

## **Spatial analysis of homicides in South East Brazil: An assessment of differential risk between men, women, and the youth\***

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### **Riassunto**

Il presente studio si basa su di una prospettiva geografica e esplora l'evoluzione spaziale e temporale dei tassi medi di morte per omicidio nel Sudest brasiliano, tra il 2001 e il 2008, per differenti sotto-popolazioni (maschile, femminile, giovani dai 15 ai 29 anni e popolazione totale).

I risultati rivelano che questo fenomeno colpisce in maniera asimmetrica i giovani di sesso maschile, così come le donne rappresentano i più bassi tassi medi. L'analisi spaziale ha mostrato aree consolidate con alti tassi di omicidio, come le regioni metropolitane di Rio de Janeiro e Vitória. D'altro lato, vi sono differenti dinamiche tra le regioni metropolitane di Belo Horizonte (RMBH), Campinas e San Paolo.

### **Résumé**

Cette étude se base sur une perspective géographique et analyse l'évolution dans l'espace et dans le temps des taux moyens de morts par homicide dans la région du Sud-Est du Brésil, entre 2001 et 2008, chez les hommes, les femmes, les jeunes entre 15 et 29 ans, et l'ensemble de la population.

Les résultats mettent en évidence que ce phénomène touche de manière asymétrique les jeunes hommes, tandis que chez les femmes les taux moyens sont les plus bas.

L'analyse dans l'espace a souligné qu'il existe des zones avec des taux d'homicide élevés et stabilisés dans le temps, comme les régions métropolitaines de Rio de Janeiro et Vitória. En revanche, l'étude a montré qu'entre les régions métropolitaines de Belo Horizonte (RMBH), Campinas et San Paolo, les dynamiques sont différentes.

### **Abstract**

This study is based on a geographical perspective and explores the spatial and temporal evolution of average homicide rates in Southeast Brazil, between 2001 and 2008 for different subpopulations (male, female, youth, and total population).

Results show that this phenomenon affects asymmetrically young males, while women have the lowest average rates. Spatial analysis pinpoints consolidated areas with high homicide rates, such as the metropolitan areas of Rio de Janeiro and Vitoria. On the other hand, different dynamics can be observed among the metropolitan areas of Belo Horizonte (BHMA), Campinas and Sao Paulo.

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## 1. Introduction.

The consistent and rampant growth of violent crime in contemporary Brazil, as well as the inherent complexity of the phenomenon have attracted researchers from various scientific fields. Among these scholars are geographers, who given the improvement of spatial analytical tools drew upon themselves the task of understanding the spatial dynamics of crime, through the discipline Geography of Crime<sup>1</sup>.

This discipline examines a major criminal dimension hitherto not extensively explored: the geographical location of criminal events<sup>2</sup>. Criminal behavior is highly influenced by its immediate environment and the distribution of crime is patterned in both time and space. Understanding both the environment and temporal and spatial patterning are powerful tools in the investigation, control and prevention of crime<sup>3</sup>.

It should be noted, however, that the contribution of geographers to crime analysis cannot be reduced to the mere cartography of criminal offenses. Geographers are concerned with the significance of all the processes leading to and resulting from crime, such as environmental, socio-economic, political, cultural, etc.<sup>4</sup>. In this context the Geography of Crime becomes an important ally in understanding the role of

violence as agent of geographical transformation and reorganization, as well as an important factor shaping space and its meanings<sup>5</sup>. Thus, the identification of areas more prone to criminal activity and its determinants are fruitful objects of geographical analysis, subsidizing public authorities with important means of planning and combating this social problem<sup>6</sup>.

Seeking to understand the process of spatial (re) organization of homicides in Southeast Brazil, this study deals with the spatial and temporal evolution of offenses between 2001 and 2008, focusing on the total, male, female, and young populations. This endeavor is relevant as studies about the spatial distribution of homicides have demonstrated that this phenomenon takes places heterogeneously, killing in an asymmetrically way distinct sub-populations, giving rise to specific spatial signatures to different segments the social structure<sup>7</sup>.

## 2. Theoretical Framework.

The specific causes of urban violence remain unclear; nonetheless, several hypotheses and theoretical constructs were advanced, and can be synthesized in five major approaches<sup>8</sup>:

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<sup>4</sup> Felix S. A., "Geografia do Crime", *Revista de Geografia*, São Paulo, v.13, 1996, pp. 145-166.

<sup>5</sup> Diniz A. M. A., Nahas M. I. P., Moscovitch S. K., "Geografia da violência urbana em Belo Horizonte", *Caderno de Geografia*, Belo Horizonte, v. 13, n. 20, 1º Sem. 2003, pp. 39-56.

<sup>6</sup> Diniz A. M. A., "Migração, Desorganização Social e Violência Urbana em Minas Gerais", *Revista Ra'Ega*, Curitiba, n. 9, 2005, pp. 9-23.

<sup>7</sup> Cano I., Ribeiro E., "Homicídios no Rio de Janeiro e no Brasil: dados, políticas públicas e perspectivas", In Cruz M.V.G. e Batitucci E.C. (orgs), *Homicídios no Brasil*, Rio de Janeiro, editora FGV, 2007.

<sup>8</sup> Lima R., *Conflitos Sociais e Criminalidade Urbana: Uma análise dos homicídios cometidos no município de São Paulo*, Dissertação de Mestrado – Departamento de Sociologia – USP, Mimeo, 2000.

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<sup>1</sup> Lacerda E. G., Horsth G. B., Diniz A.M.A., "Análise espaço-temporal da criminalidade violenta em Minas Gerais entre 1999 e 2004, por meio dos registros de ocorrência da Polícia Civil", in Lobato W., Sabino C. V. S., Abreu J. F. (Org), *16º Seminário de Iniciação Científica, Destaques 2008*, Belo Horizonte, Editora PUCMINAS, 2009, pp. 417-442.

<sup>2</sup> Felix S. A., *Geografia do Crime: Interdisciplinaridade e Relevância*, Marília - Unesp, Marília Publicações, 2002.

