2015 CE Survey Microdata Users' Workshop

Sample Design and Weights

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Overview

- History and Concepts
- Sample Selection
  - Define PSUs
  - Stratify and select a Sample of PSUs
  - Stratify and Select a Sample of Households
  - The Future (2010 Census-based Sample Design)
- Weighting the households (CUs)

History of Sample Redesigns

- New sample of geographic areas and addresses selected every decade (2010)
  - 1980 Census-Based Sample Design (1986–1995)
  - 1990 Census-Based Sample Design (1995–2004)
  - **2000 Census-Based Sample Design (2005–present)**
  - 2010 Census-Based Sample Design (2015–2024?)

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Concepts

- Target Population=U.S. non-institutional civilian population
- Consumer Unit
  - person or a group of persons in a household related by blood, marriage, adoption, or other legal arrangements
    - OR are unrelated but pool their incomes to make joint expenditure decisions
    - Same as households approximately 98% of time

Concepts (cont.)

- Sampling Frame – List of Households from which we draw our sample
  - Unit Frame: Regular households (80%)
  - Area Frame: Rural households (10%)
  - Permit Frame: New construction (9%)
  - Group Quarters: (1%)
- Will Change to Census Bureau's Master Address File (MAF) in 2015 (2010 Census with updates twice per year by US Postal Service)

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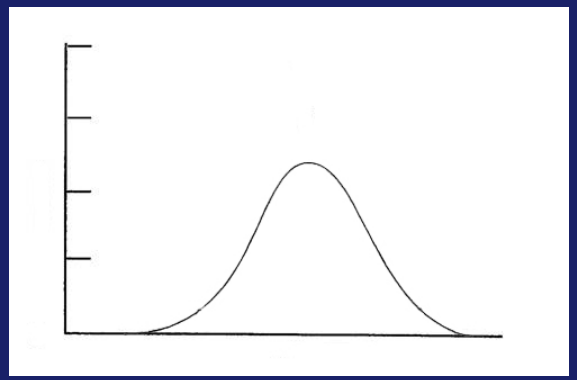
Sample Selection – Overview

- Geographic areas are randomly selected to represent the total U.S.
- Households are randomly selected to represent the geographic areas

Guiding principle:

"***Randomness ensures representativeness***."



Define PSU

- PSU: Primary Sampling Unit
  - Counties are geographically grouped together to become units for sample selection
- CBSA: Core Based Statistical Areas (~old MSA)
  - Counties are grouped together into geographic entities called core based statistical areas (CBSA's) by Office of Management and Budget
  - **Metropolitan** – one or more counties centered around urban area of > 50,000 people

