


## Facilitated Training – Speakers Notes

### “Reproductive Health Care and Congenital Heart Defects”

The American Academy of Pediatrics (AAP) has developed this **Reproductive Health Care and Congenital Heart Defects** resource to help pediatricians and other medical home team members care for individuals with congenital health defects who may need reproductive health guidance and have reproductive health questions. This training is intended to be facilitated by members of the practice team to encourage discussion in a short 20-25-minute presentation. This training consists of presenter slides, facilitator speakers notes, and a case study. These materials can be presented anywhere from staff meetings to professional development opportunities.

This resource was funded through a cooperative agreement (#5NU38OT000282) between the AAP and the Centers for Disease Control and Prevention’s National Center on Birth Defects and Developmental Disabilities.

The format for this training was inspired by the Spark trainings developed by the Adolescent Health Initiative at the University of Michigan. Their trainings can be found on their website at: [http://bit.ly/AHI\\_Spark](http://bit.ly/AHI_Spark).

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#### LEARNING OBJECTIVES

- Understand the reproductive health needs and considerations for adolescents and young adult patients with congenital heart defects (CHD).
- Examine the role of pediatricians in supporting reproductive health needs of adolescents and young adult patients with CHD.
- Analyze primary teaching concepts of reproductive health care of adolescents and young adult patients with CHD during 4 different life stages.
  - Family Planning/STI prevention
  - Preconception Counseling
  - Pregnancy
  - Postpartum

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## Slide 2

At the end of this mini training, the learner should be able to understand the reproductive health needs of the adolescent and young adult patients with congenital heart defects. We will examine the role of the pediatrician in supporting these reproductive health needs. Lastly, we will analyze primary teaching concepts that the pediatrician can integrate into care of the patient with CHD during **four** different life stages which include Family Planning, Preconception Counseling, Pregnancy, and Postpartum. The life stages are fluid where patients can move in and out at different ages. The pediatrician's role in the different life stages changes as the patient needs change. During the life stage of family planning and sexually transmitted infections (STI) prevention, the pediatrician role may be one of a counselor and teacher. The pediatrician can seek to understand the tasks involved in life stages of preconception counseling, pregnancy, and postpartum but is not responsible for orchestrating these.

#### BACKGROUND

- For any adolescent (male or female) the probability of having sexual intercourse by age 15 through 20 is similar
  - ~10% by age 15; ~50% by age 17; ~75% by age 20
- CHD Incidence and Prevalence<sup>4,5</sup>
  - 1 out of every 110 live births
- Pregnancy Rates in persons with Congenital Heart Disease<sup>6,7</sup>
  - 13-23% of women of childbearing age with CHD had a pregnancy
- Cardiovascular Disease and Maternal Mortality<sup>8</sup>
  - CVD is largest contributor in developing countries
- Congenital Heart Disease and Maternal Mortality<sup>7,9</sup>
  - Maternal mortality with CHD only 0.1-0.15%

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## Slide 3

To give some perspective on sexual activity in general and then on congenital heart disease, the following statistics are presented here. First, let's discuss the adolescent's probability of having sexual intercourse, and then examine how many patients have congenital heart defects, and how many patients with congenital heart defects may consider reproductive health issues.

- For both female and male adolescents from 15 to 20 years of age, the probability of having sexual intercourse is similar. By age 15, 21% of females and 20% of males have ever had sexual intercourse. By age 17, 53% of females and 48% of males have ever had sexual intercourse. By age 20, 79% of females and 77% of males have ever had sexual intercourse.
- The condom is the most commonly used contraceptive method among female teenagers. However, females who had a first sexual encounter over age 15, were more likely to use contraception versus those under age 14 at first sexual intercourse. For females at first sexual intercourse, 79% used contraception at ages 15 to 16, whereas 83% used contraception at ages 17 to 19. However, for females under age 14, only 57% used contraception at first sexual intercourse. In comparison, for males at first sexual intercourse, 93% used contraception at ages 15 to 16, whereas 91% used contraception at ages 17 to 19. For males under age 14, 78% used contraception at first sexual intercourse (Hamilton et al 2019).
- Congenital Heart Defects affect 1 out of every 110 live births, making CHD the most common type of major structural birth defect. Prevalence data is extrapolated from Canadian data and applied to the United States (US) Census data. From 2010 data, in the US, an estimated 1 mil children and about 1.4 mil adults were living with CHDs, and about 300,000 of these individuals had a critical CHD (Bjornard et al 2013; Gilboa et al 2016; Hoffman & Kaplan 2002; Reller et al 2008).
- To understand the pregnancy rates of individuals with CHD, large studies in large metropolitan areas are useful. From 2008 to 2010 in three large metropolitan US areas, about 13-23% of women with CHD had experienced a pregnancy (Raskind-Hood et al 2019).
- Between the years 1998 to 2007, there was a 34.9% increase in the number of pregnant people with CHD who were admitted for delivery compared to a 21.3%

