25th Regional Congress of the Perinatal Society of Malaysia Scientific Programme

PREVENT, DETECT & TREAT :
ENSURING QUALITY CARE IN PERINATAL MEDICINE

5TH TO 8TH OF APRIL 2018, ROYALE CHULAN, JALAN CONLAY, KUALA LUMPUR, MALAYSIA

PSM WORKSHOPS (UKM & UM) 5th April 2018				25th REGIONAL CONGRESS OF THE PERINATAL SOCIETY MALAYSIA (ROYALE CHULAN) 6th to 8th APRIL 2018							
Time / Date	Thursday 5th April 2018			Time/ Date	Friday 6th April 2018		Time/ Date	Saturday 7th April 2018		Sunday 8th April 2018	
0800 - 0900	Registration - PSM Workshops			0730 - 0800	Registration – PSM Congress Day 1 Morning Coffee		0730 - 0800	Registration – PSM Congress Day 2 Morning Coffee		Registration – PSM Congress Day 3 Morning Coffee	
	Auditorium, UKM Advanced Surgical Skill Centres (ASSC) Universiti Kebangsaan Malaysia (UKM) Medical Centre, Cheras, Kuala Lumpur		Obstetrics Auditorium, Women & Children's Complex KKWK, University of Malaya Medical Centre (UMMC), Kuala Lumpur	0800-0900	P1: TAMING SARI 1&2 FAOPS PLENARY LECTURE *CHAIR: SOO THIAN LIAN* Perinatal Quality Improvement Initiatives in Achieving SDG's Across Asia ***Speaker : Socorro Mendoza***		0800-0900	P2: TAMING SARI 1&2 DATO' DR LIM NYOK LING MEMORIAL LECTURE *CHAIR: AZANNA A KAMAR* Evidence Based Practice in Quality Improvement for Perinatal Care ***Speaker : Shoo Lee***		P3: TAMING SARI 1&2 PLENARY LECTURE 3 *CHAIR: HAMIZAH ISMAIL* Role of Genetic Testing on Perinatal Care ***Speaker : Sailesh Kumar***	
0900 - 1030	W1 : ULTRASOUND OF THE NEONATAL LUNG *CHAIR : CHEAH FOOK CHOE*	0900 1015	W2: CARDIO-TOCOGRAPH (CTG) MASTERCLASS *CHAIR: IMELDA BALCHIN*	0900 - 1030	TAMING SARI 1 & 2 OPENING CEREMONY Graced by the Patron of Perinatal Society of Malaysia YTM RAJA DATO' SERI ELEENA BINTI ALMARHUM SULTAN AZLAN MUHIBUDDIN SHAH AL-MAGHFUR-LAH FOLLOWED BY VISIT TO EXHIBITION BOOTHS AND POSTER VIEWING SESSION		0900-1030	TAMING SARI 1 & 2 SYMPOSIUM 5 ANAEMIA *CHAIR: BAVANANDAN NAIDU*	TAMING SARI 3 SYMPOSIUM 6: PREVENTION OF PERINATAL DEATH *CHAIR : MICHELLE LING*	TAMING SARI 1 & 2 SYMPOSIUM 9 : INFECTION CONTROL IN THE NICU AND LABOUR ROOM *CHAIR: SOO TL*	TAMING SARI 3 SYMPOSIUM 10 : PERINATAL INFECTIONS *CHAIR : CAROL LIM KK*
0900 - 0930	W1A: Why You Will Love Ultrasound Lung *Patricia Woods*	0900 - 0915	Opening Speech *Imelda Balchin*				0900-0930	S5A : Reducing the Need for Blood Transfusions in Pregnancy *Carol Lim Kar Koong*	S6A : The Role of Pathology in Perinatology *Tan Geok Chin*	S9A : Role of Multi-Disciplinary Teams in Prevention of Infection *Melanie Curless & Azanna A Kamar*	S10A : Zika : Time to Put It to Rest? *Muniswaran Ganesham*
0930 - 1000	W1B: Fun Physics ! *Patricia Woods*	0915 - 0945	Use of CTG for Screening *Imelda Balchin*				0930-1000	S5B : Milking the Evidence - Delayed Cord Clamping *Azanna Ahmad Kamar*	S6B : Role of Customized Foetal Growth Charts *Rosnah Sutan*	S9B : Outbreak Management *Melanie Curless*	S10B : Maternal Dengue *Sharifah Faridah Syed Omar*
1000 - 1030	W1C : How To Perform Lung Ultrasound *Patricia Woods*	0945 - 1015	Physiology of Foetal Heart Patterns *Sailesh Kumar*				1000-1030	S5C: Role of Erythropoietin in Anaemia in Prematurity *Cheah Fook Choe*	S6C : Role of the Midwife in Preventing Perinatal Death *Ravichandran Jeganathan*	S9C : The Challenge of Early Diagnosis of Neonatal Infection *Ibukun Akinboyo*	S10C : Group B Streptococcal Infection *Neoh Siew Hong*
1030 - 1100	TEA BREAK	1015 - 1045	TEA BREAK	1030-1100	TEA BREAK		1030-1100	TEA BREAK			
1100 - 1300	W1 : US NEONATAL LUNG - Illustrated Clinical Cases & Research	1045 - 1300	W2 :CTG MASTER CLASS - Scenarios	1100-1230	TAMING SARI 1 & 2 SYMPOSIUM 1 EARLY DETECTION AND PREVENTION OF PRETERM COMPLICATIONS *CHAIR: BOO NEM YUN*	TAMING SARI 3 SYMPOSIUM 2 SOCIAL ASPECTS OF PERINATAL CARE *CHAIR :CAROL LIM KK*	1100-1230	TAMING SARI 1 & 2 SYMPOSIUM 7 NECROTISING ENTEROCOLITIS *CHAIR: NEOH SIEW HONG*	TAMING SARI 3 SYMPOSIUM 8: ANTENATAL ULTRASOUND: PREDICTING OUTCOMES *CHAIR: ZALEHA MAHDY*	TAMING SARI 1 & 2 SYMPOSIUM 11 PARENTAL ROLE *CHAIR: CHEE SIOK CHIONG*	TAMING SARI 3 SYMPOSIUM 12 STEM CELL THERAPY IN PERINATAL MEDICINE *CHAIR : TP BASKARAN*
1100 - 1130	W1D : TTN vs RDS *Patricia Woods*	1045 – 1115	Real Scenarios & Quizzes 1 -4 *Imelda Balchin* *Sailesh Kumar* *Bavanandan N* *Carol Lim* *Hamizah Ismail*	1100-1130	S1A : Lung Ultrasound and Prediction of Respiratory Outcome in NICU *Patricia Woods*	S2A : Unintended Pregnancies *John Teo*	1100 – 1130	S7A : Can We Prevent NEC? *Chee Siok Chiong*	S8A : Role of Ultrasound Predicting Preterm Births *Bavanandan Naidu*	S11A : Parental Role and Empowerment for Successful Implementation of Kangaroo Care *Foong Wai Cheng*	S12A : Placenta as A Source of Stem Cells *Tan Geok Chin*
1130 - 1200	W1E : Pneumothorax *Patricia Woods*	1115 - 1145		1130-1200	S1B: Retinopathy of Prematurity: Can We Prevent It? *Choo May May*	S2B: Teen Pregnancies *Sheila Marimuthu*	1130 - 1200	S7B : Imaging in NEC *Che Zubaidah*	S8B : Role of Ultrasound in Pre-eclampsia and IUGR *Yip Khar Weng*	S11B : Family Integrated Care in the NICU *Shoo Lee*	S12B : Potential of Mesenchymal Stem Cells *Fadilah Abdul Wahid*
1200 - 1230	W1F: Pleural Effusion, Consolidations *Patricia Woods*	1145 – 1215		1200-1230	S1C : Mg Sulphate for Neuroprotection: Time for Action? *Sailesh Kumar*	S2C : Mothers on Ice, Babies in Limbo *Umi Adzlin Silim*	1200-1230	S7C : Role of Surgery in NEC *Zakaria bin Zahari*	S8C : Intrapartum Ultrasound: Monitoring of Progress of Labour *Vallikannu Narayanan*	S11C : Following Through Preterm Families After NICU Discharge *Alvin Chang*	S12C : The Promise of Nobel Prize's Stem Cells - Facts vs Myths *Cheong Soon Keng*
1230 - 1300	W1G : Broncho-pulmonary Dysplasia *Patricia Woods*	1215 - 1300									
1300 - 1400	LUNCH			1230-1430	LUNCH		1230-1400	LUNCH SYMPOSIUM Feeding Strategies for Preterm Infants - Importance of Optimizing Nutrition From Hospital to Home *Berthold Koletzko*		END OF CONGRESS	
1400 - 1530	W1: ULTRASOUND NEONATAL LUNG – Hands On LEAD : Patricia Woods	W2 : CTG MASTER CLASS - Scenarios LEAD : Imelda Balchin		1430-1600	TAMING SARI 1 & 2 SYMPOSIUM 3 NEONATAL SCREENING *CHAIR: SEE KWEE CHING*	TAMING SARI 3 SYMPOSIUM 4 MATERNAL DISEASE WITH PERINATAL COMPLICATIONS *CHAIR: BAVANANDAN NAIDU*	1400-1530	TAMING SARI 1 & 2 FAOPS PERINATAL FORUM HUMAN MILK BANKING & SHARING – How Best to Implement ? *CHAIRPERSON: IRENE CHEAH* Panelists: • Dr. Socorro Mendoza (FAOPS President-Elect & Neonatologist) • Dr. Sh Md Saifuddeen Sh Md Salleh (IKIM) • Dr. Noor Haliza Yussoff (Head & Consultant Obstetrician, National Lactation Centre) • Pn. Noor Fazila Abdul Rahman (Parent Representative)			
1400 – 1530	W1H : Phantom Lung Models Facilitators : • Wong Chee Sing • Faizah Mohd Zaki • Wan Nurulhuda • Yap Hsiao Ling • Cheah Fook Choe • Anis Siham Z Abidin	1400 - 1430	Real Scenario & Quiz 5 All Faciliators	1430-1500	S3A : Neonatal Jaundice Screening: the Problems in Malaysia *Boo Nem Yun*	S4A : Management of Pre-eclampsia at the Threshold of Viability *Imelda Balchin*					
		1430 – 1500	Modern Management of Labour Hamizah Ismail								
		1500 – 1600	Launching of New MOH Clinical Practice Guidelines (CPG) – Diabetes in Pregnancy *Imelda Balchin* Endocrine Perspective *Rohana Ghani* Family Medicine Perspective *Mastura Ismail* Obstetrics Perspective *Ranjit Singh*	1500-1530	S3B : Molecular Testing of NNJ *Cheah Fook Choe*	S4B : Acute Kidney Injury in Pregnancy *Zaleha A Mahdy*					
				1530-1600	S3C : Hypothyroidism Screening: Time to Revisit the Cut-Off Values *Wu Loo Ling*	S4C: A Relook at the Diagnosis and Glycaemic Control of Gestational Diabetes *Hamizah binti Ismail*	1530-1630	FREE PAPER PRESENTATIONS TAMING SARI 1 & 2 NEONATOLOGY *CHAIRPERSON:AZANNA A KAMAR* TAMING SARI 3 OBSTETRICS *CHAIRPERSON: CAROL LIM KAR KOONG* LANANG 1 NURSING *CHAIRPERSON : VALARMATHI KOVINDARAJOO*		
1530 - 1600	TEA BREAK	END OF WORKSHOP Overall Review		1600-1630	TEA BREAK		1630-1700	TEA BREAK			
1600 - 1630	Quiz Time !			1630	END OF DAY 1 CONGRESS		1700	END OF DAY 2 CONGRESS			
1630	END OF WORKSHOP			1630-1730	LANANG 1 25TH PERINATAL SOCIETY OF MALAYSIA ANNUAL GENERAL MEETING		1930 - 2300	25th Anniversary PSM Congress Dinner @Taming Sari 1 & 2, Royale Chulan, Jalan Conlay, Kuala Lumpur			
1700 - 1800	LANANG 3 FOYER, ROYALE CHULAN REGISTRATION FOR 25TH PSM CONGRESS										