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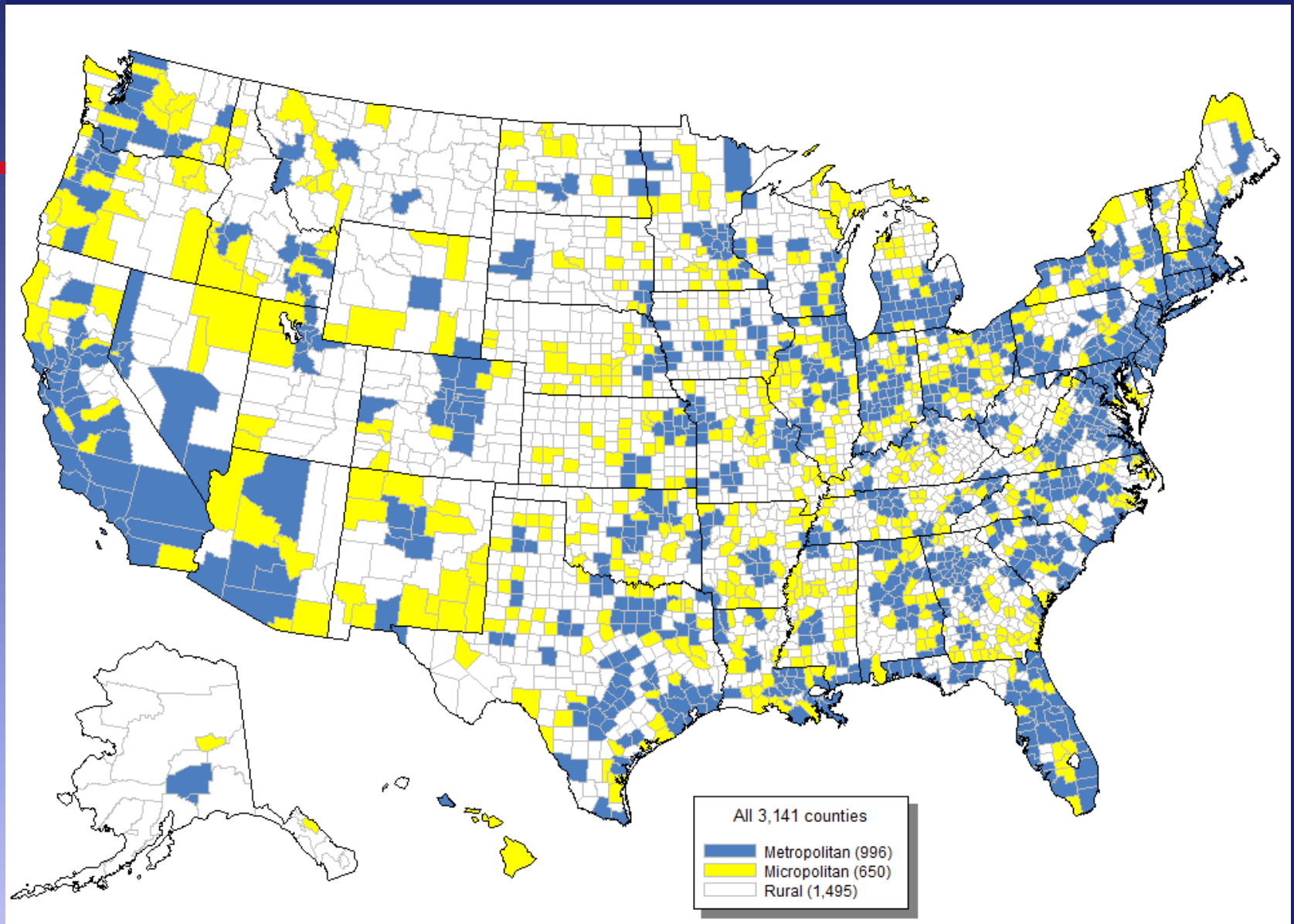
Define PSU (cont.)

- **Micropolitan** – one or more counties centered around urban area of 10,000 - 50,000 people