<sup>3</sup> Worthley R., Mazerolle L., *Environmental Criminology and Crime Analysis*, Cullompton, Willan, 2008.

- a) theories that attempt to explain crime in terms of individual pathologies, exploring disorders of biological, psychological and psychiatric evaluations;
- b) theories relating urban violence to the frustrations and aggressions arising from social exclusion and poverty<sup>9</sup>;
- c) *a subculture of violence* is emphasized by the third explanatory paradigm in which violent acts are understood as rational behaviors and somehow expected within the social environment in which victims and perpetrators are inserted;
- d) *the social disorganization approach* assumes that crime emerges as a result of problems associated with social control mechanisms. In this context, local communities, marked by a complex system of formal and informal associations, relations of friendship and kinship, contribute to the process of socialization and acculturation of individuals. Therefore, elements that promote the breakdown of social cohesion and, consequently, social control, would be indirectly inciting criminal practices<sup>10</sup>. Such relationships would be conditioned by structural factors such as economic status, ethnic heterogeneity, residential mobility, urbanization and migration;
- e) theories based on the notion of crime as *a rational activity of maximizing profit*, from which the criminal act was caused by an objective assessment of the expected benefits and costs in

respect of that act<sup>11</sup>. According to this proposal, the individual would respond, on the one hand, the instigators factors such as low salaries, and on the other inhibiting factors, such as police efficiency and punishment.

Given the contradictory nature of theoretical constructs, the analysis of causal factors of urban violence is a field open to research. As this social phenomenon directly or indirectly affects the entire scope of society, academics from various fields of research offer a wide range of interpretations. Another complicating factor is associated with the very complexity of the term "violence", which involves different modalities and behaviors<sup>12</sup>. Finally, the difficulties associated with the generation and processing of statistical data associated with the topic as well as the peculiarities inherent to the various units of analysis adds further complexity to the interpretation of urban violence.

The study of crime has been an important aspect of Anglophone Human Geography since the 1970s. These efforts have generated a series of theoretical and methodological advances that allowed crime and its various manifestations to be approached from different geographical perspectives<sup>13</sup>. Consequently, the Geography of Crime has become one of the richest and most diverse sub-disciplines of Human Geography.

An assessment of the geographical production in English language on crime over the last 15 years

<sup>9</sup> This approach has been the target of bitter criticism, because of its methodological weakness, and its politically reactionary nature (Campos, 1980). After all, much of the impoverished population does not follow the way of crime (Benevides, 1993).

<sup>10</sup> Sampson R. J., "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy", *Science Magazine*, vol. 277, no. 5328, 1997, pp. 918-924.

<sup>11</sup> Becker G., "Crime and Punishment: an economic approach", *Journal of Political Economy*, v. 76, 1968, pp. 169-217.

<sup>12</sup> Wilson J. Q., Herrnstein R. J., *Crime and Human Nature*, New York, Simon and Schuster, 1985.

<sup>13</sup> Yarwood R., "Crime and Policing in the British Countryside: Some Agendas for Contemporary

reveals a set of five major recurring themes: spatial patterns of crime; determinants of the geography of crime; identification and characterization of landscapes of fear; residential organization and crime; and communities and crime prevention. We now turn to a brief discussion of these major themes.

A group of scholars is devoted to the identification of spatial patterns in the distribution of various forms of crime in different contexts. Invariably, these studies employ geospatial technologies (GIS) to explore the spatial distribution of criminal activities. Emblematic of this sub-theme are the studies by Weisburd et al.<sup>14</sup> on hot spots of crime committed by teenagers in Seattle, USA; Vilalta<sup>15</sup> on robberies in the Metropolitan Zone of Mexico Valley, Beauregard et al.<sup>16</sup> on rape in the U.S. and Canada; and Amanda et al.<sup>17</sup> on thefts in the British city of Cardiff. The results of these studies suggest that crime does not occur randomly in space, presenting distinct spatial patterns.

The greatest number of studies revolves around the identification of spatial patterns, deploying GIS and spatial statistical modeling tools in order

to pinpoint crime conditioning factors. Within this context, the geographer Vania Ceccato has a prominent role. She explored the dynamics of crime along the border areas of Lithuania<sup>18</sup>; *criminogenic* conditions in the city of Tallinn in Estonia<sup>19</sup>; the incidence and the determinants of crime in Estonia, Lithuania and Latvia<sup>20</sup>; comparative analysis between Cologne, Germany and Tallinn in Estonia<sup>21</sup>; determinants of home invasions, auto thefts and vandalism in Stockholm, Sweden<sup>22</sup>. Keith Harries, one of the pioneers in the geographical study of crime, also deserves attention. Harries<sup>23</sup> promotes a historical review of homicides in the U.S. between 1935 and 1980; and explores the spatial variations of crime in Baltimore County and their associations with physical and social elements<sup>24</sup>.

Another group of scholars has been working on the perception of different social groups in relation to the likelihood of victimization in space, a fact usually treated in the literature under the name of the “geography or landscape of fear”.

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Geographical Research”, *Sociologia Ruralis*, v. 41, n. 2, 2001, pp. 201-219.

<sup>14</sup> Weisburd D., Morris N. A., Groff E. R., “Hot Spots of Juvenile Crime: A Longitudinal Study of Arrest Incidents at Street Segments in Seattle, Washington”, *Journal of Quantitative Criminology*, v. 25, n. 4, 2009, pp. 443-467.

<sup>15</sup> Vilalta C., “Un Modelo Descriptivo de la Geografía del Robo en la Zona Metropolitana del Valle de México”, *Journal of Latin American Geography*, v. 8, n.1, 2009, pp. 55-78.

<sup>16</sup> Beauregard E., Proul J., Rossmo D. K., “Spatial patterns of sex offenders: Theoretical, empirical, and practical issues”, *Aggression and Violent Behavior*, v. 10, 2005, pp. 579-603.

<sup>17</sup> Amanda L. N., *The geography of shoplifting in a British city: Evidence from Cardiff*, Department of Geography, Worcester College of Higher Education, Worcester U.K, 1996.

