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Em parceria com: fct Fundação para a Ciência e a Tecnologia
PRR Plano de Recuperação e Resiliência
REPÚBLICA PORTUGUESA
Financiado pela União Europeia NextGenerationEU
POLICY BRIEF 2026
SCIENCE4POLICY
CONCURSO DE ESTUDOS DE CIÊNCIA PARA AS POLÍTICAS PÚBLICAS

Artificial Intelligence in Domestic Violence Prevention: The Impact of Territorial Analysis on Decision-Making

Marisa Ferreira, Óscar Oliveira and Ana Borges
School of Technology and Management – Polytechnic of Porto

Executive Summary

Domestic violence is a complex and persistent social challenge that affects the safety and well-being of victims and communities. The SAFE project (Solutions for Assisting and Facilitating Equity) proposes the development of an innovative digital system for the territorial analysis of domestic violence using Artificial Intelligence (AI) to transform data into insights that can improve decision-making. This system aims to strengthen the capacity of local entities to identify early patterns of recidivism and design more effective responses tailored to the territory. The absence of integrated and automated tools for data collection and analysis currently stands as an obstacle to effective action. The SAFE methodology is based on the automated collection, standardization, and integration of data from local structures, with the potential for its scope to be expanded.

Recommendations

- Recommendation 1 - Establish a unified data model through data contracts.
- Recommendation 2 - Implement a technical capacity-building, literacy, and ethics plan for AI.
- Recommendation 3 - Plan the gradual expansion and replication of the SafePro platform at a national scale.
- Recommendation 4 - Link analytical evidence to the design and adjustment of local public policies.

Target Audience of the Policy Brief

Political decision-makers at regional and local levels, as well as Public Administration entities with responsibilities in the areas of justice and equality, such as the Commission for Citizenship and Gender Equality (CIG) and the National Network for the Support of Domestic Violence Victims (RNAVVD).

Introduction and Problem Statement

The territorial dimension of domestic violence is crucial (Bowstead, 2023), as the prevalence of the phenomenon varies significantly across regions, reflecting the influence of socioeconomic, cultural, and political variables. The way violence is understood, tolerated, or addressed is shaped by local perceptions and specific regional characteristics. These territorial asymmetries can condition reporting processes, the search for support, and the effectiveness of available responses.

The SAFE project proposes the standardization and automation of data collected across the territory, using Artificial Intelligence to deepen the understanding of the phenomenon and,

consequently, optimize the prevention of domestic violence recidivism. To materialize these objectives, the project developed the SafePro platform.

This approach is fundamentally relevant in a territory like Douro, Tâmega and Sousa, which is marked by systemic vulnerabilities and regional disparities. In this region, the Intermunicipal Community of Douro, Tâmega and Sousa (CIM DT&S) coordinates the country's first intermunicipal support network for domestic violence victims: UNIDAS (Rede Intermunicipal de Apoio à Vítima de Violência Doméstica do Douro, Tâmega e Sousa).

Figure 1 – Territorial coverage of the UNIDAS network

Source: Intermunicipal Community of Tâmega and Sousa (CIM-TS)

Analysis/ Key Findings

Methodological Note

The methodology adopted in the SAFE project combined the integration and harmonization of databases from multiple sources, the statistical analysis of sociodemographic variables, and the application of machine learning models. The design of this approach demonstrated that the technical success of predictive modeling depended, strictly, on the creation and execution of data contracts.

These formal governance instruments were integrated into the methodology to moderate the heterogeneity of existing information systems, align the analytical capacity asymmetries of partner entities, and clearly define the legal and institutional responsibilities of each stakeholder when sharing sensitive information. The methodology is thus grounded in the ability to design and establish these data contracts in a concerted manner, ensuring that any information flow meets the structural, quality, semantic, and privacy requirements before being processed.

Results

The operationalization of this methodology resulted in the development of the SafePro platform, an AI-driven digital solution that transforms scattered data into strategic knowledge through two core features:

- Automated Flows and Data Harmonization: Implementation of an interoperable ecosystem that collects, standardizes, and integrates data from different support structures. This overcomes information fragmentation and ensures a standardized, comparable format across territories based on methodologically validated parameters.
- Predictive and Interpretive Systems: Integration of analytical models capable of classifying risk profiles and identifying patterns of recidivism. This dual capability allows users to not only anticipate critical

situations but also audit and understand the underlying risk variables, thereby guiding decision-making.

