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Criminal Law and HIV Testing: Empirical Analysis of How At-Risk Individuals Respond to the Law

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Criminal Law and HIV Testing: Empirical Analysis of How At-Risk Individuals Respond to the Law

Sun Goo Lee

ABSTRACT:

This Note assesses the effect of laws that specifically criminalize behaviors that expose others to the human immunodeficiency virus (HIV). This Note examines the relationship between HIV testing decisions by high-risk individuals and the existence of these HIV-specific statutes, as well as the amount of media coverage related to them.

One of the main reasons public health experts criticize criminalization of HIV-exposing behavior is that it may discourage at-risk individuals from undergoing HIV testing. This argument, however, remains empirically untested to date. This study quantitatively examines whether at-risk individuals living in jurisdictions with HIV-specific statutes are less likely to report having been tested for HIV in the past year compared to those living in jurisdictions without HIV-specific statutes. Regression analysis is conducted using data collected in the United States over a seven-year span.1

The results show that at-risk individuals residing in states with HIV-specific statutes are no less likely to report having been tested for HIV than those who live in other states. However, the number of people who reported that they had been tested for HIV is inversely correlated with the frequency of newspaper coverage of criminalization of HIV-exposing behavior. These findings imply that at-risk individuals' HIV testing is associated with media coverage of criminalizing HIV-exposing behavior.

The negative impact that criminal law has on HIV testing rates could be a serious public health threat. Testing is often the initial step in public health interventions that most effectively modify the risky behavior of HIV-positive individuals. The adverse consequence of criminalization should weigh heavily in the design and application of criminal sanctions for HIV-exposing behavior. In addition, future research should further explore the relationships between

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1 This study uses data from the Behavioral Risk Factor Surveillance System (BRFSS) collected by the Centers for Disease Control and Prevention (CDC) from 2002 to 2009 (with the exception of 2007) in 50 states and the District of Columbia in the United States.
Criminal Law and HIV Testing

criminalization, media coverage of criminalization, and HIV testing decisions for a more nuanced understanding of the consequences of criminalization.
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INTRODUCTION

This Note assesses how criminalization of behavior that exposes others to HIV affects HIV testing decisions of at-risk individuals in the United States. Since the outbreak of the HIV epidemic in the 1980s, many state and federal courts have imposed criminal liability on individuals who expose others to HIV. Over half (33) of the jurisdictions in the United States have adopted HIV-specific statutes that impose criminal liability on HIV-positive individuals who expose others to HIV. Several others (six) have applied general criminal law (which I refer to as “traditional” law) and the state of Kansas has applied a statutory law that prohibits exposing others to a sexually transmitted disease (STD). Estimates suggest that, to date, more than 900 HIV-positive individuals have been criminally prosecuted under these laws.

This Note focuses on the impact of criminal law on public health policies, specifically in the context of HIV testing. Arguments that support or criticize criminalization center on the influence of criminal law on HIV-exposing and HIV testing behavior. Supporters of criminalization highlight criminal law’s deterrent effect on HIV-exposing behavior. Their primary claim is that the possibility of prosecution discourages HIV-positive individuals from engaging in risky sexual behaviors that spread the virus. Opponents claim that criminalization discourages HIV testing. According to this argument, the chance of criminal liability may discourage at-risk individuals from confirming their HIV status because an awareness of their status can assist the prosecution in establishing intent to infect others. This deterrence is a serious public health threat since HIV testing is crucial to HIV prevention.

Several empirical studies have validated the theory that criminal punishment

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2 As of 2012, 40 jurisdictions in the United States criminalize behavior that exposes others to HIV. Thirty-three states have adopted HIV-specific criminal statutes, six states have applied traditional criminal law to sanction individuals who expose others to HIV, and one state has applied a general STD statute regarding HIV-exposing behaviors. For detailed information, see Section I.A below.


4 See infra Subsection I.E.2.

5 Id.

fails to prevent risky sexual activities. However, researchers have not yet examined the impact of criminal law on HIV testing decisions. This Note fills this gap by analyzing whether and how HIV-specific criminal law affects HIV testing decisions. This study conducts regression analysis using the Behavioral Risk Factor Surveillance System (BRFSS) data that the Centers for Disease Control and Prevention (CDC) collected in the United States from 2002 to 2009 (except 2007). To contextualize its empirical findings, this Note starts with a normative analysis of HIV-criminalization laws.

The empirical study of criminal law in this Note suggests that current criminal laws are written and applied in a way that might be detrimental to HIV prevention policies. The regression results show that, in states with HIV-specific statutes, the number of at-risk individuals who report that they had been tested for HIV in the past 12 months is negatively correlated with the number of media reports on the criminalization of HIV-exposing behavior.

This Note’s conclusions provide insight into how criminal law can interact with public health policy, and recommends that lawmakers consider the objectives of criminal and public health policies in tandem. The study’s implications also apply to laws governing other communicable diseases, particularly those that share traits with HIV.

This Note proceeds as follows. Part I provides background information on criminal law governing HIV-exposing conduct. Section IA explains the history of criminalizing HIV-exposing behavior in the United States. Sections IB, IC, and ID respectively provide a normative analysis of HIV-specific statutes, traditional criminal law, and an STD statute that may apply to HIV-exposure cases. Section IE presents a summary of two primary arguments surrounding the criminalization of behavior that exposes others to HIV, and discusses the validity of each argument based on available empirical evidence. Part II presents this study’s methodologies and results, followed by the conclusion and suggestions for future research in Part III.


8 The SERO Project performed a study on this subject, but has published neither methodologies nor final results yet. For preliminary findings, see The SERO Project: National Criminalization Preliminary Results, SERO (July 25, 2012), http://seroproject.com/wp-content/uploads/2012/07/Sero-Preliminary-Data-Report_Final.pdf.
I. THE LAW AND ITS IMPACT ON PUBLIC HEALTH: CRIMINALIZATION OF HIV-EXPOSING BEHAVIOR IN THE UNITED STATES

A. History of Criminalization of HIV-Exposing Behavior in the United States

The majority (40) of United States jurisdictions penalize individuals who expose others to HIV by applying an HIV-specific criminal statute, a general STD statute, or a traditional criminal law (Table 1).9 Thirty-three states have introduced HIV-specific statutes to penalize HIV-exposing behavior. One state, Kansas, has applied a general STD statute that applies to HIV-positive individuals who expose others to the virus. The courts of six states have been applying traditional crimes, such as attempted murder and aggravated assault, to individuals who expose others to HIV.10 As a consequence, people in these states, who account for more than 90% of the United States population, live under legal systems that criminally punish people with HIV who expose others.11

Table 1. Summary of State Legislation Against HIV Exposure

| One state applying general STD statutes | Kansas |
| Six states applying traditional criminal law | Massachusetts, Minnesota, New Hampshire, New York, Oregon, Texas |

9 State laws were collected from three different sources: (1) Global Criminalisation Scan, supra note 3; (2) HIV Criminalization: State Laws Criminalizing Conduct Based on HIV Status, LAMBDA LEGAL, http://www.lambdalegal.org/publications/fs_hiv-criminalization (last updated July 12, 2010); and (3) State Criminal Statutes on HIV Transmission—2008, AM. CIVIL LIBERTIES UNION (ACLU) (2008), http://www.aclu.org/files/images/asset upload file292_35655.pdf. Each source’s information was cross-checked with other sources to obtain the most up-to-date survey of each state’s law. When there was a discrepancy between the reports of three organizations, Westlaw and LexisNexis search engines were used to obtain the texts of the statute and verify the criminalizing policy of each state.


HIV-specific legislation began in Washington in 1988. At the onset of the epidemic, the Presidential Commission on the Human Immunodeficiency Virus Epidemic submitted a report to the President, which recommended prosecuting HIV-positive individuals who subject others to a risk of infection. The Report explained that criminalization holds violators of the law accountable for their conduct and also deters high-risk behavior. The Ryan White Comprehensive AIDS Resources Emergency Act (the CARE Act) of 1990 also catalyzed HIV-specific criminal legislation. This Act restricts federal emergency AIDS relief grants to jurisdictions with laws that criminalize HIV-exposing behaviors. Jurisdictions can fulfill this requirement by amending their public health statutes to include HIV under their existing STD exposure statutes, applying traditional criminal law such as attempted murder or aggravated assault, or introducing an HIV-specific criminal statute. Following enactment of the CARE Act, jurisdictions that did not already have HIV-specific statutes added them in haste. By 1990, 21 states had introduced statutes that penalize behavior that exposes others to HIV through sexual means. Jurisdictions that already had statutes amended them to comply with the Act’s requirements.

The second wave of HIV-specific state legislation occurred around 1998, in response to the Nushawn Williams case. In 1997, Williams was prosecuted for having unprotected sex with approximately 50 women in New York after learning he was HIV-positive. The media covered the story heavily, leading to widespread anger against the HIV-positive population. The Williams case prompted states to adopt HIV-specific criminal statutes in order to remove

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14 Id.
18 Id. at 840.
20 Stein, supra note 12, at 180.
21 As one commentator noted, such “highly publicized, outrageous cases” caused a “public uproar.” Id.
barriers against prosecuting HIV-exposing individuals. In Florida, for example, state legislators cited the Williams case when they classified knowing transmission (or attempted transmission) of HIV as a felony. A statement by an Ohio lawmaker when he introduced a criminalization bill characterizes public sentiment at the time: “It is wrong for society to simply look the other way and not offer reasonable protection to those who are unknowingly being exposed to this lethal disease.”

Along with HIV-specific statutes, some jurisdictions have applied traditional crimes to prosecute individuals who knowingly expose others to HIV. Some states that adopted HIV-specific statutes at a later stage of the epidemic had previously used traditional criminal laws to prosecute HIV-positive individuals. States without HIV-specific legislation often issue charges based on the traditional crimes of attempted murder and aggravated assault.

According to data released by the Global Network of People living with HIV/AIDS (GNP+), there have been over 900 incidents of arrest or prosecution of HIV-positive individuals who allegedly exposed others to HIV in the United States. Table 2 provides the year each state started criminalizing behavior that exposes others to HIV, the accumulated number of prosecutions and convictions reported for each state court, and the type of crime exposing others to HIV would constitute in that state.

