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Author(s):	Kelly Walsh, Jeanette Hussemann, Abigail Flynn, Jennifer Yahner, Laura Golian
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Summary Technical Report Authors:

Kelly Walsh, Jeanette Hussemann,

Abigail Flynn, Jennifer Yahner, Laura Golian

Inquiries should be directed to:

KWalsh@urban.org

202-261-5434

Kelly Walsh c/o Urban Institute 2100 M St. NW

Washington, DC 20037

Abstract

This study extends research on wrongful convictions in the U.S. and the factors associated with justice system errors that lead to the incarceration of innocent people. Among cases where physical evidence produced a DNA profile of known origin, 12.6 percent of the cases had DNA evidence that would support a claim of wrongful conviction. Extrapolating to all cases in our dataset, we estimate a slightly smaller rate of 11.6 percent. This result was based on forensic, case processing, and disposition data collected on murder and sexual assault convictions in the 1970s and 1980s across 56 circuit courts in the state of Virginia. To address limitations in the amount and type of information provided in forensic files that were reviewed in the Urban Institute's prior examination of these data, the current research includes data collected through a review of all publicly available documents on court processes and dispositions across the 714 convictions, which we use to reassess prior estimates of wrongful conviction.

Introduction

Over the past two decades, more than 300 people in the U.S. have been exonerated of crimes that occurred in the pre-DNA era (Innocence Project, 2016). As a result, researchers and practitioners have become increasingly interested in identifying the factors and processes that lead to the incarceration of innocent people. To date, this research body has offered a limited understanding of factors associated with justice system errors, and widely divergent views on the prevalence of wrongful convictions.

This research builds upon the 2012 Urban Institute report, "Post-Conviction DNA Testing and Wrongful Conviction," (hereafter called "Part I") which presented an estimated rate of wrongful conviction based on post-conviction DNA testing of over 700 felony convictions in the state of Virginia between 1973 and 1987 (Roman et al. 2012). These 2012 findings relied primarily on original forensic testing documents (e.g. evidence submission forms, serology reports) and post-conviction DNA testing reports to identify convictions that were strengthened or weakened by new DNA evidence. These documents contained data on victim and suspect demographics, case progression dates, original forensic collection and testing, and post-conviction DNA testing. However, these data were inconsistently available for all cases, and the documents did not include more detailed information on the criminal justice processes that led to the conviction (e.g., legal representation, case disposition, motions to appeal).

In order to address this gap and supplement the 2012 findings, Urban was awarded funds in 2013 to visit Virginia circuit courts and review case processing records for these felony convictions. The additional data collected as part of the current study (Part II) provide a new foundation by which to reclassify case outcomes and calculate an estimated rate of wrongful conviction for similar convictions in Virginia during the 1970s and 1980s. In an effort to examine the external validity of this estimate, we additionally analyzed 1985 felony conviction data from 43 states to determine whether Virginia conviction rates were similar to other states during the time period in which this post-conviction DNA testing occurred.

This report summarizes the methods and findings for estimating the prevalence of wrongful convictions. Additional findings on the correlates of wrongful conviction will be presented in future peer reviewed publications.

Key Terms

Throughout this technical summary, we rely on the following terms to discuss the outcomes of DNA testing and the impact of that testing on the strength of the original conviction, as reported in Part I:

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- Determinate (Outcomes 2, 3, and 4): Allows a conclusion to be drawn as to whether the person convicted was a possible source of the DNA developed from the original evidence.

- Indeterminate (Outcome 1): No new DNA evidence was developed in the case or no conclusion can be drawn about the source of DNA.

- Inculpatory (Outcome 2): Describes DNA evidence that adds strength to the assertion that the person convicted committed a criminal act.

- Exculpatory but insufficient for exoneration (Outcome 3): The DNA evidence that excludes the person convicted as the source of the DNA, but which does not support a claim of wrongful conviction due to the context of the case and old evidence (i.e., its probative value).

