Tackling the decrease in GA

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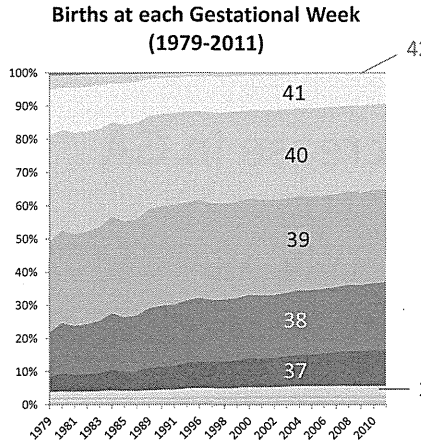
CHANGES IN GESTATIONAL LENGTH AND DEMOGRAPHIC VARIATION IN JAPAN

Changes in Gestational Length in Japan



- ✓ Over-term (41-44) births
  - ⇩ 5% → 0.3%
- ✓ Full-term (39-41) births
  - ⇩ 71% → 63%
- ✓ Early-term (37-38) births
  - ⇧ 20% → 30%
- ✓ Preterm (22-36) births
  - ⇧ 4%→6%

(mostly of 36 weekers 1.5% → 3%)

※75% of PTB are late-preterm

Different reasons for shorter duration of pregnancy

- In Africa, unmet need for induction is 66-80%

  Secondary analysis from the 2004-2005 WHO Global Maternal and Perinatal Health Survey

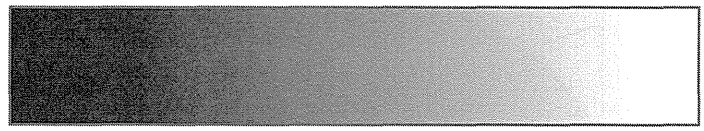
- In Australia and the UK, over 20% of deliveries are by pre-labor cesarean sections

  Australia's mothers and babies 2007 . National Perinatal Statistics Unit, Australia
  Method of delivery 1990 to 2007-8. National Health Services, UK

Ideally, we would like to execute pre-labor delivery on only those who benefit from earlier delivery.

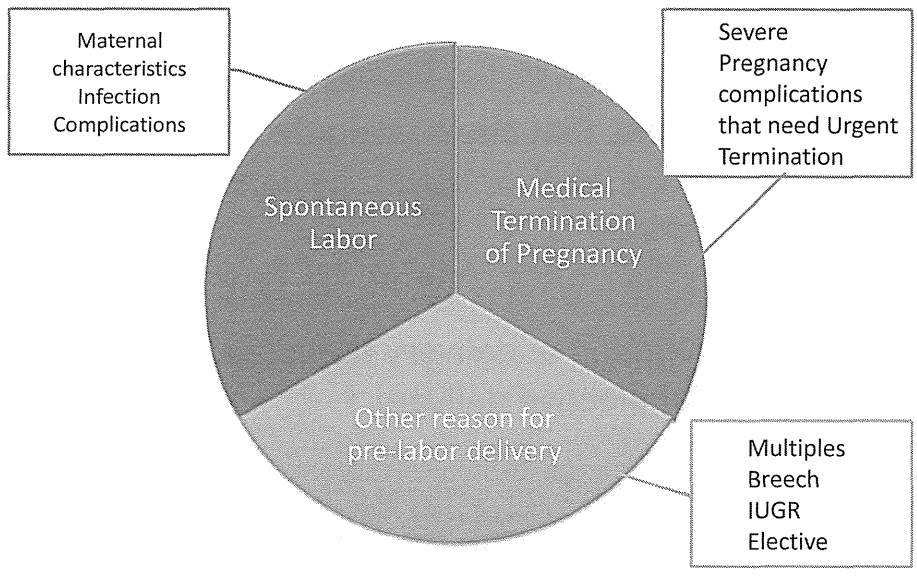
But who are they?

To deliver or not to deliver...