<table>
<thead>
<tr>
<th>State</th>
<th>Year of Criminalization</th>
<th>Number of Prosecutions</th>
<th>Number of Convictions</th>
<th>Type of Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>1987</td>
<td>1</td>
<td>0</td>
<td>Class C misdemeanor</td>
</tr>
<tr>
<td>Alaska</td>
<td>1996^27</td>
<td>0</td>
<td>0</td>
<td>Sentence enhancement</td>
</tr>
<tr>
<td>Arkansas</td>
<td>1989</td>
<td>8+</td>
<td>5+</td>
<td>Class A felony</td>
</tr>
<tr>
<td>California</td>
<td>1998</td>
<td>10+</td>
<td>Unknown</td>
<td>Felony</td>
</tr>
</tbody>
</table>

22 Id.
24 Mark Tatge, Bill Would Require HIV Disclosure, PLAIN DEALER (Cleveland, Ohio), Feb. 10, 1999, at 5B.
25 For criminal charges brought under traditional criminal laws, see infra Section I.D.
26 National AIDS Manual (NAM) also estimates that at least 442 HIV-positive individuals have been prosecuted, and emphasizes that “it is likely that [this] estimate . . . substantially underestimates the actual number.” HIV & the Criminal Law: North America, NAM AIDSMAP, http://www.aidsmap.com/page/1445031 (last visited Dec. 18, 2013).
<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>6+</th>
<th>4+</th>
<th>Sentence enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado</td>
<td>1999</td>
<td>6+</td>
<td>4+</td>
<td>Sentence enhancement</td>
</tr>
<tr>
<td>Delaware</td>
<td>1988</td>
<td>0</td>
<td>0</td>
<td>Class E felony</td>
</tr>
<tr>
<td>Florida</td>
<td>1997</td>
<td>239</td>
<td>Unknown</td>
<td>3rd degree felony</td>
</tr>
<tr>
<td>Georgia</td>
<td>1988</td>
<td>20+</td>
<td>10+</td>
<td>Felony</td>
</tr>
<tr>
<td>Idaho</td>
<td>1988</td>
<td>54</td>
<td>Unknown</td>
<td>Felony</td>
</tr>
<tr>
<td>Indiana</td>
<td>1988</td>
<td>20+</td>
<td>15+</td>
<td>Class A/C felony</td>
</tr>
<tr>
<td>Illinois</td>
<td>1989</td>
<td>100</td>
<td>Unknown</td>
<td>Class 2 felony</td>
</tr>
<tr>
<td>Iowa</td>
<td>1998</td>
<td>25</td>
<td>15</td>
<td>Class B felony</td>
</tr>
<tr>
<td>Kansas</td>
<td>2009</td>
<td>1</td>
<td>1</td>
<td>Level 7 person Felony</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1990</td>
<td>8+</td>
<td>Unknown</td>
<td>Class D felony</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1987</td>
<td>55+</td>
<td>Unknown</td>
<td>Not specified</td>
</tr>
<tr>
<td>Maryland</td>
<td>1989</td>
<td>8+</td>
<td>5+</td>
<td>Misdemeanor</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2003</td>
<td>4+</td>
<td>1+</td>
<td>General criminal law</td>
</tr>
<tr>
<td>Michigan</td>
<td>1989</td>
<td>Unknown</td>
<td>5+</td>
<td>Felony</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1988</td>
<td>3+</td>
<td>2+</td>
<td>General criminal law</td>
</tr>
<tr>
<td>Missouri</td>
<td>1988</td>
<td>27+</td>
<td>10+</td>
<td>Class A/B felony</td>
</tr>
<tr>
<td>Montana</td>
<td>1989</td>
<td>0</td>
<td>0</td>
<td>Misdemeanor</td>
</tr>
<tr>
<td>Nevada</td>
<td>1993</td>
<td>3+</td>
<td>3+</td>
<td>Category B felony</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2002</td>
<td>2</td>
<td>1</td>
<td>Class B felony</td>
</tr>
<tr>
<td>New Jersey</td>
<td>1997</td>
<td>4</td>
<td>3</td>
<td>Crime of 3rd degree</td>
</tr>
</tbody>
</table>

28 Punishable by a fine not more than $6000, imprisonment with or without hard labor for not more than one year, or both, except in certain circumstances.
30 U.S. v. Moore, 846 F.2d 1163, 1164 (8th Cir. 1988).
B. Review of HIV-Specific Statutes in 33 States

In general, HIV-specific statutes require three elements to establish criminal HIV exposure: criminal intent, criminal behavior, and lack of defense. This section reviews how courts of different jurisdictions define each of these three elements.

<table>
<thead>
<tr>
<th>State</th>
<th>Year (if specified)</th>
<th>Cases</th>
<th>Unknown</th>
<th>Sentence Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>1988</td>
<td>6+</td>
<td>Unknown</td>
<td>Class D felony</td>
</tr>
<tr>
<td>N. Carolina</td>
<td>1988</td>
<td>6+</td>
<td>2+</td>
<td>Misdemeanor</td>
</tr>
<tr>
<td>North Dakota</td>
<td>1989</td>
<td>1</td>
<td>1</td>
<td>Class A felony</td>
</tr>
<tr>
<td>Ohio</td>
<td>1996</td>
<td>33+</td>
<td>19+</td>
<td>2nd degree felony</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1988</td>
<td>6+</td>
<td>Unknown</td>
<td>Felony</td>
</tr>
<tr>
<td>Oregon</td>
<td>1992</td>
<td>3+</td>
<td>Unknown</td>
<td>Felony</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>1998</td>
<td>13+</td>
<td>Unknown</td>
<td>2nd degree felony</td>
</tr>
<tr>
<td>S. Carolina</td>
<td>1988</td>
<td>11+</td>
<td>5+</td>
<td>Felony</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2000</td>
<td>69</td>
<td>Unknown</td>
<td>Class 3 felony</td>
</tr>
<tr>
<td>Tennessee</td>
<td>1994</td>
<td>50+</td>
<td>40+</td>
<td>Class C felony</td>
</tr>
<tr>
<td>Texas</td>
<td>1998</td>
<td>22+</td>
<td>20+</td>
<td>2nd degree felony</td>
</tr>
<tr>
<td>Utah</td>
<td>1993</td>
<td>1+</td>
<td>1+</td>
<td>Sentence enhancement</td>
</tr>
<tr>
<td>Virginia</td>
<td>1995</td>
<td>3+</td>
<td>Unknown</td>
<td>Class 6 felony</td>
</tr>
<tr>
<td>Washington</td>
<td>1997</td>
<td>9+</td>
<td>6+</td>
<td>Class A felony</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>2001</td>
<td>0</td>
<td>0</td>
<td>Sentence enhancement</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>343+</td>
<td>206+</td>
<td></td>
</tr>
</tbody>
</table>

37 Stein, supra note 12, at 182.
1. Criminal Intent

In general, statutory crimes require that a defendant have a certain state of mind—*mens rea*—often defined as "intentionally," "knowingly," "purposely," or "willfully." 38 The basic idea is that "an act does not make [a person] guilty, unless the mind be guilty." 39 HIV-specific criminal laws also require that an HIV-positive individual has *mens rea*. The laws of six states—California, Kansas, Oklahoma, South Dakota, Virginia, and Washington—require that a defendant have the specific intent to transmit or expose HIV to others to bear criminal liability. 40 The remaining state laws (28) simply require that individuals are aware of their HIV-positive status. 41 Among these 28 states, the laws of five define when an HIV-positive individual has knowledge of HIV infection, 42 but the other 23 are silent on this point. As a result, whether an individual who has received a medical diagnosis of AIDS has sufficient knowledge of HIV infection or an HIV positive test result is necessary is largely left to judicial interpretation.

Except in Florida and Kentucky, HIV-specific criminal statutes of 33 states do not address whether HIV-positive individuals should understand that they are

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39 JOSHUA DRESSLER, UNDERSTANDING CRIMINAL LAW 117 (5th ed. 2009); LAFAVE, supra note 38, at 239.
40 The statute of California clearly states that a person’s "knowledge of his or her HIV-positive status, without additional evidence, shall not be sufficient to prove specific intent." CAL. HEALTH AND SAFETY CODE § 120291 (West 2013). “It is unlawful for an individual . . . with the intent to expose that individual to that life threatening communicable disease.” KAN. STAT. ANN. § 21-3435 (2013). In Oklahoma, it is unlawful for an HIV-positive individual to engage in certain conduct “with intent to infect another.” OKLA. STAT. tit. 21 § 1192.1 (2013). But when HIV-positive status enhances the penalty for other sex crimes such as prostitution, laws generally do not require an HIV-positive individual to have intent.
42 The laws of these five states are as follows: ALASKA STAT. ANN. § 12.55.155(c)(33) (West 2013) (stating that those “previously diagnosed as having or having tested positive for HIV” are criminally culpable); ARK. CODE ANN. § 5-14-123 (2013) (clearly stating that only an individual who had received a positive test is forbidden from exposing others to HIV); COLO. REV. STAT. § 18-7-201(7) (2013) (“with knowledge of being infected with” HIV); OHIO REV. CODE ANN. § 2903.11 (2013) (“with knowledge that the person has tested positive” for HIV); UTAH CODE ANN. § 76-10-1309 (2013) (“[a] person . . . is guilty of a third degree felony if the person is an HIV positive individual”).
infectious. There is a difference between simply knowing one’s HIV-positive status and understanding the risk of infecting others, but most states only require the former to establish criminal intent for the crime of exposing others to HIV.

2. Criminal Behavior

Many state laws provide only a very general and blurry depiction of what behavior the law proscribes. In Alabama, for example, a statute forbids “any act which will probably or likely transmit such disease to another person.” Mississippian fords an HIV-positive individual from “expos[ing] another person to HIV,” but it does not define exposure. The law of Illinois punishes HIV-positive individuals if they knowingly “engage in intimate contact with another” or “transfer . . . blood, tissue, semen, organs, or other potentially infectious body fluids . . . to another.” The term “potentially infectious body fluids” is quite broad and could be interpreted to include tears or saliva, which have a negligible risk of HIV transmission. The law also defines “intimate contact” vaguely, as “the exposure of the body of one person to a bodily fluid of another person in a

43 Fla. Stat. Ann. § 384.24(2) (West 2013) (with knowledge of such infection and having “been informed that he or she may communicate this disease to another person through sexual intercourse”); Ky. Rev. Stat. § 311.990(24)(b) (West 2013) (“knows he is infected with human immunodeficiency virus, and who has been informed that he may communicate the infection by donating organs, skin, or other human tissue”).
44 Ala. Code § 22-11A-21(c) (West 2013) (emphasis added); see also Nev. Rev. Stat. § 201.205 (West 2013) (“engages in conduct in a manner that is intended or likely to transmit the disease to another person”).
47 Shriver, supra note 46, at 333. Other states have similar statutes in place: 720 Ill. Comp. Stat. Ann. 5/12-5.01 (“1) engages in sexual activity with another without the use of a condom knowing that he or she is infected with HIV; (2) transfers, donates or provides his or her blood, tissue, semen, organs or other potentially infectious body fluids for transfusion, transplantation, insemination, or other administration to another”; Iowa Code § 709C.1 (West 2013) (“1) engages in intimate contact with another person; (2) transfers, donates, or provides blood, tissue, semen, organs, or other potentially infectious body fluids for transfusion, transplantation, insemination, or other administration to another person’); IOWA CODE § 709C.1 (West 2013) (“1) engaging in sexual intercourse or other intimate physical contact with another person; (2) transferring, donating, or providing blood, tissue, semen, organs or other potentially infectious body fluids or parts for . . . administration to another in any manner that presents a significant risk of HIV infection’); Tenn. Code Ann. § 39-13-109 (West 2013) (“1) [e]ngages in intimate contact with another; (2) [t]ransfers, donates, or provides blood, tissue, semen, organs, or other potentially infectious body fluids or parts for transfusion, transplantation, insemination, or other administration to another in any manner that presents a significant risk of HIV . . . transmission’).
manner that could result in the transmission of HIV."\(^{48}\)

The laws of many jurisdictions explicitly prohibit acts that have a negligible risk of HIV transmission. Louisiana, Pennsylvania, and Missouri criminalize biting and/or spitting by HIV-positive individuals as a form of HIV exposure,\(^{49}\) although "transmission by biting is extremely rare."\(^{50}\) Even in these rare cases, the people who were bitten acquired HIV because their deep wounds were exposed to a substantial amount of blood in the biter's saliva.\(^{51}\) Some state statutes, such as that of Illinois, prohibit exposure to bodily fluids such as urine and saliva, which do not have any reported incidents of HIV transmission.\(^{52}\) In Arkansas and Michigan, the definition of proscribed sexual activities includes intrusion of "any object,"\(^{53}\) enabling prosecution of many activities that carry no risk of transmission. This broad definition may even prohibit the use of sex toys by HIV-infected people.\(^{54}\)

The majority of the aforementioned 33 states that have HIV-specific criminal statutes prohibit conduct even if it has only a slight risk of HIV transmission and do not require that an HIV-negative individual actually contract HIV as a result of the exposing incident.\(^{55}\) Most of the states do not even require that the victim be HIV-free at the time of exposure. In fact, one of the reasons state legislatures adopted HIV-specific criminal statutes was to eliminate prosecutors' burden of proving that the incident in question caused HIV infection. Under traditional

\(^{48}\) Shriver, supra note 46, at 332 (emphasis added). Iowa defines intimate contact as "the intentional exposure of the body of one person to a bodily fluid of another person in a manner that could result in the transmission of the human immunodeficiency virus." IOWA CODE § 709C.1(2)(b) (2013) In Tennessee, the law defines an "intimate contact with another" as the "exposure of the body of one person to a bodily fluid of another person in any manner that presents a significant risk" of HIV transmission. TENN. CODE ANN. § 39-13-109(b)(2) (West 2013).