- Over 3,000 county and county equivalents in the U.S.
- Over 900 CBSAs defined by OMB


All 3,141 counties
Metropolitan (996)
Micropolitan (650)
Rural (1,495)

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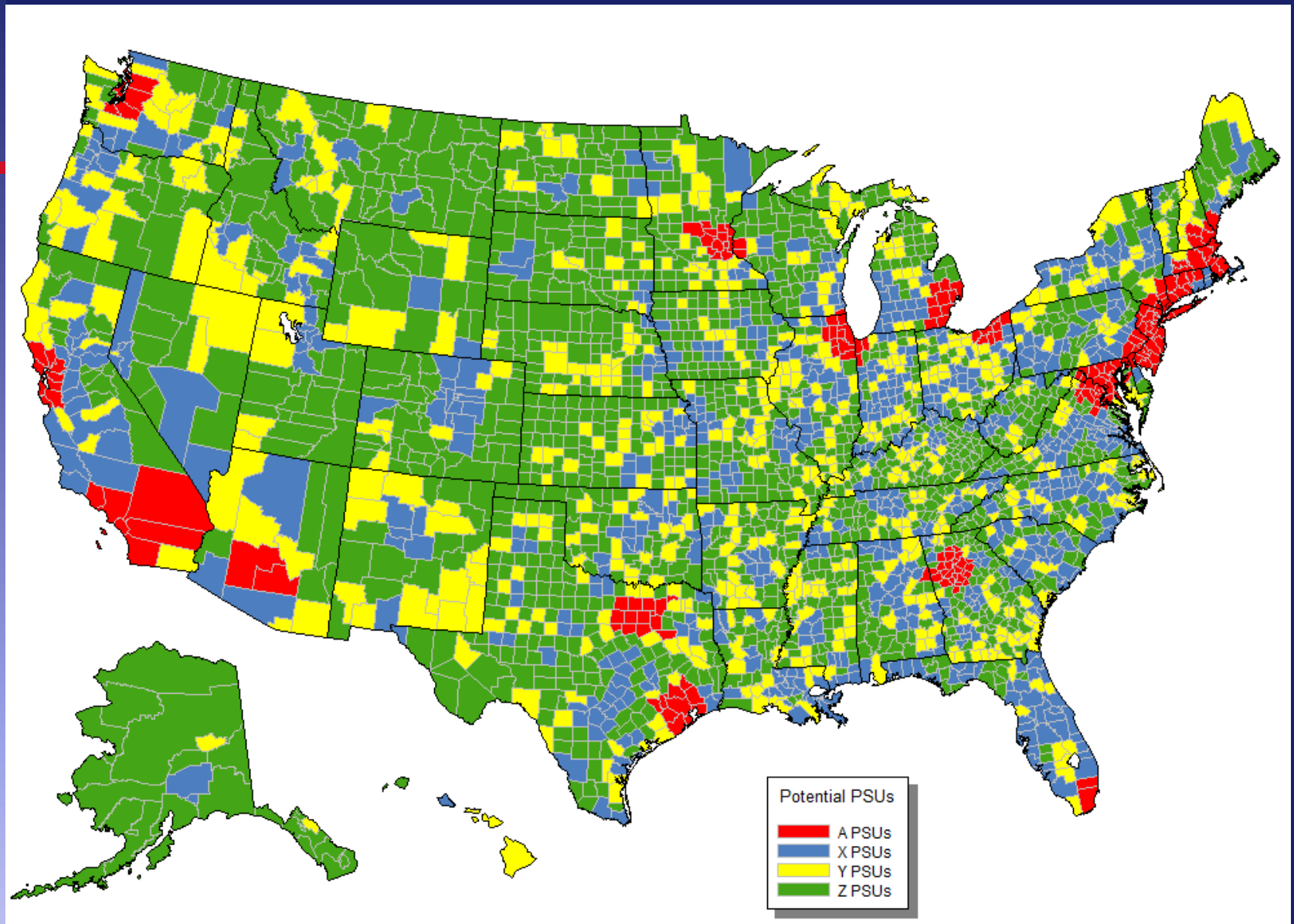

