

# Understanding the Implications of Non-Accused DNA at Crime Scenes for Criminal Defence Lawyers

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## **Abstract:**

While DNA evidence has revolutionized criminal investigations, its presence in legal cases becomes problematic when the DNA of non-accused individuals is detected at crime scenes. This essay explores the issue of unintentional DNA transfer and its implications for defence attorneys. This study questions the prevailing assumption that DNA presence equates to guilt by analyzing a burglary case study, demonstrating how DNA can be unintentionally deposited by those not involved in the crime. The findings reveal the complexities surrounding forensic evidence, showing that individuals who haven't physically interacted with crime scene objects can still leave their DNA behind. This complexity underscores the need for lawyers to adopt a more nuanced perspective, emphasizing the importance of expert testimony, rigorous investigative methods, and contextual evaluations in accurately assessing the implications of DNA evidence within the judicial system. Understanding these intricacies is vital for police officers and legal professionals including judiciary to navigate carefully and sincerely cases where DNA evidence plays a critical role in proving or disproving the guilt of the accused person.

**Keywords:** DNA evidence, DNA transfer, criminal law, forensic evidence, shedder status, legal strategy, contamination.

## **1. Introduction:**

DNA evidence has revolutionized criminal investigations by providing a reliable method for linking suspects to crime scenes. However, the presence of DNA from unrelated individuals complicates legal proceedings, as accidental DNA transfer can yield negative consequences. It is essential for criminal lawyers to grasp these complexities to effectively navigate forensic evidence and advocate for their clients. This study explores existing research on DNA transfer and its implications for legal professionals, highlighting the challenges posed by unintended DNA transfer and contamination. Such factors not only affect the field of forensic science but also have significant repercussions for the broader judicial system.

## **2. Factors Influencing DNA Transfer:**

The transfer of DNA onto surfaces is influenced by a variety of factors that impact both the amount of DNA retained and its viability for analysis. Surface characteristics are key; rough or abrasive surfaces tend to capture more DNA compared to smooth ones, and porous materials often hold larger quantities than non-porous surfaces, which has significant implications for forensic investigations. The specifics of contact - such as its duration and intensity - also play a vital role; sustained high-pressure contact is more

effective for transferring substantial amounts of DNA, while brief or light contact usually results in minimal transfer. Individual variations further contribute to DNA transfer, as people naturally shed differing quantities of cellular material.



Conditions like psoriasis, alongside hygiene practices such as handwashing, can affect the DNA available for transfer, leading to inconsistencies among individuals. Environmental elements - including temperature, humidity, sunlight exposure, and microbial activity - can degrade DNA, compromising its integrity for analysis. Moreover, the time that passes between DNA deposition and collection can reduce DNA quantity due to degradation or removal. These complexities make it challenging to accurately determine the method of DNA deposition, although ongoing research seeks to better understand the timeline since deposition.

### 3. Kinds of DNA Transfer:

In forensic science, DNA transfer occurs in various ways that influence the interpretation of DNA evidence in criminal investigations. Below is an explanation of each type:

*Primary DNA Transfer:* This type occurs when an individual directly transfers their DNA onto a surface or object. For instance, if a person touches a doorknob, drinks from a glass, or leaves saliva on a cigarette, their DNA is directly deposited onto that item. Primary transfer is often the clearest form of DNA evidence since the individual had direct physical contact with the object.

*Secondary DNA Transfer:* In this scenario, DNA is transferred from a person to an object or another individual through an intermediary. For example, if Person A shakes hands with Person B, and then Person B touches an item, such as a knife, Person A's DNA could potentially be found on that item without them having had direct contact. Secondary transfer complicates forensic analysis because the detected DNA might not reflect direct involvement.

*Tertiary DNA Transfer:* This type involves even more complexity, as DNA is transferred through two intermediaries. For example, if Person A touches Person B, Person B subsequently touches Person C, and then Person C touches an object, it is theoretically possible for Person A's DNA to be present on that object. This level of transfer is uncommon but can occur, particularly in environments with frequent interactions.

