

Pregnancy related complications in congenital heart disease:

European Experience

P.G. Pieper

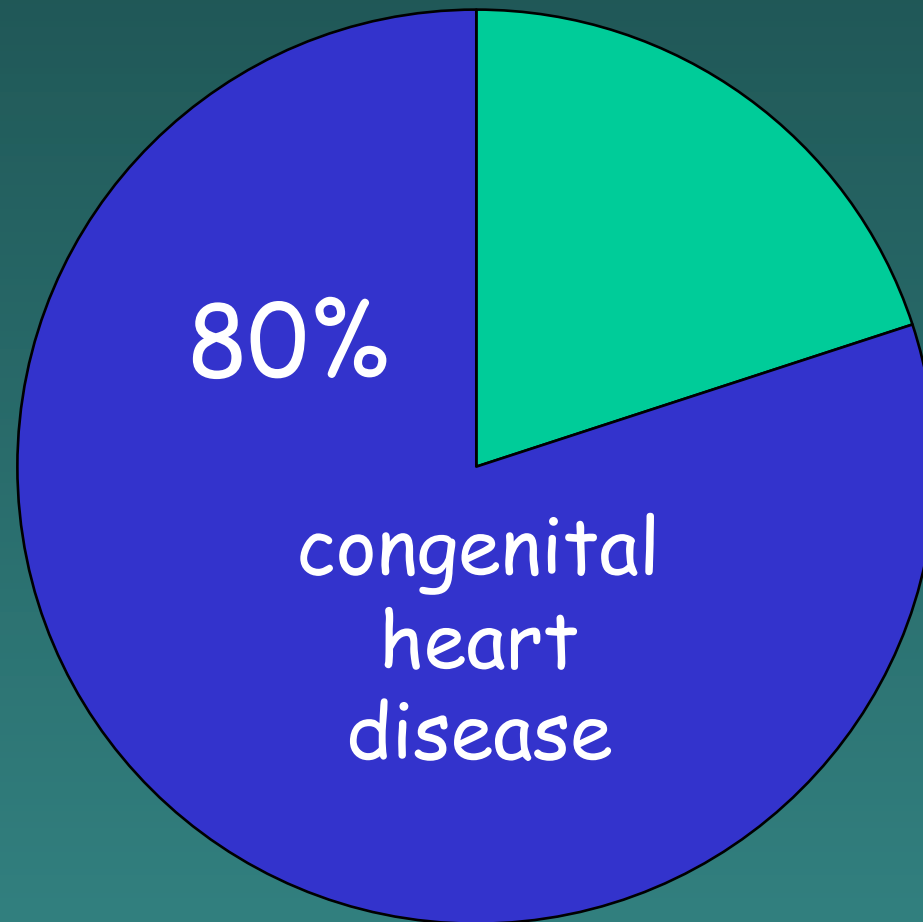
University Medical Centre Groningen
The Netherlands

