

# Potential Data Sources

## Addressing Diabetes in Women of Childbearing Age as a Risk Factor for Birth Defects

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The following are potential sources of population-based data concerning the incidence and prevalence of diabetes and gestational diabetes in women of childbearing age. They are offered to assist state and partners in identifying statistics of regional relevance in developing and promoting public health prevention messages. References to published analyses of diabetes rates in various populations are included in the Table. Numerous additional studies demonstrate the increased risk for birth defects when mother has pregestational diabetes. Two recent studies are included in the table.

### **Centers for Disease Control and Prevention (CDC) Diabetes Data and Trends**

<http://apps.nccd.cdc.gov/ddtstrs/>

Resources documenting the public health burden of diabetes and its complications in the United States. The Diabetes Indicators and Data Sources Internet Tool (DIDIT) is a user-friendly web-based tool designed to support surveillance, epidemiology, and program evaluation activities of state diabetes control programs.

#### **National Diabetes Fact Sheet**

[http://www.cdc.gov/diabetes/pubs/pdf/ndfs\\_2007.pdf](http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2007.pdf)

More information on the data sources for these estimates can be found in the fact sheet.

### **Behavioral Risk Factor Surveillance System (BRFSS)**

<http://www.cdc.gov/brfss/index.htm>

BRFSS is a state-based system of health surveys that collects information on adult health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury, including diabetes. State level data on trends are available on line. Data sets are available for analysis. There is some variation from state to state. For more detailed data requests, also contact your state program. To see a sample state data brief on diabetes from the Michigan BRFSS visit:

[http://www.michigan.gov/documents/mdch/MIBRFSS\\_Surveillance\\_Brief\\_December2007\\_Vol1No2\\_Dec10\\_2007\\_FINAL\\_221887\\_7.pdf](http://www.michigan.gov/documents/mdch/MIBRFSS_Surveillance_Brief_December2007_Vol1No2_Dec10_2007_FINAL_221887_7.pdf)

### **Pregnancy Risk Assessment Monitoring System (PRAMS)**

<http://www.cdc.gov/prams/>

PRAMS is a surveillance project of the CDC and state health departments. PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy. Data sets are available for analysis. There is some variation from state to state. Some states do not participate. For more detailed data requests, also contact your state program. View the Michigan PRAMS newsletter focusing on diabetes and pregnancy at:

[http://www.michigan.gov/documents/mdch/MDCH\\_MCH\\_Epi\\_CL\\_PRAMS\\_newsletter-January\\_2008\\_227453\\_7.pdf](http://www.michigan.gov/documents/mdch/MDCH_MCH_Epi_CL_PRAMS_newsletter-January_2008_227453_7.pdf)

"In 2005, 12,926 women (10.4% of all live births) experienced diabetes during their most recent pregnancy. The majority of these women (76.9%) had gestational diabetes while the remaining portion (23.1%) reported having pre-gestational diabetes."

### **National Health and Nutrition Examination Survey (NHANES)**

<http://www.cdc.gov/nchs/nhanes.htm>

NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations. Data sets available for analysis. State specific data are not available. View a diabetes prevalence study based on NHANES data published in the CDC's Morbidity and Mortality Weekly Report (MMWR) at:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5235a1.htm>.

**National Birth Defects Prevention Network, Birth Defects Prevention Month 2010**

**References for rates of pregestational and gestational diabetes among women of childbearing age**

<b>Resource</b>	<b>Reference</b>	<b>Data source</b>	<b>Condition</b>	<b>Risk factor</b>	<b>Risk and/or Prevalence</b>
<b>1</b> Trends in the Prevalence of Preexisting Diabetes and Gestational Diabetes mellitus Among a Racially/Ethnically Diverse Population of Pregnant Women, 1999-2005	Lawrence JM, Contreras R, Chen W, Sacks DA. Diabetes Care. 2008 May;31(5):899-904. Epub 2008 Jan 25. PMID: 18223030	Kaiser-Permanente 1999-2005	GDM and PGDM	General	<b>GDM</b> overall: ~7.4% (no significant increase) <b>PGDM</b> overall increase: from ~.8% to ~1.8%.
				Age	Risk increases w/age: ♦ <b>GDM</b> 1.7% (13-19 yo); 13% (35-39 yo); 17% (40+ yo). ♦ <b>PGDM</b> increased from ~.1% to ~.5% (13-19 yo); from ~1.5% to 3.5% (35-39 yo); from ~3% to 4% (40+ yo).
				Race/Ethnicity	<b>GDM</b> disparity: NHW 5%; Hispanic 8.5%; B 5%; Asian 10% <b>PGDM</b> disparity: NHW 1.4%; Hispanic 2%; B 2.8%; Asian 1.7%
<b>2</b> Gestational diabetes in the United States: temporal trends 1989 through 2004	Getahun D, Nath C, Ananth CV, Chavez MR, Smulian JC. Am J Obstet Gynecol. 2008 May;198(5):525.e1-5. Epub 2008 Feb 15. PMID: 18279822	NHDS 1989-2004  Age groupings: <25; 25-34; 35+	GDM	General	Overall increase; 2.2% to 4.2% in (W) 25-34 yo
				Age	Risk increases w/age
				Race/Ethnicity	Disparity: Greater increase - 1.9% to 5.7% in (B) 25-34 yo
				Region	<u>W</u> <2% to 4-5%; <u>S</u> <2% to 3-4%; <u>MW</u> ~2% to 4-5%; <u>NE</u> 2-3% to ~5%
<b>3</b> Prevalence of Diabetes and Impaired Fasting glucose in Adults in the U.S. Population -NHANES 1999-2002	Cowie CC, Rust KF, Byrd-Holt DD, Eberhardt MS, Flegal KM, Engelgau MM, Saydah SH, Williams DE, Geiss LS, Gregg EW. Diabetes Care. 2006 Jun;29(6):1263-8. PMID: 16732006	NHANES 1999-2002  Adult M and F	IFG and DM	General	Total <b>DM</b> overall increase in adult M+F from ~ 8% to ~ 9%; <b>IFG</b> increase from 25.5% to 26%
				Age	Risk increases w/age: <b>DM</b> increase from 1.6% to 2.4% in 20-39 yo
				Race/Ethnicity	Disparity: <b>DM</b> in NHW 7-8%; NHB 14-15%; MexAm 13-14%
<b>4</b> Increasing Prevalence of Gestational Diabetes Mellitus – A public health perspective	Ferrara A. Diabetes Care. 2007 Jul;30 Suppl 2:S141-6. Erratum in: Diabetes Care. 2007 Dec;30(12):3154. PMID: 17596462	Review	GDM	General	Overall 10 yr increase in multiple studies; from ~3-6% to ~5-9%.
				Age	Risk increases w/age; ~2% (15-19 yo) to ~ 15% (42-45 yo).
				Race/Ethnicity	Greater increase in some populations: up to about 25% in Asian and Hispanic (42-45 yo).