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<sup>18</sup> Ceccato V., “Crime Dynamics at Lithuanian Borders”, *European Journal of Criminology*, v. 4, 2007, pp. 131-160.

<sup>19</sup> Ceccato V., “Crime in a City in Transition: The Case of Tallinn, Estonia”, *Urban Studies*, v. 46, 2009, pp. 1611-1638.

<sup>20</sup> Ceccato V., Oberwittler D., “Comparing spatial patterns of robbery: Evidence from a Western and an Eastern European city”, *Cities*, v. 25, 2008, pp. 185-196.

<sup>21</sup> *Ibidem*.

<sup>22</sup> Ceccato V., Haining R., Signoretta P., “Exploring Offense Statistics in Stockholm City Using Spatial Analysis Tools”, *Annals of the American Geographers*, v. 92, n.1, 2002, pp. 29-51.

<sup>23</sup> Harries K. D., “The Historical Geography of Homicide in the U.S., 1935-1980”, *Geoforum*, v. 16, n. 1, 1985, pp. 73-83.

<sup>24</sup> Harries K., “Extreme Spatial Variations in Crime Density in Baltimore County, Md”, *Geoforum*, v. 31, 2006, pp. 404-416.

Focusing on gender relations Pain<sup>25</sup>, Brownlow<sup>26</sup>, Panelli et al.<sup>27</sup>, Whitzman<sup>28</sup> explore the geographies of fear among men and women, assessing their impacts on the construction of specific spatial identities. Webster<sup>29</sup> studies the relationship between race, space and fear in northern England; Shirlow and Pain<sup>30</sup> work the politicization of fear in the U.S., while Nayak<sup>31</sup> focuses on the fear of crime through the eyes of children, using as reference northeast England.

Another set of studies focuses on the relationship between different forms of organization, residential architecture and criminal events. Holloway and McNulty<sup>32</sup> analyze the combination of racial segregation and public housing in Atlanta and the incidence of violent crime. Along the same lines Murie<sup>33</sup> analyzes the relationship between geography and public sector residential

crime in Britain, while Shah and Kesan<sup>34</sup> study the impact of architecture on crime rates. According to these authors, architecture influences the manifestation of criminal activities, expressing cultural or symbolic meanings, and interfering in how social groups interact and how certain social values are materialized.

The development of crime prevention measures focused on communities has been explored by numerous scholars<sup>35</sup>. Among the various measures scrutinized emphasis was placed on surveillance networks of neighbors (neighborhood watch) and political rapprochements between police and communities<sup>36</sup>. On the other hand, Grogger and Weatherford<sup>37</sup> work on the demands of communities for police services in England, emphasizing the perception of residents regarding the prioritization of routines.

While the Geography of Crime in the United States was developed in the 1970s, the subject is still embryonic in Brazil, having formally organized in the mid-1990s, thanks to the pioneering work of Sueli Felix. From a longitudinal analysis of crime in Marilia SP,

<sup>25</sup> Pain R. H., "Social Geographies of Women's Fear of Crime", *Trans Inst Br Geogr Ns*, v. 22, 1997, pp. 231-244.

<sup>26</sup> Brownlow A., *A geography of men's fear*, Department of Geography and Urban Studies, Temple University, Philadelphia, PA, USA, 2004.

<sup>27</sup> Panelli R., Little J., Kraack A., "A Community Issue? Rural Women's Feelings of Safety and Fear in New Zealand", *Gender, Place and Culture*, v. 11, n. 3, 2004.

<sup>28</sup> Whitzman C., "Stuck at the front door: gender, fear of crime and the challenge of creating safer space", *Environment and Planning A*, v. 39, 2007, pp. 2715-2732.

<sup>29</sup> Webster C., "Race, Space and Fear: Imagined Geographies of Racism, Crime, Violence and Disorder in Northern England", *Capital & Class*, v. 27, n. 2, 2003, pp. 95-122.

<sup>30</sup> Shirlow P., Pain R., "The Geographies and Politics of Fear", *Capital & Class*, v. 27, n. 2, 2003, pp. 15-26.

<sup>31</sup> Nayak A., "Through Children's Eyes: childhood, place and the fear of crime", *Geoforum*, v. 34, 2003, pp. 303-315.

<sup>32</sup> Holloway S. R., McNulty T. L., "Contingent Urban Geographies of Violent Crime: Racial Segregation and the Impact of Public Housing in Atlanta", *Urban Geography*, v. 24, n. 3, 2003, pp. 187-211.

<sup>33</sup> Murie A., "Linking Housing Changes to Crime", in *Social Policy and Administration*, Volume 31, Issue 5, December, 1997, pp. 1-170.

<sup>34</sup> Shah R. C., Kesan J. P., "How Architecture Regulates", *Journal of architectural and Planning Research*, v. 24, n. 4, 2007, pp.350-359.

<sup>35</sup> Ashby D. I., "Policing Neighbourhoods: Exploring the Geographies of Crime, Policing and Performance Assessment", *Policing and Society*, v. 15, n. 4, 2005, p. 413-447; Yarwood R., "Crime and Policing in the British Countryside: Some Agendas for Contemporary Geographical Research", *Sociologia Ruralis*, v. 41, n. 2, 2001, pp. 201-219; England M., "When 'good neighbors' go bad: territorial geographies of neighborhood associations", *Environment and Planning A*, v. 40, 2008, pp. 2879-2894.

<sup>36</sup> Herbert D. T., Harries K. D. "Area-Based Policies for Crime Prevention", *Applied Geography*, v. 6, 1986, pp. 281-295.

<sup>37</sup> Grogger J., Weatherford M. S., "Crime, Policing and the Perception of Neighborhood Safety", *Political Geography*, v. 14, n. 6/7, 1995, pp. 521-541.

Felix<sup>38</sup> reveals a clear link between this phenomenon and the time of existence of neighborhoods. Another geographical study that deserves attention was advanced by Mendonça<sup>39</sup>, who examined the influence of climate upon the human body and psychology through the correlation between air temperature and crime rates among ten Brazilian Cities.

