Obstetric Complications: The Essentials and More

40,000
Babies born with a CHD each year

25%
Percentage of babies born with a CHD who will need surgery or other interventions to survive

2-3 Million
Children & adults living with CHDs in the U.S.

37.5%
Decrease in death rates from CHDs in the U.S. since 1999 thanks to medical advancements

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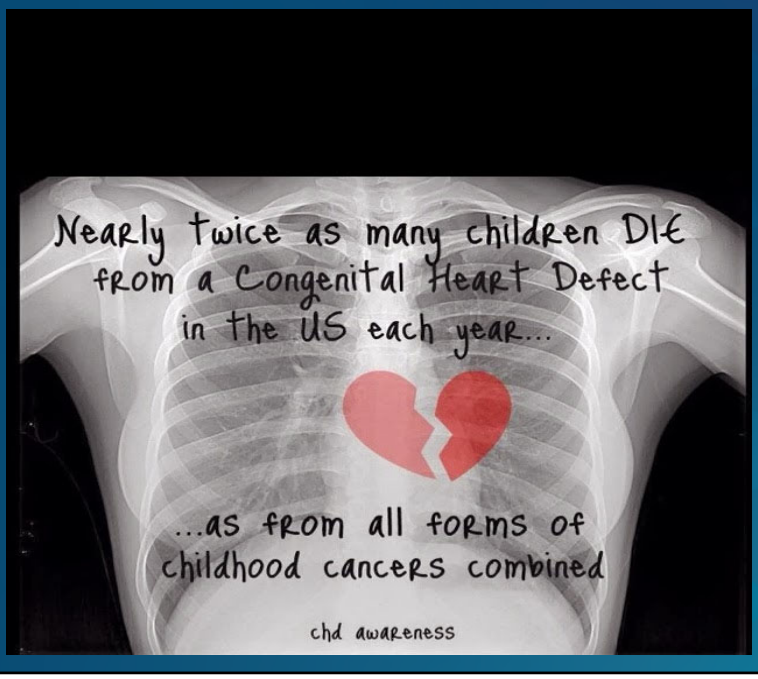
Obstetric Complications: The Essentials and More



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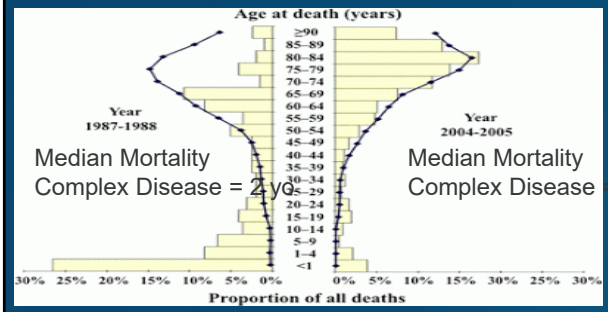
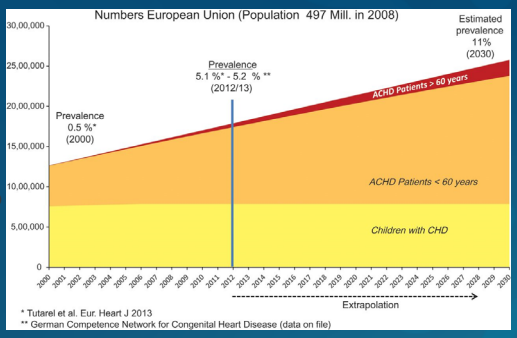
Obstetric Complications: The Essentials and More

CHD is a Medical Success Story

Changing Mortality in CHD
85% increase in complex disease



Changing prevalence of CHD in the EU by age group.



- Almost 50% of ACHD admissions are in patients > 60 yo
- Greatest survival trend is in complex CHD
- 2003-2012:
  - 85% increase in valve procedures
  - 57% increase in EP procedures

Marelli, et all. Progress in CV diseases 53 (2011) 239-246
Marelli et al. Circulation. 2007;115:163-172
Helmut Baumgartner Eur Heart J 2014;35:683-685
Khairy et al. JACC 2010; 56:1149-1157
Agarwal et al. J Am Heart Assoc 2016;5:e002330

