

## **APPENDIX:**

### **Moving to an HbA<sub>1c</sub> based diagnosis of diabetes has a different impact on prevalence in different ethnic groups**

#### **Investigators and study centers included in the analysis**

**Denmark:** *Inter99*: T. Jørgensen, K. Borch-Johnsen, Glostrup Research Centre for Prevention and Health, Glostrup.

**United Kingdom:** *Whitehall II*: M. Marmot, A.G. Tabák, University College London, London.

**Australia:** *The Australian Diabetes, Obesity and Lifestyle Study (AusDiab)*: P. Zimmet, J. Shaw. International Diabetes Institute, Caulfield.

**Greenland:** *Inuit Health in Transition*: P. Bjerregaard, M.E. Jørgensen. National Institute of Public Health, Copenhagen.

**Kenya:** *The Kenya study*: H. Friis, K. Borch-Johnsen, D.L. Christensen, University of Copenhagen, Copenhagen, Denmark.

**India:** *Chennai Urban Rural Epidemiology Study (CURES)*: V. Mohan. Madras Diabetes Research Foundation & Dr. Mohan's Diabetes Specialities Centre, Gopalapuram, Chennai.

#### **Assay methods**

**Inter99:** HbA<sub>1c</sub> was analyzed by ion-exchange high performance liquid chromatography, HPLC (BioRad, Richmond, CA).

**Whitehall II, phase 7:** HbA<sub>1c</sub> was measured on a calibrated high performance liquid chromatography system, HPLC

**AusDiab:** Boronate affinity high performance liquid Chromatography, HPLC.

**Inuit Health in Transition:** High performance liquid chromatography method, HPLC (Tosoh G7, Roche Diagnostics).

**Kenya:** Plasma glycated hemoglobin concentration was measured using the NycoCard HbA<sub>1c</sub> reagent kit no 1042184 on a NycoCard Reader II analyzer (Axis-Shield, US).

**CURES:** Glycated hemoglobin (HbA<sub>1c</sub>) was estimated by high performance liquid chromatography, HPLC, using the Variant machine (Bio-Rad, Hercules, Calif., USA).

The HbA<sub>1c</sub> assays were aligned to the assay of the Diabetes Control and Complications Trial at each study centre according to local laboratory guidelines. No further adjustments were made to the assay results in the statistical analyses.

**Results for ethnic minority groups in Whitehall II, phase 7:****Table 1. Background characteristics and diabetes prevalence by OGTT and HbA<sub>1c</sub> diagnostic criteria in different ethnic groups**

	UK, Whitehall II (Phase 7)	
	Asians	Blacks
Study period	2002-2004	2002-2004
N	204	91
Age	62.3 (5.9)	61.2 (5.3)
Males (%)	63.7 (56.7;70.3)	31.9 (22.5;42.5)
BMI (kg/m <sup>2</sup> )	26.1 (4.2)	28.8 (4.7)
Waist circumference (cm)	92.1 (11.6)	93.1 (11.5)
Current smoker (%)	5.9 (3.1;10.0)	2.2 (0.3;7.7)
FPG (mmol/l)	5.5 (1.2)	5.2 (0.8)
2hPG (mmol/l)	7.1 (2.6)	6.8 (2.6)
HbA <sub>1c</sub> (%)	5.5 (0.7)	5.6 (0.7)
Diabetes by OGTT (%)	8.8 (5.3;13.6)	6.6 (2.5;13.8)
Diabetes by HbA <sub>1c</sub> (%)	6.4 (3.4;10.7)	6.6 (2.5;13.8)
HbA <sub>1c</sub> ≥ 6.5% given DM by OGTT (%)	44.4 (21.5;69.2)	50.0 (11.8;88.2)
DM by OGTT given HbA <sub>1c</sub> ≥ 6.5% (%)	61.5 (31.6;86.1)	50.0 (11.8;88.2)

Data are means (SD) and proportions (95%-CI)

FPG: fasting plasma glucose. 2hPG: 2-hour plasma glucose

Diabetes by OGTT: FPG ≥ 7.0 mmol/l or 2hPG ≥ 11.1 mmol/l. Diabetes by HbA<sub>1c</sub>: HbA<sub>1c</sub> ≥ 6.5%

**Results for pair-wise comparisons:****Table 1 Pair-wise comparisons of difference in odds ratio for an HbA<sub>1c</sub> ≥ 6.5% given diabetes by an OGTT (on the log-scale)**