Within the context of Belo Horizonte city, Diniz et. al<sup>40</sup> explored the relationship between crime and social vulnerability. On the other hand Diniz contrasted the sense of insecurity and the incidence of crime in Belo Horizonte, and attributed the lack of correlation to the sensationalist treatment of isolated events by the mass media. Diniz and Batella<sup>41</sup> studied the spatial concentration and specializations of crime at the regional level in Minas Gerais State, Brazil; while Diniz and Ribeiro<sup>42</sup> discovered a strong relationship between federal road junctions and crime rates across mid-sized cities of Minas Gerais State.

Diniz (2005a) also identified high levels of violent crime along the borders of Minas Gerais State,

where the highest rates of interstate migration are found. This overlap at border regions is strongly influenced by the clash of cultural values, weak social cohesion, limits of state police jurisdictions and the lack of communication between state police forces, which strengthens the overall clutter confirming the thesis that links migration and urban violence.

Working in another perspective, Batella and Diniz<sup>43</sup> applied some spatial descriptive statistics to investigate the spatial restructuring of crime in Minas Gerais State, using data on crimes against property and against people for 1996 and 2003. The authors noted that in both periods the highest concentrations of crime against property were found in the two most economically vigorous regions of the state: the city of Uberlândia, in the west of Minas, and the Metropolitan Region of Belo Horizonte (BHMA). When the analysis drew on crime against people a phenomenon called attention: the highest concentration of such crimes in the northeastern portion of the state, one of the poorest areas of Minas Gerais, as well as within the municipalities around the BHMA. The existence of this bilateral movement, which pulls the center weighted average of the crime against the people toward it, made Batella and Diniz<sup>44</sup> to compare it to a "tug of war."

### 3. Methodological Procedures.

The aspects of interest for this study are contained in the International Classification of Diseases - ICD-10, in its Chapter XX, which defines

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<sup>38</sup> Felix S. A., *A Geografia do Crime Urbano: aspectos teóricos e o caso de Marília*, Tese (Doutorado) – Universidade Estadual Paulista Júlio Mesquita, Instituto de Geociências, Rio Claro, 1996.

<sup>39</sup> Mendonça F., *Clima e Criminalidade: ensaio analítico da correlação entre a temperatura do ar e a incidência da criminalidade urbana*, Curitiba, Ed. da UFPR, 2001.

<sup>40</sup> Diniz A. M. A., Nahas M. I. P., Moscovitch S. K., "Geografia da violência urbana em Belo Horizonte", *Caderno de Geografia*, Belo Horizonte, v. 13, n. 20, 1º Sem. 2003, pp. 39-56.

<sup>41</sup> Diniz A. M. A., Batella W. B., "Criminalidade Violenta nas Regiões de Planejamento de Minas Gerais: Uma Abordagem Quantitativa", *Caderno de Geografia*, Belo Horizonte, v. 14, n. 23, 2º Sem. 2004, pp. 51-72.

<sup>42</sup> Diniz A. M. A., Ribeiro J. G. da P., "Violência urbana nas cidades médias mineiras: determinantes e implicações", *Geosul*, Florianópolis, v. 20, n. 40, jul./dez. 2005, pp. 77-103.

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<sup>43</sup> Batella W. B., Diniz A. M. A., "O uso de técnicas elementares de estatística espacial no estudo da reestruturação espacial da criminalidade violenta no Estado de Minas Gerais: 1996-2003", *Caderno de Geografia*, Belo Horizonte, v. 16, n. 26, 2006, pp. 153-167.

"external causes of morbidity and mortality." Among the causes of death established by ICD-10 the groups between X85-Y09, receiving the generic title of "aggressions" were used. This Chapter is characterized by the presence of aggressions inflicted by third parties, deploying various means to cause damage, injury or death of the victim.

The data used in this work were retrieved from the Mortality Information System of the Brazilian Ministry of Health. Information was filtered in such way that homicide occurrences by different age groups (five-year interval) and gender are identifiable. Data for each sub-group were later transformed in crude annual rates based on demographic information and estimates made available by the Brazilian census recording agency – IBGE. It is necessary to emphasize that all data collected refer to the years 1999 to 2009 for every single municipality of Southeast Brazil (figure 1).

Given the undisputable influence of age structure upon homicide rates, we had to standardize the age distribution for all municipalities in order to perform city by city comparisons in terms of their homicide incidence. We deployed Carvalho, Sawyer and Rodrigues<sup>45</sup> method which controls or isolates the effect of certain characteristics that are affecting the comparison.

Once standardized rates were produced, we noticed that in municipalities endowed with low populations raw rates presented considerable random fluctuations within the time frame of this study. In order to minimize these oscillations, we

adopted a three year moving averages of raw rates to come up with a synthetic and more stable risk rate. In this process the smoothed coefficient of the year  $i$  ( $Y_{ai}$ ) corresponded to the arithmetic average of the coefficients in the previous year ( $i-1$ ), the same year ( $i$ ) and the following year ( $i+1$ ):  
$$Y_{ai} = (Y_{i-1} + Y_i + Y_{i+1})/3.$$

The next step consisted of preparing choropleth maps using the software ArcGIS 9.3, in order to visualize and analyze the spatial distribution of average homicide rates in Southeastern Brazil. Maps depicting the distribution of average standardized rates of the total, male, female and young (15-29 years) populations for all municipalities and years were advanced.

## 4. Results.

### 4.1 Overall mortality

One can infer some behavioral patterns in the spatial evolution of the overall homicide deaths rates in Southeastern Brazil (Figure 2). Firstly, consolidated areas with high mortality rates are found in the metropolitan areas of Rio de Janeiro and Vitoria; whereas, one notices different dynamics across the metropolitan areas of Belo Horizonte (BHMA), Campinas and Sao Paulo over time. While BHMA experienced significant increases in homicide rates throughout the period, the metropolitan areas of São Paulo State (Campinas and São Paulo) showed a considerable decrease.

It is also noticeable the growth in homicides rates across the municipalities of the Mucuri and Rio Doce Valleys and Northeast Minas Gerais, besides Northwest Espírito Santo, forming in 2008 an extensive criminal arc that begins in Metropolitan Area of Vitória, reaching the

<sup>44</sup> *Ibidem*.