	<p>increase in the general pregnant population admitted for delivery (Opotowsky et al 2012).</p> <ul style="list-style-type: none"> <li>It is relevant to note that cardiovascular disease of all types is the largest contributor to maternal mortality in developing world countries (Kotit &amp; Yacoub, 2021). However, interestingly in one large study overall CHD maternal mortality was at 0.15% (150/100,000; Opotowsky et al 2012) while another large study found that CHD maternal mortality due to a major adverse cardiac event was at 0.1% (37/33982; Lima et al, 2017)</li> </ul> <p>References:</p> <ol style="list-style-type: none"> <li>Hamilton BE, Martin JA, Osterman MJK, Rossen LM. Births: Provisional data for 2018. NCSS Vital Statistics Rapid Release. National Center for Health Statistics. May 2019</li> <li>Martinez GM, Abma JC. Sexual activity and contraceptive use among teenagers aged 15-19 in the United States, 2015-2017. US Department of Health &amp; Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. NCHS Data Brief. 2020(366):1-8</li> <li>Bjornard K, Riehle-Colarusso T, Gilboa SM, Correa A. Patterns in the prevalence of congenital heart defects, metropolitan Atlanta, 1978 to 2005. Birth Defects Research Part A: Clinical and Molecular Teratology. 2013;97(2):87-94.</li> <li>Gilboa SM, Devine OJ, Kucik JE, et al. Congenital Heart Defects in the United States: Estimating the Magnitude of the Affected Population in 2010. Circulation. 2016;134(2):101-109.</li> <li>Hoffman JIE, Kaplan S. The incidence of congenital heart disease. Journal of the American College of Cardiology. 2002;39(12):1890-1900.</li> <li>Reller MD, Strickland MJ, Riehle-Colarusso T, Mahle WT, Correa A. Prevalence of Congenital Heart Defects in Metropolitan Atlanta, 1998-2005. The Journal of Pediatrics. 2008;153(6):807-813.</li> <li>Raskind-Hood C, Saraf A, Riehle-Colarusso T, et al. Assessing Pregnancy, Gestational Complications, and Co-morbidities in Women With Congenital Heart Defects (Data from ICD-9-CM Codes in 3 US Surveillance Sites). The American Journal of Cardiology. 2020;125(5):812-819.</li> <li>Opotowsky AR, Siddiqi OK, D'Souza B, Webb GD, Fernandes SM, Landzberg MJ. Maternal cardiovascular events during childbirth among women with congenital heart disease. Heart. 2012;98(2):145.</li> <li>Kotit S, Yacoub M. Cardiovascular adverse events in pregnancy: A global perspective. Global Cardiology Science and Practice. 2021(1):e202105.</li> </ol>
<p><b>INTRODUCING REPRODUCTIVE HEALTH TO YOUR PATIENT</b></p> <ul style="list-style-type: none"> <li>Discuss patient-specific needs early in adolescence</li> <li>Reproductive health issues need to be introduced even when the patient or family seem reluctant.*?</li> <li>Contraception and STIs are important to discuss</li> <li>Discuss broad categories of pregnancy</li> <li>Answer patient questions about any concerns</li> </ul> <p><small>American Academy of Pediatrics PEDIATRIC SOCIETY OF AMERICA</small></p>	<p><b>Slide 4</b></p> <p><b>Has anyone had experience talking to adolescents with CHD or young adults about reproductive issues?</b></p> <p><b>&lt;wait for responses/discuss responses&gt;</b></p> <p><b>Rhetorical question: Did the conversation go well or not so well? What went well? What could be better?</b></p> <p>As health care clinicians, discussing reproductive health issues and teaching concepts with the patient with CHD is important. Reproductive health discussions specific to the patient needs to start early in adolescence, and be developmentally appropriate (Deng et al., 2018; Regit-Zagrosek et al. 2011). Patients and families often have high anxiety about reproductive health issues, they may be reluctant to voice any concerns, and can possibly be misinformed. We know that most patients with CHD can become pregnant, and many deliver with a relatively low degree of risk given appropriate pre-natal and cardiology care. Therefore, standard reproductive health practices can apply to most adolescents and young adults with CHD. As we discuss reproductive health further, we will begin to focus on some exceptions.</p> <p>Reproductive health can be an emotional topic. Discussions with the patient and family may be difficult, hard, and often embarrassing, therefore, preparing ahead of time is essential, as it is important for the overall health of the patient (Osteen &amp; Beal, 2016; Regit-Zagrosek et al.,</p>

2011; Sable et al., 2011; Vigl et al., 2010). Discussions regarding the reproductive health needs and family planning of patients with CHD, may include contraception, sexually transmitted infections, or pregnancy and childbearing. Many adolescents and young adults have ideas and myths from peers that need to be clarified or resolved. Be sure to approach in a nonjudgmental way with kindness, respect, and be prepared for questions.

