Prevention through the Reproductive Life Cycle: When Is Too Early? When Is Too Late?

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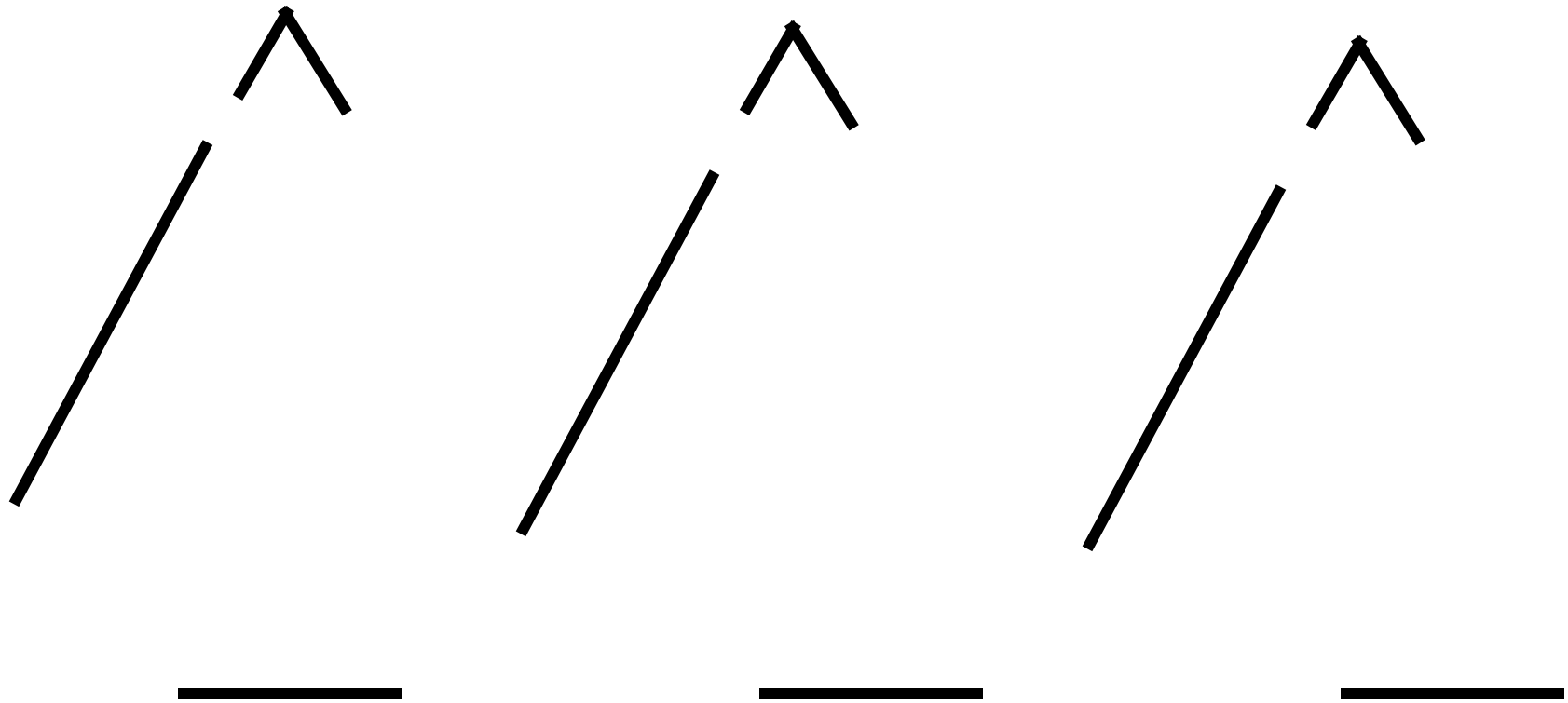
Images courtesy of: https://unsplash.com/search/photos/diverse-women

Objectives

- Describe a life course approach to the health of today's women and tomorrow's children.
- Identify opportunities to impact prematurity before pregnancy occurs, during pregnancy and between/after pregnancy
- Discuss how the work you do could impact at least 4 common women's preventive health care needs.

The Current Dominant Prevention Paradigm: What's Wrong with this Picture?

Current Dominant Perinatal Prevention Paradigm



Advancing Women's Health for Her Own Needs Now and in the Future

- Formulate and assess individual reproductive life plan (short and long term)
- Link to/provide access to contraception matched to desires
- Nutritional status (achieving healthiest weight possible)
- Encourage daily use multivitamin with folic acid
- Immunizations up-to-date
- Assess and address STI risks and diseases
- Assess and address tobacco and other substance use
- Assess and address chronic diseases in light of woman's health and health of any future pregnancies
- Assess and address medication and herbal use and safety to woman and to fetus if she conceives
- Identify and offer interventions for substance abuse and intimate partner violence

Which of those foci for care would benefit a woman's life course?

Which would benefit a pregnancy and pregnancy outcome?

