Health impact evaluation of the Vila Viva program in Belo Horizonte, Brazil

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Salud Urbana en América Latina

LAC-URBAN HEALTH
Urban Health Network for Latin America and the Caribbean

Osubh 18 ANOS
Observatório de Saúde Urbana

About us: Observatory for Urban Health in Belo Horizonte (OSUBH)

- Partnership (since 2002) between UFMG and BH City Council
- Created by academics and city technicians from the City Health Department
  - Finding ways of bridging the gap between science and public health policies

Caiaffa et al. JHU, 2014

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Origin: Belo Horizonte

6th largest city Brazil
Population: 2,375,444
Slum residents: 451.395 (19%)
186 informal settlements – 5% of BH area

Households: 600,000
Area: 331 km2
Basic Sanitation:
Water supply – 99.7%
Garbage collection – 100.0%
Sewage system – 93.0%

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Salubal ancillary study: Health impact evaluation of the Vila Viva program in Belo Horizonte, Brazil

- This ancillary study is nested to the BH-Viva Project that has being developing by Observatory for Urban Health team and partners
- Supported by the Salurbal project, funded by the Welcome Trust

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Salubal ancillary study: Health impact evaluation of the Vila Viva program in Belo Horizonte, Brazil

- To **complete the databases** compiled during the first phase of the **BH-Viva Project** (from 2002-2012) with **georeferenced information** on death, hospitalization, notifiable diseases and interventions **from 2013 up to 2019** for the entire city and two groups of informal settlements
- To evaluate the health impact of the **Vila Viva project** in Belo Horizonte using secondary data

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The intervention: Vila Viva Program

- The Vila Viva program is a comprehensive urban intervention in several informal settlements in Belo Horizonte
  - The program has been improving the living conditions of residents, enhancing public spaces, and implementing social programs

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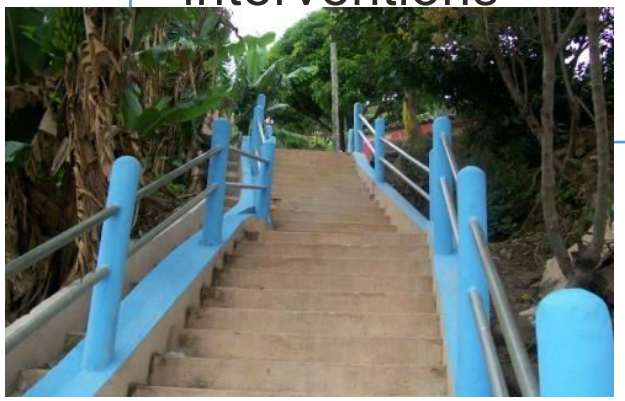
The Vila Viva place-based urban transformation interventions

Physical-environmental

- Housing
- Sanitation
- Parks and Leisure places
- Geological interventions

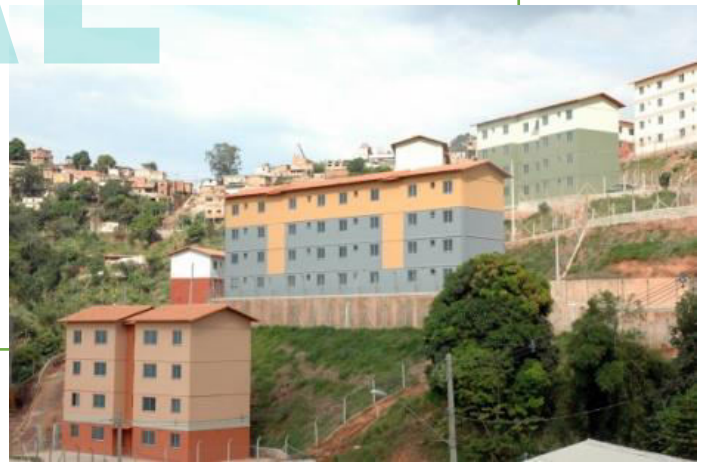


Socio-organizational

- Educational, sanitary and environmental interventions
- Creation of job opportunities

