Contraception and birth control

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Outline

- Introduction
- Brief history of fertility control
- Current patterns of fertility control
- Methods of family planning
- Family planning in Mexico and Brazil
- Female sterilization in Brazil

Introduction

- Today, most married and unmarried sexually active women and men in the United States and in other developed countries are limiting their family size and/or controlling the timing and spacing of their births through birth control

- Fewer people in the developing countries use birth prevention methods

Most popular methods

- There are a variety of methods available to women and men to prevent births
- The most popular ones worldwide are contraception, sterilization, and abortion
- The effectiveness of these methods differs from one another, and each has its advantages and disadvantages

Brief history of fertility control

- The notion of birth prevention appeared early in human history
  - Egyptian papyri (1900–1100 BC)
  - Latin works of Pliny the Elder (AD 23–79)
  - Discorides (AD 40–90)
  - Greek writings of Soranus (ca. 100)
  - Arabic medicine in the 10th century
- Most fertility control methods were relatively ineffective, with the exception of induced abortion and withdrawal

Books on contraception

- *Medical History of Contraception* by Norman Himes (1936)
  - Exhaustive survey of contraception covering many cultures worldwide over three thousand years

- *Contraception: A History of Its Treatment by the Catholic Theologians and Canonists* by John T. Noonan (1966)
  - History of contraception from the pre-Christian era to the 1960s, with an emphasis on the interpretation and reception of contraception in the Catholic Church

Books on contraception

- *Contraception: A History* by Robert Jutte (2008)
  - It extends and updates much of the work of Himes and Noonan
- *History of Contraception: From Antiquity to the Present Day* by McLaren (1992)
  - A major historical treatment
- *Eve's Herbs: A History of Contraception and Abortion in the West* by West (1999)
  - It also focuses on the use of plants and herbal products to regulate fertility

Contraceptive methods

- Contraceptive methods have been available and used by the end of the 19th century
  - Except for hormonally based methods
  - Condoms were available since around the 17th century
  - Intrauterine devices (IUDs) were first developed in Germany in the 1920s
    - IUD research was not possible in the U.S. until much later, owing to legal and other types of restrictions
  - The manual vacuum-aspiration method of abortion was first described by the gynecologist of Queen Victoria of England (2nd half of 19th century)

Contraceptive methods

- The physiological principles behind oral contraceptives were developed in the 1920s

- “But the method made no progress, partly because of the lack of a cheap source of steroid and also because contraceptive research was not academically acceptable” (Potts, 2003: 96)

Current patterns of fertility control

- 2002–2012 data on percentages of married women using various family planning methods for the world and most regions
  - Women 15–49 who are married or cohabiting
  - Data portray a contemporary empirical picture of the reproductive revolution since the 1950s, using various family planning methods

- No data for all countries in Europe and Oceania
  - Due to scarcity of family planning surveys conducted in many of these countries

Source: Population Reference Bureau, 2013.

Table 6.1. Percentage of Married Women using Family Planning Methods: World and Most Major Regions, 2002-2012

	All methods	All modern methods	Pill	IUD	Injectables	Male condom	Sterilization	
							Male	Female
WORLD	63	57	8	13	5	8	3	18
MORE DEVELOPED	72	63			-		-	
LESS DEVELOPED	62	56	7	14	6	6	2	19
LEAST DEVELOPED	34	29	10	1	11	2		3
Africa	33	27	9	4	9	2		2
Sub-Saharan Af.	26	21	5	1	10	2		2
Northern America	78	73	17	5	1	12	14	22
Latin America & the Caribbean	75	68	14	6	6	10		23
Asia	66	61	6	17	5	7	2	22
Western Asia	56	36	8	15		8		5
Central Asia	54	50	3	39	2	4		2
South Asia	54	47	7	2		6	1	29
Southeast Asia	62	54	15	7	19	4		7
East Asia	82	81	1	37		11	5	26
Europe								
Oceania	63							
Australia	72	68	30	2	2	15	9	7

Source: Population Reference Bureau, 2013

Source: Population Reference Bureau, 2013.

Variation by countries

- Less developed countries have almost similar levels as more developed countries
  - But the use of family planning methods is quite uneven across the various countries
- Percentage of married women using modern methods
  - 1% in South Sudan and Somalia
  - 2% in Chad
  - 84% in the United Kingdom and China
  - 87% in Portugal
  - 88% in Norway

Source: Population Reference Bureau, 2013.

Nonusers of contraception

- 37% of married women worldwide are contraception nonusers
- Women who are surgically sterile via a hysterectomy
  - Surgical removal of the uterus and sometimes the additional removal of the Fallopian tubes and the ovaries, or by some other non-contraceptive operation
- Women who themselves or their male partners are non-surgically sterile
- Women who are pregnant or in postpartum

Source: Population Reference Bureau, 2013.

Nonusers of contraception

- Women who are trying to become pregnant
- Women who have never had intercourse or have not had intercourse in the past three months
  - Not sexually active
- Women not using contraception and engaging in unprotected intercourse
  - Sexually active (intercourse in the last 3 months before the survey)
  - They are at the risk of becoming pregnant

Source: Population Reference Bureau, 2013.

Data on non-users, U.S.

- 62% of all women aged 15–44 are using family planning methods
- 38% not using contraceptive methods
- Of this 38%, only 8% who are not using contraceptive methods are sexually active, and thus at the risk of an unintended pregnancy

Methods of contraception

- Contraceptive methods can be divided into traditional and modern methods

- Traditional family planning methods include less effective “natural” methods
  - Calendar rhythm method (periodic abstinence)
  - Coitus interruptus (withdrawal)
  - Long-term abstinence
  - Prolonged breast-feeding

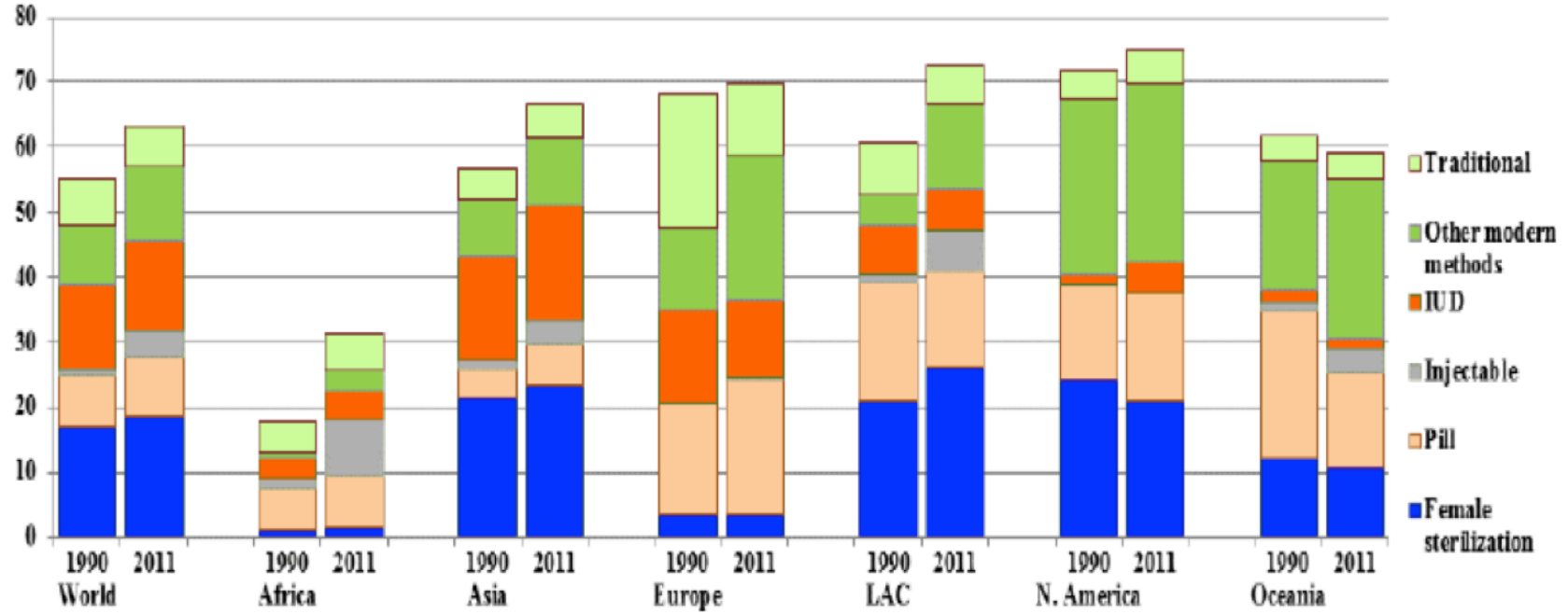
Modern methods

- Main modern methods of family planning
  - Oral contraceptive (pills), intrauterine device (IUD), contraception injection, male condom, and both male and female sterilization
- Other modern methods
  - Diaphragm, vaginal contraceptives (foams and jellies), contraceptive implants, female condom
- “Natural” family planning methods
  - Fertility awareness methods
  - Standard Days Method® and Billings ovulation method

Differences in contraceptive use

- Women vary in the use of principal contraceptive methods around the world
  - However, patterns of use have not changed much between 1990 and 2012
- Most common method is female sterilization
  - 18% worldwide among married women
  - Common in Asia, LAC and North America
- Next popular methods
  - IUD (13%): common in Asia and Europe
  - Oral contraceptive and male condom (both at 8%), injectables (5%), male sterilization (3%)

Figure 6.1. Percentages of Married or In-union Women Using Different Methods of Contraception: The World and Its Regions, 1990 and 2011



Source: (UNDESF) United Nations Department of Economic and Social Affairs. 2013, p. 1.

Prevalence of specific methods

- One or two contraceptive methods comprise half or more of total contraceptive use among the married or cohabiting women in almost all countries
- The pill is the dominant method in 20 countries
- Traditional methods are dominant in 11 countries
- Other modern methods (hormonal implants, diaphragm, spermicides) comprise a relatively small percentage
- Traditional family planning methods are employed by only around 6% of married women and men in the world

Africa

- In Africa, overall family planning use is very low
  - Among married women who use a method, 1/6 of them utilize traditional method
  - In sub-Saharan Africa, 1/5 use traditional method
- In many sub-Saharan African countries, traditional methods account for more than 50%
  - Somalia: 15% of women use any method, but only 1% use a modern method
  - Democratic Republic of the Congo: 18% of women use any method, but only 5% use a modern method
  - Cameroon: 23% of women use any method, but only 14% use a modern method

Induced abortion

- An induced abortion is a pregnancy that has been terminated by human intervention with an “intent other than to produce a live birth” (Henshaw, 2003)

- The most complete data on induced abortions are from countries where abortion is legal

- But even in the U.S. quantity and quality of the data vary considerably

Numbers of induced abortion

- In 2008, there were an estimated 44 million induced abortions worldwide
  - Most of the abortions in the world occurred in developing countries (38 million)
  - Rather than in developed countries (6 million)
  - This differential reflects the uneven distribution of the population in the two groups of countries
- Abortion rate
  - Number of abortions per 1,000 women aged 15–44
  - It decreased from 35 in 1995 to 28 in 2008
  - 34 to 29 in developing countries
  - 39 to 24 in developed countries

Table 6.2. Global and Regional Estimates of Induced Abortion, 1995, 2003, and 2008

	Number of abortions (millions)			Abortion rate*		
Region and subregion	1995	2003	2008	1995	2003	2008
World	45.6	41.6	43.8	35	29	28
Developed countries	10.0	6.6	6.0	39	25	24
excluding Eastern Europe	3.8	3.5	3.2	20	19	17
Developing countries[a]	35.5	35.0	37.8	34	29	29
excluding China	24.9	26.4	28.6	33	30	29
Region						
Africa	5.0	5.6	6.4	33	29	29
Asia	26.8	25.9	27.3	33	29	28
Europe	7.7	4.3	4.2	48	28	27
Latin America	4.2	4.1	4.4	37	31	32
Northern America	1.5	1.5	1.4	22	21	19
Oceania	0.1	0.1	0.0	21	18	17

* Abortions per 1,000 women ages 15–44.

[a] The developing countries are those in Africa, the Americas (excluding Canada and the United States), Asia (excluding Japan), and Oceania (excluding Australia and New Zealand).

Source: Guttmacher Institute, 2012.

Legal vs. illegal abortion

- The greatest abortion rates decline occurred in Europe from 48 in 1995 to 27 in 2008
  - Primary due to “the precipitous drop in Eastern Europe that drove the entire continent’s decline” (Cohen, 2007)

- Abortions do not occur more often in countries where they are legal vs. in countries where they are illegal
  - 29 in Africa where it is mostly illegal
  - 27 in Europe where it is mostly legal

Safe and unsafe abortions

- Abortions are safer in countries where they are legally performed than where they are illegally performed

- According to the World Health Organization, an unsafe abortion is
  - "a procedure for terminating a pregnancy that is performed by an individual lacking the necessary skills, or in an environment that does not conform to minimal medical standards, or both" (Guttmacher Institute, 2012)

Unsafe abortions

- The percentage of all abortions that were unsafe increased from 44% in 1995 to 49% in 2008
- Disparity between the proportion of unsafe abortions in developed and developing countries
  - Almost all abortions in developed countries are safe
  - More than 97% of all abortions performed in Africa in 2008 were unsafe
- "In Asia, the proportion of abortions that are unsafe varies widely by subregion, from virtually none (very safe) in Eastern Asia to 65% in South Central Asia" (Guttmacher Institute, 2012)

Contraceptive behavior, U.S.

- 2006–2010 data from National Survey of Family Growth (NSFG) about U.S. women aged 15–44
  - 62% were using contraception
  - 38% were not using contraception
- Most popular methods for U.S. women
  - The pill: 17.1%
  - Female sterilization: 16.5%
  - Male condom: 10.2%
  - Male sterilization: 6.2%
  - Unlike the situation worldwide, for U.S. women the IUD is one of the least favored methods

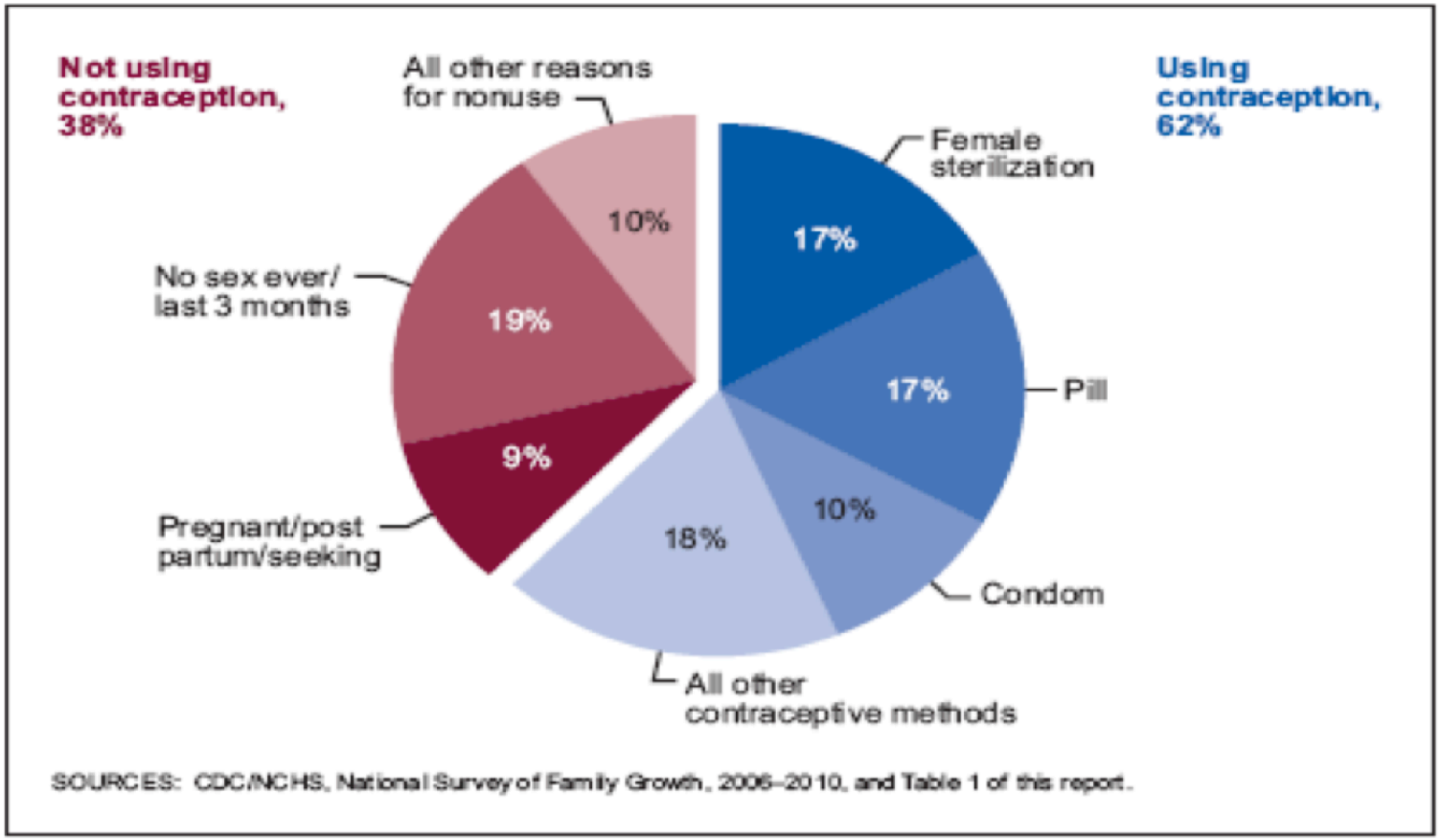
Table 6.3. Women 15–44 years of age, by current contraceptive status and method used: United States, 2006-2010

	All Women 100.0%
Using contraception (Contraceptors)	62.2
Female sterilization	16.5
Male sterilization	6.2
Pill	17.1
Other hormonal methods	4.5
Implant, Lunelle®, or patch	0.9
3-month injectable (Depo-Provera®)	2.3
Contraceptive ring	1.3
Intrauterine device (IUD)	3.5
Male condom	10.2
Periodic abstinence, calendar rhythm	0.6
Periodic abstinence, natural family planning	0.1
Withdrawal	3.2
Other methods[1]	0.3
Not using contraception	37.8
Surgically sterile – female (noncontraceptive)	0.4
Nonsurgically sterile – female or male	1.7
Pregnant or postpartum	5.0
Seeking pregnancy	4.0
Other nonuse	
Never had intercourse	11.8
No intercourse in 3 months before interview	7.3
Had intercourse in past 3 months before interview	7.7

[1]Includes diaphragm (with or without jelly or cream), emergency contraception, female condom or vaginal pouch, foan, cervical cap, Today sponge, suppository or insert, jelly or cream (without diaphragm), and other methods.

