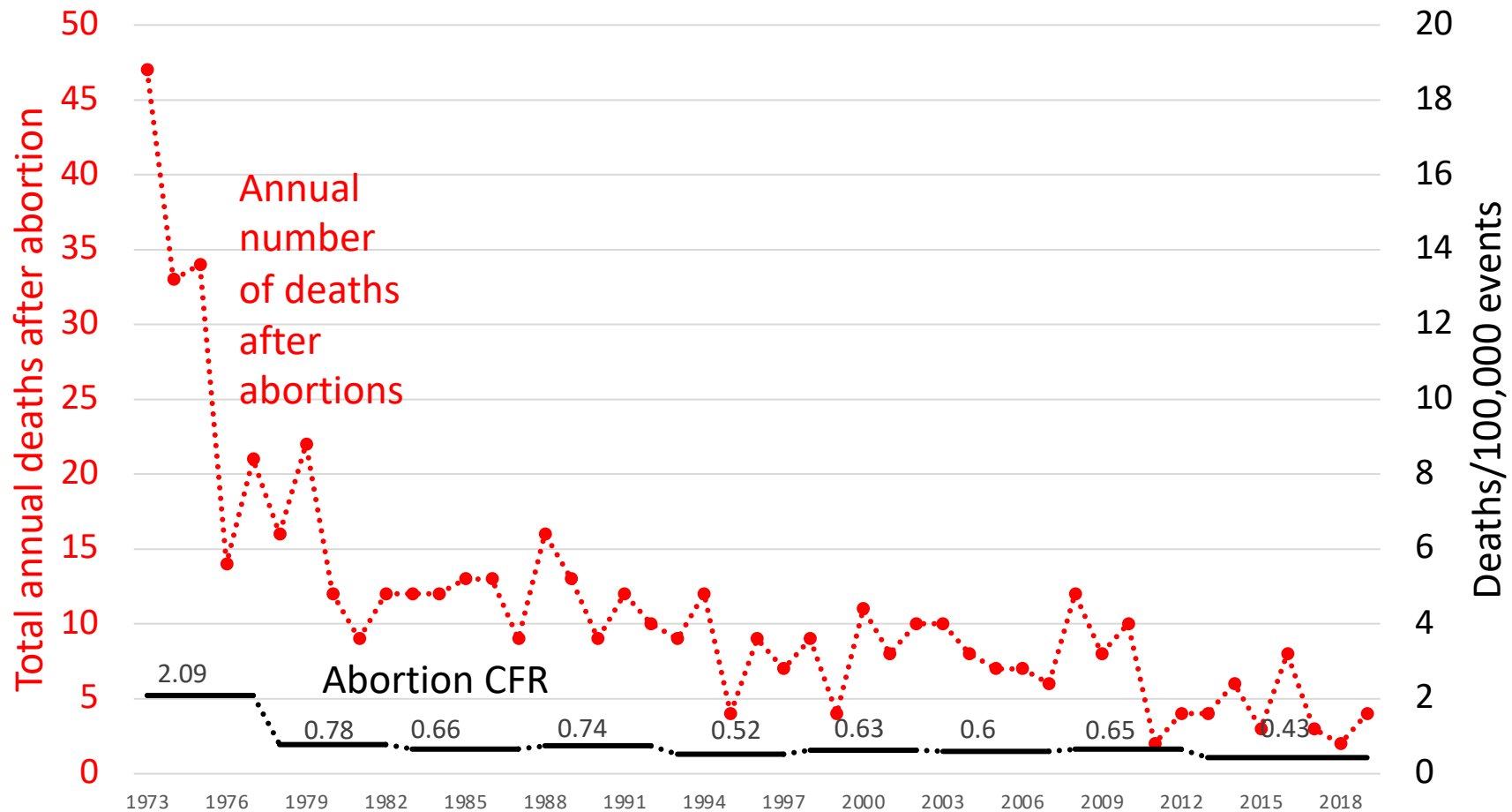


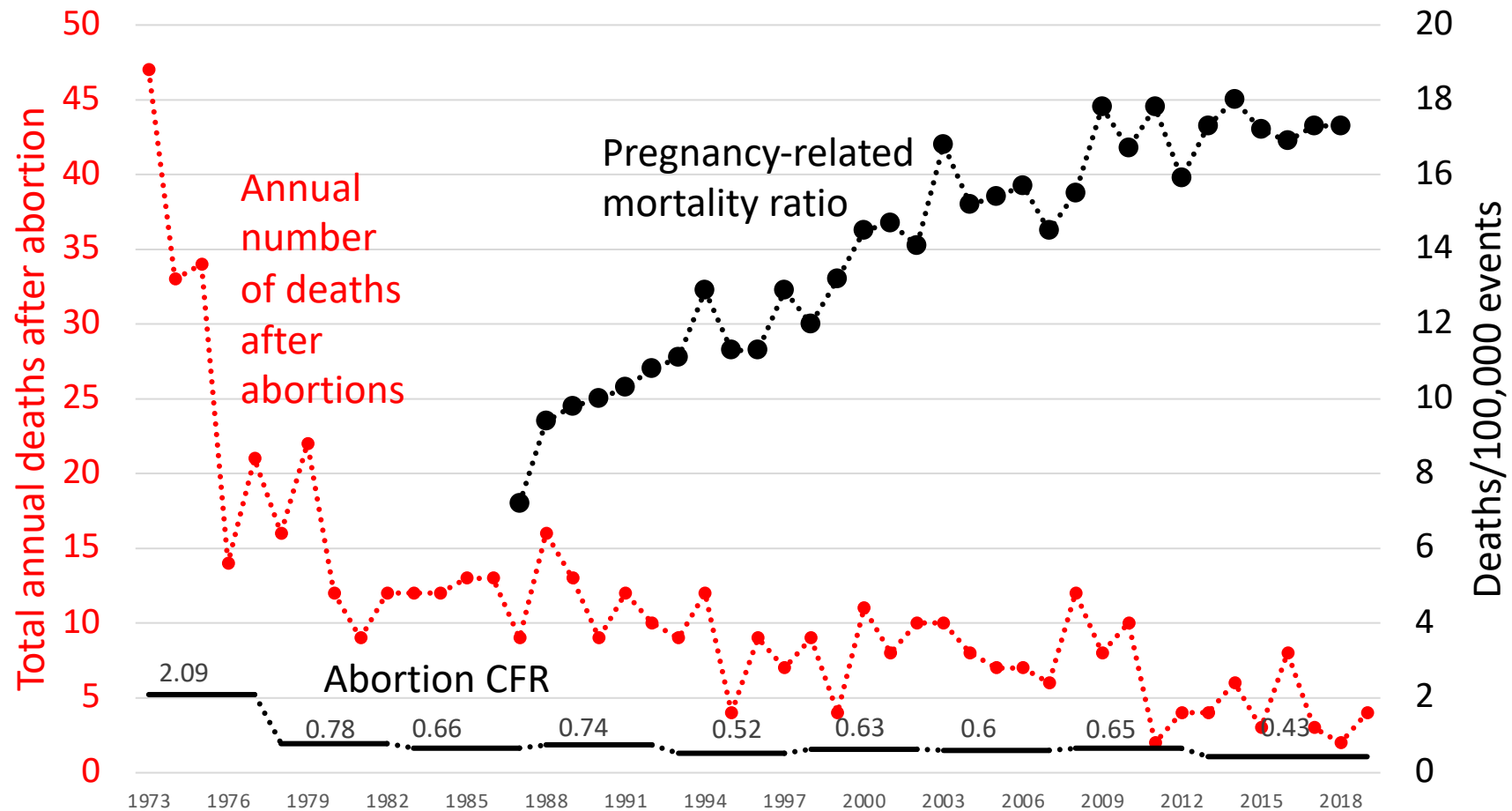
Relative risk of death due to abortion compared with remaining pregnant: a multiple decrement life table approach

Amanda Jean Stevenson

Abortion is very safe and has been getting safer since mid-century decriminalization

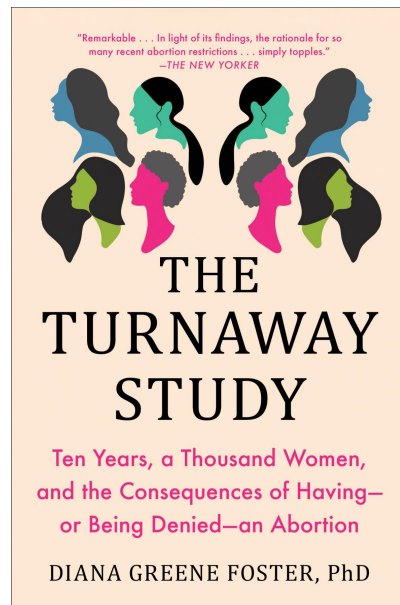


Pregnancy in general, however appears to be getting more deadly



Counterfactual risk and abortion

- Once someone is pregnant, any risks for a pregnancy resolution should be compared with the counterfactual risk of the alternative pregnancy resolution/s





The Comparative Safety of Legal Induced Abortion and Childbirth in the United States

Elizabeth G. Raymond, MD, MPH, and David A. Grimes, MD

OBJECTIVE: To assess the safety of abortion compared with childbirth.

CONCLUSION: Legal induced abortion is markedly safer than childbirth. The risk of death associated with childbirth is approximately 14 times higher than that with abortion. Similarly, the overall morbidity associated with childbirth exceeds that with abortion.

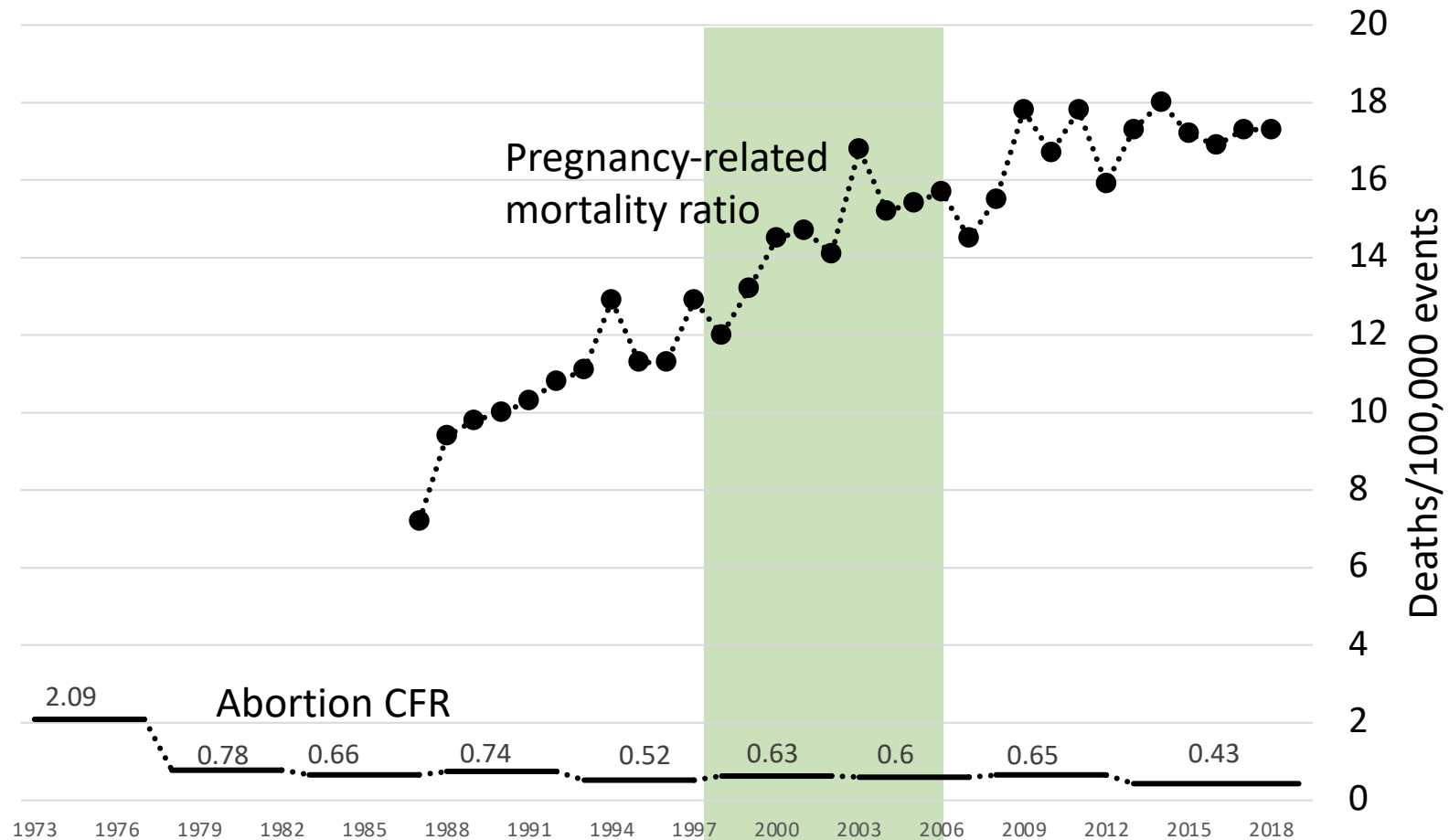
DEMOGRAPHY

The Pregnancy-Related Mortality Impact of a Total Abortion Ban in the United States: A Research Note on Increased Deaths Due to Remaining Pregnant