\(^{49}\) LA. REV. STAT. ANN. § 14:43.5 (West 2013); 18 PA. CONS. STAT. ANN. § 2703 (West 2013); MO. REV. STAT. § 191.677 (West 2013).


\(^{51}\) Id.

\(^{52}\) See Shriver, supra note 46, at 333-34; see also Carol L. Galletly & Steven D. Pinkerton, Toward Rational Criminal HIV Exposure Laws, 32 J.L. MED. & ETHICS 327, 329-31 (2004). Other states have similar laws that punish HIV-positive individuals for exposing others to bodily fluids, including saliva or urine. See, e.g., GA. CODE ANN. CODE § 16-5-60(d) (2013); IDAHO CODE § 39-608 (2013); 18 PA. CONS. STAT. ANN. § 2703.

\(^{53}\) See ARK. CODE ANN. § 5-14-123 (making it a class A felony to knowingly engage in any "intrusion, however slight, of any part of a person's body or of any object into the genital or anal opening of another person's body, without first having informed the other person of the presence of HIV"); MICH. COMP. LAWS ANN. § 333.5210 (2013) (the prohibiting of "any other intrusion, however slight, of any part of a person's body or of any object into the genital or anal openings of another person's body").

\(^{54}\) Galletly & Pinkerton, supra note 52, at 329. The irony of these prohibitions is that the use of non-shared sex toys can be a satisfying risk-free alternative to intercourse with an HIV-infected sex partner. Id.

criminal law, successful prosecution of murder or assault would require proven causation between an exposing act and HIV infection. However, because HIV infection has an initial asymptomatic period, which can last up to 10 years, prosecutors often have difficulty establishing causation. HIV-specific statutes remove this prosecutorial burden.

3. Lack of Defense: Prior Disclosure of HIV Status or Performance of Safer Sex

HIV-specific statutes in many states establish prior disclosure of HIV-positive status as a legal defense. In these states, if the defendant can prove that he or she informed a sex partner that he or she carried HIV, the defendant does not bear criminal liability. In some states, including California and North Dakota, the law requires that the infected individual take precautions in addition to disclosing infection. In California, a person is liable for exposing others to HIV only when the person has “not disclosed his or her HIV-positive status.” In North Dakota, that intercourse took place after full disclosure of the risk of such activity and involved the use of an “appropriate prophylactic device” can serve as an affirmative defense.

In the minority of jurisdictions, such as Kansas, Maryland, and Montana, laws do not allow any of these defenses. In these states, an HIV-infected individual could be criminally liable for intercourse even if he or she informs partners of his or her status and takes precautions to prevent infection during intercourse.

C. The General STD Statute of Kansas

Kansas has a general sexually transmitted disease (STD) statute that prohibits an infected individual from knowingly engaging in “sexual intercourse” with the intent of exposing a partner to the disease. The definition of the term “sexual intercourse” does not include penetration by any object other than the male sex organ.

In 2009, Kansas first applied this law to an HIV-positive individual who was accused of exposing his sex partners to HIV. The defendant had both protected

57 For the texts of state statutes, see HIV Criminalization: State Laws Criminalizing Conduct Based on HIV Status, supra note 9.
58 CAL. HEALTH AND SAFETY CODE § 120291 (West 2013).
61 KAN. STAT. ANN. § 21-3435.
62 Id.
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and unprotected sexual intercourse with two women without first disclosing that he was HIV-positive. The Supreme Court of Kansas held that to establish a violation of the law, the state must prove beyond a reasonable doubt that the defendant (1) knew that he was “infected with a life-threatening communicable disease”, (2) “knowingly engaged in sexual intercourse” with the victims, and (3) “engaged in this conduct with the intent of exposing” the victims to the disease.

The Supreme Court of Kansas held that exposing others to an STD is a “specific intent” crime in that the law “specifically identifies or requires the further particular intent to expose.” The court stated that such specific intent could be inferred from the fact that the defendant knew he had HIV at the time of intercourse, none of the victims knew, he did not use a condom, and he falsely represented to a victim that he was free of HIV. But in this case, the court decided that the prosecution failed to prove these points and therefore failed to show that the defendant had the specific intent to expose his partners. Accordingly, the Supreme Court overturned the defendant’s conviction.

D. Review of Cases Applying Traditional Criminal Law to HIV-Exposing Behavior

In Massachusetts, Minnesota, New Hampshire, New York, Oregon, and Texas, courts have applied traditional criminal laws to HIV-positive individuals who expose others to HIV. The three types of behavior that are most frequently discussed in cases are sexual conduct, biting, and spitting on others. Each type of behavior can result in charges for attempted murder and aggravated assault.

1. Crime Distinctions Under HIV-Specific Statutes

The most frequent criminal charge in sexual transmission cases is attempted murder. Murder is often defined as the “unlawful killing of another ‘living
human being’ with ‘malice aforethought.’”\textsuperscript{71} “Attempted murder” is an act done with the intent to commit murder but falls short of its actual commission.\textsuperscript{72} In order to successfully prosecute an HIV-positive individual for attempted murder, the state has to prove that the infected individual had sexual intercourse with the specific intent to commit murder, even though the exposed individual did not die as a result of that encounter.\textsuperscript{73}

In cases where HIV exposure was charged as attempted murder, courts have focused on determining whether the defendant had the necessary criminal intent. In general, courts have held that individuals have the specific intent to commit murder when they have intercourse knowing that they are HIV-positive. In such cases, the prosecution need not prove that the defendant intended to harm or cause the death of the victim. In \textit{State v. Hinkhouse}, for example, an HIV-positive defendant was accused of attempted murder for having unprotected sexual intercourse with various women without disclosing his HIV-positive status even after he found out that he was HIV-positive.\textsuperscript{74} The defendant claimed that he meant only to satisfy himself sexually and that there was insufficient evidence to prove his intent to harm or to cause the death of others. The court, however, stated that having unprotected sex without disclosing his HIV-positive status “demonstrated that his purpose was more than mere sexual gratification.”\textsuperscript{75}

As long as HIV-positive individuals considered death to be a possible consequence of exposing others to HIV, courts have found specific intent even when no death has resulted. In \textit{Hinkhouse}, the defendant was convicted of ten counts of attempted murder and ten counts of attempted assault. The defendant appealed but the Court of Appeals of Oregon affirmed the lower court’s decision, holding that the crime of attempted murder only requires criminal intent, not the consequence of death. According to the court, expert testimony that HIV is rarely transmitted through unprotected sexual intercourse does not affect criminal liability for attempted murder when the defendant engaged in sexual activities knowing that he tested positive for HIV and that exposing others to his HIV could result in HIV transmission.\textsuperscript{76}

requirement. Common law requires “that the victim die within a year and a day of the defendant’s actions in order to attribute the death to the defendant.” This requirement would preclude most murder prosecution for HIV because HIV has a lengthy incubation period and can progress slowly. \textit{ld}; see also \textit{Lawrence O. Gestin, The AIDS Pandemic: Complacency, Injustice, and Unfulfilled Expectations} 187-88 (2004).

\textsuperscript{71} \textit{Lafave}, supra note 38, at 725.
\textsuperscript{72} \textit{Dressler}, supra note 39, at 508-09; \textit{Lafave}, supra note 38, at 725.
\textsuperscript{73} 175A AM. JUR. 2D Homicide § 580 (2012).
\textsuperscript{75} \textit{ld.} at 925.

\textsuperscript{76} In this case, the court stated that according to Oregon law, a person commits a crime “when the person intentionally engages in conduct which constitutes a substantial step towards commission of the crime.” \textit{Hinkhouse}, 912 P.2d. at 924 (quoting \textit{Or. Rev. Stat.} § 163.185(1) (1995)). A person, therefore, “commits attempted murder when he or she attempts, without justification or excuse, intentionally to cause the death of another human being.” \textit{ld.}
Individuals with HIV have also been prosecuted for aggravated assault, assault with a deadly weapon, or reckless conduct with a deadly weapon for having sex with an unknowing partner. Courts have ruled that having unprotected intercourse without disclosing HIV-positive status meets the conduct standards required for these crimes; many have repeatedly held that seminal fluid containing HIV is a deadly weapon under state criminal laws.

Courts have further held HIV-positive individuals liable for aggravated assault regardless of whether the HIV-positive individuals actually put the victim in danger of contracting HIV. In *Lewis v. State*, the defendant had inserted his finger into the vagina of a 10-year old girl and masturbated until he ejaculated near her. The Court of Appeals of Texas affirmed the trial court's judgment, convicting Lewis of aggravated sexual assault. The Court stated that, despite the lack of actual transmission of body fluids that are likely to infect the victim with HIV, the aggravated crime applies to the defendant because he had HIV.

2. Biting and Spitting by HIV-Positive Individuals

In addition to sexual activities, biting and spitting have led to charges of attempted murder against HIV-positive individuals. In these cases, courts have inferred intent to murder from what an HIV-positive individuals said when they bit or spit at others. In *State v. Smith*, an HIV-positive jail inmate was prosecuted for attempted murder after he bit an officer. The defendant was convicted of attempted murder and aggravated assault before the superior court, and he appealed. The defendant argued that he did not have intent to kill because

77 "A person is guilty of aggravated assault if he: (a) attempts to cause serious bodily injury to another, or causes such injury purposely, knowingly or recklessly under circumstances manifesting extreme indifference to the value of human life; or (b) attempts to cause or purposely or knowingly causes bodily injury to another with a deadly weapon." Model Penal Code § 211.1(2) (1962). Assault with a deadly weapon (alternatively referred to as "assault with a dangerous weapon") is defined as "[a]n aggravated assault in which the defendant, using a deadly weapon, threatens the victim with death or serious bodily injury." Black's Law Dictionary (9th ed. 2009). See also *Sellers v. State*, No. 05-94-0033-CR, 1996 WL 223537 (Tex. Ct. App. Apr. 29, 1996); *Hinkhouse*, 912 P.2d at 925.


