

Perspectives on Hyperglycaemia in pregnancy

Professor David Simmons

Professor of Medicine, WSU

Director of Endocrinology, Campbelltown and Camden Hospitals

Director, DOMTRU

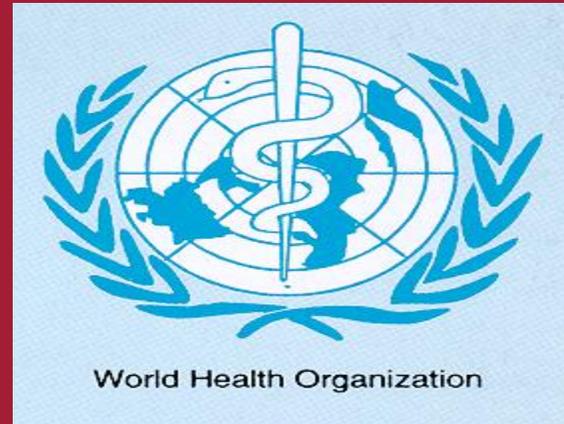
Perspectives on Hyperglycaemia in pregnancy

- Overview
- Type 1 and Type 2 diabetes
- Gestational diabetes

St. Vincent Declaration

SAINT VINCENT (ITALY), 10-12 OCTOBER 1989

A Meeting Organized by WHO and IDF in Europe



“Achieve a pregnancy outcome in the diabetic woman that approximates that of the non-diabetic woman.”

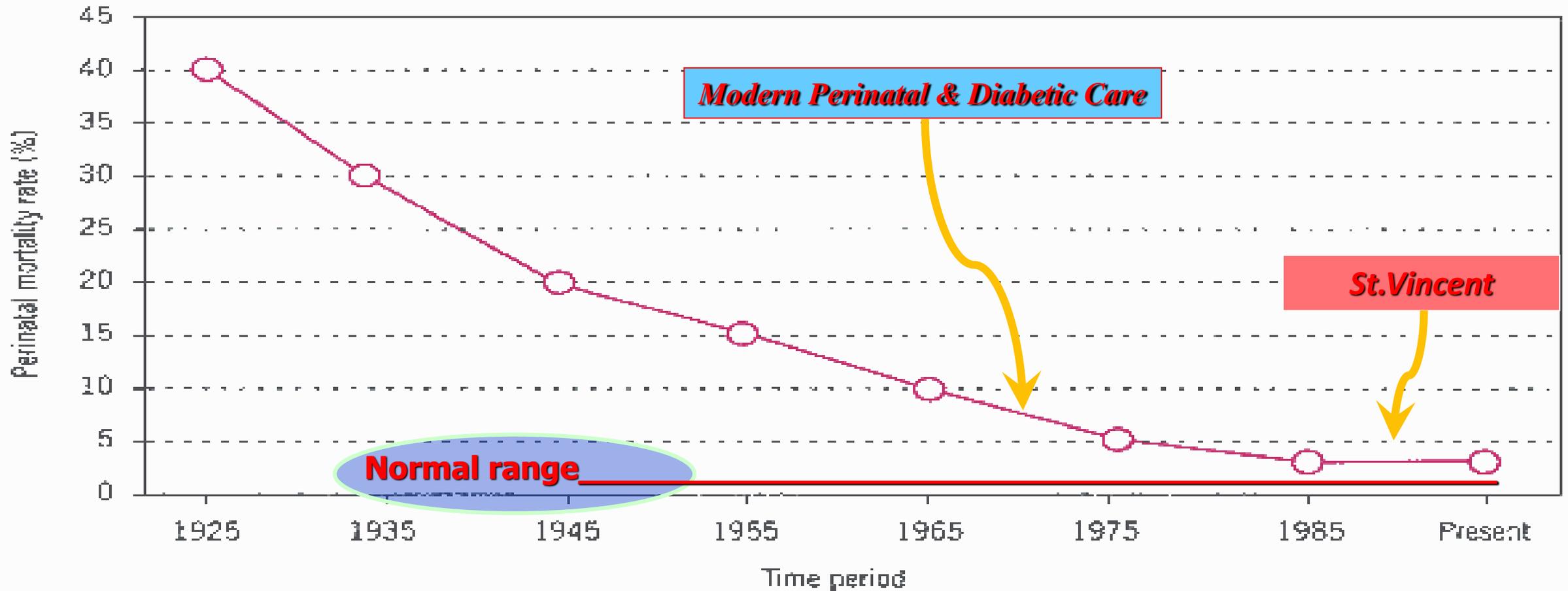
WHO Classification for Hyperglycaemia in Pregnancy