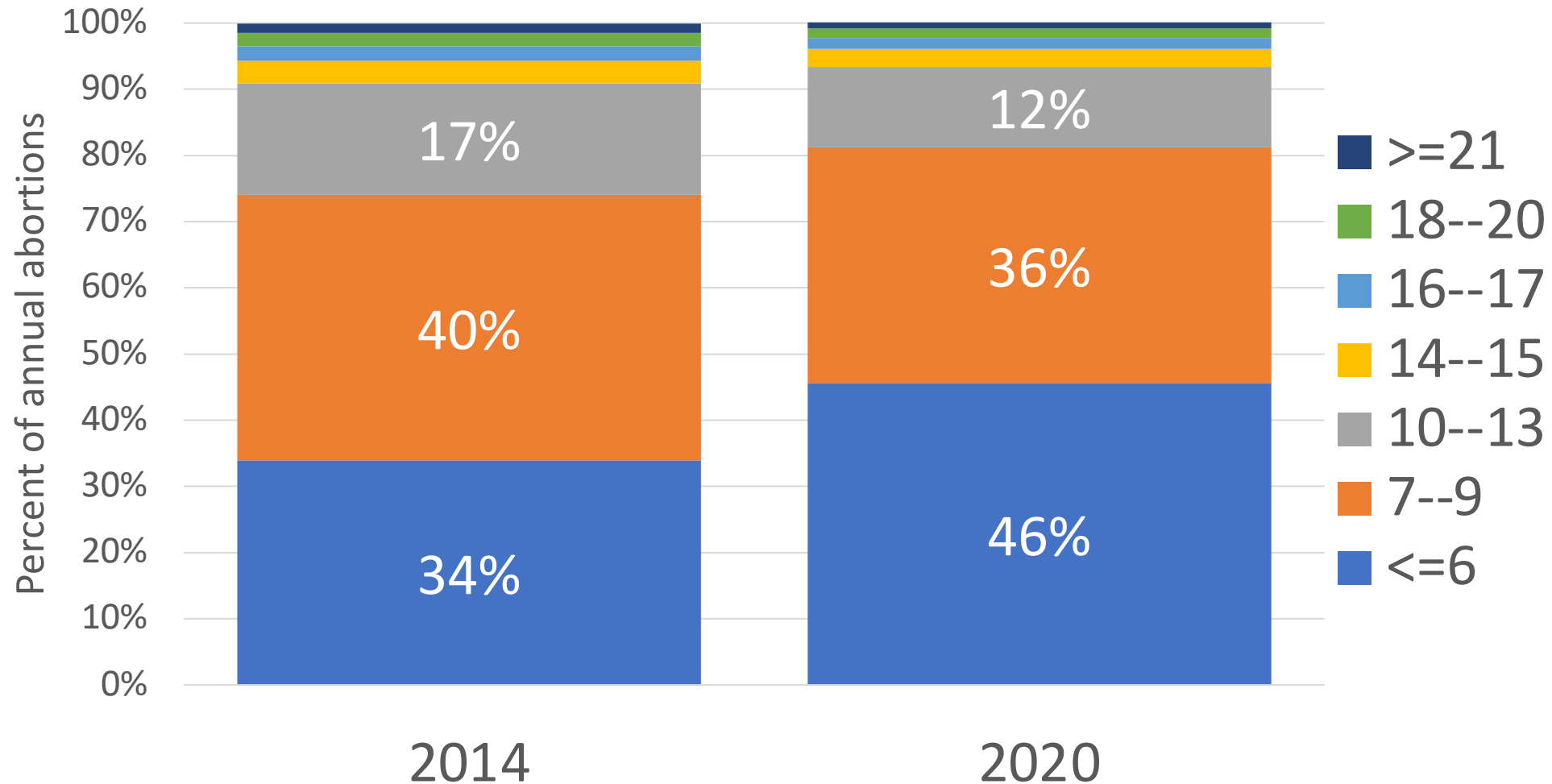
Amanda Jean Stevenson

ABSTRACT In this research note, I estimate one component of the mortality impact of denying all wanted induced abortions in the United States. This estimate quantifies the magnitude of an increase in pregnancy-related deaths that would occur solely because of the greater mortality risk of continuing a pregnancy rather than having a legal induced abortion. Using published statistics on pregnancy-related mortality

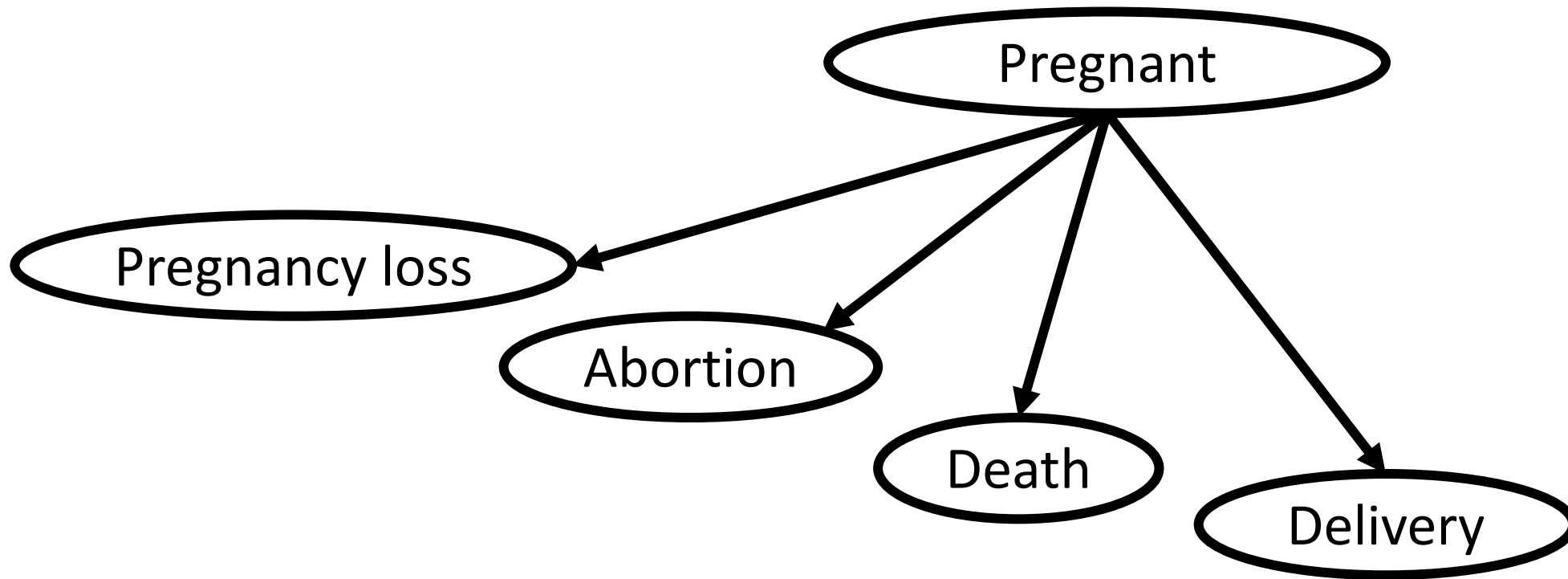
Abortion is more than 14 times safer than staying pregnant



Abortion is increasingly provided at early gestational durations



Pregnancy is a multiple-decrement process

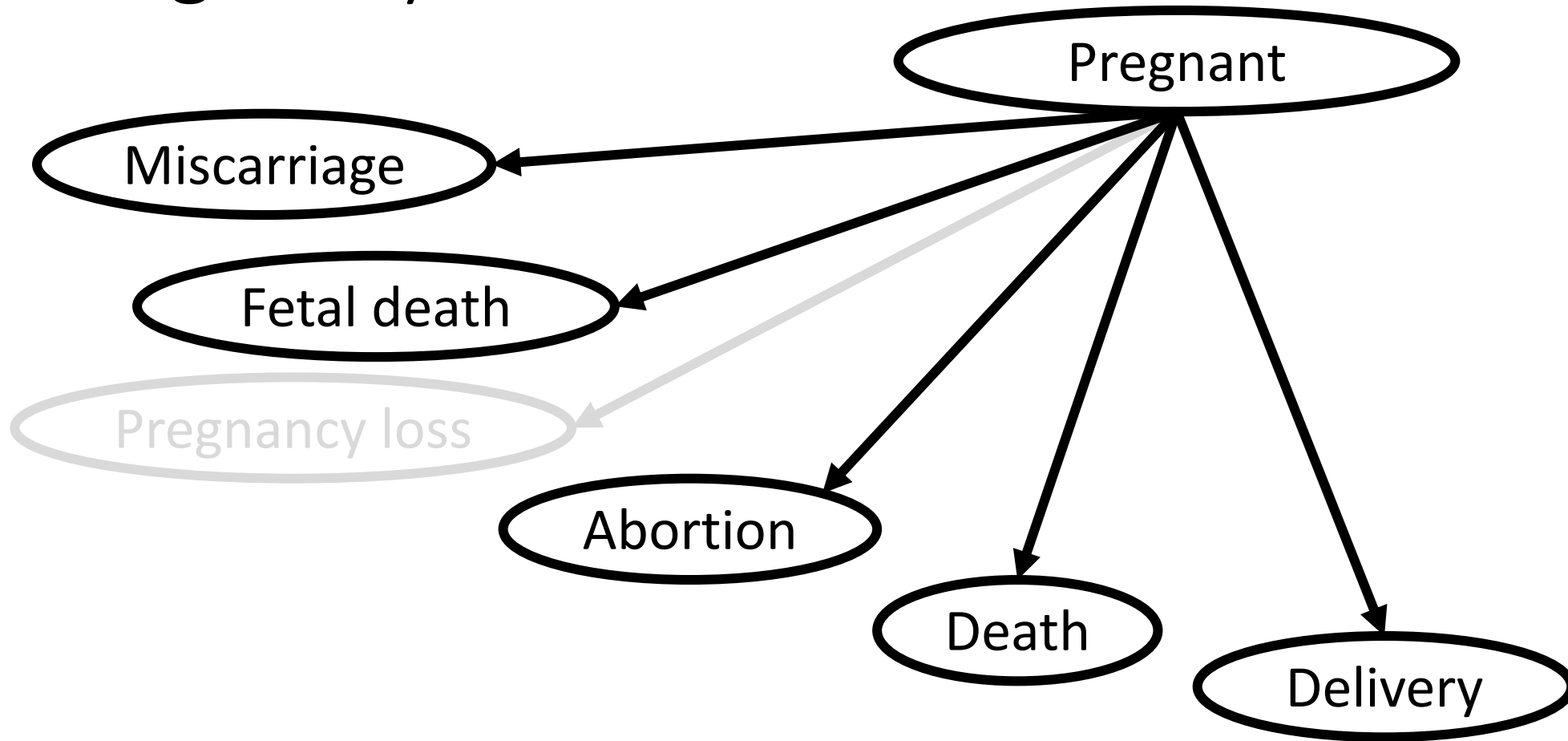


$$RR = \frac{\text{Deaths} \mid \text{Stay pregnant}}{\text{Stay pregnant}} \bigg/ \frac{\text{Deaths} \mid \text{Abortion}}{\text{Abortion}}$$

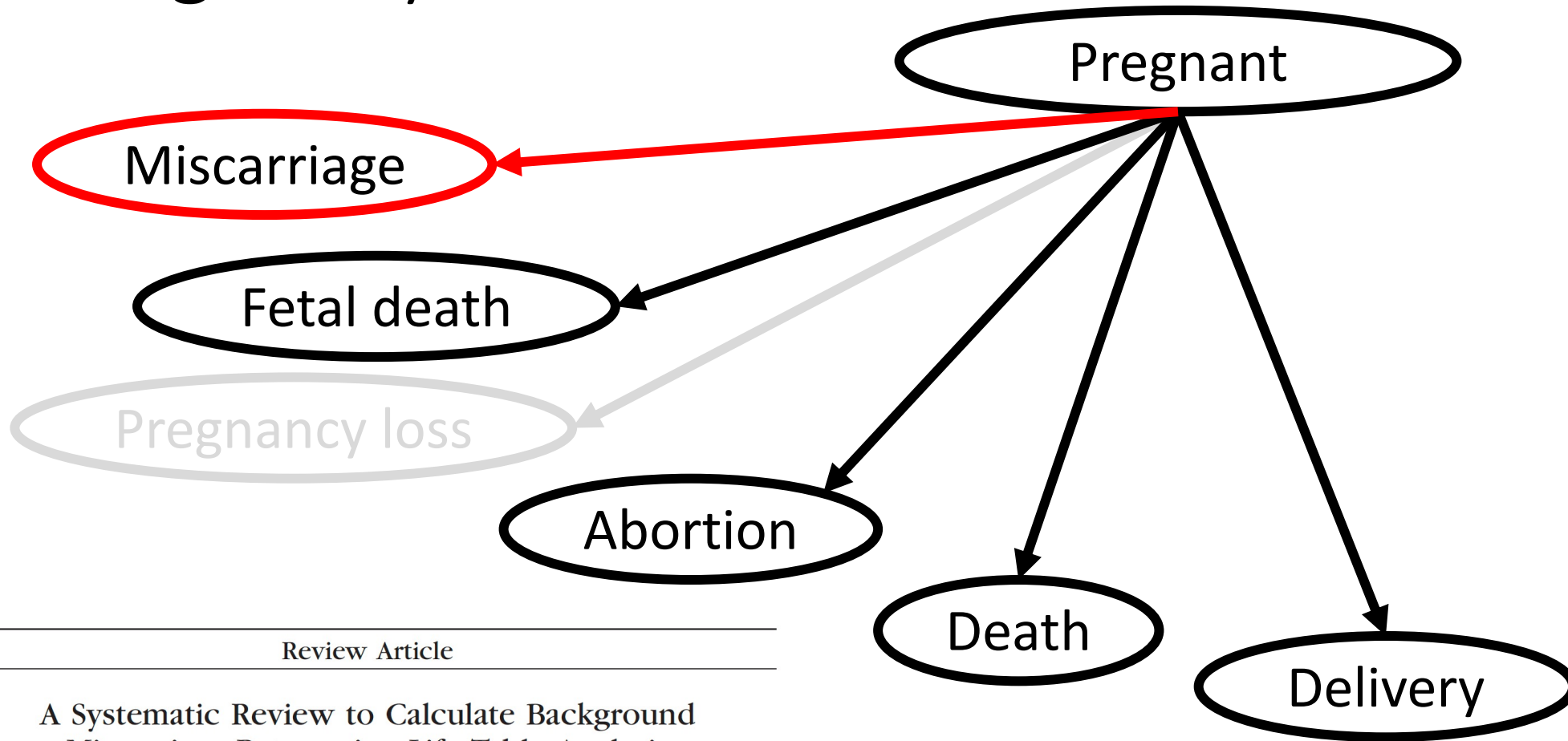
For every week x we want:

$$P_{xMaternalDeath}^{-Abortion} = \frac{l_{xMaternalDeath}^{-Abortion}}{l_x^{-Abortion}}$$

Pregnancy loss



Pregnancy loss



Review Article

A Systematic Review to Calculate Background Miscarriage Rates using Life Table Analysis

