- Preterm & early term deliveries are more scheduled. Rate higher in major cities
- Full term births have become less likely to be scheduled. Rate similar for residence
- Preterm & early term pre-labor deliveries largely due to
 - medical urgencies
 - breech, multiple pregnancies
 - repeated cesarean section
- Breech mostly delivered by cesarean section before 39 weeks
- Multiple pregnancies mostly delivered before 39 weeks
- Repeated cesarean section mostly operated at early term
- PROM is a main reason for scheduled delivery at full term
- 50% of pre-labor delivery at full term may be elective



国立成育医療センター
National Center for Child Health and Development

1979年から2010年における日本全出生の 低出生体重児および早産増加の要因分析

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要旨

約30年間の我が国の人口動態調査・出生票を分析し、増加している低出生体重児と早産の経年変化とその要因を明らかにした。高齢出産の低出生体重児出生のリスクは、近年減少しており、差はなかった。早産に限ると、高齢出産は1.5倍リスクは高いが、減少傾向であった。これは、20代での早産および低出生体重児出生が増加している影響と考えられる。地方と都市部での差はみられなかった。今後は、若い世代の低出生体重児出生予防の対策が課題となる。

背景

- 近年、先進国で低出生体重児が増加しているのは日本だけであるがいつから増加してきたのか、地域差があるのか、早産が増えているのかなど原因を分析することで今後の予防政策を立案するための重要なデータとなる。
- 低出生体重児は新生児死亡予後リスクだけではなく、将来、心臓病、脳梗塞、悪性腫瘍などの成人病発症の素因となり発症のリスクが高くなることが疫学調査から明らかにされている。

目的

1. 1979年から2010年の人口動態調査・出生票を用いて新生児平均体重の経年変化を明らかにする。
2. 近年増加する低出生体重児・早産の増加の経年推移とその要因および地域差があるかどうかを分析する。

方法

人口動態調査の出生票から、単胎で出生した低出生体重児(出生体重が2500g未満)の割合、早産(出生週数が37週未満)の割合、初経産、母親年齢、児性別、出生体重、出生時妊娠週数、出生曜日、出生地域(都市部1, 地方0)などの変数を抽出し、ロジスティック回帰にて要因を分析した。統計はR(ver:3.0.2)とデータ加工時の使用言語はpython, SQL, AWKを使用した。

結果

図1: 平均出生体重増加量(男女別:g) 図2: 低出生体重児および早産児出生割合(%)

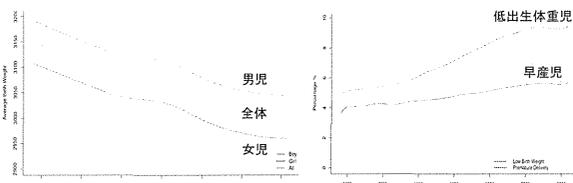


図3: 低出生体重児出生週数別出生数

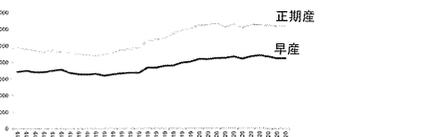


図4: 出生曜日別出生割合: 低出生体重児

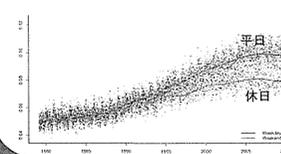


図5: 低出生体重児出生と地方・都市部

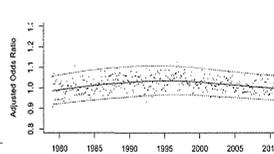


図6: 低出生体重児出生と高齢出産(35歳以上)

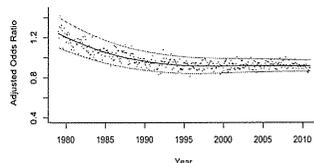


図7: 早産児出生と高齢出産(35歳以上)

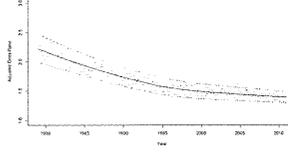


表1: 母親年齢別の低出生体重児別割合

1979年	0.5kg未満	1.0kg未満	1.5kg未満	2.5kg未満
19歳	0.00%	0.12%	0.55%	7.83%
20-24	0.00%	0.06%	0.28%	4.92%
25-29	0.00%	0.06%	0.25%	4.05%
30-34	0.00%	0.09%	0.36%	4.36%
35-39	0.01%	0.17%	0.71%	7.12%
40+	0.01%	0.29%	1.19%	10.17%

表2: 母親年齢別の低出生体重児週数別割合

1979年	37週未満	37-42週未満	42週以降
19歳	43.36%	53.95%	2.69%
20-24	37.15%	60.75%	2.10%
25-29	38.21%	59.85%	1.94%
30-34	44.79%	53.52%	1.69%
35-39	47.47%	50.57%	1.96%
40+	52.92%	45.05%	2.04%