Discuss pregnancy and reproduction in broad categories and in an age-appropriate manner. Make sure to discuss contraception for pregnancy prevention but also sexually transmitted infection prevention. Make sure to include the person's individual desire and expectation for pregnancy but also the long-term impact and life expectancy post pregnancy of both parental individuals involved (Regitz-Zagrosek et al. 2011).

It is noted in the literature that reproduction conversations are marginally discussed with consistency by clinicians in all areas of CHD care but especially in transition (Deng et al., 2018; Kovacs et al, 2008; Lindley et al, 2021; Sable et al., 2011; Vigl et al, 2010). Therefore, one clinician should not assume another clinician discussed reproductive health with the patient with CHD. Missed teaching opportunities to discuss reproductive related issues can lead to many unanswered questions for the adolescent or early young adult, that may result in potential unplanned pregnancy or a sexually transmitted infection.

Establishing a relationship with the patient and family is important as the patient moves through the adolescent and young adult years (Regitz-Zagrosek et al. 2011). At times these conversations may need to be introduced to the patient and family due to an intentional or unplanned pregnancy with many discussions, decisions, and teaching opportunities needed. Parents should be included, but also structure the appointment where the patient feels comfortable asking questions and if needed or requested - give privacy. The key is to know your patient and family needs.

**What are some ways you can change your practice to include/increase reproductive health discussions with your patients with CHD?**

<wait for responses/discuss responses>

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1. Osteen KA, Beal CC. . Reproductive Health and Women With Congenital Heart Disease. *The Journal of Perinatal & Neonatal Nursing*. 2016; 30 (1): 25-35.
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7. Lindley KJ, Madden T, Cahill AC, Ludbrook PA, Billadello JJ. Contraceptive Use and Unintended Pregnancy in Women with Congenital Heart Disease. *Obstetrics and Gynecology*. 2015;126(2):363-369.

#### LIFE STAGE 1: FAMILY PLANNING/STI PREVENTION

- Discuss early and often (circumstances change over time)
- Make sure patient has ways to contact your team and guidance surrounding confidentiality
- Multiple methods of both long and short acting:
  - Barrier methods
  - Oral contraceptives
  - Long-Acting Reversible Contraceptives
    - Intrauterine device (IUD) including copper and hormonal
    - Subdermal implants
    - Implants
- Discuss emergency contraception (EC, copper IUD or oral EC)
- Discuss with your patient benefits and risks of each contraceptive method, as related to their type of CHD<sup>1,3</sup>

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### Slide 5

Discussions surrounding family planning and pregnancy and STI prevention should start early and as soon as developmentally appropriate for the patient. Typically, this is around the early teen years, but timing may vary. As development and social circumstances change greatly during the teen and young adult years, it is important to continue to address types of contraception and need for family planning at least at routine annual checkups. While these conversations are important for every teen, the implications of unplanned pregnancy or STI for a patient with CHD may be much greater than for the average teen or young adult. Regarding pregnancy, this includes both the health of the fetus and the birthing parent and may relate to the underlying heart condition, cyanosis or teratogenic medications. The patients should have multiple methods of reaching you or your team for questions and should be aware that these discussions can be confidential from their parents even if they are under 18 years of age. It is important to review all the contraceptive options and the risks and benefits as they may appeal differently to each patient. **{Briefly discuss each type here}.**

Certain types of contraception may carry higher risk for some patients with CHD such as increased clotting risk with estrogen products. For example, you would want to avoid estrogen in patients with mechanical valves or other underlying higher clot risk. So, depending on the heart condition, progesterone-only methods such as LARC may be preferred. Choices for long-term contraception should be reviewed with the cardiologist. In some situations where birth control was not used, failed or inconsistent, emergency contraceptive medication can be considered but this is not meant for regular birth control use and should be discussed with the physician (especially now that EC is over-the-counter). While the topic may be challenging, an open and non-judgmental approach can be successful in helping patients avoid infections and unexpected pregnancy.

