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Patterns of exchange of forensic DNA data in the European Union through the Prüm system

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ABSTRACT

This paper presents a study of the 5-year operation (2011–2015) of the transnational exchange of forensic DNA data between Member States of the European Union (EU) for the purpose of combating cross-border crime and terrorism within the so-called Prüm system. This first systematisation of the full official statistical dataset provides an overall assessment of the match figures and patterns of operation of the Prüm system for DNA exchange. These figures and patterns are analysed in terms of the differentiated contributions by participating EU Member States. The data suggest a trend for West and Central European countries to concentrate the majority of Prüm matches, while DNA databases of Eastern European countries tend to contribute with profiles of people that match stains in other countries. In view of the necessary transparency and accountability of the Prüm system, more extensive and informative statistics would be an important contribution to the assessment of its functioning and societal benefits.

1. Introduction

The European Union (EU) has invested in the creation of a system for the transnational exchange of forensic data between Member States for the purpose of combating cross-border crime, terrorism and illegal migration: the so-called Prüm system [1,2]. This system relies on the permanent and automated exchange of information (specifically DNA profile data, fingerprints and vehicle registration data) between Member States. This paper focuses on the exchange of DNA data insofar as the Prüm Decisions have widened the scope of DNA profiling and databasing as an increasingly important tool for criminal investigation and criminal justice systems [3,4].

Although the implementation of the Prüm system has not been as fast and smooth as expected [5], according to the DAPIX[1] report issued in May 2016 [6], there are 22 operational Member States exchanging DNA data. The following six Member States have not initiated DNA data exchange: Croatia, Denmark, Ireland, Italy, Greece and the United Kingdom.

The Prüm system for exchanging DNA data consists of sending through a secure communications infrastructure (sTESTA) the profiles that comply with the Prüm matching rules, on a hit/no hit basis (Step 1).[2] Only the hits or matches that are confirmed by both parties allow additional information to be requested through the existing mutual assistance channels (Step 2). If deemed relevant, the results of the information request can then be forwarded to the authorities responsible for the criminal case concerning the match [1,7].

Nevertheless, the automated comparison of DNA profiles has increased the possibility of false positives and false negatives given the volume of profiles that are available for comparison [7–9]. In spite of the Prüm matching rules and the upgrade to the European Standard Set (ESS)-loci[3] that could mitigate this risk and an eventual re-testing to confirm matches, there are a number of profiles in older databases

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[1] DAPIX is the name of the "Working Party on Data Protection and Information Exchange". This body is mandated to overview and support the tasks and procedures related to the implementation of legislation and policies on information exchange and the protection of personal data in the context of the so-called Prüm Decisions (2008/615/JHA and 2008/616/JHA) and the "Swedish Initiative" [49]. DAPIX works in close cooperation with EUROPOL in promoting cross-border information exchange and is responsible for the implementation of the European Information Management System (IMS) and IMS Action Lists, as well as the regular update and revision of the Law Enforcement Information Exchange Manual.

[2] The automatic hits or matches generated through mass comparisons in the Prüm system were defined in Decision 2008/616/JHA [2] and classified according to their quality. A Quality 1 match (full match) occurs when all allele values of the compared loci commonly contained in the requesting and requested DNA profiles are the same. A Quality 2 match is also equal in all compared alleles but with a wildcard. That is, the compared profile counts as a match when it is equal in six loci, plus the extra allele that can be different. As such, and given the amount of profiles exchanged, Quality 1 and Quality 2 matches reported in the DAPIX statistics can include false positive (or adventitious) matches. For a discussion on Prüm matching rules and examples, see van der Beek [6].

[3] Because of the different STR systems used in forensic databases in the EU, including older, smaller systems, and the increased possibility of adventitious matches involved in massive profile data exchanges, it became necessary to expand the European Standard Set (ESS) from 7 to 12 loci [9].

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that are only upgraded when they produce a match [10]. These profiles are often not included for international comparisons and, therefore, represent a missed opportunity to solve a crime [10].

Given the increasing importance of the exchange of DNA data in criminal justice systems [11,12], this paper aims to map and analyse the patterns of DNA matching between operational countries by examining the available statistics of the operation of the Prüm DNA data exchange from 2011 to 2015.

1.1. Challenges of the Prüm system: risks and benefits

A growing body of literature in the field of social sciences has focused on the institutional and political consequences of the implementation and development of the Prüm system and the associated exchange of forensic information among EU Member States [13–19]. One topic of debate has been the differentiations in power, interests and trust among the Member States and how these aspects could bring implications in the Prüm system, as well as the consequences for the wider processes of European integration [14,17]. Dimensions related to privacy and data protection issues raised by Prüm have also been the subject of analysis, mainly referring to the implementation of common minimal standards of data protection under Prüm and the diversity of legal frameworks in EU Member States [20–23]. The obligatory nature framed by the so-called Prüm Decisions [1,2] meant that all legislative differences and locally nuanced policies and practices[4] associated with DNA profiling and databasing are now to be considered in a wider context, beyond the nation state [24–28].