UMCG

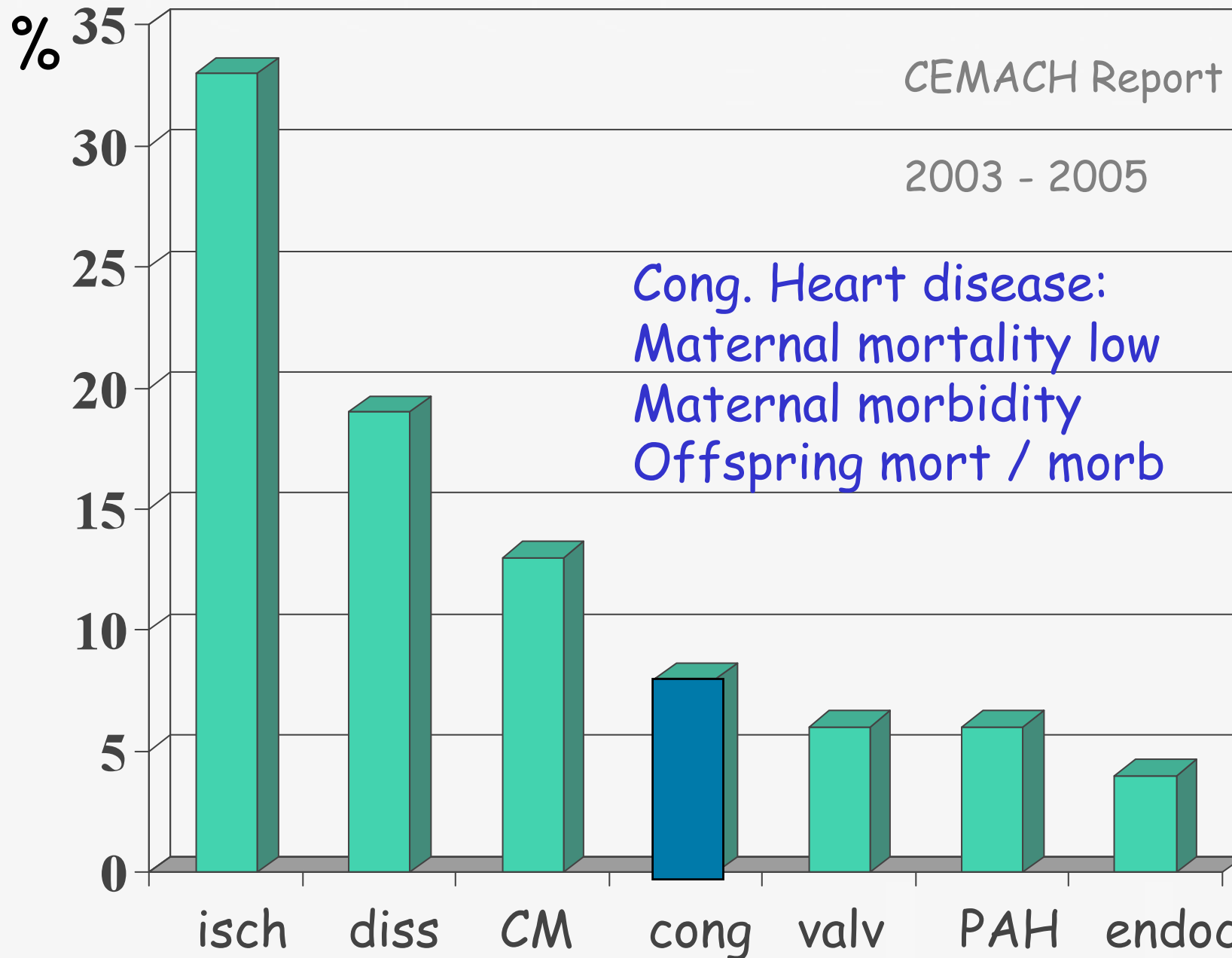


university of
groningen

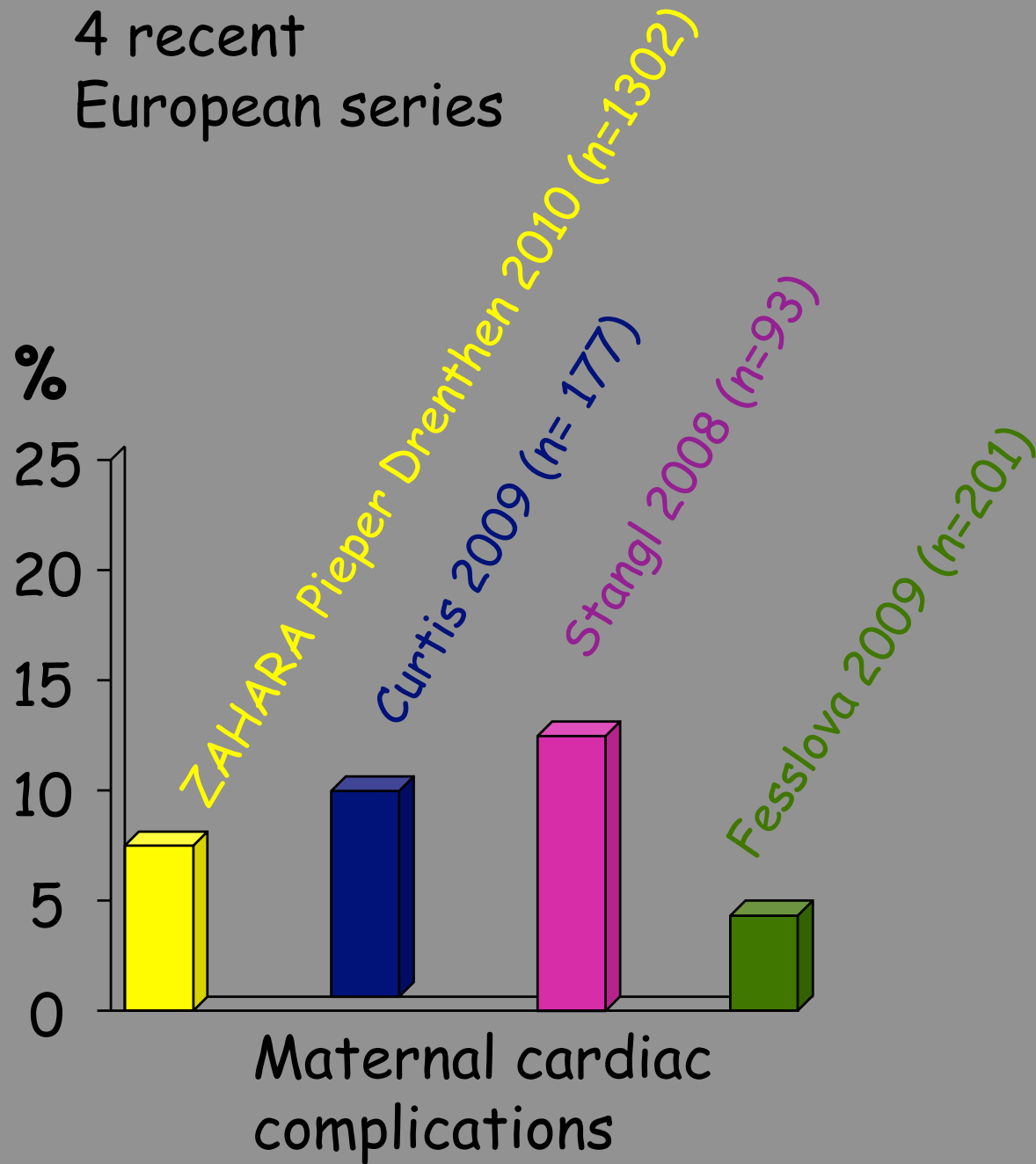
Heart disease during pregnancy western countries



UK: heart disease most important cause of maternal †



4 recent European series



Offspring complications



Prema-
ture birth



Small for
gestational age

Offspring
†



ZAHARA study:
25%

ZAHARA I study

retrospective evaluation
of pregnancy complications
in Dutch women with congenital heart disease (CHD)

1802 women with structural CHD
gave informed consent (82%)



1696 gestations



336 (20%)
miscarriages

(N 15%)



