

## New Sources of Data for Public Health: Using Electronic Health Records to Examine Population Obesity and Smoking Prevalence and Variation

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**GUNDERSEN**  
HEALTH SYSTEM.

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## DISCLOSURE

I have no financial relationships to  
disclose.

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## BACKGROUND:

- Estimates of obesity and tobacco use are largely from population-based telephone surveys. These are known to suffer from non-participation bias and from response bias.
- Improvements happen at the community level where little data exists.

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## Obesity

- Second leading cause of death in the U.S.
- Estimated annual medical cost of obesity in the U.S. was \$147 billion in 2008
  - Obese patients \$1,429/year higher than normal wt patient
- CDC estimates 35.7% of U.S. Adults are obese

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## Tobacco Use

- Leading cause of death in the U.S.
- Estimated annual medical cost of tobacco use in the U.S. was \$96 billion in 2008
- CDC estimates 19% of U.S. adults are current smokers

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## Sources of Data

- Behavioral Risk Factor Surveillance System (BRFSS) – telephone survey (2013: 493,435)
- National Health and Nutrition Examination Survey (NHANES) – combination of physical examination and interview.(2011/12: 9338 had exam) – tobacco?
- National Health Interview Survey (NHIS) – personal household interview (2013: 34,664)

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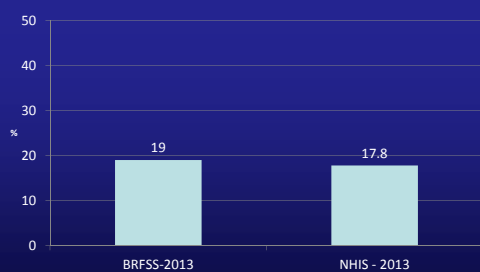
## Obesity Prevalence



## Obesity - Variation

- Age
  - 40-59: 39.5%
  - 60+: 35.4%
  - 20-39: 30.3%
- Gender
  - Females: 36.5%
  - Males: 33.7%
- Race
  - Black: 47.8%
  - Hispanic: 42.5%
  - White: 32.6%
  - Asian: 10.8%
- Education
  - Male: no relationship
  - Female: college educated – lower risk

## Smoking Prevalence



## Tobacco - Variation

- Age
  - 18-24: 17.3%
  - 25-44: 21.6%
  - 45-64: 19.5%
  - 65+: 8.9%
- Gender
  - Males: 20.5%
  - Females: 15.8%
- SES
  - Below poverty: 27.9%
  - At or above poverty: 17.0%
- Race
  - Black: 18.1%
  - Hispanic: 12.5%
  - White: 19.7%
  - Asian: 10.7%
  - Multiple race: 26.1%
- Education
  - No HS diploma: 24.7%
  - GED: 41.9%
  - Diploma: 23.1%
  - College degree: 9.1%
  - Advance degree: 5.9%

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## Bias to estimates

- Telephone survey biases
  - Sampling bias
  - Response bias
- Household surveys
  - Sampling bias (recruitment, refusal)
- Meaningfulness to those on the “front line”

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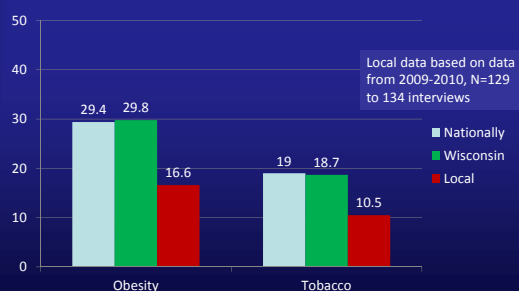
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## Best Estimates of Obesity and Tobacco




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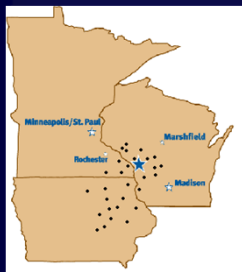
## OBJECTIVE

- We used data from electronic health records (EHR) to determine the rate of obesity and tobacco use in our service area, and to examine variability from year to year.
- Use information to improve population health