#### References:

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#### LIFE STAGE 2: PRECONCEPTION COUNSELING

##### CHD Pregnancy Risk Scores

- Modified World Health Organization<sup>1</sup> (mWHO) classification of maternal cardiovascular risks
- CARPREC<sup>2</sup> and CARPREC II<sup>3</sup> - (CARDiac Disease in PREGnancy) - Canada
- ZAHARA<sup>4</sup> - (Zwangerschap bij Aangeboren HARTafwijking: Pregnancy and Congenital Heart Disease) - Europe

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### Slide 6

**Is anyone familiar with CHD pregnancy risk scoring tools? If yes, which ones have you used?**

**<wait for responses/discuss responses>**

**Do you think the risk scoring tool you used was helpful in identifying potential cardiac problems with your patient with CHD? Was the risk scoring tool helpful in opening up a conversation with your patient about reproductive health issues?**

The pediatrician may not ever need to complete these risk scoring tools, however knowing the risk assessment tools is important for many reasons: One - to understand and be knowledgeable about which cardiac issues confer increased patient pregnancy risk; Two - to enhance pediatrician and cardiologist collaboration; Three - to enhance pediatrician preparedness to discuss risk scores with the patient should they have questions. Often the

	<p>cardiologist will complete these risk assessments, however it is important to be aware of what they are and how the score is determined.</p> <p>There are many risk assessment tools available to use as clinicians work through discussions about pregnancy and maternal health, however the most widely used risk tool is the modified WHO (mWHO) (Thorne et al., 2006). The modified WHO classification provides an initial inspection of risk for cardiovascular events during pregnancy that integrates preexisting congenital heart disease and acquired heart disease. However more detailed information is needed from further clinical examination to understand a full picture of specific potential patient risk.</p> <p>The CARPREG (Sui et al., 2001) is a second assessment tool available to clinicians that was developed in Canada with a large cohort of which 64% of the women had CHD. The CARPREG II (Silversides et al., 2018) is an updated CARPREG tool that includes more information than the initial CARPREG tool and the modified WHO classification. The CARPREG II risk tool is specific to risk predictors for pregnancy and heart disease.</p> <p>The ZAHARA (Drenthen et al., 2010) Risk Score was developed in Europe exclusively for women with CHD. The ZAHARA adds specific CHD predictors that are not in the modified WHO or CARPREG risk tools. The bottom line is to make sure if you are assessing risk of your patient with CHD, you are looking at the patient and not just the score. For example, some patients with CHD with a simple CHD lesion may still be high risk due to comorbid conditions. Clinicians need to be sure to regard the whole patient including the presence of comorbid conditions, physical, and mental health, to determine risk.</p> <p>References:</p> <ol style="list-style-type: none"> <li>1. Thorne S, Nelson-Piercy C, MacGregor A, et al. Pregnancy and contraception in heart disease and pulmonary arterial hypertension. <i>J Fam Plann Reprod Health Care</i>. 2006;32(2):75-81.</li> <li>2. Siu SC, Sermer M, Colman JM, et al. Prospective Multicenter Study of Pregnancy Outcomes in Women With Heart Disease. <i>Circulation</i>. 2001;104(5):515-521.</li> <li>3. Silversides CK, Grewal J, Mason J, et al. Pregnancy Outcomes in Women With Heart Disease: The CARPREG II Study. <i>Journal of the American College of Cardiology</i>. 2018;71(21):2419-2430.</li> <li>4. Drenthen W, Boersma E, Balci A, et al. Predictors of pregnancy complications in women with congenital heart disease. <i>European Heart Journal</i>. 2010;31(17):2124-2132.</li> </ol>
<p><b>LIFE STAGE 2: PRECONCEPTION COUNSELING</b></p> <p><b>Risk Assessment</b><sup>1,2,3</sup></p> <ul style="list-style-type: none"> <li>• General History – NYHA class, functional capacity, CYN history, meds</li> <li>• Cardiac History – heart failure, arrhythmia, clotting problems, pulmonary hypertension</li> <li>• Exam, EKG</li> <li>• Imaging – echo, possible MRI/CT</li> <li>• Stress testing</li> <li>• Lab testing</li> </ul> <p><small>American Academy of Pediatrics DEDICATED TO THE HEALTH OF ALL CHILDREN</small></p>	<p><b>Slide 7</b></p> <p>When a patient is considering pregnancy, a specific assessment is important to evaluate the risk and benefits to the individual patient. As previously mentioned, there are a number of available risk scores to help in this process, but clinical judgment also plays a large role. While the majority of testing will be done by the cardiologist, the pediatrician is often a primary point of contact, and it is important to be aware that the patient with CHD needs a cardiac evaluation prior to pregnancy. The evaluation can also be done in the early stages of pregnancy, if not done prior. When assessing the risk of pregnancy, one must consider both the health of the pregnant person as well as the developing fetus.</p> <p>A comprehensive cardiac history including topics from the risk scores such as heart failure, arrhythmias, pulmonary hypertension or thromboses is a good place to start. The rest of the history is also important to be aware of other medical conditions, functional abilities, syndromes, Gyn history and medications. There are certain cardiac medications that can be harmful in pregnancy and need to be stopped or adjusted prior, such as ACE inhibitors or</p>