A Relook at the Diagnosis & Glycaemic Control of Gestational Diabetes

Assoc. Prof. Dato' Dr. Hamizah Ismail

Head
Department of Obstetrics and Gynaecology
International Islamic University Malaysia

President
Perinatal Society of Malaysia

Content

- Introduction
  - Global healthcare burden
  - Maternal outcomes of GDM
  - Outcomes of baby of GDM mother
- Relook at diagnostic criteria
  - Old criteria
  - IADSPG criteria
  - Outcome
- Relook at glycaemic control

DIABETES RESEARCH AND CLINICAL PRACTICE 87 (2010) 293–301

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

ELSEVIER

International Diabetes Federation

Diabetes Atlas

Global healthcare expenditure on diabetes for 2010 and 2030

Ping Zhang [a,*], *Xinzhi Zhang* [a], *Jonathan Brown* [b], *Dorte Vistisen* [c], *Richard Sicree* [d], *Jonathan Shaw* [d], *Gregory Nichols* [b]

Table 2 – Health expenditures for diabetes among adults aged 20–79 years for years 2010 and 2030: 80 most populous countries.

Country	Health expenditure for diabetes in 2010 ('000)			Mean health expenditure per person with diabetes in 2010			Health expenditure for diabetes in 2030 ('000)		
	US dollars	International $	% of health Expenditure	US dollars	International $	% of health Expenditure	US dollars	International $	% of health Expenditure
Australia	4,105,051.93	7,701,169.16	3,872,763.55	7,265,390.96	9	3780.52	3566.59	5,649,982.74	10,895,824.56	5,330,272.93	10,279,273.66

Table 3 – Top 10 countries with the highest health expenditures for diabetes as measured by the national total, per person with diabetes, and percentage of the national health expenditure on diabetes in 2010.

Country	Total (USD in 000s)	Country	Per person with diabetes (USD)	Country	Percent (%)
United States	197,956,040	United States	7383	Nauru	41
Germany	28,108,815	Luxembourg	7268	Saudi Arabia	21
Japan	22,150,916	Monaco	5866	Mauritius	20
France	17,242,239	Slovenia	1626	Tuvalu	19
Canada	11,217,092	Norway	6933	Bahrain	19
Italy	11,022,611	Iceland	7001	Tonga	18
United Kingdom	7,647,875	Switzerland	5995	Oman	18
Spain	6,694,086	Ireland	5035	Qatar	18
China	4,968,697	Canada	3914	Seychelles	18
Mexico	4,836,480	Austria	4007	Malaysia	16

Zhang et al; Diabres 2010

Maternal Outcomes of GDM

Mother:

- Type 2 diabetes mellitus
- Metabolic syndrome
- Preeclampsia in subsequent pregnancies

- Major implications for public health
  - Increased long-term risk of :
    - Obesity
    - Diabetes Mellitus
    - Cardiovascular diseases
  - Trans-generation
    - Ongoing obesity and DM epidemics

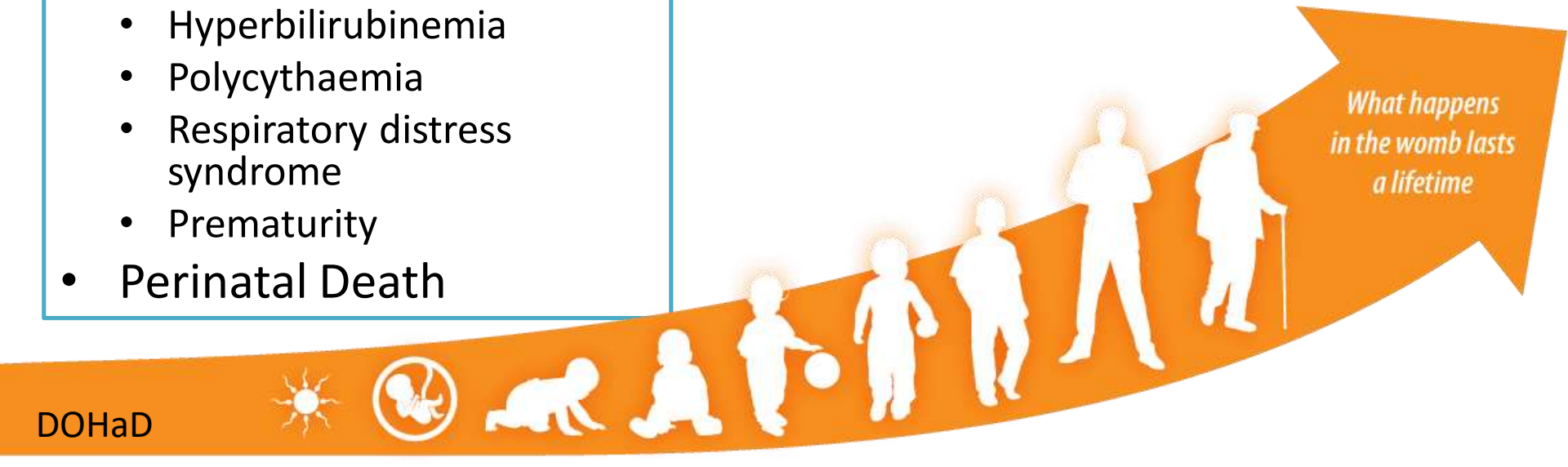
OUTCOMES OF BABY

PERINATAL

- Birth trauma
  - shoulder dystocia
- Caesarean
- Macrosomia
  - (BW>4000gm)
- Neonatal complications
  - Hypoglycemia
  - Hypocalcaemia
  - Hyperbilirubinemia
  - Polycythaemia
  - Respiratory distress syndrome
  - Prematurity
- Perinatal Death

Repercussion to CHILDREN and ADULTHOOD

- Obesity
- Metabolic syndrome



DOHaD

A Relook at the Diagnosis Criteria of Gestational Diabetes Mellitus

Diagnostic Criteria

- Old diagnostic criteria
- New Diagnostic Criteria from HAPO & IADPSG
- Screening Strategy
  - 1st trimester screening
  - 24-28th weeks screening
- Implications of the New Diagnostic Criteria

1964 O'Sullivan & Mahan
1979 NDDG
1982 Carpenter & Coustan

TWO STEPS
- **50g-GCT**

1h GBL >7.8mmol
- **100g-OGTT**

0, 1, 2, 3 hr

1996 EASD
1996 ASGODIP
1998 ADIPS
1999 WHO
2006 WHO

ONE STEP
75g- OGTT
0, 1, 2 hr

Over 50 years:
- The first diagnostic criteria were chosen
- To identify women at high risk for development of diabetes after pregnancy
- Derived from criteria used for nonpregnant individuals.
- Since then competing across the globe on
  - Whom to screen
  - When to screen
  - Methods of screening
  - diagnostic criteria
- Complicates delivery of healthcare, the design and interpretation of research in Gestational Diabetes Mellitus (GDM)

Two-step vs One-step

Table 1 Advantages and disadvantages of two-step and one-step testing for GDM

Characteristic	Two-step	One-step
Method	In the two-step screening approach, a 50-g GCT followed by a 100-g, 3-hour OGTT. Those who screen positive are followed up by an oral 100-g glucose tolerance test	In the one-step screening approach, 75- or 100-g OGTT is done in all patients, without the preliminary step by GCT
Advantages	• Fewer false positives • Avoids OGTT in more than 75% of the women	• Simple to follow • Easily diagnosed
Disadvantages	• Missed diagnosis: 75% sensitivity with 84% specificity as compared with single-step 100-g OGTT • Delay in initiating treatment even in those who test positive • It requires patients to make two visits for testing, where GCT is not feasible throughout the day	• Poor reproducibility • All women need to come in fasting state

Abbreviations: GDM, gestational diabetes mellitus; GCT, glucose challenge test; OGTT, oral glucose tolerance test.

