

2010

Post Enumeration Estimates  
Using Census Coverage  
Measurement (CCM)

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# Overview

- Purpose of the 2010 survey-based Census Coverage Measurement (CCM) program
- Background on the 2010 CCM
- Net Error and Components of Census Coverage
- Current plans of estimation domains for 2010

# Introductory Note

Several ways to measure coverage of census

- Post-enumeration survey, CCM
- Demographic analysis

Demographic analysis discussed earlier

# Purpose of the 2010 CCM

- No intent to adjust the census counts
- Estimates of net coverage
- Estimates of components of census coverage
- Evaluate coverage of:  
    People in Housing Units and  
    Housing Units

# Sample Design of 2010 CCM

- Population (P) Sample: Independent sample of housing units in block clusters. Interview and matching results will identify people.
- Enumeration (E) Sample: Census enumerations in the same sample block clusters

# CCM Operations and Timing

Independent Listing: August – December, 2009

Person Interviewing: August – October 2010

Person Matching: October 2010 – April 2011

Final HU Matching: April 2011 - July 2011

# Estimation for 2010 CCM

- Document the CCM estimates and estimation domains by end of March 2010
- Dates of release are still under consideration
- Estimates from CCM survey will be out sometime in 2012

# Net Coverage of the 2010 Census

## *Net* coverage

- Estimate net undercount or overcount

## Dual System Estimation

- Method used in 1980, 1990 and 2000
- Use logistic regression modeling instead of post-stratification
- Correlation bias adjustment for 18+ males

# Dual System Estimation

P Sample

In

Out

E  
Sample

In

Out

$N_{11}$

$N_{12}$

$N_{1+}$

$N_{21}$

$N_{22}$

$N_{+1}$

$N$

# Components of Census Coverage

- New objective for 2010
- Provide more information than national-level estimates of erroneous enumerations and omissions in past

# Components of Census Coverage

People in Housing units	Housing Units
<ol style="list-style-type: none"><li>1. Correct Enumerations</li><li>2. Erroneous Enumerations</li><li>3. Census Imputations</li><li>4. Omissions</li></ol>	<ol style="list-style-type: none"><li>1. Correct Enumerations</li><li>2. Erroneous Enumerations</li><li>3. Omissions</li></ol>

# Difference between Net Error and Component

Different definitions of correct and erroneous than stringent rules of dual system estimation

- Cases not automatically erroneous if census record does not have name and 2 other characteristics
- Use a National-level criteria

Erroneous Enumerations for components

- Duplication
- Should not have been counted at all

# Components of Census Coverage: Estimation Approach for Census Components

## Estimates of Correct or Erroneous Enumerations

- Design-based estimates
- Two-stages of ratio adjustment to control variance

## Whole-Person Census Imputations

- Tally of imputations from Census files

# Components of Census Coverage: Omissions

Relationship between net error, omissions and erroneous enumerations

Net Error = Omissions – Erroneous Enumerations

Omissions = Net Error + Erroneous Enumerations

In addition, estimate person omissions by whether the housing unit was include in census or not

# Current Plans for Estimation Domains for 2010 CCM

Estimation domains have not been finalized so products shown here are current plans

Break into 3 Major Groupings:

- Demographic or HU Characteristic groups
- Geographic areas
- Census operation results

# Race and Hispanic Origin Estimates

Reporting results in Multiple Ways

Seven Race/Origin domains used in 2000 A.C.E.

Two of the domains: Non-Hispanic Black  
Non-Hispanic Asian

Also Doing:

- Race marked alone or in combination
- Hispanic Origin

# Examples of Estimation Domains for Demographic Groupings for People in Housing Units

Demographic Groupings	Net Error	Components of Census Coverage			
		Correct	Erroneous	Imputations	Omissions
Race and Hispanic Origin	Yes	Yes	Yes	Yes	Yes
Tenure	Yes	Yes	Yes	Yes	Yes
Age/Sex Groupings	Yes	Yes	Yes	Yes	Yes
Individual Years of Age	Yes	No	No	No	No

# Examples of Estimation Domains for Geographic Areas for People in Housing Units

Geographic Areas	Net Error	Components of Census Coverage			
		Correct	Erroneous	Imputations	Omissions
Type of Enumeration Areas	Yes	Yes	Yes	Yes	Yes
Bilingual Mailing Blocks	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes
Each State	Yes	No	No	No	No
Substate Estimates (county, places)	Under Review	No	No	No	No

# Substate Estimates of Net Error

Produce substate estimates if:

- meet a to-be-determined statistical criteria
- Sampling Error
- Nonsampling Error

# Examples of Estimation Domains for Census Operations for People in Housing Units

Census Operation/Results	Net Error	Components of Census Coverage			
		Correct	Erroneous	Imputations	Omissions
Mail Return	No	Yes	Yes	Yes	No
NRFU enumeration	No	Yes	Yes	Yes	No
Operation Check-in Date Groupings	No	Yes	Yes	Yes	No
Coverage Followup	No	Yes	Yes	Yes	No

## Additional Table for People in Housing Units

What about those people who should have been enumerated somewhere else?

A table to show people who should be enumerated outside our block cluster search area.

- Same county
- Different county in the same state
- Different state

## Examples of Estimation Domains for HU Characteristics for Housing Units

Demographic Groupings	Net Error	Components of Census Coverage		
		Correct	Erroneous	Omissions
Occupancy Status	Yes	Yes	Yes	Yes
Tenure of Occupied Units	Yes	Yes	Yes	Yes
Type of Structure (Single, Multi-units)	Yes	Yes	Yes	Yes

# Examples of Estimation Domains for Geographic Areas for Housing Units

Geographic Areas	Net Error	Components of Census Coverage		
		Correct	Erroneous	Omissions
Type of Enumeration Areas	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Each State	Yes	No	No	No
Substate Estimates (county, place)	Under Review <sup>1</sup>	No	No	No

<sup>1</sup>Similar criteria mentioned for people will apply to housing units as well

# Examples of Estimation Domains for Census Operations for Housing Units

Census Operation/Results	Net Error	Components of Census Coverage		
		Correct	Erroneous	Omissions
Address Canvassing	No	Yes	Yes	No
LUCA	No	Yes	Yes	No
Field Verification	No	Yes	Yes	No

## Additional Table for Housing Units

What housing units were geocoded incorrectly?

A table to show housing unit geocoding results in relation to block cluster search area

- Geocoded to block cluster
- Geocoded to one ring of surrounding blocks
- Geocoded outside block cluster search area

# Review to Reduce Nonsampling Error in the CCM

- Part of Decennial review being conducted by Director Groves
- In process of identifying areas in the CCM where efforts can be made to reduce nonsampling error
- Reducing the CCM sample size is being considered.

# Thank you.

Thanks to Pat Cantwell and others who  
contributed toward this presentation.

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# DSE estimators

March 2001 A.C.E. Estimates

$$\hat{N} = \sum_h (C_h - H_h) (\hat{p}_{\text{corr enum}, h}) \left( \frac{1}{\hat{p}_{\text{match}, h}} \right)$$

2010 CCM

$$\hat{N} = \sum_{i \in C} (\hat{p}_{\text{dd}, i}) (\hat{p}_{\text{corr enum}, i}) \left( \frac{1}{\hat{p}_{\text{match}, i}} \right) CB_i$$