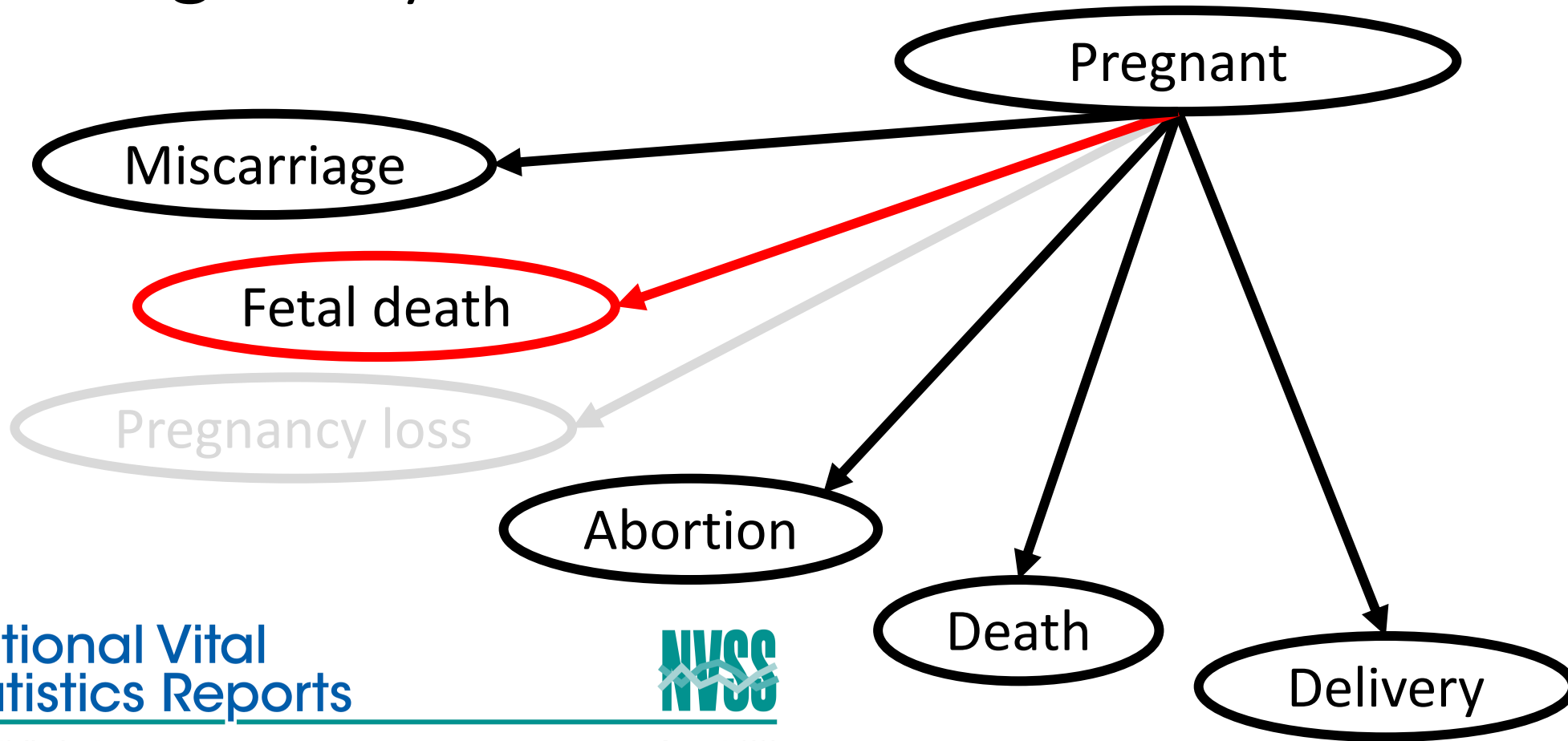
Lyndsay Ammon Avalos,^{1*} Claudia Galindo,² and De-Kun Li¹

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Received 9 June 2011; Revised 4 February 2012; Accepted 7 March 2012

Pregnancy loss



National Vital
Statistics Reports

Volume 71, Number 4

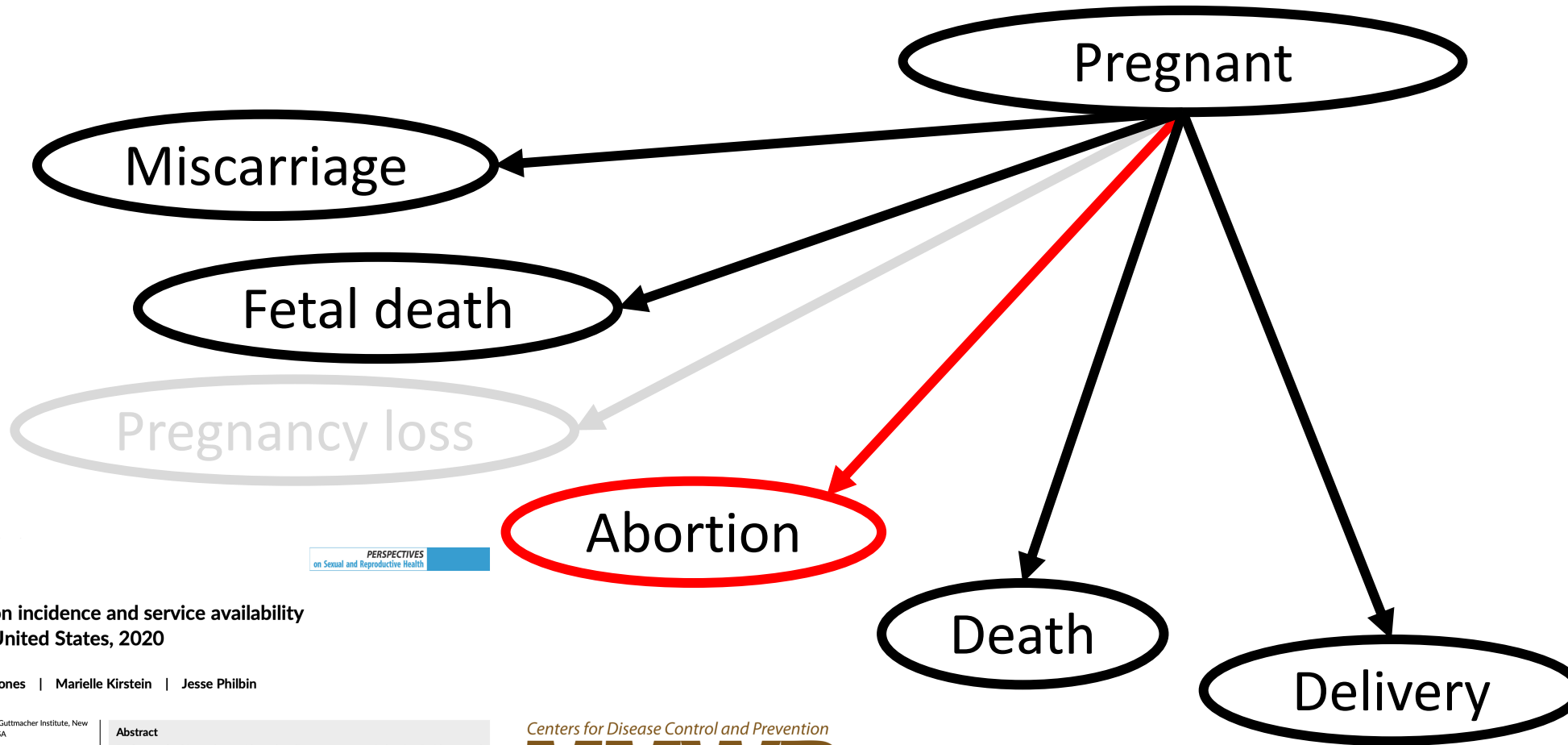


August 4, 2022

Fetal Mortality: United States, 2020

by Elizabeth C.W. Gregory, M.P.H., Claudia P. Valenzuela, M.P.H., and Donna L. Hoyert, Ph.D.,
Division of Vital Statistics

Abortion



ARTICLE

PERSPECTIVES
on Sexual and Reproductive Health

Abortion incidence and service availability in the United States, 2020

Rachel K. Jones | Marielle Kirstein | Jesse Philbin

Research Division, Guttmacher Institute, New
York, New York, USA

Correspondence

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Guttmacher Institute, 125 Maiden Ln., 7th Fl.,
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Abstract

Background: This study provides a baseline assessment of abortion incidence and service delivery prior to *Roe v. Wade* being overturned.

Methods: We collected information from all facilities known to have provided abortion services in the United States in 2019 and 2020. We examined abortion incidence by state, region and nationally and combined data on number of abortions with population data to estimate abortion rates. We also examined the number of abortion clinics, trends in medication abortion and service disruptions and changes in abortion protocols that occurred during the COVID-19 pandemic. We compare these findings to those of our prior Abortion Provider Census, which collected information for 2017.

Results: We documented 930,160 abortions in 2020, an 8% increase from 2017.

Centers for Disease Control and Prevention

MMWR

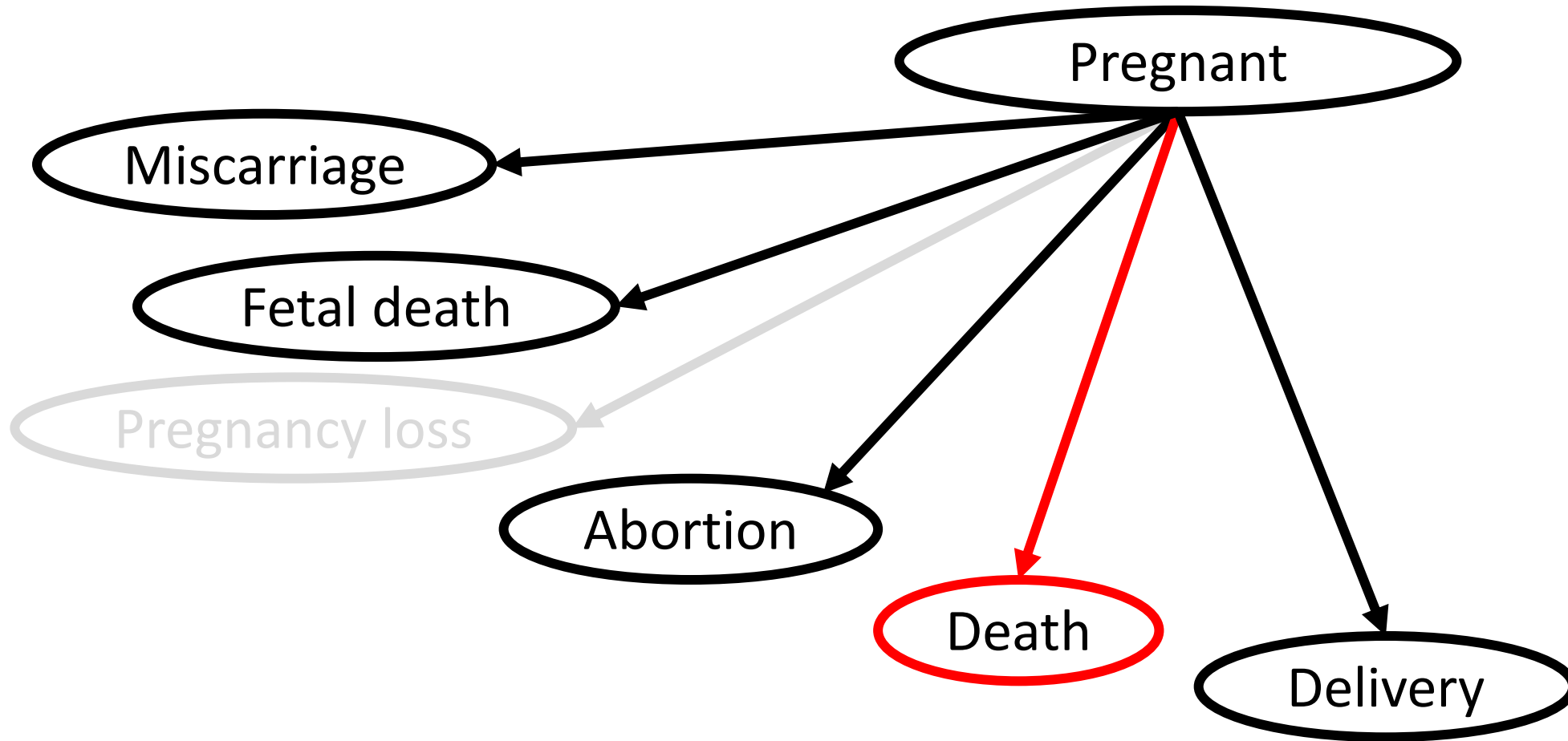
Surveillance Summaries / Vol. 71 / No. 10

Morbidity and Mortality Weekly Report

November 25, 2022

Abortion Surveillance — United States, 2020

Maternal death

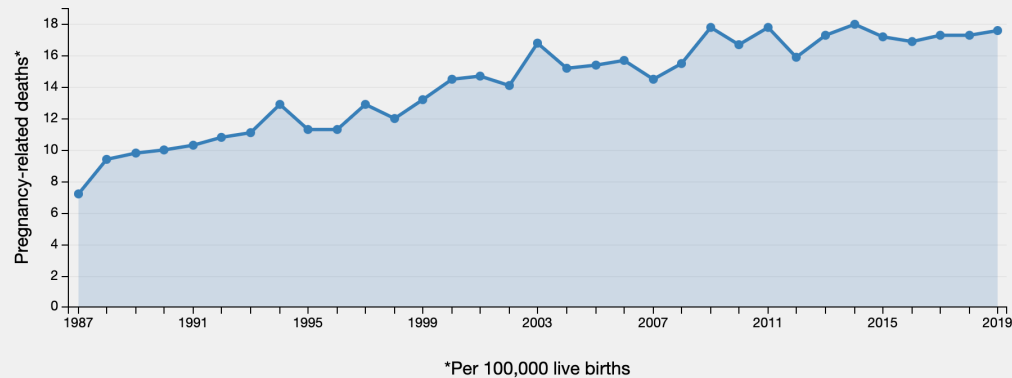


Pregnancy-related and maternal mortality in the US



Reproductive Health

Trends in pregnancy-related mortality ratios in the United States: 1987-2019



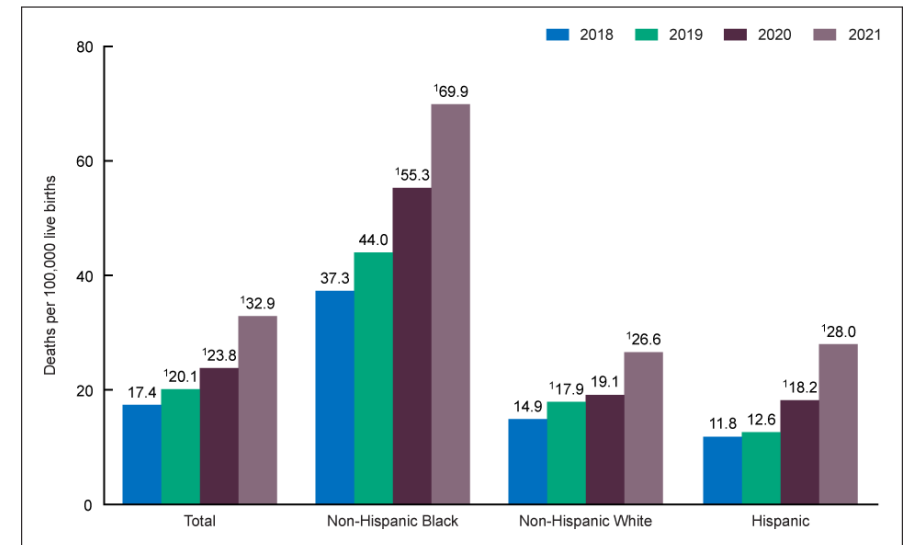
NATIONAL CENTER FOR HEALTH STATISTICS

Health E-Stats

MARCH 2023

Maternal Mortality Rates in the United States, 2021

by Donna L. Hoyert, Ph.D., Division of Vital Statistics



¹Statistically significant increase from previous year ($p < 0.05$).
NOTE: Race groups are single race.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Pregnancy-related deaths occur throughout pregnancy and postpartum period

Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019

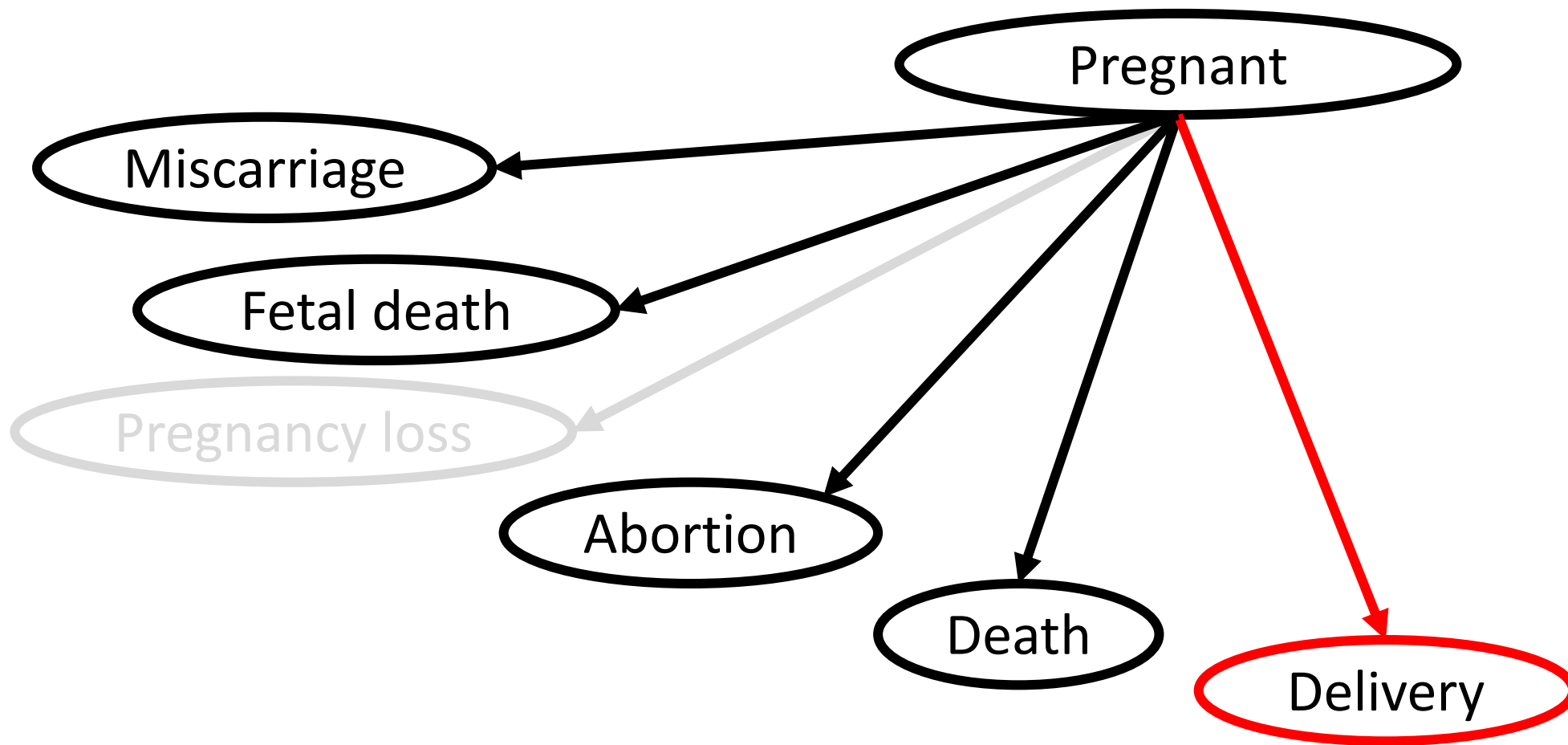


Susanna Trost, MPH; Jennifer Beauregard, MPH, PhD; Gyan Chandra, MS, MBA; Fanny Njie, MPH; Jasmine Berry, MPH; Alyssa Harvey, BS; David A. Goodman, MS, PhD

Table 3. Distribution of pregnancy-related deaths by timing of death in relation to pregnancy, data from Maternal Mortality Review Committees in 36 US states, 2017–2019*

	N	%
During pregnancy	216	21.6
Day of delivery	132	13.2
1–6 days postpartum	120	12.0
7–42 days postpartum	233	23.3
43–365 days postpartum	301	30.0

*Specific timing information is missing (n=2) or *unknown* (n=14) for 16 (1.6%) pregnancy-related deaths.



NCHS vital statistics

A multiple decrement pregnancy life table

$$l_x = l_{x+1} + d_{xM} + d_{xA} + d_{xMD} + d_{xFD} + d_{xD}$$

Time measured in weeks since last menstrual period

A multiple decrement pregnancy life table

Must be
estimated from
rates

Available as incidence by week
or range of weeks LMP

$$l_x = l_{x+1} + d_{xM} + d_{xA} + d_{xMD} + d_{xFD} + d_{xD}$$

Time measured in weeks since last menstrual period

A multiple decrement pregnancy life table

Directly computed for weeks 40-21 conditional
on distributional assumptions

$$l_x = l_{x+1} + d_{xM} + d_{xA} + d_{xMD} + d_{xFD} + d_{xD}$$

Time measured in weeks since last menstrual period

A multiple decrement pregnancy life table

$$l_x = l_{x+1} + \underbrace{d_{xM}} + d_{xA} + d_{xMD} + d_{xFD} + d_{xD}$$

$$d_{xM} = m_{xM} * L_x$$

A multiple decrement pregnancy life table

$$l_x = l_{x+1} + \underbrace{d_{xM} + d_{xA} + d_{xMD}} + d_{xFD} + d_{xD}$$

$$d_{xM} = m_{xM} * (l_x - 0.5(d_{xM} + d_{xA} + d_{xMD}))$$

A multiple decrement pregnancy life table

$$l_x = l_{x+1} + \underbrace{d_{xM} + d_{xA} + d_{xMD}} + d_{xFD} + d_{xD}$$

$$d_{xM} = m_{xM} * (l_x - 0.5(d_{xM} + d_{xA} + d_{xMD}))$$

$$d_{xM} = \frac{m_{xM}(l_{x+1} + 0.5d_{xA} + 0.5d_{xMD})}{(1 - 0.5m_{xM})}$$

For every week x we want:

The risk of dying from pregnancy-related causes during or after week x among all pregnancies beginning week x :

$$P_{xMaternalDeath}^{-Abortion} = \frac{l_{xMaternalDeath}^{-Abortion}}{l_x^{-Abortion}}$$

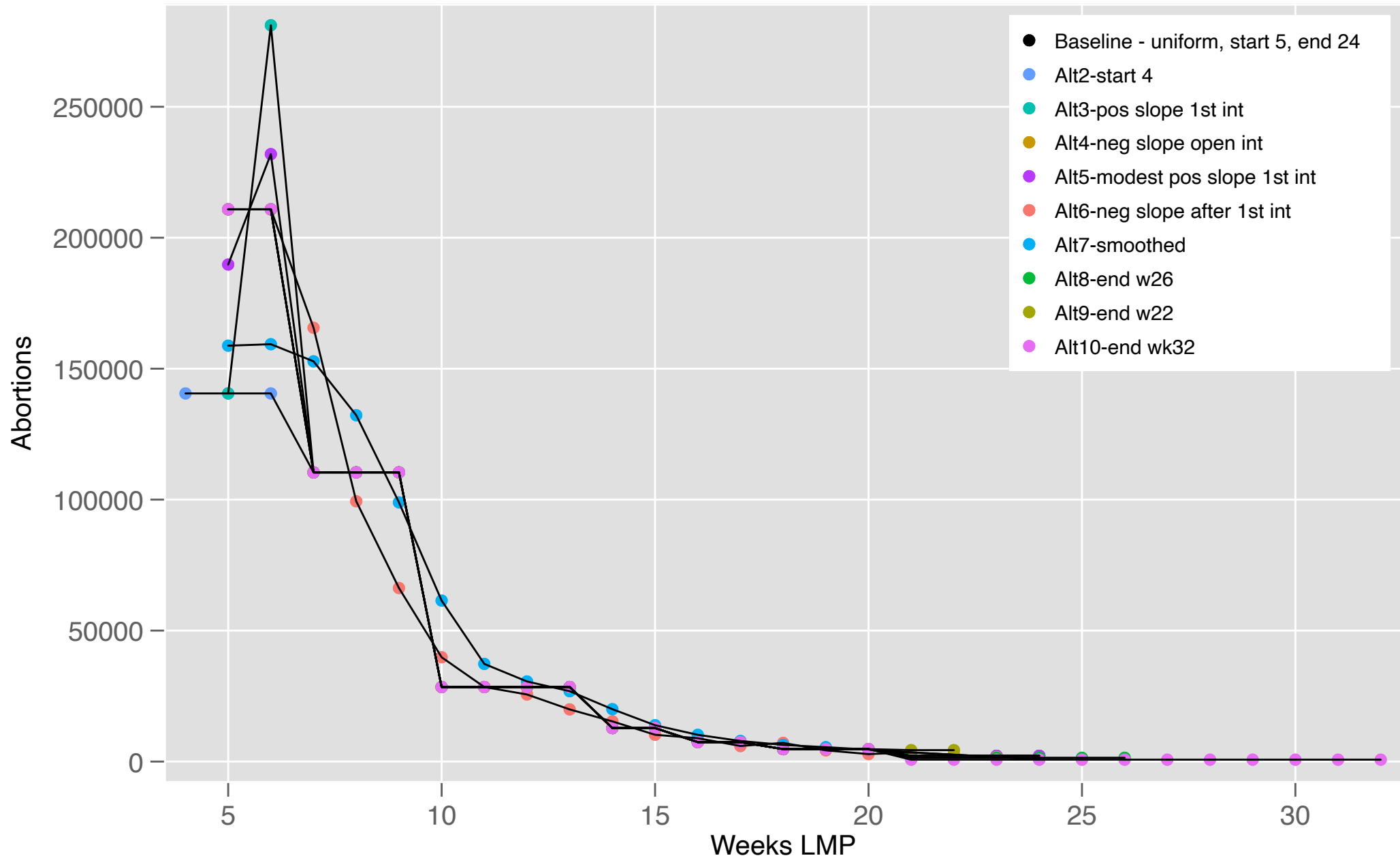
Steps

1. Make distributional assumptions for incidence estimates
2. Select miscarriage rate schedule
3. Construct multiple decrement life table based on 1 and 2
4. Construct cause-deleted life table in which abortion is deleted
5. Take weighted average of the risk of dying from pregnancy-related causes, weighting by the fraction of abortions in each week (a_x)

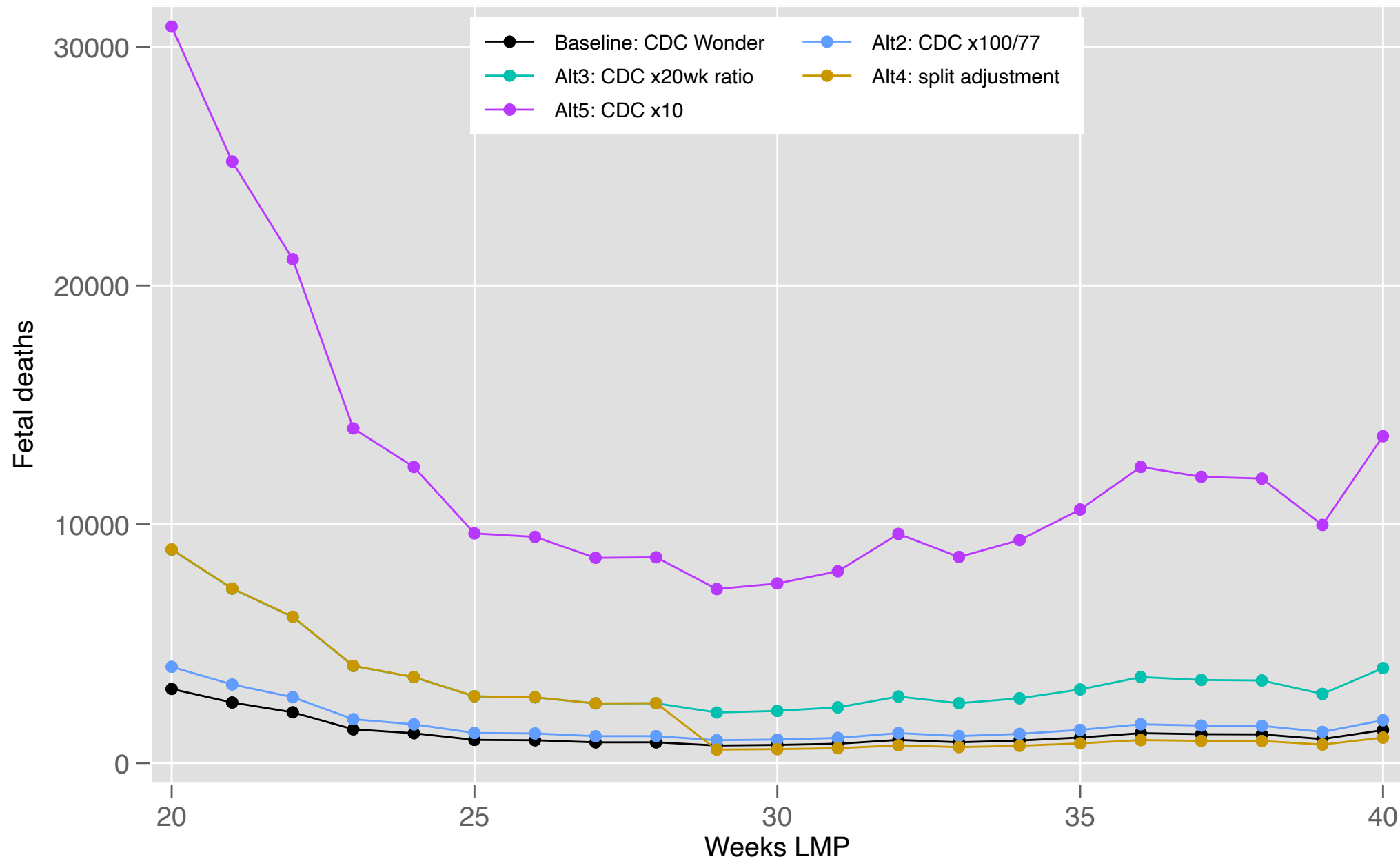
$$\sum_{week=x}^{40} a_x \frac{l_{xMaternalDeath}^{-Abortion}}{l_x^{-Abortion}}$$

$$RR = \frac{\sum_{week=x}^{40} a_x \frac{l_{xMaternalDeath}^{-Abortion}}{l_x^{-Abortion}}}{\frac{Abortion\ deaths}{Abortions}}$$