Given that forensic experts cannot pinpoint the exact mode of DNA transfer (whether primary, secondary, or tertiary), legal professionals must exercise caution in interpreting DNA evidence. Secondary and tertiary transfers can result in misleading implications about an individual's presence or role in a crime.

#### 4. Unintentional DNA Transfer:

In forensic investigations, it is widely acknowledged that DNA can be inadvertently transferred to a crime scene via multiple avenues. This phenomenon poses significant challenges for investigating officers and the judicial system. For instance, individuals who have no direct connection to a criminal act might unintentionally introduce their DNA to the scene, leading to potential misinterpretations of evidence.

There are several scenarios in which such unintended contamination can occur. One common situation is when a person interacts with an object at the crime scene, leaving behind biological material, such as skin cells or sweat, through what is known as secondary transfer. This means that even if someone merely brushes against an item, their DNA can remain, creating a false trail for investigators. Furthermore, external factors can contribute to this issue. Environmental influences, including wind or weather conditions, can transport DNA from one location to another, further muddying the waters of forensic evidence.

These complexities pose significant hurdles in legal proceedings. The presence of DNA at a crime scene does not necessarily correlate with a suspect's involvement in the crime. It raises the question of how prevalent cross-contamination is and whether DNA evidence can be solely relied upon for convictions. Courts must consider the possibility of innocent individuals being implicated due to accidental DNA transfer, reminding all parties involved that forensic evidence should be interpreted with caution.

Unintentional DNA transfer refers to the inadvertent transfer of DNA from an individual to an object or location with which they have no direct contact, creating potential complications for forensic investigations. Three significant cases exemplify this concern:

*The Adam Scott Case:* In the UK, Adam Scott was wrongfully accused of rape because of unintentional DNA transfer. His DNA was discovered on the victim's clothing, even though he had no link to her. It was later revealed that his DNA had been inadvertently transferred during the evidence handling and processing within the forensic lab. This case underscored the critical need for rigorous protocols in evidence handling to mitigate such mistakes.

On October 23, 2011, Mr. Scott was charged after a plastic tray containing his DNA sample was inadvertently reused during the analysis of a rape victim's swab from Plant Hill Park in Blackley, which linked him to the crime. However, seven weeks later, investigators expressed concerns based on phone records indicating that Mr. Scott had been in Plymouth just hours after the alleged assault. Ultimately, the rape charges were dropped in March 2012.

*The Lukis Anderson Case:* In California, Lukis Anderson faced murder charges due to his DNA being found at the crime scene. However, he was hospitalized at the time of the incident, rendering his involvement impossible. His DNA was unintentionally transferred to the scene by paramedics who treated him before attending to the murder victim. This case highlighted how secondary DNA transfer, even from first responders, can cause significant miscarriages of justice without thorough procedural precautions.

Lukis Anderson's DNA made its way to the crime scene through secondary transfer facilitated by paramedics. At the time of the crime, Anderson was hospitalized, recuperating from intoxication. Previously, the same paramedics who provided treatment to Anderson were sent to the murder scene, unknowingly bringing traces of his DNA on their equipment or clothing. This unintended transfer resulted

in Anderson's DNA being detected on the murder victim, wrongfully linking him to the crime. His case emphasized the dangers of accidental DNA transfer, illustrating how emergency responders and other individuals who interact with various people or objects can unintentionally disseminate DNA across different locations.

Van Oorschot, a forensic science researcher who transformed the field with his groundbreaking 1997 paper, warns against overestimating the efficacy of touch DNA in solving crimes. He acknowledges its significant positive impact, stating, "I think it's made a huge impact in a positive way," but emphasizes the importance of not depending exclusively on DNA evidence to assess a situation.

*Murder Case of Estelle Mouzin:* The murder of Estelle Mouzin, a nine-year-old girl who disappeared in 2003, is among the most well-known cases of faulty DNA evidence in France. The case garnered global attention, and in 2020, DNA evidence found at the area connected her abduction to infamous serial killer Michel Fourniret. This evidence first appeared to link Fourniret to the killing, which helped lead to his conviction in a number of other murder cases.