Advancing Women's Health to Improve Future Pregnancy Outcomes

- Formulate and assess individual reproductive life plan (short and long term)
- Link to/provide access to contraception matched to desires
- Nutritional status (achieving healthiest weight possible)
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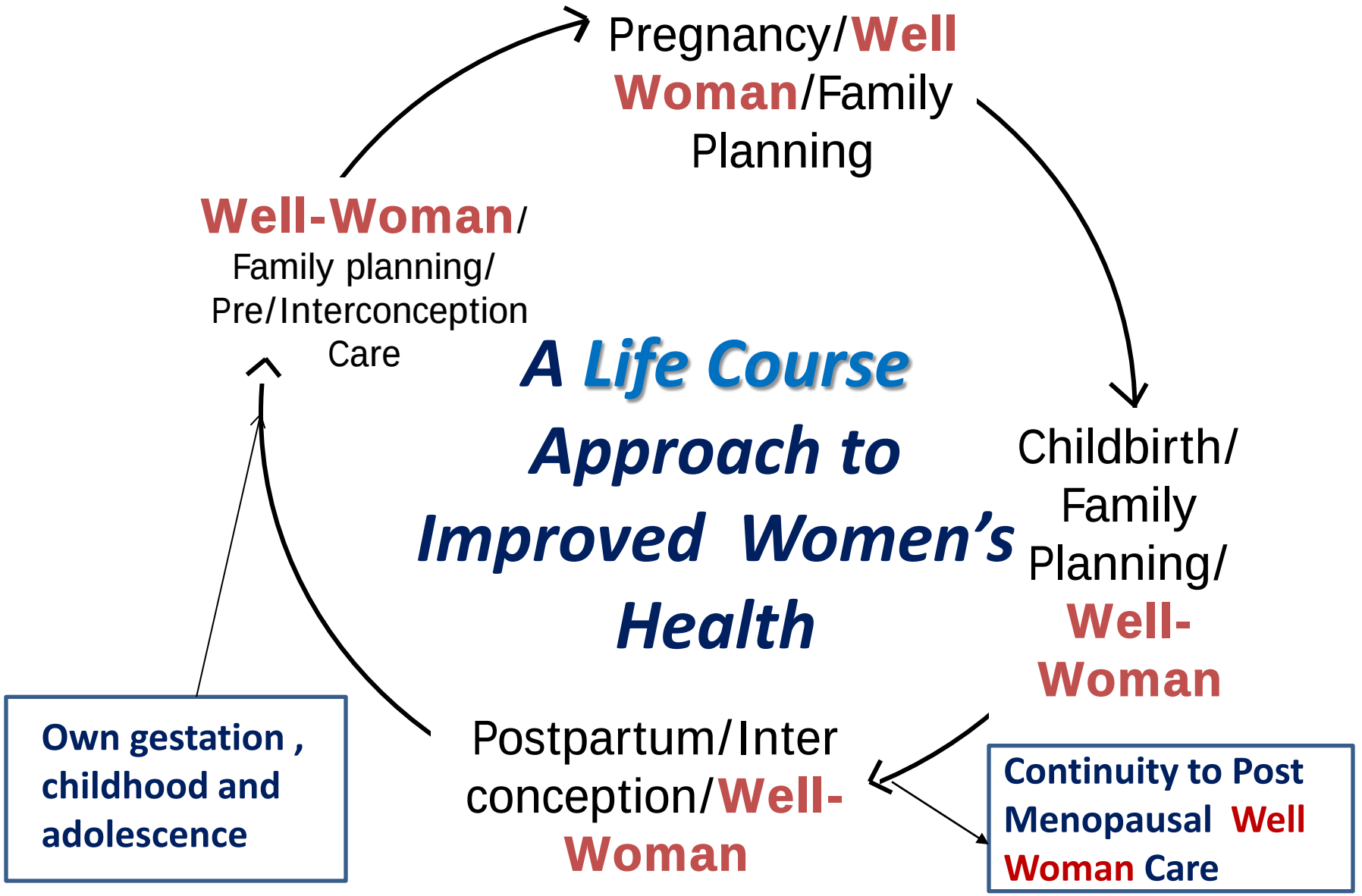
Preventing the Preventable

- When is it too early?
- When is it just a missed opportunity to do what can be done?
- When is it too late?


Pregnancy/Well Woman/Family Planning
Childbirth/ Family Planning/ Well-Woman
Postpartum/Inter conception/Well-Woman
Well-Woman/ Family planning/ Pre/Interconception Care
A Life Course Approach to Improved Women's Health
Own gestation , childhood and adolescence
Continuity to Post Menopausal Well Woman Care

We Need to Move Our Efforts Toward Prevention Rather than Rescue

- Healthier women from conception through senescence are an important outcome whether they **EVER** become pregnant or pregnant again
- Healthier women have healthier pregnancies and healthier pregnancy outcomes