The social, legal, ethical, economic and operational challenges associated with the exchange of forensic bioinformation were the subject of several works by McCartney and colleagues [8,29–31]. These offer insights into the multifaceted and complex issues of transnational cooperation in police and forensic matters, reflecting on the impacts in terms of the Prüm system's technical viability, democratic legitimacy and acceptability in view of its socioeconomic costs and benefits. As discussed by Fiodorova [26] and Prainsack and Toom [5], all the necessary procedures to implement and ensure the operation of the Prüm system impose costs (i.e., technical, financial and organisational costs) to Member States that are unequally distributed. This is evidenced in the responses to a questionnaire issued by the Belgian Presidency of the Council of the EU in 2010 that was sent to all Member States that had not yet fully completed the implementation of the "Prüm Decisions." The issues identified by the respondents as hampering the implementation of DNA exchange were mainly information technology (IT)-related, but they were also associated with financial matters and human resources [32]. Moreover, besides legal and operational challenges, many EU countries are facing economic difficulties that limit the availability of resources that can be dedicated to the implementation or standardisation of systems for sharing forensic information [8,29].

In spite of critical voices, the potential benefits and advantages of the Prüm system have been highlighted in view of the criminal investigation intelligence it can offer in articulation with other sources of information [33]. More recently, the implementation, evaluation and strengthening of the structures for the exchange of DNA data in Prüm were the subject of a research project that focused on the cases of Belgium, France, the Netherlands and the United Kingdom. The PIES[5] project resulted in particularly relevant studies of cross-border matches between Belgium and the Netherlands [12], as well as between the Netherlands and 18 other operational Member States [34]. These and other works [35–37] have used data about confirmed matches to map the geographical patterns of crimes solved with DNA intelligence obtained through the Prüm exchange. The conclusions of these studies emphasise the notion of a "proximity effect" in relation to cross-border criminality. That is, the selected location to commit a crime is usually close to the offender's residence, and the same effect can be observed in contiguous regions in spite of national borders [12,34,37].

Considering the wider implications of the Prüm DNA exchange, Wilson problematised and evaluated the Prüm model for forensic biometric cooperation in view of its contribution to the production of global public good(s) [38]. The author argues that its contribution towards the production of a global public good derives from the way in which it respects national political and legal autonomy over the regulation and use of sensitive personal data. The stability of the Prüm system will depend on its supervision and accountability to both EU and national institutions.

However, Wilson [38] also points out that the present statistical model[6] is unsatisfactory. In view of the necessary transparency and accountability of the Prüm system, more extensive and informative statistics would be an important contribution to the assessment of the system's functioning and societal benefits. Specifically, there is not much information about what Wilson refers to as "public bads," like cross-border offences. In this regard, the author questions if the asymmetrical distribution of power in the EU results in pressure for the weaker members to internalise the costs of crime. In the words of the author: "*Does the Prüm legislation oblige states of (migratory) origin to undertake the cost of databasing criminal justice information for the benefit of destination states? In other words, does it force the internalisation of externalities?*" [38].

This question seems to highlight an asymmetrical proportion of contributions (namely, the inclusion in DNA databases of known criminal offenders) and the collection of benefits (obtaining information to solve crimes) between the founding members of Prüm and the countries that joined the system through the EU Council Decisions. By resorting to the statistical data made available by DAPIX, we aim to provide an overall assessment of the current scenario and patterns of operation of the Prüm DNA exchange, highlighting the differentiated contributions by the EU Member States.

2. Materials and methods

The data collected for the analysis in this paper refer to the annual reports designed according to the form detailed in document 14103/11 [39]. This determines the format of the match statistics that Member States should report to DAPIX. Match statistics are to be issued annually and include the total number of profiles of people and stains at the beginning and end of the year in the national DNA database, as well as the total number of profiles sent and received. However, the number of profiles received from other countries is not available in countries that use CODIS (Combined DNA Index System) software, as this system only keeps statistics on the number of matches. Another table describes the match statistics of each country with its respective exchanging Member States. The columns on the table for each operational Member State include the following: total, stain own-person ex, stain own-stain ex, person own-stain ex, person own-person ex, where "own" means in

[4] For an overview of the legislative differences in forensic DNA databasing, see Santos et al. [41] and Wallace et al. [50].

[5] PIES – The Prüm Implementation, Evaluation and Strengthening of Forensic DNA Data Exchange.

[6] In 2011, DAPIX initiated the discussion of proposals for the publication of common statistics on DNA data exchange. The Dutch delegation proposed three options for the presentation of DNA exchange statistics, according to the following models: 1) the number of investigations aided, 2) the number of results that could aid an investigation (i.e., relevant results) and 3) "unfiltered" statistics counting all matches. For reasons explained in document 12226/11 [47] regarding the proposal for common statistics on DNA data exchange, Option 1 would be unviable because it would be impossible to acquire such information in most Member States and to acquire this information in a useful time period. Although the Commission expressed preference for Option 2, most Member States (15) voted for Option 3, that is, "unfiltered" statistics, which is arguably the least useful model, albeit the most feasible one. The contents of Option 3 relate the following information: all unique Quality 1 and 2 matches (sorted by country and match type), only matches based on outgoing requests (to prevent duplicate counting), the number of unique profiles sent and received in the reporting year, the number of profiles in the DNA database at the start and the end of the year and an explanation of the meaning of the data [39,47].