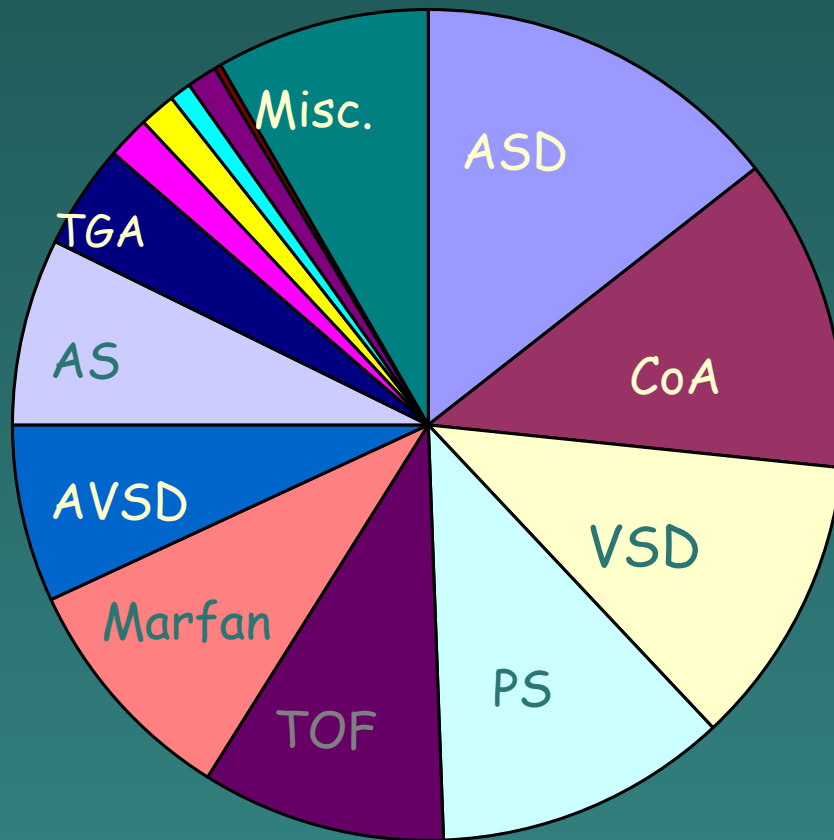
58 (3.4%)
elective
abortions



1302 complete
pregnancies
(>20 weeks)

ZAHARA study

Congenital heart disease distribution (n = 1302)



Reporting of complications:

- Total population (predictors)
- Disease oriented (14 publications)

- Ebstein
- CC-TGA
- PA
- Complex
- PHT/Eisenmenger
- Miscellaneous

TGA, Mustard or Senning correction

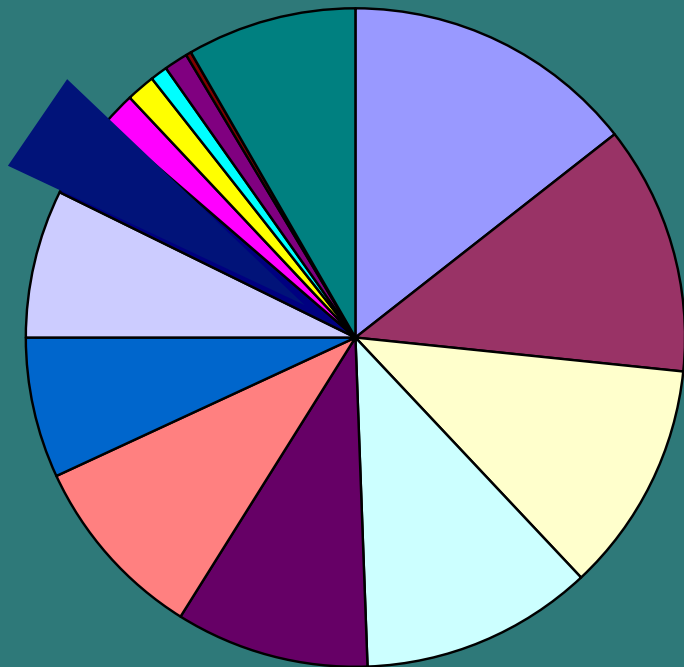
69 pregnancies, miscarriages 25%
49 complete pregnancies (> 20 weeks)

Cardiac complications: 30%

arrhythmias 22%

heart failure 4%

persisting NYHA ↓ 8%



Obstetric complications

Preeclampsia 10% (N 3%)

Offspring complications (47%):

Premature birth 31% (31 wk)