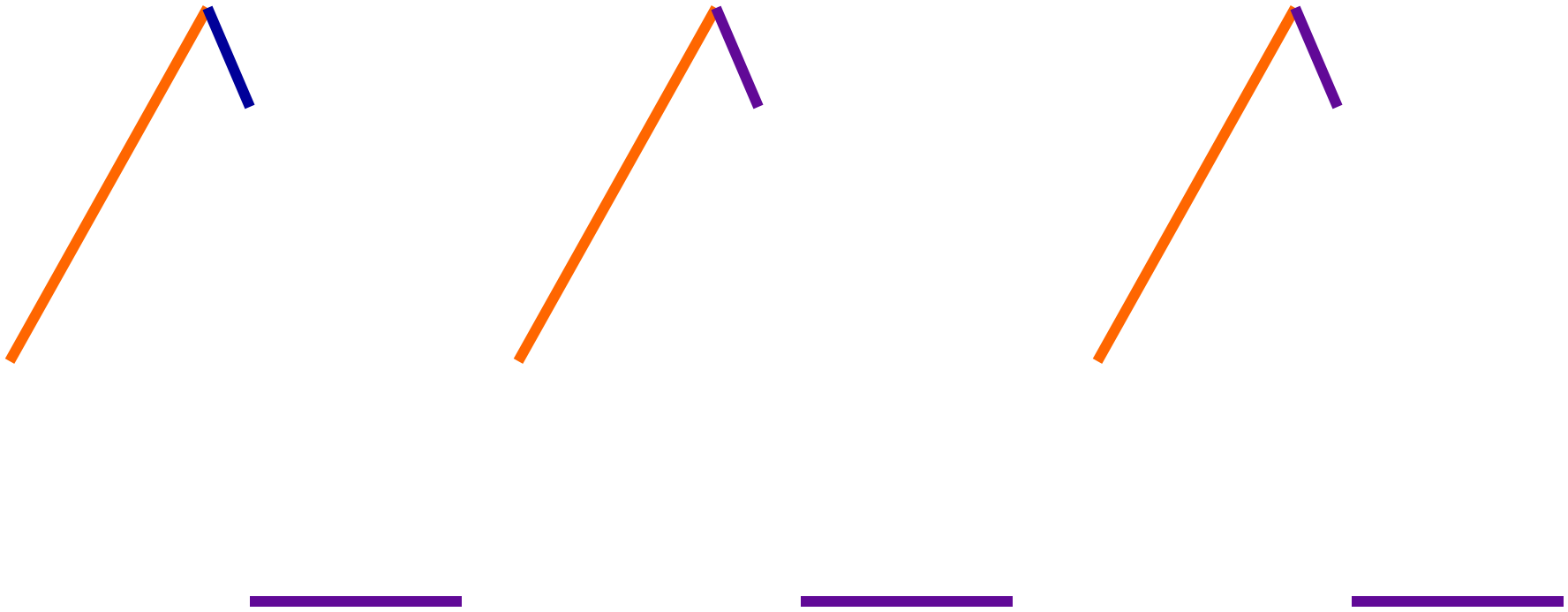
Isn't that the focus of our work?

Examining the Evidence of Links Between Women's Health Status and Reproductive Outcomes

NUTRITIONAL STATUS: Obesity An Epidemic

- **Obesity and Women's Health:**
  - **Diabetes**
  - **Hypertension**
  - **Cardiovascular disease**
  - **Disabilities**
- **Maternal Obesity and pregnancy complications:**
  - **Glucose intolerance of pregnancy**
  - **Pregnancy induced hypertension**
  - **Thrombophlebitis**
  - **Infertility**
  - **Neural tube defects**
  - **Prematurity**

Usual Approach to Weight Status in Women of Reproductive Age



What about the Other Epidemic: Underweight

Other examples of the link. . .

- Tobacco use
- Alcohol use
- Chronic Disease Control
- Folic acid

The Benefits of Higher Levels of Women's Wellness

- Higher levels of women's wellness will result in healthier women across the lifespan. . .
- Higher levels of women's wellness will result in healthier pregnancy outcomes (because of the primary prevention benefits of reducing periconceptional risks)
- Because most pregnancies aren't planned in the US new approaches for promoting preconceptional/interconceptional health are needed for all women (and men, too)
- It is very likely that we could achieve better periconceptional health by addressing women's wellness as an important good unto itself, irrespective of reproductive plans

An Example of NOT Too Early

- Jenny is 21 years old and has never been pregnant.
  - She weighs 98 pounds
  - She smokes 1 ½ packs of cigarettes a day
  - She takes accutane for cystic acne but no other medications including vitamins
  - She does not wish to become pregnant, is in a sexually intimate relationship and is not using a highly effective contraceptive method.

In obstetrics. . .

most of our outcomes or their determinants are already present before we ever meet our patients—

In the NICU. . .
many of the admissions could have been predicted preceding the conception

Important Examples

- Intendedness of conception
- Interpregnancy interval
- Maternal age
- Maternal weight
- Chronic disease control
- Exposure ART/ovulation stimulation
- Spontaneous abortion
- Abnormal placentation
- Congenital anomalies
- Timing of entry into prenatal care

What Is The Leading Cause of Infant Mortality/Morbidity in US?

1. Congenital Malformations/Birth Defects
2. Premature Birth/Low Birthweight
3. Sudden Infant Death Syndrome (SIDS)
4. Maternal Complications of Pregnancy
5. Injury

GENERALLY UNDER-RECOGNIZED:

IMPORTANCE OF

Periconception Period

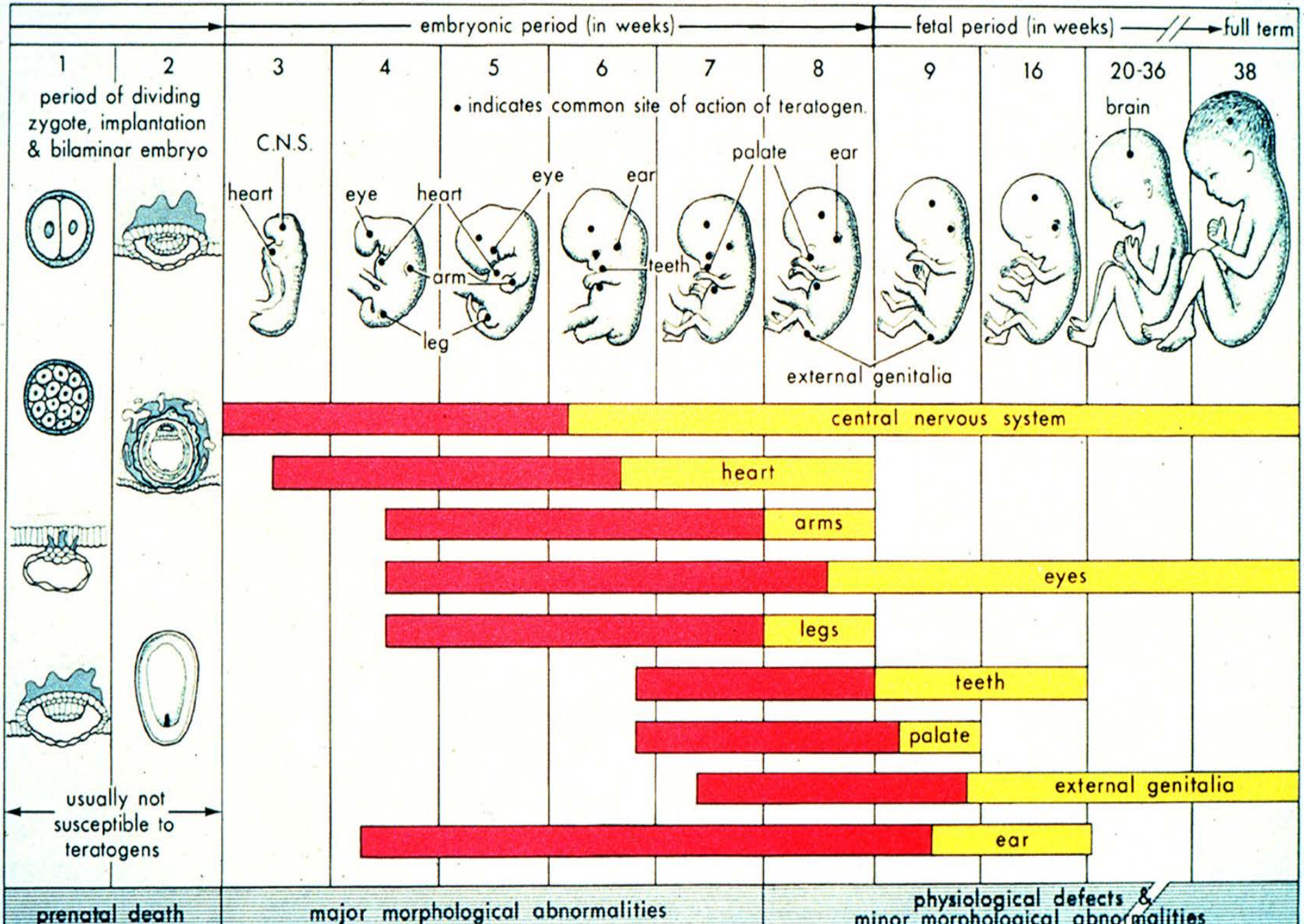
ON

PREGNANCY OUTCOMES

Some Definitions

- **Preconception**—before pregnancy
- **Periconception**—immediately before conception through organogenesis
- **Interconception**—period between end of one pregnancy and conception of next

CRITICAL PERIODS OF DEVELOPMENT
(RED DENOTES HIGHLY SENSITIVE PERIODS)



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WHAT ARE HER PERSONAL RISKS?

WHAT ARE PREGNANCY OUTCOME RISKS?

Interventions During Pregnancy to Prevent Poor Outcomes (and missed opportunities to prevent the preventable)

Antepartum Care

- Early, continuous prenatal care
  - Evidence based medical care
  - Designed around previous pregnancy outcomes
  - Nutrition education, support
  - Health care for the life course not just the pregnancy (e.g. tobacco cessation, etc.)
  - Holistic, patient-centered, mindful of multiple determinants of health

“As attractive and relatively inexpensive as prenatal care is, a medical model directed at a 6-8 month interval in a woman’s life cannot erase the influence of years of social, economic, [physical] and emotional distress and hardship.”

Dillard, RG NCMJ 65:3 p147 (2004)

Important Under-Utilized Prenatal Prevention Strategies to Prevent Preterm Birth

- Appropriate use of
  - Smoking cessation
  - Weight gain guidance/management
  - 17a-hydroxyprogesterone caproate (17P)
  - Appropriate use of low dose aspirin

Smoking in Pregnancy

- According to the 2011 Pregnancy Risk Assessment and Monitoring System (PRAMS) data from 24 states
  - Approximately 10% of women reported smoking during the last 3 months of pregnancy.
  - Of women who smoked 3 months before pregnancy, 55% quit during pregnancy.
  - Among women who quit smoking during pregnancy, 40% started smoking again within 6 months after delivery.

Pregnancy Weight Gain Guidance

- New article underscores missed opportunity
  - Provider advice about weight matters
  - Only 25% of pregnant women received guidance consistent with the IOM recommendations
  - Another 25% received no advice at all
    - Deputy, N., Sharma, A., Kim, S., Olson C. JWH, Jan, 2018

Yet gestational weight gain is a strong predictor of infant birth weight, complications of pregnancy and a gateway to lifelong health risks related to postpartum weight retention

Use of 17-P

- Which of these women are candidates

for 17-P?

  - MB is G3P1102 (preterm infant was born after induction for FGR)
  - KL is G1P000 (currently pregnant with twins)
  - MM is G2P1001 who has just now established on-going prenatal care due to moving from across country at 25 weeks GA
  - MB is G2P0100 who is starting prenatal care at 9 weeks GA

Use of 17-P

Level A Recommendation (ACOG):

- Woman with a **singleton** gestation and **prior spontaneous preterm singleton birth** should be offered progesterone supplementation **starting at 16-24** weeks GA, regardless of transvaginal u/s length, to reduce risk of SVPB
- Recommendation came from research indicating this strategy would reduce risk of recurrent preterm delivery by **34%** (note: full implementation would NOT prevent the majority of SVPBs)

Penetration of this Promising Strategy

- Actual implementation falling short—**FAR** short
  - Case report of "ideal" implementation case indicates only 59% of eligible women initiated 17P and 20% of those women electively stopped before receiving the full course.