Source: Jones, Mosher and Daniels, 2012: 14.

Figure 6.2. Percent Distribution of Women Aged 15-44, by Whether They Are Using Contraception, and By Reasons for Nonuse and Methods Used, United States, 2006-2010



Source: Jones, Mosher and Daniels, 2012: 5.

No contraception, U.S.

- Of the 38% of women not using contraception
  - 2.1% of them are sterile (surgically or nonsurgically)
  - 9% are pregnant, just gave birth, or are trying to become pregnant
  - Almost 12% have never had intercourse
  - 7.3% are not sexually active
  - 7.7% are nonusers of contraception and are sexually active
- Only 20% (7.7/38) of the non-users of contraception are sexually active and do not fall into one of the other categories
  - Only sexually active women are truly at risk of an unintended pregnancy

Most popular contraception

- Among all contracepting women aged 15–44, the most popular contraceptive methods are
- Oral contraceptive: 27.5%
- Female sterilization: 26.6%

Contraception by marital status

- Among currently and formerly married women, the most popular method is female sterilization
  - 30.2% of married women
  - 55.5% of formerly married women
- Among cohabiting and never married women, the most popular method is the pill
  - 32.2% of cohabiting women
  - 46.6% of never married women

Table 6.4. Percentage Distributions of Contracepting Women aged 15–44, by Contraceptive Method, according to Marital or Cohabiting Status: United States, 2006-2010

	All marital statuses	Currently married	Currently cohabiting	Formerly married, not-cohabiting	Never married,not-cohabiting
All Methods	100.0	100.0	100.0	100.01	100.0
Female sterilization	26.6	30.2	24.0	55.5	10.2
Male sterilization	10.0	17.1	4.0	6.1	0.6
Pill	27.5	18.6	32.2	16.5	46.6
Male condom	16.4	15.3	15.8	7.7	22.0
Other hormonal methods[1]	7.2	3.9	10.1	7.3	12.0
Intrauterine device (IUD)	5.6	7.1	5.9	3.6	3.0
Periodic abstinence[2]	1.2	1.7	1.4	---	---
Other methods	5.7	6.1	6.6	3.1	5.4

[1]Also includes Implanon, 1-month injectable (Lunelle), contraceptive patch, and contraceptive ring.

[2]Includes calendar rhythm, natural family planning (NFP), cervical mucus test, and temperature rhythm.

Source: Jones, Mosher, and Daniels, 2012: 17.

Effective contraceptive use by union status and race/ethnicity

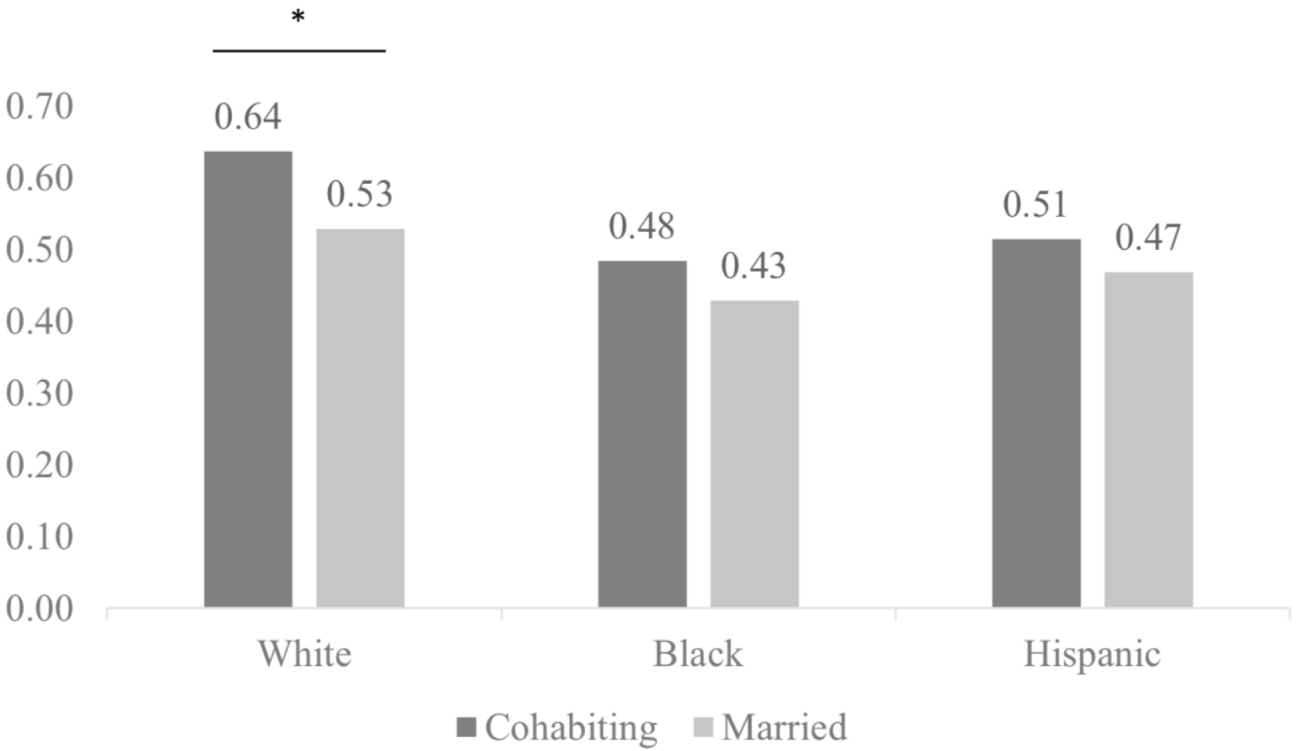


Fig. 1 Weighted predicted probabilities of effective contraceptive use across race and ethnicity. *Notes*: *$p < 0.05$. Predicted probabilities are based on a model that adds interaction terms of race/ethnicity and union status to Model 2 in Table 2 (model not shown). *Source*: 2013–2015 National Survey of Family Growth

- Model controls for union status, race/ethnicity, parity, age, union duration, education, health insurance, religiosity, and interaction terms of race/ethnicity and union status.

Source: Anyawie, Manning, 2019.

Contraception use by age

- Patterns of contraceptive use and nonuse of U.S. women vary by age
- Among contraception users
  - Oral contraceptive (pill)
    - 49% among women aged 15–24
    - 33% among women in their late 20s
    - 10% among women in their early 40s
  - Female sterilization
    - 3% among women aged 20–24
    - 30% among women aged 30–34
    - 51% among women aged 40–44

Contraception use by education

- Among contracepting women in the U.S.
  - Those with less education tend to rely on female sterilization
  - Those with more education use the pill

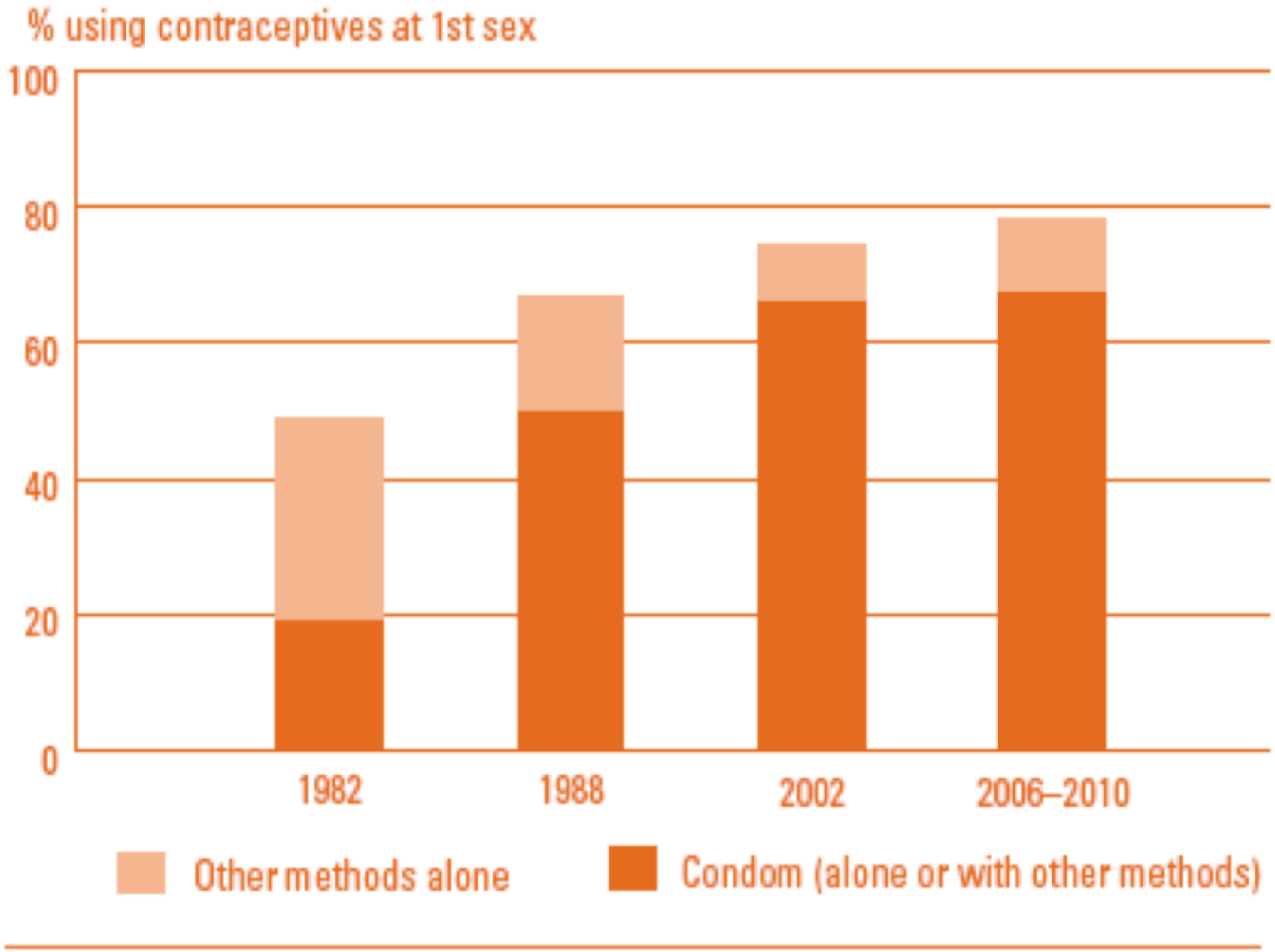
- Use of oral contraceptive
  - 11% among women without a high school education
  - 35% among women with at least a four-year college degree

First premarital intercourse

- The use of contraception in a woman's first premarital intercourse
  - This is important because it is the beginning of exposure to the risk of nonmarital pregnancy, birth, and sexually transmitted infections

- Teenagers who do not use a contraceptive method the first time they have sex are twice as likely to become pregnant and have a baby
  - Compared to teenagers who do use a method the first time they have sex

Figure 6.3. Percentage of Teenagers Using Contraceptives at 1st Sex: United States 1982 to 2006-10



Source: Guttmacher Institute, 2014a: 2 (reprinted with permission of the Guttmacher Institute).

Abortions in the United States

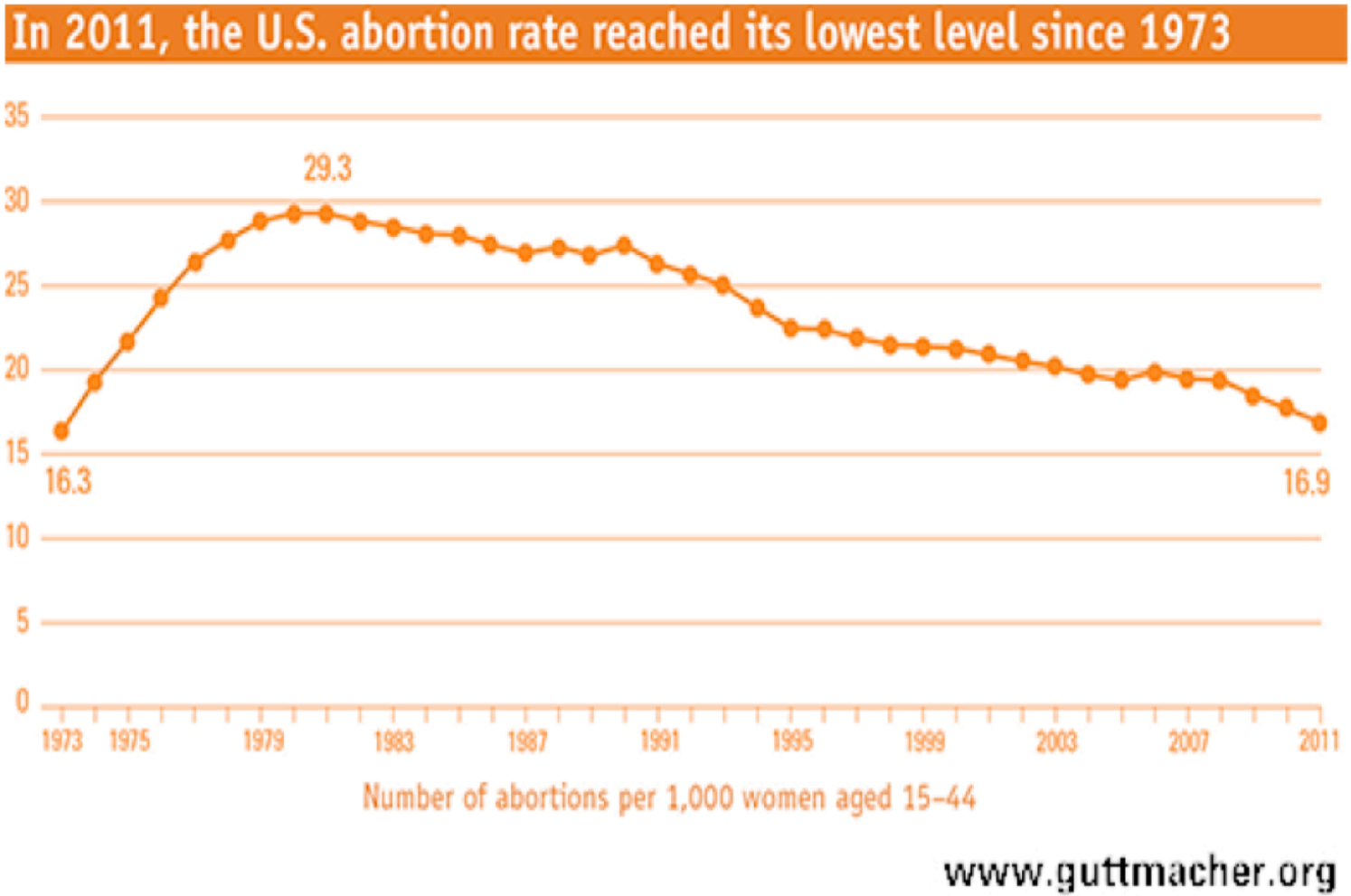
- Abortions became legal in the U.S. in 1973 in the Roe v. Wade decision by the Supreme Court
  - Women, in consultation with their physician, have a constitutionally protected right to have an abortion in the early stages of pregnancy, that is, before the fetus is viable, free from government interference

- Between 1973 and 2011
  - 53 million legal abortions were performed
  - 1.3 million in 2000
  - 1.2 million in 2008
  - Just over 1 million in 2011

Abortions in the United States

- Percentage of women expected to have an abortion by age 45
  - 43% in 1992
  - 30% in 2008
- About 20% of pregnancies end in abortion
- Abortion is one of the most common surgical procedures experienced by U.S. women

Figure 6.4. Number of Abortions per 1,000 Women aged 15-44, by Year: United States, 1973-2011



Source: Guttmacher Institute, 2014b (reprinted with permission of the Guttmacher Institute).

