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Change in BRFSS Methodology: Start of a New Era

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The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys created by the Centers for Disease Control and Prevention (CDC) in 1984 to gather information on the health of adults ages 18 years and older. State health departments conduct the BRFSS surveys continuously through the year using a standardized core questionnaire and optional modules, plus state-added questions. More than 400,000 adult interviews are conducted annually. The BRFSS is the sole source of state-level health risk factors, behaviors and prevalence of certain chronic conditions.

Beginning with data collected in 2011, two significant changes have been made to the methodology used with the BRFSS survey. Cell phone interviews are now included, and a new weighting procedure has been implemented. These changes were brought about to maintain the accuracy and validity of the BRFSS.

Background

Traditionally, the BRFSS survey has relied on landline telephone numbers. With the rapid growth of cell phone-only households by more than 700 percent from 2003 to 2009, these households needed to be included to more accurately reflect the adult population. People with cell phone-only service are known to have a different demographic profile than those who have a landline telephone. People in cell phone-only households tend to be younger, rent instead of own their homes, are not married and are likely to be in a racial or ethnic minority group. There are also attitudinal and behavioral differences between these two groups. Including cell phone-only households will improve survey coverage of certain population groups. The proportion of interviews conducted with respondents who are male, those with lower education and lower income levels and younger ages will increase, while the proportion for white, older and female respondents will decrease.

Since the 1980s, the CDC has used a statistical method called post-stratification to weight BRFSS data to adjust survey respondent data to known proportions of age, race and ethnicity, sex, geographic region or other known characteristics of a state's population. Weighting is important because it makes the sample more representative of the population and adjusts for non-response bias. The CDC began testing a more sophisticated weighting method called iterative proportional fitting, or "raking," in 2006. Raking has several advantages over post-stratification. Additional demographic variables such as education level, marital status and home ownership are brought into the weighting process, along with cell phone surveys. Advances in ultra-fast computer processors also gave the CDC the ability to adopt the more sophisticated raking method.

Results

Raking and the inclusion of cell phone respondents will result in improved measuring of risk factors; as such, 2011 BRFSS data will not be comparable to earlier years. In 2011, the median proportion of interviews represented by cell phones is believed to be 10 percent. In 2012, the CDC requested that all states have at least 20 percent of their interviews represented by cell phone.

Use of the new methodology will result in prevalence estimates that will be different from estimates achieved with the previous post-stratification procedure. These differences will vary by survey question and state, with the results determined by state variations in demographic variables used for raking plus the proportion of respondents who use cell phones. The CDC has determined that some of the BRFSS indicators will increase for the majority of the states. This increase is most likely due to the addition of cell phone respondents and the new raking method and is not a "real" change in the prevalence from 2010. Analysis done by the CDC indicates that the shape of trend lines will not change greatly over time.

A review of select variables among states indicated that use of the new methodology meant changes ranging from +9.6 percent (Idaho) to +49.4 percent (South Dakota) (+1.5 to +7.6 percentage points) for all states for current smoking. The estimated prevalence of adults with any type of health care coverage meant changes ranging from -0.7 percent (Maine) to -10.4 percent (Georgia) (-0.6 to -8.7 percentage points) for all states. Prevalence estimates by state will be made available by CDC soon.

Risk factors and behaviors more prevalent in younger and/or minority groups, such as smoking and binge drinking, will have more of a change from 2010 to 2011. For Indiana, use of the new methodology resulted in a higher prevalence for certain risk factors and behaviors in 2011 compared to 2010, for example:

- Current smoking: 25.6 percent (2010 prevalence was 21.2 percent)
- Adults ages 18-64 without health care coverage: 23.6 percent (2010 prevalence was 17.9 percent)
- Adults reporting binge drinking: 17.8 percent (2010 prevalence was 13.5 percent)

As stated above, the change in prevalence does <u>not</u> mean an actual increase in the behavior, but is more likely due to the change in weighting and the inclusion of cell phones.

For Indiana, there were similar prevalence estimates for certain risk factors and behaviors for 2010 and 2011:

- Adults ever being told they have diabetes: 10.2 percent (2010 prevalence was 9.8 percent)
- Percent of adults considered obese based on body mass index calculated from self-reported height and weight: 30.8 percent (2010 prevalence was 30.2 percent)
- Adults reporting current asthma: 9.6 percent (2010 prevalence was 9.5 percent)

It is important that the BRFSS, along with other health surveys, take advantage of improvements in surveillance and statistical procedures to provide the best information possible. Raking methods allow the BRFSS to incorporate information from cell phone interviews and create estimates with smaller sample sizes. The prevalence resulting from the new methodology is a more precise estimate of the various behaviors and risk factors obtained through the BRFSS.

The Indiana State Department of Health (ISDH) and the CDC will publish results from the 2011 BRFSS survey in the upcoming months.