	<p>warfarin. While telehealth remains a common method of seeing patients, pre-pregnancy evaluation should be done in person to allow for a physical exam and cardiac testing.</p> <p>Every patient should undergo an EKG and echocardiogram to assess ventricular and valvular function and for other abnormalities. Some patients may also need advanced imaging such as cardiac MRI or CT prior to pregnancy to assess things not well seen on echo such as ventricular function, aortic dimensions, or other vascular anatomy.</p> <p>While not a consideration in most of the risk scores, a stress test can be helpful to assess for overall functional capacity as well as for arrhythmias, ischemia or desaturation with exercise which can all affect a pregnancy and developing fetus.</p> <p>Basic lab testing including CBC and chemistries is also recommended by the AHA prior to pregnancy. In some circumstances, it may also be recommended that patients undergo cardiac catheterization either for diagnosis or optimization, such as when there is a concern for pulmonary hypertension or cyanosis at rest or with exercise.</p> <p>References:</p> <ol style="list-style-type: none"> <li>1. Lindley KJ, Bairey Merz CN, Asgar AW, Bello NA, Chandra S, Davis MB, Gomberg-Maitland M, Gulati M, Hollier LM, Krieger EV, Park K, Silversides C, Wolfe NK, Pepine CJ; American College of Cardiology Cardiovascular Disease in Women Committee and the Cardio-Obstetrics Work Group. Management of Women With Congenital or Inherited Cardiovascular Disease From Pre-Conception Through Pregnancy and Postpartum: JACC Focus Seminar 2/5. <i>J Am Coll Cardiol</i>. 2021 Apr 13;77(14):1778-1798.</li> <li>2. Canobbio MM, Warnes CA, Aboulhossn J, et al. Management of Pregnancy in Patients With Complex Congenital Heart Disease: A Scientific Statement for Healthcare Professionals From the American Heart Association. <i>Circulation</i>. 2017;135(8):e50-e87.</li> <li>3. Roos-Hesselink JW, Budts W, Walker F, De Backer JFA, Swan L, Stones W, Kranke P, Sliwa-Hahnle K, Johnson MR. Organization of care for pregnancy in patients with congenital heart disease. <i>Heart</i>. 2017 Dec;103(23):1854-1859.</li> </ol>
<p><b>LIFE STAGE 2: PRECONCEPTION COUNSELING</b></p> <p><b>Multidisciplinary team <sup>1,2</sup></b></p> <ul style="list-style-type: none"> <li>• Pediatrician/primary care</li> <li>• CHD cardiologist</li> <li>• MFM with experience in CHD if possible</li> <li>• OB anesthesiologist</li> <li>• Others – geneticist, heart failure specialist, electrophysiologist, nurse, pharmacists</li> </ul> <p><b>Alternatives to pregnancy <sup>3</sup></b></p> <ul style="list-style-type: none"> <li>• Surrogacy</li> <li>• Adoption</li> <li>• Sterilization</li> <li>• Pregnancy termination</li> </ul> <p><small>American Academy of Pediatrics PEDIATRIC CARDIOLOGY AND CONGENITAL HEART DISEASE</small></p>	<p><b>Slide 8</b></p> <p><b>Does anyone have a multidisciplinary team knowledgeable of CHD needs readily available to assemble? What are some reasons a team like this might be important?</b></p> <p><b>&lt;wait for responses/discuss responses&gt;</b></p> <p>When discussing reproductive health and pregnancy with a patient with CHD, it is important to explain the multidisciplinary team and the roles of each team member. Multidisciplinary teams are more readily available to assemble in large urban areas where there is higher likelihood of integration of healthcare services (Kotit &amp; Yacoub, 2021; Mehta et al 2020). The team will need to be involved in care early in the pregnancy and up to one year postpartum (Canobbio et al 2017; Mehta et al 2020). The patient may not understand the concept of a multidisciplinary team, therefore explain specifically the doctors, nurses and other clinical staff who will participate in their care. Additionally, explain who the specialized clinicians on the team are and the role the team members may play in the patient care. This may help the patient conceptualize the people caring for them. Specific individual members on the team might include those noted on the slide.</p> <p>These team members develop a thorough plan to manage the patient from pregnancy, antepartum, delivery, postpartum, and peripartum. The pediatrician and CHD cardiologist will help identify members, coordinate the team, and counsel the patient to achieve a shared</p>