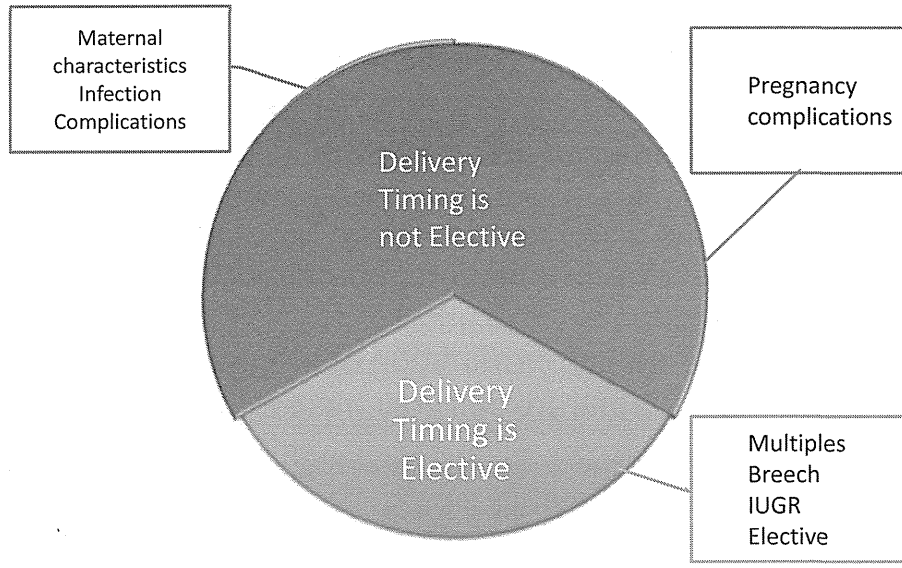


- Some life threatening conditions are clear indications for termination of pregnancy,
- Some conditions you cannot find a justified reason for earlier termination of pregnancy,
- Other conditions are still gray (research still needed)

Factors of Duration of Pregnancy



Factors of Shorter Duration of Pregnancy



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

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- Trends in timing of delivery that could reflect decision of elective delivery

Data of Japan

- National Survey on Infants and Toddlers
  - 1980, 1990, 2000, 2010 (Every 10 years)
  - Multi-level random selection of in-hospital births alive at day of study
  - 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

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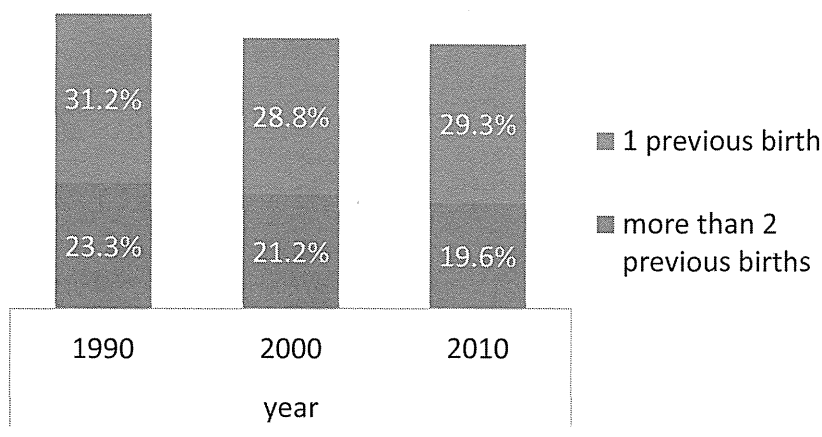
ANALYSIS OF NATIONAL SURVEY DATA (1990, 2000,2010)

