

Review Article

Bio-Crime and Public Health: Legal and Forensic Perspectives on the Intentional Transmission of HIV and Communicable Diseases

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A B S T R A C T

The conscious spread of infectious diseases, particularly HIV, is one of the most challenging intersections between law, forensics, psychiatry and public health. In India, the relevant laws are compartmentalised, while Sections 271-272 of the Bharatiya Nyaya Sanhita (BNS), 2023, deal with negligent and malignant acts that are likely to spread infection, while the Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (Prevention And Control) Act, 2017 (HIV & AIDS Act) prohibits discrimination and certain acts (Section 4), imposes a duty to prevent transmission (Section 10), and protects confidentiality with specific exceptions (Sections 8–9); Section 37 prescribes penalties for contravention. The courts have faced this dilemma of striking a balance between these provisions and the right to autonomy in the case of *Mr X v. Hospital Z* (1998), when prerogatives of confidentiality clashed with public interest. Courts across the world have had different approaches, ranging from *R v. Dica* (UK, 2004), which held reckless transmission as serious harm, to *R v. Mabior* (Canada, 2012), requiring disclosure of HIV status even when a person is virally suppressed. For forensic science, it gets more complicated. Although sequencing of the microbial genome and phylogenetic comparisons can indicate a direct connection between source and victim, they seldom demonstrate criminal intent beyond reasonable doubt. The lack of forensic guidelines and psychiatric evaluations increases the likelihood of miscarriages, which are already being directed at marginalised groups. This article uses exceptions and putative remedies to critically examine current statutes, judicial solutions, and forensic realities and argues in opposition against stigma-laden attacks on human dignity.

Keywords: Bharatiya Nyaya Sanhita (BNS), Forensic evidence, HIV & AIDS, Human rights, Intentional transmission, Public health law.

Introduction

Bio-Crime in the Era of Communicable Diseases

The biocrime, or deliberate spread of infectious diseases, has provided one of the most contentious areas of overlap between law, medicine, and public health. At its heart is the act of deliberately employing one's infection as violence, posing tough questions around culpability, ensuring victim protection, and seeing where it stands from a state intervention perspective. Although HIV & AIDS has become the focus of legal and judicial discussions due to their stigma, severity, and incurability over time, studies have cast light on other viruses such as Hepatitis B, Hepatitis C, or even emerging pathogens like SARS-CoV-2 (COVID-19) gradually appearing in cases of intentional infection or reckless exposure.

This is what creates an ongoing legal-epidemiologic tension. On one hand, the state has a responsibility to defend its citizens against deadly pandemics. On the other hand, over-criminalization can reinforce stigma, dissuade testing, and undercut public health approaches based on confidentiality and consent. This balance is not easy to strike, and domestic and foreign courts often fail to strike it, especially when prosecutorial discretion is also affected by overblown media coverage or moral panic.

The research gap is clear: despite increasing prosecutions in the world, no unified methodology integrates forensic evidence with the law's requirements and psychiatric findings. Forensics is often unable to provide a conclusive account of intent; law tends to use blunt instruments like generic criminal categories or to have no distinction at all in the case of the mentally impaired; and psychiatry usually works with little or no ground between recklessness/negligence and malice. This article locates bio-crime on that intersection, contending that the judiciary and legislatures should move from fear-based to fact-based, rights-respecting adjudication.

Methods

This review article employs doctrinal legal research grounded in legal provisions, case laws, and policy perceptions to examine the legal, forensic, and public health dimensions of the intentional transmission of HIV and other communicable diseases. The study adopts a descriptive and critical-analytical methodology examining statutory provisions such as the Bharatiya Nyaya Sanhita, 2023, and the HIV/AIDS (Prevention and Control) Act, 2017; judicial decisions from India and comparative jurisdictions; peer-reviewed scientific literature; forensic studies; forensic psychiatry; and public health reports to assess the evidentiary value of forensic techniques in determining criminal intent and the human rights implications of criminalization policies. The objective

is to identify legal gaps and propose a balanced framework that integrates public health concerns, scientific reliability, and principles of justice. A selective review of English-language legal and scholarly literature was conducted using databases including Google Scholar, ScienceDirect, Scopus, PubMed, Hein Online, and JSTOR, focusing on the legal, forensic, and public health dimensions of bio-crime and the intentional transmission of HIV and communicable diseases. Non-English publications were excluded from this review. Search terms used in titles, abstracts, and keywords included "bio-crime," "intentional HIV transmission," "communicable disease transmission," "infectious disease law," "criminal liability HIV transmission," "recklessness disease transmission," "disease transmission criminal liability," and "bio-ethical legal framework." Selected studies were hand-searched to enhance the robustness of findings. The analysis is based on normative arguments and does not include primary quantitative data.