	<p>decision. A Maternal Fetal Medicine physician, or MFM, who is experienced in patients with CHD is needed to outline potential fetal risks, but also help minimize any risks should they occur. The OB anesthesiologist is included to assist and guide coordination of delivery. Other specialists such as geneticist and heart failure specialist, will be included as needed. The heart failure specialist may be included, as heart failure is the most common complication for all women with heart disease, and heart failure is a potential problem, secondary to pregnancy, and can occur up to 13 weeks postpartum. An electrophysiologist may be included to help correct any arrhythmia or complication of an existing arrhythmia that may arise (Kotit &amp; Yacoub, 2021). The pharmacist will help review all medications for safety while pregnant (Mehta et al 2020).</p> <p>As the conversations occur with patients, the weight of the decisions may be a lot to bear for the patient, sometimes patients have questions about alternatives to pregnancy. It is of importance to note however, that patients can confuse the phrase “should I get pregnant” with “can I get pregnant.” Clinicians need to remember that for most patients with CHD, fertility is not impaired and standard reproductive practices apply. Clinicians must be able to address any alternatives to pregnancy in an unhurried manner including those we would not normally recommend to an adolescent. Clinicians must be very open to discussing alternatives to pregnancy including surrogacy, adoption, sterilization, and pregnancy termination. Remember to be open and non-judgmental about the many definitions of what a family looks like. Clinicians realize that there are many ways to have a family, and families look different across the many ideas and cultures in our country.</p> <p>References:</p> <ol style="list-style-type: none"> <li>1. Kotit S, Yacoub M. Cardiovascular adverse events in pregnancy: A global perspective. <i>Glob Cardiol Sci Pract</i>. 2021(1):e202105.</li> <li>2. Mehta LS, Warnes CA, Bradley E, et al. Cardiovascular Considerations in Caring for Pregnant Patients: A Scientific Statement From the American Heart Association. <i>Circulation</i>. 2020;141(23):e884-e903.</li> <li>3. Canobbio MM, Warnes CA, Aboulhossn J, et al. Management of Pregnancy in Patients With Complex Congenital Heart Disease: A Scientific Statement for Healthcare Professionals From the American Heart Association. <i>Circulation</i>. 2017;135(8):e50-e87.</li> </ol>
<p><b>LIFE STAGE 3: PREGNANCY</b></p> <p><b>CHD Complications of Pregnancy <sup>1-4</sup></b></p> <ul style="list-style-type: none"> <li>• Arrhythmias</li> <li>• Heart failure / volume retention</li> <li>• Thrombotic / Bleeding complications</li> <li>• Worsening valvular disease</li> <li>• Compromised lung capacity</li> <li>• Fetal / Neonatal complications <ul style="list-style-type: none"> <li>→ Intrauterine Growth Restriction / Small for Gestational Age</li> <li>→ Premature birth</li> <li>→ CHD; Fetal Echo recommended at 18 -20 weeks gestation</li> </ul> </li> </ul> <p><small>American Academy of Pediatrics</small></p>	<p><b>Slide 9</b></p> <p>Pregnant people with congenital heart defects are at risk for both birthing parent and fetal complications. Despite pre-pregnancy counseling and risk assessment, complications can still occur throughout the pregnancy and the early post-natal period. The complications also vary greatly based on the underlying condition, again emphasizing the importance of individualized pre-natal risk assessment prior to pregnancy. For example, a person with a repaired atrial septal defect will have a different and less complicated risk assessment than someone with single ventricle heart disease. It should be noted however, that outcome studies likely have a large selection bias as the sickest patients were likely counseled against pregnancy to start.</p> <p>For the birthing parent, most complications occurred in the antenatal period. The most common defects are arrhythmias, particularly supraventricular tachycardia, and heart failure. In addition, these patients are at risk for both thrombotic complications due to the underlying condition and the hypercoagulable state induced by pregnancy as well as bleeding complications from either the underlying conditions or medications required to prevent thrombosis, like anticoagulant and anti-platelet agents. Due to the hemodynamic changes in pregnancy with increased heart rate and cardiac output, some patients will have</p>



