Behavioral Risk Factor Surveillance System (BRFSS) Methods Changes

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BRFSS Methods Changes

Raking

And cell phones
Goals of this Presentation

- Review the purpose of weighting BRFSS data
- Explain changes in BRFSS weighting and sampling methods
- Explain effect of changes on chronic disease and risk factor estimates
Oregon Behavioral Risk Factor Surveillance System: Overview

• BRFSS is an important source of information about health risk behaviors, preventive health practices, and health care access
• Data come from interviews of some adults in residential households each month
• Ongoing since 1988 in Oregon
Frame: Oregon phone numbers

Sample: Phone numbers chosen to be called

Respondents
Why Weight the Data?

• As a group, do respondents “look like” the population?
  – What might cause them to look different?

• Weighting makes sure the information collected on BRFSS accurately represents the population
An Easy Example

• Sampling frame:
  – 1,000 people: 500 men and 500 women

• Sample:
  – 100 people: 52 men and 48 women

• Respondents:
  – 40 people: 10 men and 30 women.
An Easy Example, con’t.

• The ratio of men to women in the base population is? 1:1
• Among respondents the ratio of men to women is? 1:3
  – What effect might this imbalance have on estimates?
The Early Years: “Classic” Weight

- Comprised of two parts:
  1. Chance of being selected
  2. Demographic factors to make sample “look like” population: age groups and sex

- Employed post-stratification
  - Simple and easy to do

- In effect 1991-2009*

* For Oregon. For U.S. data, the classic weight was used through 2010.
Raking Weight...

It's a whole new ball of wax
Now: “Raking” Weight

- Still comprised of two parts:
  - Chance of being selected
  - Demographic factors to make sample “look like” population: many more!

- Employs iterative proportional fitting, aka raking
  - Computationally intensive

- In effect from 2010 --??*

* For Oregon. For U.S. data, the classic weight was used through 2010.
Factors Included in Raking

Raking adjusts for one factor at a time, but in multiple cycles, or iterations, until data converge to the population estimates.

- Age by gender
- Detailed race/ethnicity
- Education level
- Marital status
- Renter/owner
- Gender by race/ethnicity
- Phone type (CP/LL/both)
- Age by race/ethnicity
Why These Factors?

• CDC commissioned a study to identify demographics that were most likely to be related to key indicators

• Education, race, marital status, home ownership status
  – what do these have in common?

• Why wasn’t income included?
Classic vs. Raking Weighting

**Classic**
- Adjusts for age and sex
- Landline only

**Raking**
- Adjusts for age, sex, race/ethnicity, education level, marital status, home ownership, and includes cell phone data
Why Does Cell Phone Matter?
Telephone Surveys (BRFSS, polls)

Frame: Oregon phone numbers

Sample: Phone numbers chosen to be called

Respondents

Population (Oregon Adults)
Percentage of U.S. Households Without Landline Telephones

- 1963: 18%
- 1970: 18%
- 1975: 20%
- 1980: 24%
- 1985-1986: 31%
- 1997: 20%
- Early 2003: 5%
- Early 2005: 7%
- Early 2007: 14%
- Early 2009: 24%
- Late 2011: 36%
Percentage of U.S. Households Without Landline Telephones

- 34% of households have only wireless telephones

Graph showing the percentage of households without landline telephones from 1963 to Late 2011, with categories for Cell phone only, Unknown, and No phone.
Cell Only by State: 2010 estimate

OR: 30.6%
Pop Survey

• Who in this room has a cell phone?

• Who also has a landline?
Phone Types, Oregon Adults, July 2009-June 2010

- No phone: 2%
- Landline only: 12%
- Landline plus cell: 56%
- Cell only: 31%
Who has Switched to Cell Only?

United States, July-December 2011

- Men: 34%
- Women: 31%
- 18-24: 49%
- 25-29: 60%
- 45-64: 24%
- Rent: 56%
- Own: 21%
- In poverty: 51%
- Near poverty: 40%
- Higher income: 29%

Blumberg, Luke. Wireless Substitution: Early release of estimates from the National Health Interview Survey
What does this mean for Oregon?

- Let’s look at some 2010 data weighted using the classic weight versus the raking weight.
Percent of adults reporting selected health risks, Oregon, 2010

<table>
<thead>
<tr>
<th>Health Risk</th>
<th>Old method, landline only</th>
<th>New method, adds cell phone</th>
<th>Absolute difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binge drinking (past 30 days)</td>
<td>14.3</td>
<td>16.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Consume 7+ sodas per week</td>
<td>12.3</td>
<td>14.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Current cigarette smoking</td>
<td>16.4</td>
<td>19.9</td>
<td>3.5*</td>
</tr>
<tr>
<td>No leisure time physical activity</td>
<td>17.4</td>
<td>19.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Obese</td>
<td>27.1</td>
<td>27.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

* Difference is statistically significant
## Percent of adults reporting selected chronic conditions, Oregon, 2010

<table>
<thead>
<tr>
<th>Condition</th>
<th>Old method, landline only</th>
<th>New method, adds cell phone</th>
<th>Absolute difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>30.2</td>
<td>32.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7.1</td>
<td>8.4</td>
<td>1.3</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>29.0</td>
<td>31.1</td>
<td>2.1</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>37.0</td>
<td>38.1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

* Difference is statistically significant
Percent of adults reporting selected screenings or other health-related factors, Oregon, 2010

<table>
<thead>
<tr>
<th></th>
<th>Old method, landline only</th>
<th>New method, adds cell phone</th>
<th>Absolute difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol check in past 5 years</td>
<td>74.6</td>
<td>73.0</td>
<td>(1.6)</td>
</tr>
<tr>
<td>Has health insurance, including Medicaid</td>
<td>83.4</td>
<td>79.8</td>
<td>(3.6)*</td>
</tr>
<tr>
<td>Health status (good to excellent)</td>
<td>84.2</td>
<td>81.8</td>
<td>(2.4)*</td>
</tr>
<tr>
<td>Screened for colorectal cancer appropriately (ages 50-75)</td>
<td>62.2</td>
<td>59.0</td>
<td>(3.2)</td>
</tr>
</tbody>
</table>

* Difference is statistically significant
What does this mean for Oregon?
Or, Put Slightly Differently:

Q: Can estimates prepared from classic weighted data (prior to 2010) be compared with those using raking weighted data (2010 and later)?

A: People will want to compare the results, but they should not. It’s like pressing the reset button.
Percentage of cigarettes smokers among Oregon adults, 1996-2010

Note: In 2010 data collection methods changed. The 2010 estimate is not comparable to earlier years.
And Another Thing…

Q. By instituting this change, won’t some people conclude that BRFSS is unreliable?

A. Perhaps, but they’ll adjust. This change keeps pace with a changing environment in which more adults use cell phones, and desktop computers are more powerful. Most survey researchers have or will make these shifts.
Oregon Health Authority Next Steps

• Document explaining the changes: “Adult Behaviors and Health Conditions from the BRFSS: 2010 Data Better Represent Oregon Adults”
• FAQ and Talking Points
• 2010 Oregon BRFSS data will be posted to the OHA website before the end of the year