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Selection of PSUs

PSU size	SR/ NSR	CBSA/ Non-CBSA	Population Total	Examples
A	SR	Metropolitan (urban)	More Than 2,700,000	A103 Boston MA A210 Cleveland OH
X	NSR	Metropolitan (urban)	Less Than 2,700,000	X486 Denver CO X218 Cincinnati OH
Y	NSR	Micropolitan (urban)		Y104 Ithaca NY Y426 Newport OR
Z	NSR	Non CBSA (rural)		Z210 Holmes OH Z324 Montague TX

2000 Census-based Sample Selection
CPI – 75 PSUs; CE – 91 PSUs

PSU Size	Region				Total
	Northeast	Midwest	South	West	
A	5	4	6	6	21
X	4	10	16	8	38
Y	2	4	6	4	16
Z	2	4	6	4	16
Total	13	22	34	22	91

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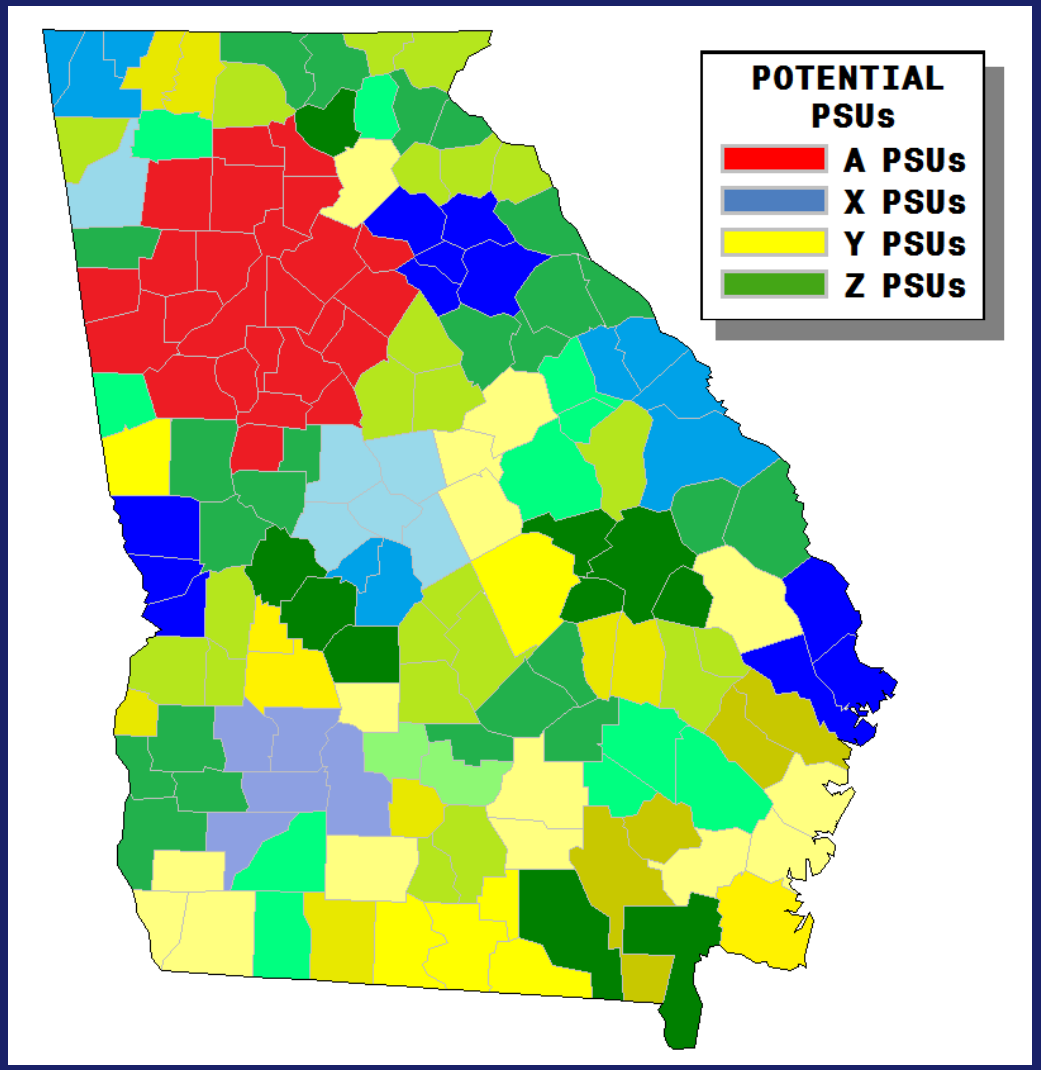
Georgia PSU Selection



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Metropolitan CBSAs in Georgia

CBSA	2000 Population	Probability of Selection
Augusta-Aiken, GA-SC	523,162	0.54746
Columbus, GA-AL	274,624	0.28738
Albany, GA	157,833	0.16516
Total	**955,619**	**1.00000**

CBSA	2000 Population	Probability of Selection
Savannah, GA	293,000	0.30906
Macon, GA	222,368	0.23456
Athens, GA	207,668	0.21905
Warner Robins, GA	134,433	0.14180
Rome, GA	90,565	0.09553
Total	**948,034**	**1.00000**

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Number of Households

- Allocate Target Sample to PSUs
  - Target size: ~7,000 interviewed households (**Based on Finite Budget)**
    - For Diary Survey per year
    - For Interview Survey per quarter
  - 6,600 to Households used jointly by CE and CPI (for CPI cost weight calculations)
    - 21 A-size PSUs
    - 54 X-size and Y-size PSUs
  - 400 to CE Households
    - 16 Z-Size PSUs

Number of Households (con't)

- **Target Sample Size**
  - 7,000 interviewed households per year (Diary)
  - 7,000 interviewed households per quarter (Interview, interviews 2-5 only)

- **Target Sample Yield**
  - 14,000 weekly diaries per year (=7,000×2)
  - 28,000 quarterly interviews per year (=7,000×4)

Number of Households (con't)

- **Local Target Sample Size**
  - Allocate 7,000 interviewed households to individual PSUs, proportional to each stratum's population
  - Minimizes CE's nationwide variance

Translate Addresses into Interviewed Households

- 80% “eligibility” rate: (most of the missing 20% are unoccupied)
- 75% response rate
- 60% “participation” rate (0.60 = 0.80×0.75)

Translate Interviewed Households into Addresses (con't)

PSU	Interviewed households	Addresses	%
A102 Philadelphia	169	322	52
A103 Boston	195	286	68
A109 New York City	220	420	52
A110 NY-Conn suburbs	212	335	63
A111 NJ suburbs	182	291	63
etc.	*etc.*	*etc.*	
Total	**7,000**	**11,750**	

Select a Random Sample of Households (Mechanics)