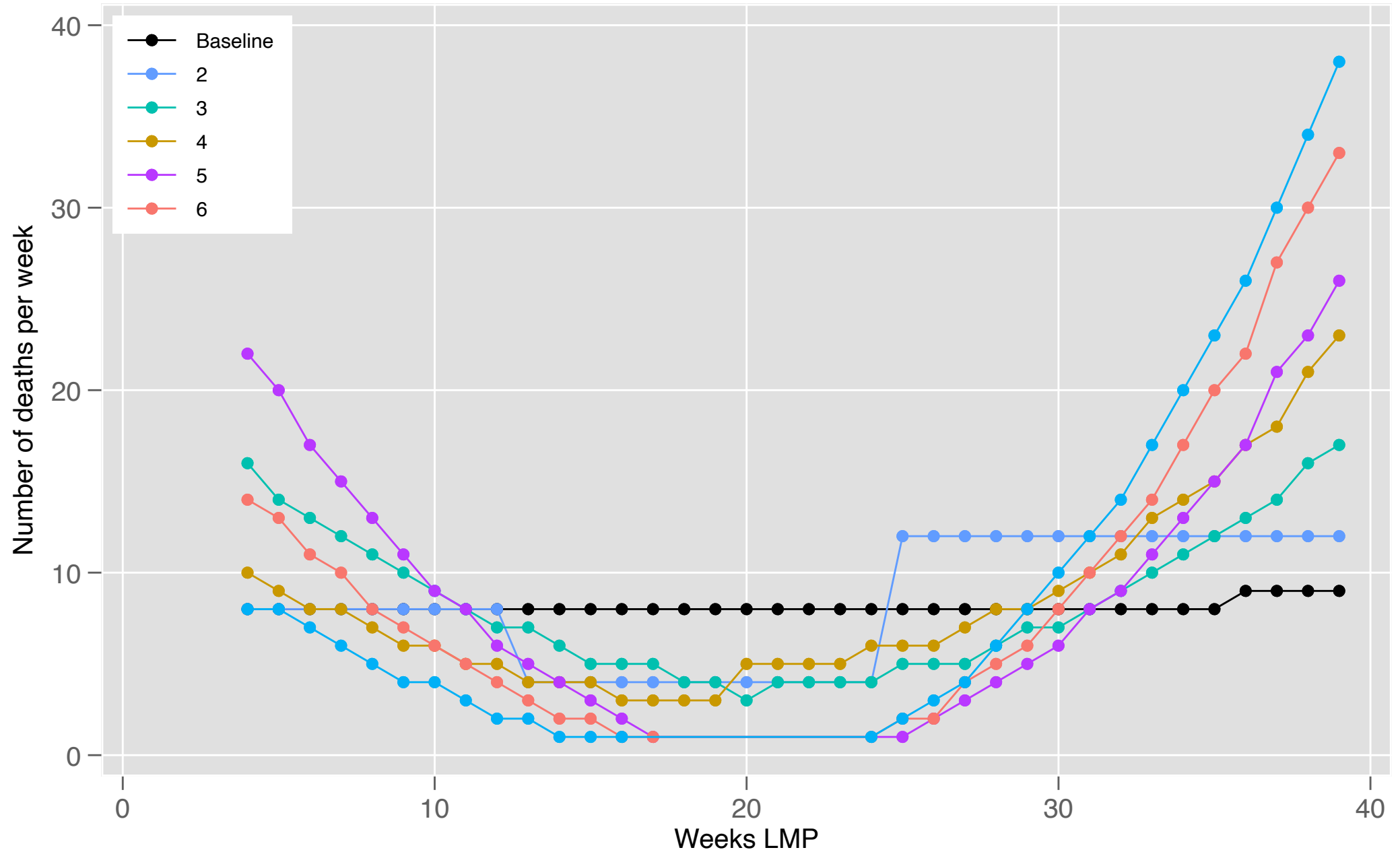
Distribution of abortions within week ranges, 2020



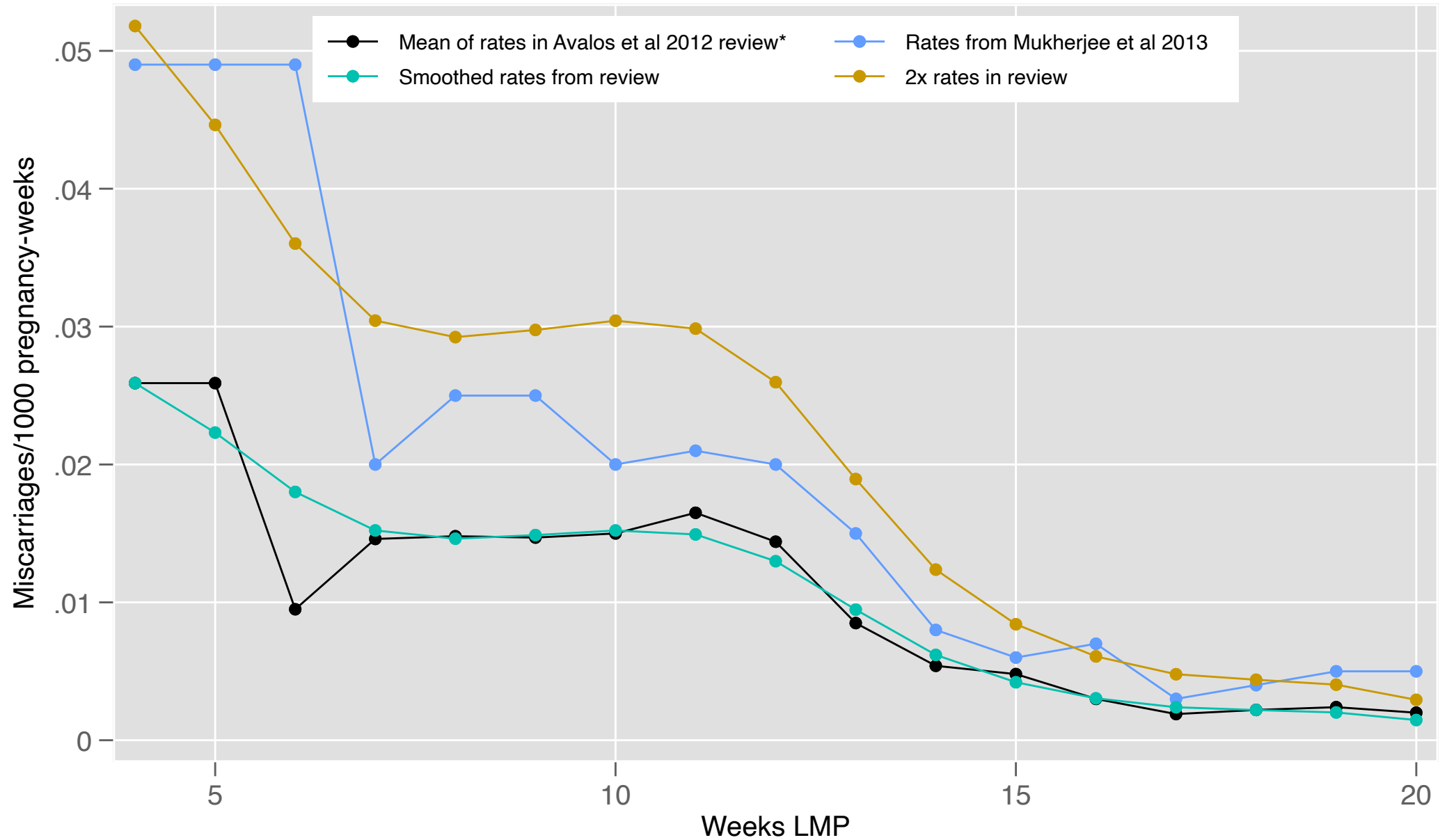
Fetal deaths under various adjustments, 2020