<sup>45</sup> Carvalho J. A. M. De, Sawyer D. O., Rordrigues R. do N., *Introdução a Alguns Conceitos Básicos e Medidas em Demografia*, 2. Ed. Ver., São Paulo, ABEP, 1994 (reimpr. 1998).

northern coast of Espírito Santo, and moving inwards, contaminating the municipalities in direct and indirect contact with the federal highways BR 418 and 381 in Minas Gerais State. It is noteworthy the persistence in time of a criminal corridor extending along the entire coastline of Rio de Janeiro State, while the municipalities located in the hinterland of Minas Gerais and Sao Paulo States present rates far below the ones found along the coastline.

Figure 6/1 reveals a steady and significant decrease in crime rates in the states of Sao Paulo and Rio de Janeiro, however, the state of Rio de Janeiro rates remained above the national average. Minas Gerais presents a less consistent trend, since the state experienced a slight increase in homicide rates until 2004, when the phenomenon has stabilized and started to decrease from 2005 onwards. In the context of Southeastern Brazil, Espírito Santo deserves attention. In addition to presenting consistently homicide rates above the national average throughout the period analyzed, the state excels by a completely erratic evolutionary pattern, but with an ascending trend since 2005.

#### 4.2 Homicides by gender

Given the fact that the vast majority of homicides occur among males, the spatial and temporal distributions of male homicide rates (Figure 3) appear very similar to those found for the total population. However, one notes a significant difference in the intensity of the phenomenon. While risk rates for the overall population were around 21 deaths per hundred thousand inhabitants in 2008, the male homicide rates reached nearly 40 homicides (Figure 6/2).

On the other hand, when you appreciate the data relating to women one notices several peculiarities with regards to the intensity, spatial organization and temporal evolution of homicides in Southeast Brazil (Figures 3 and 4). Female rates are significantly lower than the overall population and even smaller than those found for men. Notice that average homicide rates fall below 4 deaths per 100,000 women, contrasting with close to 40 among men.

Although there seems to be no clear area of intense concentration of female homicides, one witnesses slightly higher rates across the north of Espírito Santo and a few scattered municipalities in Minas Gerais. It is also noteworthy the fact that Espírito Santo and Minas Gerais States experienced increases in homicide rates during much of the analyzed period; while, Espírito Santo presented female homicide rates almost three times as higher as the one found for Southeast Brazil as a whole in 2008 (Figure 6/3). Figure 6/3 also demonstrates a significant reduction of homicides in Sao Paulo and Rio de Janeiro States over the same period.

#### 4.3 The youth

Data show that the likelihood of becoming a homicide victim in Southeast Brazil is far greater among the young population (15 to 29 years) than in any other subpopulation. Once again, the coastal municipalities of Espírito Santo and Rio de Janeiro States (including the metropolitan areas of Rio de Janeiro and Vitoria) proved to be very affected by the phenomenon (Figure 5). The municipalities of northern Espírito Santo and Minas Gerais's Mucuri and Rio Doce Valleys as well as Belo Horizonte Metropolitan region proved to be areas of high social vulnerability. On



the other hand, the metropolitan areas of São Paulo and their hinterland presented decreasing homicide rates over the analyzed period.

Within this context, Southeast Brazil as a whole presented homicide rates slightly over 40 deaths per 100,000 young populations (Figure 6/4). However, this value decreased over the years given the substantial and consistent fall in deaths by homicide experienced by the municipalities of São Paulo and Rio de Janeiro States. Although experiencing a slight increase Minas Gerais still present rates below the national and regional average. The same cannot be said about Espírito Santo which proved to be tremendously vulnerable to the phenomenon, presenting in 2008 somewhere around 115 homicides per 100,000 young people.

## **5. Conclusion.**

Deadly violence in Southeast Brazil has surpassed the 10 deaths per 100,000 people that mark the accepted threshold of an epidemic. When we break down these figures by subpopulation one witnesses that violence against males and against the most vulnerable members of society, the youth, exceeds that threshold manifold. Nonetheless, unlike a disease epidemic, homicides are not contained or short-lived because they have become an integral part of the Brazilian society.

The high crime rates observed in the region convey much more than a simple account of those who perished. It testifies to a culture of violence in which personal conflicts are solved by the extermination of inconvenient elements, a process aggravated by the historical omissions of the Brazilian State. High homicide rates proliferate in the so-called consolidated peripheries or slums, all

lacking public investments in infrastructure, education, health, and recreational facilities.

Crime control policies currently underway in Brazil, which place heavy emphasis on repressive measures, most specifically incarceration, are not sufficient to control homicides and other interpersonal crimes. After all, homicides across Southeast Brazil metropolitan areas are associated with criminal gangs and abusive police. Across mid-sized cities social asymmetries are the chief factors behind violent crimes; whereas in smaller towns violence is deployed as a means to solve personal conflicts and differences. Nonetheless, results show substantial changes in spatial terms over the recent past.

Over the analyzed period it is noticeable the significant decrease in homicide rates in Southeast Brazil. This decrease is due mainly to the sharp drop in homicides in the largest municipalities of the region: São Paulo and Rio de Janeiro, where better policing and economic growth are associated with the downward trend. However, the States of Minas Gerais and Espírito Santo experienced positive growth between 2000 and 2008.

One also witnesses a consistent trend in the evolutionary pattern of homicides in Southeast Brazil, observable in all subpopulations explored in this paper. However, the intensity in which the phenomenon manifests itself occurs unevenly across the subpopulations, privileging the young male population.

Another important result is related to spatial restructuring of the phenomenon. At the beginning of the scrutinized period killings tended to be concentrated in the metropolitan areas of São Paulo and Campinas; whereas, in 2008 a new

geography emerged. The likelihood of being a homicide victim was far greater in the metropolitan region of Belo Horizonte and the mesoregions of Mucuri and Rio Doce Valleys in Minas Gerais. On the other hand, one spatial pattern was consistent throughout the period: the presence of a deadly coastal corridor connecting the States of Rio de Janeiro and Espírito Santo. It also becomes patent the need to reassess the tremendous and somewhat consistent increase in homicides observed in Espírito Santo, a behavior that contradicts the overall trend observed in Southeast Brazil.