Of all abortions in 2011

- Age
  - 33% by women aged 20–24
  - 24% by women aged 25–29
- Race/ethnicity
  - 30% by non-Hispanic black women
  - 36% by non-Hispanic white women
  - 25% by Hispanic women
  - 9% by women of other races

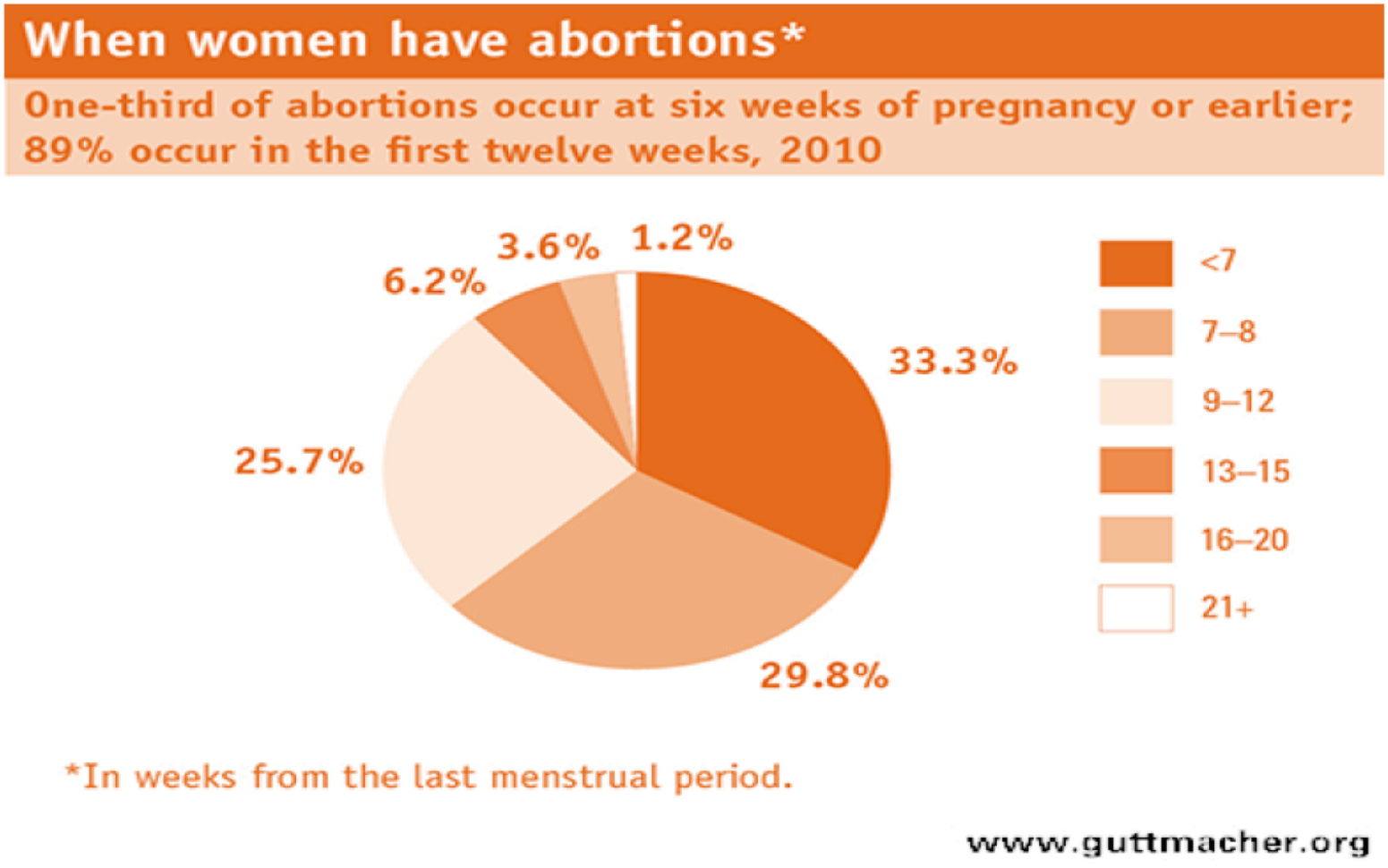
Of all abortions in 2011

- Religion
  - 37% by Protestants
  - 28% by Catholics
- 45% by women who have never married and are not presently cohabiting
- 61% by women with 1+ children

Abortions by time period

- Around 89% of all legal abortions performed in the U.S. in 2010 were to women in the first 12 weeks of their pregnancies
  - 63% by women in the first 8 weeks of their pregnancies
  - 26% by women in the 9–12 weeks
- 1% by women in the 21st or later week

Figure 6.5. Percentage of abortions to U.S. Women, by Time Period of Occurrence, 2010



Source: Guttmacher Institute, 2014b (reprinted with permission of the Guttmacher Institute).

Methods of family planning

- Several ways to categorize contraceptives
  - Whether or not the contraceptive serves as a barrier to keep the man's sperm from entering the woman
  - Whether the contraceptive contains hormones
  - Whether the contraceptive requires continuous input (e.g., the pill or the condom) or whether it is long-lasting (e.g., IUDs and implants)
  - Whether to rank the contraceptive on the basis of its efficacy and failure in preventing pregnancy

Effectiveness

- Effectiveness of family planning methods may be measured in terms of use effectiveness or theoretical effectiveness
  - **Use effectiveness** measures the effectiveness of the method taking into account the fact that some users do not follow the directions and the rules perfectly
    - And/or may not use the method all the time
    - Use effectiveness data tell us how effective the method is in typical use
  - **Theoretical effectiveness** refers to the "efficaciousness" of the method when it is used "consistently according to a specified set of rules" and used all the time

Table 6.5. Contraceptive Failure Rates (Percentage of Women Experiencing an Unintended Pregnancy during the First Year of Use), by Contraceptive Method, according to Use (i.e., Typical) Effectiveness and Theoretical (i.e., Perfect) Effectiveness, United States, post-2000

Method	Use Effectiveness	Theoretical Effectiveness
No method	85	85
Spermicides[1]	28	18
Fertility awareness methods	24	
Standard days method		5
Two-day method		4
Ovulation method		3
Symptothermal method		0.4
Withdrawal	22	4

Method	Use Effectiveness	Theoretical Effectiveness
Sponge		
Parous women	24	20
Nulliparous women	12	9
Female condom[2]	21	5
Male condom[2]	18	2
Diaphragm[3]	12	6
Combined pill & progestin-only pill	9	0.3
Ortho Evra patch	9	0.3
Vaginal ring, NuvaRing	9	0.3
Injectables, Depo-Provera	6	0.2

Method	Use Effectiveness	Theoretical Effectiveness
Intrauterine device (IUD)		
ParaGard	0.8	0.6
Mirena	0.2	0.2
Female sterilization	0.5	0.5
Male sterilization	0.15	0.10
Implanon	0.05	0.05

Notes:

[1] Foams, creams, gels, and vaginal suppositories.

[2] Without spermicides

[3] With spermicidal cream or jelly

Source: Trussel and Guthrie, 2011, chapter 3: Table 3-2.

Family planning in Mexico and Brazil

- Mexico
  - Government programs for both insured and uninsured with promotion of IUD and female sterilization beginning in the 1970s
- Brazil
  - Much less emphasis on the supply of methods, restrictions on female sterilization, especially postpartum, frustrated demand for contraception, and exchange of sterilization for votes

Source: Amaral, Potter 2009 (https://doi.org/10.31235/osf.io/gwk5t).

Main question

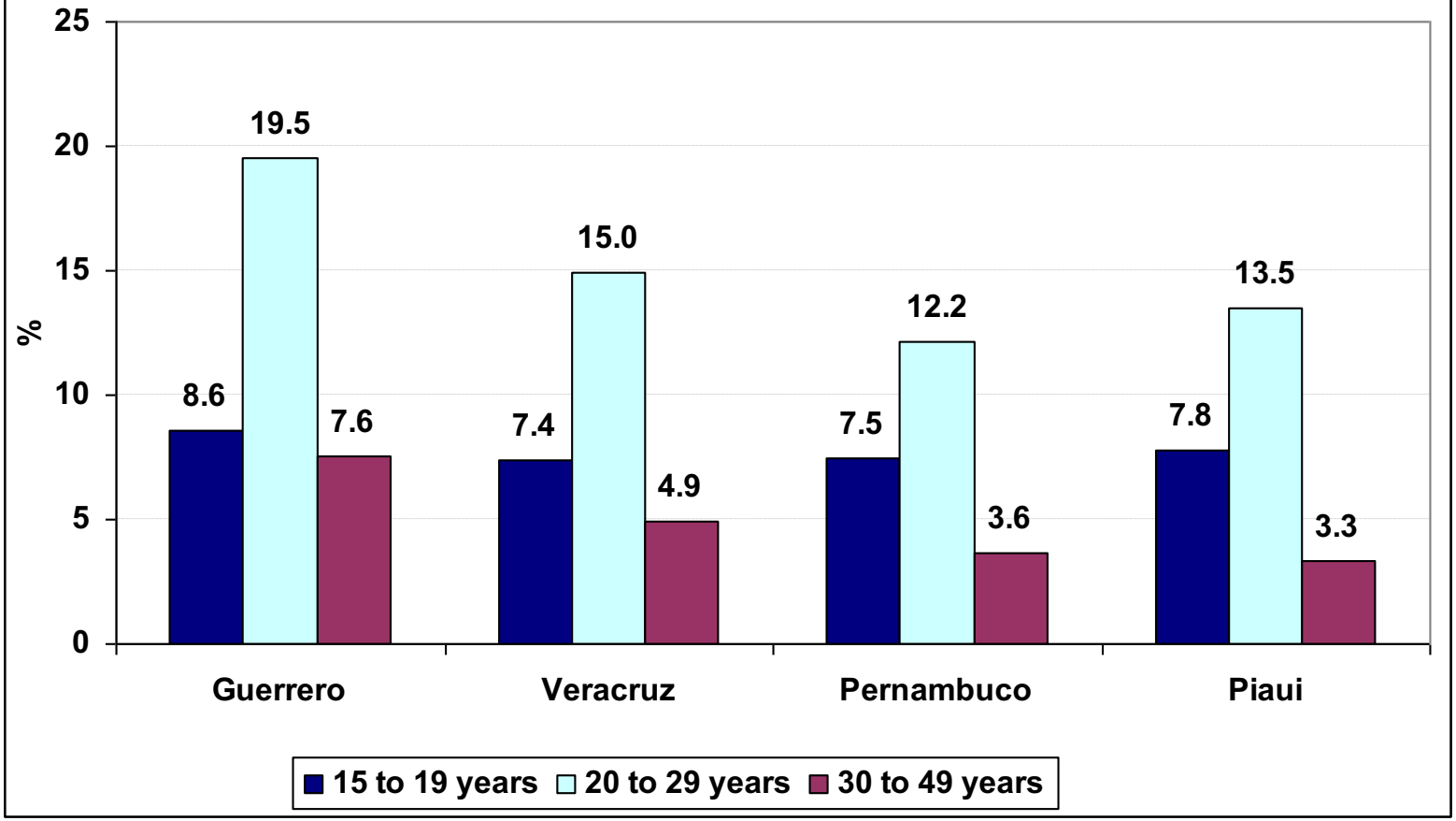
- Within a municipality, will fertility differentials by socioeconomic status be smaller in Mexico than in Brazil?

- 2 poor states were selected in each country
  - Guerrero and Veracruz in Mexico
  - Pernambuco and Piauí in Brazil

- 2 wealthier states were selected in each country
  - Morelos and Tamaulipas in Mexico
  - Espírito Santo and Rio Grande do Sul in Brazil

Source: Amaral, Potter 2009 (https://doi.org/10.31235/osf.io/gwk5t).

PERCENT OF WOMEN WITH CHILD BORN ALIVE LAST YEAR IN THE POPULATION OF BRAZILIAN AND MEXICAN STATES, 2000



Source: Amaral, Potter 2009 (https://doi.org/10.31235/osf.io/gwk5t).

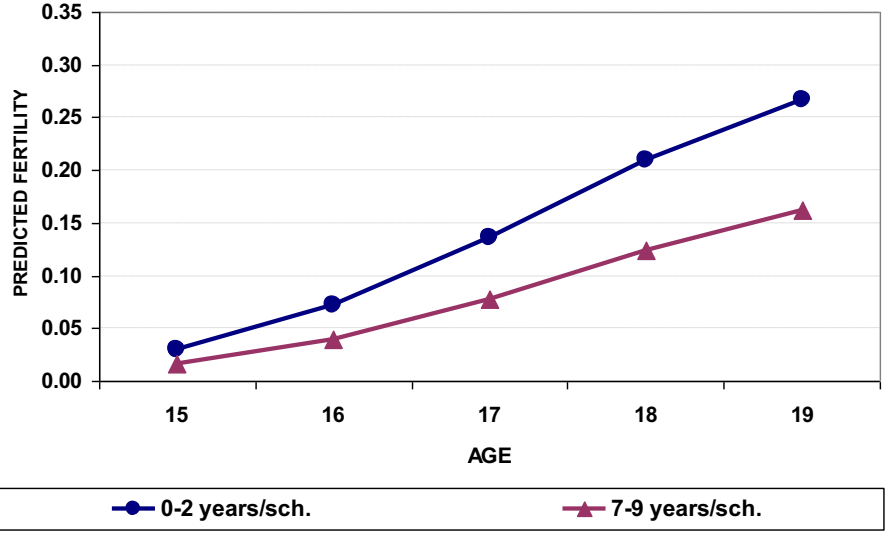
Regression models

- Logistic regressions using 2000 Censuses
- Dependent variable: child born alive last year
- Independent variables
  - Age, age-squared, education groups, parity, catholic, indigenous, states, municipal electrification factor
  - Interactions with states and electrification

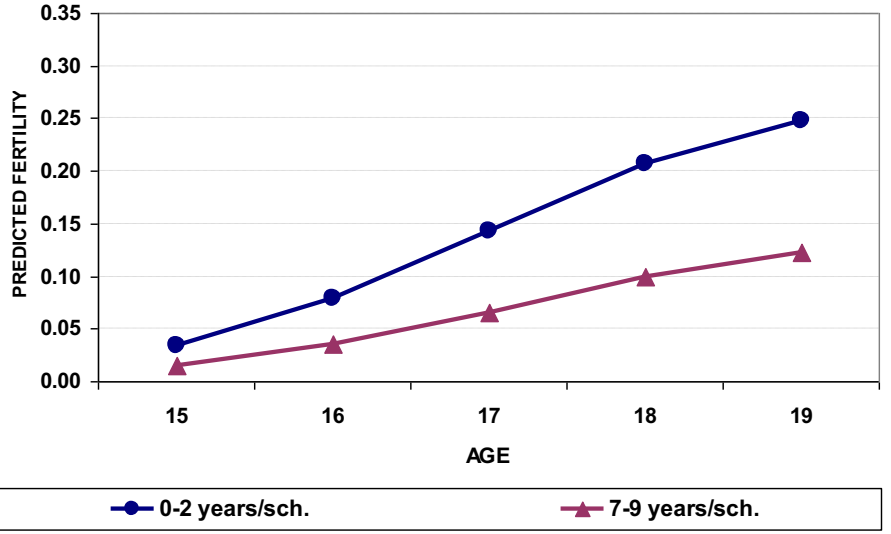
Source: Amaral, Potter 2009 (https://doi.org/10.31235/osf.io/gwk5t).