Timing of pregnancy-related deaths during pregnancy, 2020

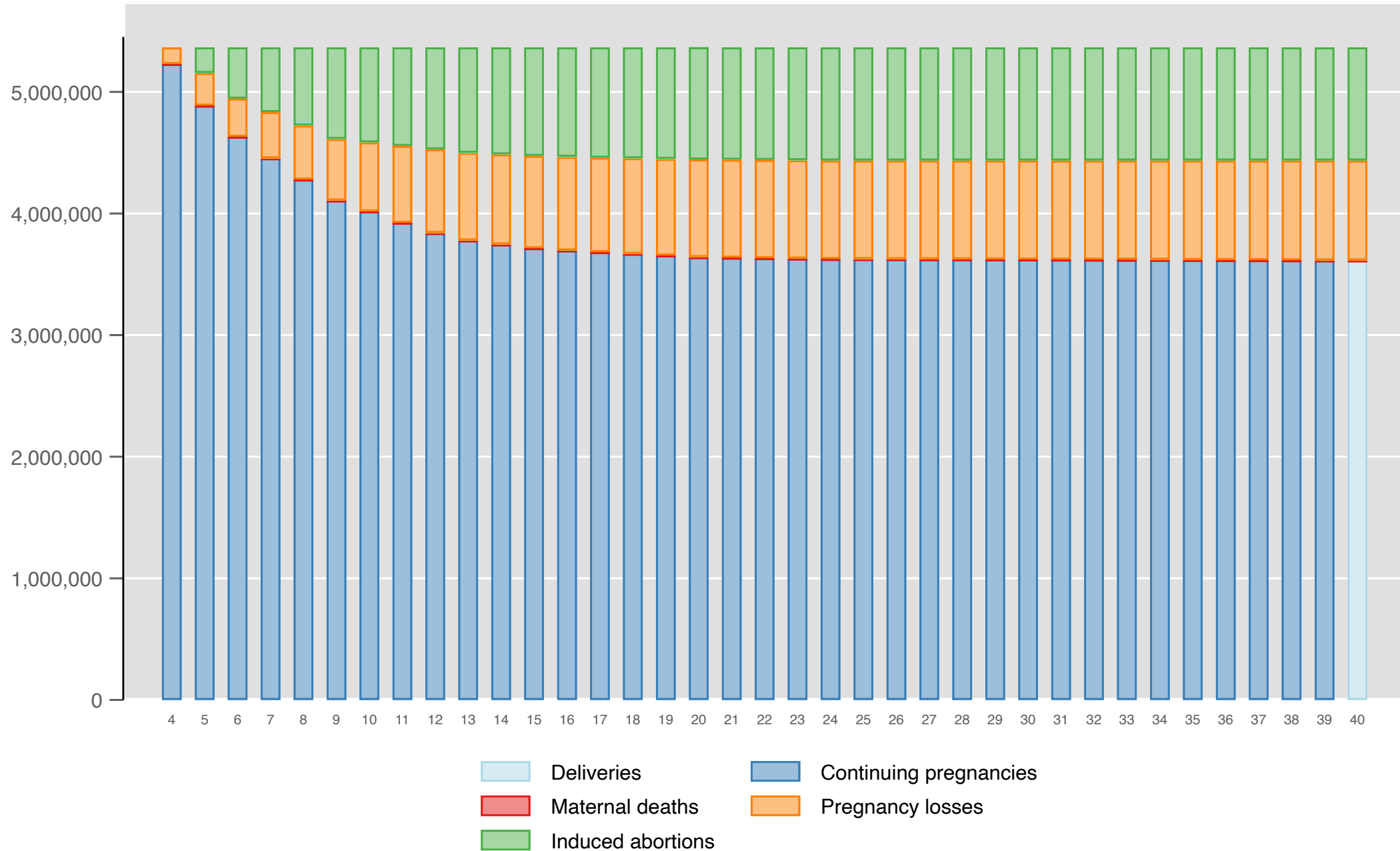


Four sets of weekly miscarriage rates

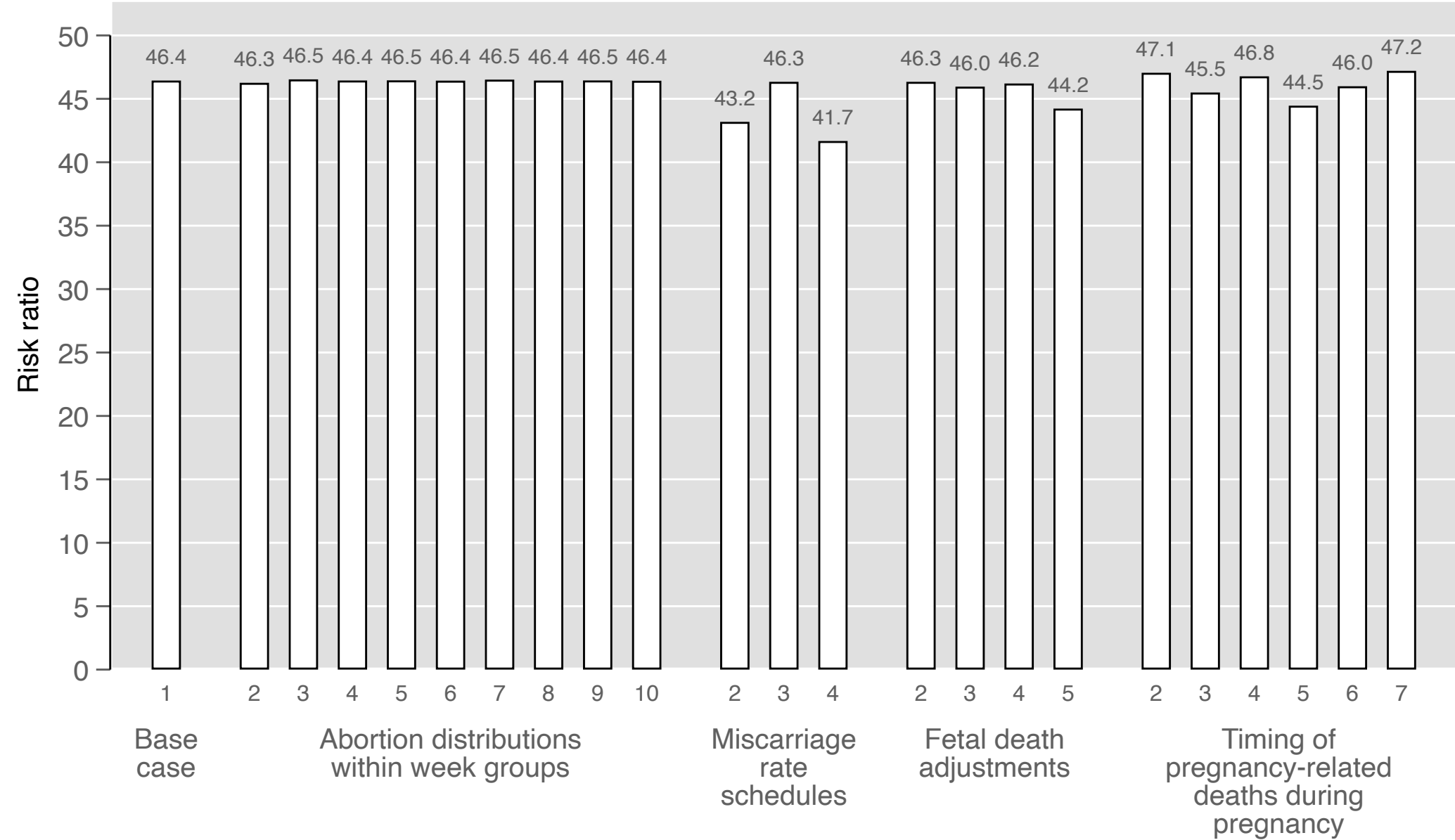


*baseline assumption

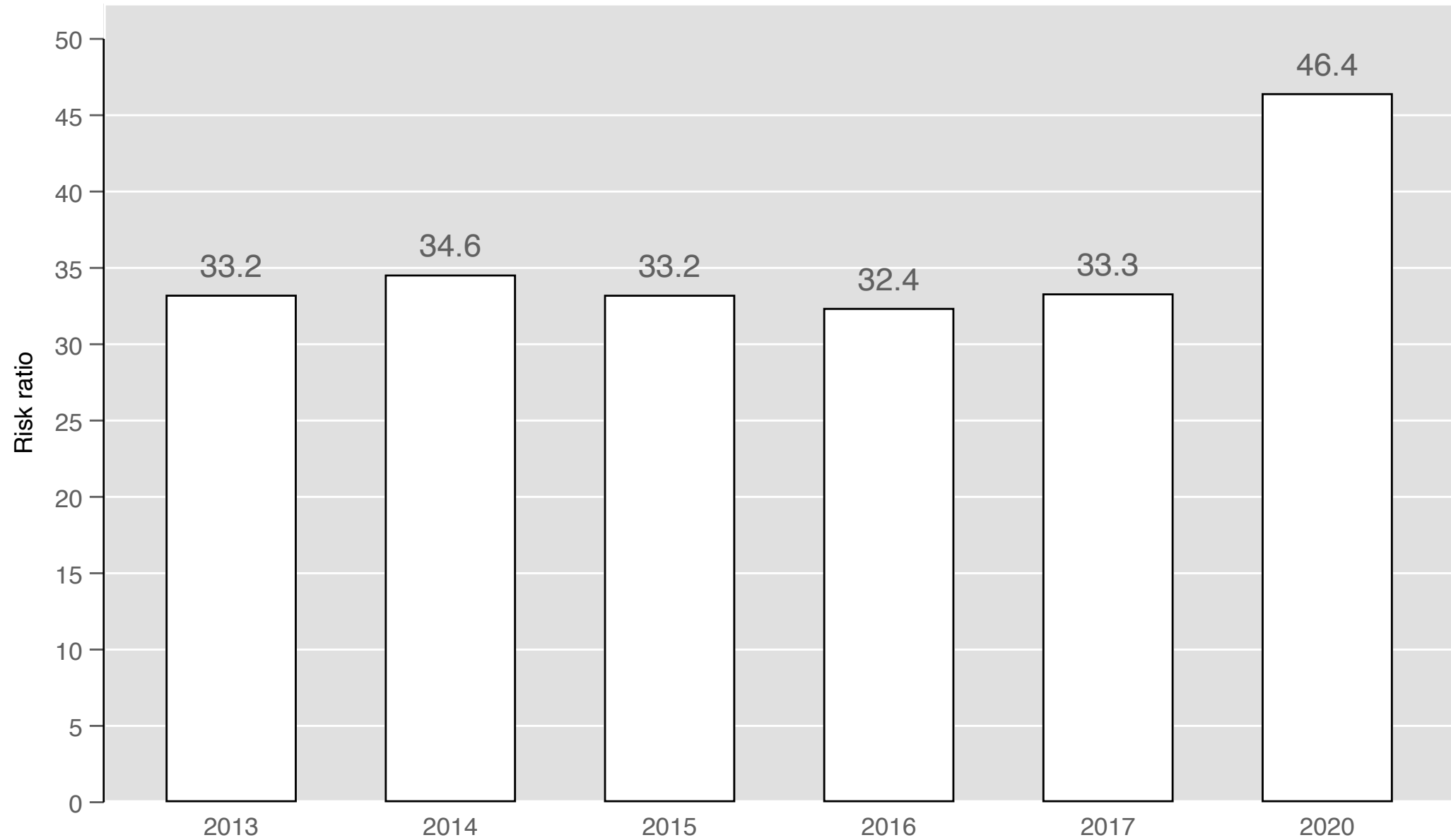
Cumulative pregnancy resolutions by weeks LMP, 2020



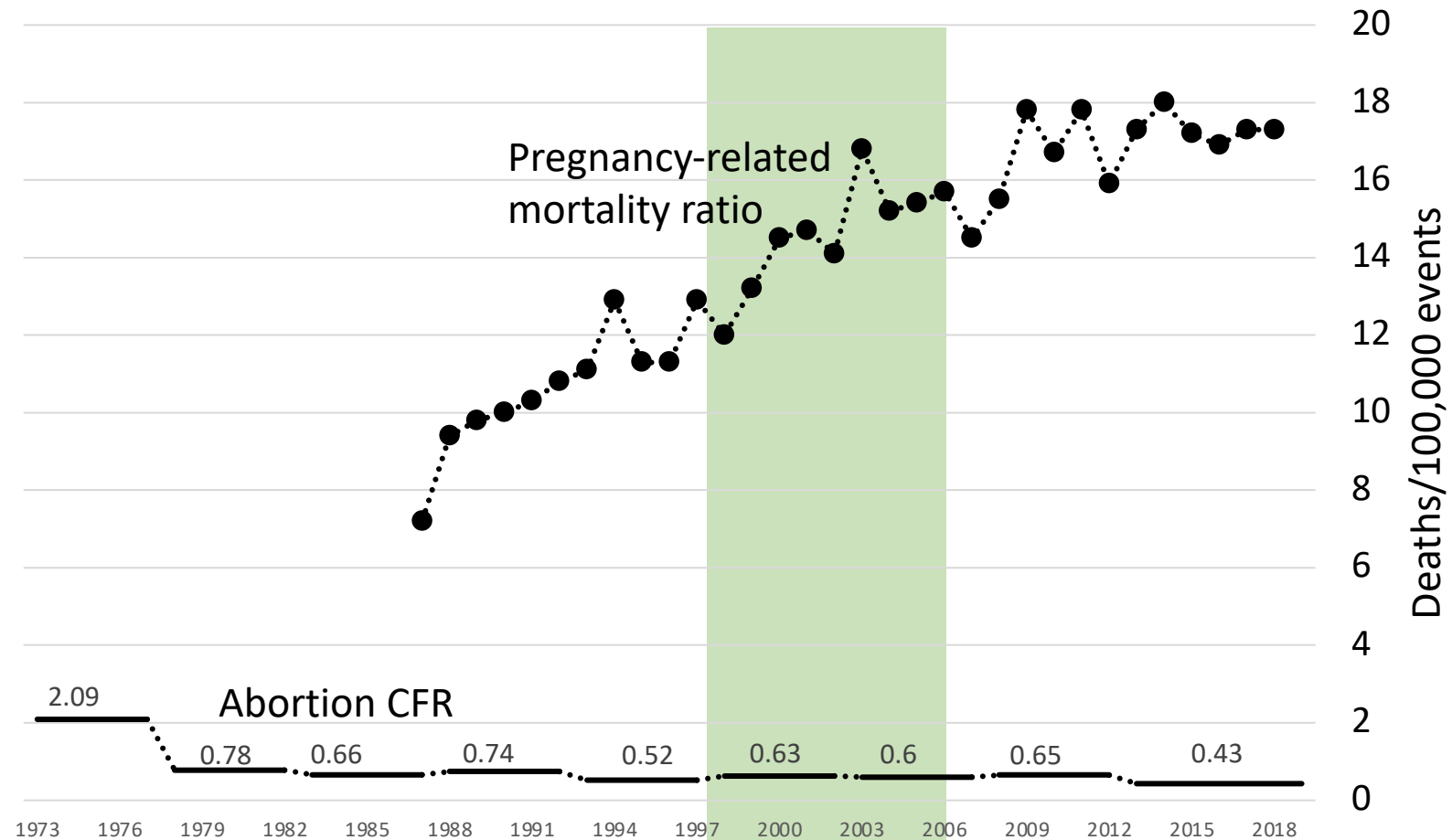
Average relative risk of maternal death due to remaining pregnant compared to having an abortion, 2020



Average relative risk of death due to remaining pregnant
compared to having an abortion, 2020