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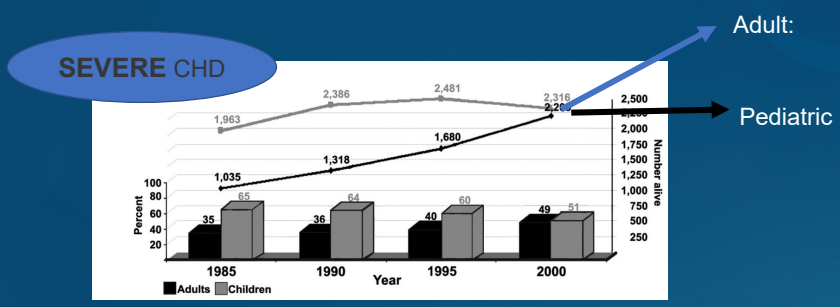
More Women with CHD are able to contemplate Pregnancy



- Greatest survival trend is in severe/complex CHD
- There are now more adults than children with complex CHD
- Complex disease in adulthood increased 85% - 1985-2000
  complex=conduits, TGA (atrial or arterial switch), single V, PA, Truncus, any cyanotic lesion
- Median age of patient with complex disease 2000: 29 yo in

Marelli, et all. From Numbers to Guidelines. Progress in CV diseases 53 (2011) 239-246
Marelli et al. Circulation. 2007;115:163-172

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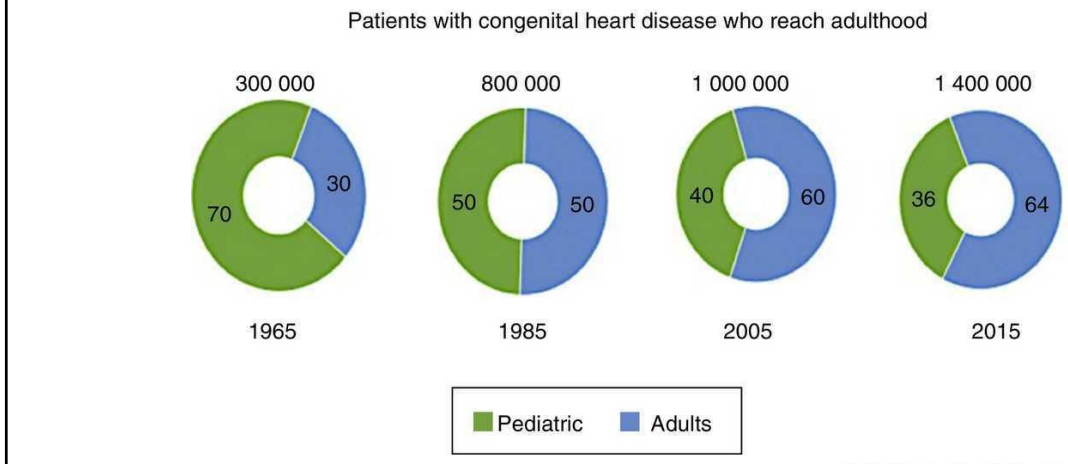
PATIENTS WITH CONGENITAL HEART DISEASE WHO REACH ADULTHOOD



Rev Col Cardiol. 2017;24:e9–e13

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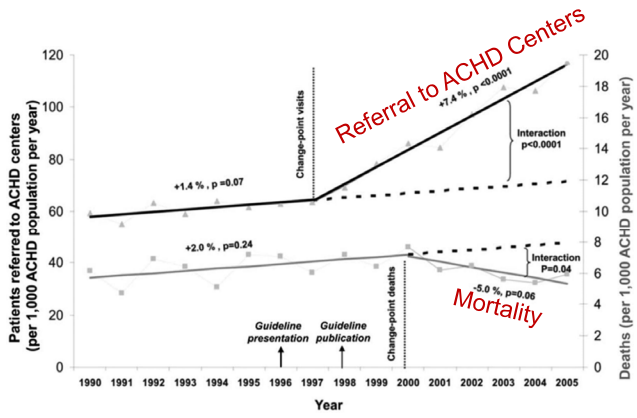
As a Result, Pregnancy and Reproductive Care is Essential to ACHD Programs

Reduced mortality but high morbidity

Arrhythmia, heart failure, valve disease, pregnancy



2017 – 11 centers

ACHA ACHD PROGRAM CRITERIA
Comprehensive Care Center

A.	ACHD Cardiologist
B.	ACHD Medical Program Director
C.	Advanced Practice Nurse/Physician Assistant
D.	Registered Nurse
E.	Cardiothoracic Surgery and Cardiothoracic Intensive Care Unit
F.	Heart Failure, Heart Transplant, Heart/Lung Transplantation
G.	Interventional Cardiac Catheterization
H.	Interventional Electrophysiology
I.	Inpatient Services
J.	Outpatient Services
K.	Transitional Services
L.	Patient-Centered Care
M.	Echocardiography
N.	Cardiac Magnetic Resonance Imaging
O.	Cardiac Computed Tomography
P.	Pulmonary Arterial Hypertension
Q.	Exercise Testing and Cardiac Rehabilitation
R.	Reproductive Services
S.	Psychology and Social Work

American Heart Association.