Dia

	FBS	1Hr	2hr	
WHO 2013	5.1-6.9	≥ 11.0	8.5-11	GDM
WHO 2006	≥ 7.0		≥ 11.1	DM

Since then competing diagnostic criteria across the globe

		Steps	OG lo
O'Sullivan 1964 [6]	B	2	10
NDDG 1979 [11]	P	2	10
C&C 1982 [12]	P	2	10

	Fastin mmol/
Normal	< 5.5
IFG	6.1 - 6.
IGT	< 7.0
Diabetes mellitus	≥ 7.0
GDM	≥ 5.5

AFES Study Group on Diabetes in Pregnancy (ASGODIP)

ASGODIP protocol
1-step (high-risk)
75-g OGTT
2h cut-off 140 mg/dL

	Prevalence (%)
Indonesia	16
Malaysia	13
Philippines	14
Singapore	10
Thailand	13
ASEAN	13

Philippines	n/N
Low risk	35/853
High risk	136/350
Overall	171/1203 **14.2%**

Litonjua AD et al. AFES Study Group on Diabetes in Pregnancy: Preliminary Data on Prevalence. PJIM 1996:34:67-68.

Diagnostic Criteria for GDM

NOT EVIDENCE BASED

Criteria used of nonpregnant individuals

- identify women at high risk for development of diabetes after pregnancy
- Not necessary to identify pregnancies with increased risk for adverse perinatal outcome

HAPO STUDY 2008

Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) Study

- ✓ To clarify risk of adverse pregnancy outcomes associated with degrees of maternal glucose intolerance less severe than those with overt diabetes during pregnancy.
- ✓ To lead unification and agreement on the diagnostic criteria for GDM.

ONE STEP
75g- OGTT
0, 1, 2 hr
24-28 weeks


The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MAY 8, 2008 VOL. 358 NO. 19

Hyperglycemia and Adverse Pregnancy Outcomes

The HAPO Study Cooperative Research Group*

- An observational study
- 23,316 pregnant women
- A 75 g OGTT with sampling at 0, 1, and 2 hours

Goal – achieve consensus in the diagnosis of GDM by investigating the maternal glycaemia, less severe than overt diabetes, on the risk of adverse pregnancy and neonatal outcomes

HAPO Study 2008 Outcomes

48.3% whites
11.6 % black
8.5 % Hispanic
29 % Oriental

- 75-g OGTT
- 23,316women
- 24-32 weeks

PRIMARY OUTCOMES

- Birth weight > 90thcentiles
- Cord blood C-peptide
- Clinical Neonatal Hypoglycemia
- Primary caesarean section

SECONDARY OUTCOMES

- Preterm Delivery < 37 weeks' gestation
- Shoulder dystocia / birth injury
- Preeclampsia
- Neonatal skinfold thickness > 90 %

A linear increase in the risk of primary outcomes and secondary outcomes

Mean HAPO
4.5 mmol/L
7.4 mmol/L
6.2mmol/L

HAPO, N. Engl J med. 2008

2010 :

Conference of International Association of Diabetes and Pregnancy Study Groups (IADPSG)

- Conferees from 40 countries reviewed HAPO and other studies
- Recommended the first evidence-based diagnostic criteria for GDM
- Endorsed by various bodies, including the World Health Organization

The International Association of Diabetes in Pregnancy Study Groups (IADPSG) - 2010

1. How to use the HAPO findings to create **diagnostic criteria** for GDM based on pregnancy and neonatal outcomes
2. How to **establish the one-step 75-g OGTT** as the preferred international diagnostic test for GDM
3. **How to screen and diagnose preexisting** DM (PEDM) in the first trimester

1. IADPSG 2010
Diagnostic Criteria

- Odds Ratio of 1.75 times the mean
  - outcome of LGA, cord C-peptide, Neonatal body fat > 90 th percentiles
  - Prevalence of GDM in collaborating HAPO Centers ranged from 9.3-25.5 % average 17.8 %.

Mean plasma glucose value
4.5 / 7.4 / 6.2 mmol/l
1.75 odds ratio, Diagnostic Criteria :
≥5.1 / ≥10 / ≥8.5 mmol/l

2. IADPSG 2010 :

Establish the method / step

- Survey of IADPSG members
- 60 % opted the one-step method
- 30 % the two-step method

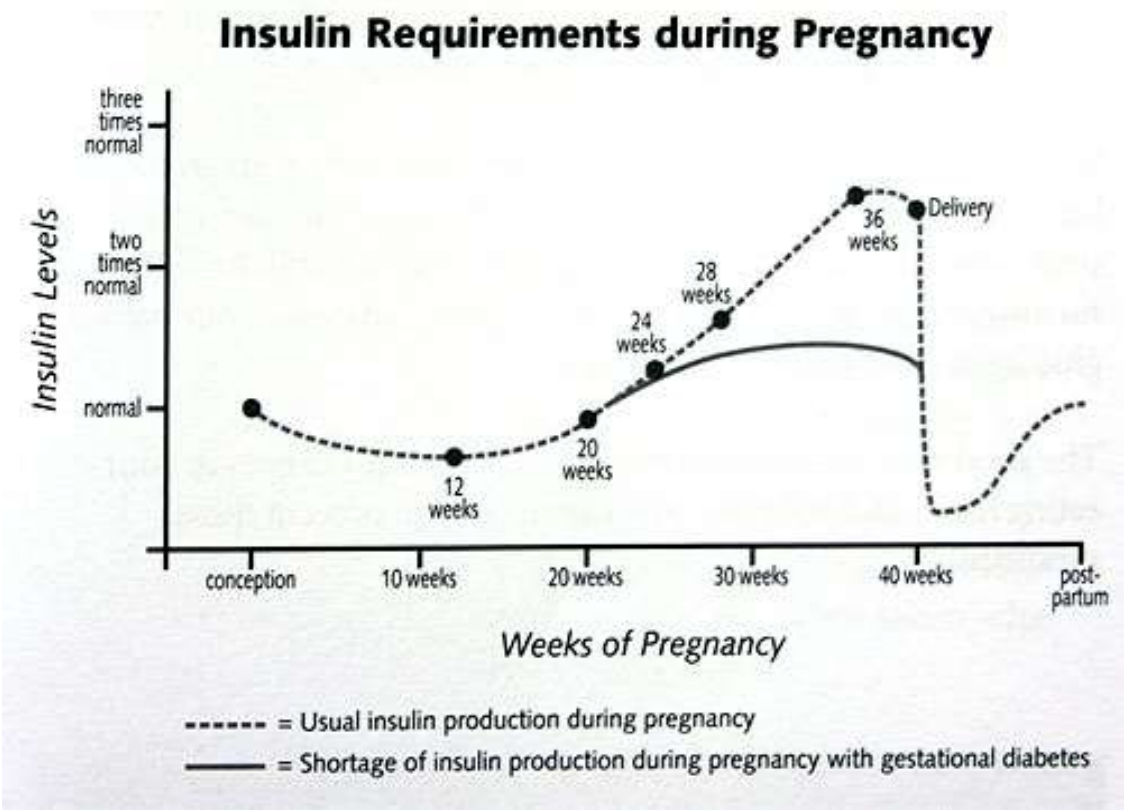
TWO STEPS
50g-GCT
1h GBL >7.8mmol
100g-OGTT
0, 1, 2, 3 hr

ONE STEP
75g- OGTT
0, 1, 2 hr
24-28 weeks

3. IADPSG 2010 :

Strategy for detection 24-28 weeks gestation Universal

Diagnosis of hyperglycemia in pregnancy



75g – oral glucose :

- Fasting ≥ 5.1 mmol/l
- 1-hr ≥ 10.0 mmol/l
- 2-hr ≥ 8.5 mmol/l

GDM

75g – oral glucose :