	<p>worsening valvular disease during pregnancy. This can typically be treated with medications but in some cases may progress to require catheter-based or surgical interventions.</p> <p>The pregnancy complications in patients with CHD are not only cardiac. Common obstetric complications include postpartum hemorrhage and premature birth as well as IUGR and SGA but, again, these will vary based on the underlying CHD and any medications necessary during the pregnancy. As there is an increased risk of CHD in the offspring of parents with CHD, genetic counseling can be offered to families for a better assessment of their individual risks. In addition, a fetal echocardiogram at 18-20 weeks gestation is recommended when either parent is identified as having CHD. If a CHD is identified, the parents and doctors can be prepared for any issues that might arise in the postpartum and neonatal periods.</p> <p>References</p> <ol style="list-style-type: none"> <li>1. Lindley KJ, Bairey Merz CN, Asgar AW, Bello NA, Chandra S, Davis MB, Gomberg-Maitland M, Gulati M, Hollier LM, Krieger EV, Park K, Silversides C, Wolfe NK, Pepine CJ; American College of Cardiology Cardiovascular Disease in Women Committee and the Cardio-Obstetrics Work Group. Management of Women With Congenital or Inherited Cardiovascular Disease From Pre-Conception Through Pregnancy and Postpartum: JACC Focus Seminar 2/5. <i>J Am Coll Cardiol</i>. 2021 Apr 13;77(14):1778-1798.</li> <li>2. Garcia Roperio A, Baskar S, Roos Hesselink JW, Girnius A, Zentner D, Swan L, Ladouceur M, Brown N, Veldtman GR. Pregnancy in Women With a Fontan Circulation: A Systematic Review of the Literature. <i>Circ Cardiovasc Qual Outcomes</i>. 2018 May;11(5):e004575.</li> <li>3. Füniss HE, Stiller B. Arrhythmic risk during pregnancy in patients with congenital heart disease. <i>Herzschrittmacherther Elektrophysiol</i>. 2021 Jun;32(2):174-179. English.</li> <li>4. Alshawabkeh L, Economy KE, Valente AM. Anticoagulation During Pregnancy: Evolving Strategies With a Focus on Mechanical Valves. <i>J Am Coll Cardiol</i>. 2016 Oct 18;68(16):1804-1813.</li> </ol>
<p><b>LIFE STAGE 4: POST-PARTUM</b></p> <p><b>Post-partum Considerations</b></p> <ul style="list-style-type: none"> <li>• Close postpartum follow up<sup>1</sup></li> <li>• Hypertension <sup>2,4</sup></li> <li>• Heart failure<sup>5</sup></li> <li>• Medication management <sup>4</sup></li> <li>• Breastfeeding<sup>5</sup> <ul style="list-style-type: none"> <li>- Few contraindications</li> <li>- Few medications are contraindicated</li> </ul> </li> </ul> <p><small>American Academy of Pediatrics PEDIATRIC CARDIOLOGY</small></p>	<p><b>Slide 10</b></p> <p><b>What type of postpartum issues have you seen in your practice? What long term issues have you seen or would you think would be an issue with your patients postpartum?</b></p> <p><b>&lt;wait for responses/discuss responses&gt;</b></p> <p>Discussing with the patient about what will happen after pregnancy is just as important as any other discussion with the patient that has been addressed here. Pediatricians should be knowledgeable about what needs to and/or could occur after childbirth in order to educate the adolescent with CHD prior to pregnancy. Additionally, the pediatrician can be aware of the needs of the postpartum patient with the intent of that patient receiving the best care possible if a pregnancy occurs or if non-pregnancy related issues arise in the postpartum setting. The multidisciplinary team as noted on the previous slide should continue to closely follow the patient up to one year postpartum per guidelines (Mehta et al., 2020). Hypertension is common during and after delivery. It is noted that patients with hypertension in pregnancy are more likely and at a higher risk of having recurrent hypertension in subsequent pregnancies. Additionally, these patients are more likely to develop hypertension later in life (Brouwers et al., 2018).</p> <p>Heart failure recurrence with a subsequent pregnancy is reported in 50% of cases even with the best treatment available to the patient (Forster et al., 2008). Therefore, counseling regarding the ability to allow adequate time to heal from the pregnancy is essential. If a repeated pregnancy occurs close to the previous, this can predispose the patient to harmful consequences (Regitz-Zagrosek et al., 2011).</p>

