An update on GDM post IADPSG.

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GDM - what's all the fuss about?

- Very common and numbers are increasing.
- Greater burden in emerging countries.
- Significant clinical burden, challenging healthcare delivery.
- 2 patients for each case of GDM affected.
- Perinatal adverse outcomes.
- Long term health implications which are costly.
- Diagnosis is easy and cheap.
- Interventions for the majority are low cost and effective.

What global factors are contributing to increased GDM prevalence?

- Prevalence of Type 2 DM; NHANES 4.6% (18-44 y).
- Prevalence of pre-diabetes NHANES 26.4% (18-44 y).
- Prevalence of Obesity, 20-30% global estimates.
- Rising maternal age for pregnancy.

Why are we concerned about GDM?

Mother

- PIH/PET
- PTD
- CS delivery
- Future Diabetes
- Obesity
- MetS and CVS

Infant

- Macrosomia/Shoulder D.
- Hypoglycaemia/NNU
- Future Diabetes
- Future Obesity
- Neurocognitive /Autism


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The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 16, 2005 VOL. 352 NO. 24

Effect of Treatment of Gestational Diabetes Mellitus on Pregnancy Outcomes

Caroline A. Crowther, F.R.A.N.Z.C.O.G., Janet E. Hiller, Ph.D., John R. Moss, F.C.H.S.E., Andrew J. McPhee, F.R.A.C.P., William S. Jeffries, F.R.A.C.P., and Jeffrey S. Robinson, F.R.A.N.Z.C.O.G., for the Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) Trial Group*

Crowther: Reduces Adverse Perinatal Outcomes.

Outcome	ACHOIS RCT (%)		P
	Not treated	Treated	
BW >90th percentile	22	13	<0.001
BW < 10th centile	7	7	
NICU admission	61	71	0.04
Shoulder Dystocia	3	1	0.08
Preeclampsia	18	12	0.02

Table 2. Primary Clinical Outcomes among the Infants and Their Mothers.*

Outcome	Intervention Group	Routine-Care Group	Unadjusted Relative Risk (95% CI)	Unadjusted P Value	Adjusted Relative Risk (95% CI)†	Adjusted P Value†	Step-Down Sidak P Value
	no. (%)						
Infants							
Total no.	506	524					
Any serious perinatal complication‡	7 (1)	23 (4)	0.32 (0.14–0.73)	0.004	0.33 (0.14–0.75)	0.01	0.04
Death	0	5 (1)		0.06		0.07	
Stillbirth	0	3 (1)§		0.25		0.26	
Neonatal death	0	2 (<1)		0.50		0.50	
Shoulder dystocia¶	7 (1)	16 (3)	0.45 (0.19–1.09)	0.07	0.46 (0.19–1.10)	0.08	
Bone fracture	0	1 (<1)		1.00		0.38	
Nerve palsy	0	3 (1)‖		0.25		0.11	
Admission to neonatal nursery**	357 (71)	321 (61)	1.15 (1.05–1.26)	0.002	1.13 (1.03–1.23)	0.01	0.04
Jaundice requiring phototherapy	44 (9)	48 (9)	0.95 (0.64–1.40)	0.79	0.93 (0.63–1.37)	0.72	0.98
Women							
Total no.	490	510					
Induction of labor††	189 (39)	150 (29)	1.31 (1.10–1.56)	0.002	1.36 (1.15–1.62)	<0.001	0.003
Cesarean delivery	152 (31)	164 (32)	0.96 (0.80–1.16)	0.70	0.97 (0.81–1.16)	0.73	0.98
Elective	72 (15)	61 (12)	1.23 (0.89–1.69)	0.20	1.17 (0.85–1.60)	0.33	
Emergency	80 (16)	103 (20)	0.81 (0.62–1.05)	0.11	0.87 (0.68–1.13)	0.31	

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

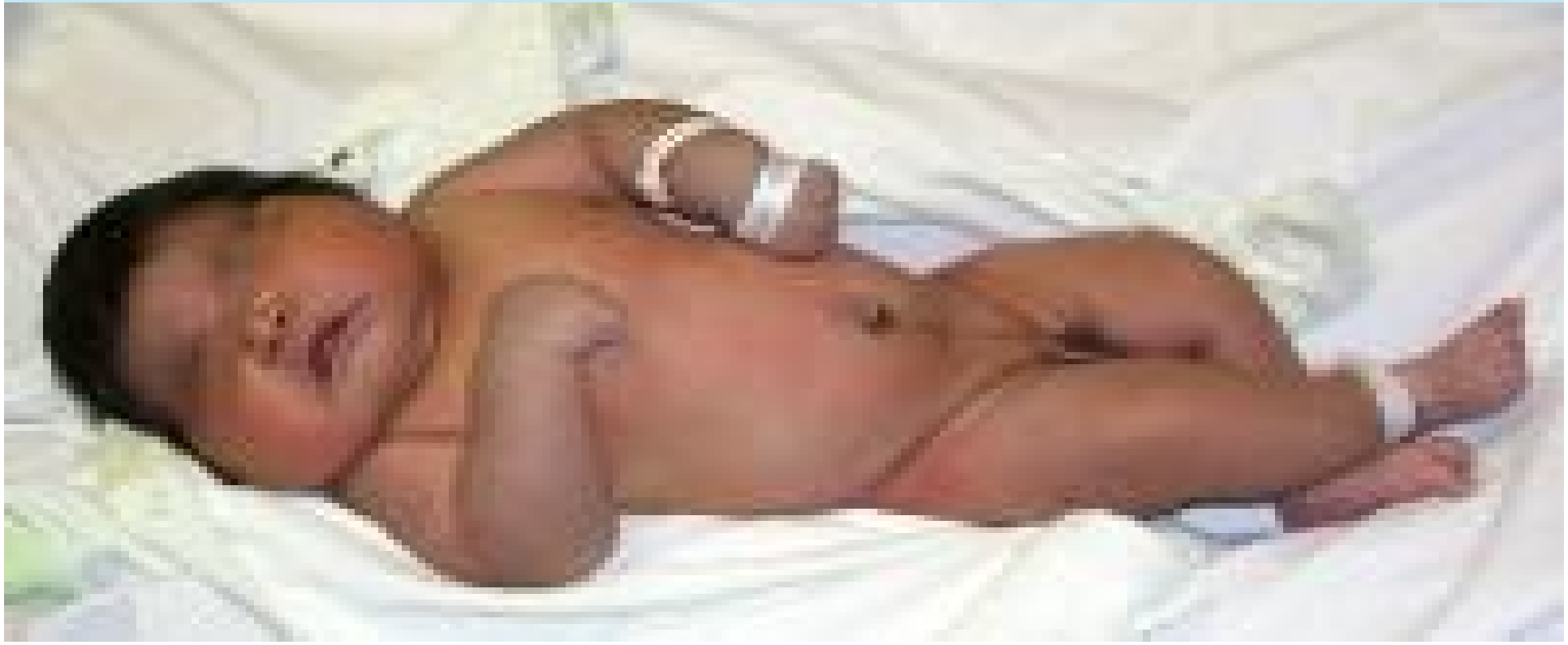
A Multicenter, Randomized Trial of Treatment for Mild Gestational Diabetes

Mark B. Landon, M.D., Catherine Y. Spong, M.D., Elizabeth Thom, Ph.D., Marshall W. Carpenter, M.D., Susan M. Ramin, M.D., Brian Casey, M.D., Ronald J. Wapner, M.D., Michael W. Varner, M.D., Dwight J. Rouse, M.D., John M. Thorp, Jr., M.D., Anthony Sciscione, D.O., Patrick Catalano, M.D., Margaret Harper, M.D., George Saade, M.D., Kristine Y. Lain, M.D., Yoram Sorokin, M.D., Alan M. Peaceman, M.D., Jorge E. Tolosa, M.D., M.S.C.E., and Garland B. Anderson, M.D., for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal–Fetal Medicine Units Network*

Landon: Reduces Adverse Perinatal Outcomes.

Outcome	NICHD RCT (%)		P
	Not treated	Treated	
BW >90th percentile	14.5	7.1	<0.001
C-peptide >95th percentile	22.8	17.7	0.07
NICU admission	11.6	9.0	0.19
Shoulder Dystocia	4.0	1.5	0.02
Preeclampsia*	5.5	2.5	0.02