Pre-gestational Diabetes	Diabetes in Pregnancy	Gestational Diabetes
Known T1DM Known T2DM Known other forms eg monogenic, secondary	DIP: Diagnosed first time in pregnancy and expected to continue postpartum	GDM: Diagnosed first time in pregnancy and not expected to continue postpartum

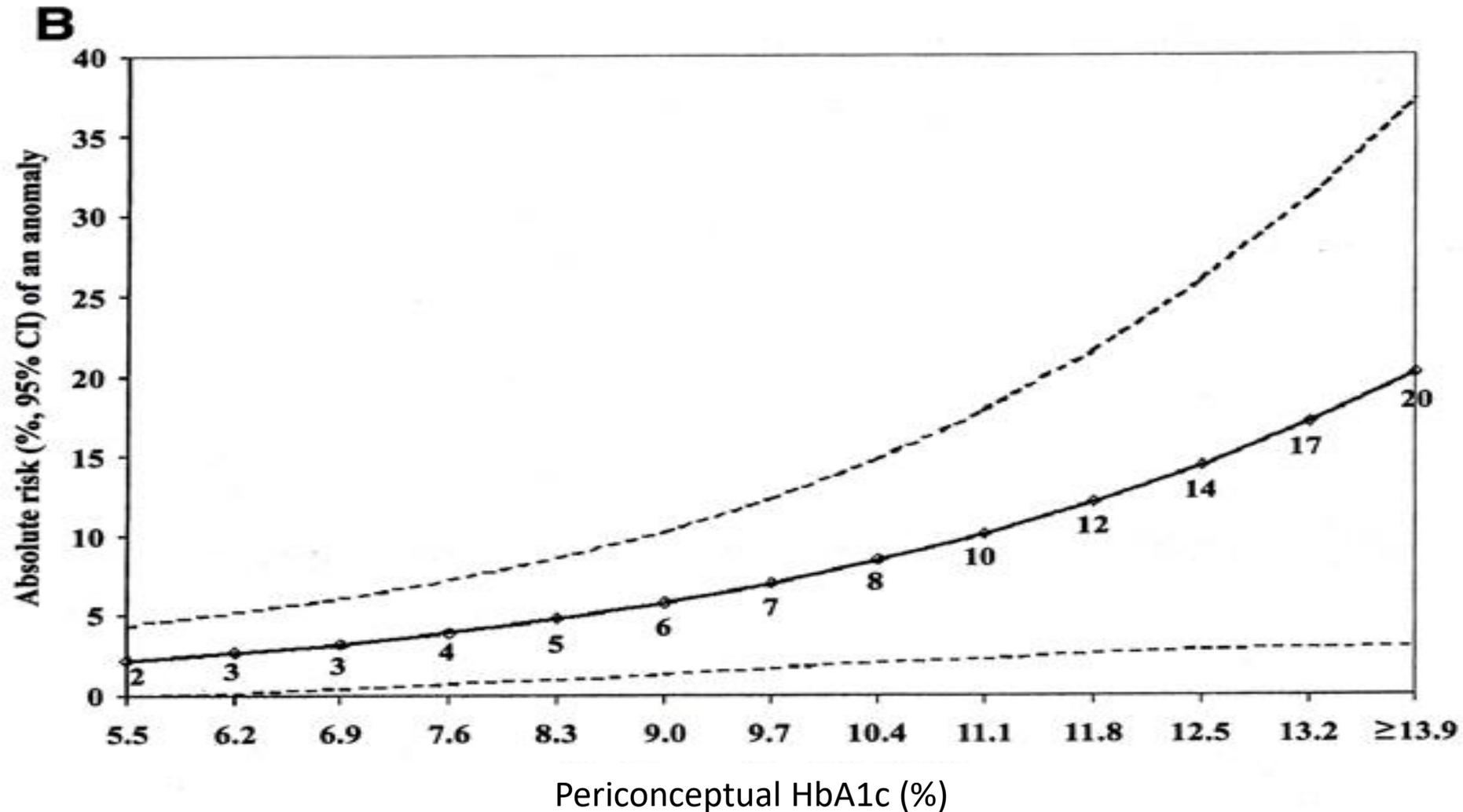
World Health Organisation. Diagnostic Criteria and Classification of Hyperglycaemia First Detected in Pregnancy WHO/NMH/MND/13.2. WHO Geneva 2013