The Medical and Epidemiological Context

The deliberate spread of infectious diseases straddles the uncomfortable line between epidemiology and criminal law. HIV has been most prominent among prosecutions because of its chronic and lifelong treatment needs, as well as deep social stigma. But other diseases with long (illogical) latency periods, such as Hepatitis B and C (bloodborne), or fast transmission times and geopolitical presence in the form of COVID-19 (airborne), or sexually transmitted illnesses like syphilis have at times come up in legal settings where deliberately or recklessly spreading was alleged.

From a public-health point of view, intentional infection undermines decades of success in prevention and education. In contrast to accidental infection, deliberate transmission can also act as an amplifier of alarm in healthcare systems and discourage testing and heighten fear among the most vulnerable. Now this risk is causing governments to mull over the possibility of criminal sanctions. But science throws a wrench into the works.

Demonstrating intent medically is difficult. HIV, for example, can have a long latency period, and someone who has been exposed might not test positive for months after infection. Multiple exposures make scientifically unsound the determination of a single "source." In addition, viral resistance mutations and treatment history can change genetic fingerprints, which also make forensic attribution more difficult. These uncertainties open the door to potential miscarriages of justice rooted in incomplete or misunderstood science.

In India, the National AIDS Control Organization (NACO) has repeatedly warned about such indiscriminate criminalization, as it results in driving patients underground, diminishes voluntary testing, and perpetuates stigma. The

problem is that it's hard to separate malicious behavior from negligence or simple calculated risk. Indeed, in the absence of nuanced medical translation, courts run the risk of permitting scientific uncertainty to be weaponized as legal certainty, corroding both justice and public health outcomes.

Forensic Science in Proving Transmission

Forensic science has emerged as a critical but controversial weapon in prosecutions for deliberate transmission of infectious diseases. It does so first by making out a case that the victim was infected-when he or she was infected and whether he or she was-and second by connecting (and meeting an evidentiary threshold) the accused's alleged source to the victim. But the difference between scientific probability and legal certainty is still vast.

Medical forensics usually starts with recording infection chronology, exposure routes, and symptoms. In HIV cases, for instance, detectives may want to show whether or not a victim was HIV negative before coming into contact with the respondent and when s/he developed seroconversion. Such decisions can also be based on type of exposure, like sex without protection, use of a needle by several people, or blood transfusion. Yet a latency period and multiple exposures also make for a confusing trail.

For example, for microorganisms the methods available in microbial forensics are more advanced, such as genome sequencing and phylogenetic analyses. These approaches can chart the genetic overlap of viral strains in two people and may indicate a transmission connection. There is evidence in the courts of a number of jurisdictions that have used to convict criminally on such evidence. But here, too, one should proceed with caution. While genetic identity may show that two patients carry a strain of the same lineage, it cannot prove that one infected the other or even that the transmission was intentional.

Struggling with causation is nothing new for the courts. In *R v. Clarence* (UK, 1888), a leading early case on transmission of disease, the court refused to regard non-disclosure of syphilis as an assault, based on cursory belief that causation could be proven in such matters. Today's courts confront similar quandaries with even more sophisticated science and the same underlying uncertainty.

Equally significant are procedural safeguards. Blood, tissue, and other biological specimens must be handled by biohazard and chain of custody guidelines. A misstep, whether it be a failure to store properly, to guard against contamination or to maintain meticulous records, could call into question both the safety and evidentiary integrity of samples.

Crucially, there may be a tendency to over-claim the certainty of forensic science. A genetic match in viral

terms is not proof of intent, nor does it preclude other sources of infection. In the absence of this type of careful interpretation, courts can confuse scientific probability with that which is actually provable and fuel miscarriages of justice. Forensic science, indispensable though it is, must be therefore, presented with humility about its limits so that we prosecute biocrims not based on moral panic or misapplied science but on sound context-sensitive evidence.