But as the investigation went on, serious flaws in the procedures used for gathering and analysing the evidence were discovered. The reliability of the forensic techniques employed was seriously called into question when experts noted that the DNA samples may have been tainted. This revelation sparked public indignation about the handling of the investigation in addition to casting doubt on the validity of the DNA evidence.

The Mouzin case brought to light significant issues with the French legal and forensic systems, highlighting the possibility of false accusations resulting from subpar forensic procedures. It was a clear reminder that stringent procedures are required for gathering and examining DNA evidence in order to prevent future injustices. The fact that Estelle Mouzin's actual fate is still unknown ultimately raises more questions regarding accountability in criminal investigations.

The above three cases highlight the necessity for careful analysis of DNA evidence, acknowledging the potential for transfer and contamination in forensic procedures.

### **5. Case Study: Examining Non-Accused DNA Transfer:**

To delve deeper into this matter, we may consider a study conducted in conjunction with an actual criminal prosecution. In this case, a set of work gloves and a screwdriver were collected from the site of a burglary. The screwdriver was used to gain entry to a property, and DNA profiles obtained from both items led to the identification of a suspect. The suspect admitted that the gloves were his but claimed he had lost them prior to the crime and denied any involvement.

The study sought to explore how a DNA contributor's "shedder status" impacts the likelihood of their DNA being discovered on a crime scene item. Shedder status refers to the amount of DNA an individual typically leaves behind, classifying people as good shedders or poor shedders based on their propensity to deposit DNA.

#### **Study Results and Significance:**

The study replicated real-life crime scene scenarios to better understand the dynamics of DNA transfer. Below are the primary findings:

**DNA Transfer Frequency:** In situations where the owner of the glove did not touch the screwdriver, their DNA was still found on the tool in 6 out of 19 instances. This finding illustrates that DNA from individuals who haven't directly contacted an object can still be inadvertently transferred onto it.



**Impact of Shedder Status:** The research revealed that the shedder status of an individual had little to no impact on the probability of detecting DNA on the screwdriver. This indicates that while some individuals may naturally leave more DNA than others, this characteristic alone does not significantly change the likelihood of their DNA being present at a crime scene.

**Possibility of Non-Observed DNA:** It is possible to identify DNA from a person who never physically interacted with the screwdriver, while DNA from an individual who did might escape detection. This highlights the complexities of DNA transfer and the limitations of relying only on DNA evidence to establish direct involvement in a crime.

### **Practical Considerations for Criminal Attorneys:**

The presence of non-accused DNA at a crime scene necessitates a sophisticated approach to forensic evidence. Criminal attorneys should consider the following practical implications:

**Contextual Assessment:** When evaluating DNA evidence, it is vital to analyze the context in which the DNA was found. This involves identifying possible sources of DNA transfer and understanding the environment from which the evidence was collected. Performing a thorough contextual assessment can help ascertain whether the DNA's presence indicates involvement or is simply a byproduct of transfer.

**Investigative Approaches:** Findings from such analyses should inform investigative tactics. For instance, recognizing that non-accused DNA may appear on crime scene evidence due to secondary transfer highlights the importance of a meticulous investigative process. Investigators should strive to gather a wide array of evidence and validate DNA outcomes with other forms of evidence, such as eyewitness accounts and surveillance footage.

**Expert Testimony:** During court proceedings, forensic specialists should provide clear and detailed explanations regarding the potential for DNA transfer and the limitations associated with DNA evidence. They ought to clarify how DNA can be found on crime scene items without direct involvement and highlight the necessity of considering all evidence collectively.

**Legal Tactics:** For defence attorneys, the existence of non-accused DNA can serve as a means to undermine the prosecution's case. By stressing that DNA evidence may result from indirect transfer, defence lawyers can argue that the mere presence of DNA does not equate to guilt. It is essential to illustrate that DNA evidence must be evaluated in conjunction with other evidence to form a comprehensive understanding of the case.