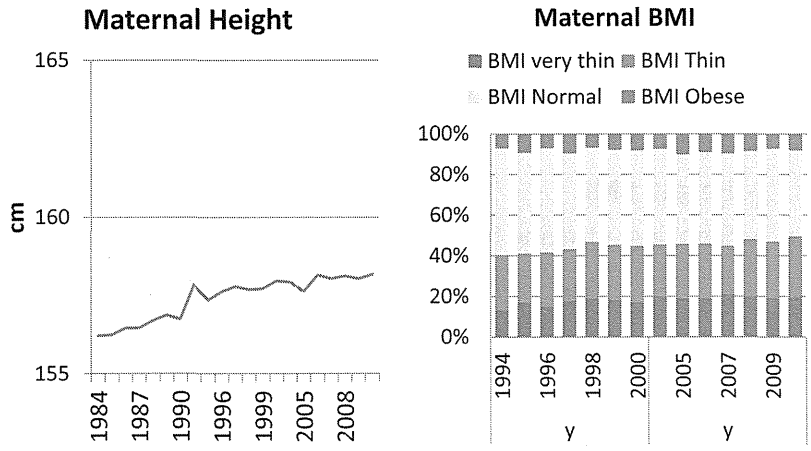
Demographic Trends in Japan from National Survey on Infants and Toddlers

- Maternal Characteristics
  - Maternal age
  - Parity
  - Height, BMI
  - Smoking, drinking habits
- Pregnancy Characteristics
  - Multiplicity
  - Maternal complications
  - Number of antenatal visits
  - Mode of delivery

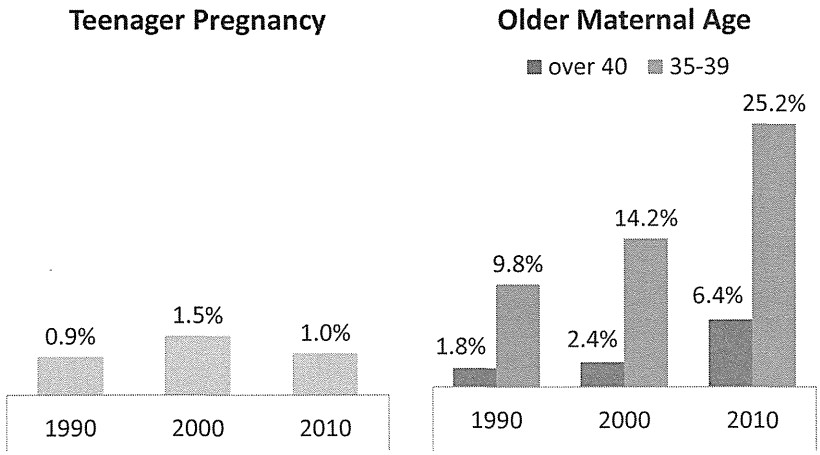
Demographic Trends in Japan: Less Previous Births



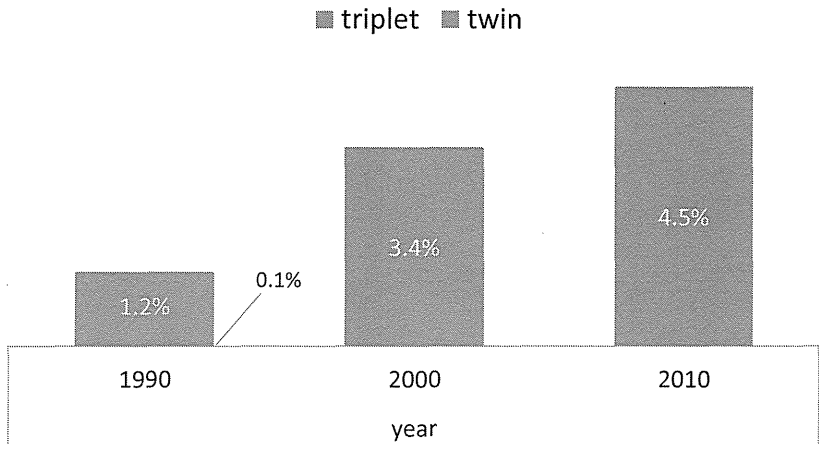
Demographic Trends in Japan: Taller and Thinner