Poorer states & 15–19 years

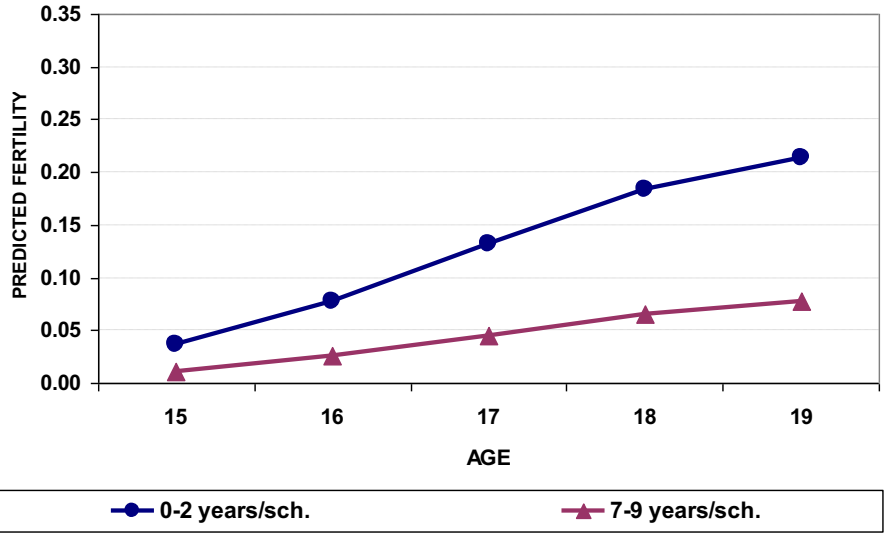
Guerrero, Mexico



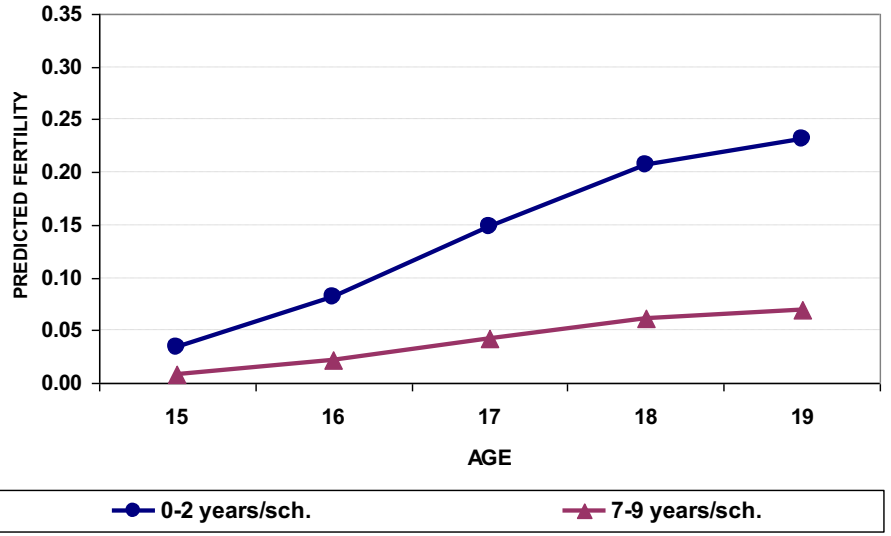
Veracruz, Mexico



Pernambuco, Brazil

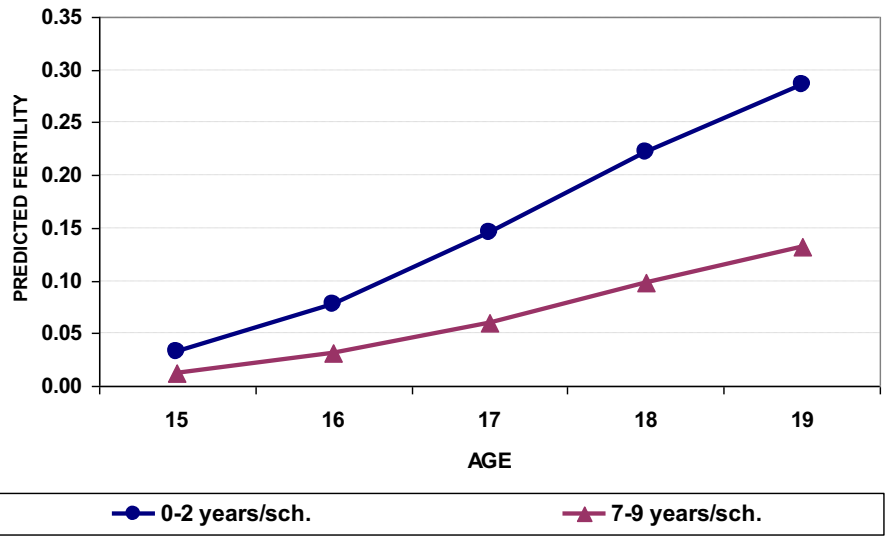


Piauí, Brazil

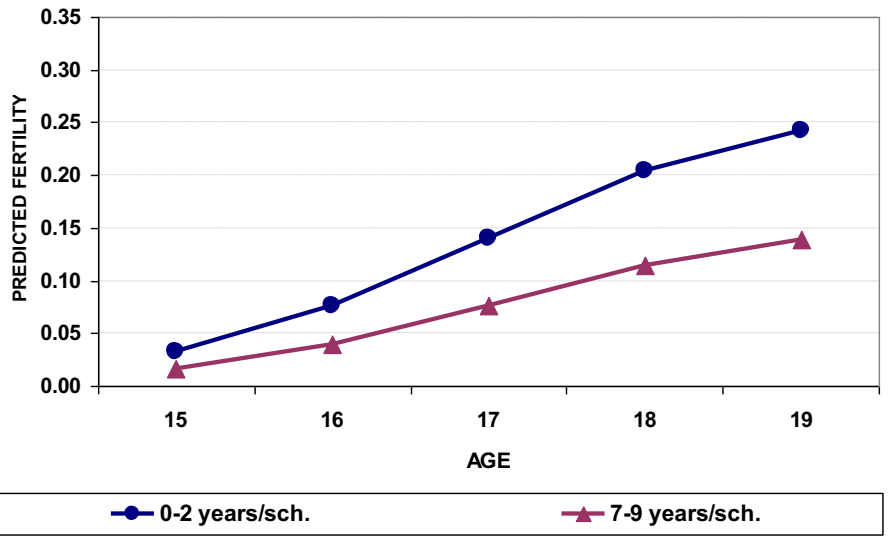


Wealthier states & 15–19 years

Morelos, Mexico



Tamaulipas, Mexico



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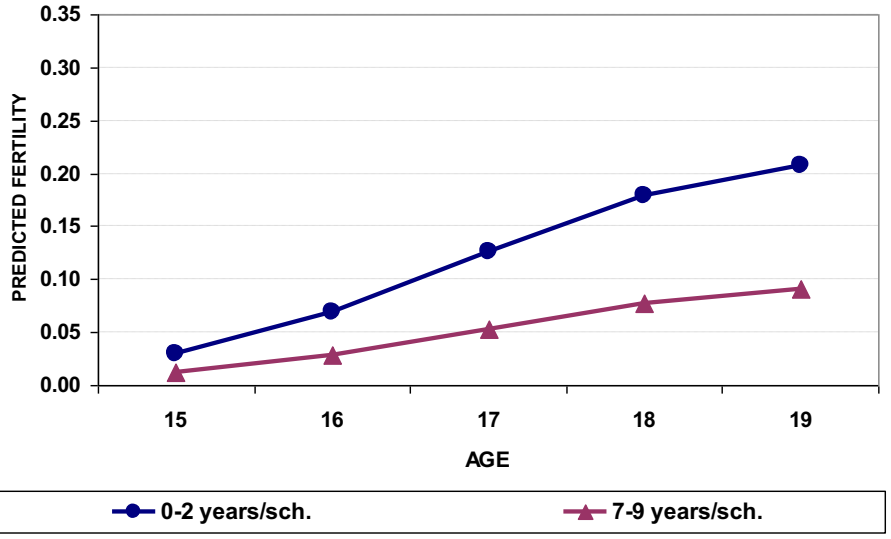

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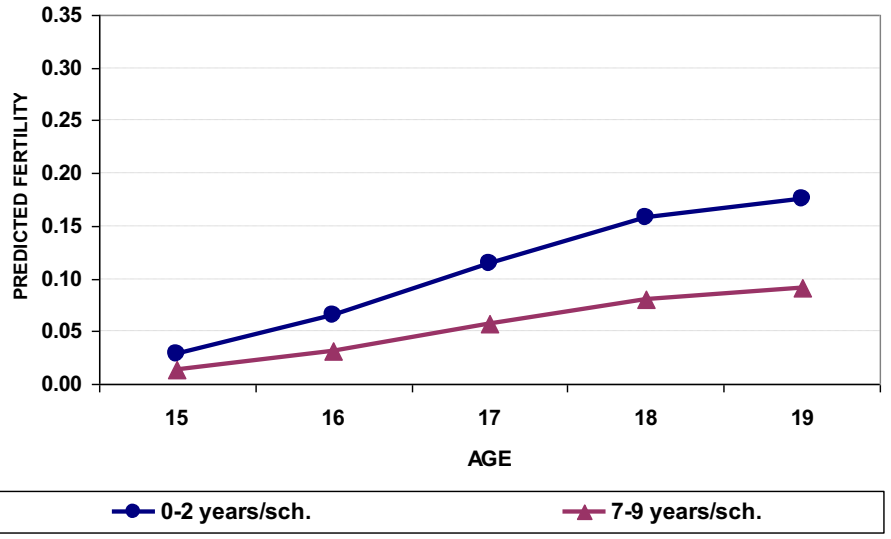

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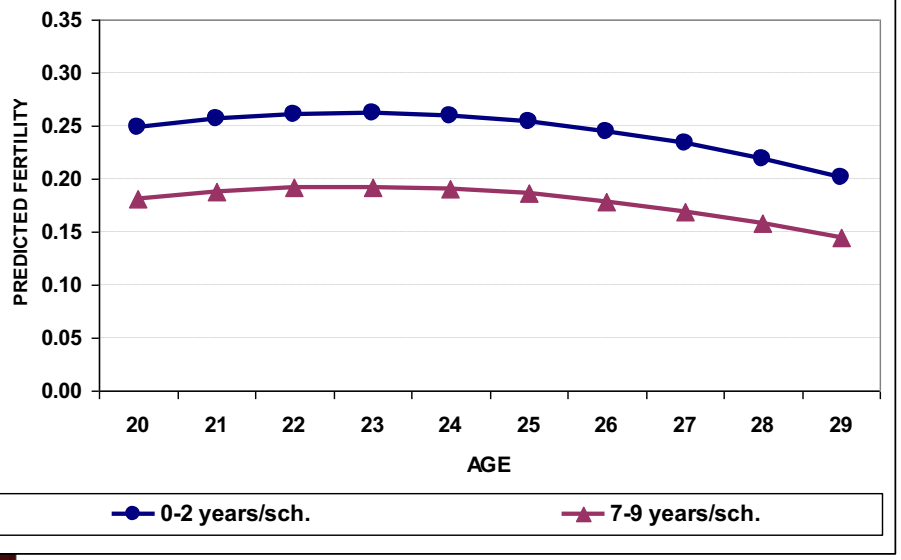

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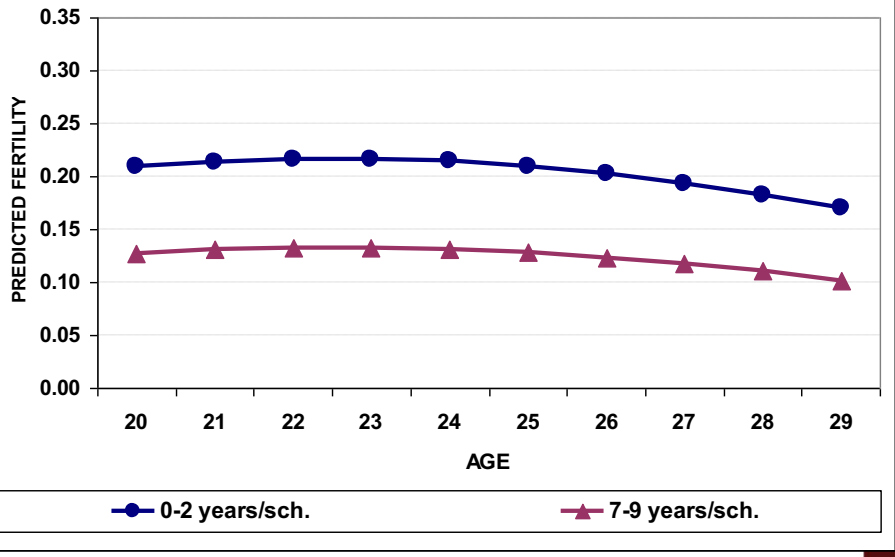

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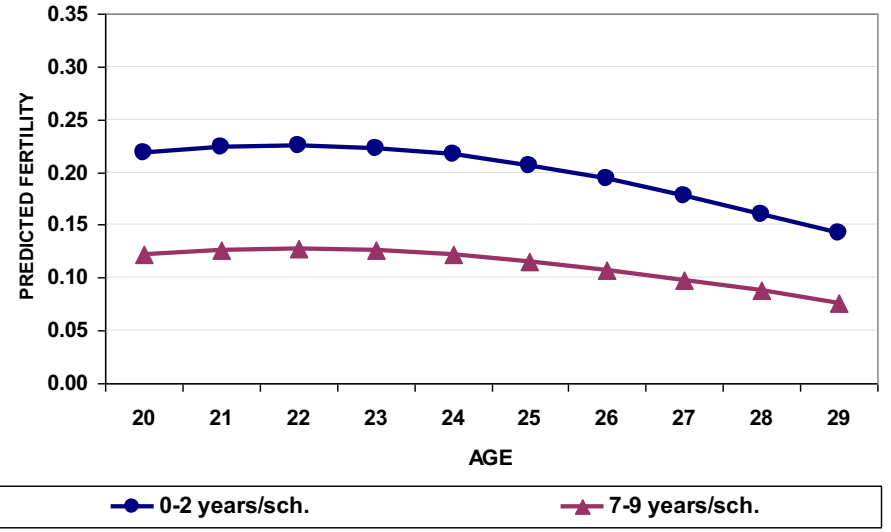

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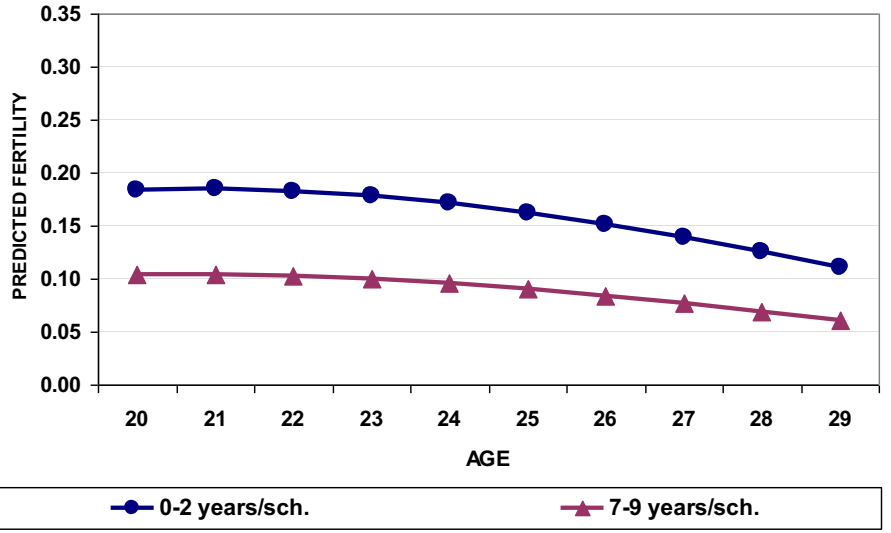