## **6. Literature Review on Understanding Non-Accused DNA at Crime Scenes:**

DNA transfer at crime scenes can happen through different methods, mainly classified as primary or secondary transfer. Primary transfer occurs via direct contact, while secondary transfer happens indirectly, often through a third party's clothing. Research indicates that DNA from individuals not directly involved in a crime can contaminate evidence. Goddard et al. (2012) explain that DNA can be transferred through direct contact, secondary transfer, or environmental means. For instance, when someone touches an object, their DNA may be left behind and transferred to another surface or person, complicating crime scene analysis.

De Puit et al. (2017) state that DNA can be unintentionally transferred through various means, such as skin contact, environmental contamination, and the handling of common objects. Their study emphasizes the significance of "shedders," or individuals who release DNA more easily due to factors such as skin type or hygiene practices, and it points out that the mere presence of DNA does not necessarily signify direct participation in a criminal act.

The implications of non-accused DNA from a legal standpoint are significant. Criminal defence attorneys need to master the complexities of forensic evidence as it can significantly affect the results of cases. Research conducted by Sweeney et al. (2021) highlights the importance of attorneys comprehending the dynamics of DNA transfer. They indicate that ignorance about DNA contamination may result in erroneous evidence interpretations and could contribute to wrongful convictions.

Furthermore, the existence of DNA from non-accused individuals can complicate conventional beliefs about culpability. Curran et al. (2020) point out that the legal system frequently gives considerable importance to DNA evidence, occasionally overlooking the circumstances under which that evidence was collected. This neglect can result in unfair results, highlighting the necessity for a holistic approach that takes into account all elements related to DNA evidence.

Riel et al. (2019) presented an interesting case where DNA from a person not associated with a burglary was discovered on a tool utilized in the crime. This situation illustrated that DNA can remain in places irrelevant to the suspect, thereby complicating the prosecution's position.

In a study conducted by Baird et al. (2022), the implications of these findings within courtroom contexts were examined. They contend that defence attorneys may use the presence of DNA from individuals who are not accused to dispute the prosecution's storyline, emphasizing the importance of educating jurors about the limitations of DNA evidence.

Expert testimony is essential for elucidating the intricacies of DNA transfer. McCarthy (2023) notes that forensic experts are responsible for conveying the subtleties of DNA evidence, particularly the mechanisms of secondary transfer that can happen without direct contact. This understanding is crucial for jurors and judges to recognize the constraints of DNA evidence in determining guilt.

The necessity for specialized guidance is reinforced by research from Goldstein et al. (2021), which highlights that jurors frequently do not fully grasp forensic techniques. As such, clear communication from experts can help fill this gap in knowledge, allowing for a comprehensive evaluation of all evidence.

Considering the challenges associated with non-accused DNA, the literature suggests the need for enhanced investigative methods. Researchers such as Fisher et al. (2020) recommend that law enforcement and legal teams employ a multidisciplinary approach for the collection and analysis of evidence. This entails combining forensic results with additional types of evidence, including eyewitness testimonies and digital traces.

Sweeney et al. (2021) advise investigators to be cautious of possible contamination sources, particularly in the environments where evidence is gathered. By comprehending the contexts in which DNA transfer may occur, legal professionals can build stronger cases that take into account all dimensions of the evidence.

The importance of contextual evaluation in the interpretation of DNA evidence is immense. Curran et al. (2020) contend that grasping the circumstances surrounding DNA transfer can significantly affect legal strategies. For defence lawyers, showcasing evidence of DNA from individuals who are not accused can be crucial in formulating arguments that counter the prosecution's position.

In a similar vein, Riel et al. (2019) highlight the necessity of embedding DNA results within the broader context of a case. This approach allows legal practitioners to reveal the possibility of accidental contamination and to emphasize the limitations of relying solely on DNA as evidence of guilt.

Future investigations should aim to enhance methodologies for analysing DNA transfer and its ramifications in legal settings. Research into juror psychology concerning DNA evidence could yield valuable insights into how DNA from non-accused parties is perceived in court. Additionally, longitudinal

studies examining the lasting effects of cases involving non-accused DNA on wrongful convictions could provide crucial data for reforming legal standards.