Results also attest to the fact that Geography and Spatial Analytical tools were effective in identifying behavioral patterns of killings, subsidizing the State with important information to curb this deleterious social process. However, the results of this study bring to light a series of spatial patterns that deserve further attention, especially the need to identify the multi-scalar determinants of violent deaths operating at the individual, family, peer group, community, and society levels among the various subpopulations assessed.

Thus, no single theoretical approach is sufficient to fully understand the complexities of criminal behavior in Southeast Brazil and no single solution can be applied to curb present levels of criminal activity. Fighting crime in the region must undoubtedly include a pool of measures, including the reduction of the gap between rich and poor; specific prevention programs targeting the subpopulations more exposed to risk (youth and male); the elimination of illegal arms commerce and drug trafficking; and integrated

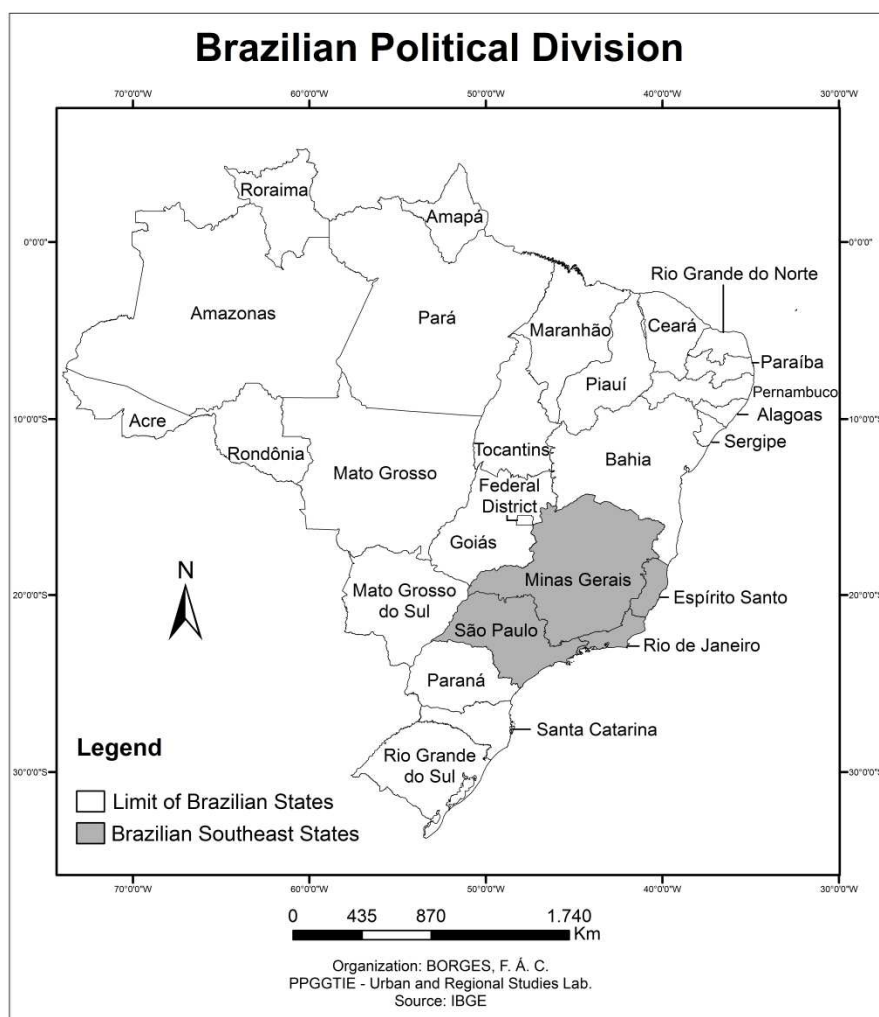
public safety programs, involving Federal, State and Municipal authorities.