SGA 22%

mortality 12%

ASD II / sinus venosus defect

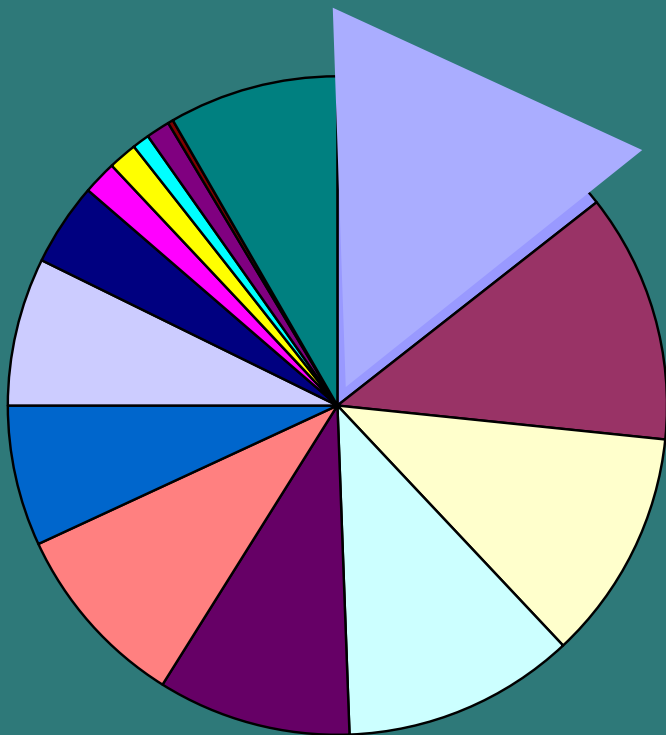
243 pregnancies (unrepaired 188, repaired 55)

arrhythmias 4,3%

- unrepaired ASD vs controls:

↑ pre-eclampsia (7% vs 2%)
OR 3.54 (1.26-9.98)

↑ offspring events
OR 2.99 (1.14-7.89)
(SGA 21%; † 2%)



AtrioVentricular Septal Defect

48 complete pregnancies
(44 repaired AVSD)

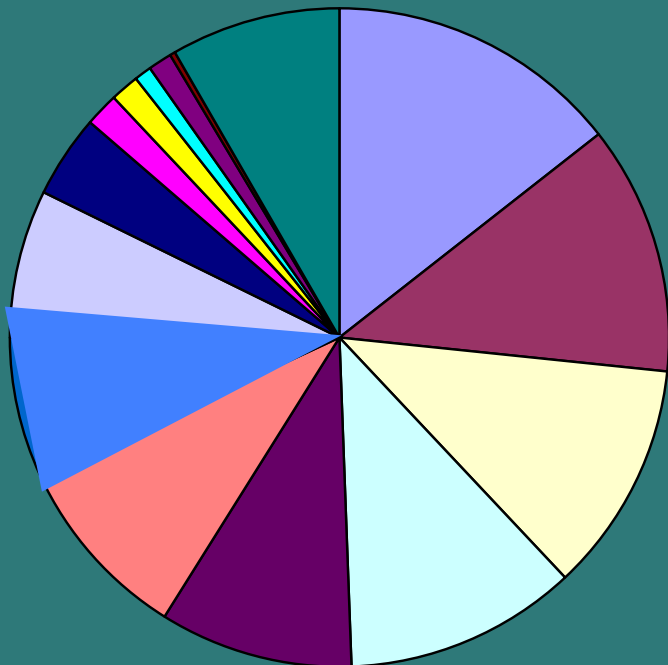
Cardiac complications: 40%



Arrhythmias 19%

Heart failure 4% (severe LAVVI)