- Fasting ≥ 7.0 mmol/l

Overt Diabetes

4. IADPSG 2010 :

Strategy for detection Screening at DM First Trimester

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

concentrati
reshold*

m

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§

Overt Diabetes

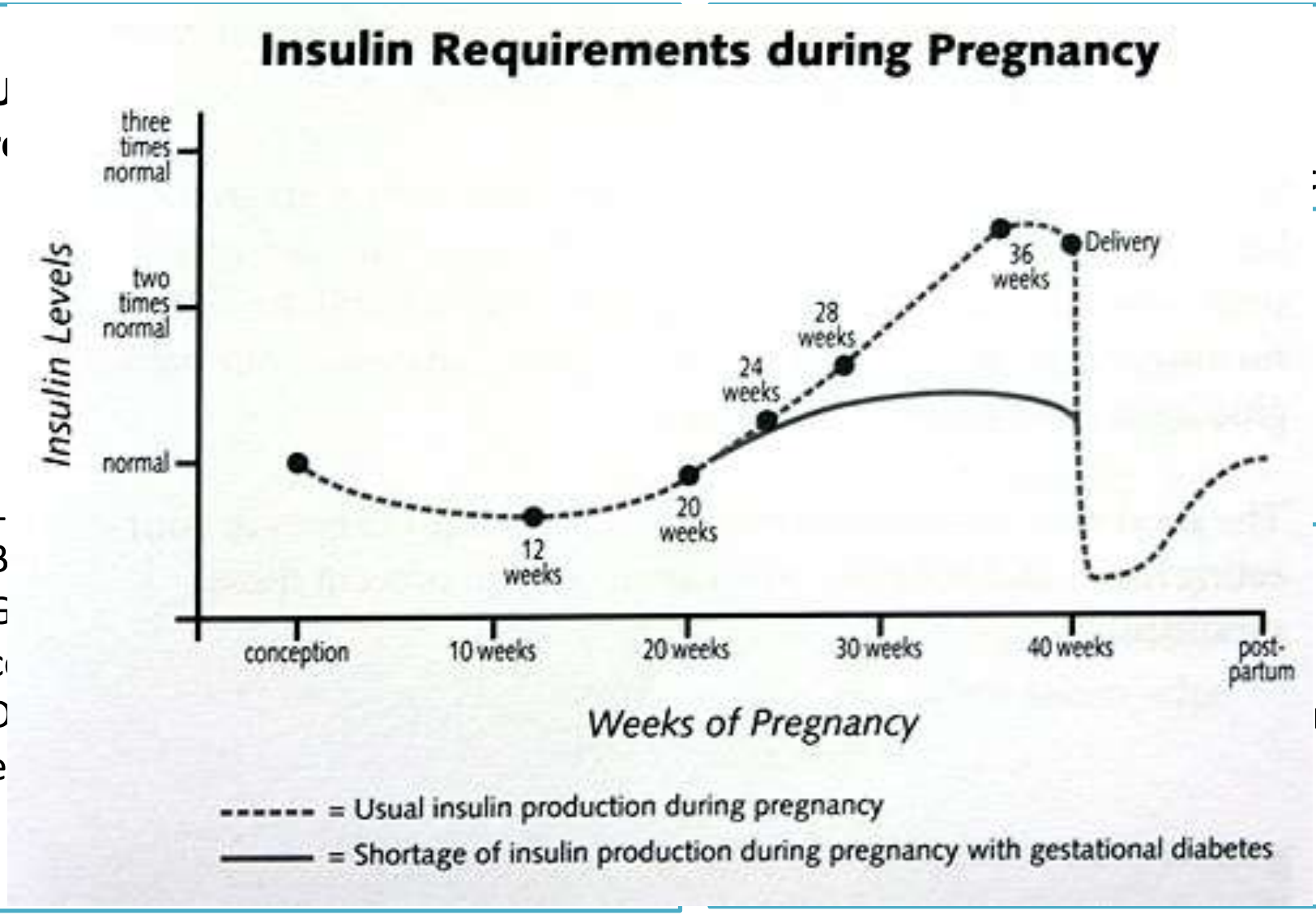
- FBS ≥ 7.1mmol/l
- HbA1c ≥ 6.5 %
- RBS ≥ 11.1mmol/l with diabetes symptoms

GDM

75g – oral glucose :

- Fasting ≥ 5.1 mmol/l
- 1-hr ≥ 10.0 mmol/l
- 2-hr ≥ 8.5 mmol/l

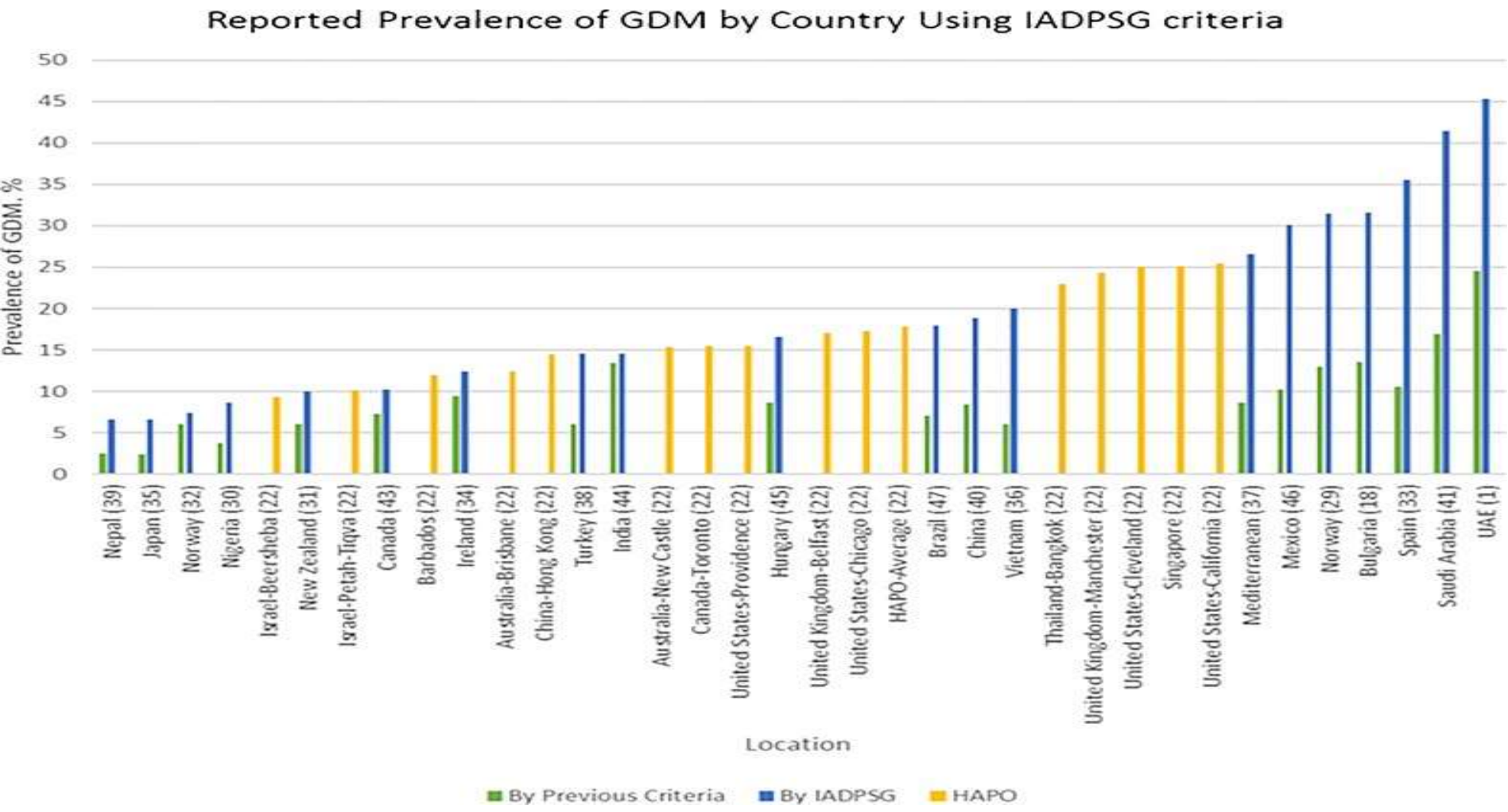
Controversies – IADSPG 2010



NIH Consensus

- 14,398 citations included 97 studies (6 RCT, 63 prospective cohort studies, 28 retrospective cohort studies)
- First trimester screening for Overt or Preexisting Diabetes
  - **limited evidence for or against early screening**
- Universal second trimester screening
  - while there was clear evidence of worsening pregnancy and neonatal outcomes with increasing levels of glucose,
  - **No adequate data to support a one –step 75-g OGTT over the two-step 100-g OGTT**

Prevalence of GDM by country using IADPSG criteria



- a detailed assessment for the presence of diabetes related complications is recommended at diagnosis of diabetes, especially complications which can affect pregnancy or be aggravated by it, such as retinopathy and renal impairment
- during pregnancy a more intensive monitoring and treatment of hyperglycaemia is recommended and pharmacotherapy is much more likely to be required to control the hyperglycaemia
- following the pregnancy there is need for closer follow-up and ongoing monitoring and treatment of women with diabetes.

DM Diagnostic Criteria : by countries

IADSGP 2010

FPG ≥ 7.0
HbA1c ≥ 6.5 %
Random PG ≥ 11.1 + symptom

≥ 5.1 /≥ 10.0 /≥ 8.5

Endorsed BY:

American Diabetes Association. Diabetes Innovation

World Health Organization

ACOG

World Health Organization 2013

FPG ≥ 7.0
2-hr PG ≥ 11.1 (75 g oral glucose)
Random PG ≥ 11.1 +symptoms

≥ 5.1 /≥ 10.0 /≥ 8.5

Diabetes in pregnancy society

HKCOG

NICE accredited www.nice.org.uk/accreditation 2015

≥ 5.6 / - /≥ 7.8

Ministry of Health Malaysia 2015 2018

≥ 5.1 / - /≥ 7.8

American Diabetes Association. Diabetes Innovation 2015

5.3/10/8.6/7.8

2014

5.1 / - /- /7.8

Diabetes and GDM Diagnostic Criteria : by countries

College of Obstetricians & Gynaecologists, Singapore

2017

First trimester screen – under review

24-28 weeks, Universal Screening
≥ 5.1 / ≥ 10.0 /≥ 8.5

FPG ≥ 7.0
HbA1c ≥ 6.5 %
Random PG ≥ 11.1 + symptom

Country Specific Prevalence according to different diagnostic criteria

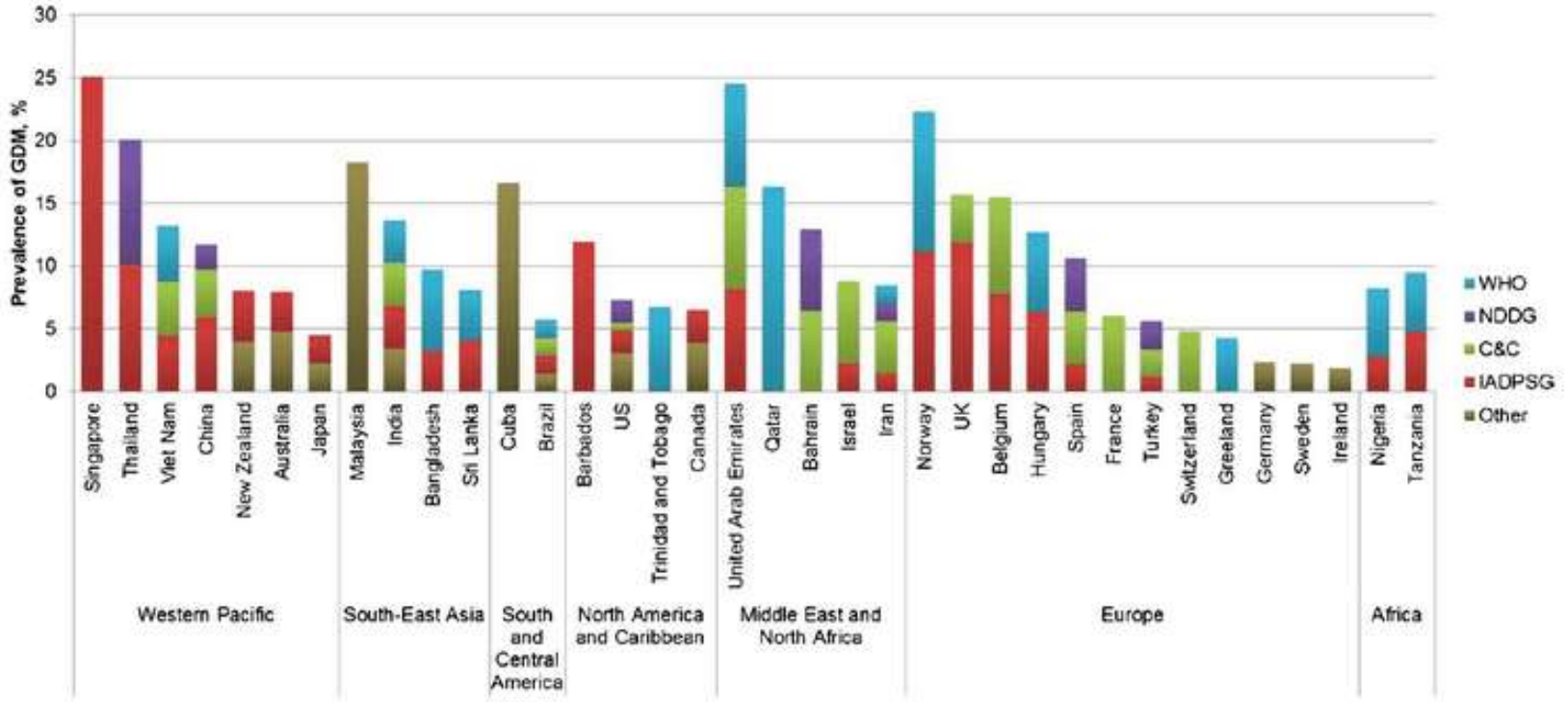


Fig. 2 Country-specific prevalence of GDM according to different diagnostic criteria. *C&C* Carpenter and Coustan criteria, *IADPSG* International Association of Diabetes and Pregnancy Study Groups, *NDDG* National Diabetes Data Group, *WHO* World Health Organization, other included International Classification of Diseases codes and local guidelines or criteria

Prevalence of GDM by WHO Region

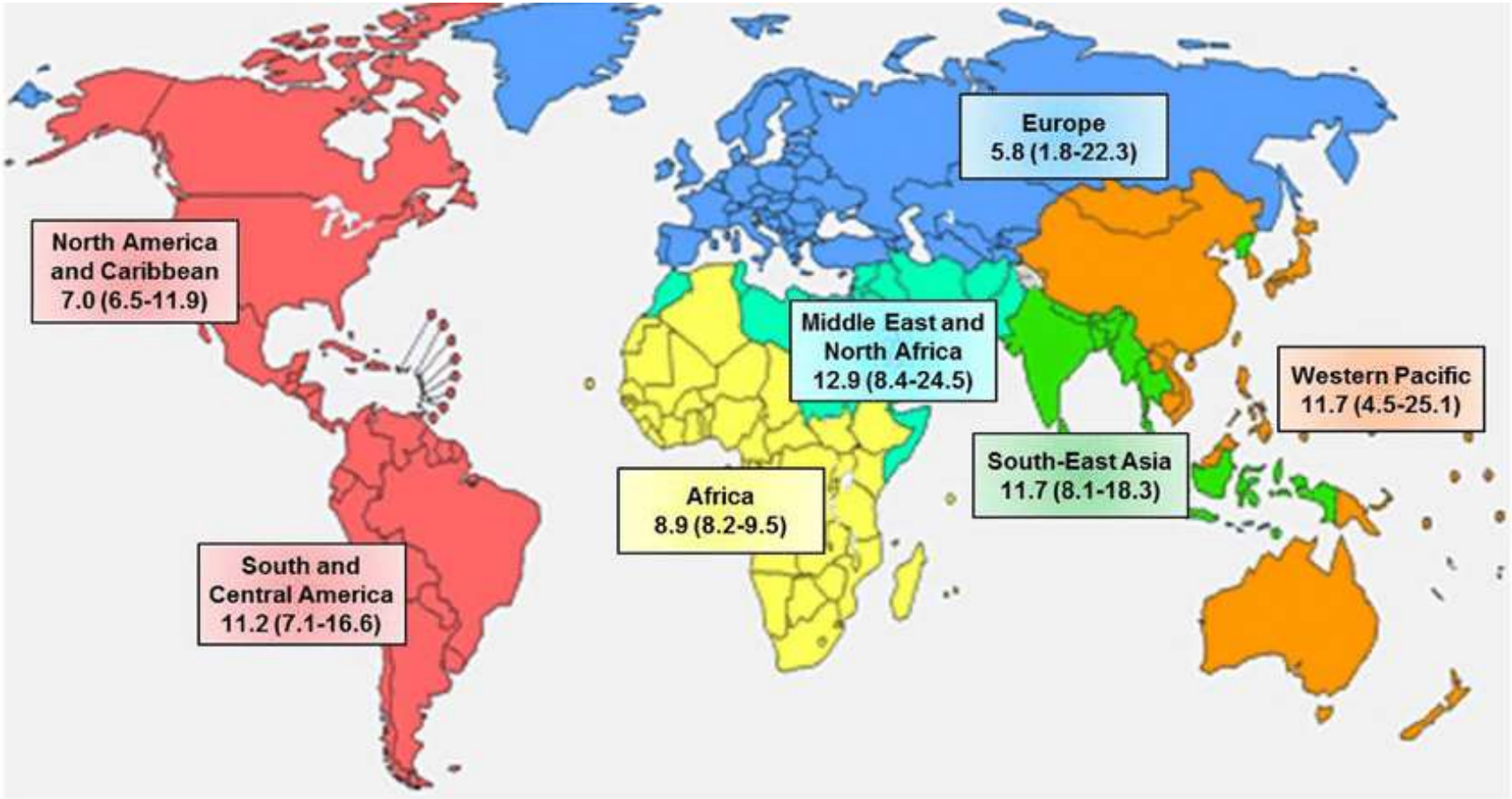


Fig. 1 Median (interquartile range) prevalence (%) of GDM by WHO region, 2005–2015. (Map generated from WHO website at http://www.who.int/

Definition / Classification

GDM – any degree of glucose intolerance developing or first detected during pregnancy

American Diabetes Association. *2011*

GDM is a carbohydrate intolerance resulting in hyperglycaemia of variable severity with onset or first recognition during pregnancy.

World Health Organization *1999*

HAPO 2008

GDM –

hyperglycaemia with first recognition during pregnancy that is **not overt diabetes** instead of any hyperglycaemia first recognised in pregnancy, as it had been previously recommended.

IADSPG 2010

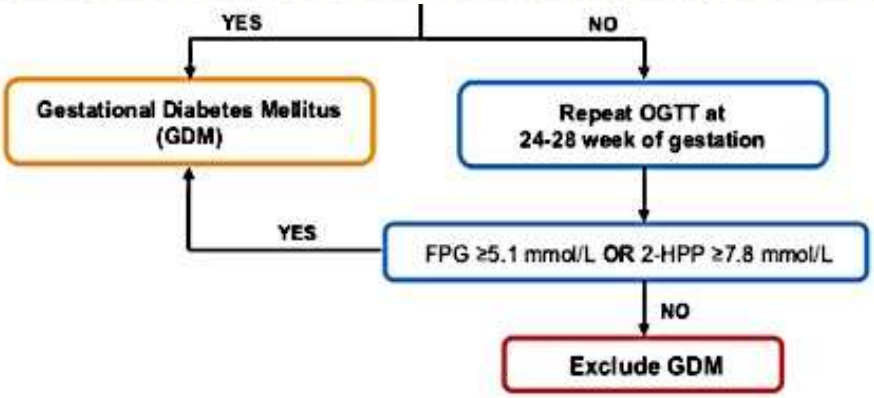
Ministry of Health Malaysia

*** Presence of any risk factors:**

- BMI >27 kg/m^2
- Previous history of GDM
- First degree relative with DM
- History of big baby (>4 kg)
- Bad obstetric history
- Glycosuria ≥2+ on two occasions
- Current obstetric problems (essential hypertension, pregnancy-induced hypertension, polyhydramnios and current use of steroids)

****Overt diabetes in pregnancy is diagnosed at any time during pregnancy with the presence of any one or more of the following criteria:**

- FPG ≥7.0 mmol/L
- 2-HPP ≥11.1 mmol/L
- Random plasma glucose ≥11.1 mmol/L with symptoms