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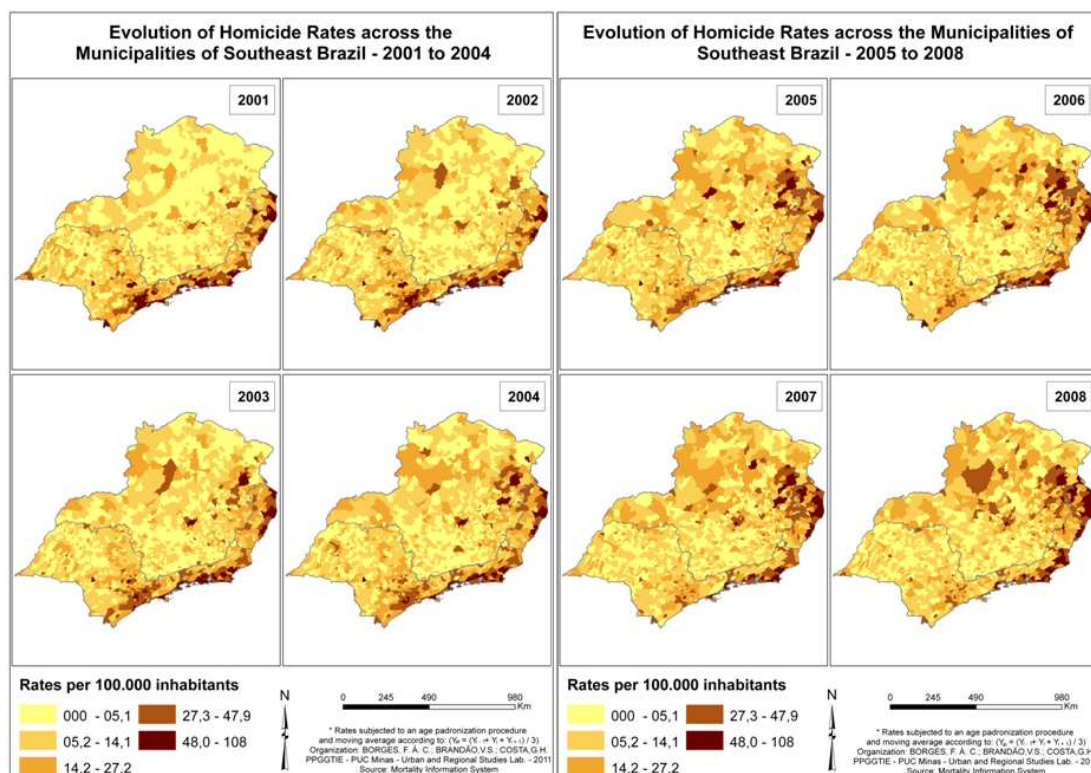
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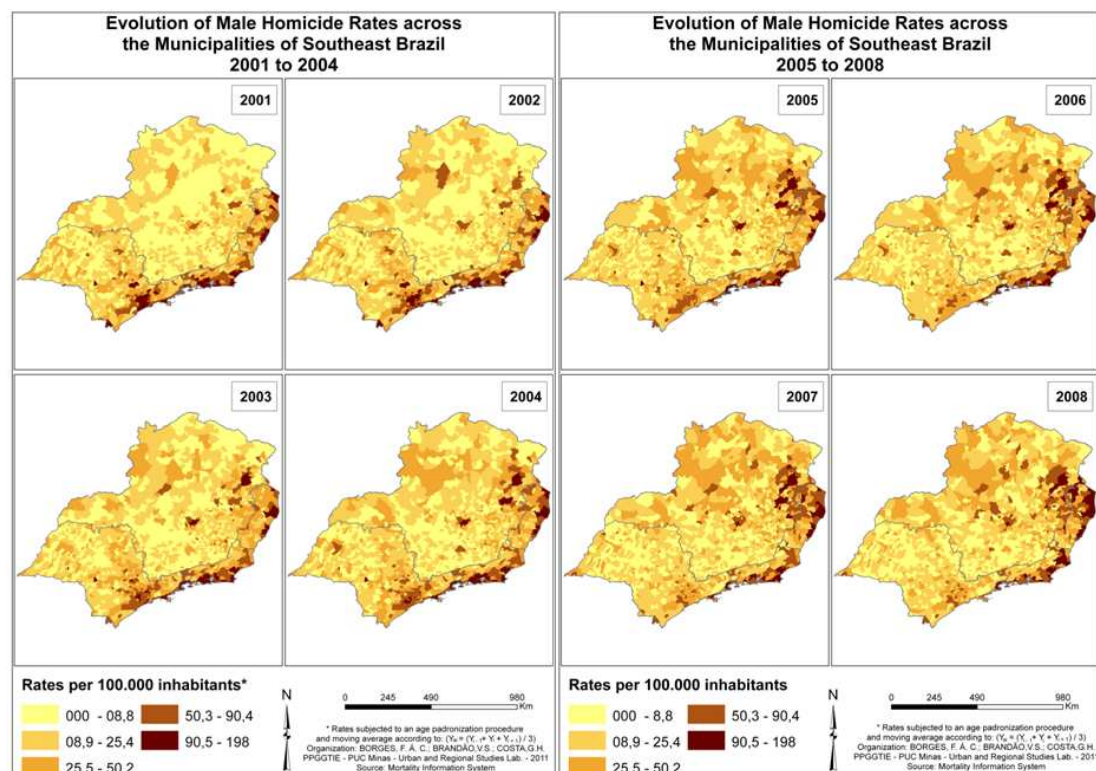
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**Figure n. 1:** *Brazilian Political Division.*

