



Push for Forensic DNA Phenotyping, Ancestry Testing in Germany Raises Discrimination Concerns

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NEW YORK (GenomeWeb) – A bill currently under consideration in the German state of Bavaria is stirring up controversy regarding the promise of expanded forensic DNA testing to fight crime and the danger of discriminating against minorities along the way.

The [legislation](#), expected to be passed by the Bavarian parliament this month, would expand state police power in a number of areas. Among other measures, it would allow law enforcement to collect DNA from individuals they consider dangerous, and to perform genetic analysis on crime scene samples for clues about an unknown perpetrator's appearance and ancestry to avert "impending dangers."

On the national stage, law enforcement officials, politicians on the far right, conservative and left-leaning parties, and some prominent forensic geneticists also want to amend the federal criminal procedure code to expand DNA collection efforts and enable these kinds of forensic analyses, which they say could provide critical clues about perpetrators in rapes, murders, and acts of terrorism when police have no leads. Horst Seehofer, Germany's minister of interior and former head of the Bavarian government, as well as a member of the conservative Christian Social Union (CSU), [was recently quoted](#) in the press saying that the police task law under consideration in Bavaria could become a model for the country and other states.

The [German Code of Criminal Procedure](#) currently allows authorities to collect DNA samples from those accused of serious offenses or who they believe will repeatedly commit a crime, analyze them for specific short tandem repeats, and to see whether this profile matches any in a national database of 867,000 "DNA fingerprints." The database also contains 326,000 samples from crime scenes where the offenders are unknown, but the law currently only allows analysis of those samples for matching profiles and determining sex, not for DNA phenotyping to try to predict hair, eye, and skin color, or biogeographical ancestry.

In response to recent efforts in the state of Baden-Württemberg, Bavaria's neighbor, to introduce legislation in the German Bundesrat (the federal legislative chamber representing the states) that would amend the federal criminal procedure code to allow forensic DNA phenotyping, Veronika Lipphardt, a professor of science and technology studies at University College Freiburg, has formed a multidisciplinary group of scientists, ethicists, and legal scholars who have called for greater public discourse on the capabilities and failings of these tools, as well as their impact on communities. Lipphardt and her colleagues fear that expanding DNA collection and analysis without establishing the necessary legal and administrative safeguards will not only increase discrimination against minority groups in Germany, but also chip away at privacy rights and civil liberties for all citizens.

Those who want to change the laws for forensic DNA analysis must do a significant amount of work to guarantee the fundamental rights of all citizens, and minorities in particular, Lipphardt's group wrote in an [open letter](#) in December 2016 in reaction to efforts to amend the criminal procedure code. "Using DNA technologies to determine physical appearance and biogeographical origin have the potential to transform whole populations into suspects, regardless of the guilt or innocence of individual members of those groups."

In contrast, those who want access to these tools say that they'll only be used rarely, in cases where other investigative means have failed to produce leads. They argue that the use of these tests will even reduce discrimination in situations where testing shows the perpetrator is not from a minority group.

Lipphardt's group would counter that the language in the legal proposals do not provide such assurances. Moreover, she and her colleagues assert that the proponents of these technologies have greatly exaggerated their utility in solving crimes without addressing their limitations.

"If you don't give people a sense of the limitations, and don't tell them that good predictions can only be reached in certain cases but not in all, you'll have problems," she said. "Once the technologies are in place and fail to function the way everybody expects them to, what will people make of this? And we will definitely experience false predictions, especially if the technologies are being used in such a rash way, as suggested in the law proposals."

Reaction to a murder

The push for expanded DNA analysis came after the murder and rape of Maria Ladenburger in Freiburg, a city in Baden-Württemberg, in 2016. The southwestern German city had welcomed asylum seekers after Chancellor Angela Merkel decided in 2015 to allow more than 1 million refugees into the country. In November 2016, shortly after the body of the 19-year-old medical student was found in the Dreisam River, a group called the League Against Assimilation [circulated a leaflet](#), which claimed that it is very easy to determine the race of an individual using genetic testing and that it should be used to rule out suspects in the Ladenburger investigation.

On social media, many people already seemed convinced that a foreigner was responsible for the murder, and in quick succession, police officers, the media, and politicians also began urging for DNA analysis to determine externally visible characteristics and biogeographical ancestry of the perpetrator, Lipphardt recalled. Among the most vocal proponents were members of Merkel's conservative Christian Democratic Union (CDU) and the far right Alternative for Germany (AfD), which aired a video where police officers spoke about the need for DNA phenotyping.