What are some explanations?

Barriers to Promising Strategy

- Necessary steps:
  - Early prenatal care
  - Identification as candidate for 17-P use
  - Offered 17-P
  - Accepting 17-P
  - Affording 17-P
  - Accessing 17-P
  - Adherence to [inconvenient] weekly dose schedule

  "Until a commitment is made to actually measure 17-P coverage, understand the reasons for failed coverage and act upon our findings, we will likely continue to fall short. . .[of preventing the preventable]" (Stringer, et al. Obstet Gynecol, 2016)

Low-dose ASA to Reduce Maternal Mortality, Morbidity and PTB

- Preeclampsia accounts for 12% - 16% of maternal deaths in the United States, and 15% of preterm births.
- According to the US Preventive Services Task Force, an effective, inexpensive, and simple intervention exists to reduce rates of preeclampsia: low dose ASA (2014).

- The USPSTF recommends the use of low-dose aspirin (81 mg/d) as preventive medication after 12 weeks of gestation in women who are at high risk for preeclampsia. (Level B)
- The related SER concluded that low-dose aspirin (range, 60 to 150 mg/d) reduced the risk for preeclampsia by 24% in clinical trials and reduced the risk for preterm birth by 14% and IUGR by 20%.

USPSTF Recommendations

Risk Level	Risk Factors	Recommendation
High†	History of preeclampsia, especially when accompanied by an adverse outcome Multifetal gestation Chronic hypertension Type 1 or 2 diabetes Renal disease Autoimmune disease (systemic lupus erythematous, antiphospholipid syndrome)	Recommend low-dose aspirin if the patient has ≥1 of these high-risk factors
Moderate‡	Nulliparity Obesity (body mass index >30 kg/m^2) Family history of preeclampsia (mother or sister) Sociodemographic characteristics (African American race, low socioeconomic status) Age ≥35 years Personal history factors (e.g., low birthweight or small for gestational age, previous adverse pregnancy outcome, >10-year pregnancy interval)	Consider low-dose aspirin if the patient has several of these moderate-risk factors§
Low	Previous uncomplicated full-term delivery	Do not recommend low-dose aspirin

Penetration of this Promising Strategy

- What percent of eligible women are offered education and counseling about low dose ASA?

Important Over-Utilized Prenatal Prevention Strategies to Prevent Preterm Birth

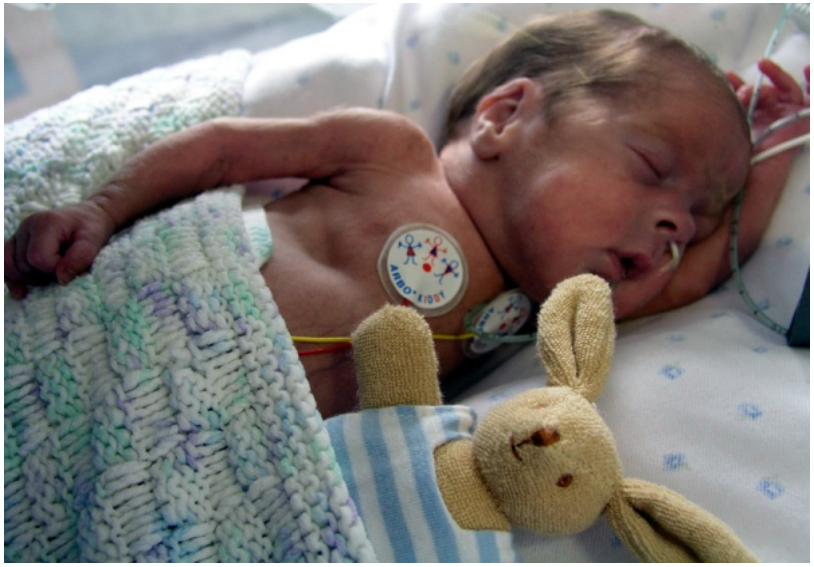
- Fetal fibronectin screening
- Bacterial vaginosis testing
- Home uterine activity monitoring (HUAM)

When Is Too Late?

- Jessica is a 19 yo who had an infant in your NICU. Five months ago she gave birth to her first child, a 3 ½ pound infant. Her pregnancy was complicated because she:
  - Was obese when she started prenatal care (BMI 30) and gained weight rapidly
  - Smoked 1 ppd which she was able to cut down on but she was not able to quit
  - Experienced an unintended pregnancy with the father of the pregnancy in and out of the picture.
  - Developed severe preeclampsia; subsequently induced
  - Gave birth by cesarean to an SGA infant at 35 weeks GA

- None of these issues were revisited after her last delivery—despite contact with
  - the neonatal care unit for 6 weeks
  - home visiting care for infant follow-up
  - routine and high risk pediatric care.
- She missed her postpartum visit because it coincided with the week she took her baby home
  - no one from that practice contacted her and she was subsequently so overwhelmed she failed to reschedule.

Who dropped the ball?