Persisting NYHA↓ 22%

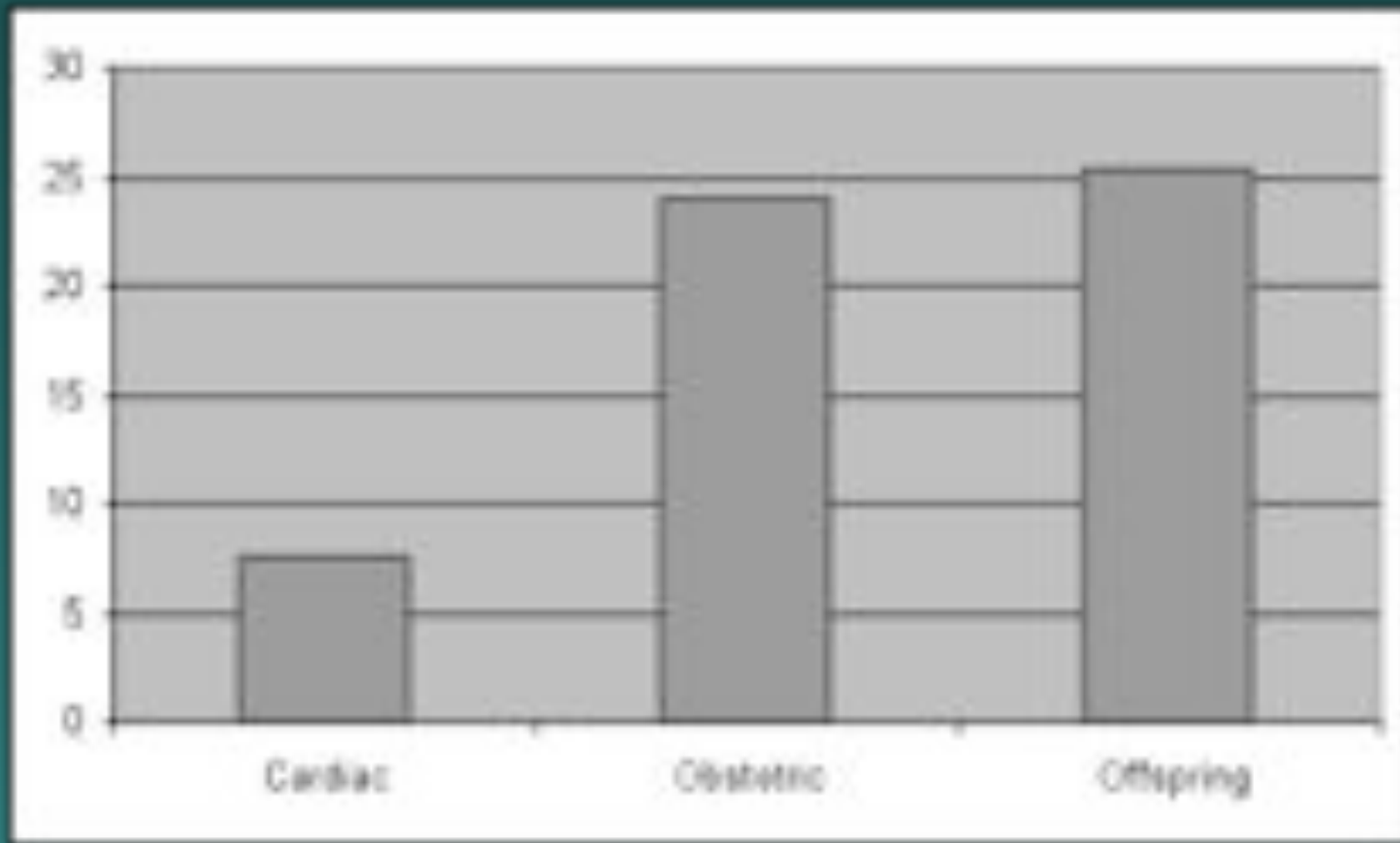


Offspring complications:

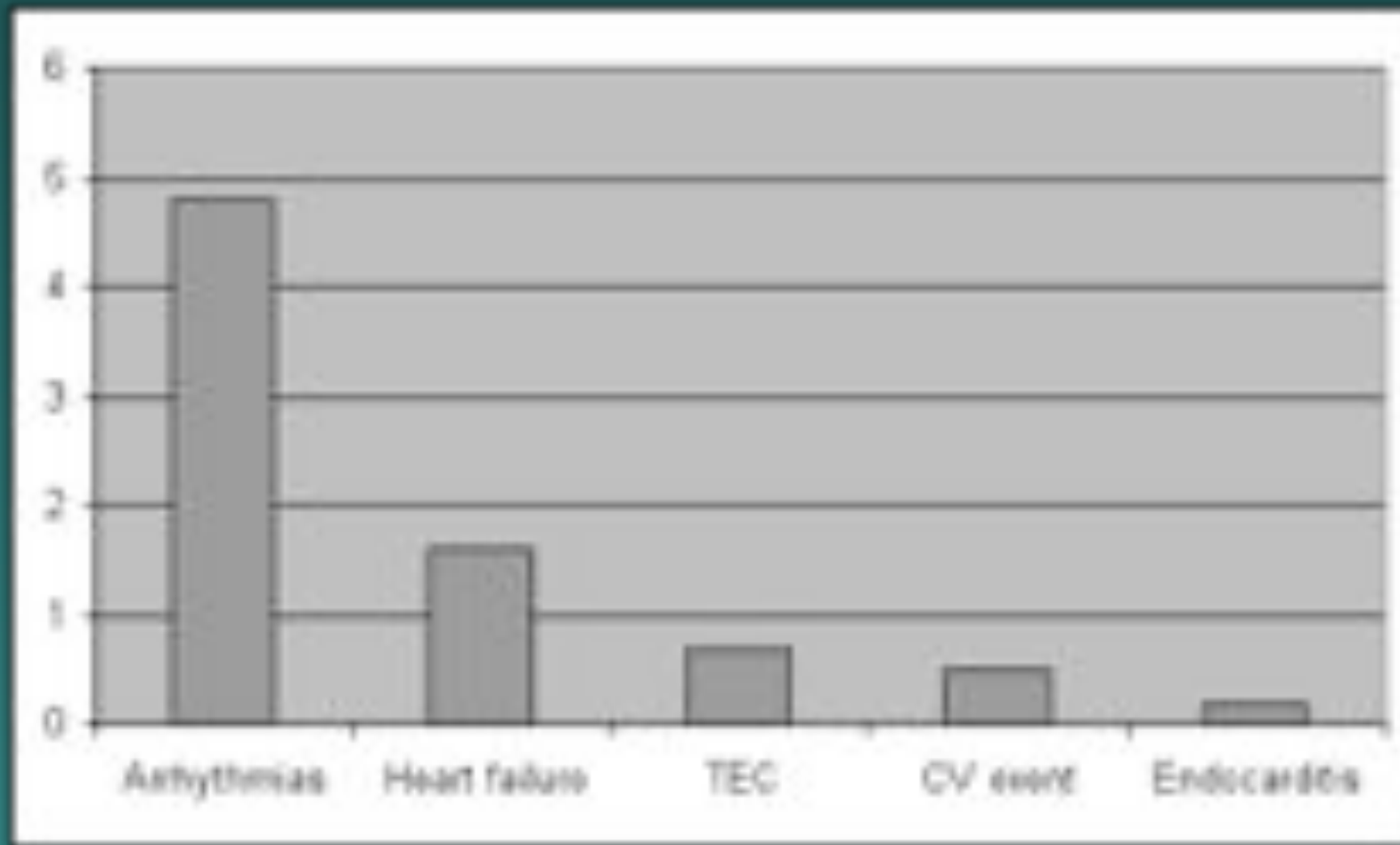
CHD 10%

Mortality 6%

ZAHARA I total population (n=1302)



ZAHARA I cardiac complications



ZAHARA I n=1302

Predictors for cardiac complications

	OR	95% CI
Arrhythmia	4.3	1.8 - 10.2
NYHA class III-IV	2.2	1.1 - 4.5
LVOT obstruction (PG>50 mmHG / AVA < 1.0 cm ²)	12.9	3.9 - 42.3
Systemic AV valve regurgitation	2.0	1.0 - 4.0
Pulmonary AV valve regurgitation	2.3	1.1 - 5.0
In origin cyanotic heart disease	5.0	3.0 - 1.7 -
Cardiac medication prepregnancy	4.2	2.1 - 8.6
Mechanical valve prosthesis	74.7	5.3 - 1057