- Sort households from poor to rich based on information from Decennial Census and ACS:
  - Number of people in household
  - Tenure (owner, renter)
  - Market value of home (owners)
  - Monthly rent (renters)

Select a Random Sample of Households (Con't)

- Compute the sampling interval for each PSU
- Sampling interval = (# addresses in sampling frame) ÷ (# addresses in CE sample)
- Typical sampling intervals:
  - Every 1,000th address (X+Y, Z PSUs)
  - Every 5,000th address (A PSUs)

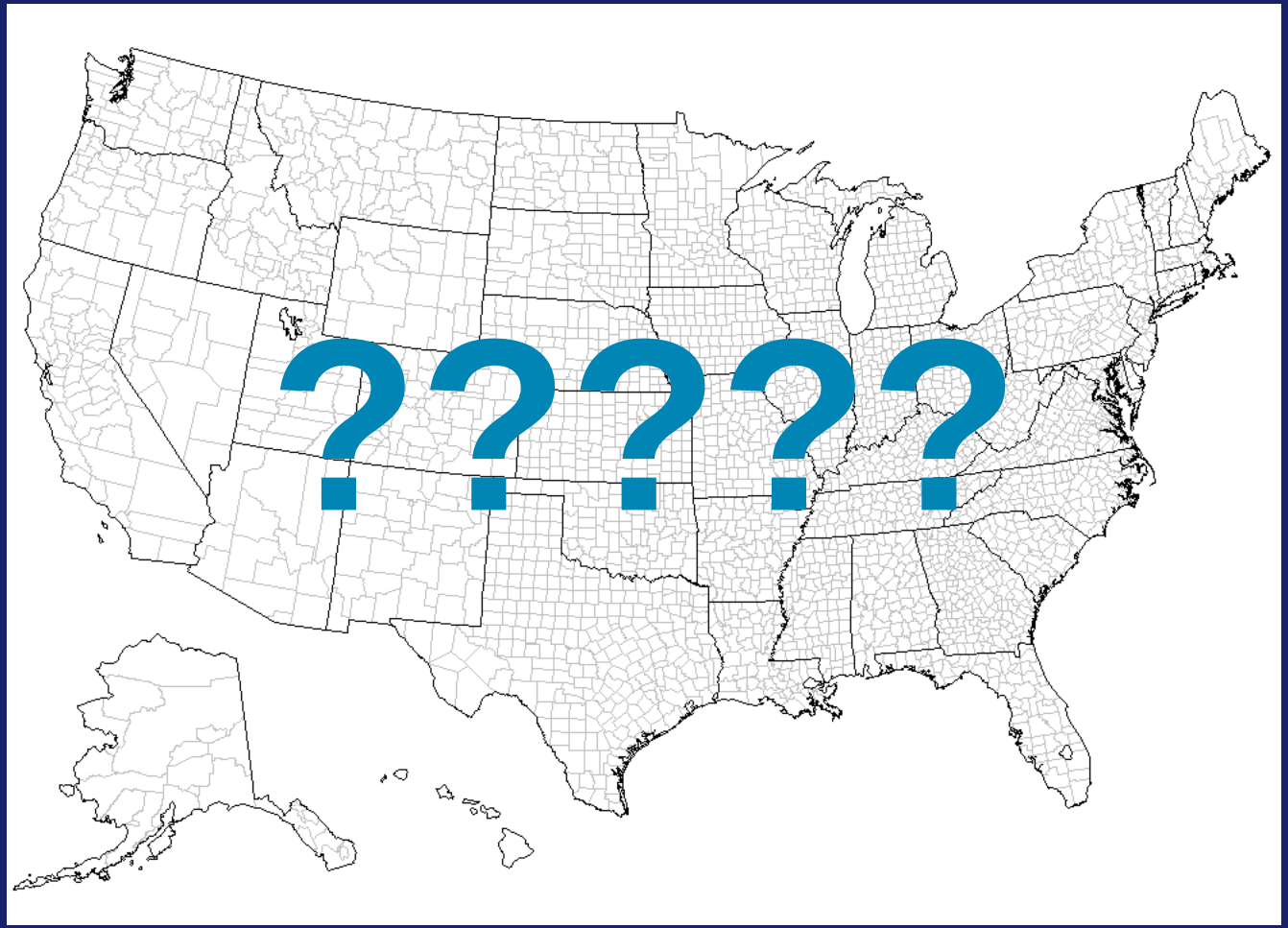
Select a Random Sample of Households (Cont.)