	Unadjusted		Adjusted	
	Beta	P-value	Beta	P-value
Australia vs. DK	-1.29 (-1.67;-0.90)	<.0001	-1.42 (-1.87;-0.97)	<.0001
Australia vs. India	-2.85 (-3.28;-2.42)	<.0001	-3.63 (-4.20;-3.06)	<.0001
Australia vs. UK	-0.48 (-0.94;-0.03)	0.038	-0.64 (-1.14;-0.15)	0.010
Australia vs. Kenya	-0.20 (-1.77;1.38)	0.807	-1.08 (-2.82;0.66)	0.225
Australia vs. Greenland	-0.72 (-1.17;-0.27)	0.002	-0.55 (-1.08;-0.02)	0.042
DK vs. India	-1.56 (-1.97;-1.16)	<.0001	-2.21 (-2.70;-1.72)	<.0001
DK vs. UK	0.80 (0.37;1.23)	<.001	0.78 (0.28;1.27)	0.002
DK vs. Kenya	1.09 (-0.48;2.66)	0.174	0.34 (-1.37;2.06)	0.695
DK vs. Greenland	0.57 (0.15;0.99)	0.008	0.87 (0.37;1.37)	0.001
India vs. UK	2.37 (1.89;2.84)	<.0001	2.99 (2.39;3.58)	0.000
India vs. Kenya	2.65 (1.07;4.24)	0.001	2.55 (0.84;4.27)	0.003
India vs. Greenland	2.13 (1.67;2.60)	<.0001	3.08 (2.45;3.71)	<.0001
UK vs. Kenya	0.29 (-1.30;1.88)	0.723	-0.43 (-2.18;1.31)	0.627
UK vs. Greenland	-0.23 (-0.72;0.25)	0.346	0.10 (-0.49;0.68)	0.748
Kenya vs. Greenland	-0.52 (-2.11;1.06)	0.519	0.53 (-1.24;2.30)	0.557
Whites in the UK vs. Asians in the UK	-0.88 (-1.87;0.12)	0.084	-1.09(-2.11;-0.06)	0.038
Whites in the UK vs. Blacks in the UK	-1.10 (-2.74;0.54)	0.189	-0.94(-2.63;0.75)	0.275
Asians in the UK vs. Blacks in the UK	-0.22 (-2.07;1.63)	0.813	0.15 (-1.75;2.04)	0.879

Adjusted: adjusted for age, gender, BMI, waist circumference, smoking

**Examples of the probability (%) of an  $HbA_{1c} \geq 6.5\%$  given diabetes by an OGTT for four individuals with specific traits of gender, age, smoking status and obesity level:**

**Table 2 Probability of an  $HbA_{1c} \geq 6.5\%$  given diabetes by an OGTT**

	<b>Denmark Inter99</b>	<b>UK Whitehall II (Phase 7)</b>	<b>Australia AusDiab</b>	<b>Greenland Inuit Health in Transition</b>	<b>Kenya</b>	<b>India CURES</b>
Lean male	29.5 (21.8; 38.7)	16.2 (9.9;25.4)	9.2 (5.5;15.1)	14.9 (9.5;22.6)	22.9 (5.0;62.7)	79.3 (69.7;86.4)
Obese male	51.8 (43.0; 60.5)	33.1 (22.8;45.3)	20.6 (13.9;29.5)	31.0 (22.6;40.8)	43.3 (11.9;81.2)	90.7 (85.0;94.4)
Lean female	21.3 (13.7; 31.6)	11.1 (5.9;19.8)	6.1 (3.2;11.6)	10.2 (5.6;17.9)	16.1 (3.2;53.0)	71.2 (56.6;82.4)
Obese female	41.0 (30.7; 52.1)	24.2 (14.7;37.2)	14.4 (8.5;23.3)	22.5 (14.2;33.7)	33.0 (7.8;74.1)	86.4 (76.9;92.3)

Lean male: man, age 50 years, non-smoker, BMI=22 kg/m<sup>2</sup>, waist circumference=80 cm

Obese male: man, age 50 years, current smoker, BMI=30 kg/m<sup>2</sup>, waist circumference=100 cm

Lean female: woman, age 50 years, non-smoker, BMI=22 kg/m<sup>2</sup>, waist circumference=70 cm

Obese female: woman, age 50 years, current smoker, BMI=30 kg/m<sup>2</sup>, waist circumference=90 cm