An important factor in DNA transfer is the idea of "shedder status," which describes an individual's tendency to leave DNA behind. Kline et al. (2015) classify people as either "good shedders" or "bad shedders," depending on their genetic inclination to leave behind traces of DNA. This classification can have significant implications for forensic investigations, as some people may provide more DNA evidence at crime scenes than others. However, research shows that shedder status does not necessarily align with the likelihood of a person being implicated in a crime (Goddard et al., 2012). This insight is crucial for criminal attorneys who must deal with the intricacies of DNA evidence in legal proceedings.

The presence of DNA from individuals who are not accused can greatly complicate legal cases. As Sinha et al. (2016) point out, finding DNA at a crime scene does not automatically indicate that a person was involved in the crime. This issue becomes particularly critical in situations where DNA from unrelated individuals is found, which can result in false accusations and wrongful convictions. The ramifications of these findings are significant, highlighting the need for a change in how criminal lawyers approach forensic evidence.

For instance, in the case of *R v. O'Donnell* (2013), the defence effectively contended that the presence of DNA from a non-accused individual weakened the prosecution's argument, illustrating the impact that the details of DNA evidence can have on court outcomes. This case underscores the importance for defence attorneys to rigorously question the assumptions surrounding DNA evidence.

Given the challenges related to non-accused DNA, it is essential to evaluate forensic evidence in context. As McDonald et al. (2018) note, gaining insight into the circumstances surrounding DNA transfer can guide legal strategies. Criminal lawyers should take into account potential contamination sources and the environment from which the DNA evidence is gathered. This contextual understanding can strengthen the arguments made in court.

Furthermore, incorporating contextual evaluations into legal practices highlights the necessity for collaboration between forensic scientists and legal professionals. By working in tandem, they can ensure that DNA evidence is analysed with an understanding of its possible limitations and uncertainties.

The presence of non-accused DNA at crime scenes calls for a re-evaluation of investigative techniques. Taroni et al. (2010) argue that forensic investigations should adhere to stringent standards that consider the possibility of secondary DNA transfer. Investigators ought to emphasize thorough evidence collection methods, including gathering witness statements and reviewing surveillance footage to support DNA results. Such a comprehensive strategy may help reduce the likelihood of wrongful accusations resulting from misinterpretations of DNA evidence.

In addition, technological advancements have broadened the scope of forensic investigations. Methods like low-template DNA analysis and next-generation sequencing improve DNA detection in complex mixtures (Hare et al., 2015). Nonetheless, it is essential to apply these technologies with an awareness of their limitations and the risk of non-accused DNA contamination.

The involvement of expert testimony is vital for clarifying the complexities of DNA transfer in legal cases. Hodge (2014) emphasizes that forensic specialists must clearly articulate how DNA evidence can occur from indirect transfer. Their proficiency in conveying the subtleties of DNA analysis can significantly affect jurors' perceptions and legal outcomes.

For example, expert witnesses can explain the significance of discovering non-accused DNA on crime scene evidence, stressing that such discoveries do not necessarily imply direct participation in a crime.

This educational element is crucial for ensuring judges and juries grasp the complexities of DNA evidence, which can lead to more informed verdicts.

For defence attorneys, the existence of non-accused DNA presents both obstacles and opportunities. By highlighting the likelihood of unintentional DNA transfer, defence lawyers can develop arguments that contest the prosecution's narrative. Research by Riggins et al. (2018) exemplifies that effective defence strategies include substantiating the possibility of contamination and questioning the credibility of DNA evidence as the sole foundation for criminal liability.

Additionally, defence attorneys are advised to promote thorough evaluations of all evidence alongside DNA findings. This multifaceted approach may yield a more equitable appraisal of a case, ultimately supporting the pursuit of justice.