## Who are we?

- Integrated Delivery System
  - 6,475 Total Employees
  - Physician-led organization: 790 providers employed / 498 medical staff
  - Regional: 65 clinic locations (27-Medical, 3-Worksite, 4-ExpressCare, Podiatry, Behavioral Health, Eye, Sports Medicine, Reproductive care)
  - 325-bed Tertiary Medical Center, Level II Trauma Center + 4 Affiliated – Critical access hospitals
  - EMS ambulance service
  - Affiliated Aging units and Nursing Home Systems
  - *Electronic Medical Record – shared by clinics/hospitals/EMS/labs*
  - Gunderson Medical Foundation
    - Residency and Medical Education Programs
    - Western Campus of the University of Wisconsin Medical and Nursing School
    - Clinical Research Program

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HEALTH SYSTEM



20 county service area  
across 3 states



## METHODS

- Height, weight, gender, age, smoking status, insurance type, appointment type and total charges were obtained from electronic health records (EHRs) for 156,744 adult patients seen in 2012-2013 (excluding deceased patients).
- Analysis examined variability by patient characteristics.

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## Obesity

- BMI calculated as weight (kg)/height (m<sup>2</sup>)
- A height and weight were measured and available in 2012 on **83.71%** of patients
- Of the 20,600 patients without height and weight, an additional 47.8% (9,848 patients) had a weight measurement.
- The average height for their age and gender was used to calculate an imputed BMI.
- Thus, only 8.5% of patients had no estimate of obesity risk

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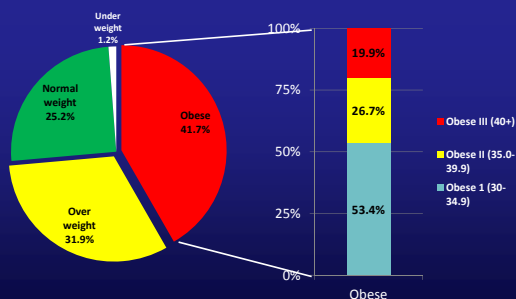
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## Obesity Risk Results: 2012




