Incidence and Cumulative Incidence of Incarceration in the United States

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ICRN/NCRP Data Providers Meeting
Aurora, CO April, 2017
Acknowledgment

This work was supported by Grant No. 2015-R2-CX-K135 awarded by the Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice to Abt Associates. Points of view in this presentation are those of the presenters and do not represent the official position of the U.S. Department of Justice.
Question Posed and Answered during this Presentation

- What proportion of people living in the United States will experience a term of prison in their lifetime?
- Terminology:
  - Lifetime likelihood of imprisonment
  - Incidence and cumulative incidence of incarceration
BJS Survey vs NCRP Estimates

BJS Survey Approach
- Bonczar (2003) estimates that 6.6% of people born in 2001 will go to State or Federal prisons during their lifetime
- Based on Birth Cohorts

BJS NCRP Approach
- Rhodes et al. (2017) estimate that 7% of the 1982-1987 age cohorts will serve some prison time over their lifetime.
- Based on Age Cohorts
Overview

- Contrast the survey-based approach to a new NCRP-based method noting different assumptions required for each method.

- Although the survey approach makes estimates based on a 2001 birth cohort, this requires strong steady state assumptions which we will demonstrate are not supported by the NCRP estimates.

- We argue that the NCRP based approach provides more realistic current estimates and is much less costly to produce.

- The remainder of this presentation provides background, methodology, and refinements to the lifetime incarceration estimates.
Definitions and Background
Prevalence of Imprisonment

- Most prior estimates of incarceration are based on prevalence calculations over time.
- Prevalence is a relatively easy measure to calculate:
  - The number of people incarcerated at a point in time (numerator) divided by the number of people at risk to be incarcerated (denominator).
  - Prevalence can be expressed many ways such as a rate, proportion, or percentage.
- Example: Mass incarceration has been characterized as the growth in the prevalence of people incarcerated from 1925 to the present.
Prevalence of Incarceration: Rate per 100,000 (NAS, 2014)

Figure 2-1: National Research Council. (2014). The Growth of Incarceration in the United States: Exploring Causes and Consequences Travis, Western, and Redburn (Eds.)
Alternative Measures: Incidence and Cumulative Incidence of Imprisonment

- **Incidence**: the rate of first time admissions to prison (numerator) for members of an age cohort (denominator)
  - For example, 2 percent of the 1975 age cohort entered prison for the first time at age 18

- **Cumulative Incidence**: sum over time of the first time admissions to prison of an age cohort
  - For example, 6 percent of the 1975 age cohort entered prison at least once by age 30

- These measures are cohort-specific and are more difficult to estimate
Age and Birth Cohorts

- NCRP-based estimates use age cohorts *not* birth cohorts
- Birth cohorts only involve people born in the United States –
  - For example everyone born in Texas in 1982
- Age cohorts also include migration in and emigration out the United States as well as migration across state lines
  - Everyone born in 1982 who were residents in Texas
Subcategories of Incidence and Cumulative Incidence

- As with prevalence, we can stratify incidence and cumulative incidence by evaluating differences in race, sex, and other important socio-economic categories.

- Incidence and cumulative incidence allows us to address different questions:
  - What is the distribution of age of first incarceration for an age cohort?
  - Does this distribution change across different age cohorts?
Survey-based Method to Estimate Incidence and Cumulative Incidence
Survey-Based Prior Research on Prison Admissions


- Bonzcar (2003) reports on the method for cumulative incidence for birth cohorts – These were the survey estimates at the beginning of this presentation
Survey-Based Methodology

  - Birth date -- to place a person in a birth cohort
  - US born -- to eliminate non-citizens
  - First admission to prison within the prior 12 months -- to establish incidence

- Survey weights can be used to make population incidence and cumulative incidence estimates
Survey-Based Methodology

- Anyone who was admitted and released in the year prior to the survey administration would not be counted
- The missing first time admissions are derived using NCRP data identifying new court commitments in NCRP – in some states it is difficult to disentangle revocation returns from new court commitments
- The survey method requires strong steady state assumptions going backward and forward in time, as well as periods between surveys
NCRP-based Method to Estimate Incidence and Cumulative Incidence
NCRP-Based Methodology