Darren Mylotte et al. Circulation. 2014;129:1804-1812

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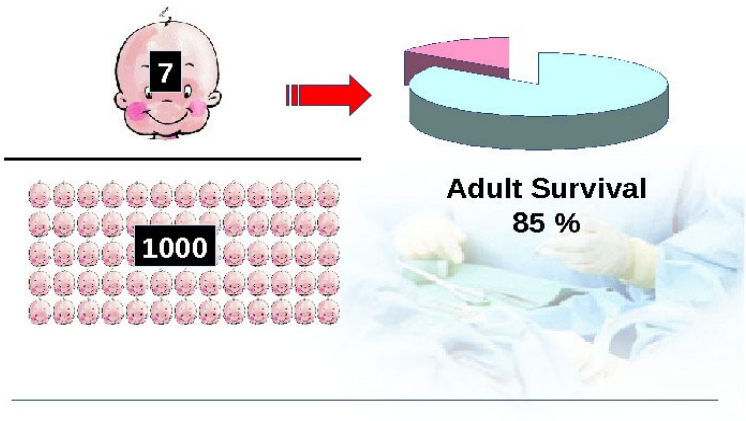
Adult CHD is not rare !



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MORE CHILDREN WITH CHD NOW SURVIVE INTO ADULTHOOD

- -Thanks to advances in surgery and medical care
- -Estimated 1% of women giving birth in the US have congenital heart disease
  - CHD accounts for about 75% of cases of heart disease in pregnancy
    - Siu SC, Sermer M, Harrison DA, et al. Risk and predictors for pregnancy-related complications in women with heart disease. Circulation 1997; 96(9):2789-2794.
- Between 2000 and 2010, prevalence of maternal CHD increased from 6.4-9.0/10,000 hospitalizations for childbirth
- ACHD ranges in severity
  - Simple abnormalities: ASD (17%)/VSD (14%)
  - Moderate abnormalities: Tetralogy of Fallot repaired (11%)
  - Severe abnormalities: Transposition of great arteries (TGA) [5%] and Ebstein anomaly (2%)

Verheugt CL, Uiterwaal CS, van der Velde ET, et al. *Mortality in adult congenital heart disease*. Eur Heart J 2010; 31(10):1220-1229.

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 doi: 10.1161/CIRCULATIONAHA.115.019307

Thompson JL, Kuklina EV, Bateman BT, Callaghan WM, James AH, Grotegut CA. *Medical and obstetric outcomes among pregnant women with congenital heart disease*. Obstet Gynecol 2015; 126(2):346-354

Hoffman JI, Kaplan S. *The incidence of congenital heart disease*. J Am Coll Cardiol 2002; 39(12): 1890-1900.

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Cardiac lesion	RR in siblings with unaffected parents		RR in children of affected parents	
	1 child affected	≥ 2 children affected	Mother affected	Father affected
VSD	3%	10%	9%–10%	2%–3%
ASD	2%–3%	8%	6%	1%–2%
TOF	2%–3%	8%	2%–5%	1%–2%
CoA	2%	6%	4%	2%–3%
AS	2%	6%	12%–20%	5%
PS	2%	6%	6%–7%	2%
HLHS	3%	10%	nr	nr
AVSD	3%–4%	nr	10%–14%	1%
PA	1%	3%	nr	nr
TA	1%	3%	nr	nr
TGA	1%–2%	5%	nr	nr
L-TGA	5%–6%	nr	nr	nr
Ebstein anomaly	1%	3%	6%	nr
Heterotaxy	5%–6%	nr	nr	nr
Overall	**1%–6%**	**3%–10%**	**2%–20%**	**1%–5%**

ASD = atrial septal defect. AS = aortic stenosis. AVSD = atrioventricular septal defect. CoA = coarctation of the aorta. HLHS = hypoplastic left heart syndrome. L-TGA = congenitally corrected transposition of the great arteries. nr = not reported. PA = pulmonary atresia. PS = pulmonary stenosis. TA = truncus arteriosus. TGA = transposition of the great arteries. TOF = tetralogy of Fallot. VSD = ventricular septal defect.