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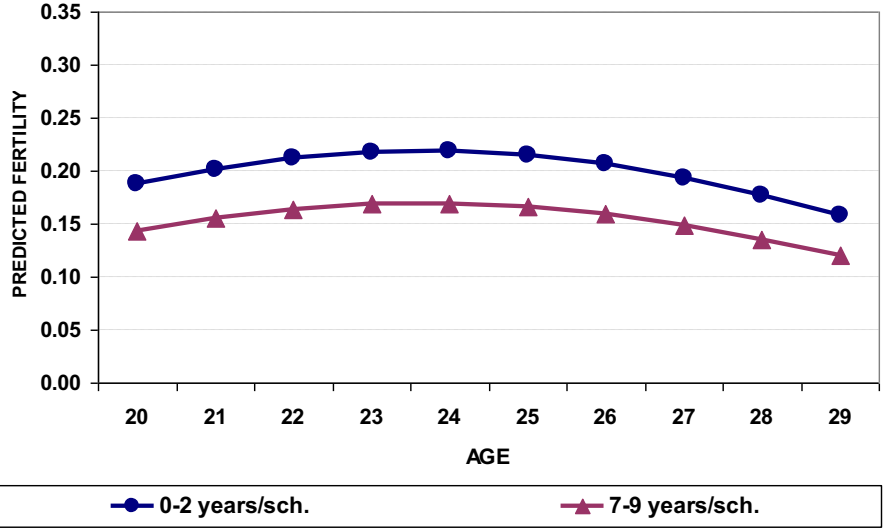

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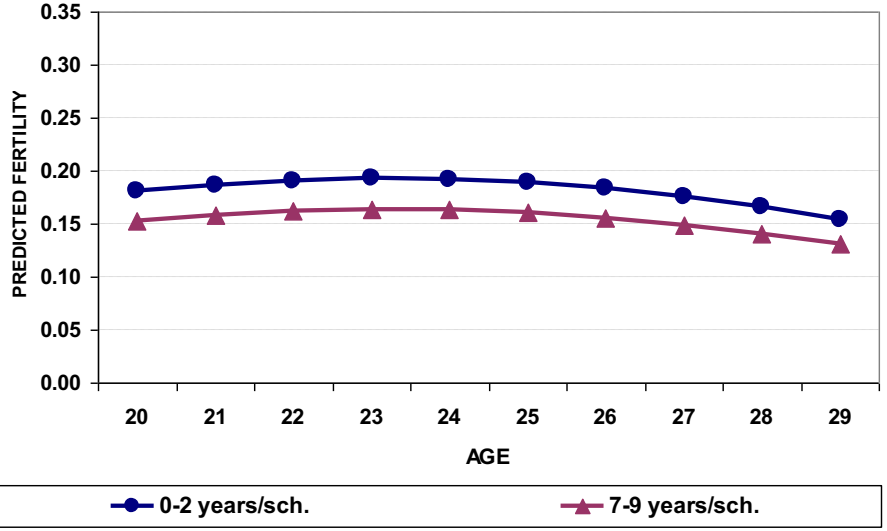

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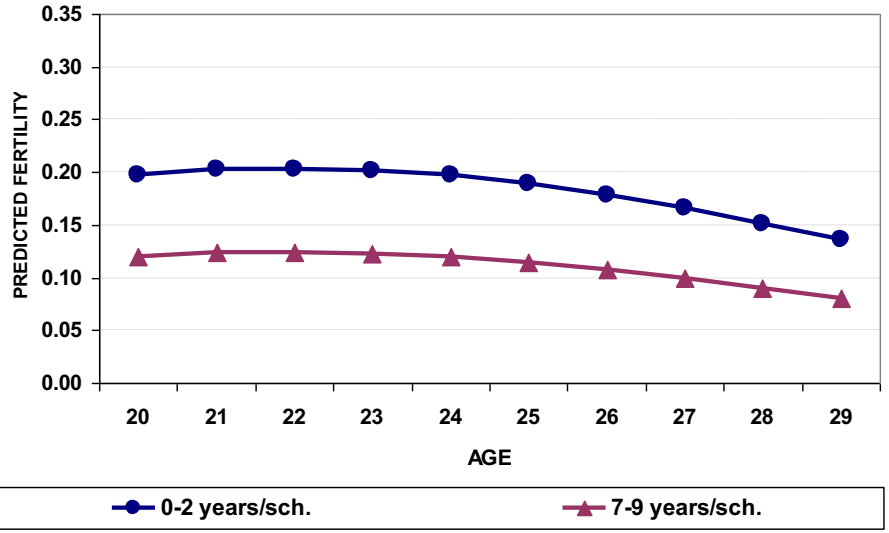

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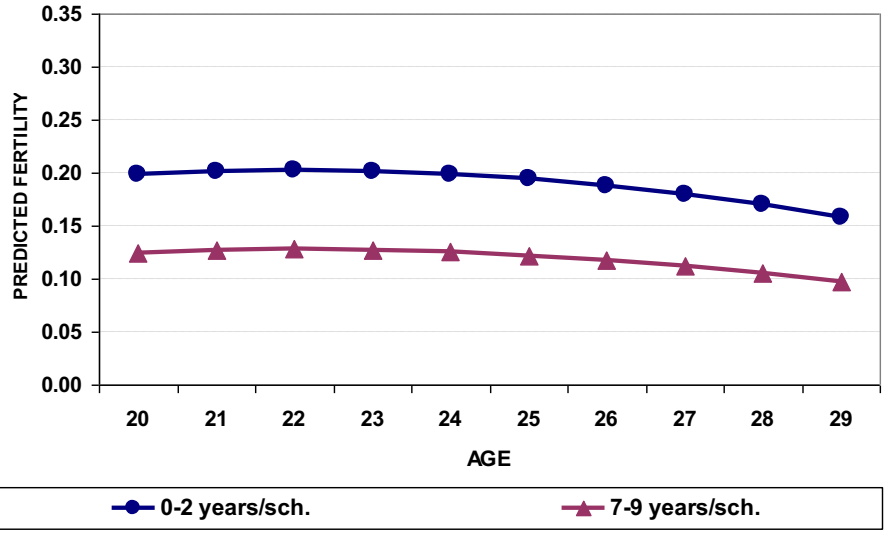
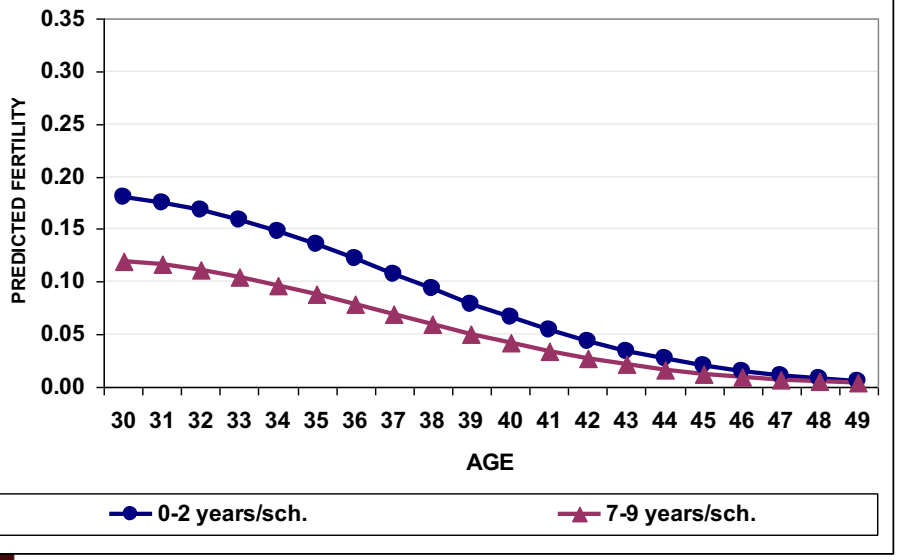
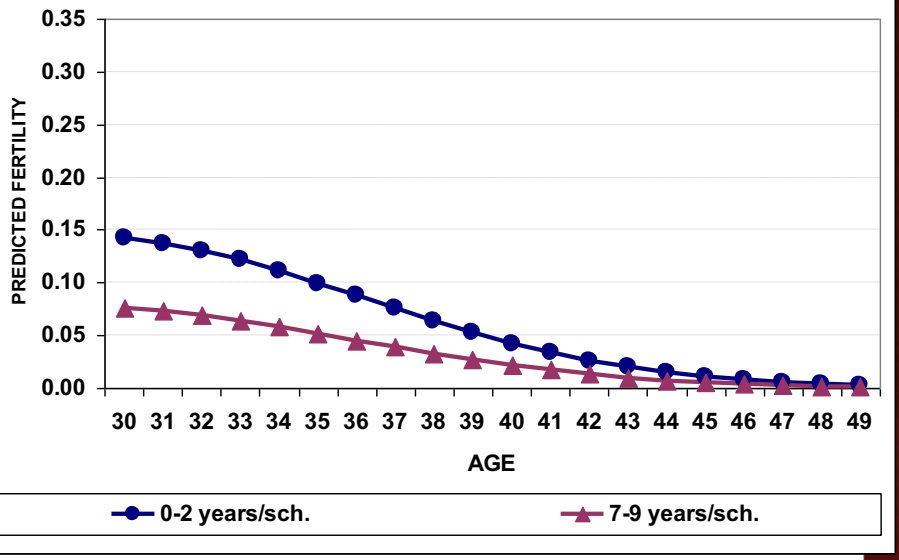


Guerrero, Mexico



Veracruz, Mexico



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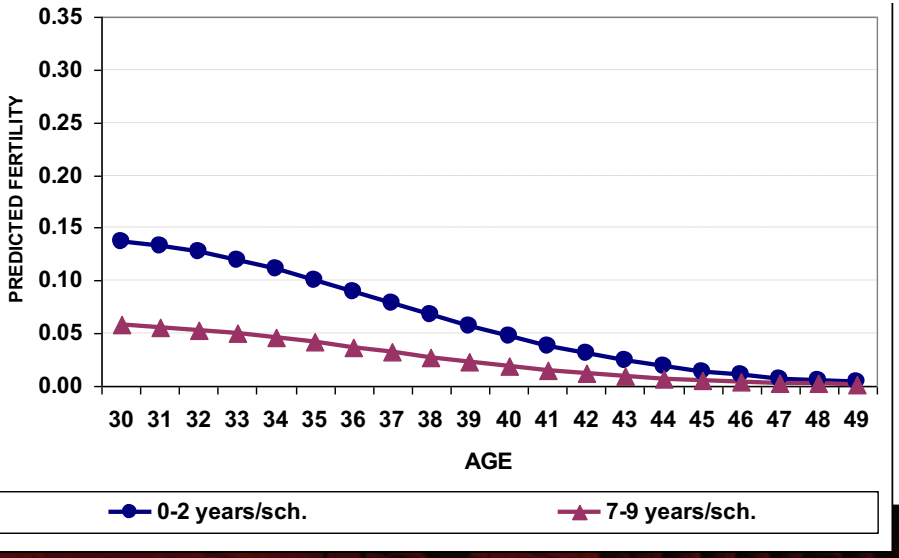

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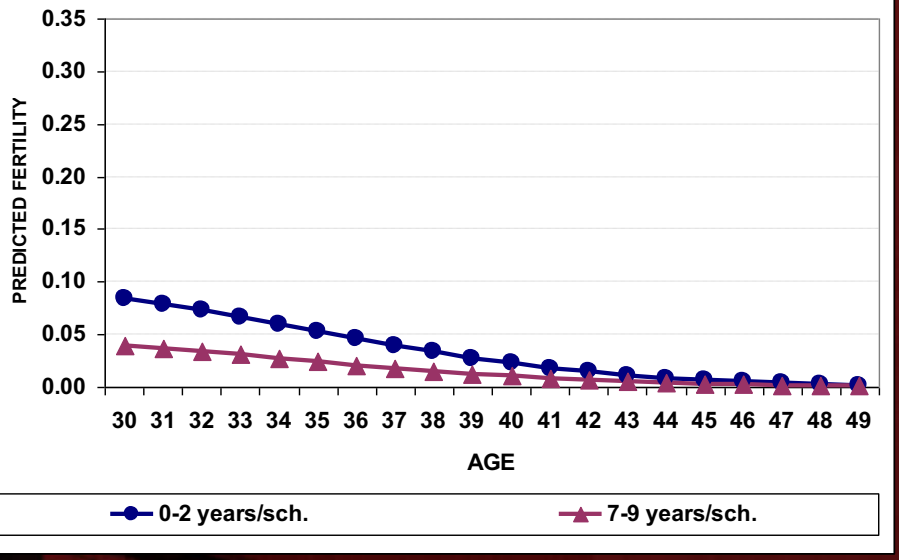
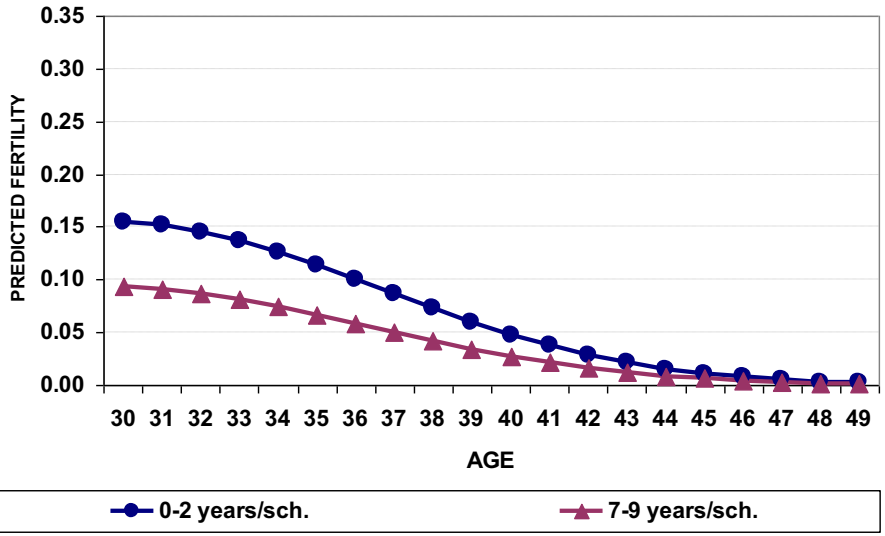


Morelos, Mexico



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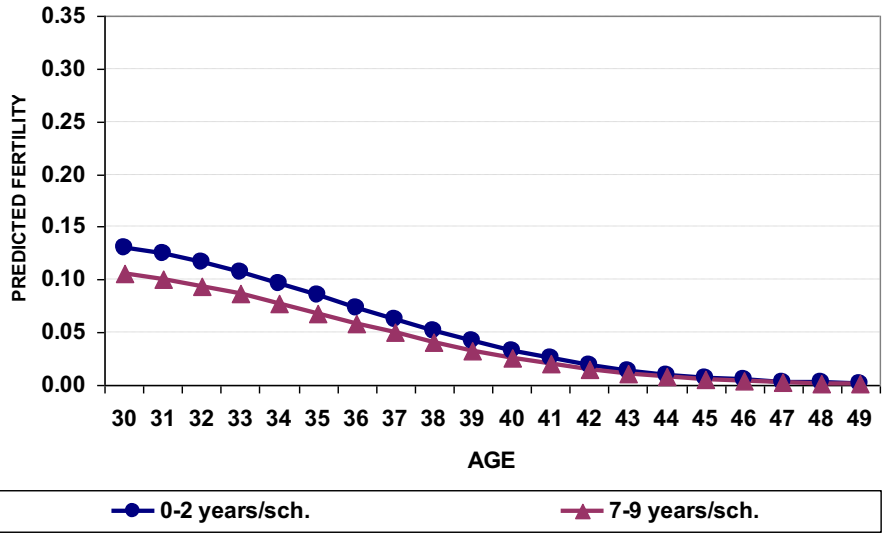
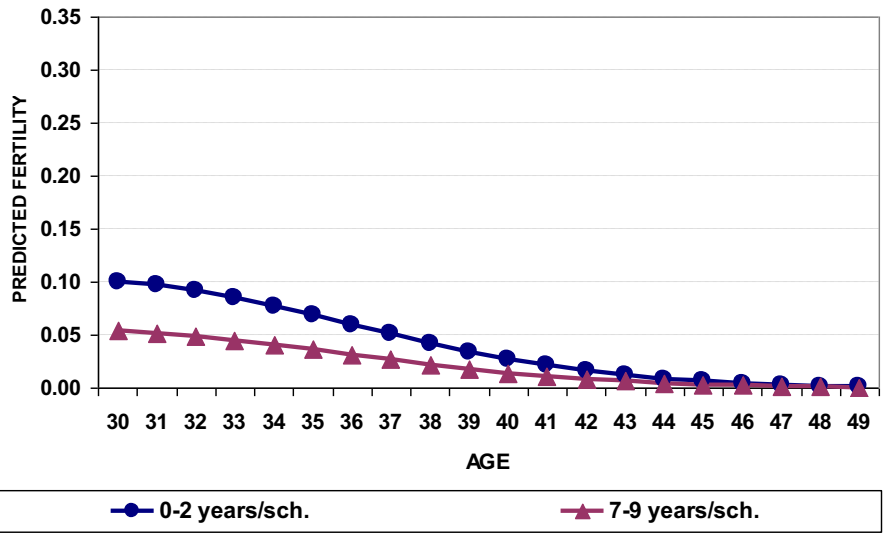
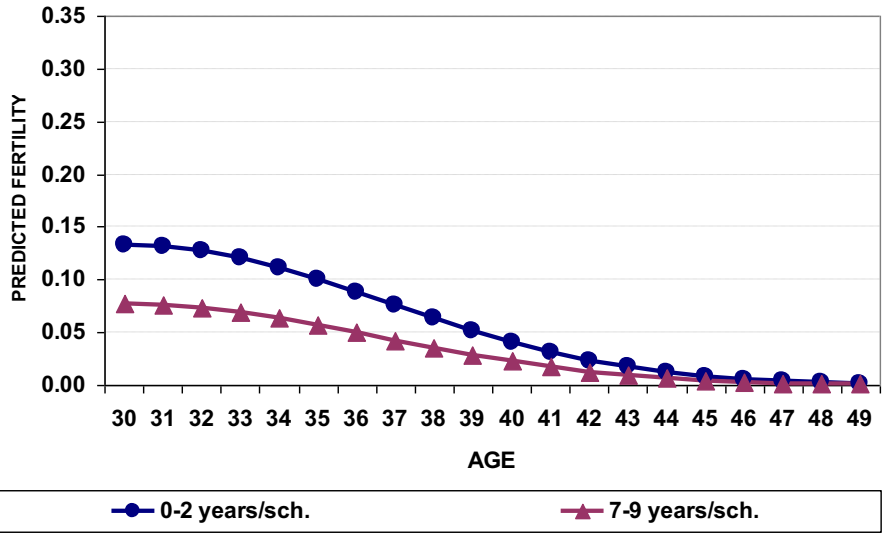