Judicial Framework in India

In India, the criminal prosecution for attempting to deliberately spread communicable diseases is a blend of general offences as contained in the BNS and specific protections provided under the HIV & AIDS Act. Together, they offer a portrait of the strengths and contradictions in India's approach.

The BNS, under Section 271, has made negligent acts likely to spread the infection of disease dangerous to life punishable with six months in jail or a fine. Section 272 covers acts done malignantly with intent to spread the disease and can be punished with a maximum of two years in jail or a fine, or both. These provisions are expansive and have historically been used in cases such as tuberculosis and enforcing COVID-19 violations during lockdowns. But at the same time, this generality makes them difficult to interpret when used in the context of infections such as HIV for which questions of disclosure, consent and proof of intent are often complex.

It is to tackle stigma and discrimination that the HIV & AIDS Act has comparatively better provisions to protect the rights of people living with HIV. The Act, however, does not define the term "intentional transmission" in Section 2(g). What is interpreted with reference to the right under Section 2(g) are the "guidelines" given by the central government regarding prevention, control, and treatment of HIV & AIDS. It is worth noting that the Act does not cover non-disclosure, ignorance, or accidental transmission. The Act prohibits discrimination against protected persons under Section 3, prohibits certain acts (including propagating hatred) under Section 4, and imposes a duty to prevent transmission under Section 10 (requiring "reasonable precautions" such as risk-reduction strategies or informing partners before sexual contact). Section 8 governs confidentiality of HIV status with specific exceptions (court order, healthcare provider to another provider, and partner disclosure under Section 9). Section 9 permits healthcare providers (physicians/counsellors) to disclose an HIV-positive person's status to a partner if the provider reasonably believes the partner is at significant risk and the HIV-positive person will not inform them. Section 37 is the penalty provision (punishment for contravention of Sections 3–10: imprisonment up to 5 years or a fine up to ₹100,000 or both), not the prohibition itself. By creating

this distinction, the Act aims to avoid overly criminalising those who are infected with HIV while focusing on truly reprehensible behaviour.

Indian courts have struggled to balance protecting the public against preserving individual liberties. And in the case of *Mr X v Hospital Z* (1998), it was held that the fact that a patient with HIV disease committed his fiancée under force majeure of her right to life pay attention while giving an answer to whether or not he is tested positive does not make for a breach of confidentiality.

A crucial crevice is created in between BNS provisions and that of the HIV & AIDS Act. Even though the Act was supposed to decriminalise non-intentional transmission, prosecutors still occasionally charge people under BNS Sections 271–272. This has caused confusion and leaves patients open to unjust criminal prosecution.

Comparative Global Frameworks

What the intentional or reckless transmission of communicable diseases looks like as a crime has been developed in a haphazard manner from jurisdiction to jurisdiction, influenced by different public health-criminal law balances. The world over, we see how courts and lawmakers have grappled with issues of consent, disclosure, and intent without stigmatizing the already-stigmatized.

Some of the few prosecutions in the United Kingdom have been brought under the Offences Against the Person Act 1861. The landmark case of *R v. Dica* (2004) acknowledged that reckless HIV transmission could constitute “grievous bodily harm.” This was extended in *R v Konzani* (2005), which stated that consent to unprotected sex did not amount to lawful effective consent unless the complainant had actual knowledge of the accused’s HIV-positive status. These cases were notable for changing their attitudes from silence on disease transmission to recognizing it as a form of bodily assault, while upholding consent as a possible defense.

In Canada, the case law is some of the most stringent. In *R. v. Cuerrier* (1998) the Supreme Court found nondisclosure of one’s HIV-positive status could void consent to sexual intercourse based on fraud. Later, the case *R v. Mabior* (2012) determined that a person who does not disclose their HIV status, even where they had low viral loads and/or used condoms, could be charged with aggravated sexual assault. This move has come under fire for failing to take into account recent scientific progress in treatment and disproportionately affecting the most vulnerable.

The United States, however, has a fragmented approach, with more than 33 states implementing HIV-specific criminalization laws. Certain legislation includes stiff penalties for failure to disclose or exposure regardless of

actual transmission. Critics say these laws, passed during the panic over HIV in the 1980s, are outdated, unscientific, and indiscriminately enforced against sex workers and often racial minorities or people who are poor.