80 Id.

81 Id. In this case, the court also mentioned that, although the defendant merely ejaculated, the fact that there was a semen stain on the shorts he was wearing made it a possibility that the victim might have been exposed to HIV because she had "a light brown discharge from the vaginal area" from rubbing with defendant’s finger. Id. at *4. The court also cited *Atkins v. State*, No. 05-07-0086-CR, 2008 WL 2815087 (Tex. Ct. App. July 23, 2008), which imposed a heightened penalty on an HIV-positive individual, despite the lack of evidence that the victim was exposed to HIV as a result of sexual assault.


he knew that HIV could not spread through biting and spitting. He contended that he had come to this conclusion through HIV counseling sessions with a health care professional. He claimed that he threatened to kill others with HIV because he simply wanted to take advantage of others’ ignorant beliefs. However, the appellate court rejected these arguments and held that his threatening speech amounted to the requisite intent. The court accordingly affirmed the superior court’s decision.

The fact that HIV can rarely be transmitted through biting and spitting has not been found to negate the criminal intent of HIV-positive individuals. In *Weeks* *v.* *State*, an inmate spit twice in the face of an officer and was charged with attempted murder. In this case, expert witnesses testified that the likelihood of transmitting HIV through spitting is extremely low. The jury interpreted the expert testimony to mean that HIV could still be transmitted through spitting and convicted the defendant.

HIV-positive individuals are also convicted of aggravated assault after biting or spitting on others. Courts have held that HIV is a deadly weapon whether or not the victims contract HIV from the conduct of HIV-positive defendants. In *Degrate* *v.* *State*, for example, an HIV-positive inmate bit an officer, who continued to test HIV-negative after the incident. The court held that the mouth of an HIV-positive individual is a “deadly weapon,” which can “potentially” transmit HIV to the person being bitten and affirmed the trial court’s conviction of aggravated assault.

**E. Arguments Surrounding Criminalization of HIV Exposure and Available Evidence**

Two opposite points have been raised with regards to the public health effect of criminalizing behavior that exposes others. Some argue that criminal sanctions promote public health by deterring risky sexual activities that spread HIV. Others believe that criminalization undermines HIV prevention because it may discourage HIV testing. This section explains both sides of this argument and introduces empirical evidence in support of each.

84 *Id.* at 509-10.
85 *Id.* at 493.
88 For example, one expert witness “stated that anything is theoretically possible but that the chance of transmitting HIV through saliva is the lowest in theoretical possibility.” *Id.* at 564.
89 *For the definition of aggravated assault, see supra note 77.*
91 *Id.* at *5-6.
92 *Id.* at *3.
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1. Arguments Advocating Criminalization of Behavior that Exposes Others to HIV

   i. Deterrence Argument Supporting Criminalization

   Sexual activities and needle sharing among injecting drug users are the most common causes of new HIV infections in the United States. Since there is no vaccine or cure for HIV at present, the most effective way to stem the spread of HIV is to reduce the number of HIV-positive individuals who engage in these risky activities.

   Supporters of criminalization claim that criminal punishment of risky activities deters at-risk individuals from engaging in them. The theory of deterrence in criminology generally assumes that a would-be offender will make a rational decision by comparing the benefits and costs of committing a crime. According to supporters, HIV-positive individuals are more likely to avoid exposing others to HIV if they know that HIV-exposing behavior can result in criminal liability.

   In fact, the 1988 report of the Presidential Commission on the Human Immunodeficiency Virus Epidemic recommended criminalization of HIV-exposing behavior, stating that “[e]stablishing criminal penalties for failure to comply with clearly set standards of conduct can also deter HIV-infected individuals from engaging in high-risk behaviors, thus protecting society against the spread of the disease.” Based on this expectation, state legislatures adopted HIV-specific criminal statutes prohibiting HIV-exposing behavior. For example, California introduced criminal law provisions in 1998 to prohibit behavior that exposes others to HIV. When the Senate Committee on Public Safety discussed the potential impact the bill might have on public health, proponents of the bill argued that the criminalization would deter high-risk behavior, thereby stopping the spread of HIV. Despite civic groups’ counterpoint that the law might

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94 Id.
97 See PRESIDENTIAL COMMISSION REPORT, supra note 13, at 152.
98 CAL. HEALTH & SAFETY CODE §§ 120290-120291 (West 2013).
99 SEN. COMM. ON PUB. SAFETY, BILL ANALYSIS, S.B. 705 (Cal. Apr. 22, 1997). Groups against criminalization submitted reports to the Committee arguing that the state should focus its efforts on education and prevention of HIV. The opponents stressed that the criminal law might infringe upon the privacy rights of HIV-positive individuals and be selectively applied to disadvantaged people who are already facing strong stigma.
discourage people from undergoing testing, the Committee adopted the law.\textsuperscript{100} 

Many courts have also repeatedly argued that imposing criminal liability for HIV-exposure would stop the spread of HIV.\textsuperscript{101} In \textit{State v. Whitfield}, the court held that the criminalization of HIV-exposing behavior bears a reasonable relationship to a legitimate state objective, which is to stop transmission of a “deadly disease.”\textsuperscript{102} In some cases, courts have phrased the state’s interest in criminalizing HIV-exposing behavior as the protection of human life against the threat of HIV.\textsuperscript{103}

\textit{ii. Empirical Evidence Demonstrating the Failure of Criminal Law to Modify Risky Sexual Behavior of At-Risk Individuals}

Contrary to the expectations of commentators, courts, and legislatures, public health experts have been doubtful about the deterrent effect of criminalization. These experts point out that the fear of criminal punishment is not likely to affect sexual decisions because sexuality is highly complex and involves many different feelings and desires.\textsuperscript{104} Public health experts note that historically, laws regulating sexual behavior, such as sodomy statutes, have not effectively deterred such behavior.\textsuperscript{105}

Researchers have conducted empirical studies in order to examine the validity of each side of this argument. Three studies have found that criminalization fails to effectively deter the risky sexual activities of at-risk individuals. Scott Burris and colleagues conducted an empirical study comparing the behavior of at-risk individuals in a state with an HIV-specific criminal statute to behavior in a state without such a statute.\textsuperscript{106} The researchers found that the sexual behavior of individuals in these two states differed little. Similarly, Horvath’s recent study quantitatively assessing the impact of HIV-specific statutes on sexual behavior of at-risk individuals found that criminalization had little effect on sexual activity without protection and/or disclosure of HIV-

\textsuperscript{100} Id.
\textsuperscript{102} Id. Many other states have ruled in favor of criminalizing behavior exposing others to HIV based on the same reason. See, e.g., State v. Musser, 721 N.W.2d 734 (Iowa 2006); State v. Gamberella, 633 So. 2d 595 (La. Ct. App. 1993).
\textsuperscript{103} In reviewing the constitutionality of an HIV-specific statute, the court stated that “essential to the analysis in the case at bar is the Supreme Court’s recognition and affirmation of the state’s compelling interest in protecting life . . . . Furthermore, a State [has] an unqualified interest in the preservation of human life.” People v. Jensen, 231 Mich. App. 439, 456 (Mich. Ct. App. 1998) (quoting Roe v. Wade, 410 U.S. 113, 153 (1973) (internal quotation marks omitted)).
\textsuperscript{104} GOSTIN, supra note 70, at 189; Lawrence O. Gostin & James G. Hodge, Jr., Piercing the Veil of Secrecy in HIV/AIDS and Other Sexually Transmitted Diseases: Theories of Privacy and Disclosure in Partner Notification, 5 DUKE J. GENDER L. & POL’Y 9 (1998); Wolf & Vezina, supra note 19, at 873; Elliot, supra note 95, at 6.
\textsuperscript{106} Burris et al., supra note 7, at 467-68.
positive status. The results show that residents of different states with different HIV criminal laws did not hold different attitudes towards HIV-positive individuals who have risky intercourse without disclosure. In a qualitative study, researchers conducted interviews with homosexual men with HIV in the United Kingdom to investigate their experiences of unprotected anal intercourse. The findings of this study suggest that the threat of criminal prosecution drove some people to disclose HIV status or take precautions, but the law also moved others towards “increased anonymity” in sexual relationships and reduced openness about HIV status, which could be detrimental to HIV prevention.

2. Criticisms Against Criminalization as a Disincentive for HIV Testing

i. Public Health Concerns Involving HIV Testing

Public health experts and advocacy groups are worried that criminalization of HIV-exposing behavior might discourage individuals at high risk of HIV from testing. Although there is an extremely small portion of HIV-positive individuals who use their virus to harm others, accumulated evidence shows that most HIV-positive individuals tend to protect others once they learn that they are HIV-positive. Citing this evidence, public health experts stress the importance of at-risk individuals learning their HIV status through testing at the earliest

107 Horvath et al., supra note 7, at 1225.
108 The researchers used the participant’s residency in a state with an HIV-specific statute as a proxy for whether criminalizing law governed the participant’s behavior. Trained interviewers interviewed survey participants in a 3.5-month period in 2008 using online banner advertisements placed on two websites popular with gay and bisexual men. The banner ad stated, “Participate in University Research on Sex and Alcohol and Earn $30.” It included the university and study logo and a picture of a man. Id. at 1222. A total of 1725 participants, who identified themselves as male and having had sex with a man, completed the survey.
109 Dodds et al., supra note 7, at 137.
110 Id. at 142. Of 29 men who reflected on personal impact, almost half felt that prosecutions had not influenced their sexual behavior in any way. The rest said they had planned to behave and communicate differently with their sex partners as a direct result of concern at “the prospect of legal intrusion into their sex lives.” Id. at 140.
112 Nicole Crepaz et al., Do Prevention Interventions Reduce HIV Risk Behaviours Among People Living with HIV? A Meta-Analytic Review of Controlled Trials, 20 AIDS 143, 144 (2006); Peter H. Kilmarx, Francoise F. Hamers, & Thomas A. Peterman, Living with HIV: Experiences and Perspectives of HIV-Infected Sexually Transmitted Disease Clinic Patients After Posttest Counseling, 15 SEXUALLY TRANSMITTED DISEASES 25 (1998); Gary Marks, Nicole Crepaz & Robert S. Janssen, Estimating Sexual Transmission of HIV from Persons Aware and Unaware That They Are Infected with the Virus in the USA, 20 AIDS 1447 (2006); Weinhardt et al., supra note 6, at 1403.
possible time.113

Currently, in the United States, it is estimated that approximately one in five people infected with HIV (21%) are unaware that they are infected and may be “unknowingly transmitting the virus to others.”114 HIV has an asymptomatic incubation period that can last up to 10 years after infection, leaving HIV-positive individuals unaware of their HIV-positive status unless they are tested.115 HIV-positive individuals are infectious during this asymptomatic period, especially if they do not receive antiretroviral treatments.116 Public health efforts have responded to this situation by focusing on increasing HIV testing of at-risk individuals to inform them of their status at the earliest possible time.117

Public health experts worry that the criminalization of HIV-exposing behavior undermines these efforts because at-risk individuals may not undergo testing due to fear of criminal charges. The majority of HIV-specific criminal statutes in the United States punish HIV-positive individuals for engaging in certain behaviors if they know that they are HIV-positive.118 According to public health experts, individuals at high risk of infection may avoid testing because awareness of their status could be used against them in court.119

ii. Media Amplification of Criminalization’s Negative Effect on HIV Testing

According to existing research, media coverage can increase the impact of criminal law on HIV testing in several ways. First, media coverage can raise public awareness of the law. Because many people do not have direct experience with the criminal justice system, the public’s knowledge of the law may rely

118 See supra Section I.B.
largely on how the law is presented in the media. When the media publicizes that criminal courts use HIV test results to prove that HIV-positive individuals knowingly exposed others, at-risk individuals may decide to avoid testing to stay "legally negative." An empirical study investigated how at-risk individuals become aware of criminal liability for exposing others. Respondents pointed to media coverage as one of few information sources.