- Exculpatory and supportive of exoneration (Outcome 4): The DNA testing excludes the person convicted as the source of DNA developed from old evidence. Given the context of that old evidence in the case, this result would support a claim of wrongful conviction, though it may not be sufficient to prove wrongful conviction.

Prior Research

The design and findings of studies of wrongful convictions vary widely. Prior research has relied on data collected through self-reporting by convicted individuals (Poveda 2001) and interviews with criminal justice professionals (Ramsey and Frank, 2007; Zalman et al. 2008) across diverse populations and types of convictions. Estimates of the prevalence of wrongful conviction range from as low as 0.027 percent (cited in Justice Scalia's concurrence in *Kansas v. Marsh*) to as high as 37.7 percent (Poveda, 2001), though the most widely accepted estimates range between 1 and 5 percent (Gross, Hu, Kennedy, and O'Brien 2014; Gross 2008; Radin 1964; Gould and Leo 2010; Ramsey and Frank 2007; Zalman 2012). However, most of these studies contain sample bias they are unable to correct for, which may affect the validity of these estimates (e.g., bias due to the convictions examined, type of data collected, or how a potential wrongful conviction is determined). For example most studies are not able to account for the process by which DNA testing of evidence occurs or for variation among forensic practitioners.

Notably, the results presented in Urban's 2012 study (Part I) come from the first effort to apply post-conviction DNA testing to a large set of convictions, regardless of any existing claims or evidence of wrongful conviction. The Part I retrospective study focused exclusively on 715 murder and/or sexual assault convictions disposed in Virginia between 1973 and 1987, for which

biological evidence from the original case was found. While almost all forensic evidence had been destroyed in accordance with commonwealth policy at the time, one forensic serologist, Mary Jane Burton, and the individuals whom she trained, physically attached biological evidence (including swabs and cuttings) to hard copy laboratory files. Because this evidence was not stored with other case evidence (e.g. weapons or knives), these potential sources of DNA were not destroyed and have since aided exoneration cases in Virginia. Importantly, because DNA evidence and testing was assigned at random to the serologists (as reported in Part I), these 715 cases provide a nearly unbiased sample of convictions from the time.

Urban's Part I data collection and reporting relied on a review of information included in DNA files provided by the Virginia Department of Forensic Science (DFS), including basic case attributes, original forensic testing, post-conviction DNA testing, and some case outcomes. After data were collected for each of the 715 convictions, the research team determined through consensus whether the evidence was inculpatory of the convicted suspect's guilt, or either supportive of or insufficient to support exoneration. Depending on the determination, all convictions were coded as indeterminate (Outcome 1), inculpatory (Outcome 2), exculpatory but insufficient for exoneration (Outcome 3), or exculpatory and supportive of exoneration (Outcome 4).

The Part I study reported that either 5% or 8% of convictions in homicide and/or sexual assault cases were wrongful. These findings were important for their rigorous method of producing an estimate of the prevalence of wrongful conviction from a relatively unbiased sample. However, the Part I conclusions were based almost exclusively on information in the DFS files, which did not necessarily provide all the relevant case file information needed to make an accurate determination regarding the original conviction.

Rationale for Research

This Part II study represents an effort to overcome the limitations of Urban's Part I study by reviewing all publicly available files from over 50 Virginia Circuit Courts to collect case processing and disposition data for each conviction included in Part I. Key research questions for this project include:

1. What is the prevalence of the four conviction-level outcomes identified in the first study (i.e., the DNA evidence was: inculpatory, exculpatory but insufficient for exoneration, exculpatory and supportive of exoneration, or indeterminate)?
2. What case, victim, and convicted person attributes are correlated with these outcomes?
3. How do the Virginia conviction rates compare to other states?
4. What is the utility of post-conviction DNA testing as a tool to detect wrongful convictions?