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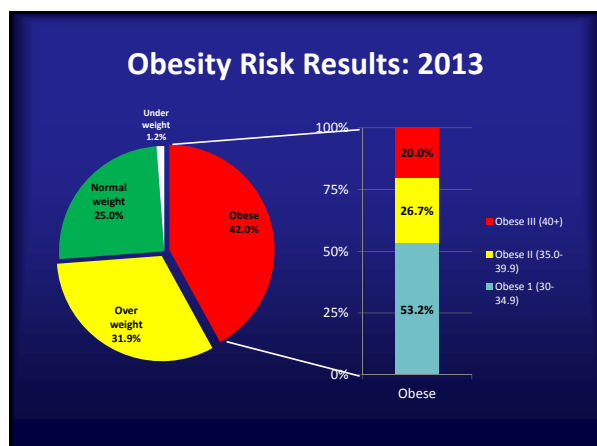
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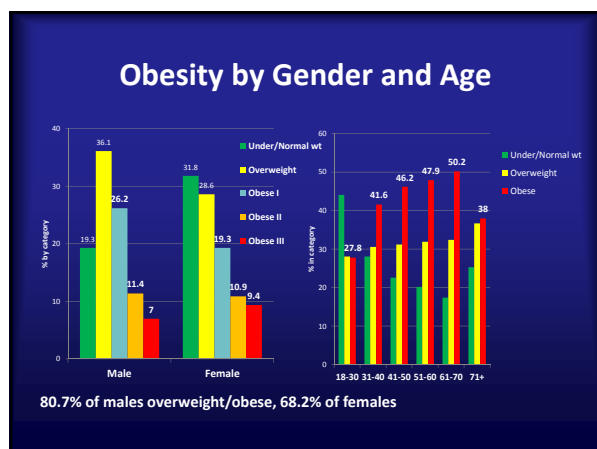
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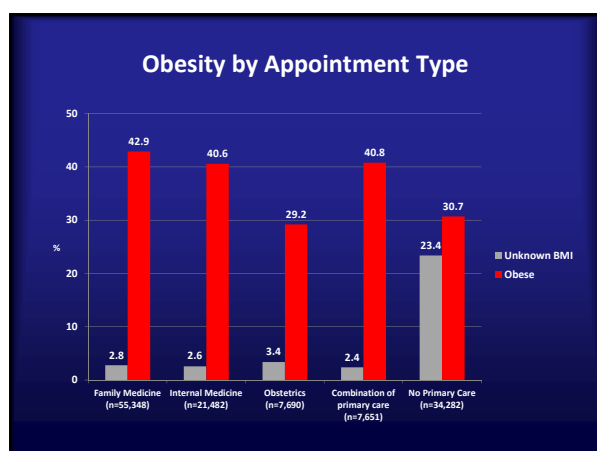
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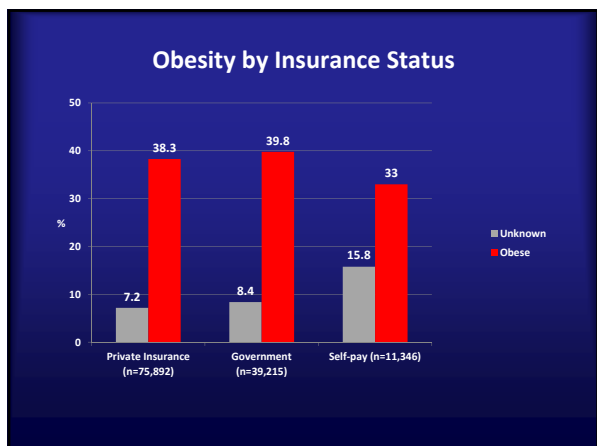
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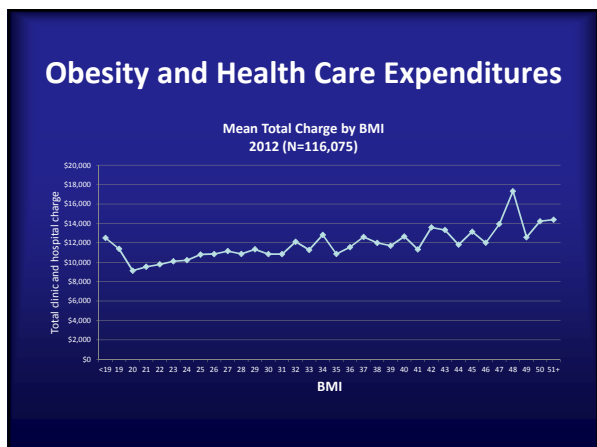
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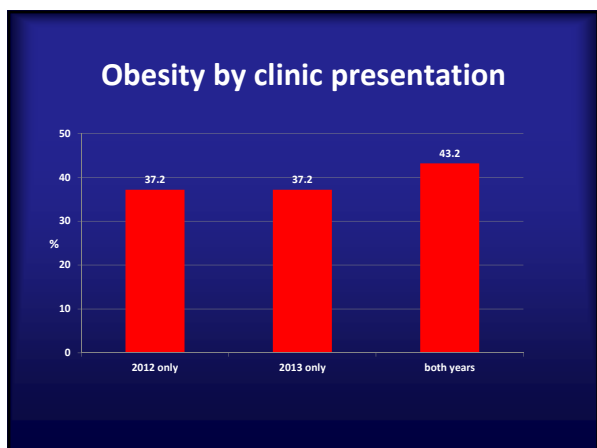
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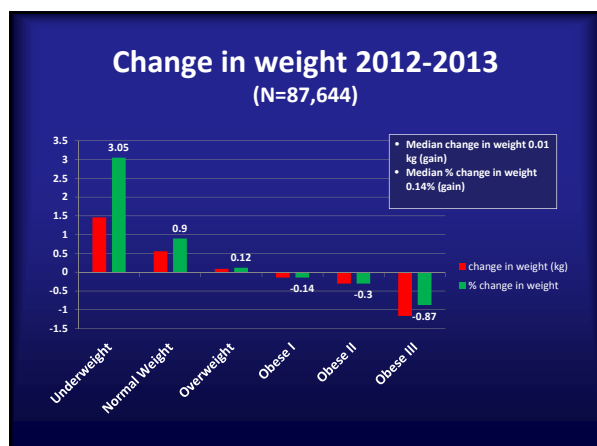
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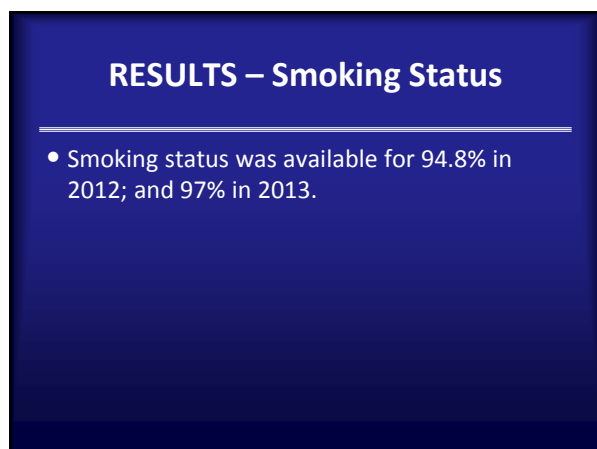
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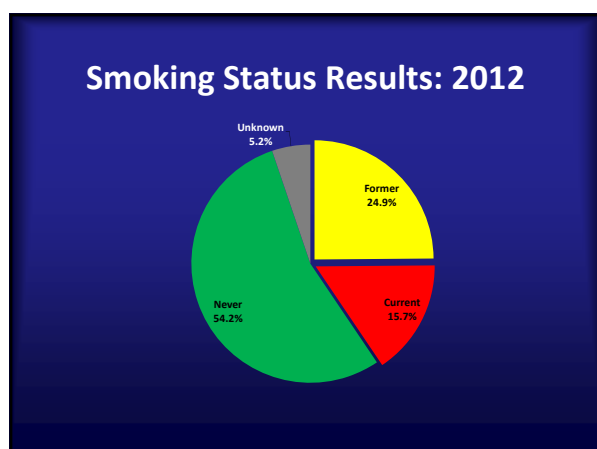
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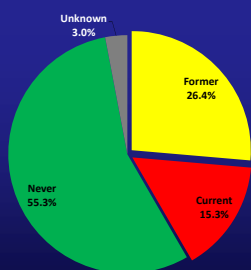
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### Smoking Status Results: 2013