Macrosomia



Prevent Macrosomia

Stillbirth

Shoulder Dystocia / Birth Trauma

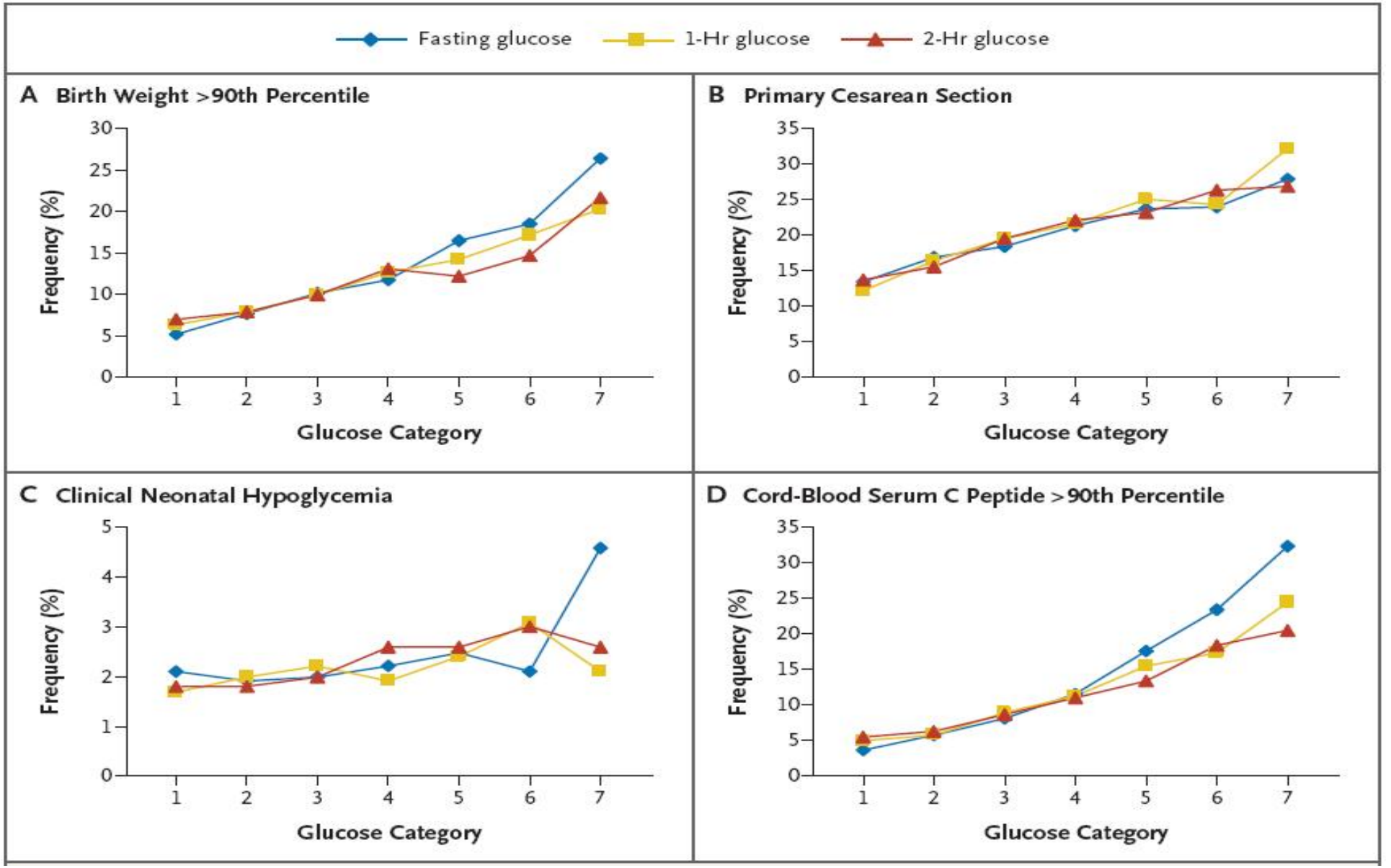
Caesarean Delivery

Hypoglycaemia

Need NNU care

Our common goal?

- Identify women with GDM in a timely manner.
- Minimise the number of cases missed.
- Screen and diagnose in a cost-effective manner.
- Intervene as early as possible to reduce adverse outcomes.
- Follow women and offspring longitudinally to assess if screening, diagnosis and treatment reduces the long term adverse health implications for both.


Fasting glucose
1-Hr glucose
2-Hr glucose
A Birth Weight >90th Percentile
Frequency (%)
Glucose Category
B Primary Cesarean Section
Frequency (%)
Glucose Category
C Clinical Neonatal Hypoglycemia
Frequency (%)
Glucose Category
D Cord-Blood Serum C Peptide >90th Percentile
Frequency (%)
Glucose Category

REVIEW ARTICLE

International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy

INTERNATIONAL ASSOCIATION OF DIABETES AND PREGNANCY STUDY GROUPS CONSENSUS PANEL*

cemia less severe than overt diabetes is controversial. Several factors contribute to this longstanding controversy.

Some have attributed risks of adverse

Diagnosis of hyperglycemia in pregnancy

Table 1—*Threshold values for diagnosis of GDM or overt diabetes in pregnancy*

To diagnose GDM and cumulative proportion of HAPO cohort equaling or exceeding those thresholds

	Glucose concentration threshold*		Above threshold (%)
Glucose measure	mmol/l	mg/dl	Cumulative
FPG	5.1	92	8.3
1-h plasma glucose	10.0	180	14.0
2-h plasma glucose	8.5	153	16.1†

To diagnose overt diabetes in pregnancy

Measure of glycemia	Consensus threshold
FPG‡	≥7.0 mmol/l (126 mg/dl)
A1C‡	≥6.5% (DCCT/UKPDS standardized)
Random plasma glucose	≥11.1 mmol/l (200 mg/dl) + confirmation§

*One or more of these values from a 75-g OGTT must be equaled or exceeded for the diagnosis of GDM. †In addition, 1.7% of participants in the initial cohort were unblinded because of FPG >5.8 mmol/l (105 mg/dl) or 2-h OGTT values >11.1 mmol/l (200 mg/dl), bringing the total to 17.8%. ‡One of these must be met to identify the patient as having overt diabetes in pregnancy. §If a random plasma glucose is the initial measure, the tentative diagnosis of overt diabetes in pregnancy should be confirmed by FPG or A1C using a DCCT/UKPDS-standardized assay.

What are the IADPSG criteria?

Diagnostic criteria for GDM.

Based on **current best evidence.**

Only criteria related to **adverse pregnancy outcome.**

External validity.

1-step **75g OGTT** for all women at 24-28 weeks

What do IADPSG guidelines say?

- Check for overt Diabetes at first ANC visit. Fasting > 7mmol/l, random > 11.1mmol/l, HbA1C > 6.5%.
- Treat overt Diabetes.
- 75g one step OGTT at 24-28 weeks.

Arguments in favour of using IADPSG criteria

- First criteria based on **adverse perinatal** outcomes.
- Greater detection of **milder cases** where low cost interventions of D&E have already been shown to reduce perinatal morbidities (ACHOIS, Landon) .
- **May be cost effective** because of reduction in morbidities that require CS /NNU care (San Carlos study)

Arguments against using IADPSG criteria

- Increase in **prevalence.**
- Increase in clinical **workload.**
- Will **perinatal outcomes** improve?
- Increase in health care delivery **costs.**
- Uncertainty regarding relationship to **long term diabetes** risk.

Frequency of Gestational Diabetes Mellitus at Collaborating Centers Based on IADPSG Consensus Panel–Recommended Criteria

The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study

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FOR THE HAPO STUDY COOPERATIVE RESEARCH GROUP

OBJECTIVE—To report frequencies of gestational diabetes mellitus (GDM) among the 15 centers that participated in the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study using the new International Association of the Diabetes and Pregnancy Study Groups (IADPSG) criteria.

RESEARCH DESIGN AND METHODS—All participants underwent a 75-g oral glucose tolerance test between 24 and 32 weeks' gestation. GDM was retrospectively classified using the IADPSG criteria (one or more fasting, 1-h, or 2-h plasma glucose concentrations equal to or greater than threshold values of 5.1, 10.0, or 8.5 mmol/L, respectively).

RESULTS—Overall frequency of GDM was 17.8% (range 9.3–25.5%). There was substantial center-to-center variation in which glucose measures met diagnostic thresholds.

CONCLUSIONS—Although the new diagnostic criteria for GDM apply globally, center-to-center differences occur in GDM frequency and relative diagnostic importance of fasting, 1-h, and 2-h glucose levels. This may impact strategies used for the diagnosis of GDM.

Diabetes Care 35:526–528, 2012

for other outcomes, although these tended to be weaker. Associations between maternal glucose and perinatal outcomes were independent of maternal age, BMI, and family history of diabetes. Associations did not differ among centers, indicating that HAPO Study results are applicable to all centers. The HAPO data were used by the International Association of the Diabetes and Pregnancy Study Groups (IADPSG) Consensus Panel to develop "outcome-based" criteria for classifying glucose metabolism in pregnancy (3). In this article, we present center-by-center frequencies of gestational diabetes mellitus (GDM) using the IADPSG criteria and the contributions of each glucose measure to those frequencies.

RESEARCH DESIGN AND METHODS

—In HAPO, a 75-g oral glucose tolerance test (OGTT) was performed on a heterogeneous, multinational, ethnically diverse cohort of women at 24–32 weeks' gestation. The requirements for

Frequency of GDM by field center (IADPSG criteria) and participants with elevated FPG, 1-h PG, and 2-h PG.

Center*	Participants/ center	Percent GDM	Percent of GDM diagnosed by each glucose measure			Percent of all women with individual glucose measures ≥ threshold			Percent of women with GDM with individual glucose measures ≥ threshold		
			FPG†	1-h PG‡	2-h PG§	FPG	1-h PG	2-h PG	FPG	1-h PG	2-h PG
HAPO overall	23,957	17.8	55	33	12	9.8	9.7	6.7	55	55	38
Bellflower, CA	1,981	25.5	73	21	6	18.7	12.4	6.9	73	49	27
Singapore, Singapore	1,787	25.1	47	39	14	11.9	16.3	11.7	47	65	47
Cleveland, OH	797	25.0	64	27	10	15.9	12.0	9.4	64	48	38
Manchester, U.K.	2,376	24.3	67	26	7	16.2	13.8	8.5	67	57	35
Bangkok, Thailand	2,499	23.0	24	64	12	5.5	17.4	10.0	24	76	43
Chicago, IL	753	17.3	53	28	19	9.2	8.0	8.0	53	46	46
Belfast, U.K.	1,671	17.1	63	30	7	10.7	7.8	4.2	63	46	25
Toronto, Canada	2,028	15.5	66	24	9	10.3	7.5	5.2	66	48	34
Providence, RI	757	15.5	73	19	9	11.2	5.9	5.3	73	38	34
Newcastle, Australia	668	15.3	64	25	11	9.7	7.2	5.7	64	47	37
Hong Kong, PRC	1,654	14.4	26	45	29	3.8	8.9	9.4	26	62	65
Brisbane, Australia	1,444	12.4	50	31	18	6.2	5.9	4.8	50	47	39
Bridgetown, Barbados	2,093	11.9	74	9	17	8.8	3.8	5.1	74	32	43
Petah-Tiqva, Israel	1,818	10.1	43	45	13	4.3	6.3	3.4	43	62	33
Beersheba, Israel	1,631	9.3	57	28	15	5.3	3.8	2.4	57	41	26