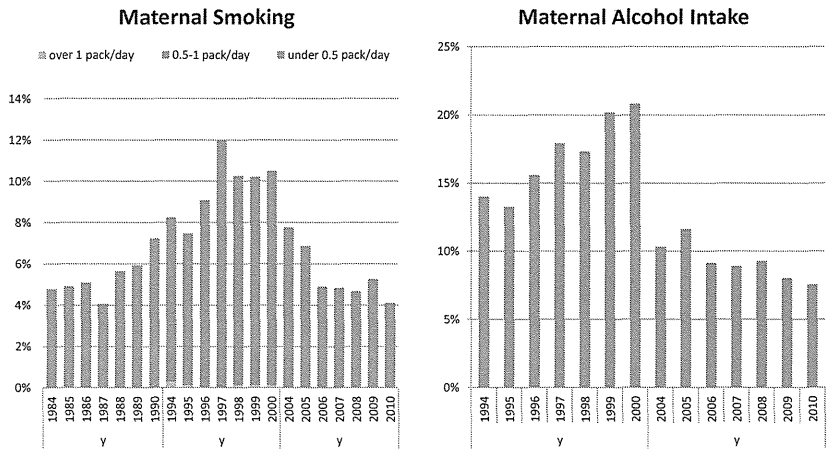
Demographic Trends in Japan: Older maternal age



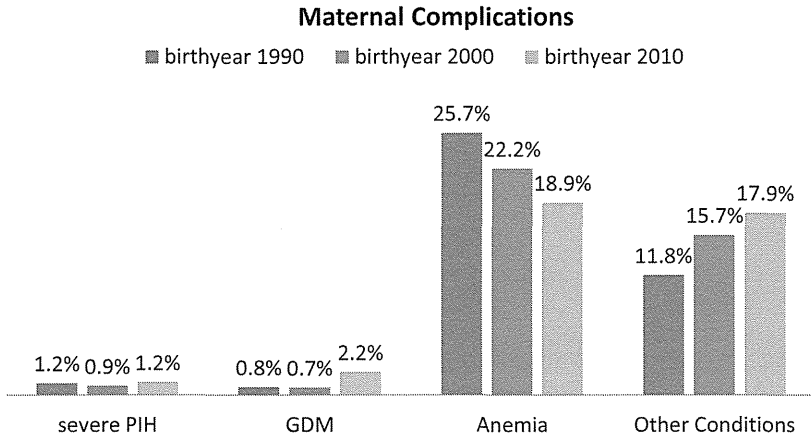
Demographic Trends in Japan: more twins



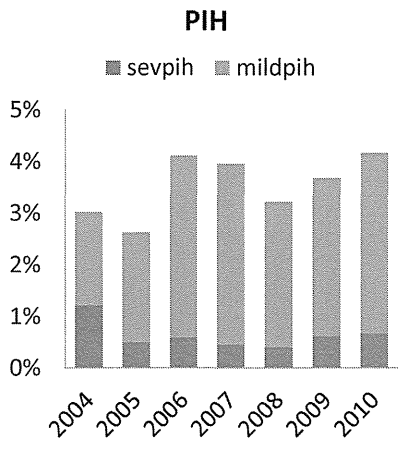
Demographic Trends in Japan: Recent decrease in smoking and alcohol intake