Legal

- Legalization of land tenure



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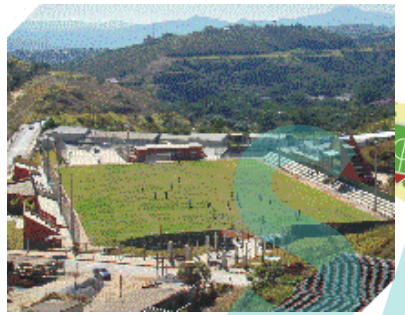
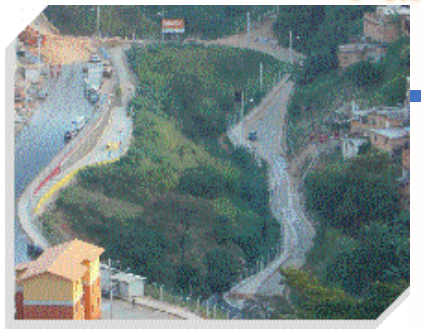
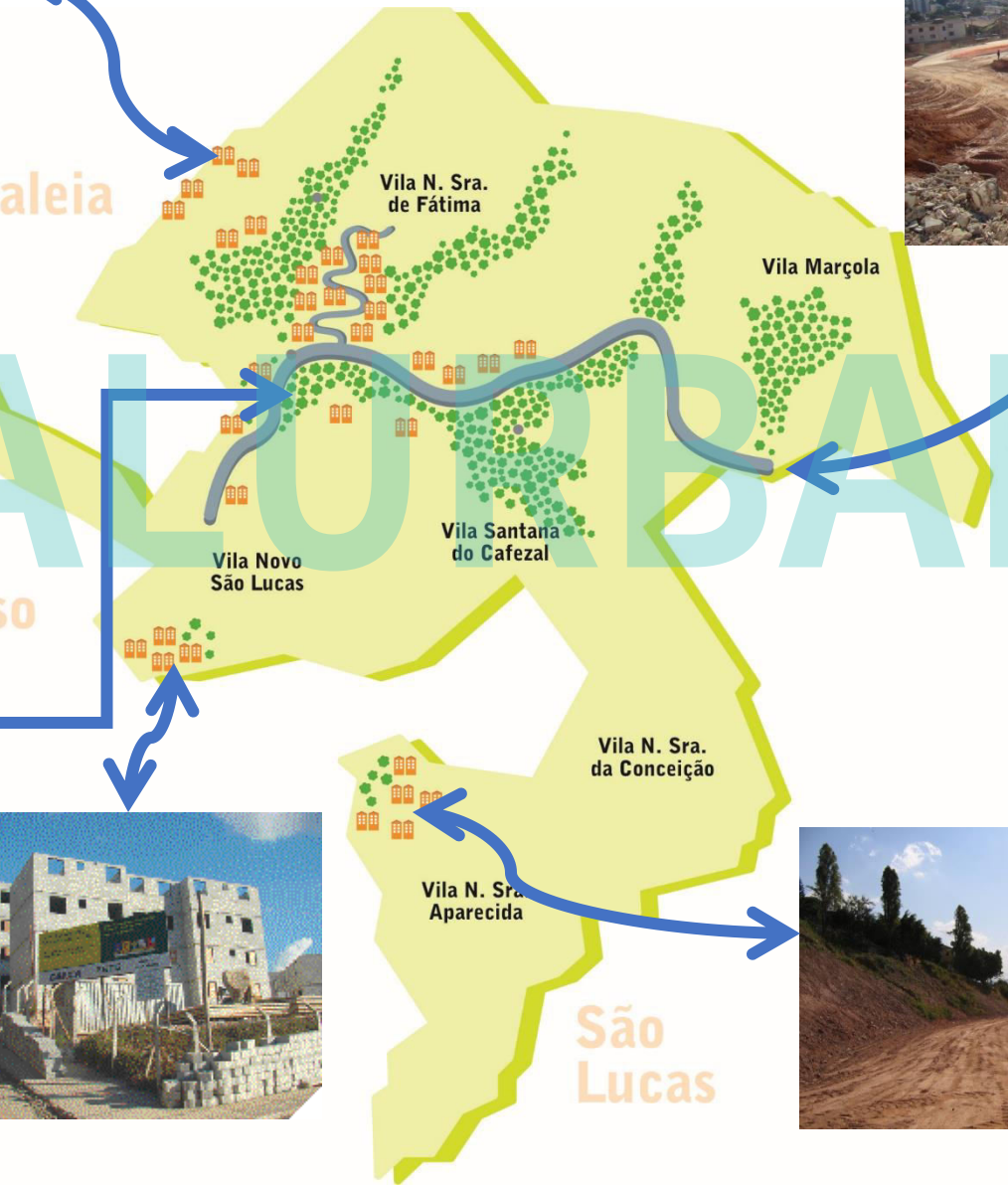
Vila Viva Program: Aglomerado da Serra







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Aglomerado da Serra before the intervention