CARPREG: systemic EF, cyanosis, MS

ZAHARA

Canadian CARPREG

Retrospective

Prospective

systemic
EF

Cong heart disease

Cong and acquired
heart disease

MS

1302 pregnancies

599 pregnancies

Mechanical valve prosthesis
AV valve regurgitation

Mechanical valve prosthesis strong predictor for cardiac pregnancy complications

	OR	95% CI
Mechanical valve prosthesis	74.7	5.3 - 1057

6 pregnancies, all had complications

Valve thrombosis n = 2

(1 mitral, 1 aortic)

LMWH 1st trim, no anti-XA

Arrhythmias n=3

Heart failure n=2



Moderate or severe atrioventricular valve regurgitation

	OR	95% CI
Pulmonary AV valve regurgitation	2.3	1.1 - 5.0
Systemic AV valve regurgitation	2.0	1.0 - 4.0

Moderate or severe atrioventricular valve regurgitation

	OR	95% CI
Pulmonary AV valve regurgitation	2.3	1.1 - 5.0

Cardiac complications (n=16):
63% arrhythmias
19% heart failure

Moderate or severe atrioventricular valve regurgitation

	OR	95% CI
Systemic AV valve regurgitation	2.0	1.0 - 4.0

Cardiac complications (n=16)
44% arrhythmias
50% heart failure

AVSD or congenital mitral disease n=10 HF n=3
systemic right ventricle n = 3 } HF n=5
other (complex) n = 3

ZAHARA I risk score

	Points	
Arrhythmia history	1.5	} per point 12% risk
NYHA class III-IV	0.75	
LVOT obstruction (PG > 50 mmHG / AVA < 1.0 cm ²)	2.5	
Systemic AV valve regurgitation	0.75	
Pulmonary AV valve regurgitation	0.75	
In origin cyanotic heart disease	1.0	
Cardiac medication prepregnancy	1.5	
Mechanical valve prosthesis	4.25	

Example: AVSD, history atrial flutter (1.5 point),
Moderate syst. AV regurg (0.75 point):
Total 2,25 point = 2.25 x 12 = 27% risk of cardiac compl.

Risk scores for cardiac complications

Limitation: population dependant

ZAHARA 1 risk score: currently being validated
in our prospective
ZAHARA II study

CARPREG score:

0 predictors = 5%

1 predictors = 27%

>1 predictors = 75%

CARPREG score: performance

	pred	ZAHARA I	Curtis	Stangl
0 pt	5%	6%	5%	6%
1 pt	27%	16%	18%	
>1 pt	75%	22%	57%	35% (≥ 1 pt)

Siu Circ 2001; Drenthen/Pieper 2009

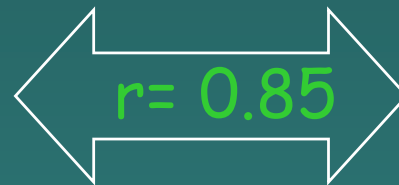
Curtis Int J Card 2009; Stangl Eur J Heart Fail 2008

Our knowledge about pregnancy complications in women with CHD is incomplete

long-term effects

mechanisms of maternal and offspring complications

Maternal cardiac complications



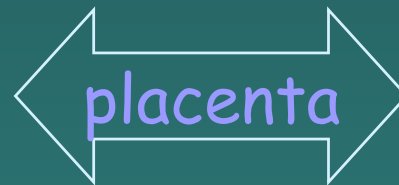
Offspring complications

Our knowledge about pregnancy complications in women with CHD is incomplete

long-term effects

mechanisms of maternal and offspring complications

Diseased
maternal heart



Fetal
development



ZAHARA II
Prospective study



Thanks

to all

ZAHARA I

investigators