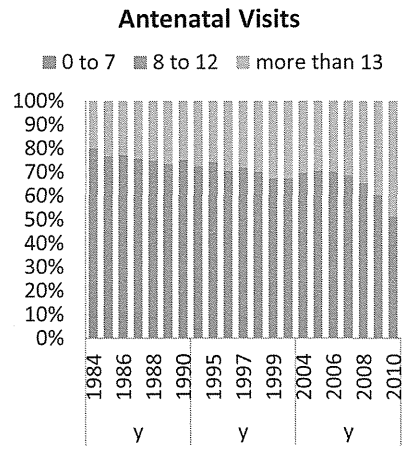


Demographic Trends in Japan: less anemia, more GDM

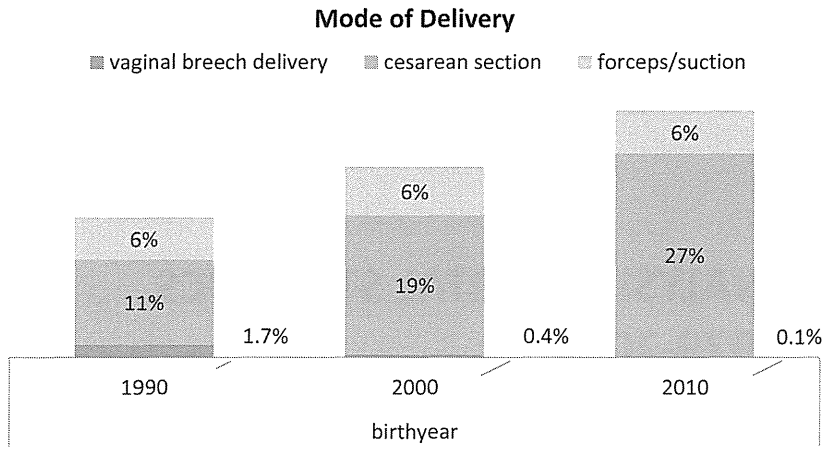


Demographic Trends in Japan: more antenatal visits, possible increase in PIH





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

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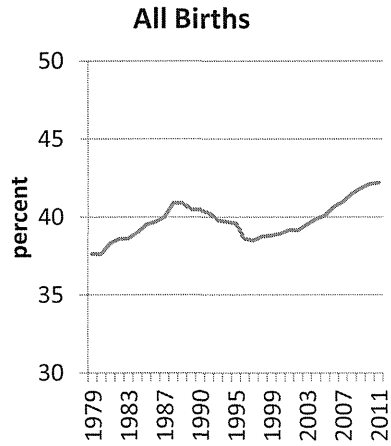
- Trends in maternal characteristics and complications that could attribute to earlier spontaneous labor or medically needed urgent delivery

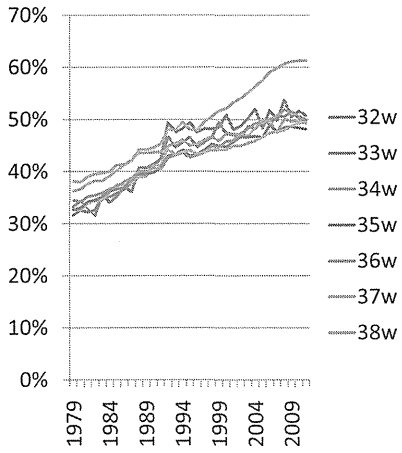
- Trends in timing of delivery that could reflect decision of elective delivery
  - Percentage of births during **regular working hours** (defined by births during 9AM-5PM on weekdays)
  - Difference in timing of birth by **access to care** (residence)

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



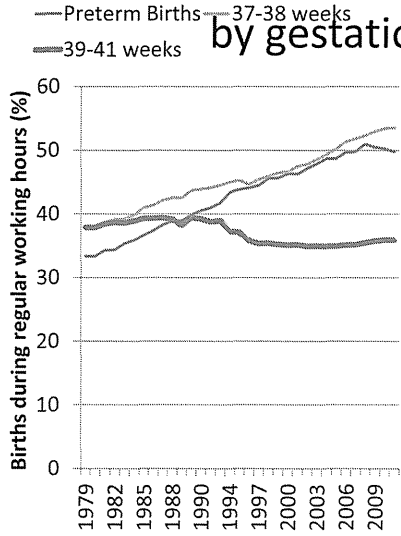
- Overall
  - Birth rate 2 times compared to non-work hours
  - apx 40% born during work hours (25%)
- z-shape trend ?

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.