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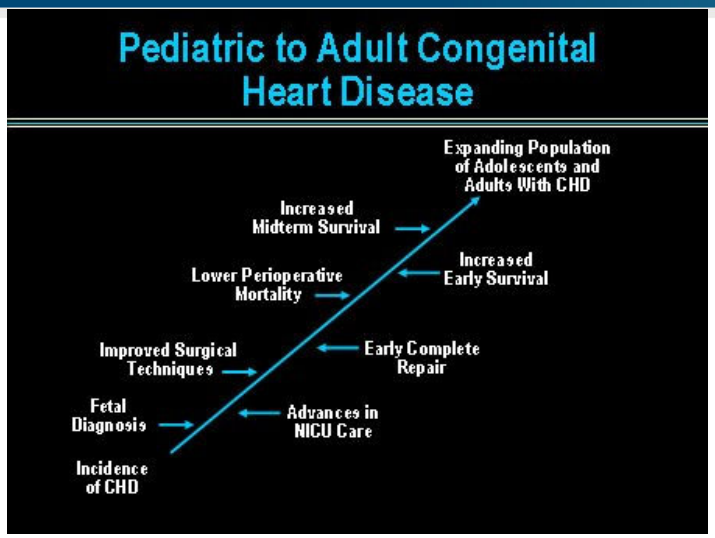
PEDIATRIC TO ADULT CONGENITAL HEART DISEASE