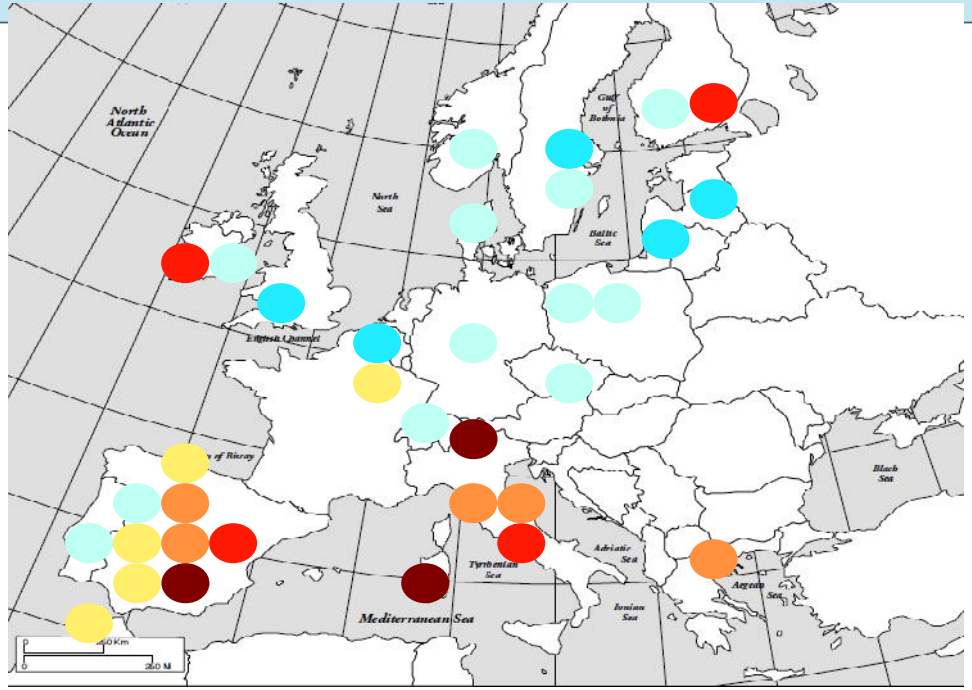
PG, plasma glucose; PRC, People's Republic of China. *Centers listed from highest to lowest unadjusted frequency of GDM. †Includes all with FPG ≥ threshold without regard to 1-h and 2-h value. ‡Includes all with FPG < threshold and 1-h ≥ threshold without regard to 2-h value. §Only 2-h value is ≥ threshold.

David A. Sacks et al. Dia Care 2012;35:526-528

NUI Galway
OÉ Gaillimh

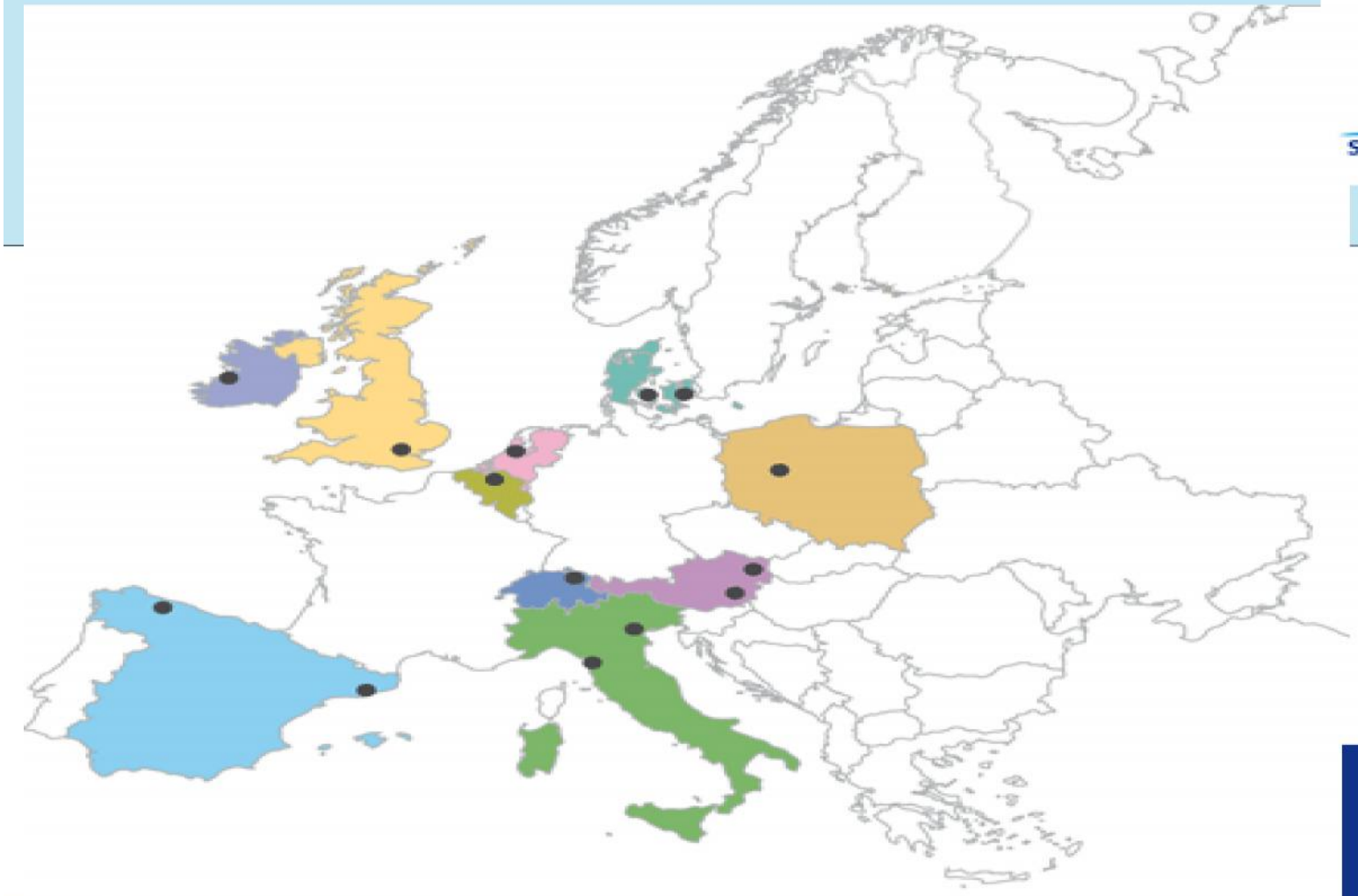
American Diabetes Association.

Europe (2012)



Variable screening/methods/ diagnostic criteria

Buckley B et al. Gestational diabetes mellitus in Europe: prevalence and current practice and barriers in screening. A review. Diabet Med. 2012 29:844-54



SEVENTH FRAMEWORK PROGRAMME

NUI Galway
OÉ Gaillimh

DALI (2016) - GDM prevalence

GDM Early pregnancy N (%)	GDM Mid pregnancy N (%)	GDM Late pregnancy N (%)	GDM Total
242/1023 (24%)	94/672 (14%)	59/476 (13%)	395/1023 (39%)

Early pregnancy data from DALI study

Harreiter J. et al Diabetes Care 2016 Jul;39(7):e90-2

- Obese European women – 23% had IADPSG GDM at enrollment (< 15 weeks)
  - 78% on fasting glucose alone
  - 22% on 1 hr and / or 2 hr glucose
- Higher BMI / insulin resistance / Systolic and diastolic BP in these “early GDM” women

North America – surrogate estimate

- NHANES 18-44 years, 4.6% diabetes
- NHANES 18-44 years**, 26% have pre-diabetes**

Prevalence

Introduction of IADPSG Criteria for the Screening and Diagnosis of Gestational Diabetes Mellitus Results in Improved Pregnancy Outcomes at a Lower Cost in a Large Cohort of Pregnant Women: The St. Carlos Gestational Diabetes Study

Alejandra Duran,[1,2] Sofía Sáenz,[1] María J. Torrejón,[3] Elena Bordiú,[1,2] Laura del Valle,[1] Mercedes Galindo,[1] Noelia Perez,[4] Miguel A. Herraiz,[2,4] Nuria Izquierdo,[4] Miguel A. Rubio,[1,2] Isabelle Runkle,[1,2] Natalia Pérez-Ferre,[1] Idalia Cusihuallpa,[1] Sandra Jiménez,[1] Nuria García de la Torre,[1] María D. Fernández,[1] Carmen Montañez,[1] Cristina Familiar,[1] and Alfonso L. Calle-Pascual[1,2]

Diabetes Care 2014;37:2442–2450 | DOI: 10.2337/dc14-0179

Results: Spain Prevalence 10.6% - 35.5% but Better Outcomes

- PIH 4.1 – 3.5% (-14.6%)
- Prematurity 6.4 - 5.7% (-10.9%)
- CS 25.4 – 19.7% (-23.9%)
- SGA 7.7 – 7.1% (-6.5%)
- LGA 4.6 – 3.7% (-20%)
- NNU 8.2 – 6.2% (-24%)

Diagnosis of more GDM lead to better pregnancy outcomes: Comparing the IADPSG and CC criteria. Taiwan

Wu ET. J Diabetes Investig 2016; 7:121-6

- **2 step CC criteria N = 888 women, 2.59%**
- **1 step IADPSG criteria N =952 women, 13.44%**
- **Improvement in pregnancy outcomes**
  - ↓ GA at dx (27 vs 30.5 weeks)
  - ↓ BW (3,065 vs 3,128 g)
  - ↓ primary CS (adjusted OR 0.79)
  - ↓ adverse fetal otucome (adjusted OR 0.79)
  - (LGA, jaundice, NICU, trauma, NN hypo, fetal death)