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This technical summary focuses specific attention to the methods and results relevant to research questions 1 and 3.[1]

Methods

Data Collection

This research relies on two data sources: primary data collection of information in original case files across 56 courthouses, and a review of existing data available from the *Bureau of Justice Statistics Census of State Felony Courts, 1985*.

Courthouse Data. Conviction-level data was sought from 56 circuit courthouses in Virginia. Courthouses were included in this study if they housed at least one file from the Part I data set that had an exculpatory outcome (Outcome 3 or 4). If so, all cases were requested for review, regardless of outcome. Most case files were coded at the courthouse. In total, the research team visited 31 courthouses in person; 18 courthouses agreed to photocopy and mail existing files; and 7 courthouses confirmed that the files no longer existed in either on- or off-site storage locations.

Urban's data collection instrument included 67 variables which covered information on the person convicted, the offense, and court processing and disposition. The instrument was developed based on case file information observed at three courthouses (Arlington, Alexandria, and Fairfax), and was then piloted at two courthouses across multiple coders prior to full implementation to ensure that the instrument was inclusive and reliable. Because court identifiers were not included in the Part I data set, convictions were matched using the convicted person's name, victim name, and the date and type of offense. Primary sources of data available in the courthouse files included sentencing and presentence reports, trial transcripts, witness summons, correspondence between involved parties, and other documents.

Trial and hearing transcripts, when available, were a rich source of information. The testimony provided information about the circumstances of the crime or potential mitigating factors. This sometimes included if the victim and defendant knew each other, information on prior convictions, the presence of an alibi, sentencing decisions, and the number of witnesses that testified for each side. Each one of these elements were captured in project variables.

Case file storage policies, and therefore data availability and completeness, varied across the 56 courthouses included in this study. Data availability ranged from absence of a case file to full cases that included multiple forms and documents. Detailed hard-copy case files were available for 432 convictions while partial files (e.g. sentencing reports only) existed for 131 convictions.

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[1] Questions 2 and 4 will be addressed in future articles submitted for peer reviewed publication.

For 81 convictions in our data set there was no file available.[2] In total, we collected data on 47 convictions with exculpatory evidence (i.e. Outcomes 3 or 4) and 517 convictions with either inculpatory or indeterminate evidence (i.e. Outcomes 1 and 2).

Based on a review of the VA post-conviction DNA testing effort history, the research team decided to include five observations in the dataset that were not included in Part 1: exonerations resulting from post-conviction DNA testing of similar Mary Jane Burton files that did not have DFS files available for review during Part 1. These were exoneration cases that preceded, and inspired, the broader VA effort to test all cases with remaining evidence. According to the conviction offense and conviction year we determined that these five cases would have been eligible for our study if they had not already been tested prior to this research effort. These five observations were all classified as Outcome 4 (having exculpatory evidence supportive of exoneration). There is no indications that other cases, which did not result in exoneration, were tested and should have been included in our data set. The research team conducted internet searches on these 5 additional convictions to fill in coding variables.

Bureau of Justice Statistics Census of State Felony Courts, 1985. Bureau of Justice Statistics data was acquired to test the generalizability of the findings of this study. If, for example, it turns out that Virginia courts were much more or less successful than other states in securing felony convictions, then the results would have limited external validity. To assess generalizability, we use data from 1985, which is in but near of the end of the time period covered in our research. The BJS data report the number of cases filed, convicted, and dismissed across jurisdictions in the 50 states.

Data Analysis

Courthouse Data and Case Reclassification. To assess the impact of the additional data collected, we reviewed all Outcome 3 and Outcome 4 cases, as coded in Part I, to determine if they should be reclassified to a new outcome category. This type of reclassification would have a direct effect on the estimated rate of wrongful conviction. In total, we reviewed 46 exculpatory case files, including 15 Outcome 3 cases and 31 Outcome 4 cases.[3] Information reviewed to

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[2] This total does not include 15 convictions that were originally selected to be part of the sample. The research team decided to exclude 11 convictions since they were indeterminate and were located at courthouses that were not included in courthouse data collection. Six additional convictions were excluded from both courthouse data collection and the final dataset. One of these convictions was found to be a duplicate of another case. Another five were found to not have resulted in a conviction—the defendant was found not guilty of the charges or the charges were dismissed. Finally, five additional observations were added to the dataset to ensure inclusion of exonerations that were a part of the set of convictions this study focuses on but did not have an available DFS file in Part 1. As such, the N for this study (714) is different than the previous study (715).