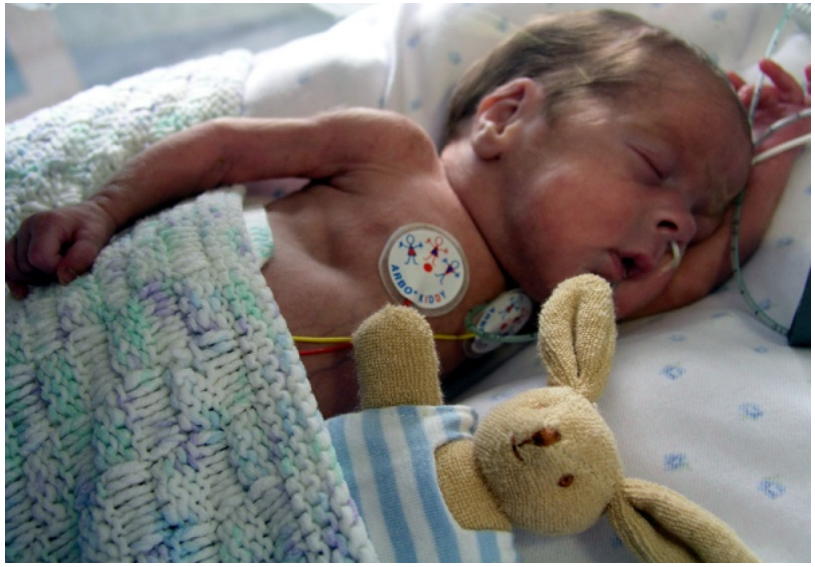


Who Dropped the Ball?

- The postpartum unit?
- The NICU?
- The home visitors?
- The obstetrician's office?
- The pediatric services?
- The woman?
- Her partner?

Who dropped the ball--everyone?

(yes!)



Today, you learn. . .

She is pregnant again!!

WHAT ARE HER RISKS FOR ANOTHER INFANT ADMITTED TO THE NICU (OR NEVER MAKING IT TO ADMISSION) THIS TIME?

Jessica's Risks THIS time

- Short interpregnancy interval (ideal is 18-60 months from one birth to next pregnancy)
- Obesity
- Smoker
- History of severe PIH
- Likely unintended conception
- Probably stress
- Possibly poor social support
- Others????

In fact, Jessica's baby was in YOUR NICU!!

What could you and your unit have done to avoid "dropping the ball"?

Why Interpregnancy Intervals (IPIs) Matter

- IPIs are measured from the end of one pregnancy and to the conception of the next one.
- Women with IPIs of less than 18 months are **14-47 percent more likely** to have premature infants.
- The most recent data suggests that approximately **14%** of women, aged 15-44, gave birth within 24 months of their last birth (**note**: to achieve the 18 month ideal interpregnancy interval a full term pregnancy would need a 27 month interval).
- Rates are higher among African-American, Latina, and poor women.
- Some reports indicate the rates are higher amongst older women and those with a previous poor pregnancy outcome.

Chandra A. et al. "Fertility, Family Planning and Reproductive Health of US Women: Data from the 2002 National Survey of Family Growth. National Center for Health Statistics. Vital Health Statistics. 23(25). 2005.

Why IPI Matters

- For each month that IPI was below 18 months,
  - Preterm births increased 1.9%
  - Low birthweight increased 3.3%
  - Poor intrauterine growth increased 1.5%

Conde-Aqudelo JAMA 2006 296(15) 1809-23.

- This means that helping a woman/couple decide to wait 12 months before attempting pregnancy rather than 6 months is important for risk reduction; and waiting 18 months rather than 15 is even less likely to create risks.

Giving the Numbers Meaning

- A woman becomes pregnant again 6 months after giving birth. Compared to waiting at least 18 months, her risks are:
  - Increased 23% for preterm birth
  - Increased 40% for low birth weight
  - Increase 18% for small for gestational age
- If woman had a previous preterm birth **and** a 6 month IPI she would have a **38% risk** for having a second premature birth

Obvious Point for Follow-Up

- The Post Partum Exam—unfortunately, far from universal:
  - Commercially insured women: 81% have a pp visit 3-8 weeks after giving birth.
  - Medicaid insured women: 64% have a pp visit 3-8 weeks after giving birth.
  - Self pay: ???? (likely even lower).

USDHHS, Women's Health, USA, 2013

Some of the "BIG" Misses at the Post Partum Visit

- Multivitamins with folic acid to prevent neural tube defects and nutrient deficiencies
- Cigarette smoking
- Education about interpregnancy intervals
- Contraception matched to patient desires
- Counseling and strategies for weight control
- Follow-up on pregnancy complications (e.g. PIH, GDM, PTB, congenital anomalies)

Omission of Key Health Promotion and Disease Prevention Opportunities at PP Visit

- Study of the content of pp visit for 400 women
  - Family planning counseling—72%
  - Weight recorded—50%
  - Weight discussed—4%
  - Return to sexual intimacy—36%
  - Breast exam—28%
  - Vitamin recommendation—16%
  - Inquired about substance use—14%
  - Inquired about maternal-infant bonding--4%
  - Inquired about family violence—2%
    - » Unpublished data from dissertation by S. Verbiest (SPH-UNC-CH, 2008)

A Reminder: Family Planning is, indeed, the most foundational step in the life course trajectory

- . . .and we can reinforce the importance of this concept by **NOT** using family planning and contraception as synonyms.
- Family planning is planning if and when to have any (or any more) children
  - if pregnancy is the choice, family planning involves undertaking actions to increase the likelihood of a healthy pregnancy and infant—in other words “planning for your future family”.
- Contraception (whether abstinence, short acting, long acting or permanent) is a strategy to achieve one’s goals about having children.

When Is It Too LATE??

- Serena was 38 yo G2P2 who died of an MI
- People could not believe it. . .She seemed so healthy.
- However, a careful look at her complete history revealed that both of her pregnancies were complicated by severe PIH and PTB.
- No notes in her EMR indicate that any provider considered her total history and risks when providing care.
- Like so many women, her care was organized around reproductive silos rather than a holistic prevention agenda.