GDM Screening: The IADPSG Compared With Carpenter-Coustan Screening. USA

Feldman RK. Obstet Gynecol 2016;127:10-7

- **USA**
- **17% (CC group)**
- **27% (IADPSG group)**

No differences in LGA: 10% CC, 9% IADPSG

↑ primary CS delivery rate: 16% CC vs 20% IADPSG

↑ NICU admission: 4% CC vs 5% IADPSG (ns)

The impact of potential new dx criteria on the prevalence of GDM in Australia. Moses RG. Med J Aust 2011;194(7):338-40

- **ADIPS: 9.6%**
- **IADPSG: 13.0%**

Prevalence Ireland 9.4% -12.4%

Diabetologia (2011) 54:1670–1675
DOI 10.1007/s00125-011-2150-4

ARTICLE

Atlantic Diabetes in Pregnancy (DIP): the prevalence and outcomes of gestational diabetes mellitus using new diagnostic criteria

E. P. O'Sullivan · G. Avalos · M. O'Reilly · M. C. Dennedy · G. Gaffney · F. Dunne · on behalf of the Atlantic DIP collaborators

Received: 2 December 2010 / Accepted: 17 March 2011 / Published online: 15 April 2011

UK Prevalence: 4.1% NICE 4.6% UKPDS

Diabetologia (2015) 58:2003–2012
DOI 10.1007/s00125-015-3647-z

ARTICLE

Diagnosis of gestational diabetes mellitus: falling through the net

Claire L. Meek[1,2,3] · Hannah B. Lewis[1] · Charlotte Patient[4] · Helen R. Murphy[1,2] · David Simmons[2,5]

Received: 24 February 2015 / Accepted: 8 May 2015 / Published online: 14 June 2015

Cost

Introduction of IADPSG Criteria for the Screening and Diagnosis of Gestational Diabetes Mellitus Results in Improved Pregnancy Outcomes at a Lower Cost in a Large Cohort of Pregnant Women: The St. Carlos Gestational Diabetes Study

Alejandra Duran,[1,2] Sofía Sáenz,[1] María J. Torrejón,[3] Elena Bordiú,[1,2] Laura del Valle,[1] Mercedes Galindo,[1] Noelia Perez,[4] Miguel A. Herraiz,[2,4] Nuria Izquierdo,[4] Miguel A. Rubio,[1,2] Isabelle Runkle,[1,2] Natalia Pérez-Ferre,[1] Idalia Cusihuallpa,[1] Sandra Jiménez,[1] Nuria García de la Torre,[1] María D. Fernández,[1] Carmen Montañez,[1] Cristina Familiar,[1] and Alfonso L. Calle-Pascual[1,2]

Diabetes Care 2014;37:2442–2450 | DOI: 10.2337/dc14-0179

Results

- The estimated cost savings was 14,358 euro per 100 women evaluated and treated.

Does IADPSG criteria for diagnosis and treatment work in clinical practice?

ORIGINAL ARTICLE

Treatment With Diet and Exercise for Women With Gestational Diabetes Mellitus Diagnosed Using IADPSG Criteria

Oratile Kgosidialwa, Aoife M. Egan, Louise Carmody, Breda Kirwan, Patricia Gunning, and Fidelma P. Dunne

Galway Diabetes Research Centre (O.K., A.M.E., L.C., B.K., F.P.D.), Galway University Hospital, Galway, Ireland; HRB Clinical Research Facility (P.G.), Galway, Ireland; and National University of Ireland (F.P.D.), Galway, Ireland

Diet only: Differences in infant size

		GDM N =567	NGT N = 2499	P value
LGA **(>90th C)**	BMI <25 BMI 25-30 BMI>30	9.4% 10.4% 15.1%	12.2% 16.0% 21.8%	0.4 0.06 0.02
Macrosomia **(> 4kg)**	BMI <25 BMI 25-30 BMI>30	7.5% 11.0% 17.6%	16.5% 21.8% 27.0%	0.02 0.01 0.01

Composite Poor Neonatal Outcome

- OR 0.79 (CI 0.64-0.98) P 0.03

- 21% less likely to have an adverse outcome

ENDOCRINE SOCIETY

ATLANTIC DIP: Insulin Therapy for women with IADPSG-diagnosed Gestational Diabetes Mellitus. Does it work?

Bogdanet D, Egan AM, Reddin C, Kgosidialwa O, Kirwan B, Carmody L, Dunne FP

The Journal of Clinical Endocrinology & Metabolism
Endocrine Society

Submitted: August 06, 2016
Accepted: November 29, 2016
First Online: November 30, 2016

Insulin: Differences in infant size

	GDM N = 752	NGT N = 2496	P value
>4kg	18%	16%	ns
LGA	20%	16%	ns
SGA	3%	5%	ns
Birth weight	3.58	3.57	ns
S Dystocia	0.9%	1.56%	ns
Gest. Wk	39	40	ns

Insulin: Differences in infant size

Shoulder dystocia (%)			
BMI <25	1/64 (1.6)	19/934 (2)	0.79
BMI 25–29.9	2/175 (1.1)	12/959 (1.3)	0.90
BMI ≥30	4/475 (0.8)	8/571 (1.4)	0.40
LGA (%)			
BMI <25	8/62 (12.5)	115/925 (12.3)	0.92
BMI 25–29.9	27/172 (15.1)	147/952 (15.3)	0.94
BMI ≥30	105/469 (21.7)	118/566 (20.7)	0.63
SGA (%)			
BMI <25	3/62 (3.7)	66/925 (7.1)	0.51
BMI 25–29.9	10/172 (5.6)	38/952 (4)	0.30
BMI ≥30	11/469 (2.3)	23/566 (4)	0.13
Macrosomia (%)			
BMI <25	9/64 (14.1)	150/933 (16.1)	0.71
BMI 25–29.9	30/179 (16.8)	213/958 (22.2)	0.17
BMI ≥30	128/481 (26.5)	150/565 (26.3)	0.98
Mortality (%)			
BMI <25	0	7/933 (0.7)	0.49
BMI 25–29.9	1/179 (0.6)	5/959 (0.5)	0.94
BMI ≥30	3/483 (0.6)	1/571 (0.2)	0.24

Is there Harmonization?

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journal homepage: www.elsevier.com/locate/ejogrb

Review

Survey by the European Board and College of Obstetrics and Gynaecology on screening for gestational diabetes in Europe

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[e] Endocrinology School of Medicine and Galway Diabetes Research Centre (GDRC), National University of Ireland, Galway (NUIG), Ireland

Summary

- Majority of European societies have adopted IADPSG criteria.
- Important first step towards harmonisation across Europe.
- Research needed to answer areas that are still controversial.

European Journal of Obstetrics & Gynecology and Reproductive Biology xxx (2016) xxx–xxx

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European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

Review

Screening for gestational diabetes in Europe: where do we stand and how to move forward?
A scientific paper commissioned by the European Board & College of Obstetrics and Gynaecology (EBCOG)

Katrien Benhalima [a,*], Peter Damm [b], André Van Assche [c], Chantal Mathieu [a], Roland Devlieger [c], Tahir Mahmood [d], Fidelma Dunne [e]

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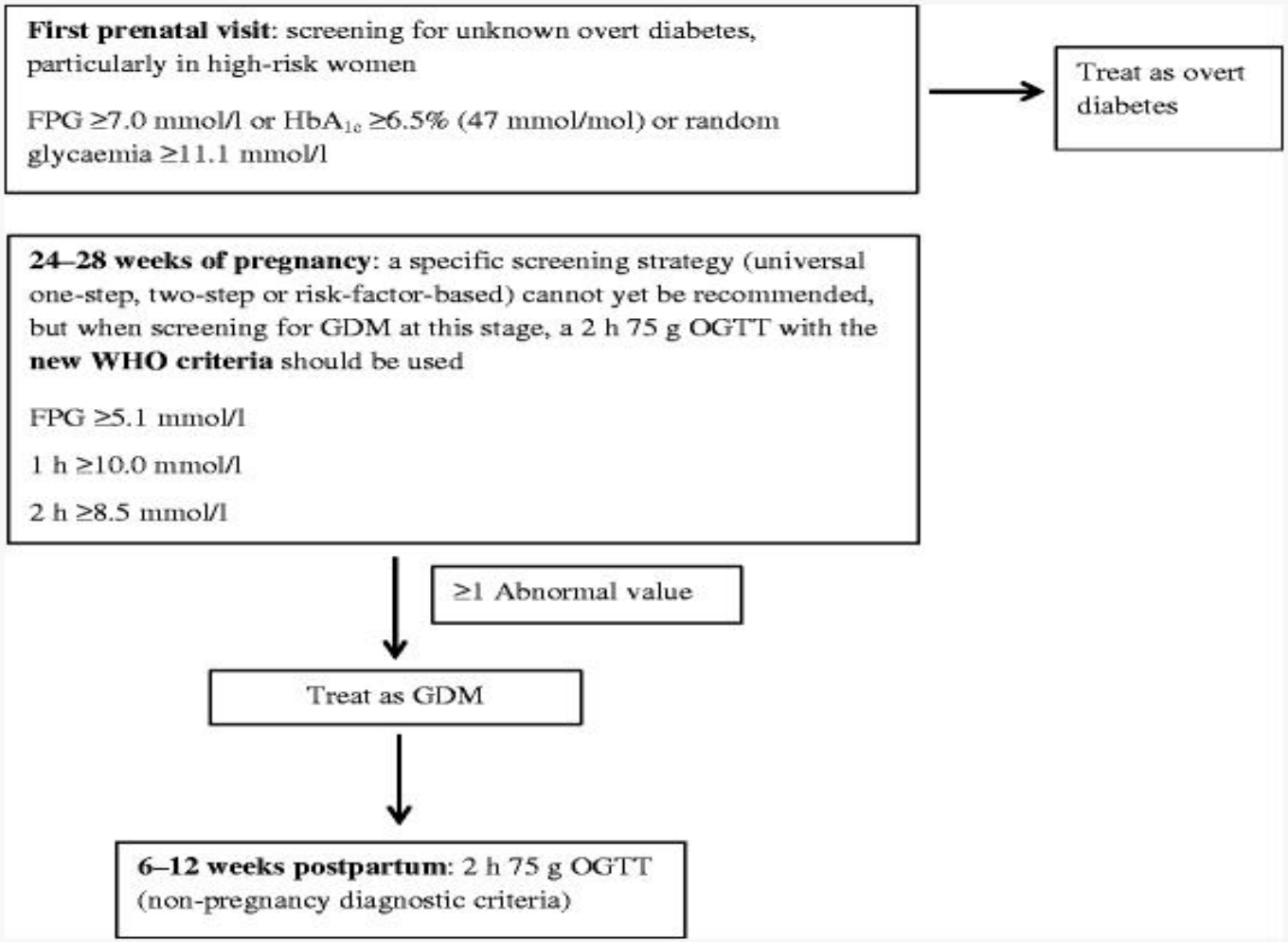

Fig. 1

A proposal for the use of uniform diagnostic criteria for GDM in Europe

What international groups support IADPSG criteria?