	<p>Regular cardiology visits are highly encouraged and if the patient becomes symptomatic can be increased. Medications need to be reviewed and managed by the team for benefits and risks to the parent infant pair, and for breastfeeding contraindications. However, there are few medication contraindications with breastfeeding. After review, dosing adjustment, changing, or discontinuing can be discussed. It is well known to avoid toxic medications that cross into breast milk, including anticoagulant medications where there are equivalent alternatives. Consult with team members for best course of action. (Canobbio et al., 2017; Regitz-Zagrosek et al., 2011). Again, there are few contraindications for breastfeeding the infant, however close monitoring of the infant's weight and growth is needed to ensure adequate nutrition (Regitz-Zagrosek et al., 2011).</p> <p>References</p> <ol style="list-style-type: none"> <li>1. Mehta LS, Warnes CA, Bradley E, et al. Cardiovascular Considerations in Caring for Pregnant Patients: A Scientific Statement From the American Heart Association. <i>Circulation</i>. 2020;141(23):e884-e903.</li> <li>2. Brouwers L, van der Meiden-van Roest A, Savelkoul C, et al. Recurrence of pre-eclampsia and the risk of future hypertension and cardiovascular disease: a systematic review and meta-analysis. <i>BJOG: An International Journal of Obstetrics &amp; Gynaecology</i>. 2018;125(13):1642-1654.</li> <li>3. Forster O, Hilfiker-Kleiner D, Ansari AA, et al. Reversal of IFN-<math>\gamma</math>, oxLDL and prolactin serum levels correlate with clinical improvement in patients with peripartum cardiomyopathy. <i>European Journal of Heart Failure</i>. 2008;10(9):861-868.</li> <li>4. Regitz-Zagrosek V, et al. ESC Guidelines on the management of cardiovascular diseases during pregnancy: The Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC). <i>European Heart Journal</i>. 2011;32(24):3147-3197.</li> <li>5. Canobbio MM, Warnes CA, Aboulhossn J, et al. Management of Pregnancy in Patients With Complex Congenital Heart Disease: A Scientific Statement for Healthcare Professionals From the American Heart Association. <i>Circulation</i>. 2017;135(8):e50-e87.</li> </ol>
<p><b>RESOURCES</b></p> <ul style="list-style-type: none"> <li>• AAP Policy Statement: <ul style="list-style-type: none"> <li>– The Care of Children With Congenital Heart Disease in Their Primary Medical Home</li> </ul> </li> <li>• Congenital Health Defects Awareness Toolkit</li> <li>• AAP Congenital Heart Public Health Consortium</li> <li>• HealthyChildren.org Articles: <ul style="list-style-type: none"> <li>– Reproductive Health in Young Patients with Congenital Heart Defects</li> <li>– Birth Control for Young Patients with CHD</li> <li>– Reproductive Counseling for Women with CHD</li> <li>– Reproductive Health Practices and CHD</li> <li>– Fertility and CHD: Why Monitoring Your Child's Health Is Important</li> <li>– Genetic Testing CHD</li> </ul> </li> </ul> <p>American Academy of Pediatrics ADVANCING THE HEALTH OF ALL CHILDREN</p>	<p><b>Slide 11</b></p> <p>&lt;call attention to resources on slide&gt;</p>
<p><b>CASE-STUDY</b></p> <p>See case study document</p> <p>American Academy of Pediatrics ADVANCING THE HEALTH OF ALL CHILDREN</p>	<p><b>Slide 12</b></p> <p>&lt;Refer to accompanying case study document&gt;</p> <p>&lt;How can [your/our] practice promote Reproductive Health for young patients with Congenital Heart Defects? Do you anticipate any changes to processes or workflow? What are some barriers you might encounter, and how could those barriers be mitigated?&gt;</p>
<p><b>EVALUATION SURVEY</b></p> <p>If you facilitated this presentation, please complete this <a href="#">evaluation survey</a> and select <b>facilitator</b>.</p> <p>If you participated as a trainee, please also complete this <a href="#">evaluation survey</a> and select <b>trainee</b>.</p>  <p>American Academy of Pediatrics ADVANCING THE HEALTH OF ALL CHILDREN</p>	<p><b>Slide 13</b></p> <p>&lt;call attention to the evaluation link&gt;</p>

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<div><div>ACKNOWLEDGEMENTS</div><ul style="list-style-type: none"><li>Lead content authors:<ul style="list-style-type: none"><li>Michelle Garritz, MD, MS</li><li>Kathryn O'Brien, PhD, RN, CMSRN, CNE</li></ul></li><li>Reviewers:<ul style="list-style-type: none"><li>Laure Hornberger, MD, MPH</li><li>Christopher P. Leary, MD</li></ul></li><li>Conflict of Interest Disclosures<ul style="list-style-type: none"><li>In the past 12 months, I, or my immediate caregivers, for this manuscript had the following financial or other relationships with the manufacturer(s) of a commercial product(s) or service(s) that may be relevant to this manuscript:<ul style="list-style-type: none"><li>None</li></ul></li></ul></li><li>The views presented in this session do not necessarily represent the views and opinions of the AAP.</li></ul><p>American Academy of Pediatrics PEDIATRIC SOCIETY OF AMERICA</p></div>	<div>Slide 18</div>
<div><div>Thank you!</div><p>American Academy of Pediatrics PEDIATRIC SOCIETY OF AMERICA</p></div>	<div>Slide 19</div> <div>Thank you for your time and participation today!</div>