Perinatal mortality rate in pregnancies complicated by type 1 diabetes mellitus (%)

PNM = 1/1000



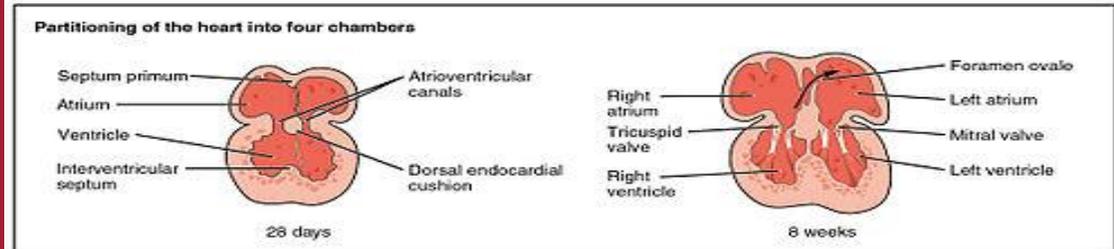
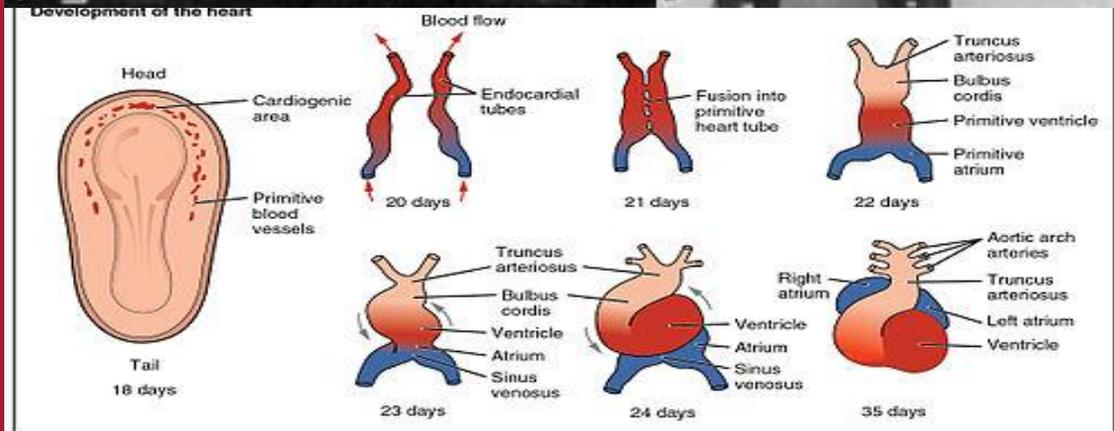
HbA1c and risk of malformation



Folic Acid

The evidence suggests that periconceptional folic acid:

- Reduces primary NTD by about 62%;
- may reduce the risk for congenital heart defects;
- may reduce the risk for orofacial clefts:



Neonatal outcomes for women with type 1 diabetes-Irl, GB, Oz

	Type 1 DM 2007	Matched control	Australia 2016	E. Anglia 2006-9
Miscarriage	215 11%	447 N/A**	107 -	397 13.3%
Stillbirth	2.8%	0.4%	7%	1.5%
Perinatal deaths	0	0	7%	0.9%
Congenital malformation	4.2%	1.6%	4%	4.2%

**N/A: Controls were screened for GDM at 24 weeks, i.e. beyond the date of possible miscarriage.

Owens et al BMC Preg & Childbirth 2015;15:69; Murphy et al Diab Med 2011;28:1060-1067; Abell et al., 2016;

Neonatal outcomes for women with type 1 diabetes-Irl, GB, Oz

	Type 1 DM 2007	Matched control	P-value	Australia 2016	E. Anglia 2006- 9
	215	447		107	397
Polyhydramnios	10%	1.8%	.001	-	
Neonatal hypoglycemia	20%	0.4%	.0001	38%	
Shoulder dystocia	2.3%	1.1%	0.39	17%	
Large for gestational age	24%	17%	0.07	44%	52.9%
Delivery <37 weeks	28%	5.4%	.001	39%	37.1%
Neonatal Unit care	55%	14%%	.0001	11%	42.6%
Neonatal composite***	48%	6.5%	.0001	-	