- ADA adopted IADPSG 2011, 2013
- WHO adopted IADPSG 2013
- Endocrine Society adopted IADPSG 2013
- DPSG
- EBCOG -2013
- EAPM -2013
- IDF - 2014
- FIGO -2015

IADPSG Working together with FIGO

- A pragmatic guide for diagnosis and management of GDM
- Colombo HIP Declaration – South Asia - 2016
- Barcelona HIP Declaration – Europe -2017
- Rio HIP Declaration – Global - 2018

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The International Federation of Gynecology and Obstetrics (FIGO) Initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care#

Moshe Hod [a], Anil Kapur [b], David A. Sacks [c], Eran Hadar [d,e], Mukesh Agarwal [f], Gian Carlo Di Renzo [g], Luis Cabero Roura [h], Harold David McIntyre [i], Jessica L. Morris [j,*], Hema Divakar [k]

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5.3.2. Gestational diabetes mellitus

As per the recommendation of the IADPSG (2010) and WHO (2013), the diagnosis of GDM is made using a single-step 75-g OGTT when one or more of the following results are recorded during routine testing specifically between weeks 24 and 28 of pregnancy or at any other time during the course of pregnancy:

(1) Fasting plasma glucose 5.1–6.9 mmol/L (92–125 mg/dL);
(2) 1-hour post 75-g oral glucose load ≥10 mmol/L (180 mg/dL);
(3) 2-hour post 75-g oral glucose load 8.5–11.0 mmol/L (153–199 mg/dL)

- FIGO adopts the WHO (2013) criteria for diagnosis of diabetes mellitus in pregnancy.
- FIGO adopts the WHO (2013) and IADPSG (2010) criteria for diagnosis of gestational diabetes mellitus. Given the resource constraints in many low-resource countries, other strategies described herein are considered equally acceptable.

FIGO suggests various options for diagnosis of GDM based on resource settings in Table 4.

The Colombo Declaration
On
Hyperglycemia in Pregnancy – South Asia

The Preamble:

Whereas

- South Asia significantly reduced its maternal mortality ratio (MMR), from 550 in 1990 to 190 per 100,000 live births in 2013, marking a decline of 65%; maternal deaths, a largely preventable tragedy, continue to be a challenge in South Asia, accounting for 24% of global maternal deaths

- Hemorrhage, hypertension, sepsis and obstructed labor directly account for a large number of these deaths, a significant proportion of deaths are due to indirect causes. Some of the indirect causes such as hyperglycemia in pregnancy (HIP) also contribute to increasing the risk for the direct causes

- With decline in direct maternal deaths because of targeted interventions, efforts to further reduce maternal mortality will have to be refocused on reduction of indirect causes

- Diabetes mellitus is escalating worldwide; it already affects over 85 million people in South Asia and is projected to affect over 150 million people by 2040. There is an equally high burden of pre-diabetes - approximately 45 million are estimated to have pre- diabetes

- Eight low and middle-income countries that account for over half the global live births, also contribute to more than half of the global diabetes burden; Bangladesh, India and Pakistan among them, also fare poorly on


Hypertension, Metabolic Syndrome and Pregnancy
Maternal Medicine meets Fetal Medicine
er 8-10, 2016 • Colombo, Sri Lanka

March 8-12, 2017 • Barcelona, Spain

BARCELONA HIP DECLARATION

The European HIP Declaration is a regional call to action to address the link between maternal health and diabetes as a public health priority. The Declaration details how countries in the specific region face similar challenges and it sets the path for stakeholders in these countries to improve maternal and child health. It also emphasizes the need to accelerate the implementation of the FIGO GDM guidelines, the first international, practical guide on diagnosis, management and care for women with gestational diabetes which has seen wide approval and endorsement

FACTS ABOUT HIP

- Diabetes mellitus is escalating worldwide and prevalence of diabetes among all age groups in increasing in Europe. It already affects about 60 million people, and is projected to increase to 71 million people by 2040
- Maternal mortality is quite low in Europe; but when they occur, maternal deaths are often directly due to hemorrhage, hypertension, sepsis and obstructed labor. Maternal deaths also result from indirect causes such as associated medical conditions. Some of the indirect causes such as hyperglycemia in pregnancy (HIP) also contribute to increasing the risk for the direct causes of maternal mortality
- Hyperglycemia in pregnancy is one of the most common medical conditions affecting women during pregnancy
- The majority of women with HIP have gestational diabetes (GDM), which develops due to hormonal changes of pregnancy and is confined to the duration of pregnancy
- Children born to women with HIP are at very high risk of obesity, early onset type 2 diabetes and cardiovascular disease, whereby, HIP perpetuates the risk of diabetes into the next generation
- Without preventive care, almost half of women with GDM develop type 2 diabetes and a significant proportion develop premature cardiovascular disease, within 10 years of childbirth

WHAT ARE WE DOING ABOUT IT?

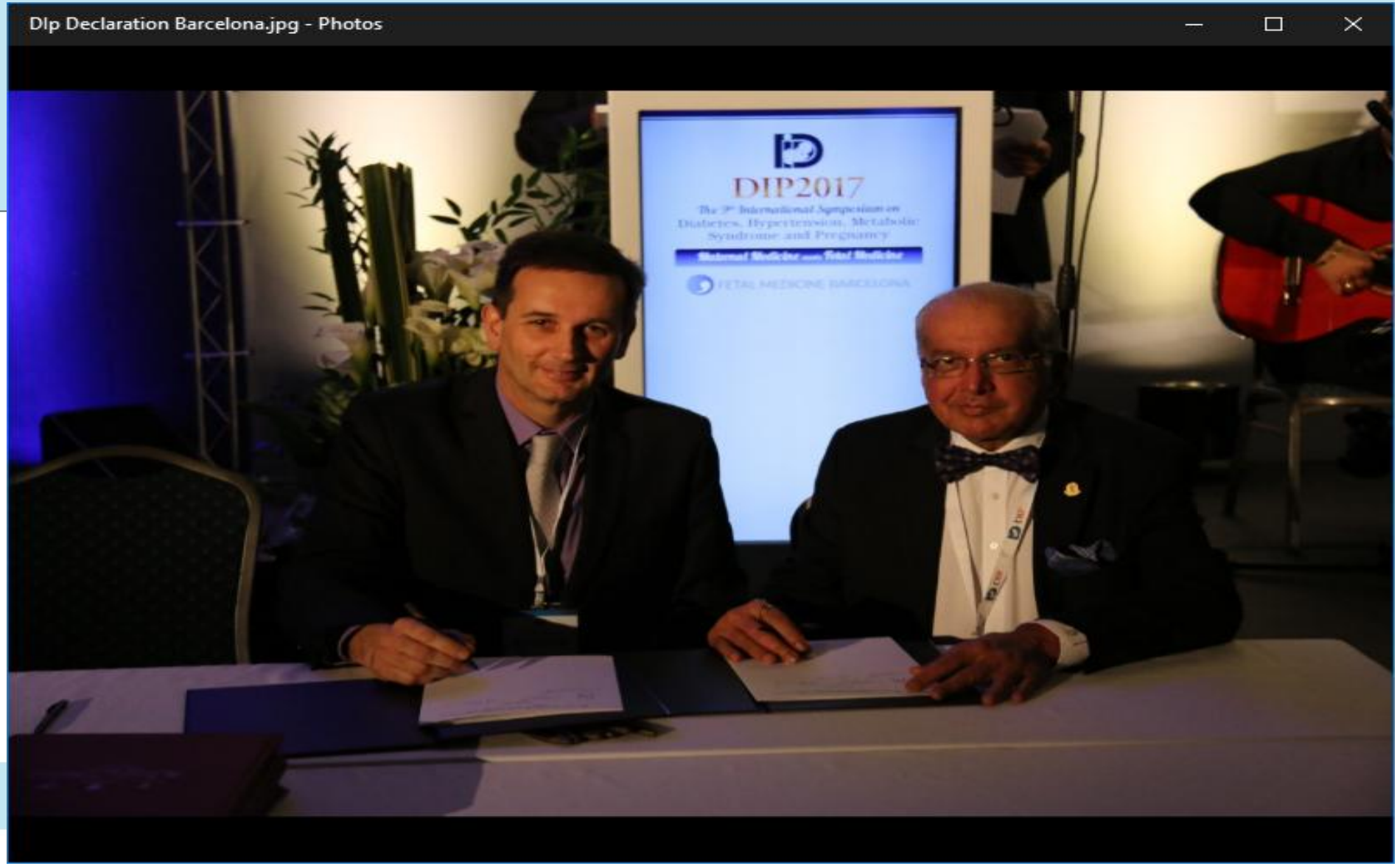
- Undertake actions in our various capacities to support efforts to address the link between maternal health obesity and diabetes as a public health priority
- Promote and celebrate a National GDM Awareness Day as an instrument to bring public attention and raise awareness of the problem
- Support efforts to increase public awareness about hyperglycemia in pregnancy and its impact on maternal and child health, encourage preconception counseling, antenatal care and post-natal follow up
- Support and encourage task shifting, role based training to build capacity for prevention, early diagnosis, and treatment of HIP and continued engagement with the high risk mother child pair over a prolonged time period
- Advocate for access to uninterrupted diagnostic supplies, medications and trained manpower for diagnosis and appropriate management for HIP at all levels of care at affordable costs keeping the pregnant women's convenience in mind
- Make all efforts to support post-partum follow up and engagement of the high risk mother child pair post-GDM pregnancy linked to the child's vaccination program by engaging and collaborating with other health care professionals