Police had found DNA evidence at the crime scene but it didn't match anyone in the national database. They also found a strand of black hair, dyed partly blonde, and identified a suspect by watching CCTV recordings from a nearby tram. In December 2016, authorities apprehended Hussein Khavari, who had entered Germany as an asylum seeker a year earlier, claiming to be underage and from Afghanistan.

DNA analysis from Khavari matched the sample from the crime scene. He was convicted of Ladenburger's rape and murder this March and imprisoned for life. Although the police cracked this case with old-fashioned investigational work, they have claimed they could have solved it much faster and more cost-effectively with the aid of DNA phenotyping and biogeographical analysis, because it would have allowed them to focus their investigation on the group the offender came from.

In the aftermath of this case, members of the Green party and the CDU, which form the coalition government in Baden-Württemberg, drafted legislation to amend the federal law to allow DNA phenotyping. Subsequently, Bavaria introduced its own proposal to amend the national law to also allow biogeographical ancestry testing.

Both of these proposals were discussed in the Bundesrat last year but weren't adopted. However, experts said there is support for expanding forensic DNA analysis capabilities within the new coalition government formed between Merkel's CDU, the more conservative CSU, and the Social Democratic Party (SPD).

In the federal election last September, the far-right AfD became the third largest party in the Bundestag by opposing Merkel's controversial refugee policy, which reflects its influence with voters. The AfD has been urging the state parliament in Baden-Württemberg to take up the initiative to allow DNA phenotyping and ancestry testing.

However, in these political efforts to change the law, "there seems to be no awareness of what these policies would do to a community," Lipphardt said. During the Ladenburger murder investigation, she recalled that people in Freiburg who looked like they might belong to a minority group were subject to verbal attacks — something that might be exacerbated if a DNA test provides evidence that a perpetrator might belong to such a group.

When it came out that an asylum seeker had murdered Ladenburger, immigrants in Freiburg held a vigil and asked the community not to paint all foreigners with the same brush. Regardless, when Freiburg's mayor Dieter Salomon made conciliatory statements, urging people not to treat all refugees as criminals, he received so much hate mail that he was forced to deactivate his Facebook page, [according to Spiegel Online](#).

A loaded word

"Race" or *Rasse* is a loaded word in Germany because of the crimes of the Nazis, which favored an 'Aryan race' above all groups. Those with visibly non-ethnically-German appearance are usually referred to as either "foreigners" or those with a "migrant background" today. As a consequence, political debates about minority rights that would refer to "racism" or "racial discrimination" in the US are often framed in terms of "hate of foreigners" or "hostility towards strangers" in Germany.

"If you bring up race, then the door is immediately shut. Often, they think you're calling them a Nazi, even though you're just trying to discuss discriminatory practices," said Carsten Momsen, a professor of criminal law at the Free University of Berlin. "The truth is, you can be a racist and not be a Nazi."

He has joined Lipphardt's group out of shared concern that DNA phenotyping and ancestry testing could become a tool for profiling minorities in a country where 80 percent don't have an immigrant background. Minorities in the country have tended to come from Turkey, Poland, Italy, Romania, and Greece, but the refugee crisis brought in large numbers of immigrants from war-torn countries in Africa and the Middle East, often without any identification papers.

Several high-profile acts of terrorism or violent crimes committed by refugees have heightened concerns that these new immigrants are making Germany unsafe. A report from the Federal Criminal Police Office (BKA) showed that there was about 90 percent more immigrant suspects in 2016 for violent crimes compared to the prior year, but many of the incidents were at shelters.

Another study published earlier this year found that violent crime rose by 10 percent in 2015 and 2016 in the German state of Lower Saxony, and that more than 90 percent of the increase was attributable to immigrants — partly because they tend to be young men separated from their families, and because crimes by refugees are twice as likely to be reported compared to those committed by Germans.

Despite these caveats, the statistics have become a pressure point for law enforcement and politicians, who are looking to new crime-solving strategies, such as DNA phenotyping and ancestry testing. Peter Schneider, a professor of forensic molecular genetics at the University Hospital Cologne's Institute of Legal

Medicine, believes it is possible to responsibly employ these technologies by educating the police, politicians, and the public about the science behind them.

He's been working with forensic geneticists at academic research labs and police labs from eight European countries in the Visible Attributes through Genomics (VISAGE) Consortium to try to develop and validate next-generation sequencing tools for identifying the appearance, age, and ancestry of unknown perpetrators using DNA evidence. The group is also working on training courses for law enforcement officials, so they can better understand what these technologies can and can't do ([see related story](#)).