***Neonatal composite: Stillbirth, miscarriage, premature delivery, polyhydramnios, hypoglycemia.

NB Ireland: no difference in hypocalcaemia, polycythaemia, jaundice, SGA

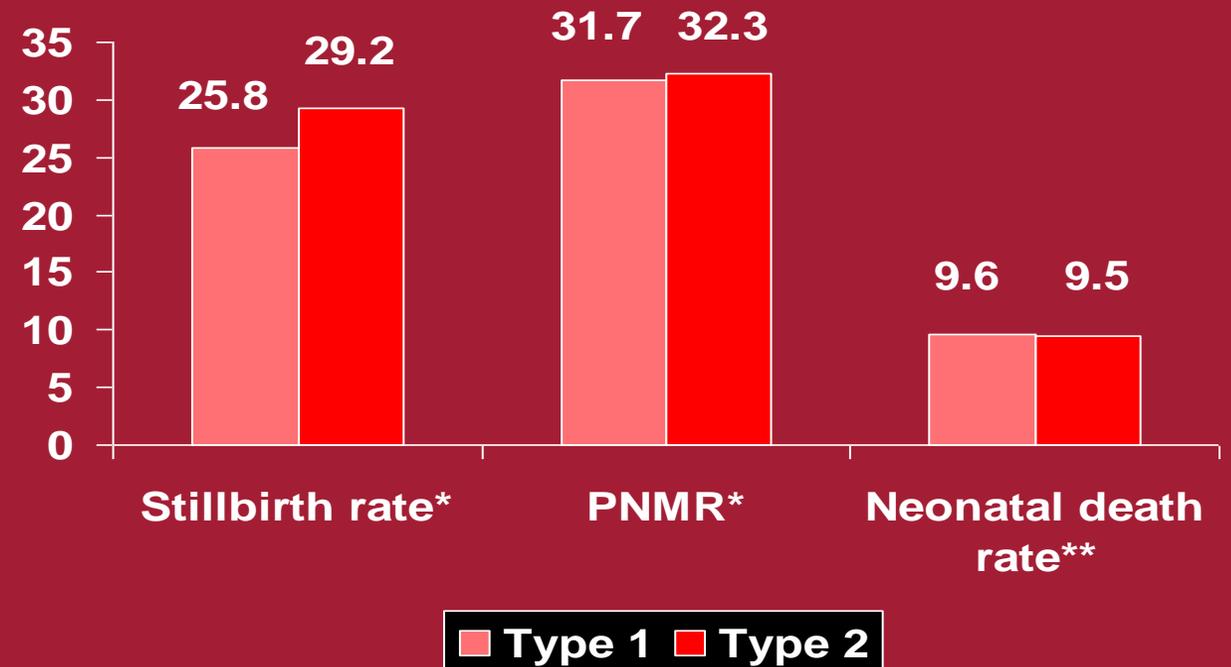
Owens et al BMC Preg & Childbirth 2015;15:69; Murphy et al Diab Med 2011; Abell1 *et al.*, 2016; 28:1060-1067;

Maternal outcomes for women with type 1 diabetes- Irl, GB, Oz

	Ireland Type 1 diabetes 2007+	Ireland Matched control	P-value	Australia 2016	E. Anglia 2006-9
	215	447		107	397
Pre eclampsia	12% (12)	4.3%(19)	.0003	5%	7.8%
Emerg/Elect section	29% / 30%	16% /15%	.0002	62%	34%/30%