Second, the media could also indirectly discourage at-risk individuals' testing by cultivating a negative impression of HIV-positive individuals. Public health advocates claim that the media tends to highlight negative, sensational aspects of criminal cases, such as an HIV-positive criminal having malicious intention to infect others. According to these advocates, the sensationalized coverage could reinforce negative attitudes that society may already have against the HIV-positive population. Public health experts have pointed out that such social hostility could undermine public health efforts to encourage voluntary HIV testing and counseling of at-risk individuals.

iii. Dearth of Empirical Evidence to Assess Criminalization's Impact on HIV Testing Decisions

The validity of concerns regarding criminalization has not been empirically tested. To fill this research gap, this Note conducts a quantitative study to examine the impact of criminal laws on HIV testing decisions. The results of regression analysis fail to support the claim that people are less likely to be tested for HIV when they are subject to HIV-specific criminal law that prohibits exposure of HIV. The regression analysis, however, supports the claim that

121 Burriss et al., supra note 7, at 512.
124 Jürgens et al., supra note 123, at 166; Elliot, supra note 95, at 23-24; Verdict on a Virus, supra note 111, at 24-26.
increased reporting of criminalization of HIV exposure is associated with reduced HIV testing of at-risk individuals.

II. EMPIRICAL ANALYSIS OF HIV-SPECIFIC CRIMINAL STATUTES’ IMPACT ON HIV TESTING BEHAVIOR OF AT-RISK INDIVIDUALS

A. Methodologies

1. Regression Analysis

The analysis is designed to test the null hypotheses that there would be no difference in self-reported HIV testing decisions in the past 12 months (1) between at-risk individuals living in states with HIV-specific statutes and those in states without a statute, and (2) between at-risk individuals living in states with HIV-specific statutes and intense media coverage of the law and at-risk individuals residing in other states.

The study utilizes the concept of “difference-in-differences” (DID) estimators using two groups of states: (1) states that introduced HIV-specific statutes between 2002 and 2009 (treatment states), and (2) states that did not adopt a new HIV-specific law during this period (control states).\(^\text{126}\) The regression model takes the following form:

\[
\text{Outcome}_{ist} = F(\beta_0 + \beta_1 * C_{st} + \beta_2 * X_{st} + \beta_3 * Y_{sti} + \psi_s + \varphi_t + \epsilon_{st}),
\]

where \(\text{Outcome}_{ist}\) is whether respondent \(i\) living in state \(s\) and interviewed at time \(t\) reports having taken HIV testing in the past 12 months, \(C_{st}\) is whether the state the survey participant was residing in at the time of interview had an HIV-specific criminal law, \(X_{st}\) is the HIV prevention policy and other environmental factors in the state the respondent was living in in the year of interview, \(Y_{sti}\) is a vector of the demographic, social, and economic characteristics of the survey participant, \(\psi_s\) is a set of state fixed-effect dummies, \(\varphi_t\) is a set of year fixed-effect dummies, and \(F\) is the logistic function.

i. Outcome Variable

The outcome variable is a binary indicator of whether the survey participant reported that he or she had been tested for HIV in the past 12 months. Due to the

\(^{126}\) DID is an econometric models to analyze panel data that were collected before and after a treatment in a treatment group and a control group. DID estimators represent the average change in \(Y\) in the treatment group over the course of the experiment, minus the average change in \(Y\) in the control group over the same period. The merit of this estimation, compared to standard regression analysis, is that, by comparing the changes in two different groups, pretreatment differences in \(Y\) are eliminated. JAMES H. STOCK & MARK W. WATSON, INTRODUCTION TO ECONOMETRICS 480-82 (2d ed. 2007).
nature of the BRFSS, this study uses self-reported HIV testing experiences of survey participants. Because the dependent variable is binary, this study uses a logistic regression model.127

**ii. Treatment Variables Related to Criminalization of HIV-Exposing Behavior in Residing State**

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV-Specific Law</td>
<td>=1 if the state of residence had an HIV-specific criminal statute at the time of interview, 0 otherwise</td>
</tr>
<tr>
<td>HIV-Specific Law * Frequency of Media Reportage</td>
<td>Interaction term between the HIV-specific law variable and the frequency of news reports of HIV criminalization in that state in that year (continuous variable)</td>
</tr>
</tbody>
</table>

**Dummy Variable to Indicate Whether the Survey Participant’s State of Residence had an HIV-Specific Criminal Statute in the Year of Interview**

This study investigates whether residing in a state that criminalizes HIV-exposing behavior through an HIV-specific statute affects HIV testing decisions. The judiciary has also applied traditional criminal law and STD law to HIV-exposing behavior, and the impacts of these laws are also worth investigating.128 However, there is no reliable data on the number of prosecutions of HIV-exposing behavior based on traditional criminal law and STD law in each state by year. This study, therefore, focuses on the impact of HIV-specific criminal statutes.

The HIV-specific law variable takes the value of 1 if the survey participant’s state of residence had an HIV-specific criminal law in the year of interview. No state has abolished HIV-specific laws, so the HIV-specific law variable takes the value of 1 for all years from the year the law was adopted.129 For the states that did not adopt an HIV-specific statute, this variable is coded 0.130

127 Logistic regression is a non-linear regression model that is specifically designed for binary dependent variables. For details, see id. at 389.
128 See supra Sections I.C and I.D.
129 The states that introduced an HIV-specific criminal law between 2002 and 2009 are Alaska and Mississippi.
130 The states that did not adopt an HIV-specific statute are: Arizona, Connecticut, District of Columbia, Hawaii, Kansas, Maine, Massachusetts, Minnesota, Nebraska, New Hampshire, New Mexico, New York, Oregon, Rhode Island, Texas, Vermont, West Virginia, and Wyoming.
Interaction Term Between the HIV-Specific Law Variable and the Frequency of Media Reporting of Criminalization of HIV-Exposing Behavior in the State of Residence in the Year of Interview Variable

The regression model includes an interaction term between the HIV-specific law variable and the continuous variable that indicates the frequency of media reportage on criminalization of HIV-exposing behavior. The model includes this variable, based on previous research findings that it could be media reportage, rather than the actual law or its enforcement, which decides the influence of the law in society.\(^{131}\)

This study focuses on printed media because newspapers and journals are an "accessible, non-transient form of media."\(^{132}\) This study uses two databases to search for newspaper and journal articles that discuss criminalization of behavior that exposes others to HIV. For the newspaper and journal articles that the general public has access to, the Westlaw United States Newspaper (USNP) database is searched with several different combinations of keywords.\(^{133}\) The USNP database contains news reports from United States Papers, as provided by NewsRoom to West, a Thomson Reuters business.

The second database used is the Ethnic NewsWatch (ENW) database,\(^ {134}\) which focuses on news sources popular with populations known to be at higher risk of HIV infection.\(^ {135}\) The ENW features newspapers and magazines from ethnic and minority presses. It presents a comprehensive, full-text collection of more than 2.5 million articles from more than 340 publications offering both national and regional coverage.\(^ {136}\) This database also includes reports presented in Spanish, such as *El Nuevo Herald*.

For this study, several different combinations of keywords were used to

\(^{131}\) See *supra* Subsection I.E.2.


\(^{133}\) The combinations of keywords used are: "HIV" & "sentence!", "HIV" & "crim!", "HIV" & "acuss!", "HIV" & "prosecut!", "AIDS" & "transmit!" & "crim!", "AIDS" & "spread" & "crim!", and "AIDS" & "expos!" & "crim!".


\(^{135}\) Because this study focuses on the behavior of individuals at elevated risk of HIV infection, this study also takes into consideration the media to which the high-risk population is most exposed. The CDC has repeatedly reported that individuals with non-white racial backgrounds constitute the majority of the HIV-positive population in the United States. Div. of HIV/AIDS Prevention, Nat’l Ctr. for HIV/AIDS, Viral Hepatitis, STD & TB Prevention, *HIV in the United States: At a Glance*, CDC 2 (Nov. 2013), http://www.cdc.gov/hiv/pdf/Statistics_Basics_Factsheet.pdf.

\(^{136}\) Ethnic NewsWatch, supra note 134.
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collect reports about criminalization of HIV-exposing behavior from the ENW. 137 This study counted the number of newspaper articles that discuss (1) criminal charges brought against HIV-exposing individuals or (2) debates surrounding an HIV-specific statute in that state. This study does not include articles about HIV-specific statutes in other states or countries.

In counting the frequency of reporting, articles published in national press outlets such as the Chicago Tribune and the Los Angeles Times are considered to have an impact across states in the year of reporting. Articles featured in regional or local press outlets are considered to have an influence limited to the state where the article was published.

Because this media reportage variable is created based on news reports available on Westlaw, this variable does not capture the frequency of reports in other media such as television and radio. Therefore, it might have limitations in serving as an accurate proxy for media coverage. But this study is valuable in that it provides at least a rough estimate and is the first study to attempt to empirically assess the effect of media on the law’s impact.

iii. Variables Related to State-Level HIV Policies and Other Environmental Factors

Table 4. Descriptions of control variables

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC prevention funding</td>
<td>Preceding three-year average of CDC spending on HIV prevention in the state of residence</td>
</tr>
<tr>
<td>ADAPs spending</td>
<td>ADAPs budget per HIV patient in the state of residence in the interview year</td>
</tr>
<tr>
<td>AIDS rate</td>
<td>Preceding three-year average of annual AIDS rate per 100,000 population in the state of residence</td>
</tr>
</tbody>
</table>

Average of Preceding Three Years’ CDC Spending on HIV Prevention Programs in the Respondent’s State of Residence

The regression model includes a continuous variable to reflect the CDC’s spending on HIV prevention programs in the respondent’s state of residence around the time of interview. This CDC spending variable serves as a proxy for various factors related to states’ HIV prevention programs that affect HIV testing behavior. Studies indicate that the way local HIV prevention programs are

137 The combinations of keywords “HIV” & “crim!” , “HIV” & “prosecut!” , and “HIV” & “accus!” were used to search for articles that featured criminalization of behavior involving exposing others to HIV.
developed and run affect HIV testing behavior. For example, HIV testing decisions are influenced by access to HIV testing, the variety of test types offered, whether someone such as a health care provider or local HIV groups actively encouraged HIV testing, and whether an individual was exposed to information that increased understanding of how one can acquire HIV and prevent or treat infection.  

However, comprehensive data about local HIV testing programs are unavailable. The BRFSS surveys conducted in recent years contain information about some of the issues at stake, such as what type of HIV testing was offered and whether the testing site was easily accessible, but the BRFSS data collected in earlier years do not have information about these factors. This study, therefore, uses the CDC’s funding for state and local HIV prevention programs as a proxy of how actively the prevention programs were run, how accessible HIV testing was, whether a testing clinic had various options that suited the needs and preferences of individuals being tested, and whether the state had active education programs to encourage HIV testing of at-risk individuals.