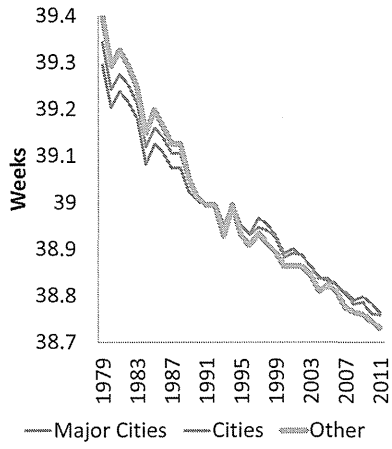
- Full term births
  - Birth during work hours **declined between 1992-1997**
  - Since, stably **1.5** times more deliveries during work hours
- Early term and preterm births
  - Birth rate during work hours **continues to increase**
  - Currently **3** times more deliveries during work hours
  - **Deliveries 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

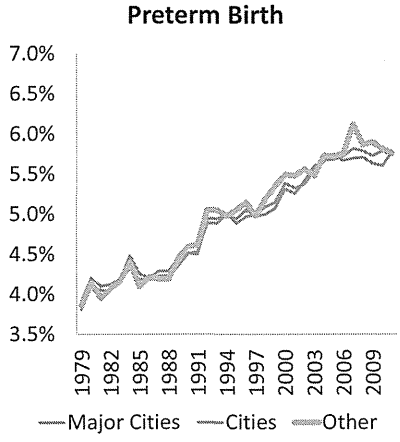
Definition and categorization

- 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



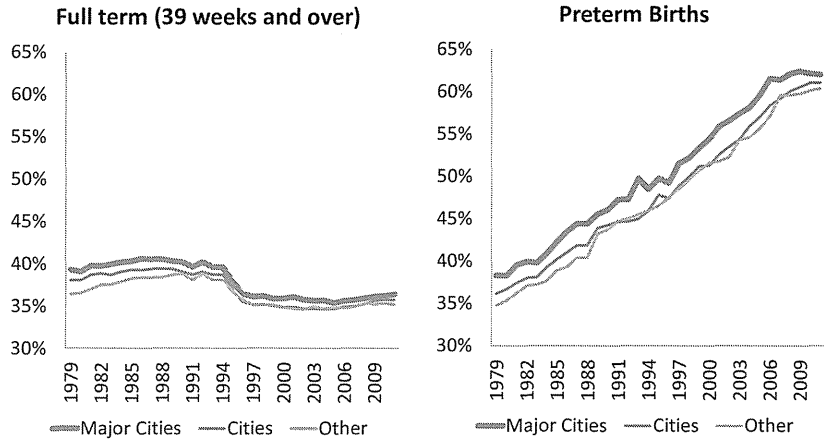
Gestational length dropped more in smaller towns and cities(4.5days), compared to major cities (3.5 days).

Difference in Trends of Gestational length by mother's residence



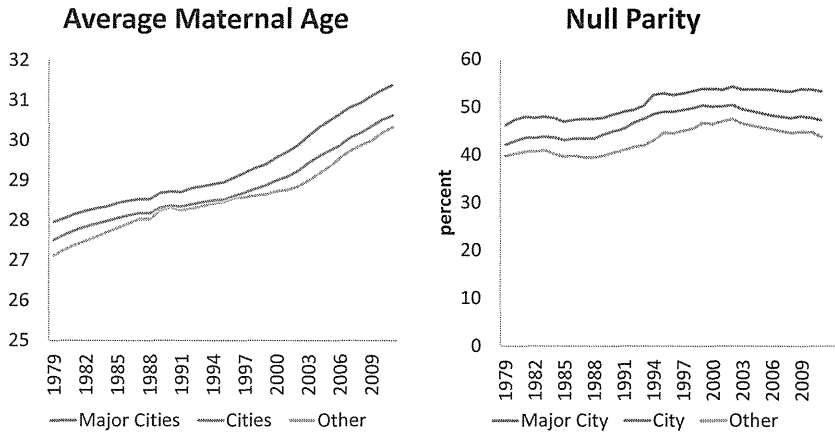
- Preterm birth rate increased more in smaller towns and cities, compared to major cities.