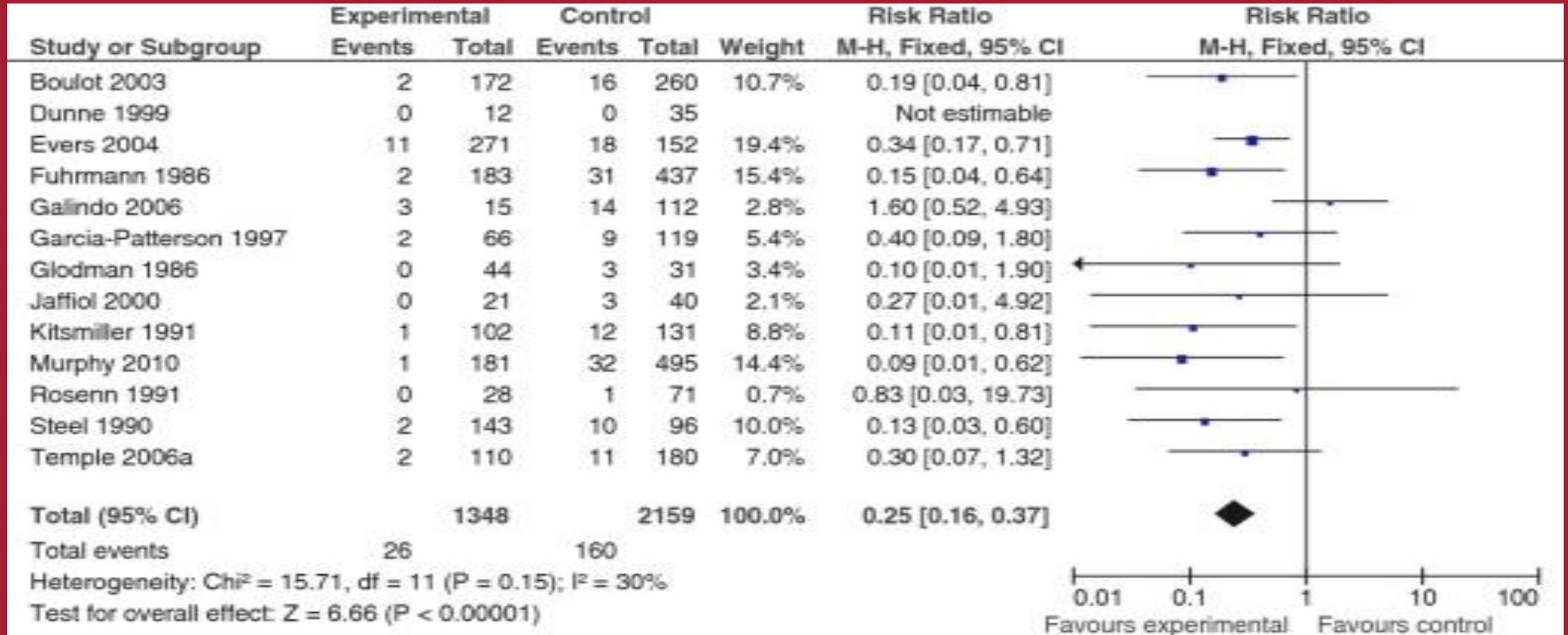
Type 2 diabetes – different needs, equivalent risks