[3] We were unable to gain access to case files for three Outcome 3 and seven Outcome 4 convictions. Convictions without new information coded during this phase of coding did not have their Outcome classification reviewed or revised. We also did not review the five new observations added to the dataset, since each of those cases resulted in exoneration.

determine if the case should be reclassified included the offense location, victim/suspect relationship, and presence or absence of confessions and alibis. A group of five researchers on the project team reviewed each conviction independently and then reached consensus on whether to keep or revise the Part I outcome classification (e.g., shift from exculpatory and supportive of exoneration to exculpatory and insufficient for exoneration) for each conviction. Outcomes were reclassified if courthouse coding provided new information that created a probable explanation for the absence of the convicted person's DNA and/or the presence of another individual's DNA other than an actual wrongful conviction.

Following the reclassification process, the research team calculated a new estimated rate of wrongful conviction. Building off a conclusion reached in the Part I study, the research team focused only on convictions that had a sexual assault component because very few homicide-only convictions yielded determinate post-conviction DNA outcomes (n=20). Of the 430 cases involving a sexual assault component, 231 yielded determinate post-conviction DNA outcomes. The estimated rate of wrongful conviction in this sample was arrived at by dividing the number of Outcome 4 convictions among these cases by the total number of convictions with a determinate outcome and sexual assault component.

This observed rate was then statistically adjusted through inverse probability weighting (IPW) to correct for differences between determinate and indeterminate cases with a sexual assault component based on the age of the case (cases less than 40 years old were more likely to yield determinate DNA evidence than those 40 years and older) and on the nature of the conviction offense (cases involving a rape or sexual assault conviction were more likely to yield determinate DNA evidence than those for which murder was the most serious conviction). IPW methods provide an approach to correcting for non-representation by weighting sample members with determinate DNA outcomes to have the same distribution of the two key covariates as the full population of cases. (Hirano, Imbens, and Ridder 2003; Wooldridge 2002).

<u>Bureau of Justice Statistics Census of State Felony Courts, 1985</u> We use data from the 1985 Bureau of Justice Statistics Census of State Felony Courts to test the generalizability of the estimated rate of wrongful conviction. This dataset reports the number of felony cases filed in 1985 in jurisdictions across 50 states, and measures the proportion of cases that result in various dispositions, including convictions. While this dataset is useful as a tool to examine variation in the proportion of felony cases filed across states, several limitations to the dataset affect our ability to rigorously analyze the external validity of our Part II findings. First, there is variation across states by the unit in which the number of cases filed and disposed are reported. Jurisdictions in 69 percent of states, including Virginia, rely on a defendant-based unit of count. In these jurisdictions, cases are reported by defendant, such that a defendant with three charges is counted as one case. Jurisdictions in twenty-one percent of states rely on a charged-based unit of count, such that a defendant with three charges would be counted as three cases. The remaining jurisdictions rely on an indictment-based unit of count, in which a defendant with three charges is counted as one case, but so too are two defendants involved in the same case. The second limitation to this data set is the occurrence of missing data. In particular, Virginia did not report the number of cases disposed by trial, guilty plea, or acquittal. Finally, this dataset does not differentiate between types of crime, which limits our ability to focus specifically on the filing and disposing of murder and/or sexual assault cases.

Given the limitations to the Bureau of Justice Statistics data, our analysis and results focus broadly on felony cases. To ensure that the unit of count is consistent across data points, we focus only on the jurisdictions across 43 states that rely on a defendant-based unit of count.[4] Finally, because we are not able to analyze whether a case is disposed through conviction due to missing data, we focus on the representativeness of the number of cases filed and the difference between number of cases dismissed.