The CDC’s funding for state and local HIV prevention programs is chosen as a proxy of state and local HIV prevention programs because the CDC’s funding significantly affects state and local HIV testing programs. The CDC fund constitutes a large portion of state governments’ spending on HIV prevention activities. Unpublished reports from 40 states to the CDC in 2000 indicate that federal funding accounted for approximately 60% of total HIV prevention spending in those states, ranging from 25% to 100% in each state. The Kaiser Family Foundation (KFF) estimates that CDC funding constituted between 84% and 95% of federal funding between the fiscal years 1995 and 2004. Reflecting


the significance of CDC funding for HIV testing programs, a team of researchers reported that changes in the CDC’s funding of state HIV prevention programs correlated with changes in the rate of people being tested for HIV.141

In creating this CDC spending variable, this study refers to the methodology used by Linas et al. (2006).142 Data of the National Alliance of State and Territorial AIDS Directors (NASTAD), which tracked the annual CDC funding for HIV prevention provided to state and local governments, is adjusted by the Consumer Price Index (CPI) for Urban Consumers in four different regions (Northeast, West, Midwest, and South).143 Subsequently, the average spending of the past three years, including the year of the interview, is entered into the regression model as a continuous variable.

**ADAPs’ Budget Per HIV Patient in the Respondent’s State of Residence in the Interview Year**

The regression includes a variable, which represents spending by AIDS Drug Assistance Programs (ADAPs) for one HIV patient in the respondent’s state of residence in the interview year. This continuous variable is a proxy for the availability of HIV treatment in the event an individual tests HIV-positive.

Many studies have found that people are more likely to be tested for HIV if treatments are available.144 Highly Active Antiretroviral Treatment (HAART) has been used to treat HIV-positive patients since the mid-1990s and has led to a dramatic prolongation of healthy lives of HIV-positive individuals.145 HAART, however, has not been available to everyone in need of treatment due to its high cost.146

The ADAPs have provided HIV-related prescription drugs to low-income HIV patients who would otherwise have limited or no coverage for prescription

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142 Id. at 1038-39.
143 NASTAD data was provided by NASTAD and is on file with the author.
The ADAPs began in 1987 and grew in the number of clients they serve. With more than 134,000 enrollees as of 2006, the ADAPs reach approximately one-quarter of those individuals with HIV estimated to be receiving care in the United States. In June of 2005 alone, the ADAPs provided medications to more than 96,000 clients and insurance coverage to thousands more. The ADAPs operate in all 50 states and the District of Columbia. The Ryan White Care Act requires all of ADAPs' clients to be HIV-positive as well as low income and either uninsured or underinsured. Reflecting the purpose of the programs, for most years, the majority of ADAPs' beneficiaries have been people of color and the uninsured.

The regression model includes a variable for ADAPs' budget per HIV patient in the respondent's state of residence in the year of interview. This variable is expected to function as a proxy for how likely treatment would be available for people who test positive for HIV. This study first collects each state's ADAPs spending from 2002 to 2009 from the KFF reports and then adjusts it by the regional CPI for Urban Consumers to reflect inflation along the years in four different regions (Northeast, South, West, and Midwest). This adjusted amount is then divided by the average AIDS cases in that state in three preceding years. The three preceding years' average AIDS cases are a proxy of the prevalence of HIV in that state. By dividing the amount of ADAPs spending by the number of average AIDS cases, this variable indicates the average money spent for each HIV patient in that state in that year. This variable is included in the regression model as a continuous variable.

Average of Preceding Three Years' AIDS Rates Per 100,000 People in the Respondent's State of Residence

Previous findings suggest that the number of people tested for HIV is associated with the prevalence of HIV in the community; the higher the prevalence, the more likely people are to be tested. Because there is no reliable

147 The description of ADAPs can be found at AIDS Drug Assistance Programs (ADAPs), KAISER FAMILY FOUND. (June 25 2013), http://kff.org/hivaids/fact-sheet/aids-drug-assistance-programs/.
149 Nat'l Alliance of State & Territorial AIDSDirs. et al., supra note 148.
150 Id.
151 Peter D. Ehrenkranz et al., Written Informed-Consent Statutes and HIV Testing, 37 AM. J. PREVENTIVE MED. 37, 60 (2009) reporting that respondents living in states with a higher prevalence of AIDS per capita were more likely to report recent HIV testing (18.3%) than people living in states with a lower prevalence of AIDS per capita (12.5%)); Kathryn A. Phillips, The Relationship of 1988 State HIV Testing Policies to Previous and Planned Voluntary Use of HIV Testing, 7 J. AIDS 403, 405 (1994) (reporting that testing rates generally increase with higher AIDS incidence).
data on HIV prevalence in each state in each year, this study uses the average of three preceding years’ AIDS rates per 100,000 people in the respondent’s state of residence as a proxy of HIV prevalence. This variable is expected to control for any influence a high prevalence of HIV might have on an individual’s decision to be tested.

This study uses publicly available CDC data to calculate the average of three year’s AIDS rate per 100,000 people from 2002 to 2009. The regression includes this average AIDS rate in the state the survey participant lived in as a continuous variable.

**iv. Variables Related to Individual Characteristics of Survey Participants**

<table>
<thead>
<tr>
<th>Factors Reported to Affect HIV Testing</th>
<th>Factors in Regression Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race $^{133}$</td>
<td>Race</td>
</tr>
<tr>
<td>Age $^{134}$</td>
<td>Age</td>
</tr>
<tr>
<td>Sex $^{135}$</td>
<td>Sex</td>
</tr>
<tr>
<td>Marital status $^{136}$</td>
<td>Marital status</td>
</tr>
<tr>
<td>Pregnancy experience $^{157}$</td>
<td>[Proxies] Age, Sex, Martial status, Current pregnancy status</td>
</tr>
<tr>
<td>Education level $^{158}$</td>
<td>Education level</td>
</tr>
<tr>
<td>Employment status $^{159}$</td>
<td>Employment status</td>
</tr>
<tr>
<td>Income level $^{160}$</td>
<td>Income level</td>
</tr>
</tbody>
</table>

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153 See Inungu, supra note 138; Paul A. Simon et al., Reasons for HIV Antibody Test Refusal in a Heterosexual Sexually Transmitted Disease Clinic Population, 10 AIDS 1549 (1996); Kellerman et al., supra note 138.


155 Kellerman et al., supra note 138; Simon et al., supra note 153.

156 Grinstead et al., supra note 154; Inungu, supra note 138.


158 Id.

159 Id.

160 Spielberg et al., Testing Strategies, supra note 138, at 349. Many studies have limited their scope of analysis to HIV testing of at-risk individuals with low-income. See Angela B. Hutchinson et al., Understanding the Patient’s Perspective on Rapid and Routine HIV Testing in an Inner City Urgent Care Center, 16 AIDS EDUC. & PREVENTION 101, 112 (2004); Kathleen J. Sikkema et al., Outcomes of a Randomized Community-Level HIV Prevention Intervention for Women Living in 18 Low-income Housing Developments, 90 AM. J. PUB. HEALTH 57 (2000).
The regression model includes the demographic and socioeconomic characteristics of survey participants as control variables. The variables include age, race, sex, marital status, current pregnancy status, education level, employment status, income level, health insurance coverage, and self-perception of general health condition. In selecting the variables, this study refers to other empirical studies that include a similar list of control variables to assess the impact of a public policy on HIV testing behavior. Many studies have found that a number of demographic and socio-economic factors affect HIV testing behavior.

For factors not included in the BRFSS, this study uses proxies to control for potential confounders. The BRFSS does not have information about whether the survey participant had ever been pregnant, whether the participant had financial barriers to HIV testing, or if the participant experienced an HIV-related health condition. For pregnancy experience, this study uses age, sex, marital status, and current pregnancy status as proxies. For financial barriers to HIV testing, this study uses health insurance coverage, employment status, and income level as proxies. For whether the person felt that he or she had a health problem associated with an HIV infection, this study uses self-perceived general health condition as a proxy.

<table>
<thead>
<tr>
<th>Table 6. Descriptions of Control Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled Factor</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Race\textsuperscript{165}</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Now pregnant</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{161} Spielberg, et al., Overcoming Barriers, supra note 138; Spielberg et al. Testing Preferences, supra note 138.
\textsuperscript{162} Ted Myers et al., Factors Affecting Gay and Bisexual Men's Decisions and Intentions to Seek HIV Testing, 83 AM. J. PUB. HEALTH 701 (1993); Kellerman, supra note 138.
\textsuperscript{163} Ehrenkranz, supra note 151; Linas, supra note 141; Phillips, supra note 151; Nicola M. Zetola et al., Association Between Rates of HIV Testing and Elimination of Written Consents in San Francisco, 297 JAMA 1061 (2007).
\textsuperscript{164} Inungu, supra note 138; Grinstead, supra note 154; Simon, supra note 153.
\textsuperscript{165} “Other races” includes “Asian,” “Pacific Islander,” “American Indian,” and “Alaska Native.”
\textsuperscript{166} Due to the design of the BRFSS survey, the samples consist of individuals aged 18 and older.
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status</td>
<td>Married: $1$ if currently married, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Married missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
<tr>
<td>Education level</td>
<td>Education level 1: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Education level 2: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Education level 3: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Education level missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
<tr>
<td>Employment status</td>
<td>Employed: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Employed missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
<tr>
<td>Income level</td>
<td>Income level 1: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Income level 2: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Income level 3: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Income level missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
<tr>
<td>Health insurance</td>
<td>Have health insurance: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Health insurance missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
<tr>
<td>General health condition</td>
<td>Poor health: $1$ if yes, $0$ otherwise.</td>
</tr>
<tr>
<td></td>
<td>Poor health missing: $1$ if value missing, $0$ otherwise.</td>
</tr>
</tbody>
</table>

(*: Excluded from regression to avoid multicollinearity)

Each variable is created as presented in Table 6. In order to capture any bias created by missing values, this study includes a separate binary variable to indicate cases with missing values for each control variable. These variables are coded 1 if the value is missing and 0 if the question is answered in any way.

The regression model does not include a variable for the participant’s self-perceived risk of HIV infection, although other studies have reported that this

167 The answers classified as “unmarried” are: “divorced,” “widowed,” “separated,” “never been married,” and “a member of an unmarried couple.”

168 The answers that belong to this category are: “Never attended school or only kindergarten,” “Grades 1-8 (Elementary),” and “Grades 9-11 (Some high school).”

169 This variable represents whether the survey participant reports having had “Grade 12 or GED (High school graduate).”

170 This variable represents whether the survey participant reports having had “education of College 1-3 years (Some college or technical school).”

171 The answers classified as employed are: “employed for wages” and “self-employed.” The answers classified as unemployed are: “out of work for more than 1 year,” “out of work for less than 1 year,” “homemaker,” “student,” “retired,” and “unable to work.”

172 The answers classified under this category are: “under 10,000,” “10,000 to less than 15,000,” and “15,000 to less than 20,000.”

173 The answers classified under this category are: “20,000 to less than 25,000” and “25,000 to less than 35,000.”

174 The answers classified under this category are: “35,000 to less than 50,000” and “50,000 to less than 75,000.”

175 The answers classified as non-poor health are: “excellent”, “very good”, “good”, or “fair” health.
factor substantially influences HIV testing decisions. The variable is not included because this study uses cases where the survey participant acknowledged being in a high-risk situation. Consequently, there is no relevant difference in the perception of HIV infection risk among survey respondents included in the analysis.