Women with T2 DM have comparable risks to women with T1 DM

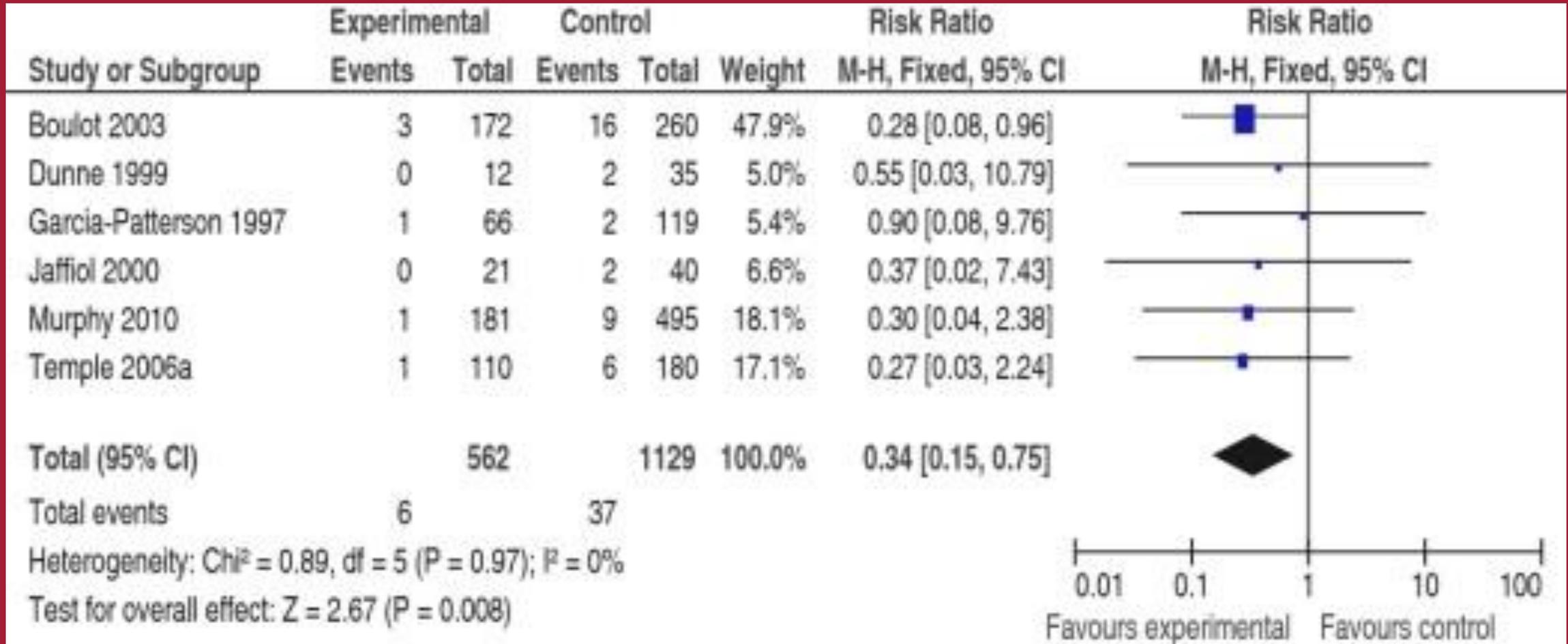


*per 1000 total births **per 1000 live births

Preconceptual Care of Diabetes and the Risk of Congenital Anomalies



Preconceptual Care of Diabetes and the Risk of Perinatal Mortality



Regional Programme: EASIPOD

- A Leaflet for all women of reproductive years-sent from diabetes clinics+some GPs
- Websites
- Educational programmes (courses and workshops) for healthcare professionals (HCPs)
- Educational programmes for patients (-women aged: 16-45 years)
- Presented earlier (6.7 v 7.7/40-*P*: 0.001)
- More likely to take 5 mg folic acid (88.2% vs. 26.7%; *P*: 0.0001)
- Lower HbA1c levels at conception (HbA1c 6.9% vs. 7.6%; *P*: 0.0001).
- Fewer adverse pregnancy outcomes (e.g. malformation, stillbirth, or neonatal death (1.3 vs. 7.8%; *P*: 0.009)
- PPC lower risk of adverse outcomes (OR = 0.2; 95%CI: 0.05, 0.89).

Views from women who did not attend

~25% “unplanned”

~25% less rigorous with contraception

~50% willing

- “Without being horrible to the doctors that I was seeing when I was kind of seventeen onwards, had I had somebody more approachable it may have been different”
- “Partner - She didn’t like the horror stories as she calls them; all the bad things *that* could happen.... I suppose looking back, in hindsight, they could have counterbalanced that with all the good things that could happen”
- “Well, now as soon as you mention the P-word [pregnant] they’re gonna come down on me ... “Oh you shouldn’t be havin it”. And that’s gonna make you feel even worse in the first place..... “

Interviews regarding pre-pregnancy planning in South Western Sydney

“...I actually found it was just too overwhelming and it did not make sense to me because I was not yet pregnant. So hearing all these things about complications and risks you are just going “yep I’ve been told that my whole life”, you didn’t hear it,” (W116-T1D).“

you can lead a horse to water but you can’t make it drink...it’s up to them whether they want to take the information on board or they just want to shrug it off and go ‘I don’t care’” (W101-T2D).

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Gestational Diabetes...a different story

“The first documented evidence of the effects of hyperglycaemia in pregnancy in the modern era was in 1824, when Bennewitz recorded a case of severe fetal macrosomia and stillbirth in a 22 year old multigravida woman in Berlin. She had symptoms of severe hyperglycaemia, but he was only able to estimate this by boiling the urine to dryness^[1]. The symptoms disappeared after the delivery.”

Plethora of criteria in the pre-HAPO/New criteria period

Organisation	Screening	Fasting	75g 1 hour	75g 2 hour	100g 3 hour
ADA (2 or more values met or exceeded)	All women except low risk	5.3 mmol/l	10.0 mmol/l	8.6 mmol/l	7.8 mmol/l
ADIPS	All unless resources ltd	5.5 mmol/l	-	8.0 mmol/l Aus 9.0 mmol/l NZ	-
BCRCP (2 or more values met or exceeded)	High risk women	5.3 mmol/l	10.0 mmol/l	8.6 mmol/l	7.8 mmol/l
CREST	All. Random glucose at 28/40	5.5mmol/l	-	9.0mmol/l	-
DIABETES UK	All. Random glucose at 28/40	IGT \leq 7.0mmol/l GDM \geq 7.0mmol/l	- and/or -	7.8-11.0mmol/l \geq 11.1mmol/l	-
IDF	All women except low risk	5.5mmol/l	-	8.6mmol/l	-
JDS (Any two of these values)	All women	5.5mmol/l	10.0mmol/l	8.3mmol/l	-
Pregnancy & Neonatal Care Group UK	All. Random glucose at 28/40	IGT 6.0-8.0mmol/l GDM $>$ 8.0mmol/l	- or -	9.0-11.0mmol/l $>$ 11.0mmol/l	-
SIGN	All. Random glucose at 28/40	5.5mmol/l	-	9.0mmol/l	-
WHO	All women except low risk	IGT \leq 7.0mmol/l GDM \geq 7.0mmol/l	- and/or -	7.8-11.0mmol/l \geq 11.1mmol/l	-