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

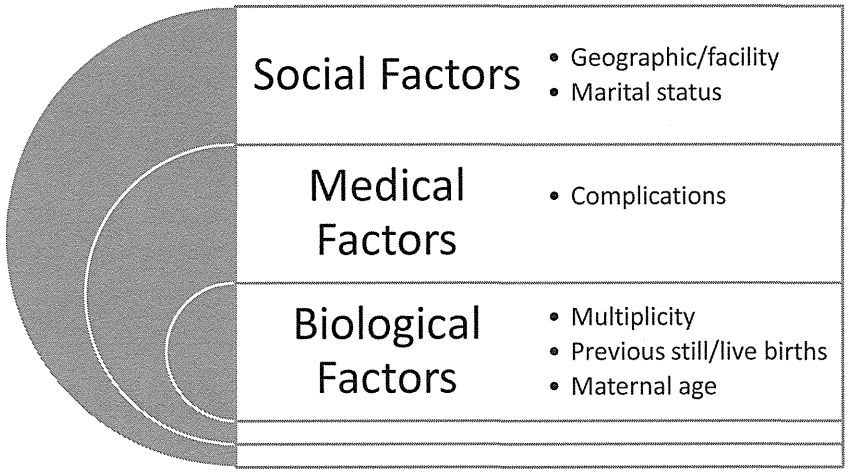


Major cities tend to have older, nullparous mothers.
Trend is similar between categories of residence.

Summary
Differences by mother's residence

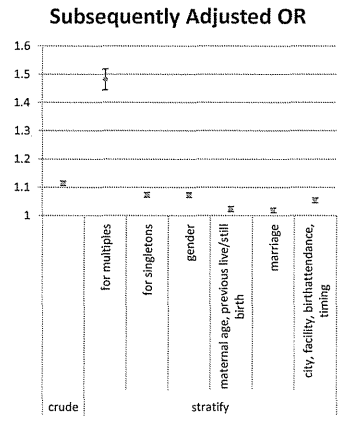
- Gestational Length
  - Dropped more in smaller cities and towns
  - Shorter in smaller cities and towns since 1990
  - Preterm birth higher in smaller cities and towns since 1990
- Scheduled Delivery
  - More frequent in major cities
  - For full term births, the difference has narrowed
- Maternal 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)

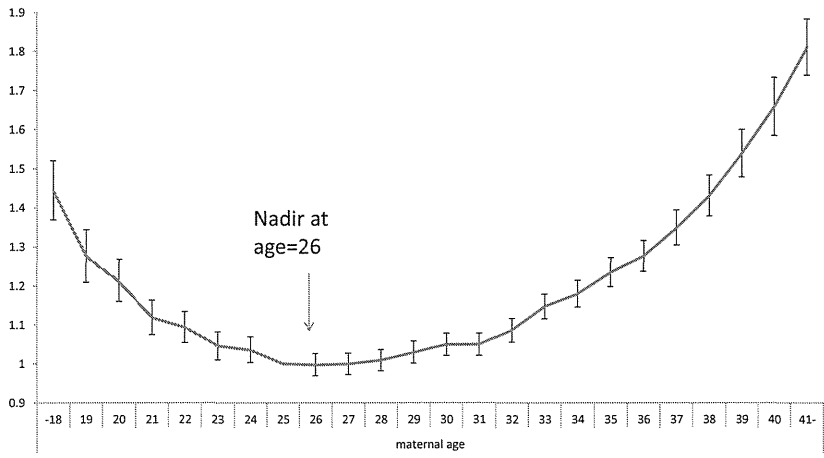
		OR	95%CI	
crude		**1.114**	1.106	1.122
stratify	for multiples	**1.482**	1.446	1.519
	for singletons	**1.073**	1.065	1.082
For Singletons				
Biological	Adj for gender	**1.073**	1.065	1.082
	+ maternal age, previous live/still births	**1.023**	1.015	1.032
Social	marriage	**1.019**	1.011	1.028
Other	City,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