Schneider disagrees with those who want to halt the use of DNA phenotyping and ancestry testing entirely because they think authorities will use them to only target minorities via a "public witch hunt."

"The best thing you can do with DNA phenotyping is narrow down a pool of suspects," he said. "If results suggest it was from the majority population, then it would protect minorities. It's very often the case that in a serious offense, foreigners are accused of the crime, but when they do the ancestry and appearance analysis, they find out the person is a local guy."

[This was the case](#) with the 1999 rape and murder of 16-year-old Marianne Vaatstra in a small village in the Netherlands. Because the murder happened near a center for asylum seekers, the local population was convinced it was a foreigner, and this led to riots in the community. In an effort to quell the unrest, the prosecutor in the case asked a lab to analyze the Y-STR profile of the semen sample found on the victim's body, which showed that the perpetrator's paternal ancestors were likely from Northwestern Europe.

Since then, legislative changes in the Netherlands have allowed DNA phenotyping and ancestry testing to investigate crimes that can't be solved by other means, and familial searching to identify relatives of a suspect that doesn't match to the national database. The Vaatstra murderer was ultimately caught in 2012 when he made a kind of genetic confession by voluntarily submitting his own DNA sample during a dragnet through which police were trying to identify the perpetrator's relatives.

In the reverse situation, where test results suggest a high probability that the perpetrator is from a minority group, that information might also be worth pursuing to narrow down leads, Schneider said. "Even if the perpetrator is of African origin, you still want to prosecute the crime. Any information that helps the investigation has to be used by the police," he said. "If they know this person may be of African origin ... should they ignore that information? I don't think so."

Group identifiers are used all the time in criminal investigations, noted David Kaye, a law professor at Penn State who teaches about the application of genetic evidence in forensics. For example, a semen sample connected to a crime scene can reasonably point police to concentrate on men only. "That's a group judgment, and there's nothing wrong with saying, 'Well, we're after men here,'" he said. "All evidence narrows down the group that merits further investigation. Isn't that what you want?"

To the extent that DNA phenotyping and ancestry information can help focus investigations on certain groups, and that the limitations of that information are understood, Kaye doesn't object to their use, as long as the information doesn't have a disparate impact on that community. Just by identifying the group, "we're not necessarily depriving them of a benefit or focusing on them to harm them," he said. "If this information can just focus on the right groups at the right time, then so be it."

However, while the police, politicians, and some forensic geneticists might argue that these tools will not necessarily be used to discriminate against minorities, "this will not be the reality in Germany," Lipphardt predicted. Her concerns are supported by examples where the police have used DNA phenotyping and biogeographical ancestry testing in ways that stoked community tensions or further stigmatized minority groups.

The "Phantom of Heilbronn," for instance, is an infamous example of German police misinterpreting DNA analysis during a criminal investigation. The police were searching for a female serial killer based on DNA evidence suggesting a woman was linked to 40 crimes in France, Germany, and Austria, including the murder of a police officer named Michèle Kiesewetter in the town of Heilbronn.

Since biogeographical ancestry testing is currently not allowed in Germany, a DNA sample from one of the crime scenes was analyzed in Austria, and revealed the owner was of Eastern European origin. According to press reports, the authorities collected samples from hundreds of women who they believed fit that DNA profile, particularly those in the Sinti and Roma community, because the police thought of them as leading an itinerant lifestyle.

In 2009, German police admitted that the cotton swabs they used at the crime scenes were contaminated with DNA from a female Polish factory worker who packaged the cotton swabs. "DNA testing might exonerate minorities, but only if everyone involved is open to this and sensitized to the problems that might arise. The Heilbronn case is a case in point [because] the DNA result pointed to females with Eastern European ancestry, which potentially is just every woman around," she said. "Yet investigators obviously interpreted this as pointing towards Sinti and Roma."

Ultimately, the investigators' interpretations of DNA phenotyping results "are dependent on [their] background knowledge and cultural sensitivity," Lipphardt said.

In 2012, Reinhold Gall, Baden-Württemberg's minister of interior at the time, apologized to the Central Council of German Sinti and Roma for the way this investigation was handled. The people of this community were also victims of Nazi atrocities.

Therefore, it's understandable why the Central Council of German Sinti and Roma may want to restrict forensic DNA phenotyping and biogeographical ancestry testing in Germany, said Matthias Wienroth, who researches at Newcastle University in the UK the ways that technologies and society interact. However, "I think that if technologies are reliable, if they are useful, if they are legitimate, then they should be able to be used in the criminal justice system," he said.