Espírito Santo, Brazil



Rio Grande do Sul, Brazil



Discussion

- Huge differentials in both countries, specially 15–19 age group

- Does policy reduces differentials?
  - This influence is clear in comparison among wealthier states (20–29 and 30–49 age groups)
  - Poorer states also have differentials, but this pattern is complicated by higher proportions of births taken at home in Mexico

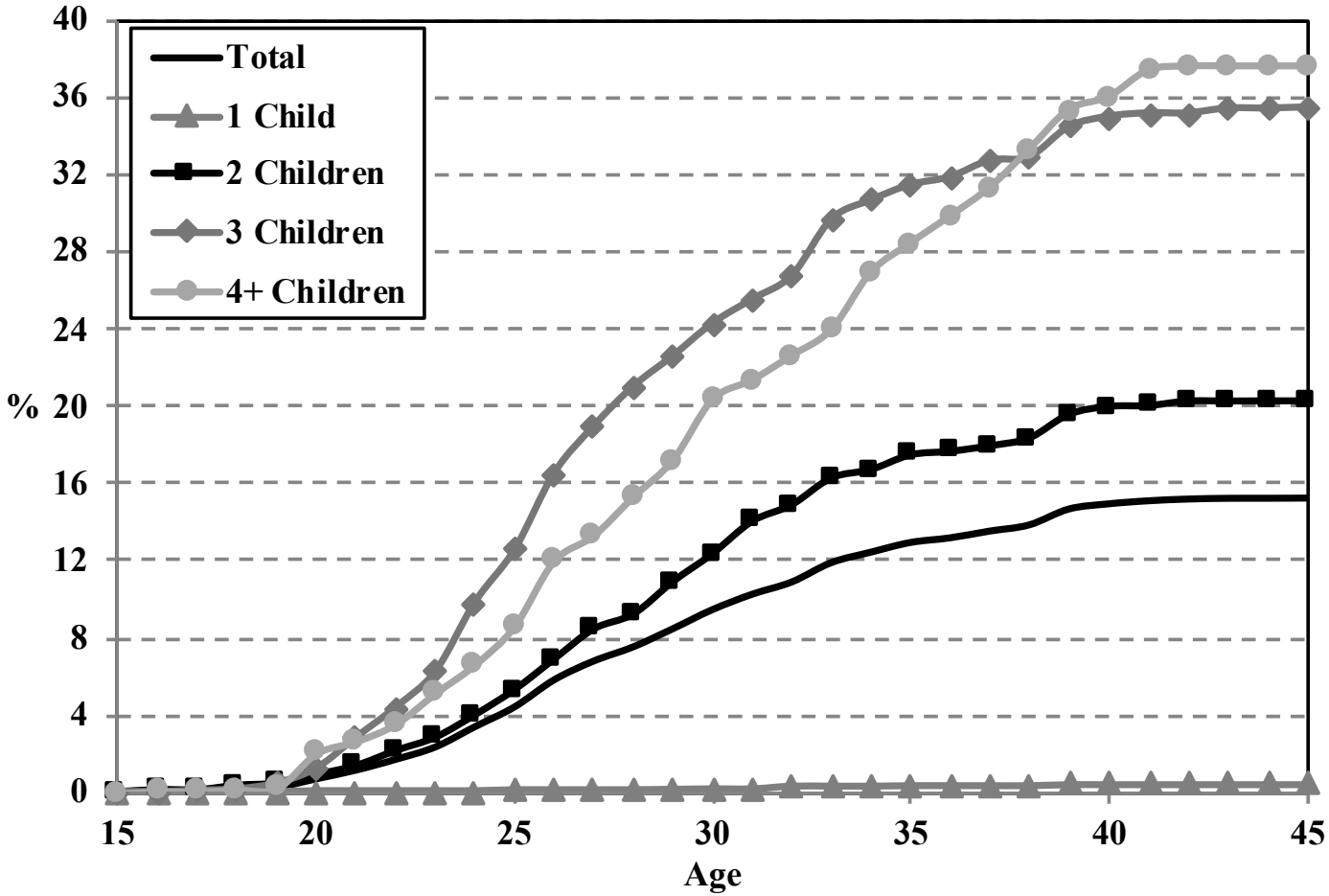
Source: Amaral, Potter 2009 (https://doi.org/10.31235/osf.io/gwk5t).

Female sterilization in Brazil

- We investigated factors associated with female sterilization in Brazil between 2001–2007
- The analysis is innovative because it adds time of exposure to the risk of sterilization after birth
- We seek to comprehend the effects of different birth intervals (postpartum duration) on the possibility of a woman getting sterilized
- **Main hypothesis:** taking into account a person's months of exposure to sterilization, the effects of color/race and years of schooling will lose significance

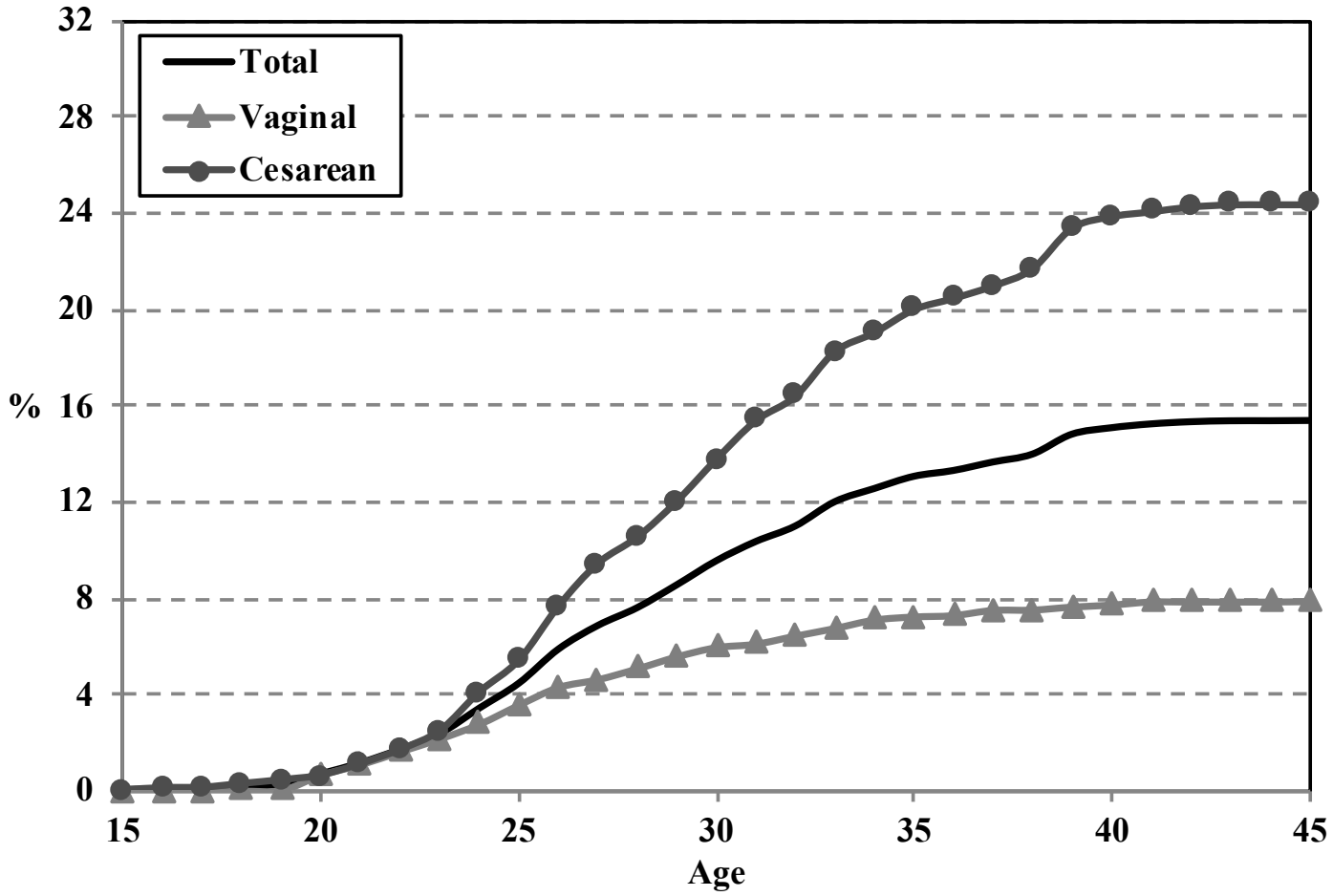
Source: Amaral, Potter 2019 (https://doi.org/10.31219/osf.io/bd4ra).

Cumulative percentage of sterilized women by age and parity



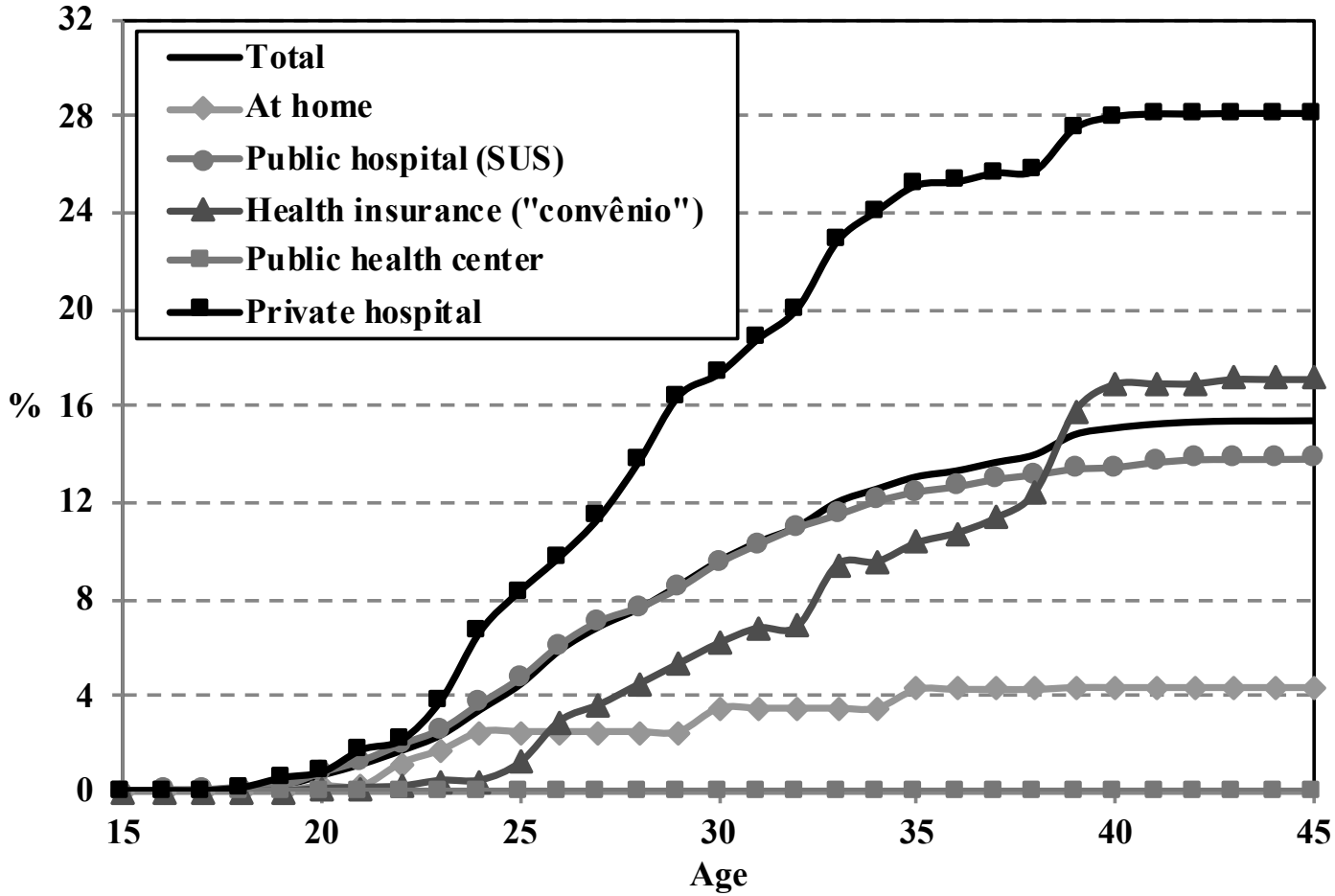
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and type of delivery



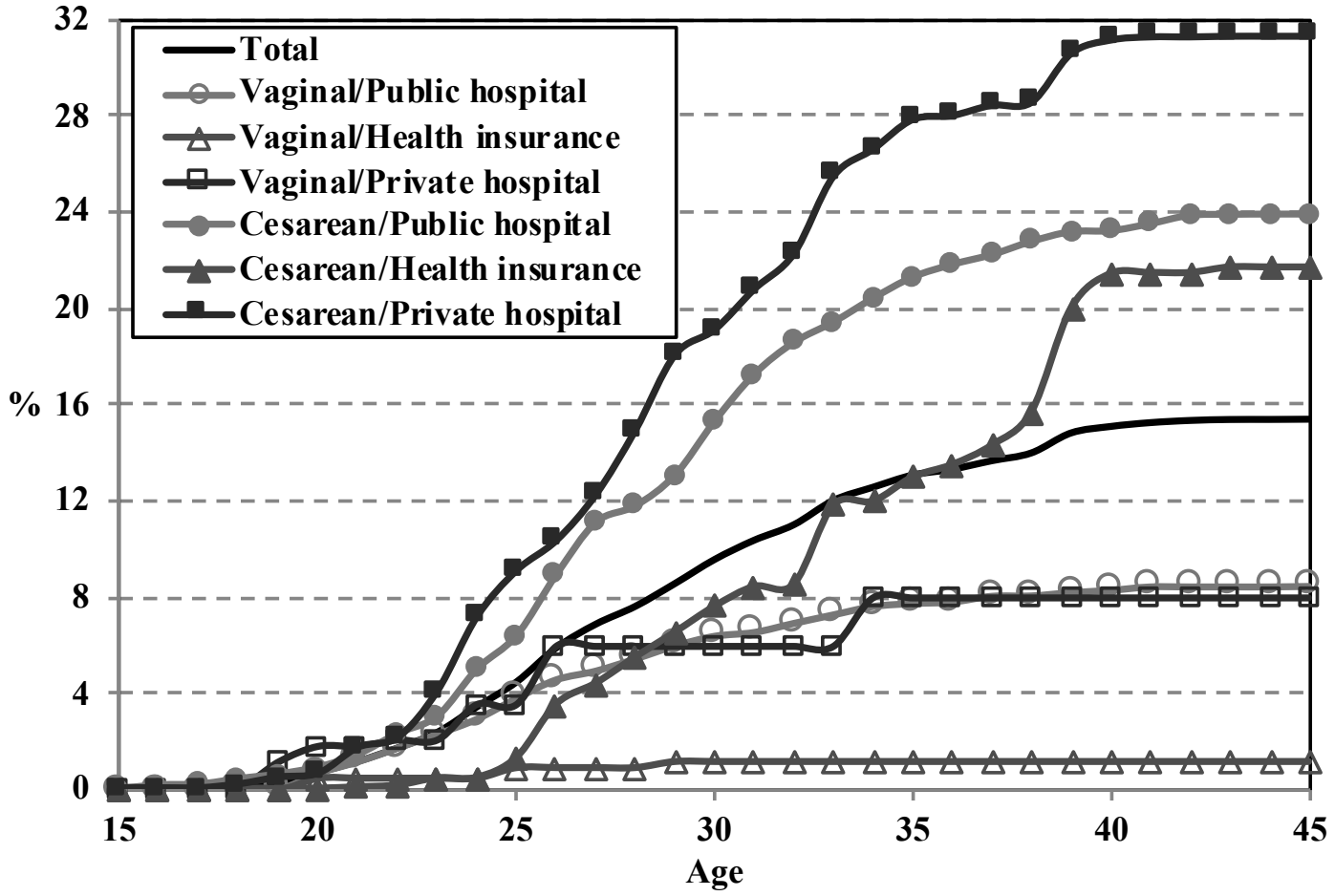
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and place of delivery