Pregnancy serves as a "stress test" for life. . .

. . .but too often the test results are not used to design care that matters.

Pregnancy is **NOT** a disease but. .

It **is** accompanied by complications which can be risk factors for a woman developing **new** chronic diseases in the future.

How Medical Complications of Pregnancy Become New Chronic Diseases

- The demands of pregnancy on a woman's body uncover some "temporary" chronic disease.
- These "temporary" conditions threaten the health of the woman, the pregnancy and the offspring.
- Often (but not always) the condition is "cured" when the pregnancy ends.

BUT . . .

- The “cure” does not last because the “temporary” condition represented a risk factor for developing one or more specific chronic diseases.

- Many women in these situations do not get needed follow-up and monitoring after giving birth which places them at high risk for complications from new chronic diseases.

Examples of Pregnancy Complications Becoming Chronic Diseases

- **Gestational Diabetes**

  as high as 50% risk of developing Type II diabetes within next 5 years

- **Preeclampsia/eclampsia**

  Up to 400% (4 X) times as likely to develop chronic hypertension in their futures than women who did not have preeclampsia

Playing It Forward: Impact of PIH on Woman's Health

- Increased risk for subsequent cardiovascular and cerebral vascular diseases. (Bellamy, et al., BMJ, 2007)
- Increased risk for T2DM. (Lykke, et al., Htn, 2009; Carr, et al., Hypertens Preg, 2009)
- May be first manifestation of metabolic syndrome.
- If recurrence of hypertensive disorders in pregnancy, the risks for vascular disease increases substantially.
- Risk greatest where preeclampsia and preterm delivery occur in combination.

Playing It Forward: Impact of GDM on Women's Health

Subsequent development of metabolic diseases including:

- T2DM
  - Twenty to 50 percent chance of developing diabetes in the five to ten years after index pregnancy (ADA
  - Relative risk is 6.0 compared to women who did not have GDM(Cheung, 2003)
  - 10-31% of parous women with T2DM had GDM (Cheung)
- Metabolic Syndrome
  - Hypertension
  - Dyslipidmia
  - Microabluminuria

Source: Verier-Mine, Diabetes Metab, 2010: 595-616; Kaaja & Greer, JAMA, 2005; 294: 2751-2757.

Why Follow-up of Pregnancy Complications *after* Pregnancy is Important

- Women who develop **new** chronic diseases in the interconception period have **new** risks for their own health and **new** risks should they become pregnant again.

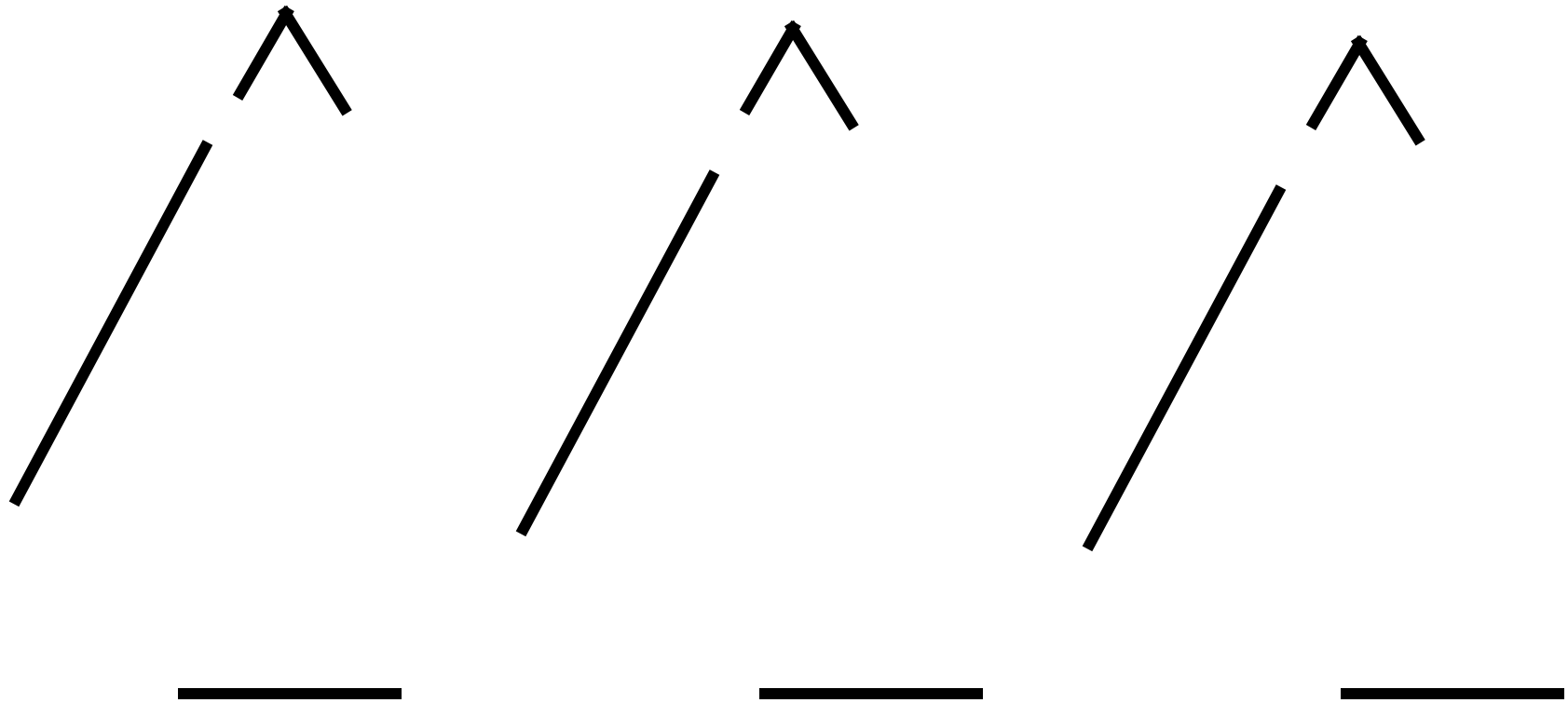
- Women are often unaware of the link between pregnancy complications and future medical problems.