The responsibility of the criminal justice system doesn't stop at re-establishing order after a crime or preventing crime from happening, though, Wienroth reflected. There is also an overarching responsibility to the communities involved in investigations and served by the criminal justice system.

"It's important not to forget that decisions in the criminal justice system affect all kinds of people, not only perpetrators," he said. "Just by using [forensic DNA phenotyping and biogeographical ancestry testing] you may be implying that certain communities or populations are more suspect than others. If you want to use [these tools] in Germany, then what you'd be usually looking for are minority groups."

'Impending dangers'

Last week, a committee in the Bavarian parliament discussed the proposed bill to amend the police task law that would give greater surveillance powers to thwart "imminent dangers," and didn't make any material changes to the parts of the bill discussing forensic DNA analysis, according to experts following the events.

The bill would allow police to collect a DNA sample from a person to look for a match in Germany's national database when "an important legal interest is in danger" and other identifying means are insufficient. This requires a judge's order, and only a doctor can collect the sample. In addition, the sample must be destroyed after analysis.

But the bill, as written, doesn't define which legally protected interests this person must threaten before DNA fingerprinting would be allowed, which Momsen interpreted as giving the police broad powers to collect DNA from anyone whom they perceive to be potentially dangerous.

When "danger cannot be averted in other ways," the bill would also allow police to DNA fingerprint samples of unknown perpetrators found at crime scenes and analyze them for sex, eye color, hair color, skin color, biological age, and biogeographical ancestry as part of the investigation into the crime. Although the legislative language is vague, Momsen believes the aim is to not only allow the results from DNA phenotyping and ancestry testing to be used as an investigative tool, but very likely also as evidence to prosecute criminals in court in the near future.

Throughout the more than 100-page bill, there is mention of the need to avert "impending dangers," but it's unclear what this means legally in the context of forensic DNA analysis. "In order to prevent a dangerous person [from committing a crime] you have to identify that specific person," Momsen said. "But using forensic DNA phenotyping and biogeographical ancestry testing, you end up identifying a group of people, and in Germany, where there isn't a lot of diversity, this information only becomes helpful if it points to a minority group."

There is concern that if DNA analysis of a crime scene sample points to a particular immigrant community, then the police will conduct dragnets to collect samples from that group. Even without access to DNA phenotyping, Lipphardt recounted how after the Freiburg murder, the police initially focused on a group of African immigrants, some of whom had been on their radar for drug dealing, and collected DNA samples from them.

Samples collected through dragnets that don't yield a matching DNA profile linked to a crime must be deleted and cannot be stored in the national database. However, each state in Germany also operates its own database, and for the duration of an investigation, the profiles collected during a dragnet can remain in the local repository. These profiles also have to be deleted within a certain timeframe, but Lipphardt cited an evaluation by the data protection officer of Baden-Württemberg a few years ago, which showed that [more than 40 percent](#) of the profiles did not meet the storage criteria under the law.

If the bill is passed by the Bavarian parliament, the police could use forensic DNA phenotyping and ancestry testing information for preventing crime, but in order to use these tools to investigate crimes, changes to the federal criminal procedure code would be required, Momsen explained.

Thilo Weichert, a lawyer and a member of the Network for Data Protection, expects the Bavarian bill to pass without significant changes or objections because it has the support of the CSU, which holds the majority in the state parliament. "By supporting this policy, it is evident that some politicians are appealing to right-wing populism ahead of the Bavarian parliamentary elections" in the fall, Weichert said. "We don't need this Bavarian security policy. We need enlightened discussion based on facts and liberal and democratic values."

The Network for Data Protection has issued a statement that the proposed bill in Bavaria is constitutionally problematic and will spur discrimination. Article 1 of the German Basic Law says it's the duty of state authorities to respect and protect human dignity. Article 3 states that all persons are equal before the law and "no person shall be favored or disfavored because of sex, parentage, race, language, homeland and origin, faith, or religious or political opinions."

There hasn't been much objection from the public over the Bavarian legislation or to efforts to amend the code of criminal procedures, experts noted, because they may not yet realize that their constitutional and privacy rights are also at stake. "People think, 'If I don't commit any crimes, why should I have a problem with having my DNA collected?'" Momsen said.

But if the Bavarian bill gets passed and the national law is also changed, he believes it will impact all of society. "A lot of my colleagues are waiting for these laws to pass so they can challenge them on constitutional grounds," he said.

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