

# Abstracts of Articles Authored or Coauthored by Permanente Physicians, Nurses, and Investigators

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*From Northern California:*

**Pregnancy plasma glucose levels exceeding the American Diabetes Association thresholds, but below the National Diabetes Data Group thresholds for gestational diabetes mellitus, are related to the risk of neonatal macrosomia, hypoglycaemia and hyperbilirubinaemia.**

*Ferrara A, Weiss NS, Hedderston MM, Quesenberry CP Jr, Selby JV, Ergas IJ, Peng T, Escobar GJ, Pettitt DJ, Sacks DA. Diabetologia 2007 Feb;50(2):298-306. Epub 2006 Nov 14.*

**AIMS/HYPOTHESIS:** Gestational diabetes mellitus (GDM) is a risk factor for perinatal complications. In several countries, the criteria for the diagnosis of GDM have been in flux, the American Diabetes Association (ADA) thresholds recommended in 2000 being lower than those of the National Diabetes Data Group (NDDG) that have been in use since 1979. We sought to determine the extent to which infants of women meeting only the ADA criteria for GDM are at increased risk of neonatal complications.

**MATERIALS AND METHODS:** In a multiethnic cohort of 45,245 women who did not meet the NDDG criteria and were not treated for GDM, we conducted nested case-control studies of three complications of GDM that occurred in their infants: macrosomia (birthweight >4500 g, n = 494); hypoglycaemia (plasma glucose <2.2 mmol/L, n = 488); and hyperbilirubinaemia (serum bilirubin  $\pm$ 342 micromol/L (20 mg/dL), n = 578). We compared prenatal glucose levels of the mothers of these infants and mothers of 884 control infants.

**RESULTS:** Women with GDM by ADA criteria only (two or more glucose values exceeding the threshold) had an increased risk of having an infant with macrosomia (odds ratio [OR] = 3.40, 95% CI = 1.55-7.43), hypoglycaemia (OR = 2.61, 95% CI = 0.99-6.92) or hyperbilirubinaemia (OR = 2.22, 95% CI = 0.98-5.04). Glucose levels one hour after the 100-g glucose challenge that

exceeded the ADA threshold were particularly strongly associated with each complication.

**CONCLUSIONS/INTERPRETATION:** These results lend support to the ADA recommendations and highlight the importance of the one-hour glucose measurement in a diagnostic test for GDM.

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*From Northern California:*

**Association of fewer hours of sleep at six months postpartum with substantial weight retention at one year postpartum.**

*Gunderson EP, Rifas-Shiman SL, Oken E, Rich-Edwards JW, Kleinman KP, Taveras EM, Gillman MW. Am J Epidemiol 2008 Jan 15;167(2):178-87.*

Shorter sleep duration is linked to obesity, coronary artery disease, and diabetes. Whether sleep deprivation during the postpartum period affects maternal postpartum weight retention remains unknown. This study examined the association of sleep at six months postpartum with substantial postpartum weight retention (SPPWR), defined as 5 kg or more above pregravid weight at one year postpartum. The authors selected 940 participants in Project Viva who enrolled during early pregnancy from 1999 to 2002. Logistic regression models estimated odds ratios of SPPWR for sleep categories, controlling for sociodemographic, prenatal, and behavioral attributes. Of the 940 women, 124 (13%) developed SPPWR. Sleep distributions were as follows: 114 (12%) women slept  $\leq$ 5 hours/day, 280 (30%) slept 6 hours/day, 321 (34%) slept 7 hours/day, and 225 (24%) slept  $\geq$ 8 hours/day. Adjusted odds ratios of SPPWR were 3.13 (95% confidence interval (CI): 1.42, 6.94) for  $\leq$ 5 hours/day, 0.99 (95% CI: 0.50, 1.97) for 6 hours/day, and 0.94 (95% CI: 0.50, 1.78) for  $\geq$ 8 hours/day versus 7 hours/day ( $p = 0.012$ ). The adjusted odds ratio for SPPWR of 2.05 (95%

CI: 1.11, 3.78) was twofold greater ( $p = 0.02$ ) for a decrease in versus no change in sleep at one year postpartum. Sleeping  $\leq$ 5 hours/day at six months postpartum was strongly associated with retaining  $\geq$ 5 kg at one year postpartum. Interventions to prevent postpartum obesity should consider strategies to attain optimal maternal sleep duration.

*Gunderson EP, Rifas-Shiman SL, Oken E, Rich-Edwards JW, Kleinman KP, Taveras EM, Gillman MW. Association of fewer hours of sleep at six months postpartum with substantial weight retention at one year postpartum. Am J Epidemiol 2008 Jan 15;167(2):178-87, by permission of Oxford University Press.*

**CLINICAL IMPLICATION:** This is the first study to examine the association of sleep duration with the risk of substantial postpartum weight retention (11 lbs or more above pregravid weight). We followed 940 women from early pregnancy and asked about sleep duration at six months postpartum, and one year postpartum. Five or fewer hours of sleep was associated with a threefold risk of substantial weight retention at one year postpartum independent of other known predictors (ie, pregravid obesity, gestational weight gain, age). Our findings suggest that six hours sleep or more per day during the first year after pregnancy may be as important as healthy eating habits and regular exercise in preventing weight retention. —EG

*From the Northwest:*

**Progression from newly acquired impaired fasting glucose to type 2 diabetes.**

*Nichols GA, Hillier TA, Brown JB. Diabetes Care 2007 Feb;30(2):228-33.*

**OBJECTIVE:** We sought to estimate the rate of progression from newly acquired (incident) impaired fasting glucose (IFG) to diabetes under the old and new IFG criteria and to identify predictors of progression to diabetes.