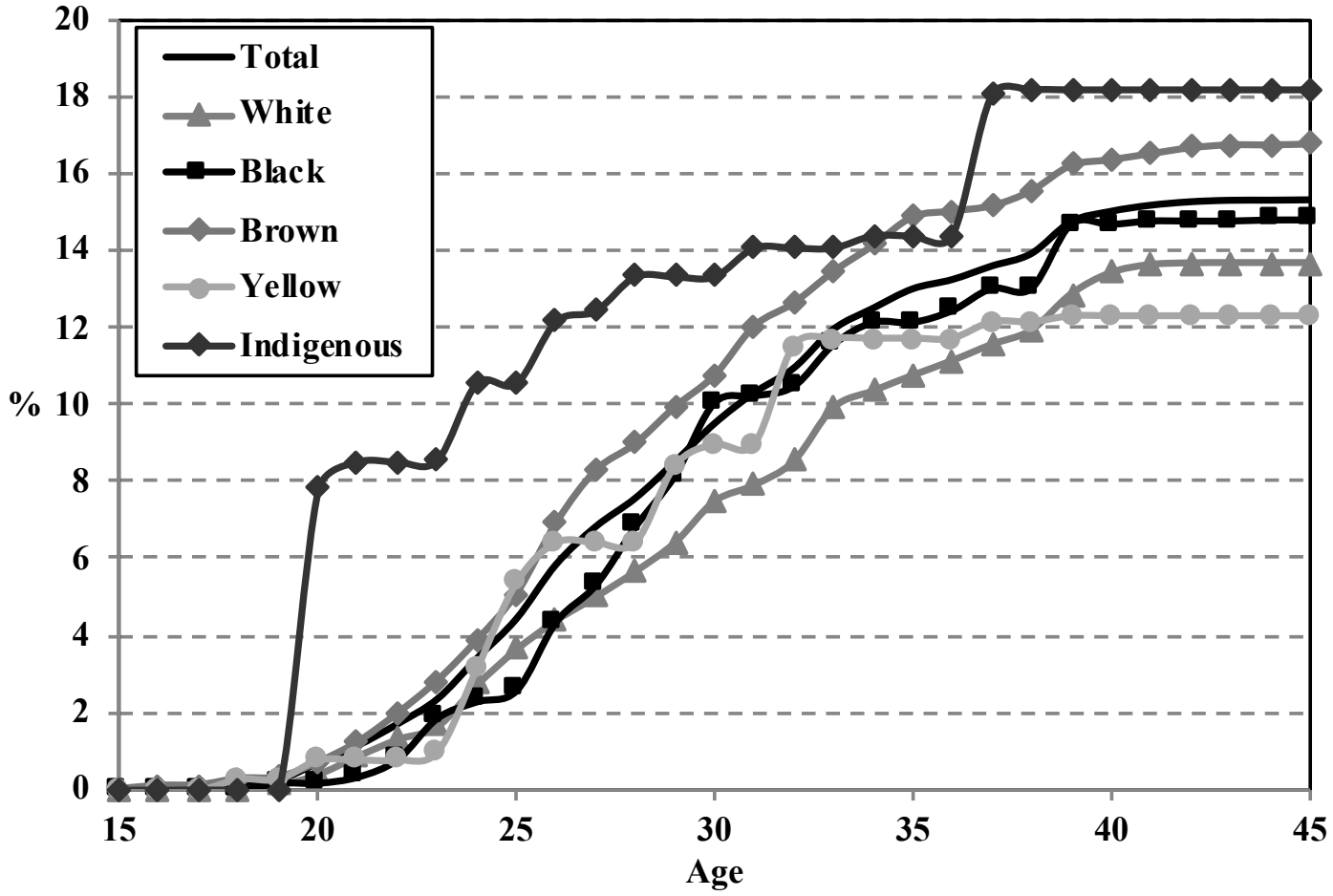
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age, type/place of delivery



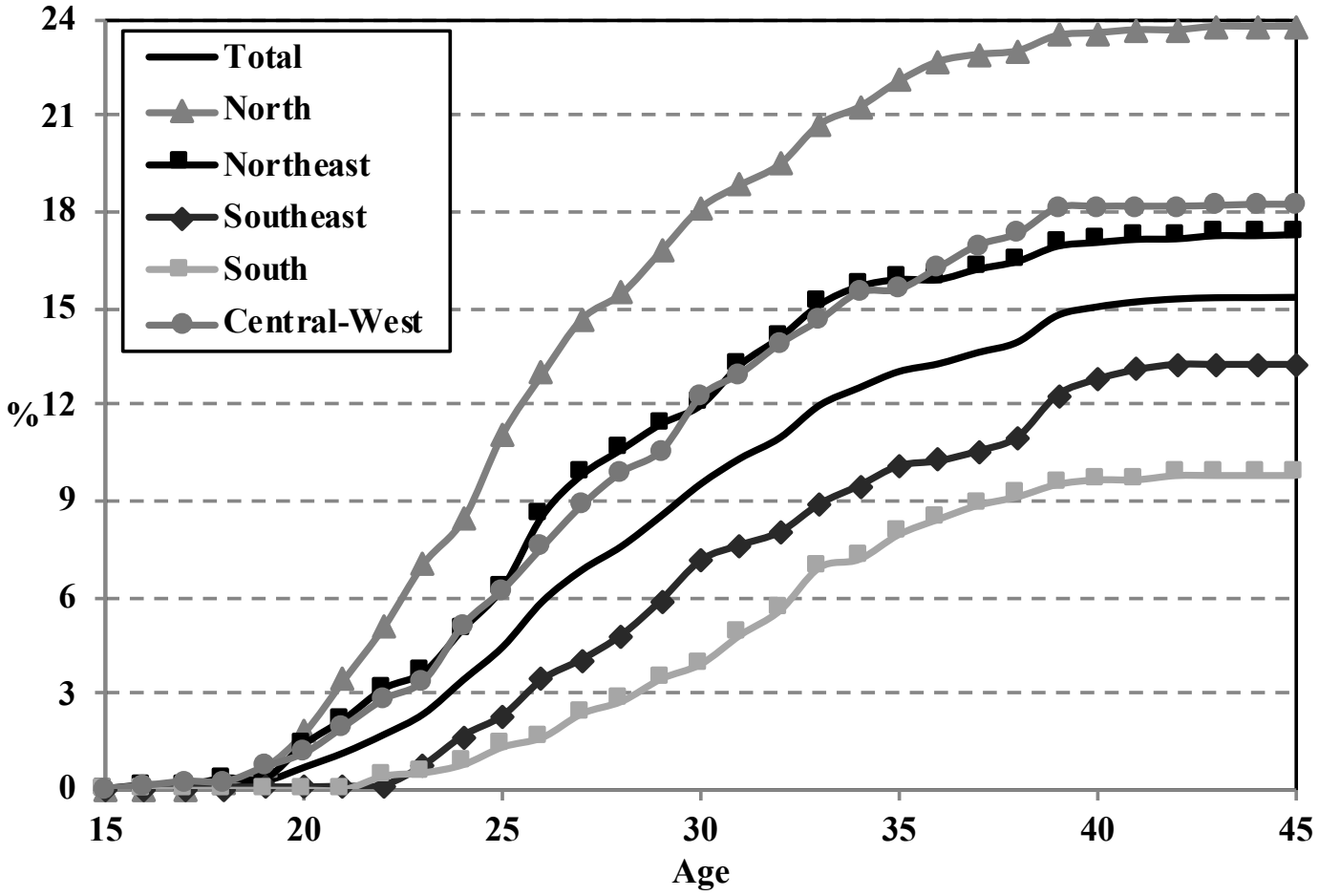
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and color/race



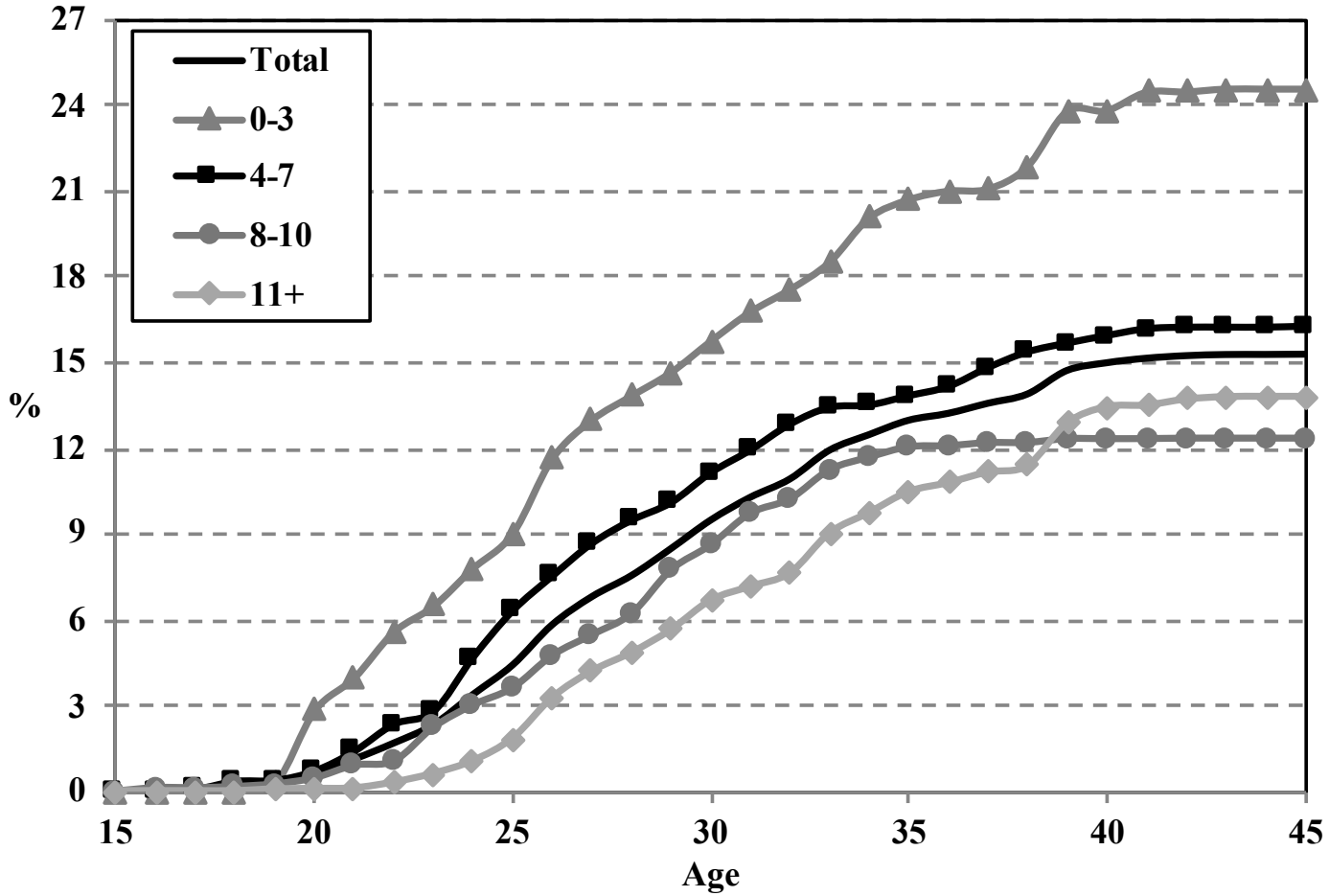
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and region



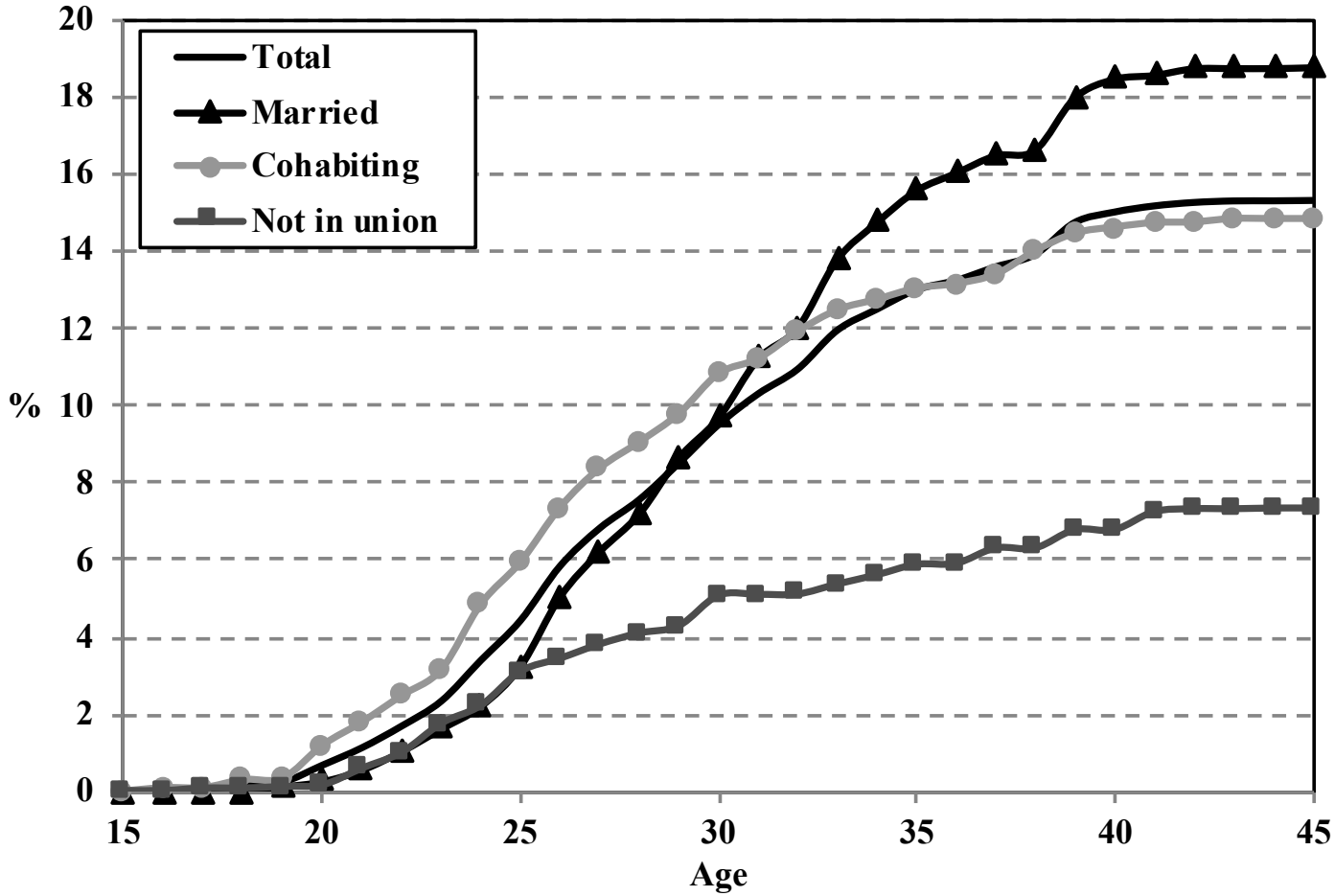
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and years of schooling