- -- D --- I --- D --- I --- D --- I --- D -- I -- -- D --- I --- D --- I --- *etc.*
- D=Diary, I=Interview
- Each “D” and “I” has enough sample to cover the next 10 years

The Future

- **New Sample Selection**
  - Based on 2010 Census
    - Updated Metropolitan/Micropolitan Statistical Area definitions from OMB
    - Updated populations used for selection probabilities
  - Currently Going Into Effect (2015)
  - No Currently Released Data

The Future



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Weighting Process

- Usable Interviews
  - Diary Survey
    - Good interviews
      - Diary complete enough to be counted
  - Interview Survey
    - Good interviews
      - Interviews 2 – 5
      - Completed enough to be counted

Weighting Process (Con't)

- Base Weight (~10,000)
  - 9,999 CUs + Self
- Weighting Control Factor (~1.00)
  - Apartment Building instead of a House
- Non-interview Adjustment Factor (~1.3)
  - Type A: Refusal to Participate
- Calibration Adjustment Factor (~1.15)
  - Adjusts sample estimate to CPS Totals

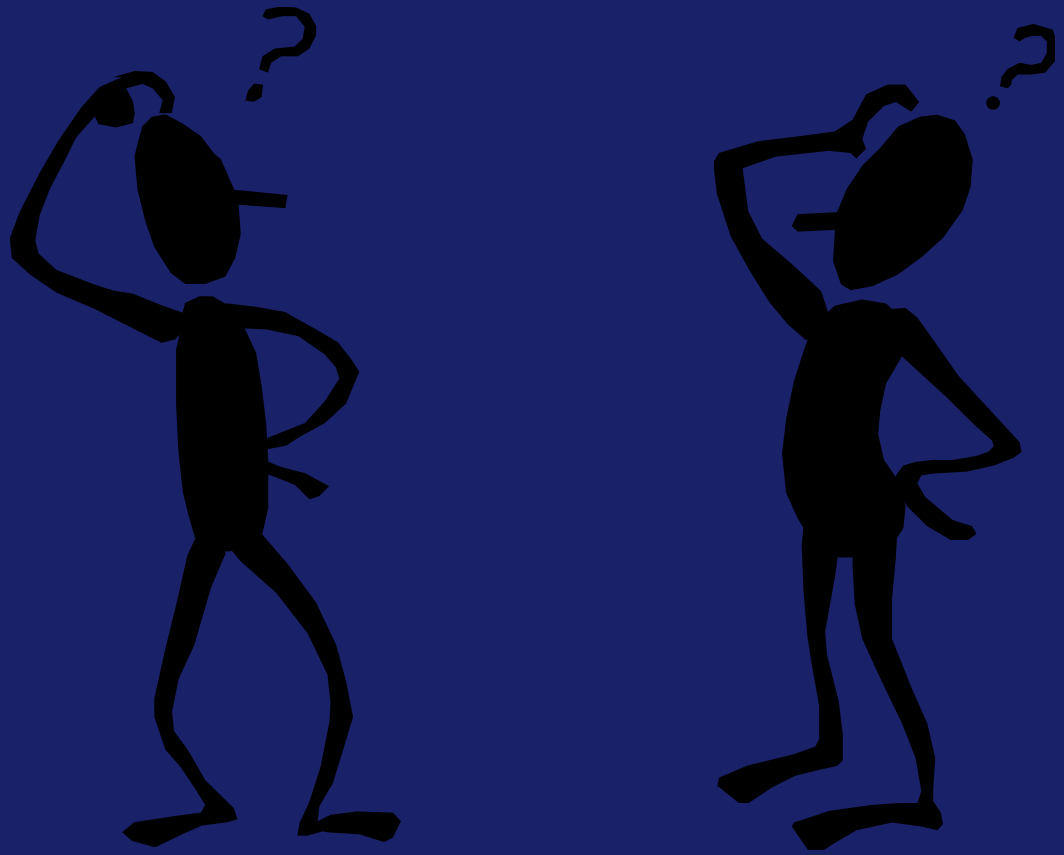
Weighting Process (Continued)

- Final Weight
  - Base Weight * Weighting Control Factor * Non-interview Adjustment Factor * Calibration Adjustment Factor
  - ~15,000 to 18,000

Conclusion

- Both Sample Design and Weighting Work Together to Produce:
  - Best Estimates of U.S. Expenditures
    - Subject to Allotted CE Budget

Any Questions?



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