Source: Google images

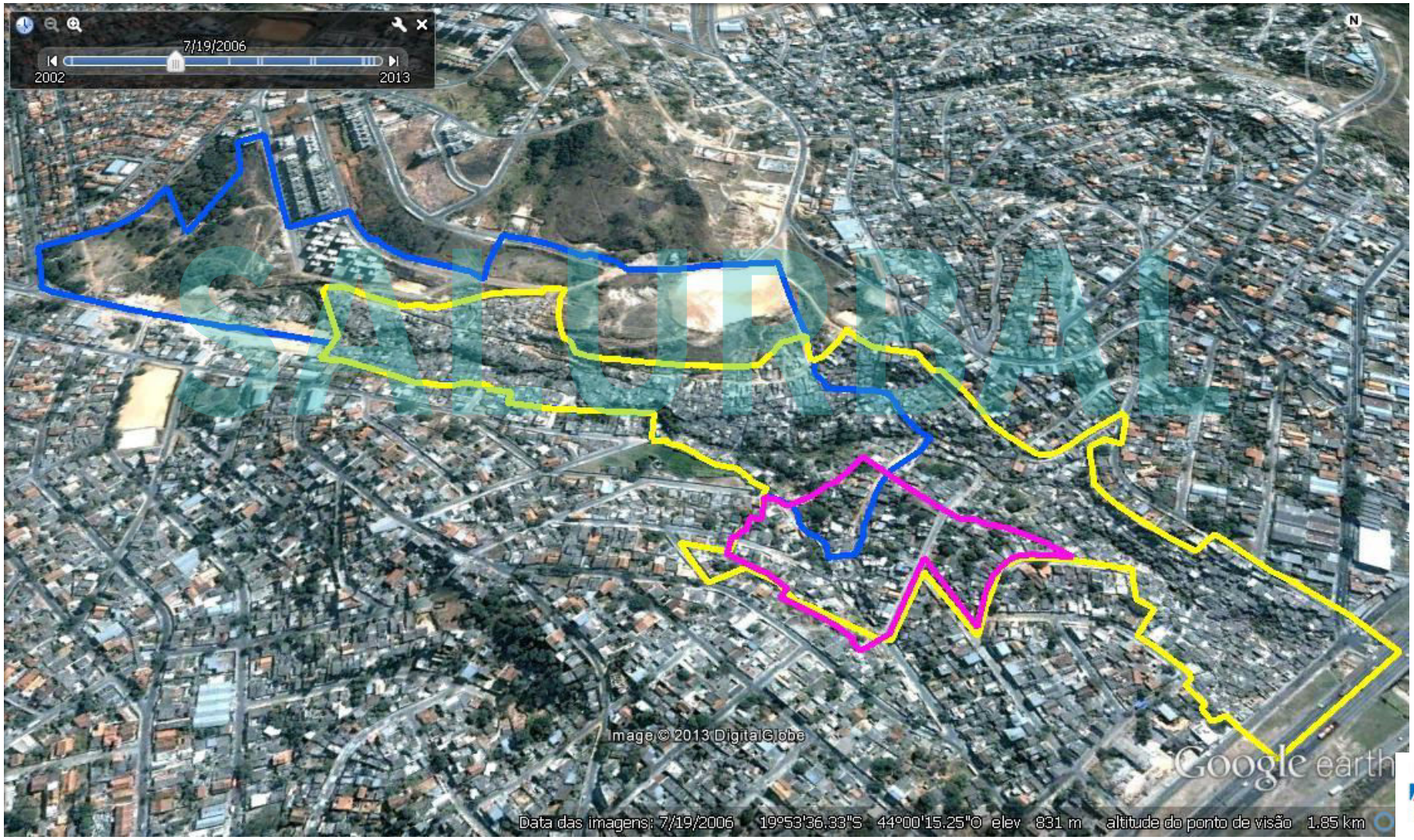
Aglomerado da Serra after the intervention