Lymphocytic Choriomeningitis Virus: "Mice Are Not So Nice"

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Lymphocytic choriomeningitis virus (LCMV) is an enveloped RNA virus and a member of the arenavirus group. Its natural host is the common house mouse, but it is capable of infecting a wide array of animals, including humans. In human infections, symptoms can range from asymptomatic to those consistent with meningitis. Appearing one to two weeks after exposure, symptoms can include fever, stiff neck, muscle aches, headache, nausea and vomiting. Death from LCMV infection is rare, so those afflicted almost always fully recuperate. The recovery time can be prolonged.

A person can become infected after physical contact with the body fluids or nesting material of an infected rodent. This can include inhalation of airborne particles from disturbed droppings or being bitten by an infected rodent. Rodents such as guinea pigs and hamsters can carry the virus, but most human infections are due to exposures to mice. Infected mice are not adversely affected by the virus, so human illness serves as a sentinel for the disease.

Human-to-human spread of LCMV has not been observed, except for the transmission from mother to baby during pregnancy. Infection during pregnancy is associated with a higher risk for miscarriage. Congenital LCMV can result in severe birth defects to the child. LCMV can also result in severe illness in organ transplant recipients. In 2005, four recipients from a common donor were infected; three of those recipients died.

In May, 2012, the Vanderburgh County Health Department (VCHD) began working with the ISDH and CDC in the investigation of two cases of LCMV. An Evansville infectious disease specialist suspected the diagnosis and sought technical assistance directly with

CDC. The CDC soon held conference calls with VCHD, ISDH and the Indiana Board of Animal Health (BOAH) to determine the course of action. The ill individuals worked at a professional rodent breeding operation in Vanderburgh County, which cooperatively submitted animal samples to the CDC for LCMV testing. Human specimens collected by VCHD staff in a human sero-survey of the workplace were also sent to CDC for testing. BOAH placed all animals and animal products originating from the facility under quarantine on May 14.

The CDC tested 1,421 mice and 399 rats from the breeding operation. The virus was present at a high rate in the mice but no rats were infected. As a result, the CDC recommended that anyone entering the breeding facility wear personal protective equipment (PPE) including a N95 respirator, face shield, gloves and gown. Additional human cases were identified among the workers. As the investigation expanded, testing was offered to former employees of the facility, a distributor and the family of a local farmer who hauled away the used and contaminated bedding material from the cages and deposited it on his property. Quarantines were not lifted until the facility culled all mice in the three buildings with LCMV contamination, removed all feed and litter and disinfected the enclosures. The breeding facility elected to depopulate the animals internally and dispose of the carcasses on the same property. By July 14, the quarantines had been removed from all buildings on the property. The breeder can elect to begin operation with a disease-free colony.

Further investigation revealed that live mice were shipped to several pet stores. These shipments are currently being tracked to the point of purchase. The CDC continues to work with public health authorities, retailers in the pet or mice breeding industries and veterinary or laboratory facilities to keep LCMV-infected animals out of animal colonies or distribution chains.

Currently all human infections related to this outbreak were acquired from occupational exposures related to the rodent breeding facility. The investigation is still ongoing. The risk of acquiring a LCMV infection is low for the general population. However, the following precautions can be taken to further reduce that risk:

- Avoid direct physical contact with wild or pet rodents if possible (if pregnant, avoid being in same room with a rodent).
- If you do have contact with rodents, their droppings or nesting materials, wash hands well with soap and water.
- Seal any gaps or holes outside of your home to keeps rodents out.
- Clean up and properly store human or pet food to avoid attracting rodents.

More detailed information about LCMV is available at:
http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/lcmv.htm .
http://www.in.gov/isdh/files/ISDH_2012_LCMV_Quick_Facts_draft_1B1_07-31.pdf

Sources:
http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/lcmv.htm
CDC. Lymphocytic choriomeningitis virus infection in organ transplant recipients---Massachusetts, Rhode Island, 2005. MMWR 2005; 54;537--9.
CDC. Interim Guidance for Minimizing Risk for Human Lymphocytic Choriomeningitis Virus Infection Associated with Pet Rodents, 2005. MMWR 2005; 54:747—9

CDC. Lymphocytic Choriomeningitis Virus Infections in Employees of a Rodent Breeding Facility – Indiana, May-June, 2012. MMWR 2012; 61; 622-3.

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Communicable Disease Reference Guide for Schools: 2012 Edition

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The ISDH Surveillance and Investigation Division recently posted the *Communicable Disease Reference Guide for Schools: 2012 Edition.* This resource for school nurses, staff and administrators is located at http://www.in.gov/isdh/23291.htm. New content has been added on *Clostridium difficile* infection, bed bugs, head lice and human papilloma virus. Each disease also includes a new section relating to outbreak guidance. Collaboration with the ISDH Immunization Division led to the inclusion of an appendix containing immunization information, including school immunization requirements and disease fact sheets.

The purpose of the *Communicable Disease Reference Guide for Schools: 2012 Edition* is to provide the best medical and public health information available to prevent the introduction of communicable diseases into the school environment and reduce transmission. The *Communicable Disease Reference Guide for Schools: 2012 Edition* was written using the most current information from reliable public health and medical sources.