**National Birth Defects Prevention Network, Birth Defects Prevention Month 2010**

**References for rates of pregestational and gestational diabetes among women of childbearing age**

<i>Resource</i>	<i>Reference</i>	<i>Data source</i>	<i>Condition</i>	<i>Risk factor</i>	<i>Risk and/or Prevalence</i>
<b>5</b> The Prevalence of Metabolic Syndrome among US Women of Childbearing Age	Ramos RG, Olden K. Am J Public Health. 2008 Jun;98(6):1122-7. Epub 2008 Apr 29. PMID: 18445796	NHANES 1999-2004  Women 18-44 yrs	Metabolic Syndrome	General	Overall increase from 17.8% to 26.5%
				Maternal history of DM	Risk doubles
<b>6</b> Weight Change and Diabetes Incidence: Findings from a National Cohort of US Adults	Ford ES, Williamson DF, Liu S. Am J Epidemiol. 1997 Aug 1;146(3):214-22 PMID: 9247005	NHANES I and NHEFS  Adult M and F	DM	BMI of 23-35	With increasing BMI: increases 2 to 10 times for all ages; 3 to 20 times for 30 years and over
				Wt gain of 20 - 40 lbs	Risk increases ~2.5 times
<b>7</b> Teratogenicity Associated with Pre-Existing and Gestational Diabetes	Allen VM, Armson BA, Wilson RD, Allen VM, Blight C, Gagnon A, Johnson JA, Langlois S, Summers A, Wyatt P, Farine D, Armson BA, Crane J, Delisle MF, Keenan-Lindsay L, Morin V, Schneider CE, Van Aerde J, Soc. of OB/GYN of Canada. J Obstet Gynaecol Can. 2007 Nov;29(11):927-44. English, French. PMID: 17977497	Review	Fetal anomalies	GDM and PGDM	Risk for major malformations increased by 4%-10%
<b>8</b> Diabetes mellitus and birth defects	Correa A, Gilboa SM, Besser LM, et al. Am J Obstet Gynecol 2008;199:237.e1-237.e9.	National Birth Defects Prevention Study	Fetal anomalies	PGDM	Risk for major malformations increased 3 times (isolated) to 8 times (multiple)

# Definitions

## What is Prevalence?

- When used without qualification: *prevalence* is the number of cases of a disease in a population at a designated point in time (point prevalence).
- A *prevalence rate* is a proportion defined by the number of cases in a population at a given time divided by the population at risk.

## What is Incidence?

- *Incidence* is the number of new cases of a disease in a population within a specified time.
- Not to be confused with *Incidence Rate*: the rate at which new cases of a disease occur in a population.

## What is an Odds Ratio?

- An *odds ratio* is simply a ratio of two odds.
  - *Odds* is the probability of an event occurring divided by the probability of the event not occurring.
- *Exposure odds ratio* (case control study) is the ratio of the odds of exposure among cases to the odds of exposure in controls.
- The *disease odds ratio* (cohort or cross sectional study) is the ratio of the odds of the disease among exposed to the odds of disease in unexposed.
- A *prevalence odds ratio* is an odds ratio derived from prevalent (versus incident) cases.

## What is Relative Risk?

- *Relative risk* is the risk of disease among those exposed relative to (divided by) the risk of disease among those unexposed. Also known as *Risk Ratio*. In rare diseases (<1:100) the Relative Risk can be approximated by the *Odds Ratio*.

## What is Attributable Risk?

- *Attributable Risk* is the difference in rate of a condition between an exposed population and an unexposed population.

## What is a Hazard Ratio?

- In survival analysis *hazard ratio* is often considered an estimate of *relative risk*.
- *Relative risk* is the risk of disease among those exposed relative to (divided by) the risk of disease among those unexposed.