Because the risk acknowledgement question asks about the respondent’s experience in engaging in a risky sexual activity, the potential confounders related to sexual activities are controlled for in the regression analysis. They include the experience of having had more than one sex partner, intercourse with a non-regular partner, and unprotected vaginal or anal intercourse.

This regression does not include control variables about emotional factors because the BRFSS does not include information about these factors. According to research, an individual’s decision to undertake HIV testing could be affected by fear of learning about HIV, dislike of needles, stress of waiting for the test result, lack of partner or peer support, lack of motivation to protect others, and dislike of condom use. However, omission of these emotional factors in the regression analysis is not likely to undermine the reliability of the estimates of primary independent variables because these factors are not systematically associated with the HIV-specific law variable; there is no reason to believe that at-risk individuals’ characteristics along these dimensions are different in states that have criminal exposure laws relative to those without such laws.

v. State and Year Fixed-Effect Variables

State Fixed-Effect Dummy Variables

The regression includes a total of 50 “state fixed-effect” dummy variables to indicate the state where the respondent lived at the time of interview. Because this regression uses pooled-cross section data, this variable is expected to control for otherwise uncontrolled static differences across states that might have affected an individual’s decision to be tested for HIV.


177 Every year, the survey questionnaire asked whether any of the following applied: “You have used intravenous drugs in the past year;” “You have been treated for a sexually transmitted or venereal disease in the past year;” “You had anal sex without a condom in the past year;” “You had anal sex without a condom in the past year.” E.g., 2009 Behavioral Risk Factor Surveillance System


178 Maguen, supra note 176; Myers et al., supra note 163; Samet, supra note 157.

179 Inungu, supra note 138; Kellerman, supra note 138; Samet, supra note 157; Spielberg et al., Overcoming Barriers, supra note 138; Spielberg et al., Testing Preferences, supra note 138.

Year Fixed-Effect Dummy Variables

The regression model includes a set of year dummy variables to indicate the year the participant completed the BRFSS interview. Because this study uses survey data conducted over a seven-year time span—from 2002 to 2009 (except 2007)—there could be factors that changed over time but were constant across states, and that other control variables do not control for. These dummy variables are expected to capture such changes that might have occurred over time and affected how at-risk individuals reported their recent HIV testing experiences.

vi. Additional Details About Regression Analysis

Clustered-Robust Analysis

In DID analysis, when the treatment variable changes very little within a cluster over time, within-cluster correlation may harm the reliability of the estimates. In this study, the criminalizing policies of the majority of states did not change much during the period of study. Over nine out of 10 samples (91.8%) lived in states that did not introduce an HIV-specific statute between 2002 and 2009; only 8.2% of samples were collected in states where the state adopted an HIV-specific statute during the period of the study. In addition, once a state adopted an HIV-specific law, it did not abolish it. As a result, there was not much variation in the status of the law within states. In order to account for within-cluster correlation that might occur in DID, this study clusters errors by states.

This study also standardizes all continuous variables to achieve convergence. This study standardizes the variables of age, CDC funding, ADAPs’ spending, AIDS rate, and the interaction term created between HIV-specific law and the frequency of media reportage. For the analysis, this study uses R as the programming language.

Robustness Check: Lagged Treatment Variables

This study conducts a robustness check to determine whether the results of
the original regression are reliable. It is difficult to draw a clear line at when exactly after its adoption the criminal law started to affect people’s HIV testing decisions. This study, therefore, conducts a separate regression with one-year lagged treatment variables: (1) the lagged HIV-specific law variable, and (2) the interaction term between this variable and the frequency of media reportage variable. As discussed in Section II.B, the results of this regression are nearly identical to those of the original regression.

Robustness Check: Missing-Value Variables

This study uses binary missing-value variables to prevent the bias that dropping observations with missing values from the dataset could cause. In order to check whether observations with missing values have certain traits that are associated with HIV testing, this study first conducts regressions with observations that have missing values. For each control variable, a binary missing-value variable is created and included in the regression. For example, for income level, the income-level missing-value variable is created to indicate whether income level information is missing for that observation. For observations that have a missing value for income level, this missing-value variable is coded 1. Model 1 and Model 3 of the regression in Table 8 present the results of regression with all observations that have missing values.

If the missing-value variable does not have statistical significance in Model 1 and Model 3, observations that have missing values for that variable are dropped from the samples. Missing-value variables for health condition, health insurance coverage, marital status, employment status, race, and pregnancy status do not have statistical significance in Model 1 and Model 3. Therefore, observations that do not have values for these variables are deleted from the data set, and the second group of regressions—Model 2 and Model 4—is conducted with data that do not have missing values for these variables. As Table 8 presents, the results are similar to those of regression using data that include observations with missing values.

2. Description of Samples

i. About BRFSS

The BRFSS is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access. The CDC established the BRFSS in 1984, and currently the CDC

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collects data monthly in 50 states and the District of Columbia. Data is collected from a random sample of adults (one per household) through a telephone survey. Over 350,000 adults are interviewed each year, but the interview is not repeated to the same individuals.\textsuperscript{186}

The BRFSS started to cover HIV-related health behaviors in 1993. Although each year’s questionnaire has had different forms of questions, the BRFSS usually contains questions regarding recent HIV testing experiences, with an exception in 2007. Since 1998, the questionnaires have asked whether the participant had been tested for HIV within the last year or their last HIV testing had taken place. The BRFSS also collected information about how survey participants perceive their risks of contracting HIV by asking whether any high-risk situations apply. The BRFSS has also consistently contained a wide range of useful information about the demographic characteristics of survey participants.\textsuperscript{187}

Because the BRFSS is survey data, it has some inherent limitations. The BRFSS relies on the answers of survey participants, so there could be a reporting bias. Given the strong stigma associated with HIV, there is a possibility of underreporting of HIV testing. There could also be a selection bias, since only those who had telephone numbers participated in the BRFSS. In addition, this study selected samples that have answers to HIV testing experience and the high-risk situation.\textsuperscript{188} Given the stigma attached to these high-risk groups, it is possible that a substantial portion of individuals at high risk for HIV infection refused to answer the question or did not faithfully answer the question, and accordingly were not included in the regression analysis.

\textit{ii. Samples Used in Regression Analysis}

The sample contains a total of 11,078 observations selected from the original BRFSS data sets collected from 2002 to 2009 (with the exception of 2007).\textsuperscript{189}

\footnotesize{\textsuperscript{186} Because of this collection method, the BRFSS is pooled cross-section data, not panel data. Pooled cross-section uses cross-section data collected at two or more different times. Pooled cross-section is analyzed like a standard cross-section, except that differences occurring across time are considered in the analysis. \textit{Wooldridge, supra} note 180, at 10.

\textsuperscript{187} This information includes each participant’s state of residence, sex, age, race, marital status, education level, employment status, income level, and current pregnancy status. The survey data also has information about each participant’s perception of his or her general health condition, and whether the participant had any kind of health insurance coverage at the time of interview.

\textsuperscript{188} \textit{See supra} note 177.

\textsuperscript{189} This study excludes the 2007 survey from the analysis because the survey did not have a question about the recent HIV testing experience of the respondent. This study originally attempted to include observations collected from 1998 to 2001 as well. However, during that period, most states that did not adopt an HIV-specific criminal law did not participate in the BRFSS survey. \textit{See infra}, Appendix 1. Insufficient data during the specific survey period raises the question of how the inclusion of data from this period would affect the outcome. Therefore, this study limited its scope of analysis to from 2002 to 2009, excluding 2007.

This data excluded four observations collected in Hawaii in 2004 because the number of
The selection was made based on whether the observation had answers to the recent HIV testing experience question and the high-risk situation question described above. Model 2 and Model 4 regression use data that do not have missing values for all control variables (except income level and education level). Hence, the sample size reduced to 9,705. For the distribution of samples in terms of state and year, see Appendix 1.

### Table 7. Sample Demographic and Socio-economic Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Individual characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>5242</td>
<td>47.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>5836</td>
<td>52.7</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>White</td>
<td>7295</td>
<td>65.9</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>1425</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>1293</td>
<td>11.7</td>
</tr>
<tr>
<td></td>
<td>Other or multiracial</td>
<td>993</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>72</td>
<td>0.6</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>2612</td>
<td>23.6</td>
</tr>
<tr>
<td></td>
<td>Not Married</td>
<td>8431</td>
<td>76.1</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>35</td>
<td>0.3</td>
</tr>
<tr>
<td>Education level</td>
<td>No education or Kindergarten</td>
<td>13</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Elementary school</td>
<td>236</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Some high school</td>
<td>1037</td>
<td>9.4</td>
</tr>
<tr>
<td></td>
<td>High school graduate</td>
<td>2959</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>Some college or technical</td>
<td>3129</td>
<td>28.2</td>
</tr>
<tr>
<td></td>
<td>College graduate</td>
<td>3699</td>
<td>33.4</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>5</td>
<td>0.0</td>
</tr>
<tr>
<td>Employment status</td>
<td>Employed until within a year</td>
<td>8236</td>
<td>74.3</td>
</tr>
<tr>
<td></td>
<td>Not employed for over a year</td>
<td>2828</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>14</td>
<td>0.1</td>
</tr>
<tr>
<td>Income level</td>
<td>&lt;19,999</td>
<td>2785</td>
<td>25.1</td>
</tr>
<tr>
<td></td>
<td>20,000-34,999</td>
<td>2405</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>35,000-74,999</td>
<td>2937</td>
<td>26.5</td>
</tr>
<tr>
<td></td>
<td>75,000&gt;</td>
<td>2033</td>
<td>18.4</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>918</td>
<td>8.3</td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td>Have any health plan</td>
<td>8649</td>
<td>78.1</td>
</tr>
<tr>
<td></td>
<td>No health plan</td>
<td>2410</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>19</td>
<td>0.2</td>
</tr>
<tr>
<td>Self-perceived health condition</td>
<td>Poor health condition</td>
<td>561</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>Fair or better health</td>
<td>10493</td>
<td>94.7</td>
</tr>
</tbody>
</table>

Observations in this state and year is not large enough and could thus cause bias. In all four of these observations, all survey participants answered that they had HIV testing in the past 12 months, for a testing rate of 100%. This rate is clearly an outlier compared to the average testing rate of 42.5% in other states.

190 See supra note 177.
Among 11,078 respondents, 4,428 (40%) reported that they had been tested for HIV in the past 12 months for a purpose other than blood donation. 575 respondents (5.2%) lived in the states that had HIV-specific criminal statutes at the time of interview. 906 survey participants (8.2%) lived in states that adopted an HIV-specific statute between 2002 and 2009 (treatment states).

B. Results

The results of the regression in all four specifications show that the HIV-specific law variable does not have a statistically significant impact on the outcome variable. On the other hand, the interaction between the HIV-specific law variable and the media reporting frequency is statistically significant in all models. For every unit of increase in the media reporting of HIV criminalization, a 7% to 9% decrease of the HIV testing rate is expected in states with HIV-specific statutes, all other factors held constant.