**RESEARCH DESIGN AND METHODS:** We identified 5452 members of a health maintenance organization with no prior history of diabetes, with at least two elevated fasting glucose tests (100-125 mg/dL) measured between 1 January 1994 and 31 December 2003, and with a normal fasting glucose test before the two elevated tests. All data were obtained from electronic records of routine clinical care. Subjects were followed until they developed diabetes, died, left the health plan, or until 31 December 2005.

**RESULTS:** Overall, 8.1% of subjects whose initial abnormal fasting glucose was 100-109 mg/dL (added IFG subjects) and 24.3% of subjects whose initial abnormal fasting glucose was 110-125 mg/dL (original IFG subjects) developed diabetes ( $P < 0.0001$ ). Added IFG subjects who progressed to diabetes did so within a mean of 41.4 months, a rate of 1.34% per year. Original IFG subjects converted at a rate of 5.56% per year after an average of 29.0 months. A steeper rate of increasing fasting glucose; higher BMI, blood pressure, and triglycerides; and lower HDL cholesterol predicted diabetes development.

**CONCLUSIONS:** To our knowledge, these are the first estimates of diabetes incidence from a clinical care setting when the date of IFG onset is approximately known under the new criterion for IFG. The older criterion was more predictive of diabetes development. Many newly identified IFG patients progress to diabetes in <3 years, which is the currently recommended screening interval.

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From Southern California:

### Asthma costs and utilization in a managed care organization.

Zeiger RS, Hay JW, Contreras R, Chen W, Quinn VP, Seal B, Schatz M. *J Allergy Clin Immunol* 2008 Apr;121(4):885-92.e5. Epub 2008 Mar 4.

**BACKGROUND:** Medical costs and health care utilization associated with asthma and the variation by treatment are poorly understood.

**OBJECTIVE:** To compare single controller inhaled corticosteroid (ICS) to other asthma drug regimens on medical costs and utilization.

**METHODS:** Direct medical costs and utilization

were captured from administrative electronic databases from continuously enrolled members with asthma age five years or older with drug coverage. Asthma patients were identified during 2002, categorized into 14 asthma drug groups on the basis of 2003 prescription records, and had total medical costs and utilization determined in 2004 adjusting for demographics, insurance types, asthma risk, comorbidity, and propensity scores.

**RESULTS:** A total of 96,631 patients met the study eligibility criteria. Patients were (mean  $\pm$  SD) age  $38 \pm 23$  years and were 57% female, 14% Medicare, 4% Medicaid, and had a median family income (mean  $\pm$  SD) of  $\$64,967 \pm \$29,285$ . Total unadjusted direct medical costs/patient/year averaged  $\$3745$  ( $\$3298$  low asthma risk vs  $\$6797$  high asthma risk;  $p < .001$ ). Adjusted total and asthma drug costs were significantly lower with single controller ICS compared with single controller leukotriene modifiers, long-acting beta-agonists, and theophylline and most combination controller regimens ( $p < .001$  for all comparisons). In addition, single controller ICS compared with single controller leukotriene modifiers and combination controllers was associated with significantly lower asthma-related utilization.

**CONCLUSION:** Total direct costs and asthma-related utilizations are meaningfully less in the year after being dispensed single controller ICS compared with single controller leukotriene modifiers or most combination controllers.

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**CLINICAL IMPLICATION:** On the basis of prior evidence of clinical efficacy and with new evidence provided by the present cost analysis study, inhaled corticosteroids are the preferred first line single controller agent for patients with persistent asthma. In addition, periodic evaluation of asthma patients on combination controllers should be done to determine if their clinical control merits tapering from combination controller therapy to single controller inhaled corticosteroid treatment. —RZ

From Northern California:

### Maternal caffeine consumption during pregnancy and the risk of miscarriage: a prospective cohort study.

Weng X, Odouli R, Li DK. *Am J Obstet Gynecol* 2008 Mar;198(3):279.e1-8. Epub 2008 Jan 25.

**OBJECTIVE:** The objective of the study was to examine whether the risk of miscarriage is associated with caffeine consumption during pregnancy after controlling for pregnancy-related symptoms.

**STUDY DESIGN:** This was a population-based prospective cohort study.

**RESULTS:** An increasing dose of daily caffeine intake during pregnancy was associated with an increased risk of miscarriage, compared with no caffeine intake, with an adjusted hazard ratio (aHR) of 1.42 (95% confidence interval 0.93 to 2.15) for caffeine intake of less than 200 mg/day, and aHR of 2.23 (1.34 to 3.69) for intake of 200 or more mg/day, respectively. Nausea or vomiting during pregnancy did not materially affect this observed association, nor did the change in intake pattern of caffeine during pregnancy. In addition, the magnitude of the association appeared to be stronger among women without a history of miscarriage (aHR 2.33, 1.48 to 3.67) than that among women with such a history (aHR 0.81, 0.34 to 1.94).

**CONCLUSION:** Our results demonstrated that high doses of caffeine intake during pregnancy increase the risk of miscarriage, independent of pregnancy-related symptoms.

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**CLINICAL IMPLICATION:** For a woman who is pregnant or is attempting to become pregnant, clinicians should advise that she stop drinking regular coffee or large amounts of caffeinated soda. She should consider switching to decaffeinated coffee. If she really feels that she must drink regular coffee, she should limit consumption to less than one cup per day. —DL ♦