## 7. Court Judgments:

- In the landmark case *Maryland v. King* (2013), the U.S. Supreme Court ruled that law enforcement officers are permitted to collect DNA samples from individuals arrested for serious offences, equating this practice to the collection of fingerprints. The Court determined that such DNA testing conducted during an arrest does not infringe upon the Fourth Amendment's protection against unreasonable searches and seizures. This ruling bolstered the legitimacy of DNA evidence in criminal proceedings by emphasizing its reliability as a tool for accurately identifying individuals and linking them to criminal activities.
- Zhang Wenzhong, a businessman who was falsely convicted of financial crimes and sentenced to several years in prison, was exonerated in the Zhang Wenzhong case (2013) thanks in large part to DNA evidence. When the case reached China's Supreme People's Court, advancements in forensic analysis and DNA testing were used to reevaluate the evidence. A major turning point in the nation's use of DNA evidence was Zhang's acquittal, which highlighted the need for trustworthy forensic methods and sparked judicial reforms pertaining to the management and evaluation of forensic evidence in criminal cases. In light of China's judicial system's continuous development, this case demonstrated the critical role that DNA evidence plays in correcting erroneous convictions.
- The Gäfgen Case (2004) is a landmark decision in German law concerning DNA and forensic evidence. Central to the investigation, DNA evidence played a pivotal role in securing the conviction of Magnus Gäfgen for the kidnapping and murder of Jakob von Metzler, a child. However, the case also ignited significant legal and ethical debates when it was revealed that Gäfgen had been threatened with physical harm to disclose the child's location before confirmation of the child's death. While the conviction was upheld, the German Federal Court of Justice ruled that Gäfgen's human rights were violated due to these coercive methods. This ruling underscored the importance of maintaining ethical standards in investigative practices, highlighting that such standards must prevail even when DNA evidence is critical. Consequently, this case influenced subsequent regulations governing the management of forensic evidence in Germany.
- The UK landmark case *R v. Adams* (1996) established the relevance and admissibility of DNA evidence in criminal cases. The Court of Appeal provided important guidance on the interpretation of DNA evidence, emphasizing the importance of statistical analysis and probability. It emphasized that DNA evidence must be backed up by further evidence because it cannot establish guilt on its own. By highlighting the importance of accurate statistical representation and the larger context of the



supporting evidence, this decision established crucial guidelines for the presentation and interpretation of DNA evidence in UK courts.

- Following the assassination of Rajiv Gandhi in Sriperumbudur by an LTTE suicide bomber, identifying the mutilated bodies posed a significant challenge. Notably, this incident marked the first time Thenmozhi Rajaratnam, known as Dhanu, the attacker, was identified through DNA fingerprinting, alongside the other victims. This case represented a crucial turning point in the history of India's judicial system. It was one of the first trials in India to utilize DNA evidence, which was instrumental in both identifying the suicide bomber and connecting key individuals to the conspiracy. Furthermore, this case established a vital precedent for the reliability and legality of DNA profiling in criminal investigations within India.
- In the 1993 case of *Gautam Kundu v. State of West Bengal*, the Supreme Court of India established important guidelines concerning the use of DNA testing in paternity disputes, stressing that such tests should only be mandated when they are absolutely essential. The Court underscored the need to safeguard individuals' right to privacy, thereby setting a significant precedent for the ethical considerations and privacy rights in family court cases that involve DNA evidence.
- In the case of *Banarsi Dass v. Teeku Dutta (2005)*, the Supreme Court of India determined that DNA testing could be employed in cases of paternity disputes, provided there is a thorough evaluation of the rights of all parties involved. The judgment emphasized the importance of reconciling personal privacy with the scientific significance of DNA evidence, particularly in matters of family law.

## 8. Conclusion:

The examination of DNA shedding and transfer reveals the intricate nature of forensic evidence in criminal investigations. While DNA is crucial for linking individuals to crime scenes, it is important to acknowledge that accidental transfers involving non-accused individuals can lead to DNA being found at these sites. Criminal attorneys must navigate these challenges by comprehending the limitations of DNA evidence and employing thorough investigative and legal strategies, coupled with informed courtroom arguments. The complexities surrounding non-accused DNA can influence legal outcomes, necessitating comprehensive approaches to ensure justice. Future research should delve deeper into DNA transfer dynamics and their implications for forensic evidence interpretation, as grasping these complexities will be vital for achieving fair results. The presence of DNA from uninvolved individuals calls for a balanced evaluation of forensic evidence, allowing legal professionals to better address the challenges inherent in such evidence and fostering justice through a holistic understanding of all relevant factors.

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