- To provide intuition, we start with a single age cohort born in 1982 and living in Georgia –
  - Members of this age cohort turn 18 in 2000
- We use the Georgia prison term file from 2000 to 2015 – this is the observation window in which we have the most confidence for most states
- By using the 1982 age cohort, we can calculate without imputation the number of adults incarcerated for the first time during our 2000 to 2015 observation window –
  - Count the number of this age cohort who enter prison for the first time at age 18, 19 … 33
- What does this look like in a spreadsheet?
## Table of First Admissions to Prison for the 1982 Age Cohorts from 2000-2015

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Age Cohorts 1983 to 1987

- Now tabulate subsequent age cohorts through 1987
- Use the 1983 age cohort to count the number of first prison admissions 18, 19 … 32
- Use the 1984 to count the number of first prison admissions 18, 19 … 31
- What does this look like in a spreadsheet?
Table of Prison First Admissions for Age Cohorts 1982-1987 from 2000-2015

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NCRP-Based Method – Older Cohorts

- Consider the 1981 age cohort whose members turn 18 in 1999, a year before the 2000 to 2015 observation window.

- For the majority of states, we have no data on first admissions occurring prior to 1981.

- This problem is magnified as we consider earlier age cohorts – the farther back in time, the fewer the number of states that have usable data.

- For that reason we do not make incidence and cumulative incidence estimates for age cohorts earlier than 1982.
Forecasting Incidence Beyond the Observation Window – NCRP-based Imputations

- How do we forecast incidence beyond the 2000 to 2015 observation window – we cannot observe people who first enter prison in 2016, 2017 ….

- As an example, consider the 1982 age cohort

- How do we impute the number of first admissions in 2016 when those offenders will be 34 years old?

- Solution: Assume the proportion of first admissions for 2016 is the same as the proportion of admissions for 34 year old's born in 1981
1981 Age Cohort First Admissions at Age 34 Used as an Imputation for 1982 First Admissions at Age 34

Notice that we cannot observe age 18 admissions for the 1981 cohort so we must adopt a rule to indicate whether people admitted in 2015 for the 1981 age cohort are first time admissions – details in the paper
NCRP-Based Method

- Now extend this logic into future admissions
- Use age cohorts prior to 1982 as imputations for first admissions beyond the 2000-2015 observation window
Forward Imputation for First Admissions - 1982 Birth Cohort

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NCRP-Based Method

- See the paper for other details about accommodations and adjustments we have to make such as:
  - The changing nature of age cohorts over time
  - Definitions regarding the self identification of race
  - The difference between first admission to a jail or prison when states have different sentencing thresholds for entering one versus the other
  - What we do about Federal prisoners
Graphic Results for Georgia and All of the States Combined
Incidence and Cumulative Incidence in Georgia Up to Age 34

1982 cohort

1982-1987 cohorts

1982 cohort

1982-1987 cohorts
Incidence and Cumulative Incidence Georgia – Estimation Beyond Age 34 Using “Synthetic Cohorts”

1982-based synthetic cohort

1982-1987 synthetic cohorts

1982-based synthetic cohort

1982 through 1987-based
Incidence and Cumulative Incidence for All States Using a Synthetic Cohort

1982-based synthetic cohort

1982-1987 synthetic cohorts

1982-based synthetic cohort

1982 through 1987-based
Racial and Gender Differences

- White Males: 4 of 100 will be incarcerated by age 32
- Black Males: 20 of 100 will be incarcerated by age 32
- All Women: 1 in 100 will be incarcerated by age 32
Older cohorts always have higher cumulative incidence (as of age 28) than do all younger cohorts. The probability that this pattern would emerge by chance is 1/720.
Concluding Remarks

- The survey and NCRP-based methods are complementary and give similar results for more recent cohorts.
- Both methods have limitations explained in the paper.
- Every year the NCRP observation window expands and some states backfill missing years – over time this will enhance the estimates of incidence and cumulative incidence.
- The NCRP estimates can be updated every year at no additional cost expanding the crucial observation window, while the Survey of Prison Inmates occurs periodically.
Concluding Remarks

- Both approaches require steady state assumptions, however:
  - The NCRP approach only requires steady state assumption beyond the observation window and includes the peak years of incarceration
  - The survey method requires steady state assumptions prior to the first, after the last, and in between the administrations