1990年	0.5kg未満	1.0kg未満	1.5kg未満	2.5kg未満
19歳	0.01%	0.25%	0.77%	8.38%
20-24	0.00%	0.16%	0.45%	6.31%
25-29	0.00%	0.12%	0.35%	5.33%
30-34	0.01%	0.16%	0.44%	5.06%
35-39	0.01%	0.28%	0.76%	6.76%
40+	0.02%	0.54%	1.36%	10.01%

1990年	37週未満	37-42週未満	42週以降
19歳	44.13%	54.85%	1.02%
20-24	37.07%	62.42%	0.51%
25-29	37.14%	62.35%	0.51%
30-34	41.27%	58.33%	0.40%
35-39	49.50%	50.13%	0.37%
40+	56.11%	43.11%	0.77%

2010年	0.5kg未満	1.0kg未満	1.5kg未満	2.5kg未満
19歳	0.04%	0.43%	0.85%	9.93%
20-24	0.01%	0.23%	0.55%	8.04%
25-29	0.02%	0.19%	0.44%	7.73%
30-34	0.02%	0.23%	0.54%	8.09%
35-39	0.03%	0.35%	0.82%	9.19%
40+	0.06%	0.53%	1.41%	11.55%

2010年	37週未満	37-42週未満	42週以降
19歳	40.18%	59.75%	0.07%
20-24	33.24%	66.69%	0.08%
25-29	33.33%	66.63%	0.04%
30-34	35.23%	64.73%	0.04%
35-39	39.33%	60.64%	0.03%
40+	45.05%	54.88%	0.07%

考察&結論

1. 平均出生体重は男女共に年々減少しており、低出生体重児、とくに早産児が増加している。
2. 出生曜日の割合が1990年前後で逆転して増加しているのは、地域のクリニックから病院への転換、産科エコー機器の導入、NICU医療向上などによる影響が考えられる。
3. 低出生体重児と早産児の地方と都市部での出生割合は差はない。
4. 低出生体重児出生と高齢出産は、1980年代は高い割合であったが、2010年以降は調整後のオッズは1に近くまで低下し、母体年齢との関連はみられなかった。これは、20代の低出生体重児出生割合が増加しているためと考えられる。
5. 早産と高齢出産は、1980年代には2倍以上リスクが高かったが、2010年には1.5倍まで低下している。若い世代のやせの増加が低出生と早産に関連している可能性が考えられる。

謝辞

本研究は、学術研究助成基金助成金若手研究B 「人口レベルの日本人在胎週数別出生時体重基準値作成に関する研究」(課題番号24790612)の助成を受けた。

Ⅲ. 研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

書籍

著者氏名	論文タイトル名	書籍全体の編集者名	書籍名	出版社名	出版地	出版年	ページ
なし							

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Shahrook S, Mori R, Ochirbat T, Gomi H.	Strategies of testing for syphilis during pregnancy (Protocol).	Cochrane Database of Systematic	2	CD010385	2013
Balogun OO, Hirayama F, Wariki WMV, Koyanagi A, Mori R.	Interventions for improving outcomes for pregnant women who have experienced genital cutting.	Cochrane Database of Systematic Reviews.	2	CD009872	2013
Kawaguchi A, Isayama T, Mori R, Minami H, Yang Y, Tamura M.	Hydralazine in infants with persistent hypoxemic respiratory failure.	Cochrane Database of Systematic Reviews.	2	CD009449	2013
Sasaki H, Yonemoto N, Hanada N, Mori R.	Methods for administering subcutaneous heparin during pregnancy.	Cochrane Database of Systematic Reviews	3	CD009136	2013
Tsuruta H, Karim D, Sawada T, Mori R.	Trained medical interpreters in a face-to-face clinical setting for patients with low proficiency in the local language (Protocol).	Cochrane Database of Systematic Reviews.	3	CD010421	2013
Wariki WMV, Nomura S, Ota E, Mori R, Shibuya K.	Interventions for reduction of stigma in people with HIV/AIDS (Protocol)	Cochrane Database of Systematic Reviews.	8	CD006735	2013
Abe SK, Balogun OO, Ota E, Mori R.	Supplementation with multimicronutrients (excluding vitamin A) for breastfeeding women for improving outcomes for the mother and baby (Protocol).	Cochrane Database of Systematic Reviews	7	CD010647	2013
Kenyon S, Tokumasu H, Dowswell T, Pledge D, Mori R.	High-dose versus low-dose oxytocin for augmentation of delayed labour.	Cochrane Database of Systematic Reviews.	7	CD007201	2013
Yonemoto N, Dowswell T, Nagai S, Mori R.	Schedules for home visits in the early postpartum period.	Cochrane Database of Systematic Reviews	7	CD009326	2013
Nishi D, Shirakawa MN, Ota E, Hanada N, Mori R.	Hypnosis for induction of labour (Protocol).	Cochrane Database of Systematic	11	CD010852	20113

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