By automating these complex analytical processes, SafePro provides local institutions that have lower technical capacity with the necessary autonomy to formulate evidence-based responses, promoting robust inter-institutional coordination and the early identification of emerging needs in the territory.

Policy Options and Recommendations

The analytical architecture and governance models developed within the SAFE project demonstrate that the effectiveness of public policies against domestic violence structurally depends on the operational maturity of three pillars: the existence of integrated information flows regulated by data contracts, the technical and analytical capacity-building of local institutions, and the consolidation of permanent territorial monitoring mechanisms.

The strategic recommendations formulated below aim to mitigate the vulnerabilities and asymmetries identified on the ground. The goal is to provide policymakers and operational structures with a preventive approach heavily anchored in auditable scientific evidence and oriented toward maximizing social impact.

To this end, the following lines of action are recommended:

- Establish a unified data model through data contracts: The effectiveness of the institutional response requires the creation of a unified, interoperable data model that systematically integrates information from local victim support structures, CIG, RNAVVD, and municipal social services. The SAFE project demonstrated that the heterogeneity of information systems creates complex operational barriers and compromises analytical consistency. To alleviate this fragmentation, it is imperative to implement data contracts that automatically regulate and validate the structure, semantics, and privacy of information at its source, facilitating secure knowledge sharing and ensuring the comparability of indicators across different territories.
- Implement a technical capacity-building, literacy, and ethics plan for AI: The adoption of advanced digital ecosystems by institutions with analytical capacity asymmetries requires continuous investment in institutional training. This capacity-building plan must go beyond the instrumental use of the platforms; it must focus structurally on data literacy, the critical interpretation of predictive and interpretive models, and the ethical principles and privacy safeguards that regulate the use of AI in contexts of high social vulnerability.
- Plan the gradual expansion and replication of the SafePro platform at a national scale: The success of the pilot project developed in CIM DT&S proves the viability of the platform as a central tool for monitoring and decision support. It is recommended to design a roadmap for its progressive adoption in other territories. This national expansion must be supported by periodic audits and evaluation mechanisms that acclimate the tool to the institutional realities of each region.
- Link analytical evidence to the design and adjustment of local public policies: The analytical and predictive information generated by the platform must be formally incorporated into political and operational planning cycles. The systematic use of these territorial diagnoses should guide the calibration of prevention measures, drive early intervention strategies, and optimize the allocation of financial and human resources, ensuring that institutional responses are tailored to the needs and specificities of each territory.

Conclusion

The SAFE project enables a transition from a reactive response to a preventive intervention tailored to each territory. By combining clear data contracts and AI models, the project bridges academic research and the practical work of support institutions on the ground.

In summary, by converting fragmented and heterogeneous data into fully auditable scientific evidence, SAFE demonstrates how technological innovation and the responsible use of artificial intelligence can act as institutional drivers. This ecosystem not only sustainably reinforces the analytical capacity of local structures but also equips policy-makers with the necessary tools to optimize resource allocation and ground the design of more effective, inclusive, and equitable public policies.

In terms of limitations, it is important to note that this is a pilot project limited to the Douro, Tâmega and Sousa region, and the platform will need to be validated before it can be replicated in other regions; it should also be noted that the results are dependent on the quality and volume of data obtained.

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HOW TO CITE THIS DOCUMENT

Ferreira, M., Oliveira, O. & Borges A. (2026). *Artificial Intelligence in Domestic Violence Prevention: The Impact of Territorial Analysis on Decision-Making.* S4P-25 Policy Brief 8041/2025. PLANAPP – Centro de Planeamento e de Avaliação de Políticas Públicas.

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science4policy@planapp.gov.pt

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This policy brief was developed under the Science4Policy 2025 (S4P-25): annual science for policy project calls, an initiative by the Centre for Planning and Evaluation of Public Polices (PLANAPP) in collaboration with the Foundation for Science and Technology (FCT), financed by Portugal´s Recovery and Resilience Plan. Thematic Line S4P-25/12: The use of artificial intelligence to predict reoffending in cases of domentic violence.