Results

Case Reclassification

To reassess the estimated rate of wrongful conviction reported in Part I, the research team examined the courthouse data collected in this study to determine if the new information influenced whether the DNA evidence supported exoneration in cases with exculpatory DNA evidence. During the reclassification process, 14 convictions that were classified as Outcome 4 during Part I were reclassified to Outcome 3. No Outcome 3 cases were reclassified as Outcome 4.

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[4] States excluded from analysis include Arkansas, Connecticut, Georgia, New Hampshire, North Carolina, Utah, Vermont, and the District of Columbia.

Table 1 shows the breakdown of Outcome 3 and Outcome 4 convictions from Part I and Part II, and the breakdown of Outcome 3 and Outcome 4 convictions amongst the subset used to calculate the rate of wrongful conviction. None of the new information obtained from the courthouse files affected the number of convictions classified as indeterminate or inculpatory—new data collected did not (and could not) change the number of convictions where the DNA evidence strengthened the conviction (Inculpatory/Outcome 2) or change the fact that new DNA testing did not produce a useful profile (Indeterminate/Outcome 1). To better understand this reclassification, Box 1 gives two examples. In the first, a conviction was reclassified when the additional context weakened the probative value of the DNA evidence. In the second, the additional context did not weaken the probative value of the DNA and did not support changing the original classification from Part I.

The reclassification process was limited to only the Outcome 4 and Outcome 3 convictions in which we were able to collect new information, and as a result some of the convictions that remained classified as Outcome 4 following Part II did not have additional information from courthouse coding that further confirmed their Part I classification. Of the 31 convictions, 11 convictions had new information that informed our choice to preserve the originally coded Outcome. Meanwhile, eight convictions had information coded at courthouses, but not for any variable that would change an Outcome. Additionally, as described above, 5 additional convictions resulting in exoneration were added to the dataset that were not included in Part I. Finally, 7 convictions originally classified as Outcome 4 were not found during Part II coding, resulting in no new information to consider.

Table 1: Number of Convictions Classified as Outcome 3 or 4

	Outcome 3 (Exculpatory but Insufficient)	Outcome 4[5] (Exculpatory and Supports Exoneration
Part I Classification (2012)	18	43
Part II Classification (2017)	30	31
Part II Classification (2017) for convictions with sexual assault component	16	29

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[5] Includes the five additional exonerations that were added to the dataset but not included in Part 1.

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Box 1. Examples of Conviction Reclassification

Example 1 Outcome 4 case reclassified to Outcome 3

Suspect was convicted of rape along with a codefendant. The DFS case file coded in Part I provided little contextual information about the crime. In Part II, the research team learned from the courthouse case file that the codefendant pled guilty and testified against the suspect, stating that both men participated in the rape. The suspect confessed to attempted rape, and a urologist testified that it was possible that Suspect A was impotent at the time of the rape. Since new information provided a possible explanation for the absence of the suspect's DNA, the conviction was reclassified as Outcome 3.

Example 2 Outcome 4 case kept as Outcome 4

The defendant pled guilty to statutory rape, and the DFS case file coded in Part I provided little details about the context of the crime. From the courthouse case file coded in Part II, the research team learned that the suspect originally denied having any contact with the victim, and that the victim was not initially confident in her identification of the suspect at a line-up. Given the additional contextual information that could support the suspect's innocence, and the absence of additional information providing a reason for the absence of the suspect's DNA, the conviction remained classified as Outcome 4

Estimated Rate of Wrongful Convictions

Ultimately, among the 231 convictions in this sample with a sexual assault component and determinate post-conviction DNA testing results, 29 convictions (12.6 percent) yielded exculpatory DNA evidence that would be supportive of the convicted suspect's exoneration. Applying the inverse probability weights described previously, the rate can be corrected to **11.6 percent**; this adjusted rate provides an estimate of wrongful conviction in the larger sample (N=430) of both determinate and indeterminate cases. These estimates may be considered an upper bound on the rate of wrongful conviction for these cases, since it is possible that even after Urban researchers' careful review of courthouse information on cases with exculpatory DNA evidence, there could be some rightful convictions included.