Table 8. Regression Results

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Non-lagged treatment variables</th>
<th>Lagged-treatment variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With missing variables (Model 1)</td>
<td>Without missing variables (Model 2)</td>
</tr>
<tr>
<td>HIV-specific law</td>
<td>0.11 (0.17)</td>
<td>0.09 (0.18)</td>
</tr>
<tr>
<td>HIV-specific law*Frequency of media reportage</td>
<td>-0.08(0.03)***</td>
<td>-0.07(0.03)**</td>
</tr>
<tr>
<td>Age</td>
<td>-0.37(0.03)***</td>
<td>-0.35(0.03)***</td>
</tr>
<tr>
<td>Sex</td>
<td>0.31(0.05)***</td>
<td>0.30(0.05)***</td>
</tr>
<tr>
<td>Poor health condition</td>
<td>0.15(0.10)</td>
<td>0.21(0.11)*</td>
</tr>
<tr>
<td></td>
<td>Estimate (SE)</td>
<td>Estimate (SE)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Health condition missing</td>
<td>0.17(0.43)</td>
<td>0.17(0.43)</td>
</tr>
<tr>
<td>Have health insurance</td>
<td>0.28(0.05)**</td>
<td>0.29(0.06)**</td>
</tr>
<tr>
<td>Health insurance missing</td>
<td>0.53(0.50)</td>
<td>0.52(0.50)</td>
</tr>
<tr>
<td>Married</td>
<td>-0.71(0.05)**</td>
<td>-0.72(0.06)**</td>
</tr>
<tr>
<td>Married missing</td>
<td>-0.43(0.37)</td>
<td>-0.42(0.37)</td>
</tr>
<tr>
<td>Education level 1-4</td>
<td>-0.09(0.08)</td>
<td>-0.13(0.08)</td>
</tr>
<tr>
<td>Education level 2-4</td>
<td>0.01(0.06)</td>
<td>0.00(0.06)</td>
</tr>
<tr>
<td>Education level 3-4</td>
<td>0.02(0.06)</td>
<td>0.00(0.06)</td>
</tr>
<tr>
<td>Education level missing</td>
<td>2.16(1.16)*</td>
<td>2.15(1.16)*</td>
</tr>
<tr>
<td>Employed</td>
<td>-0.13(0.05)**</td>
<td>-0.12(0.06)**</td>
</tr>
<tr>
<td>Employment missing</td>
<td>-0.43(0.62)</td>
<td>-0.43(0.62)</td>
</tr>
<tr>
<td>Income level 1-4</td>
<td>0.22(0.08)**</td>
<td>0.22(0.08)**</td>
</tr>
<tr>
<td>Income level 2-4</td>
<td>0.09(0.07)</td>
<td>0.04(0.08)</td>
</tr>
<tr>
<td>Income level 3-4</td>
<td>0.02(0.07)</td>
<td>0.01(0.07)</td>
</tr>
<tr>
<td>Income level missing</td>
<td>0.25(0.09)**</td>
<td>0.18(0.10)*</td>
</tr>
<tr>
<td>Race: White</td>
<td>-0.24(0.08)**</td>
<td>-0.21(0.08)**</td>
</tr>
<tr>
<td>Race: Black</td>
<td>0.16(0.10)*</td>
<td>0.16(0.10)</td>
</tr>
<tr>
<td>Race: Hispanic</td>
<td>-0.05(0.09)</td>
<td>-0.02(0.10)</td>
</tr>
<tr>
<td>Race missing</td>
<td>0.35(0.25)</td>
<td>0.34(0.26)</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>1.21(0.15)**</td>
<td>1.22(0.15)**</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>0.00(0.08)</td>
<td>0.00(0.08)</td>
</tr>
</tbody>
</table>
Criminal Law and HIV Testing

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS rate</td>
<td>-0.10(0.30)</td>
<td>-0.07(0.32)</td>
<td>-0.09(0.30)</td>
<td>-0.05(0.32)</td>
</tr>
<tr>
<td>CDC funding</td>
<td>0.12(0.13)</td>
<td>0.05(0.14)</td>
<td>0.12(0.13)</td>
<td>0.05(0.14)</td>
</tr>
<tr>
<td>ADAPs’ spending</td>
<td>-0.03(0.04)</td>
<td>-0.01(0.04)</td>
<td>-0.03(0.04)</td>
<td>-0.02(0.04)</td>
</tr>
</tbody>
</table>

Standard errors in parenthesis
*significance at 10%, **significance at 5%, ***significance at 1%
(Model 1) AIC: 13962, BIC: 14372, logLik: -6925
(Model 2) AIC: 12417, BIC: 12776, logLik: -6158
(Model 3) AIC: 13962, BIC: 14372, logLik: -6925
(Model 4) AIC: 12416, BIC: 12775, logLik: -6158

C. Discussion of Results

1. Regarding HIV-Specific Laws’ Influence on HIV Testing

In all specifications, the HIV-specific law variable has no statistically significant impact on HIV testing decisions, holding other conditions constant. State of residence is a broad proxy that reflects HIV-specific statutes’ direct and indirect influence on HIV testing decisions concerning at-risk individuals. Thus, failures to reject the null hypothesis with this state-of-residence variable do not explain the dynamics of the interaction between criminal law and HIV testing.

The findings of this study are noteworthy, however, because they are in line with many other empirical studies that have found that HIV testing policies do not affect at-risk individuals’ HIV testing decisions as much as critics of the policies assume. For example, in one study, researchers examined the number of HIV tests conducted from 1993 to 2000 in one state that adopted mandatory reporting of HIV in 1998. The results showed that HIV testing frequencies did not decrease after introducing the mandatory reporting of HIV infection. In another empirical study, a group of researchers used HIV Testing Survey (HITS) data collected in California to test at-risk individuals’ knowledge of and behavior concerning HIV testing. Contrary to what public health experts thought, this

191 Burris et al., supra note 7, at 493.
192 Klitzman et al., supra note 119, at 46-47, 49, 50-51.
study found that participants who thought California had name-based HIV reporting were more likely to have been tested for HIV infection, a result possibly attributed to participants’ poor understanding of reporting regulations; in fact, only 5% of survey participants knew that California had a name-based HIV reporting system, and only 6% were aware of the recent changes in California’s HIV reporting policy.\textsuperscript{195}

An empirical study of HIV-specific laws’ influence on sexual behavior of at-risk individuals also mentions that an HIV-specific law is likely to have a marginal influence on HIV testing. Scott Burris and colleagues found that residence in two different states with different HIV criminal law was not associated with reduced reporting of risky sexual activity. The research also found that residence in different states was not correlated with different beliefs about HIV criminal law.\textsuperscript{196} The researchers concluded that their results do not “lend support” to the claim that HIV-specific laws influence people at high risk of HIV infection to shun public health services.\textsuperscript{197}

The empirical study presented in this Note does not alone provide sufficient information about how HIV-specific statutes affect HIV testing decisions, as such statutes could have had a wide range of direct and indirect influences on HIV testing. The study does show, however, that these influences cannot be said to cause at-risk individuals to report different testing behavior.

2. The Media’s Intermediary Role between Criminalization and HIV Testing Behavior

The coefficient of the interaction term between the HIV-specific law variable and the media reportage frequency variable is statistically significant in all model specifications; increased media reporting of criminalization in states with HIV-specific statutes is correlated with a fewer number of people who reported having been tested for HIV in the past year.

This study used the number of newspaper reports on criminalization of behavior that exposes others to HIV as a rough proxy for media coverage intensity. The study’s frequency count includes newspaper reports on criminal prosecutions brought against HIV-positive individuals for knowingly exposing others to HIV as well as on debates surrounding the adoption of a statute criminalizing HIV exposure.\textsuperscript{198} This proxy does not reveal why and how such media coverage affects the law’s influence, but it does show that a factor associated with this frequency affects the law’s influence on HIV testing.

News reports, together with introduction of an HIV-specific criminal statute, may have heightened people’s awareness of the criminal law, which led to less HIV testing. Frequent media coverage of criminalization may have alerted at-risk

\textsuperscript{195} Id. at 94-95.
\textsuperscript{196} Burris et al., supra note 7, at 502.
\textsuperscript{197} Id. at 512.
\textsuperscript{198} See supra Subsection II.A.3.
individuals that positive HIV test results could be used against them to prove criminal liability for knowingly exposing others to HIV.

Alternatively, the adoption of a criminal statute and the robust media reporting of HIV exposure’s criminalization could have deepened social hostility against HIV-positive individuals. HIV-specific statutes could have singled out the HIV-positive population from the rest of society and stigmatize this population as a dangerous group requiring special attention and social regulation.\(^\text{199}\) In addition, the media could have sensationalized high-profile cases involving extremely condemnable HIV-positive individuals who intentionally infected others with HIV.\(^\text{200}\) The prevalence of this negative sentiment could have deterred at-risk individuals from utilizing public health services, including HIV testing.

These possibilities are highly likely, based on what is already known about HIV. Yet, these theories are not evidence-based. In order to provide recommendations for criminal policy that supports public health goals, it is necessary to gather further evidence on the interactions between the media, criminalization, and HIV testing.

### III. Guidance for Future Research Efforts

This Note finds that criminalization of behavior that exposes others to HIV might not exert as significant an influence on HIV prevention as claimed by public health experts and advocacy groups.\(^\text{201}\) These groups argue that at-risk individuals might abstain from HIV testing based on fear of punitive sanctions for knowingly exposing others to HIV.\(^\text{202}\) In fact, empirical studies have identified the fear of criminal prosecution as a possible deterrent to HIV testing.\(^\text{203}\) However, the results of the empirical analysis in this Note failed to find support for this claim; residence in states with HIV-specific criminal statutes was not associated with a fewer number of at-risk individuals who reported that they had been tested for HIV in the past year.

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200 Jürgens et al., supra note 123, at 166; Verdict on a Virus, supra note 111, at 24-26; Elliot, supra note 95, at 23-24.

201 See supra Subsection I.E.2.


203 For empirical studies, see Dodds et al., supra note 7, at 140-41 (noting that some participants in a focus group cited criminalization as a deterrence to HIV testing) and Klitzman et al., supra note 119, at 49-50 (noting that some survey participants expressed fear that criminalization of behaviors exposing others to HIV might deter people from being tested).
However, because the regression shows another contradicting result, the conclusion that criminal laws might not exert a significant influence on HIV prevention should be made with caution. Regression analysis also indicates that the adoption of a new HIV-specific criminal law together with intense media coverage of this criminalization is associated with reduced HIV testing in at-risk individuals. These results indicate that HIV testing decisions could be affected if the media actively broadcasts about criminal law. The specific reason why such heavy broadcasting of the law is associated with the decreased number of people being tested for HIV is unknown. It is possible that media reporting of HIV-specific statutes increases stigma against HIV-positive individuals, making at-risk individuals hesitant to come forward for HIV testing. Media reporting could also increase at-risk individuals’ awareness of the law, thereby making them fearful that their HIV test results could be used against them in criminal courts. In any event, this result proves that the concerns critics of criminalization of HIV-exposing behavior have raised may have a point. When coupled with certain factors, criminal law can have a substantially negative impact on HIV testing of at-risk individuals.

To provide a detailed recommendation for how criminal law should be changed to prevent such a negative impact on HIV testing, further research exploring the dynamic of HIV criminalization, media coverage, and HIV testing is necessary. To understand the dynamic, future research should investigate individuals’ perceptions of the law and the impact of these perceptions on HIV testing decisions. In addition, measurement of the relationship between stigma, HIV criminalization, media coverage, and HIV testing is crucial to improving the criminal law.
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