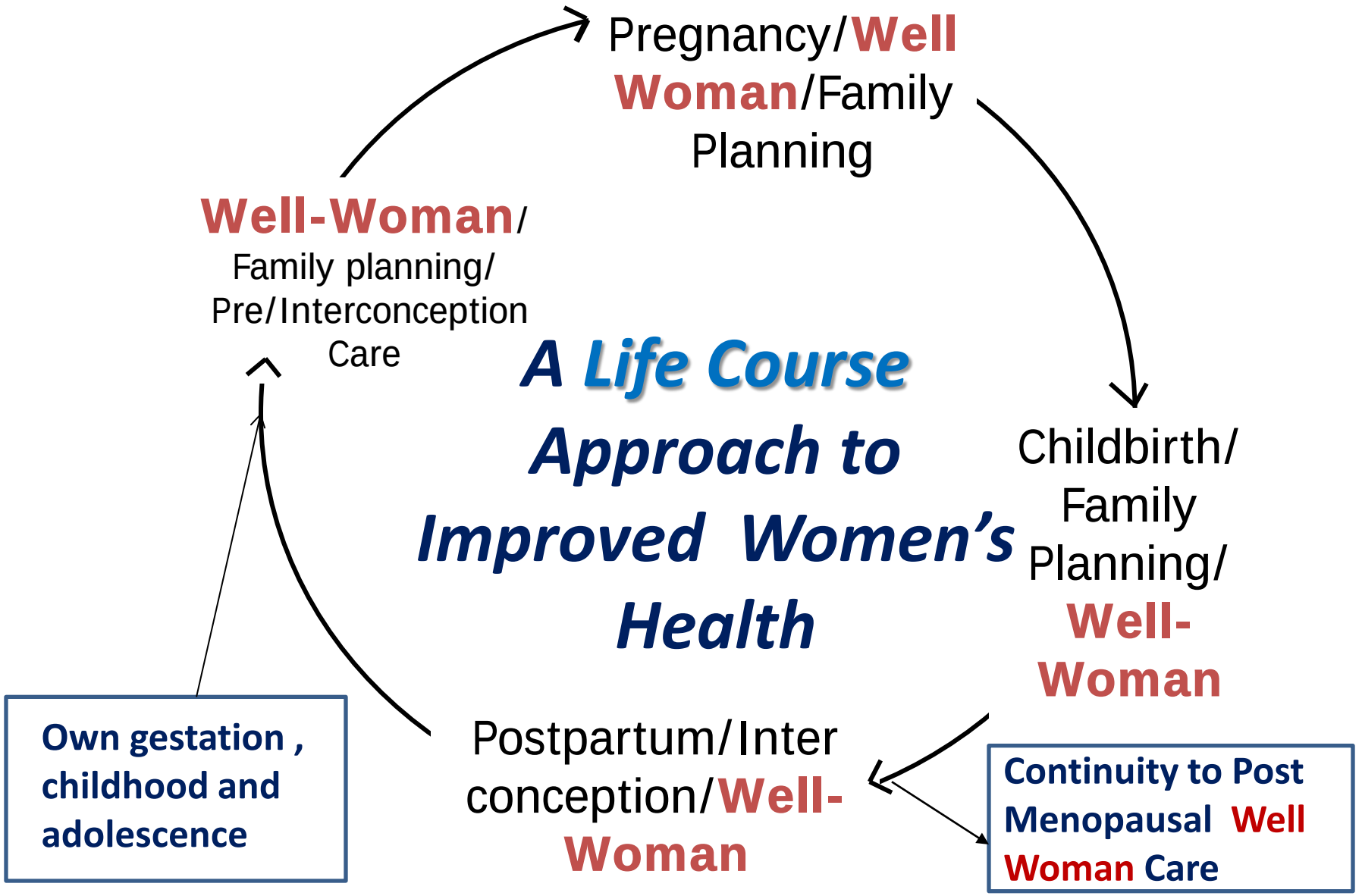
Follow-Up after GDM

- ACOG, WHO and others recommend postpartum testing at 6-12 weeks for women diagnosed with GDM in pregnancy:
- Only about **50%** of women who **attend their postpartum visit** actually are tested.
- Women who have abnormal results (pre-diabetic or T2DM) need follow-up
- Women who have normal results need continued surveillance

What can you and your colleagues do to increase the likelihood of appropriate care and follow-up?

Current Dominant Perinatal Prevention Paradigm

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Summary

- Strategies to prevent the preventable start too late or are poorly implemented. . .
- It is possible to reframe the prevention paradigm to make a difference for today's women and tomorrow's children.
- To change prevention paradigms requires new ways of approaching old problems:
  - Moving out of our silos to impact upstream opportunities
  - Reaching people with timely information—"who"
  - Providing people with simple actions—"what"
  - Recognizing that we all have opportunities to create strategies to have bigger impacts by working smarter not harder—"how"

The Opportunities Are Yours to Move Our Strategies Further Upstream:

Think Small or Think Big,

But

Think New

Impacting the Life Course for Today's Women and Tomorrow's Children