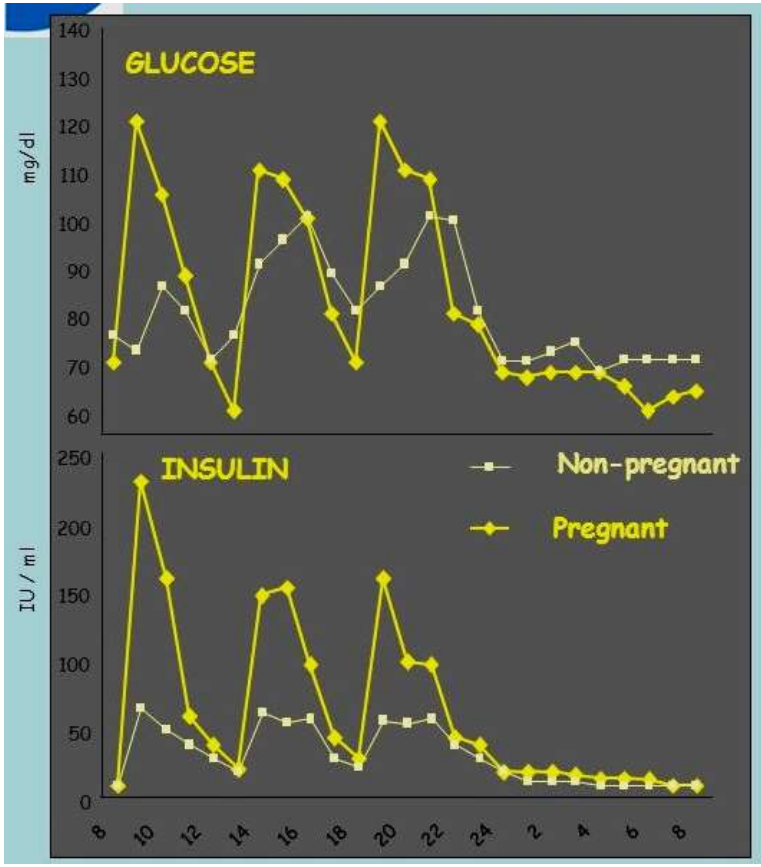


MOH CPG 2018

Diagnostic criteria

- 24-28 weeks – clear
- First trimester – no robust evidence base

Maternal Diabetes



Increased insulin resistance

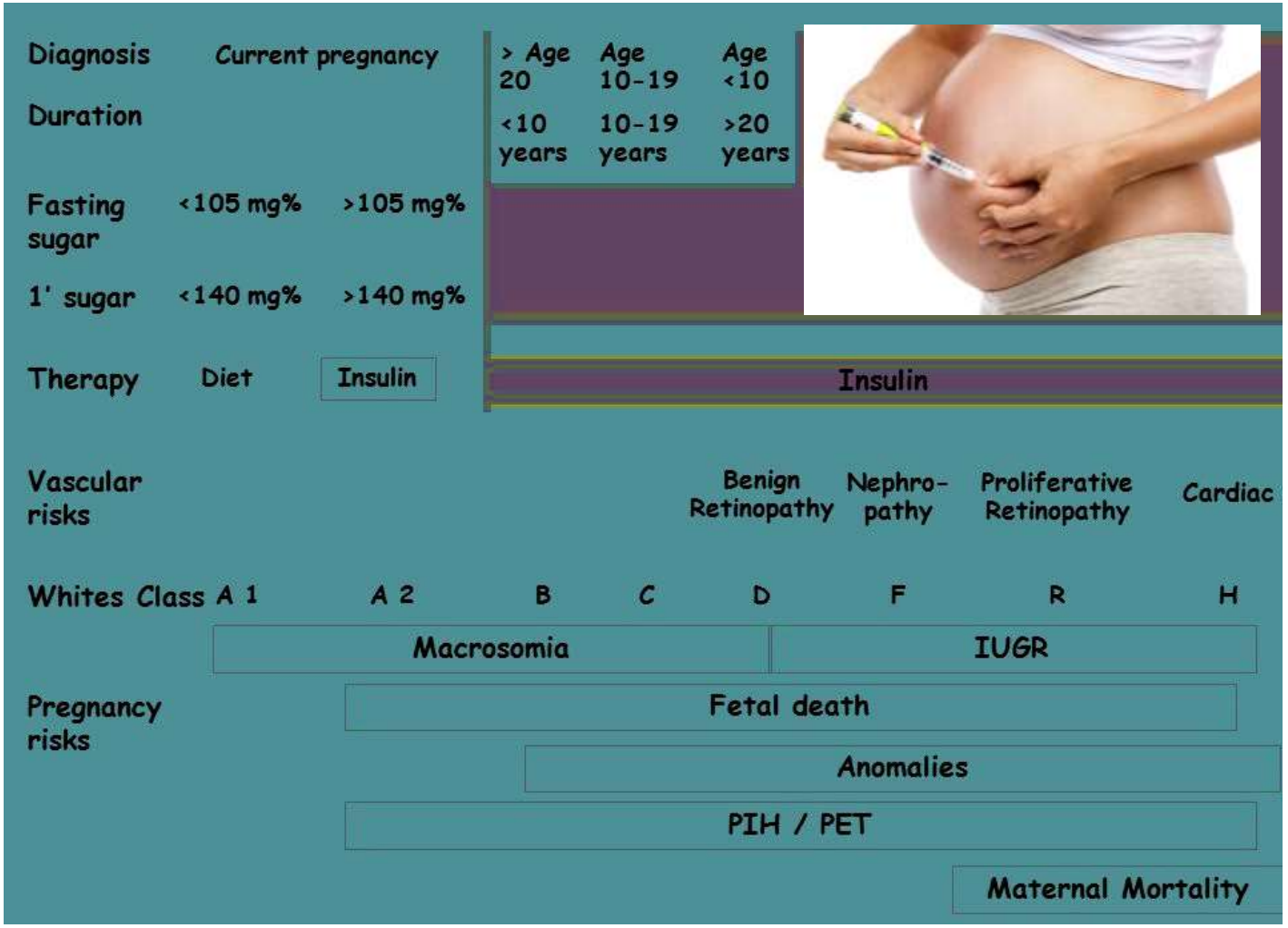
Higher postprandial glucose

Lower fasting glucose

Potential risk to develop diabetes in pregnancy

Risks of worsening glycemic control in existing diabetes

Maternal Diabetes



Understanding Glycaemic control

- Glycaemic Control –
  - a key point in GDM treatment
  - impacts favorably on reducing adverse outcomes ie macrosomia
- Glycaemic profiles in Pregnant Women
- Glucose treatment targets

Glucose Profiles in Pregnancy

Glucose levels were generally lower than expected,

Fasting Plasma Glucose mmol/L	3.9 ± 0.4
One-hour postprandial mmol/L	6.0 ± 0.72
Two-hour postprandial mmol/L	5.5 ± 0.55
24-h mean mmol/L	4.9 ± 0.55

Glucose Profiles - Obese

Obese pregnant women with NGT, even on strict eucaloric diets have higher glucose values

- than non-obese
- normal weight in the same gestational age

Strongest observed predictors of infant adiposity

- related to maternal BMI and lipids (FA + TF)
- glucose values were of less importance

Target Glucose Levels for Pregnant Women

Fasting Plasma Glucose mmol/L	≤ 5.3	3.9 ± 0.4
One-hour postprandial mmol/L	≤ 7.2 – 7.8	6.0 ± 0.72
Two-hour postprandial mmol/L	≤ 6.7	5.5 ± 0.55

Impact on Glucose Target

No or lack of evidence on :

- Different glucose target between GDM, type 1 or type 2 diabetes in pregnancy
- Impacts of different glucose targets on pregnancy outcomes

- For GDM, FPG < 5 mmol/l prevents macrosomia, preeclampsia and neonatal hypoglycaemia
- For preexisting diabetes – data were inconclusive

? Current Glycaemic Control

- Excellent glucose control with current guidelines does not normalize outcomes
- The current target – too high or not sensitive enough to detect important normal daily glucose variations affecting overgrowth

Target Glucose Levels for Pregnant Women

		Macrosomia vs Hypoglycaemia and SGA	
Fasting Plasma Glucose mmol/L	≤ 5.3	< 5.11	3.9 ± 0.4
One-hour postprandial mmol/L	≤ 7.2 – 7.8	< 6.77	6.0 ± 0.72
Two-hour postprandial mmol/L	≤ 6.7	< 6.11	5.5 ± 0.55

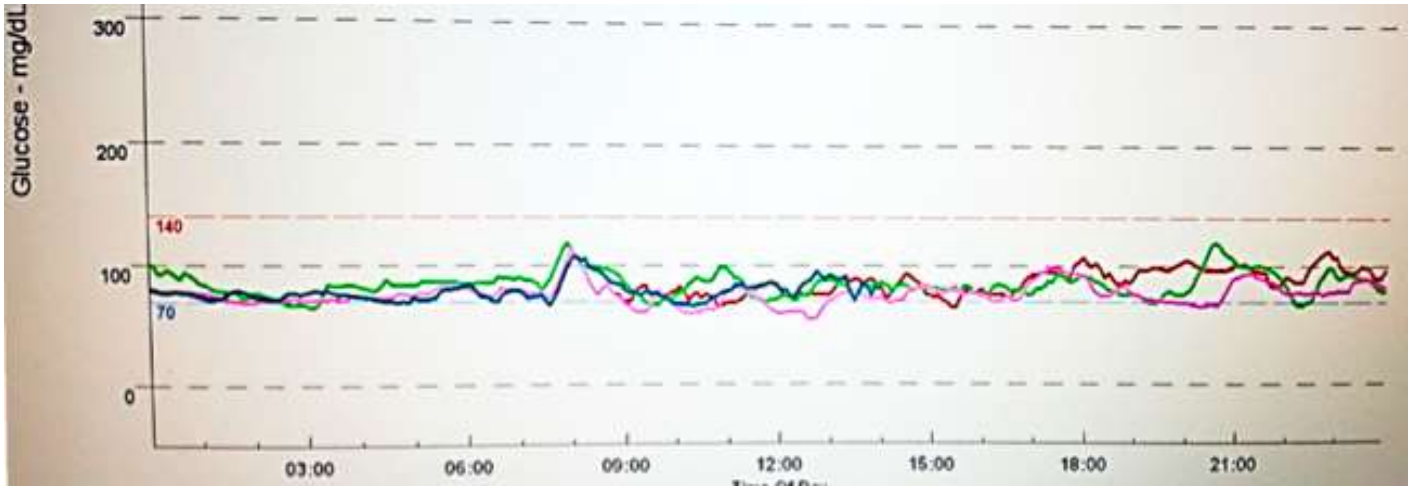
Monitoring of Glycaemia?