Screening.....so complicated

Why? Future diabetes in mother, Future diabetes in offspring, **Pregnancy outcomes**

Everyone or just those at risk

Which test-eg OGTT HbA1c

Screen-if so how

Thresholds for diagnosis

When-T1, T2, T3

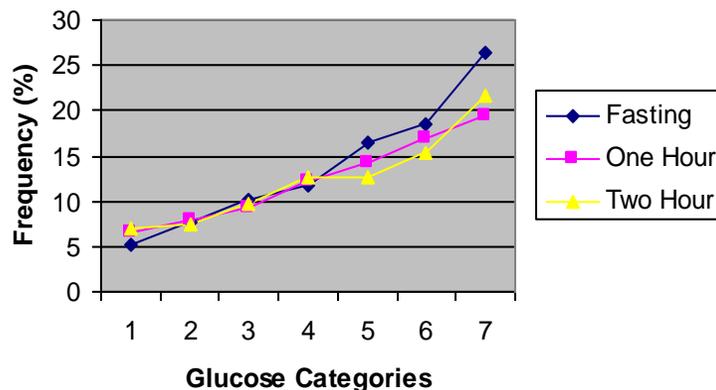
Access/Uptake

How many high/How many times?

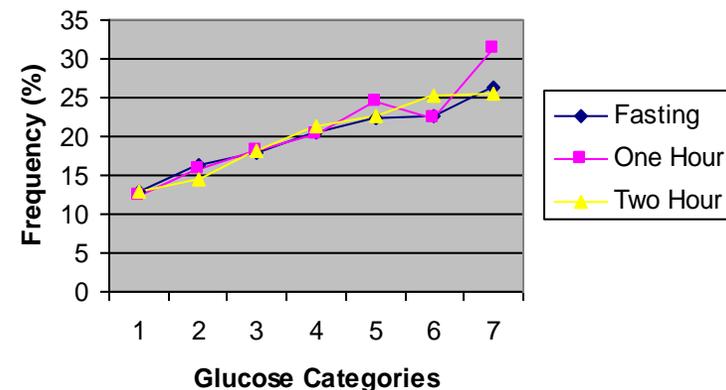
Does Rx 'Work'?

Associations: Glucose & 1° Outcomes

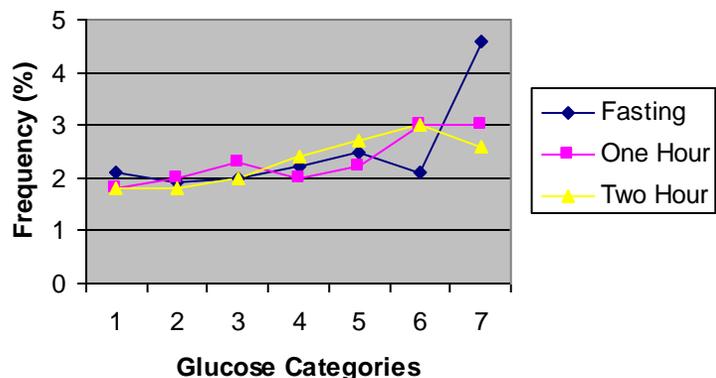
Birth Weight > 90th Percentile



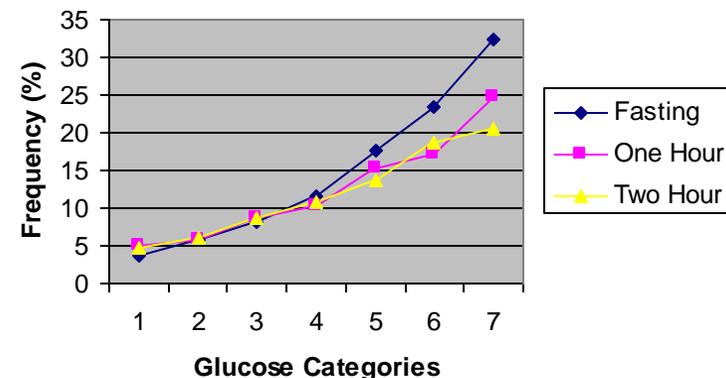
Primary C-Section



Clinical Hypoglycemia



Cord C-Peptide >90th Percentile



HAPO. N Eng J
Med 2008;
358:1999-
2002

7=5.6,11.7,9.9

6=5.3,10.6,8.9

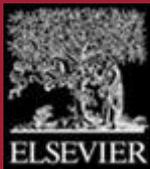
5=5.0, 9.5,7.5

Frequency of outcomes when all glucose values are below threshold or any one or more is equal to or above 75% excess risk (O.R 1.75)