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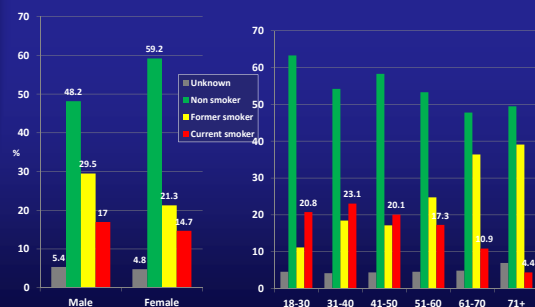
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### Smoking Status by Gender and Age




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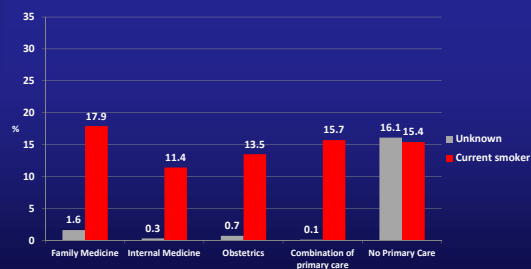
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### Smoking status by Appointment Type




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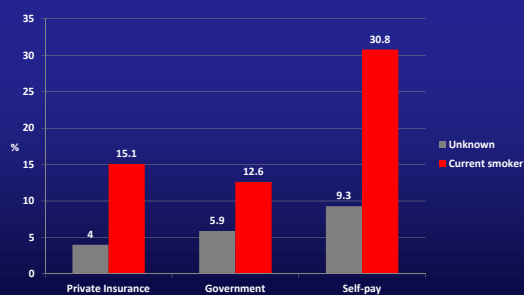
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### Smoking Status by Insurance Status