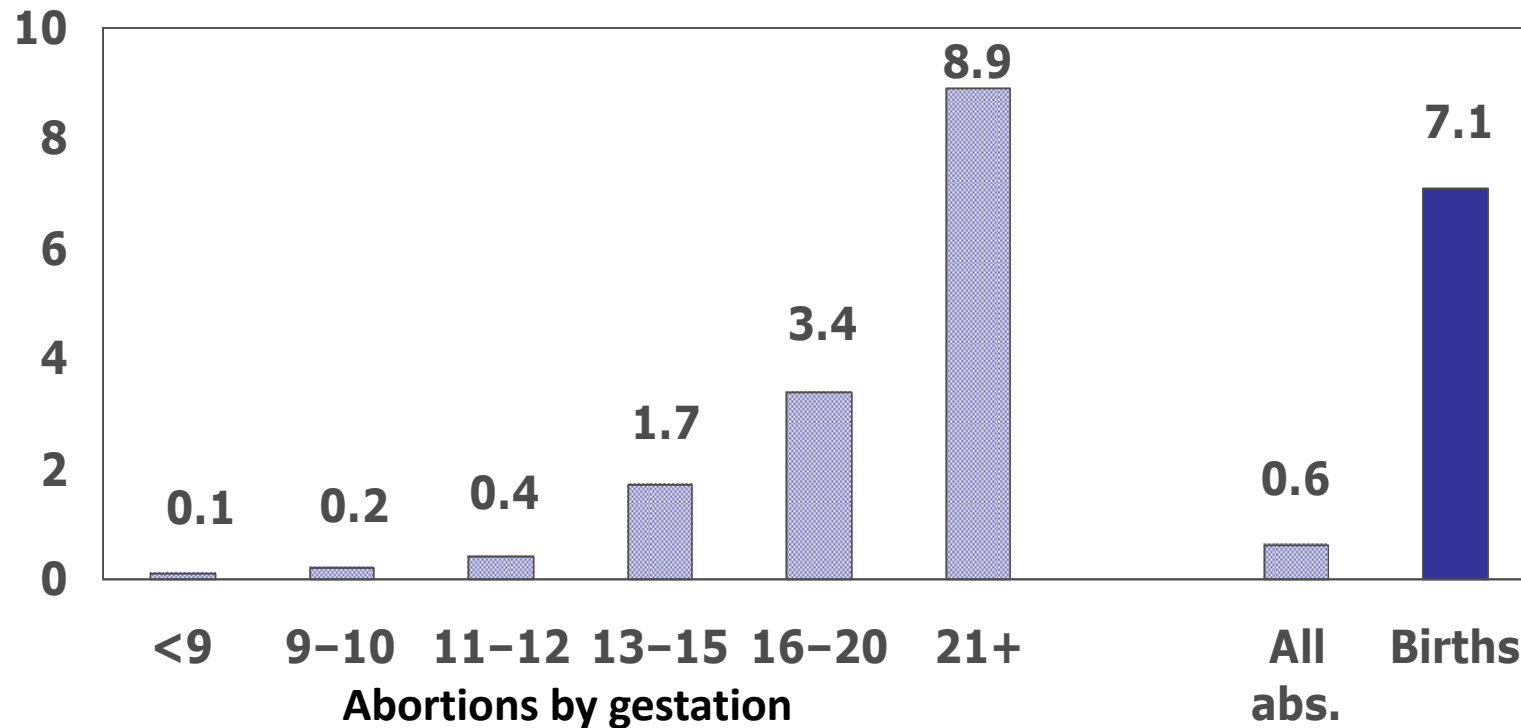


Risk of dying due to abortion varies by pregnancy duration

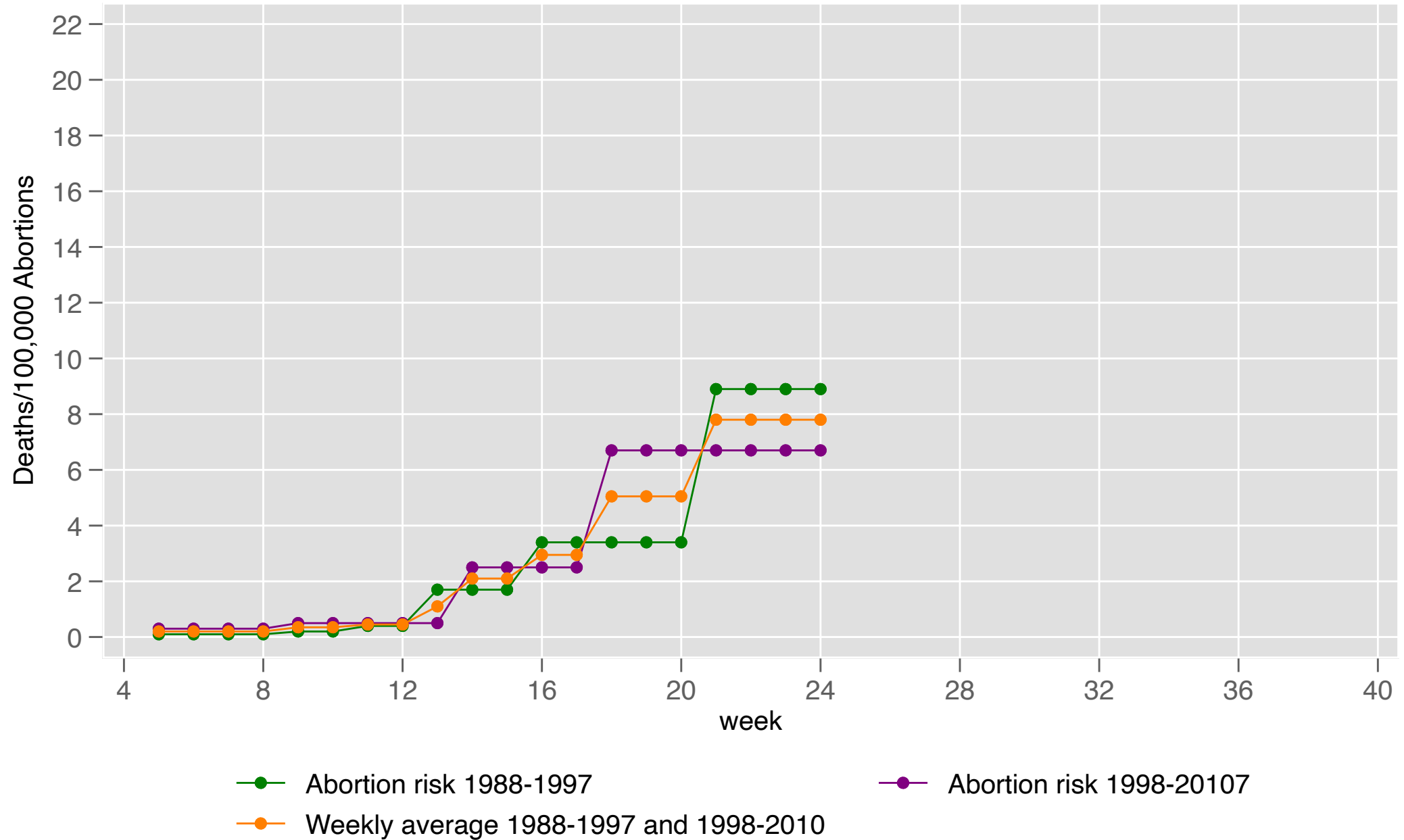


Risk of dying due to abortion varies by pregnancy duration

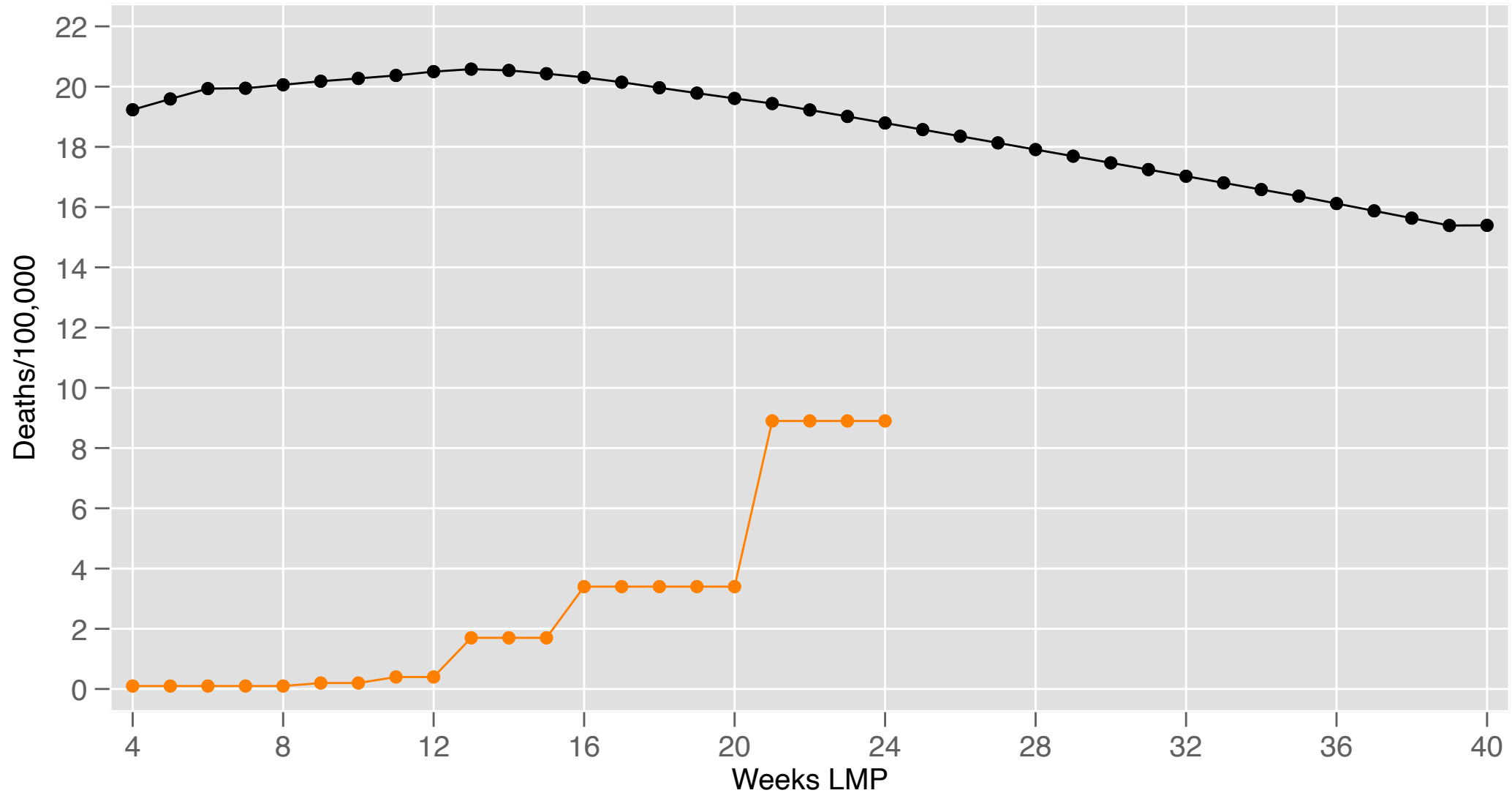
Deaths per 100,000 (1988-1997)



Risk of abortion-related death by weeks LMP by time period

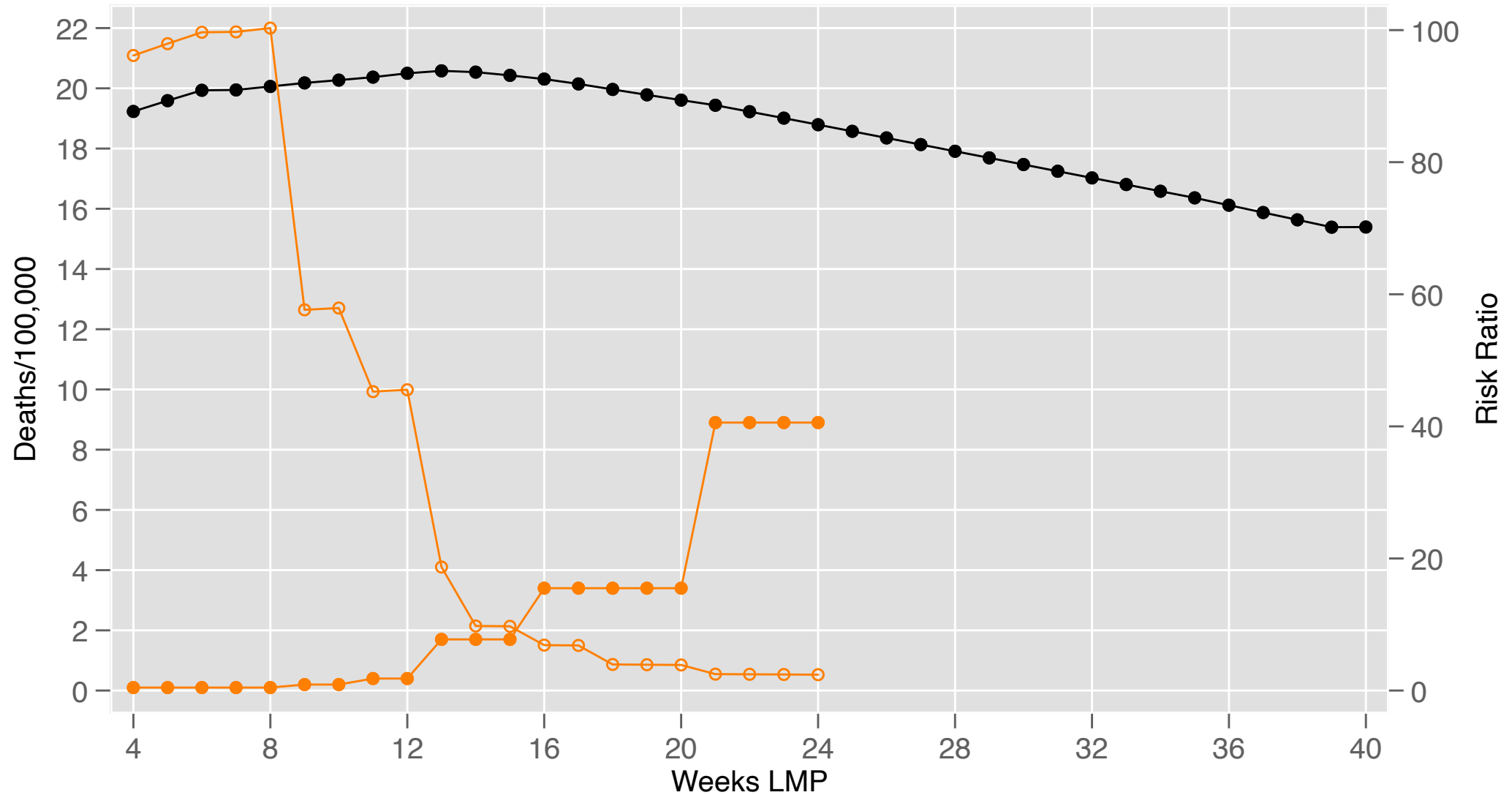


Week-specific risk of death by pregnancy resolution



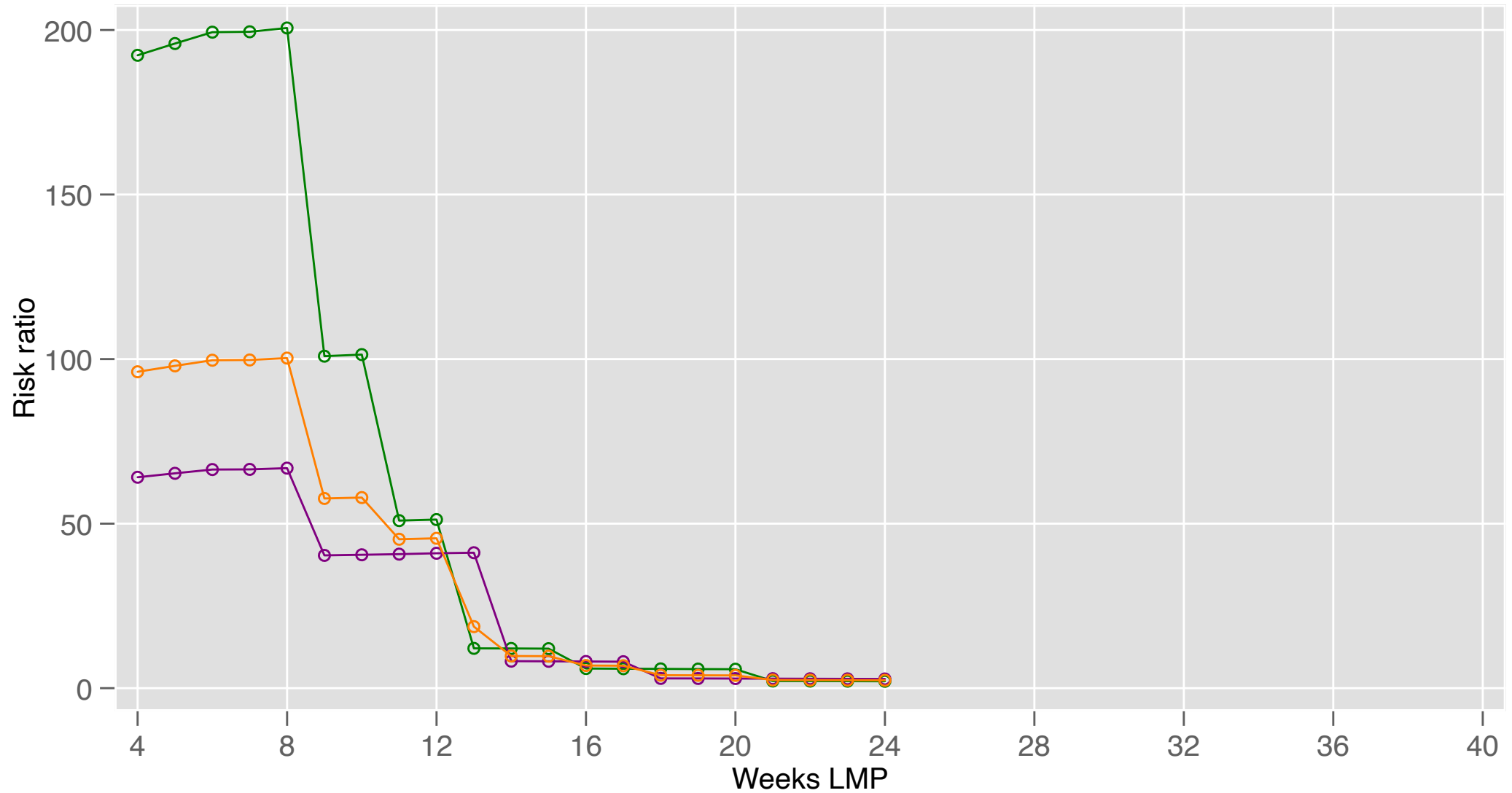
- Maternal deaths/100,000 continued pregnancies
- Deaths/100,000 abortions, 1988-2010

Week-specific risk of death by pregnancy resolution



—●— Maternal deaths/100,000 continued pregnancies
—●— Deaths/100,000 abortions, week average 1988-2010
—○— Risk ratio