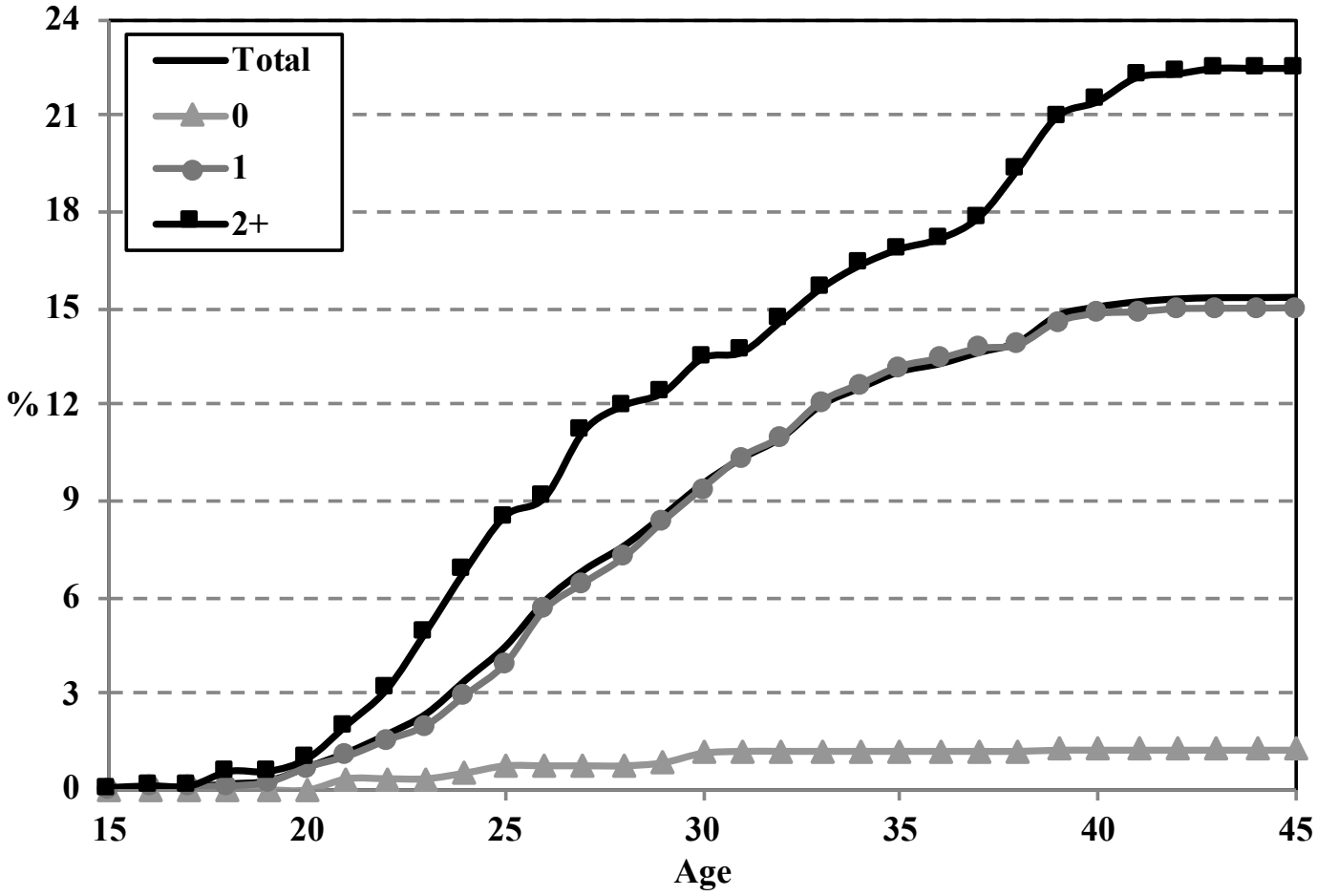
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and marital status



Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Cumulative percentage of sterilized women by age and number of unions



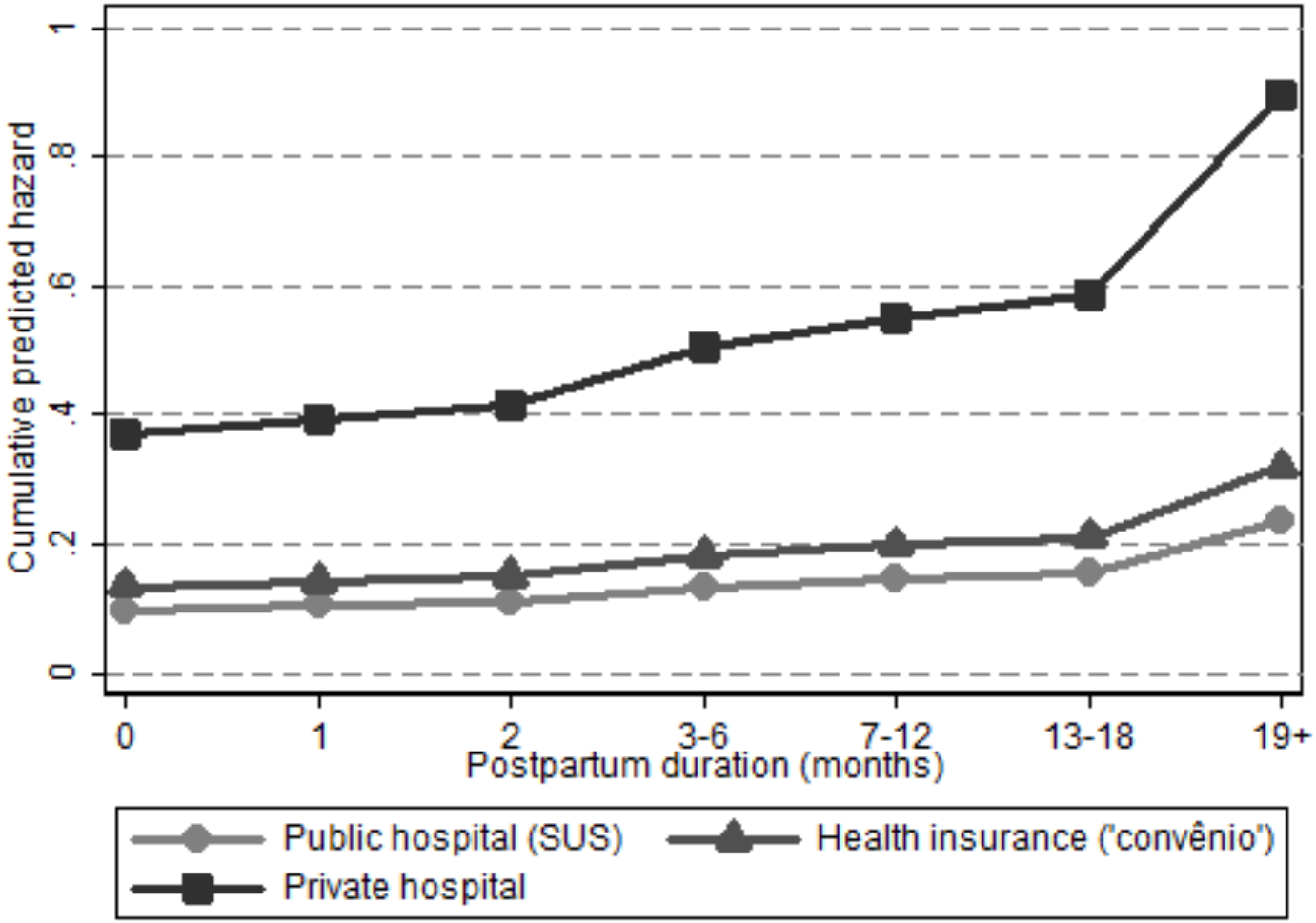
Source: Amaral 2015 (https://doi.org/10.31219/osf.io/qt3w2).

Regression results

- Multivariate models indicate that sterilization is greater
  - Following childbirth
  - Among older women
  - For those with two children at time of delivery
  - In areas of elevated fertility rates (North and Northeast)
- Women who gave birth at **private hospitals** experience the greatest chances of getting sterilized following a birth
- **Color/race** and **years of schooling** are not good predictors of the risk of female sterilization

Source: Amaral, Potter 2019 (https://doi.org/10.31219/osf.io/bd4ra).

Cumulative predicted probabilities of female sterilization

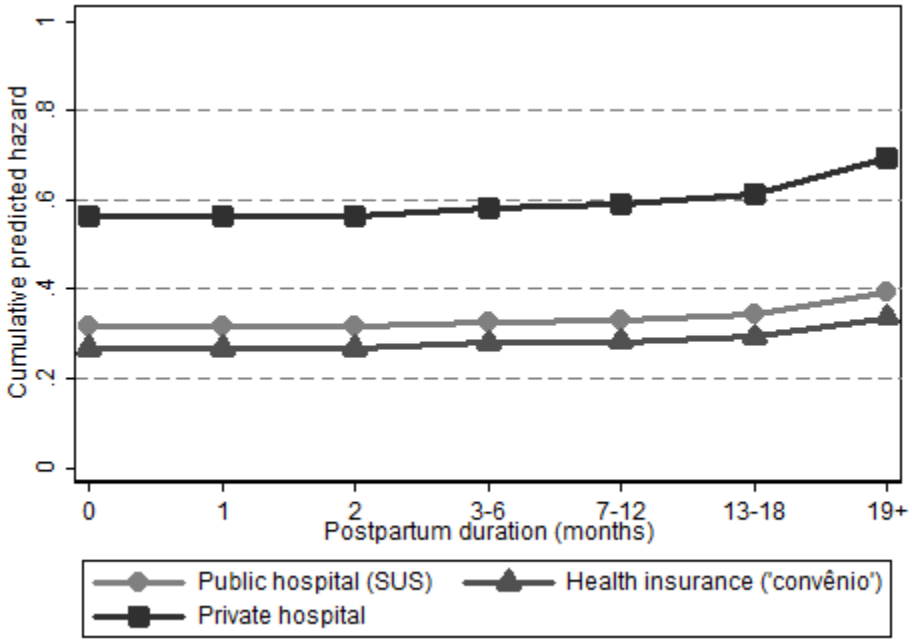


Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.

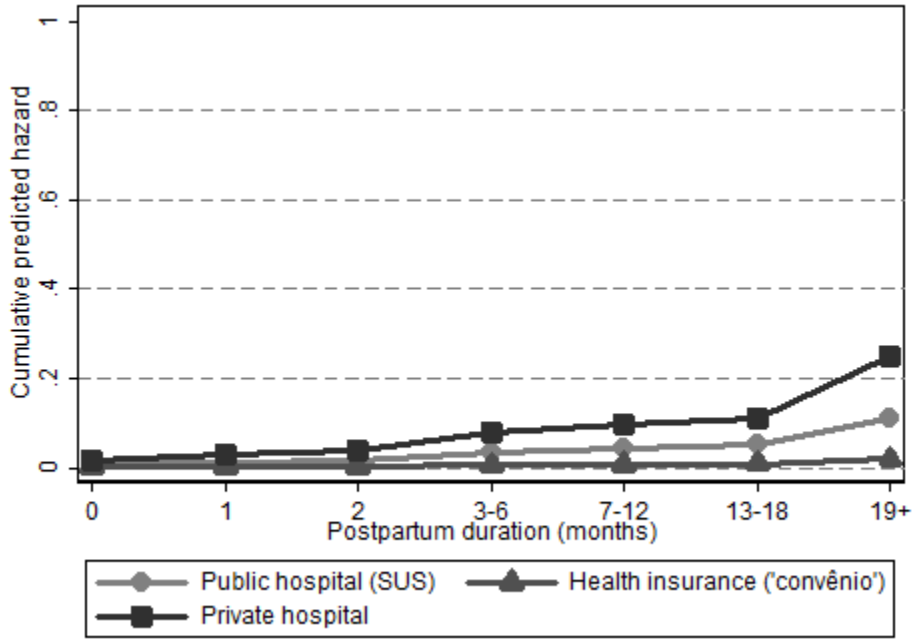
Source: Amaral, Potter 2019 (https://doi.org/10.31219/osf.io/bd4ra).

Cumulative predicted probabilities of female sterilization by type

Cesarean section



Vaginal delivery



Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.

Source: Amaral, Potter 2019 (https://doi.org/10.31219/osf.io/bd4ra).

Final considerations

- There is an indication that women may not have been able to get sterilized at public hospitals, due to regulations
- This evidence of **frustrated demand** for sterilization may be forcing women to search for this irreversible contraceptive method at private institutions
- Women may be utilizing the private sector in order to get sterilized, following an **unnecessary cesarean delivery**
- The high prevalence of sterilization in private institutions should be a concern for the government
- Public policies need to take into account the health service demands of women

Source: Amaral, Potter 2019 (https://doi.org/10.31219/osf.io/bd4ra).

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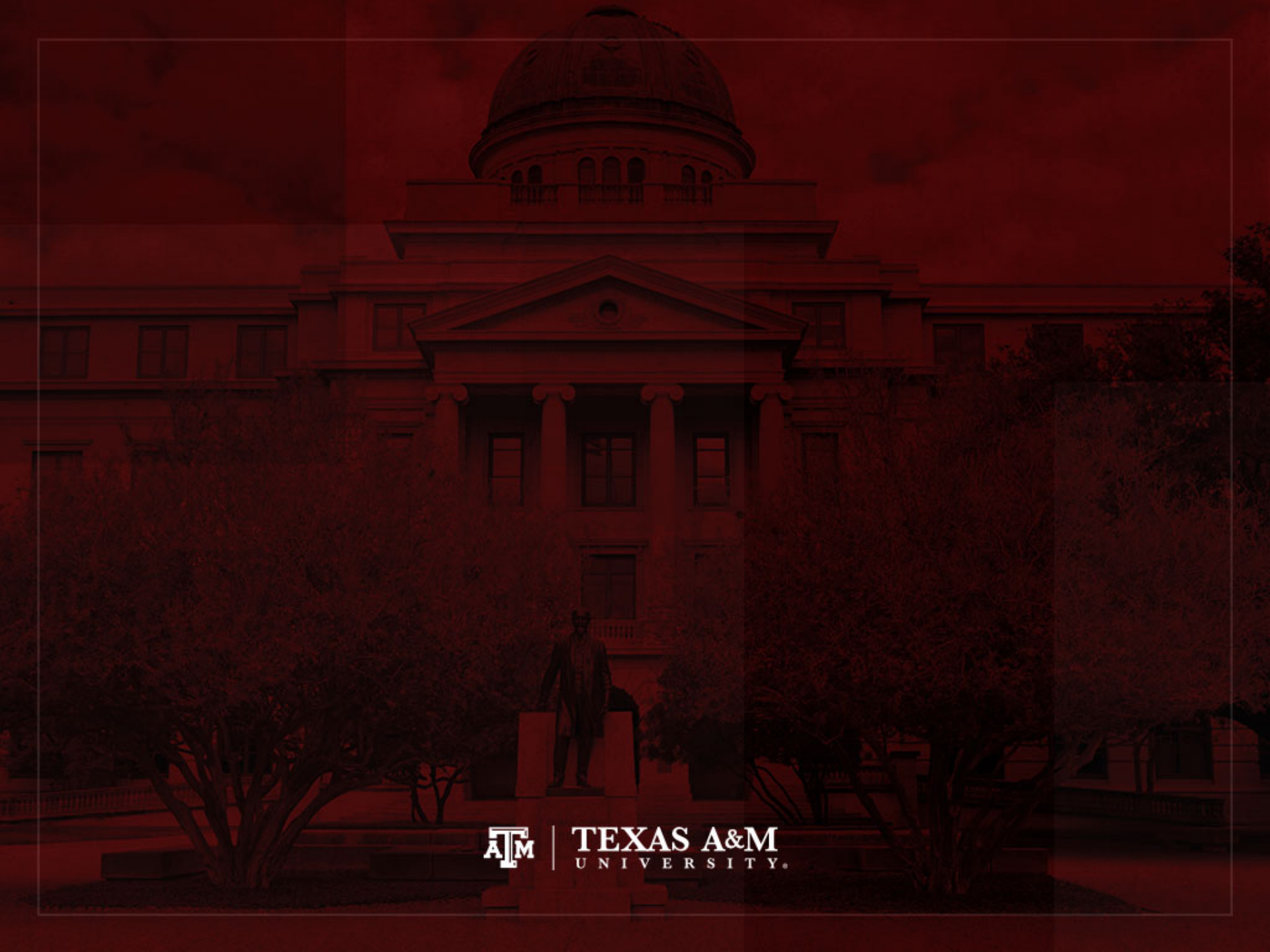
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