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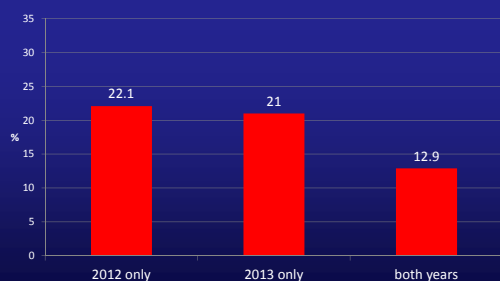
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### Smoking Status by clinic presentation




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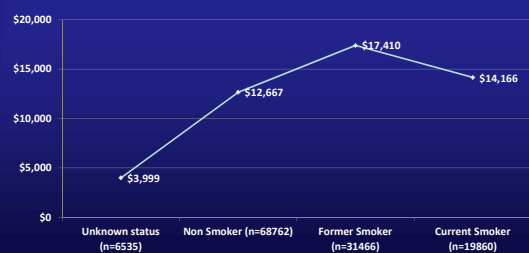
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### Smoking Status and Health Care Expenditures

Total charge adjusted by age, gender, payment method, department seen and BMI




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## Obesity Summary

- Varies by patient demographics
  - Age, gender, insurance status, type of appointment (provider)
- Varies by frequency of visit
  - Higher rate of obesity in those seen yearly
  - Managing conditions?
  - Worried well?
- Population change in weight from one year to next is stable
  - Change in weight favors the high risk

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## Tobacco Summary

- Varies by patient demographics
  - Age, gender, insurance status, type of appointment (provider)
- Varies by frequency of visit
  - Lower rate of tobacco use in those seen yearly
  - Tobacco users avoiding care

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## Does it matter?

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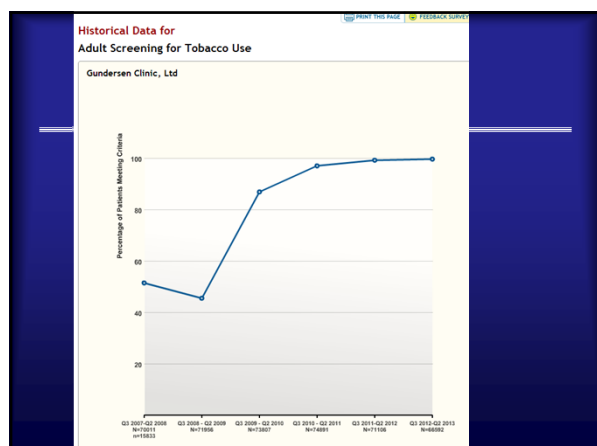
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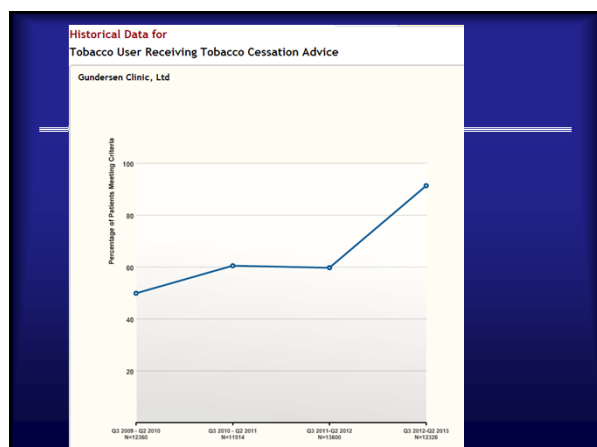
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## Smoking Cessation Rates

- 25,293 patients identified as a smoker at some time within 1/1/10-5/1/13 with at least one subsequent visit
- 4,026 of these patients were a "former smoker" at last appointment
- 15.9% Cessation Rate

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Thank You & Questions?



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