External Validity

To determine whether the rate of wrongful conviction could be generalized to other states, we examined case filings and dispositions across jurisdictions in 43 states that consistently rely on defendant-based case reporting. Due to missing data, this analysis focused explicitly on the proportion of cases that resulted in a disposition other than dismissal. These data indicate that 33% of cases filed in Virginia in 1985 resulted in a dismissal, compared to other state dismissal rates which range from 1% to 75% (Alaska and Maine, respectively). The average dismissal rate

across states included in the analysis is 16%. A test of proportions indicates that the number of cases that are not dismissed in Virginia does not significantly differ from other states. These findings provide a basis, albeit limited, to argue that estimates of wrongful convictions in Virginia may apply to other states and, furthermore, be lower than states that report lower dismissal rates.

Dissemination and Closeout Activities

The project team presented initial findings that are documented in this technical summary at the Annual Meeting of the American Society of Criminology on November 17, 2016 as part of a thematic panel (Wrongful Convictions, CODIS, and Sexual Assault Case Processing: Findings from the Urban Institute's Forensics Research Portfolio).

Prior to the end of the grant period, the research team will upload deidentified data collected during the study along with code and documentation used to produce analyses to the National Archive of Criminal Justice Data, in accordance with NIJ requirements. Additionally, the project team will submit at least one journal article for publication prior to the end of 2017. This may include findings discussed in this technical summary along with any identified correlates of wrongful convictions.

Conclusion

This study extends prior research on the prevalence of wrongful convictions. In particular, we rely on case processing and disposition data collected on 714 murder and sexual assault felony cases across 56 circuit courts to calculate an estimated rate of wrongful conviction. Based on forensic, case processing, and disposition data, we estimate, after weighting, that wrongful convictions in cases with a sexual assault component occurred at a rate of **11.6 percent**, which is different than prior estimates reported by the Urban Institute in 2012, due to both a more refined scope and additional context from case files. We also examine Bureau of Justice Statistics data collected from Felony Courts in 1985 to determine whether this new estimated rate of wrongful conviction is generalizable to other states across the U.S. These analyses indicate that the rate of dismissal in Virginia is not significantly different from other states, suggesting that the findings of this research may be extended - with caution - to other jurisdictions.

This research effort has created the most valuable dataset to date to investigate the prevalence of wrongful convictions, and provides research and practitioner communities with a new prevalence estimate for a problem that continues to plague jurisdictions across the country. Importantly, this research represents the only known effort to apply DNA testing to cases regardless of a person's individual claim of innocence. The process by which outcomes are revised by considering court processing and case disposition information highlights the limits of DNA evidence in identifying

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This research effort has created the most valuable dataset to date to investigate the prevalence of wrongful convictions, and provides research and practitioner communities with a new prevalence estimate for a problem that continues to plague jurisdictions across the country. Importantly, this research represents the only known effort to apply DNA testing to cases regardless of a person's individual claim of innocence. The process by which outcomes are revised by considering court processing and case disposition information highlights the limits of DNA evidence in identifying

potential instances of wrongful conviction. Furthermore, while most post-conviction efforts rely on DNA testing only if the conviction is a probable wrongful conviction, this work inverts that process and puts the DNA testing at the front end, which simultaneously uses DNA to identify both wrongful and rightful convictions.

Future analyses will include an examination of whether the data collected in this study is correlated with instances of potential wrongful conviction and present findings on the utility of DNA as a wrongful conviction detection tool. Since this dataset will be archived, it is our hope that it will be useful to other researchers interested in post-conviction DNA testing and wrongful conviction.

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