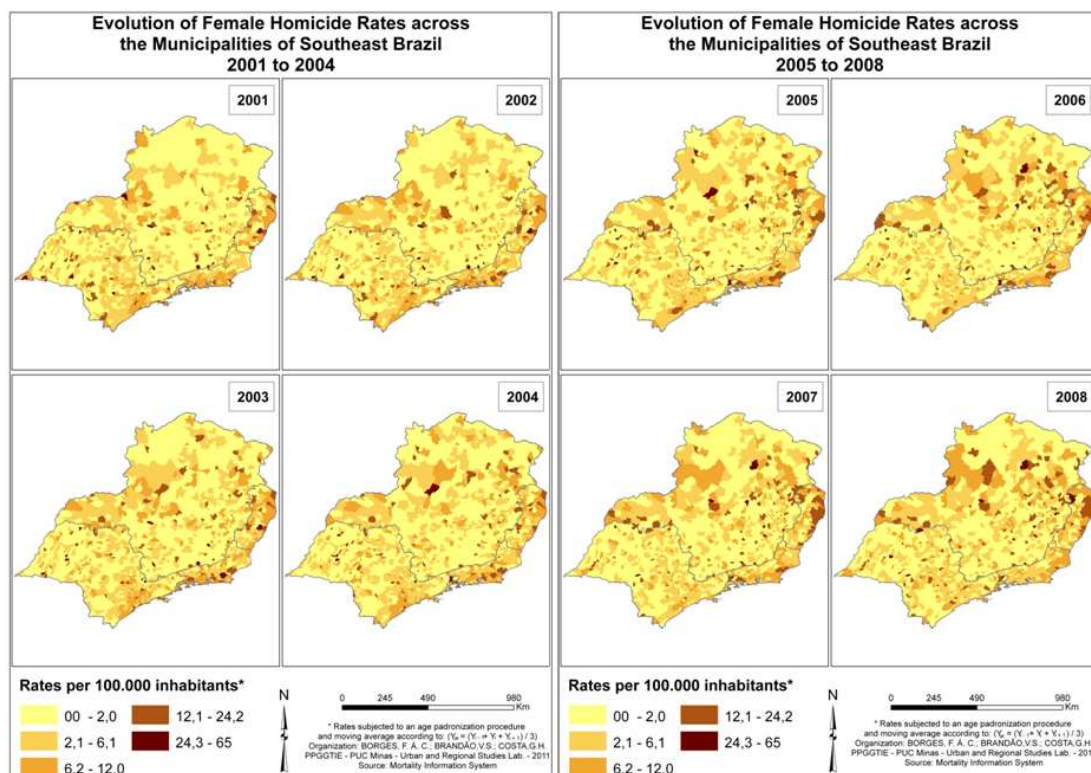


**Figure n. 2:** *Evolution of Deaths by Homicides in Southeast Brazil.*

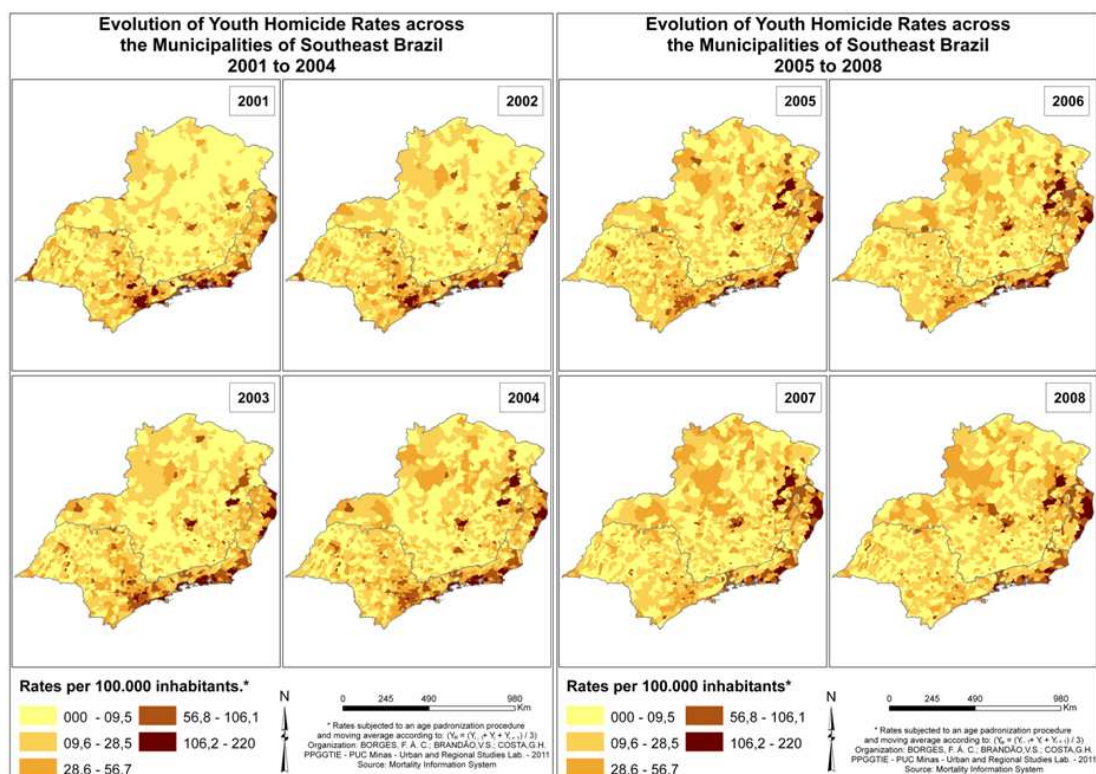


**Figure n. 3:** *Evolution of Men Deaths by Homicides in Southeast Brazil.*

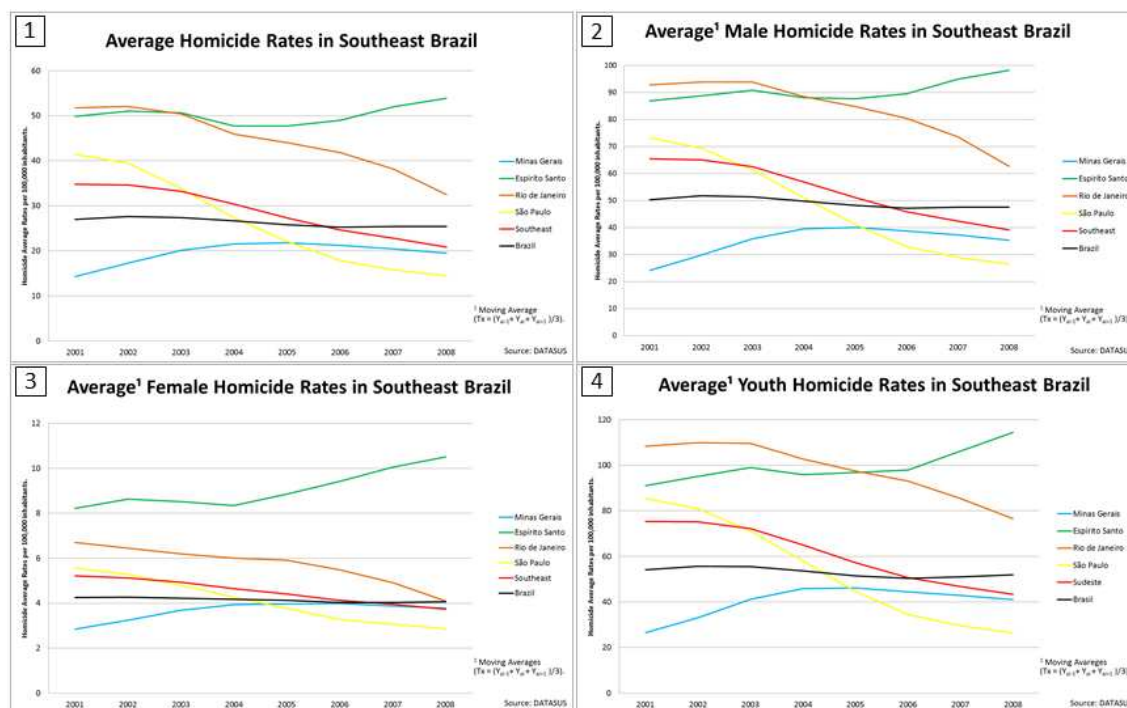




**Figure n. 4:** Evolution of Women Deaths by Homicides in Southeast Brazil.



**Figure n. 5:** Evolution of Youth Deaths by Homicides in Southeast Brazil.



**Figure n. 6:** Evolution of homicide rates in Southeast Brazil.