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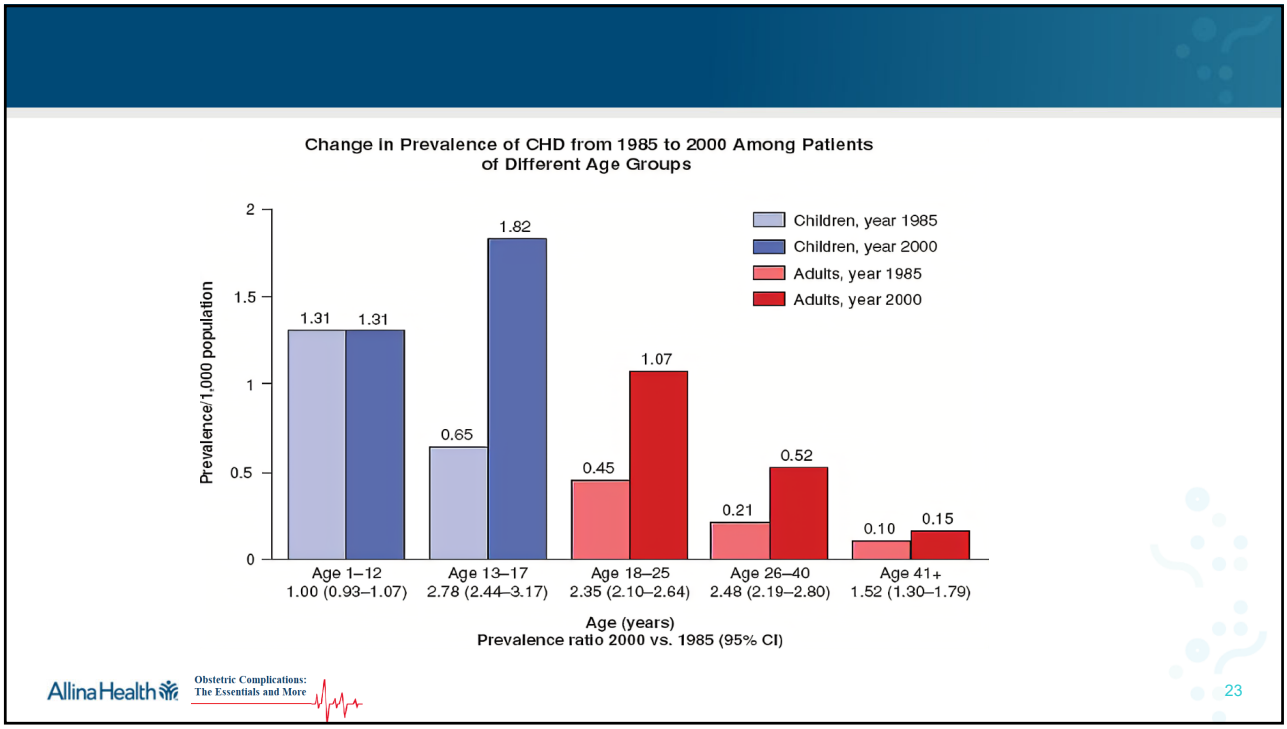
Change in Prevalence of CHD from 1985 to 2000 Among Patients of Different Age Groups
Prevalence/1,000 population
2
1.5
1
0.5
0
Children, year 1985
Children, year 2000
Adults, year 1985
Adults, year 2000
1.31
1.31
0.65
1.82
0.45
1.07
0.21
0.52
0.10
0.15
Age 1–12
1.00 (0.93–1.07)
Age 13–17
2.78 (2.44–3.17)
Age 18–25
2.35 (2.10–2.64)
Age 26–40
2.48 (2.19–2.80)
Age 41+
1.52 (1.30–1.79)
Age (years)
Prevalence ratio 2000 vs. 1985 (95% CI)
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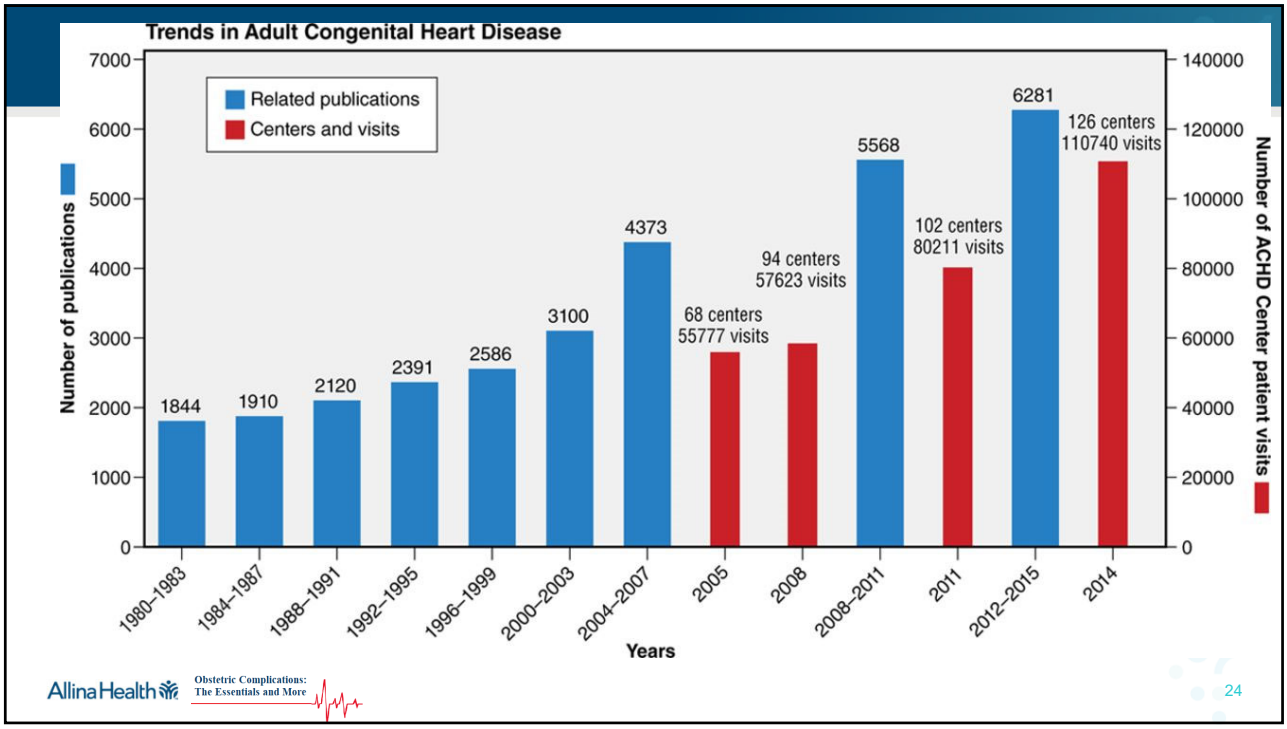
Trends in Adult Congenital Heart Disease
Related publications
Centers and visits
Number of publications
Number of ACHD Center patient visits
7000
6000
5000
4000
3000
2000
1000
0
140000
120000
100000
80000
60000
40000
20000
0
1844
1910
2120
2391
2586
3100
4373
68 centers
55777 visits
94 centers
57623 visits
5568
102 centers
80211 visits
6281
126 centers
110740 visits
1980–1983
1984–1987
1988–1991
1992–1995
1996–1999
2000–2003
2004–2007
2005
2008
2008–2011
2011
2012–2015
2014
Years
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