

Is it possible to identify early signs of violence against women in primary care records?

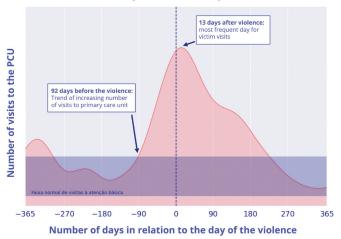


We believe so.

Using linkage to pair health databases and linguistic technology, Vital Strategies and FrameNet Brasil developed an artificial intelligence system to analyze the texts of electronic medical records of women seeking primary care in Recife.

Once all the e-medical records and violence notifications for the same woman are connected through the data linkage process, **it is possible to identify changes in visit patterns of women victims of violence around 90 days before a notification of violence is made.** This is the first step in the process of identifying patterns of genderbased violence in e-medical records.

Pattern of visits to the PCU in relation to the day of the violence episode



A Lexicon of Violence for Artificial Intelligence

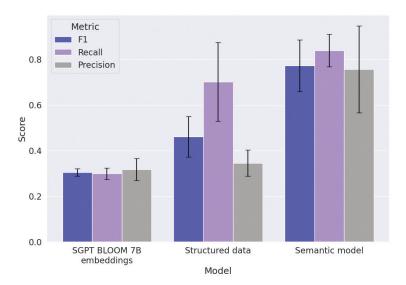
Based on a model in which the words of a language are organized around concepts, we identified a lexicon of gender-based violence in the open fields of e-medical records.

The cloud below shows the terms and concepts most present in the e-medical records of women victims of violence. By creating a computer representation of the texts in the open fields, **we trained an AI model capable of identifying gender-based violence in e-medical records, even in the absence of a violence notification.**

sexual intercourse.n suicide.n depressive disorc pregnant.a abuse.vSeXO **N**Fear diabetes.n Sanxiety.n syphilis.n nAbusing sexual.a iniur exam depression.n hypertension.n ealth pregnancy.n urinary tract infection.n

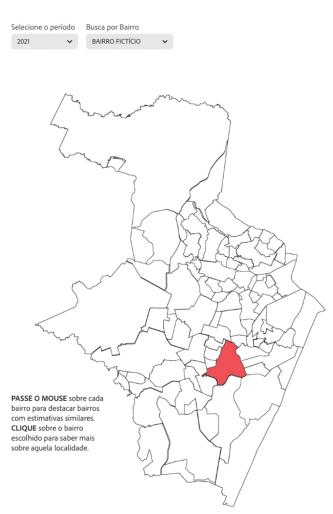
An Innovative AI Model

Based on a combination of data linkage and semantic analysis of open text fields in e-medical records, an innovative Artificial Intelligence model was developed to identify patterns of violence before they aggravate and lead to a violence notification. This model's performance excels that of an algorithm that only considers the parameterized fields of e-medical records – by 67.46% – and another that uses embeddings from a pretrained Large Language Model – by 153.94%.



A new way of visualizing data

The violence patterns inferred by the AI model make it possible to assess the situation of each neighborhood with regard to gender-based violence. It is possible to estimate the rate of underreporting, analyze its distribution by age group and check to what extent a given neighborhood serves potential victims from other areas.



Estimativa de subnotificação por 10.000 usuárias da atenção básica.

O mapa à esquerda mostra a estimativa de subnotificação de casos de violência contra a mulher para cada 10.000 usuárias da atenção básica (AB) em cada bairro. Ao passar o mouse sobre o mapa, destacam-se os bairros com quantidades similares de possíveis casos de violência não identificados pelo sistema de saúde para aquelas localidades.

Bairro Fictício	0		
Taxa de Subnotificação	16.6		
Categoria	Na Média		
Índice de Referência	-6		
População Feminina	1.243		
Bairros Relacionados 🕐	Captação	Perda	Diferença 🕐
Bairro Vizinho 1	10	5	+5 🕇
Bairro Vizinho 2	4	7	-3 🖡
Bairro Vizinho 3	11	18	-7 🖡
Unidades de Saúde	Casos Suspeitos	Usuárias	% Casos / Usuárias
Unidade Básica de Saúde 1	16	230	6,9%
Distribuição de casos	de violência por fai	xa etária	
Casos Suspeitos	Casos Confirmados		
0-9 anos			
0-19 anos	•		
0-59 anos			



10

Número de Casos