JOIN US FOR THE EUROPEAN- BARCELONA HIP DECLARATION AT DIP 2017!

www.comtecmed.com/dipap/2016/declaration.aspx

www.comtecmed.com/dip - dip@comtecmed.com

DIP Symposium


DIp Declaration Barcelona.jpg - Photos
DIP2017
FETAL MEDICINE BARCELONA

Katja Iversen: Diabetes in pregnancy—a neglected cause of maternal mortality

May 2, 2017

In the lead up to the 70th World Health Assembly (22-31 May), president and CEO of Women Deliver, Katja Iversen, highlights a neglected health problem that must be addressed in order to reduce global rates of maternal mortality and fulfil Sustainable Development Goal targets: diabetes in pregnancy

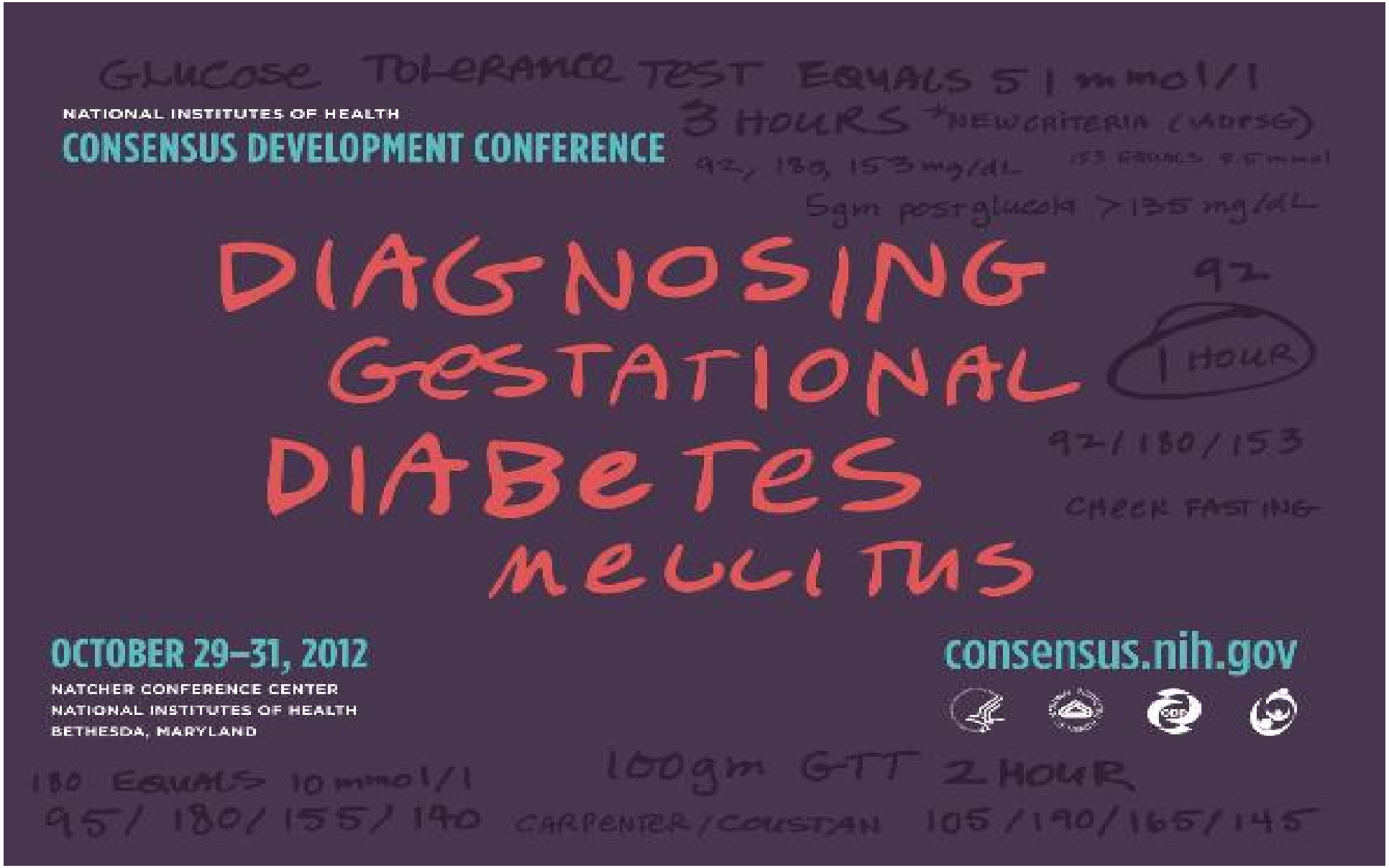
Over the past two decades, improving maternal health has become an increasingly important focus of the global development agenda—and rightly so. Between 1990 and 2015, the maternal mortality rate has fallen by 44%, from approximately 546 000 to 303 000 deaths per annum. That reduction is a testament to the sterling collective efforts of governments, institutional donors, health service providers, and family planning agencies, as well as tireless campaigning by international, national, and grassroots organisations.

Yet despite these gains, some 830 women and girls still die from preventable causes related to pregnancy and childbirth every single day. These deaths are unacceptable. Clearly, the approach needs to change if there is any hope of meeting the Sustainable Development Goals target to reduce the global maternal mortality ratio from its current 216 deaths per 100 000 live births to less than 70 deaths per 100 000 live births by 2030.

To achieve this ambitious target, the global health community must tackle previously neglected conditions that are associated with pregnancy complications, and which are thereby responsible for the unacceptably high numbers of maternal deaths each year. Diabetes in pregnancy is one such condition, affecting one out of every six pregnancies around the world.

Towards Global Commitment – Global Declaration Rio de Janeiro October 2018

SAIDIP -	**Colombo , Sri Lanka (Sept. 2016)**
AFOG –	**Addis, Ethiopia (February 2017)**
Europe -	**Barcelona , Spain (March 2017)**
Asia –	**Bangalore, India (April 2017)**
Greater China-	**Beijing , China (September 2017)**
FLASOG-	**Cancun, Mexico (November 2017)**
GULF/MENA –	**Abu Dhabi, UAE (December 2017) - IDF**


GLUCOSE TOLERANCE TEST EQUALS 5 1 mmol/1
3 HOURS *NEW CRITERIA (ADESG)
92, 180, 153 mg/dL
5gm postglucola >135 mg/dL
DIAGNOSING
GESTATIONAL
DIABETES
MELLITUS
92
1 HOUR
92/180/153
CHECK FASTING
NATIONAL INSTITUTES OF HEALTH
CONSENSUS DEVELOPMENT CONFERENCE
OCTOBER 29–31, 2012
NATCHER CONFERENCE CENTER
NATIONAL INSTITUTES OF HEALTH
BETHESDA, MARYLAND
consensus.nih.gov
180 EQUALS 10 mmol/1
95/180/155/190
100gm GTT 2 HOUR
CARPENTER/COUSTAN
105/190/165/145

Panel's Conclusion in March 2013

U.S. Department of Health and Human Services

NIH News

National Institutes of Health

NIH Office of the Director (OD)

Embargoed for Release
Wednesday, March 6, 2013
12 p.m. EST

Contact:
Deborah Langer
301–443–4569

Panel supports maintaining the current diagnostic approach for gestational diabetes mellitus

An independent panel convened this week by the National Institutes of Health has concluded that despite potential advantages of adopting a new diagnostic approach for gestational diabetes mellitus (GDM), more evidence is needed to ensure that the benefits outweigh the harms. The panel recommended following the current diagnostic approach until further studies are conducted.

"The panel believes that cost-benefit, cost-effectiveness, and cost-utility research is needed to more fully understand the implications of changing diagnostic protocols for GDM," said Dr. Peter VanDorsten, conference panel chairperson and Lawrence L. Hester, Jr. Professor, Medical University of South Carolina, Charleston.

GDM is a condition in which women without previously diagnosed diabetes exhibit high blood glucose levels during pregnancy. GDM is currently estimated to occur in 5-6 percent of U.S. pregnancies, affecting more than 240,000 births annually. GDM is associated with an increased risk of complications for both the mother and child, including maternal

Society for Maternal Fetal Medicine (SMFM)

- Continues to follow ACOG guideline from 2013 (reaffirmed in 2015) based on NIH Consensus Development Conference Statement

Current Commentary

National Institutes of Health Consensus Development Conference Statement

Diagnosing Gestational Diabetes Mellitus, March 4–6, 2013

The American College of Obstetricians and Gynecologists

WOMEN'S HEALTH CARE PHYSICIANS

PRACTICE BULLETIN

CLINICAL MANAGEMENT GUIDELINES FOR OBSTETRICIAN–GYNECOLOGISTS

NUMBER 137, AUGUST 2013

(Replaces Practice Bulletin Number 30, September 2001, Committee Opinion Number 435, June 2009, and Committee Opinion Number 504, September 2011. Reaffirmed 2015)

Gestational Diabetes Mellitus

Gestational diabetes mellitus (GDM) is one of the most common medical complications of pregnancy. Debate continues to surround both the diagnosis and treatment of GDM despite several recent large-scale studies addressing these issues. The purpose of this document is to 1) provide a brief overview of the understanding of GDM, 2) provide management guidelines that have been validated by appropriately conducted clinical research, and 3) identify gaps in current knowledge toward which future research can be directed.