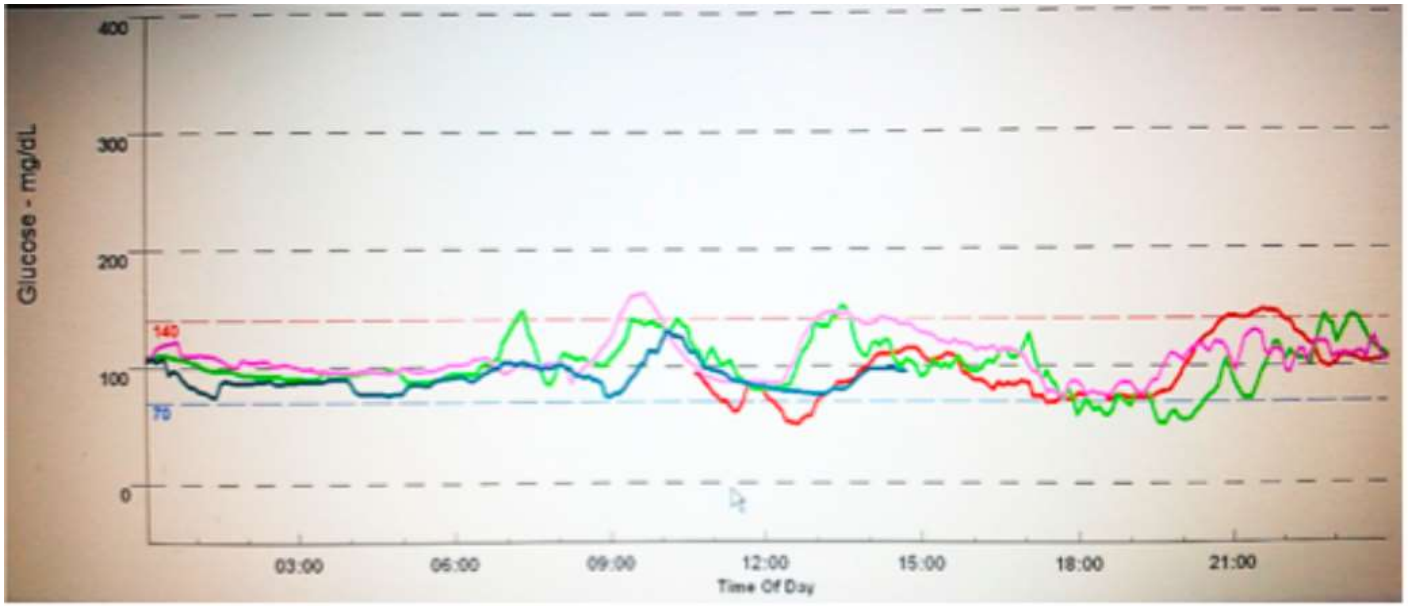
- Time Point Measurement
  - Self-monitoring of blood glucose by fingerstick glucose determinations at different times of the day
- Continuous Glucose Monitoring
- Different schedules and techniques
  - in pre-existing diabetes - have not changed pregnancy outcome - the therapeutic strategies probably do not take into account all available glucose data information
  - in GDM , both CGM and glucose time points have favorable impacts

Continuous Glucose Monitoring

- Potential useful tool to clarify which glucose parameters are best related to poor outcomes
- Analysis and interpretation – complex and challenging
  - Ambulatory Glucose Profile
  - Functional Data Analysis
- Glucose variability
  - Causes fetal overgrowth
  - Glucose fluctuation triggers endothelial dysfunction along with the activation of pathological pathways which leads to tissue damage

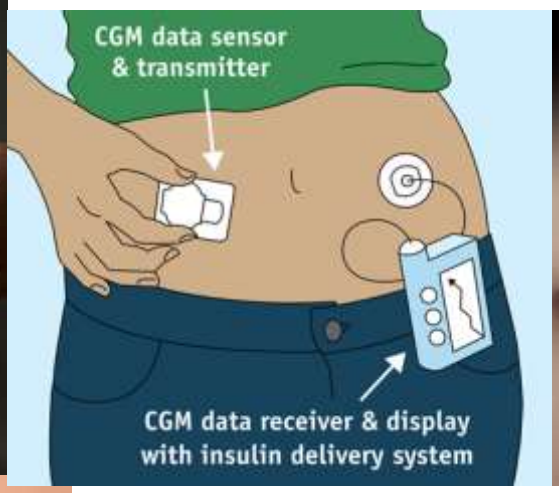
- One year postpartum – despite a normal OGTT, women still have higher glucose variability, this explained why they progress to metabolic syndrome in 5-10 years, although subsequent pregnancies do not further increase the risk

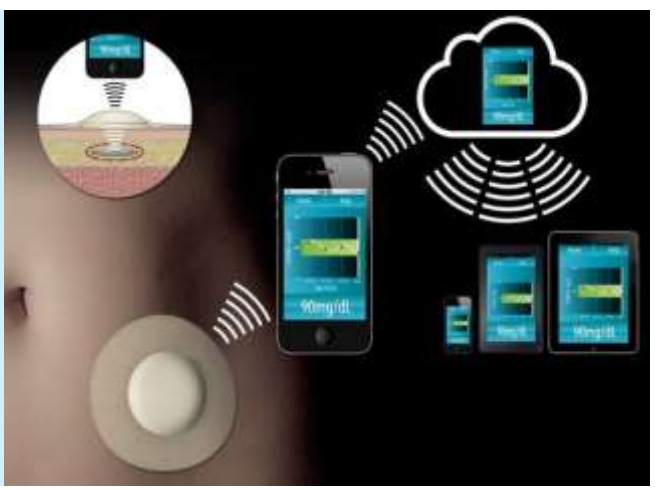

Glucose - mg/dL
300
200
140
100
70
0
03:00
06:00
09:00
12:00
15:00
18:00
21:00


Glucose - mg/dL
400
300
200
140
100
70
0
03:00
06:00
09:00
12:00
15:00
18:00
21:00
Time Of Day

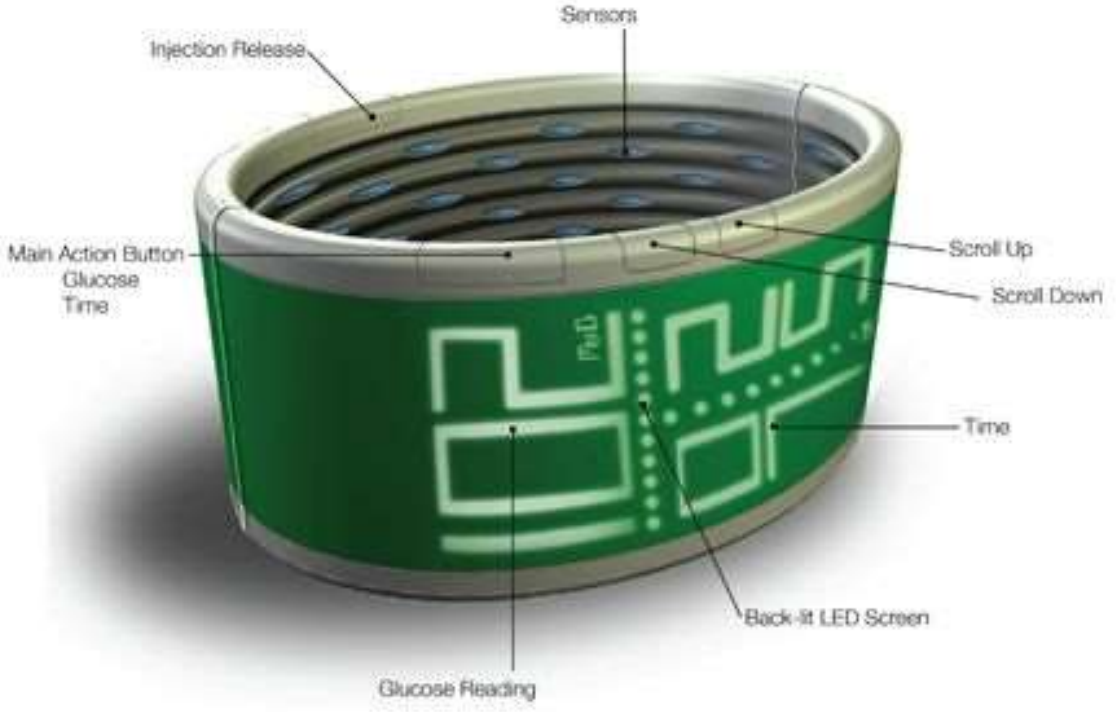
Other than glucose

- Hb A1c
  - Gold Standard indicator for glycemic control in patients with diabetes mellitus
  - In pregnancy does not reflect glycemic control accurately during pregnancy because of iron deficiency.
- Glycated albumin - not influenced by iron deficiency
- Frustosamine
- 1,5-anhydroglucitol


CGM data sensor
& transmitter
CGM data receiver & display
with insulin delivery system




GLUCOSE
MONITORING
WATCH


Sensors
Injection Release
Main Action Button
Glucose
Time
Scroll Up
Scroll Down
Time
Back-lit LED Screen
Glucose Reading

Conclusion

- Diagnostic Criteria
  - HAPO study and IADPSG diagnostic criteria
    - Not widely accepted
    - Cost-effectiveness to be determined
  - Universal 24-28 weeks – well accepted
  - First trimester screening and diagnosis – debatable
- Glycaemic control
  - Time point glucose level target?
  - Glucose Variability?
  - Monitoring technique – Continuous Glucose Monitoring?
- Factors other than glucose – adverse pregnancy outcome in women with hyperglycaemia?