Training Room

INDIANA STATE DEPARTMENT OF HEALTH IMMUNIZATION PROGRAM PRESENTS:

Immunizations from A to Z

Immunization Health Educators offer this FREE, one-day educational course that includes:

- Principles of Vaccination
- Childhood and Adolescent Vaccine-Preventable Diseases
- Adult Immunizations
    - Pandemic Influenza
- General Recommendations on Immunization
    - Timing and Spacing
    - Indiana Immunization Requirements
    - Administration Recommendations
    - Contraindications and Precautions to Vaccination
- Safe and Effective Vaccine Administration
- Vaccine Storage and Handling
- Vaccine Misconceptions
- Reliable Resources

This course is designed for all immunization providers and staff. Training manual, materials and certificate of attendance are provided to all attendees. Please see the Training Calendar for presentations throughout Indiana. Registration is required. To attend, schedule/host a course in your area or for more information, please visit http://www.in.gov/isdh/17193.htm**.**

ISDH Data Reports Available

The following data reports and the *Indiana Epidemiology Newsletter* are available on the ISDH webpage:

http://www.IN.gov/isdh/

HIV/STD/Viral Hepatitis Semi-Annual Report (June 2007- June 2011)	Indiana Mortality Report (1999-2009)
Indiana Cancer Report: Incidence; Mortality; Facts & Figures	Indiana Infant Mortality Report (1999, 2002, 1990-2003)
Indiana Health Behavior Risk Factors Report (1999-2010)	Indiana Natality Report (1998-2009)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (2003-2012)	Indiana Induced Termination of Pregnancy Report (1998-2011)
Indiana Hospital Consumer Guide (1996)	Indiana Marriage Report (1995, 1997-2004)
Public Hospital Discharge Data (1999-2010)	Indiana Infectious Disease Report (1997-2009)
Assessment of Statewide Health Needs – 2007	Indiana Maternal & Child Health Outcomes & Performance Measures (1989-1998, 1990-1999, 1991-2000, 1992-2001, 1993-2002, 1994-2003, 1995-2004, 1996-2005, 1997-2006, 1998-2007)

HIV Disease Summary

Information as of June 30, 2012 **(based on 2000 population of 6,080,485)**

HIV - without AIDS to date:

322	New HIV cases from July 1, 2011 thru June 30, 2012	12-month incidence	5.29 cases/100,000
4,758	Total HIV-positive, alive and without AIDS on June 30, 2012	Point prevalence	78.25 cases/100,000

AIDS cases to date:

321	New AIDS cases from July 1, 2011 thru June 30, 2012	12-month incidence	5.28 cases/100,000
5,720	Total AIDS cases, alive on June 30, 2012	Point prevalence	94.07 cases/100,000
11,758	Total AIDS cases, cumulative (alive and dead) on June 30, 2012		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in May - June *MMWR* Weeks 18-25		Cases Reported in January - June *MMWR* Weeks 1-25	
	2011	2012	2011	2012
Campylobacteriosis	103	117	261	277
Chlamydia	*	*	*	*
Cryptococcus	6	2	20	21
Cryptosporidiosis	6	17	46	49
E. coli, shiga toxin-producing	11	22	22	52
Giardiasis	52	23	153	109
Gonorrhea	*	*	*	*
Haemophilus influenzae, invasive	27	17	63	61
Hemolytic Uremic Syndrome (HUS)	0	2	1	3
Hepatitis A	3	1	11	8
Hepatitis B	11	12	30	46
Hepatitis C Acute	7	17	46	54
Histoplasmosis	14	20	57	69
Influenza Deaths (all ages)	0	1	24	3
Legionellosis	7	1	19	14
Listeriosis	0	1	1	5
Lyme Disease	26	25	30	33
Measles	11	0	11	15
Meningococcal, invasive	2	0	12	1
Mumps	0	2	0	4
Pertussis	26	62	113	130
Rocky Mountain Spotted Fever	2	2	2	2
Salmonellosis	110	121	222	267
Shigellosis	11	7	36	26

Disease	Cases Reported in May - June *MMWR* Weeks 18-25		Cases Reported in January - June *MMWR* Weeks 1-25	
	2011	2012	2011	2012
Severe *Staphylococcous aureus* in Previously Healthy Person	1	1	8	14
Group A Streptococcus, invasive	28	0	121	112
Group B, Streptococcus, Invasive (All ages)	49	4	154	180
Streptococcus pneumoniae (invasive, all ages)	110	97	481	380
Streptococcus pneumoniae (invasive, drug resistant)	33	29	129	98
Streptococcus pneumoniae (invasive, <5 years of age)	4	4	22	16
Syphilis (Primary and Secondary)	*	*	*	*
Tuberculosis	18	17	45	44
Vibriosis	0	0	1	3
Varicella	14	27	53	84
Yersiniosis	4	1	6	5
Animal Rabies	7 (Bats)	4 (Bats)	7 (Bats)	9 (Bats)

* STD counts were not available at the time of publication

For information on reporting of communicable diseases in Indiana, call the *Surveillance and Investigation Division* at 317.233.7125.

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Cover photo of Cryo-EM reconstruction of a norovirus capsid.courtesy of Dr. B.V.V. Prasad, Baylor College of Medicine, Houston, TX 77030

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