Efforts to Establish Consensus

DIABETES AND PREGNANCY (CJ HOMKO, SECTION EDITOR)

Counterpoint: Establishing Consensus in the Diagnosis of GDM Following the HAPO Study

H. David McIntyre · Boyd E. Metzger · Donald R. Coustan · Alan R. Dyer · David R. Hadden · Moshe Hod · Lynn P. Lowe · Jeremy J. N. Oats · Bengt Persson

Published online: 29 April 2014

Abstract The International Association of Dia
Pregnancy Study Groups (IADPSG) recommended
protocol of 1-step testing with a 75 g oral glucose
ance test for gestational diabetes in 2010. Since that tim
these recommendations have been carefully scrutinized and accepted by a variety of organizations, but challenged or rejected by others. In the current review, we present more details regarding the background to the development of the IADPSG recommendations and seek to place them in context with the available epidemiologic and randomized controlled trial data. In this "counterpoint," we also pro-

"We strongly disagree with Long and Cundy, who believe GDM diagnosis by the IADPSG criteria will 'medicalize . . . hitherto healthy pregnancies.' Rather, they will allow identification of previously ignored risks."

Introductio

Since the publication of the primary results of the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study [1], substantial efforts have been made to use HAPO study data, in combination

NIH Consensus Panel in 2013 Decision

"Given potential benefits of one-step approach, resolution of the uncertainties associated with its use would warrant reconsideration."

August 2017 – GDM forum at NIH, Bethesda

- P Catalano
- D Sacks
- L Barbour
- D Coustan
- M Landon
- D Feig
- S Meltzer
- R Corcoy
- P Damm
- F Dunne
- D McIntyre
- J Rowen
- D Simmons

Long term Diabetes risk post GDM (IADPSG)

Abnormal glucose tolerance post-gestational diabetes mellitus as defined by the International Association of Diabetes and Pregnancy Study Groups criteria

Eoin Noctor[1], Catherine Crowe[1], Louise A Carmody[1], Jean A Saunders[2], Breda Kirwan[1], Angela O'Dea[3], Paddy Gillespie[4], Liam G Glynn[3], Brian E McGuire[5], Ciarán O'Neill[4], P M O'Shea[6] and F P Dunne[1] for the ATLANTIC-DIP investigators

[1]Galway Diabetes Research Centre, National University of Ireland, Galway, Ireland, [2]Statistical Consulting Unit/CSTAR @ UL, University of Limerick, Limerick, Ireland, [3]Department of General Practice, National University of Ireland, Galway, Ireland, [4]School of Business and Economics, National University of Ireland, Galway, Ireland, [5]School of Psychology, National University of Ireland, Galway, Ireland, and [6]Department of Clinical Biochemistry, University Hospital Galway, Galway, Ireland

Correspondence should be addressed to E Noctor
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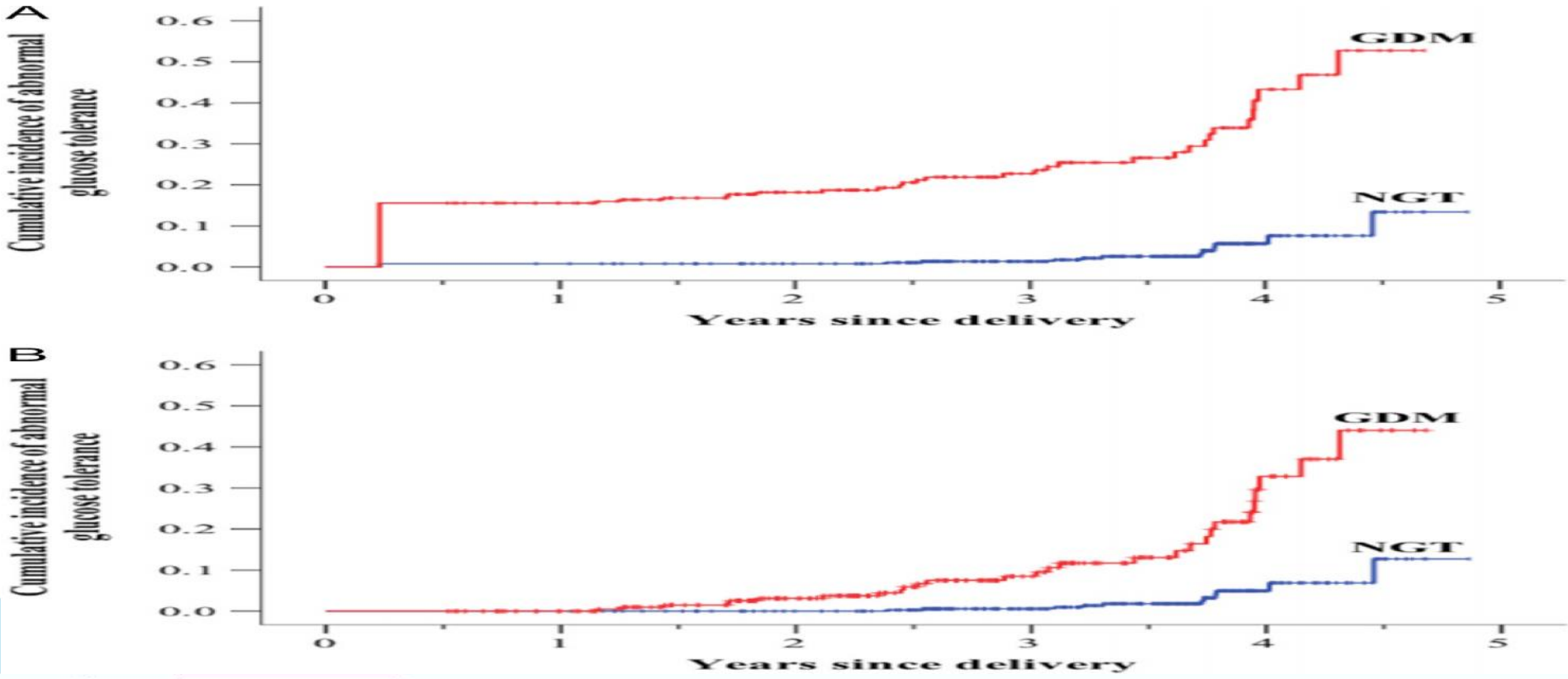
enoctor@yahoo.com

25.9% GDM vs 3.6% NGT



study.

	GDM (n=270)	NGT (n=388)	95% CI for difference	P value for difference
Number of participants with abnormal glucose tolerance at early post-partum testing				
IFG	18	0		
IGT	8	2		
IFG/IGT	12	1		
DM	4	0		
Total early post-partum	42 (15.6%)	3 (0.8%)	10.7, 19.6	0.001
Number of participants with newly diagnosed abnormal glucose tolerance at this study				
IFG	15	7		
IGT	8	4		
IFG/IGT	3	0		
DM	2	0		
Total for this study	28 (10.4%)	11 (2.8%)	3.8, 11.9	<0.001
Total number	70 (25.9%)[†]	14 (3.6%)	16.9, 28.0	0.001

[†]Added and calculated percentages differ slightly due to rounding error.

DM, diabetes mellitus; GDM, gestational diabetes mellitus; IFG, impaired fasting glucose; IGT, impaired glucose tolerance; NGT, normal glucose tolerance.