Thank you

Diabetes in Pregnancy

- Ongoing across global debate continues about when and how to diagnose GDM
- Variety of local, regional and institutional diagnostic criteria continues to be applied in practise, confusing both healthcare delivery and research
- Despite the HAPO and IADPSG diagnostic criteria controversies continues
- Try to explore the outcome and impact of the IADPSG diagnostic criteria
- Glycaemic Control on pregnancy outcomes

Thank You.

Post- HAPO-IADPSG

American Diabetes Association.

ADA 2011

ACOG

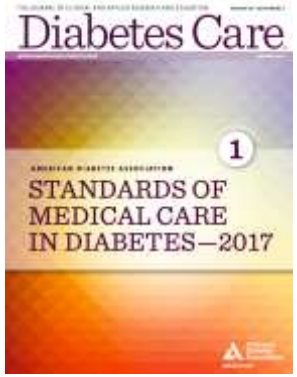
World Health Organization

WHO 2013

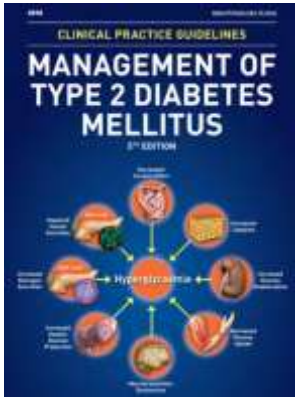
Royal College of Obstetricians & Gynaecologists

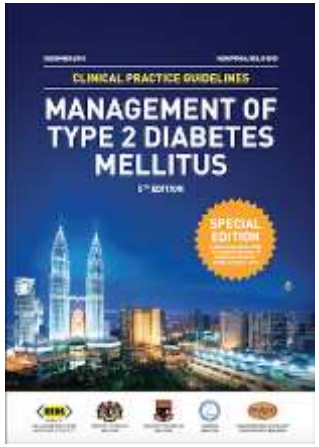
NICE

RCOG 2015



ADA 2017





2016

2017/18?

Table 2 Diagnostic criteria for gestation diabetes mellitus with their respective glucose values

Diagnostic criteria	Fasting (mg/dl [mmol/l])	1-h (mg/dl [mmol/l])	2-h (mg/dl [mmol/l])	3-h (mg/dl [mmol/l])
100-gm OGTT Carpenter/Coustan (two or more abnormal)	95 (5.3)	180 (10.0)	155 (8.6)	140 (7.8)
100-gm OGTT NDDG (two or more abnormal)	105 (5.8)	190 (10.6)	165 (9.2)	145 (8.1)
75-gm OGTT WHO (one or more abnormal)	92-125 (5.1-6.9)	≥180 (10.0)	153-199 (8.5-11.0)	-
75-gm OGTT ADA	95 (5.3)	180 (10.0)	155 (8.6)	-

OGTT = Oral glucose tolerance test, NDDG = National Diabetes Data Group, WHO = World Health Organization 2013, ADA = American Diabetes Association

Table 1 IADPSG diagnostic criteria for GDM.

	75 g OGTT (IADPSG) latest criteria	75g OGTT (WHO)	100 g OGTT (Carpenter and Coustan (89))
Number of abnormal values required for diagnosis	≥1	≥2	≥2
Fasting glucose mg/dl (mmol/l)	≥92 (5.1)	≥95 (5.3)	≥95 (5.3)
1st h mg/dl (mmol/l)	≥180 (10)	≥180 (10)	≥180 (10)
2nd h mg/dl (mmol/l)	≥153 (8.5)	≥155 (8.6)	≥155 (8.6)
3rd h mg/dl (mmol/l)	–	–	≥140 (7.8)

IADPSG, International Association of Diabetes in Pregnancy Study Group; GDM, Gestational Diabetes; OGTT, Oral Glucose Tolerance Test; WHO, World Health Organization.

Mpondo 2015

Organisation	FPG	Glucose challenge	1-h plasma glucose	2-h plasma glucose	3-h plasma glucose
IADSPG *	≥ 7 ≥ 5.1 – 6.8 GDM	75g	≥ 10.0	≥ 8.5	Not required
WHO 2015*	≥ 5.1-6.9 (GDM)	75g	≥ 10.0	≥ 8.5-11.0 (GDM)	Not required Random RPS (≥11.1 + symptoms)
	≥ 7.0 DIP		-	≥11.1 (DIP)	
NICE 2015*	≥ 5.6	75g (do not use FPG, HbA1c) Previous GDM (OGTT at booking & 24-28 wks or early self-monitoring blood glucose (previous GDM)		≥ 7.8	
		Risk factors – 24-28 wks			
Canadian **	≥ 5.3	75g	≥ 10.6	≥8.9	Not required
ACOG **	≥ 5.3	100g	≥ 10.0	≥ 8.6	≥ 7.8

- One value is sufficient for diagnosis
- Two or more values are required for diagnosis

Impact of IADPSG

- Prevalence of GDM
  - 1.03 – 3.78 –fold rise (IADPSG criteria vs baseline criteria)
- Women with GDM by IADPSG criteria
  - have more adverse pregnancy outcomes than with normal glucose tolerance (NGT)
- Treatment of GDM by IADPSG criteria
  - may be cost effective
  - Use fasting as screen before the 75-g oral glucose tolerance test to rule out
    - **Rule out GDM with FPG < 4.4 a**
    - **Rule in GDM ≥ 5.1 mmol /l**
    - **Reduces the need for OGTT by 50 % and its cost and inconvenience.**

A Relook at the Diagnosis and Glycaemic Control of Gestational Diabetes

Hamizah Ismail

Despite the landmark Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study in 2008 through which The International Association of Diabetes and Pregnancy Study Group (IADPSG) derived their recommendations in 2010, gestational diabetes mellitus (GDM) and preexisting-diabetes mellitus remain as controversial yet highly debatable than before.

The new diagnostic criteria and screening strategies has great impact on the prevalence and its possible health burden. It has also opens more debates on the classifications, one-step criteria versus two-step criteria screening, the first trimester screening and diagnostic criteria used to diagnose first-trimester-GDM contrary to what known, GDM is a second or third trimester conditions.

Similarly controversies go to defining and achieving the glycaemic control. Even with excellent glycaemic control concordance to the current guidelines on time point glucose values, adverse pregnancy outcomes such as macrosomia are still happening. Current evidences are pointing towards glucose variability rather than the time point glucose level that is responsible for the fetal to overgrowth. Other factors such as obesity in GDM or preexisting-Diabetes pregnant women also has influence to the fetal grow directly or through the poorer glycaemic control.

Consensus on diagnostic criteria, classifications, screening strategy, methods and techniques for controlling glucose variability will help improve health workers and researches understanding in order to focus on to the real solution to adverse pregnancy effects caused by hyperglycaemia less severe than overt diabetes.

Maternal Risk for Type 2 Diabetes Based on the IADPSG

DM criteria	Ref	Ethnicity	Time point	No GDM, risk of IFG/IGT, %	GDM, risk of DM2, %	GDM, risk of IFG/IGT, %
O'Sullivan	[6]	US	8 years	Not reported	29	Not reported
O'Sullivan	[9]	US	16 years	Not reported	60	Not reported
NDDG	[84]	US	6 weeks	Not reported	2.6	6.8
IADPSG	[60•]	Irish	12 weeks	0.8	1.5	14.1

- The prevalence of postpartum abnormal glucose metabolism
  - is higher for women with GDM diagnosed by IADPSG criteria versus that for women with NGT
- Data support the use of IADPSG criteria
  - if the cost of diagnosis and treatment can be controlled
  - if lifestyle can be optimized to reduce the risk of future diabetes.

A Relook at the Diagnosis Criteria of Gestational Diabetes Mellitus

Diagnostic Criteria

- Old diagnostic criteria
- New Diagnostic Criteria from HAPO & IADPSG
- Screening Strategy
  - 1st trimester screening
  - 24-28th weeks screening
- Implications of the New Diagnostic Criteria

Glycaemic Control

- Glycaemic profile in pregnant women with NPG
- glycaemic

4. IADPSG 2010
Diagnosing Preexisting Diabetes at Early Pregnancy

First Prenatal Visit on ALL or only high-risk women

- FPG
- HbA1C
- Random PG

- FPG ≥ 7.1mmol/l
- HbA1c ≥ 6.5 %
- Random PG ≥ 11.1mmol/l

- FPG < 5.1 mmol/l

  Do a 75 g OGTT at 24-28 weeks

Overt Diabetes:

- ✓ Increased risk of congenital anomalies in offspring
- ✓ Risk of diabetes complications (nephropathy and retinopathy) requiring treatment during pregnancy
- ✓ Need for rapid treatment and close follow-up during pregnancy to ensue prompt restoration of normal glycaemia
- ✓ Need to ensure confirmation and appropriate treatment of diabetes after pregnancy

- FPG ≥ 5.1 but < 7 mmol/L

  GDM ??? Normal??

3. Recommendations on how to screen and diagnosis Preexisting Diabetes in the first trimester

- ACOG recommended two-step in first-trimester

High Risk

- ≥ 35 years old
- Overweight or obese
- Chronic hypertension or PCOS
- Prior GDM
- Strong family history Diabetes
- Still birth in previous pregnancy
- High-risk racial/ ethnic

Overt Diabetes

- FBS ≥ 7.1mmol/l
- HbA1c ≥ 6.5 %
- RBS ≥ 11.1mmol/l with diabetes symptoms