A close look reveals an ominous pattern instead of being crafted in the name of public health; these laws often descend into over-criminalization and selective enforcement, disproportionately affecting communities that are already marginalized. By blurring together non-disclosure, recklessness, and maliciousness, authorities also run the risk of penalizing vulnerability rather than preventing actual wrongs from occurring. This is a global experience that highlights the importance of informed, proportionate legal action based on science and human rights rather than mirroring fear-based legislation. Psychological & Forensic Psychiatry Dimensions of the Bio-Criminal Mind

Exploring the psychology of people who knowingly or recklessly transmit HIV and other infections is also at the center of what determines blameworthiness. Unlike most other violent crimes, there are highly nuanced reasons for such behavior that include stigma, personal history, and mental state.

Expressions of motivation to transmit are revenge (an infected person alleges “punishment” against partners or society), denial (to defy any acknowledgement of personal health status and remain reckless), and economic motivation, an apathetic calm satisfaction with any payback for physical harm. Each category is rooted in separate psychological mechanisms, from consciously controlled hostility to cognitive dissonance and emotion suppression.

One of the major forensic issues is determining the difference between negligence (not being careful enough), recklessness (knowing something is risky but not caring about what will happen), and intentional bad will (intending to infect someone). Those gradients have enormously different moral and legal implications.” For instance, in *R v. Dica* (2004, UK), the court focused upon “deliberate recklessness,” considering transmission not as a mere mishap but an inferior form of culpable mind. Yet, the psychiatric elements like traumatic denial or depression were largely absent in judicial reasoning.

In India, no court has ever questioned the mental mindset of a person while transmitting infection. The great majority of cases are decided on the basis of statute or evidence without systematic psychiatric assessment. In contrast, in international debates, forensic psychiatry comes to be understood as indispensable in comprehending the mentality of an offender, of his capacity for informed consent and prognosis.

Without a forensic psychiatric evaluation, gross legal categorizations usually end up being made in that all

instances of nondisclosure or risky behavior are deemed equivalent, no matter what the mental status underpinning them. A nuanced model combining psychiatric profiling, risk assessment, and rehabilitative perspectives might help to move the law away from a merely punitive reflex and toward one of measured accountability.

Ethical and Policy Dilemmas

Few issues express the uneasy union of law, medicine, and public health as vividly as HIV criminalization. On one side is medical confidentiality, which guarantees that what a patient discloses to a doctor remains confidential. On the other is warning and protection: should a physician stay mum about an HIV-positive patient intending to marry without informing his betrothed? The Supreme Court in *Mr. X v. Hospital Z* (1998) answered no, permitting disclosure for the sake of public safety. But actions like this one risk driving HIV back into the shadows, where stigma festers.

That stigma is the second fault line. Making HIV transmission a crime can deter people from being tested or seeking treatment if they believe their diagnosis could end with them in court. Health experts caution that this strategy operates in reverse, with some infections going undetected and untreated.

And third, there's forensic ambiguity. Viral traces, unlike fingerprints or DNA, are not so definite. And though high-tech tools like genome sequencing can hint at connections, there is no accepted forensic protocol in India for identifying such evidence. Courts are forced to rely on dubious science, putting innocent people at risk of wrongful conviction but also bastardizing the principle that everyone has a right to have their day in court.

The way forward is not more criminalization but nuanced regulation. Transparent forensic guidelines, secureness of confidentiality, and a sincere attempt to minimize stigmata are needed. Otherwise, the law threatens to punish the virus rather than the intent, and fear rather than crime.

Conclusion and Suggestions

Cases of deliberate HIV and other communicable disease transmissions underscore the frailty of existing judicial, forensic, and psychiatric structures. Judges are frequently backed into a corner with murky science, opaque statutes, and complicated human motivators even as public health goals may be inadvertently undercut. A multidisciplinary treatment approach is necessary to face up to this challenge. Negligence, recklessness, and intent must be well-defined by statute in a proper manner so that there may be mitigated punishment. A focused, thoughtful investment in selected forensic laboratories for microbial evidence will improve scientific rigor. At the same time, forensic psychiatric assessments should influence judicial decisions by explaining the offender's state of mind and

ensuring justice, not harsh punishment. Other judges and prosecutors must be trained to understand complicated medical and forensic information. Ultimately, judicial reform will be required to reconcile protection of society with concern for human rights, and prosecutions need to be directed not against careless malpractice but in a manner that does not add stigma. It is through integrating law, forensic science, psychiatry, and public health that jurisdictions may apply a system that is scientifically valid and just for the prevention of illness without punishment

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