Acta Diabetol (2015) 52:153–160
DOI 10.1007/s00592-014-0621-z

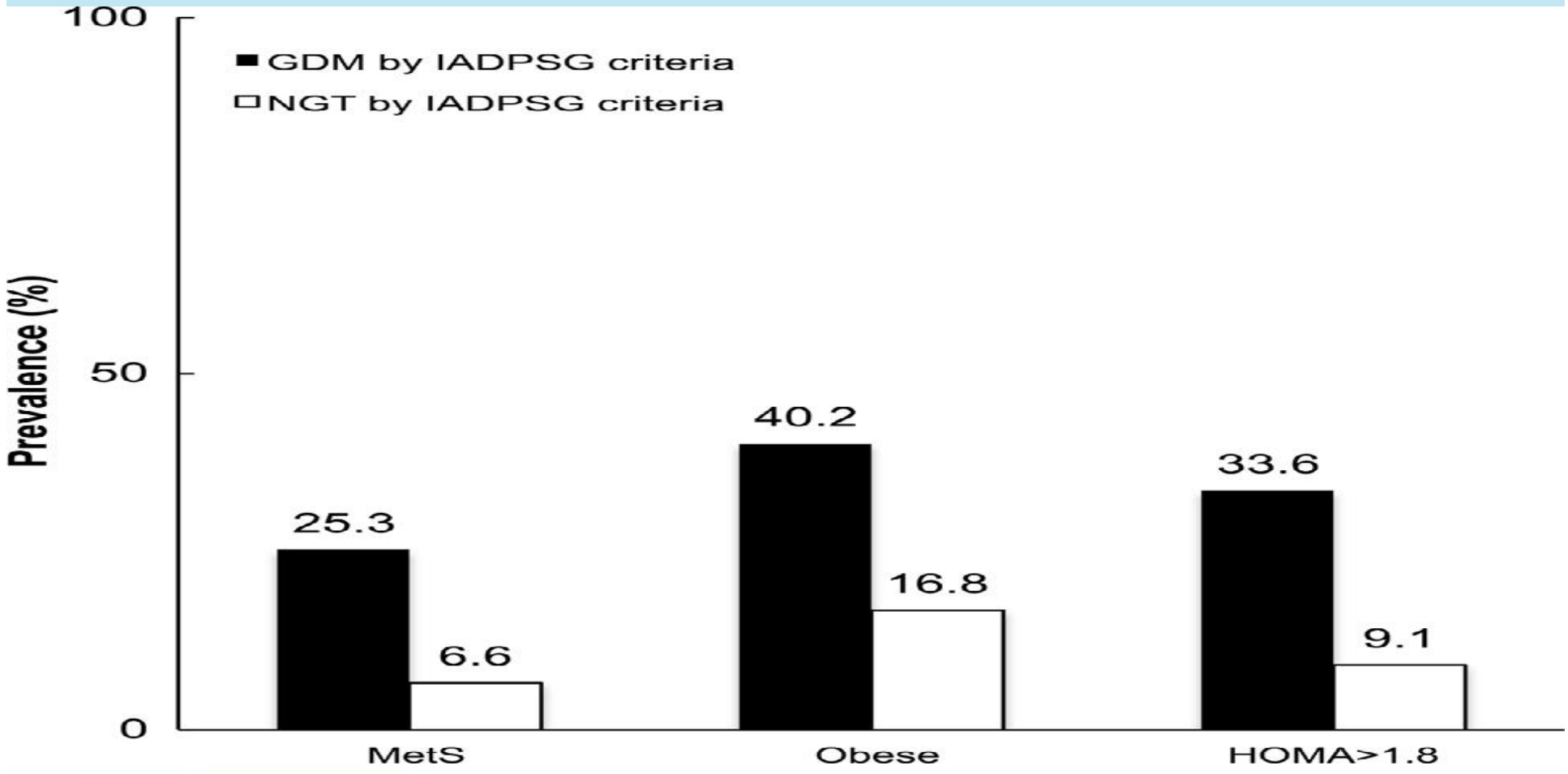
ORIGINAL ARTICLE

ATLANTIC-DIP: prevalence of metabolic syndrome and insulin resistance in women with previous gestational diabetes mellitus by International Association of Diabetes in Pregnancy Study Groups criteria

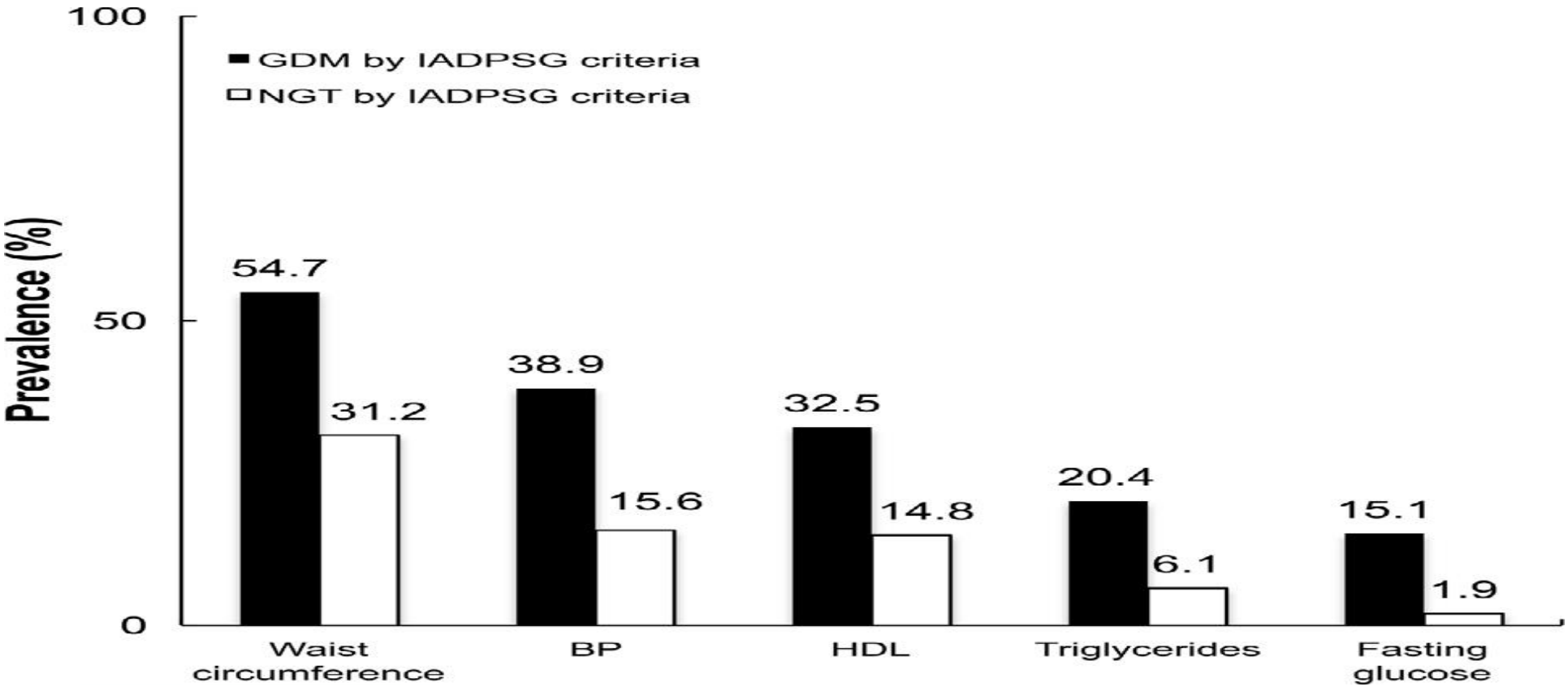
Eoin Noctor · Catherine Crowe · Louise A. Carmody · Breda Kirwan · Angela O'Dea · Liam G. Glynn · Brian E. McGuire · Paula M. O'Shea · Fidelma P. Dunne

Received: 13 February 2014 / Accepted: 25 June 2014 / Published online: 8 July 2014

MetS OB and IR post GDM



Components of the Metabolic Syndrome



Long term impact on children post GDM (IADPSG)

In Utero Exposure to Maternal Hyperglycemia Increases Childhood Cardiometabolic Risk in Offspring

Diabetes Care 2017;40:679–686 | DOI: 10.2337/dc16-2397

Wing Hung Tam,[1] Ronald Ching Wan Ma,[2,3,4] Risa Ozaki,[2] Albert Martin Li,[5] Michael Ho Ming Chan,[6] Lai Yuk Yuen,[1] Terence Tzu Hsi Lao,[1] Xilin Yang,[7] Chung Shun Ho,[6] Gregory Emanuele Tutino,[2] and Juliana Chung Ngor Chan[2,3,4]

OBJECTIVE

The objective of this study was to evaluate the effect of maternal hyperglycemia during pregnancy on cardiometabolic risk in offspring during early childhood.

RESEARCH DESIGN AND METHODS

A total of 970 mothers who had joined the Hyperglycemia and Adverse Pregnancy Outcome study were reevaluated, together with their child born during the study period, 7 years after delivery.

RESULTS

Offspring born to mothers diagnosed with gestational diabetes mellitus (GDM), as defined by the World Health Organization 2013 GDM criteria, had higher rates of abnormal glucose tolerance (4.7% vs. 1.7%; *P* = 0.04), higher rates of overweight or obesity, greater BMI, higher blood pressure (BP), lower oral disposition index,

[1]Department of Obstet... School Institute Name to go here
Chinese University of Hong Kong, Hong Kong
[2]Department of Medicine and Therapeutics, Chinese University of Hong Kong, Hong Kong

Conclusion

- Diabetes, Pre-Diabetes, MetS, Obesity are significant health concerns in GDM women Dx by IADPSG.
- Children are also at increased CVS risk.
- Although IADPSG criteria are less stringent than prior diagnostic cut offs, post pregnancy metabolic risks remain high.
- Follow up should be as frequent as for the older criteria.
- **HAPO follow up mothers and offspring at ADA 2017**

Ongoing Controversy: 1

- **RCT of IADPSG Screening Strategy**

- GCT+OGTT vs
- OGTT alone.

Psychological implications and cost effectiveness (HTA) of each arm.

Issues With the Diagnosis and Classification of Hyperglycemia in Early Pregnancy

H. David McIntyre,[1] David A. Sacks,[2] Linda A. Barbour,[3] Denice S. Feig,[4] Patrick M. Catalano,[5] Peter Damm,[6] and Aidan McElduff[7]

Diabetes Care 2016;39:53–54 | DOI: 10.2337/dc15-1887

Ongoing Controversy: 2

- Does **IADPSG criteria in T1** accurately predict GDM > 24 weeks in different populations?

Ongoing Controversy: 3

- **Benefit of early diagnosis and intervention?**

Screen + early intervention in T1

vs

Screen + usual intervention >24 weeks.

Ongoing Research

- **EGGO:** (Harper Alabama USA). Early GDM screening in Obese >30. Two step GDM testing at 14 – 18 weeks vs. standard two step GDM testing at 24-28 weeks.
- **TOBOGM**: (Simmons D Australia). Early treatment of IADPSG positive women (<20 weeks) vs Standard treatment > 24 weeks
- **Early screen and treat GDM** (Rodriguez, Florida, USA). Early two step GDM testing vs Standard two step GDM testing OGTT.
- **PINTO: (**Hughes & Rowan, New Zealand). Early HbA1c 5.7 – 6.4%, RCT of treatment vs. standard care.

Other areas identified for research

1. Epigenetic effects of treating IADPSG positive women with diet, insulin, OHA.
2. Maternal Metabolomics in early pregnancy to predict GDM in later pregnancy.
3. GDM diagnosis using POC, home OGTT, HbA1C.
4. Longitudinal follow up of GDM women (IADPSG) to predict later Type 2 Diabetes.
5. Longitudinal follow up of offspring of IADPSG diagnosed GDM women.

Working towards Harmonization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I Love
Mummy