<i>Outcome</i>	FPG, 1-hr OGTT, 2-Hr OGTT values all < 5.1, 10.0, 8.5	FPG \geq or 1-hr PG or 2-hr PG \geq threshold
Birthweight > 90 th percentile	8.3%	16.2%
Cord C-peptide > 90 th centile	6.7%	17.5%
Percent body fat > 90 th centile	8.5%	16.6%
Preeclampsia	4.5%	9.1%
Preterm delivery (< 37 weeks)	6.4%	9.4%
Primary cesarean section	16.8%	24.4%
Shoulder dystocia and/or birth injury	1.3%	1.8%
Clinical neonatal hypoglycemia	1.9%	2.7%
Hyperbilirubinemia	8.0%	10.0%
Intensive neonatal care	7.8%	9.0%

The emotional journey of gestational diabetes

- 95 women-one question
- Within 1 week of diagnosis
- Several weeks after diagnosis
- Within 3 days after delivery.
- “How do you feel about your diagnosis of gestational diabetes?”
- Thematic analysis
- Developed an image using iStock, Wordle, and Tagxedo



Figure

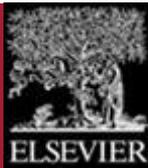
At Diagnosis



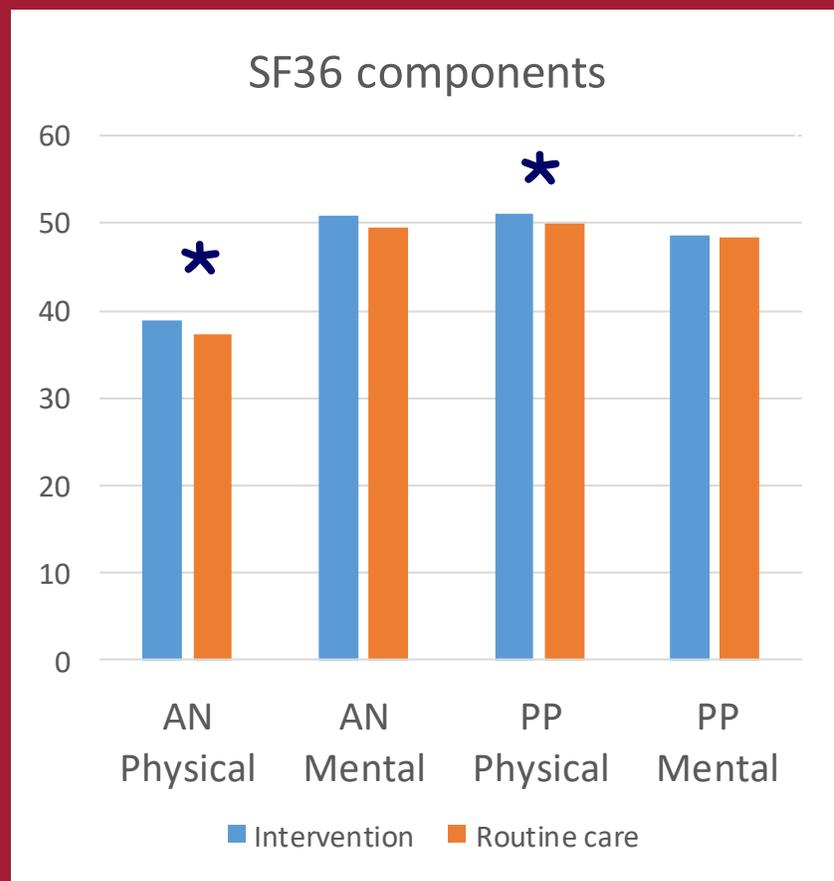
Weeks After Diagnosis



After Delivery of Baby



ACHOIS: Improves QoL



SF 36 Sum and Edinburgh Postnatal Depression Scale



Pre-existing diabetes

- Type 1=Type 2 diabetes=undiagnosed diabetes for outcomes
- Pre-pregnancy/intrapartum care reduces harm massively
- Difficult to implement
- Autonomy, HCP attitudes, access