Weekly risk ratios under three different abortion risks



—○— Abortion risk 1988-1997 vs. continuing

—○— Abortion risk 1998-2010 vs. continuing

—○— Weekly average 1988-1997 and 1998-2010 vs. continuing

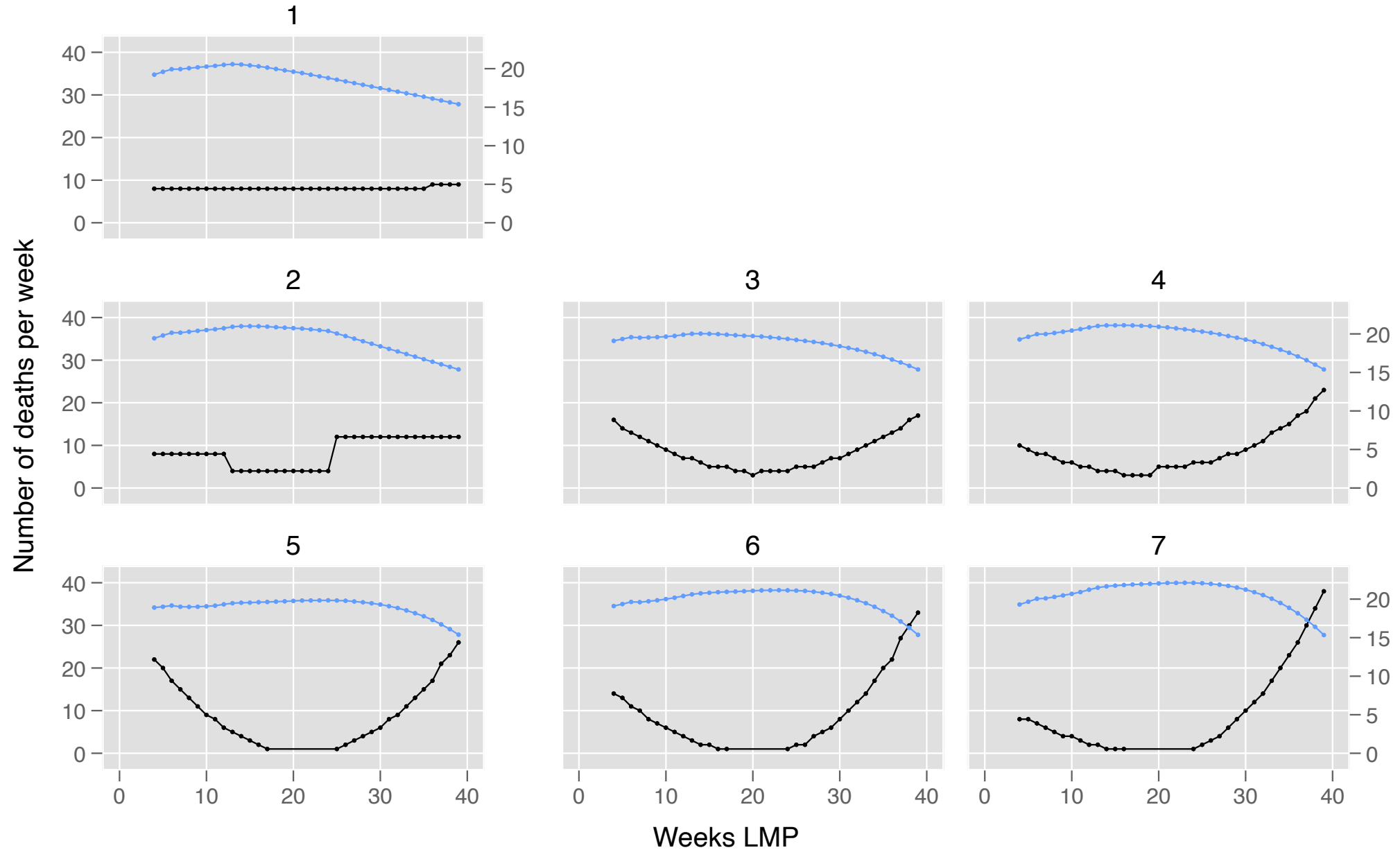
Cause-deleted remaining risk of maternal death by week LMP

- Assumes hazards of pregnancy loss, maternal death, delivery independent of induced abortion
- Assume force of exit is constant within weeks

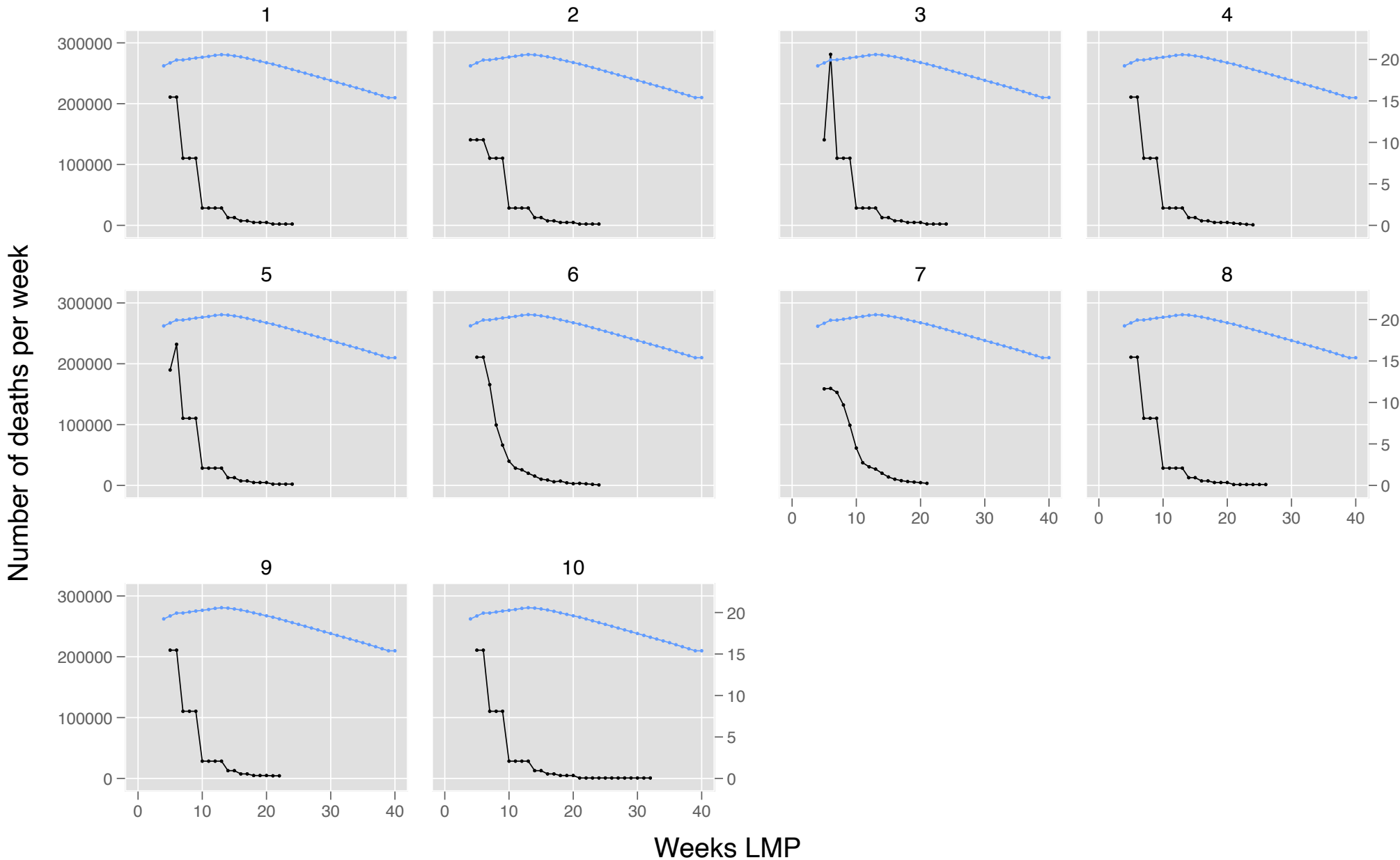
Thank you!

amanda.Stevenson@colorado.edu

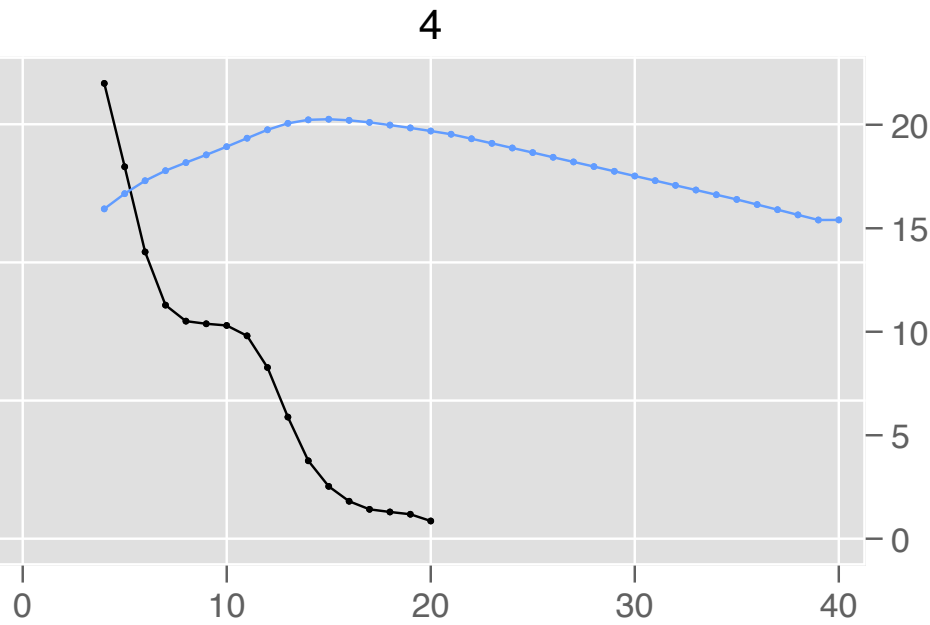
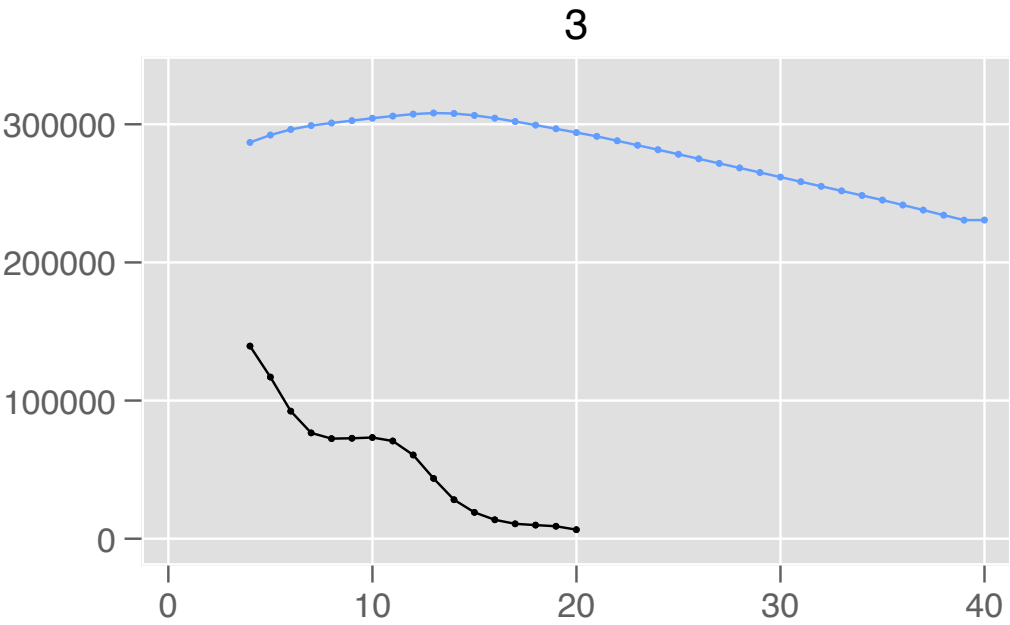
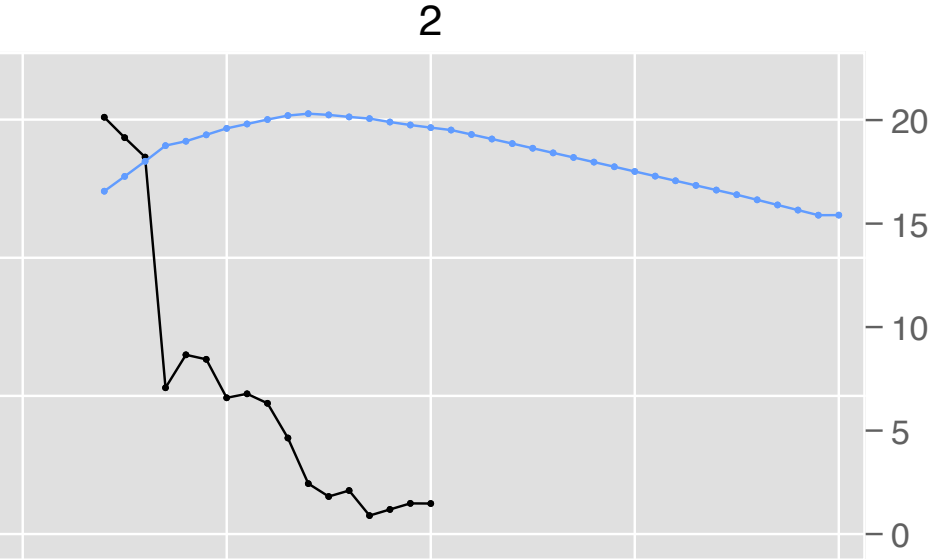
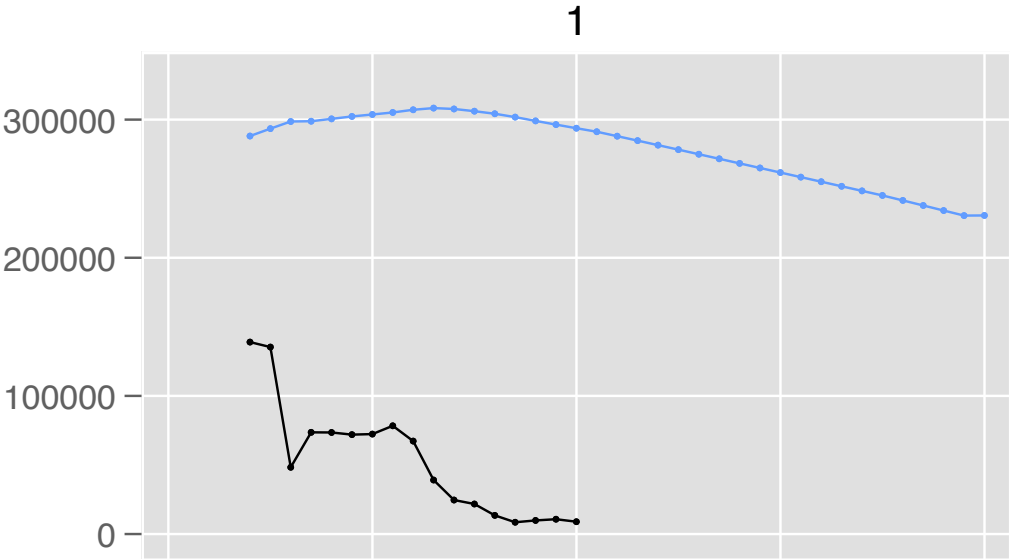
Timing of pregnancy-related deaths during pregnancy and risk due to remaining pregnant, 2020



Abortions and risk of death due to continuing pregnancy by week, 2020



Miscarriages and risk of death due to remaining pregnant by week, 2020



Fetal deaths under various adjustments and risk of death due to remaining pregnant, 2020