Source: Google images

Vila São José in November 2002

Google images + BH Viva study works' georreferencing

Vila São José in July 2006

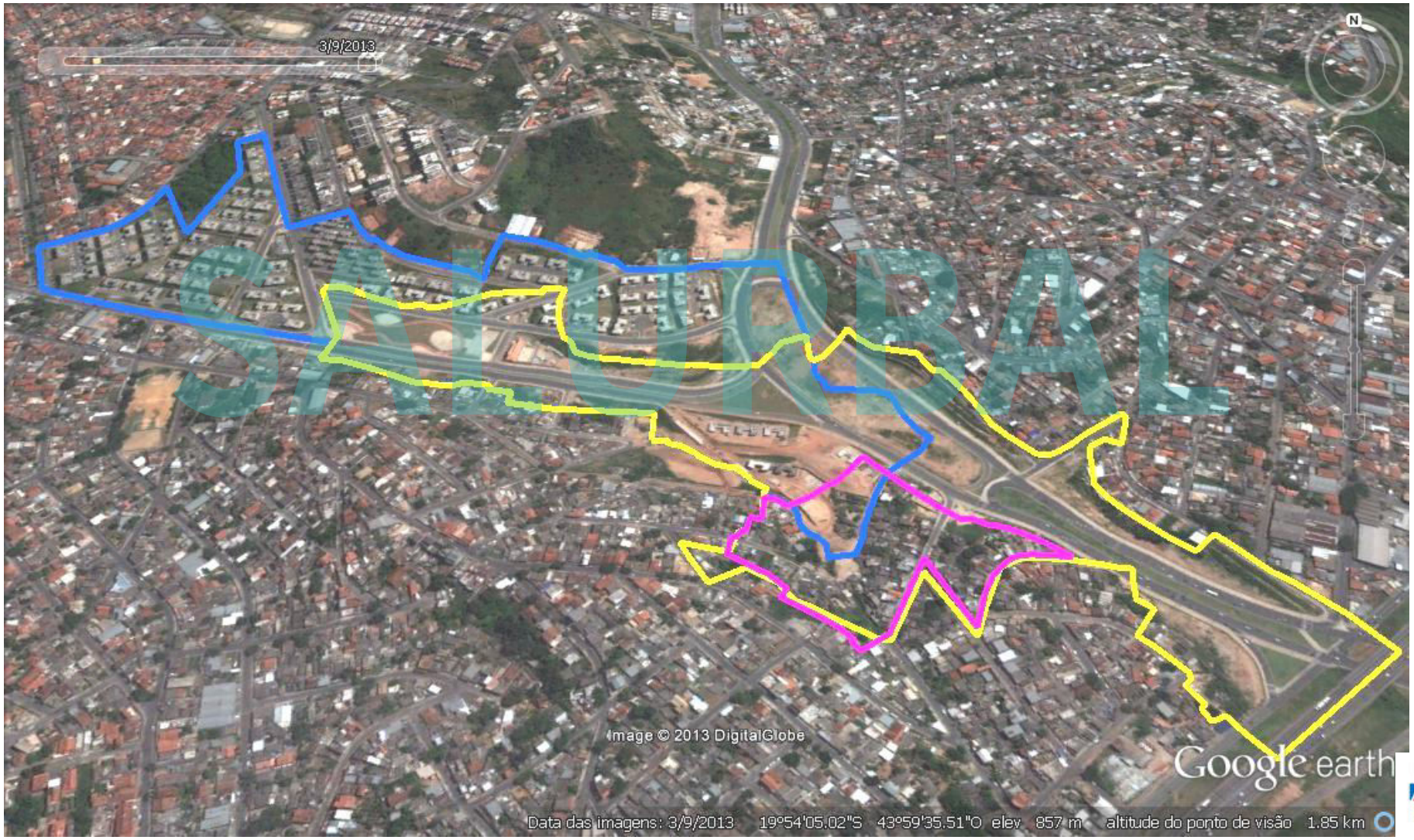


Google images + BH Viva study works' georreferencing

Vila São José in June 2011

Google images + BH Viva study works' georreferencing

Vila São José in March 2013



Google images + BH Viva study works' georreferencing

The evaluation: BH-Viva Project
Observatory for Urban Health in Belo Horizonte

- To assess the impact of the urban interventions done by the Vila Viva Program on the health and quality of life of people living in informal settlements
  - Vital events/hospitalizations
    - Asthma, Homicides, Pregnancy in adolescents
    - Dengue fever, others
  - Health behaviors
    - Social determinants of health
  - Social and Physical environment features

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A natural experiment study with mixed methods (quantitative and qualitative), using secondary information from a specially designed data warehouse (phase I), primary data collection (phase 2), and expansion of health and a historical series of intervention data

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SALURBAL Urban Health in Latin America

BH-Viva Project
Urban public policies in informal settlements

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Phase 1

Urban Health evaluation models from available secondary data

GIS Data Warehouse (DW) using available secondary databases

Papers and research projects: Methods, Asthma, Dengue, Homicides, Hospitalizations, etc

Phase 2

Household survey based on urban health model in two slums: one intervened and one to be intervened

Qualitative study of community to evaluate the impact of interventions on health services and the population's health

Research projects on: Violence and Pregnancy in adolescents

Phase 3 - 4

Systematic Social Observation of the study slums

Post-COVID-19 Household Survey and Qualitative study

Phase 3b - Salurbal ancillary study for 2nd data collection

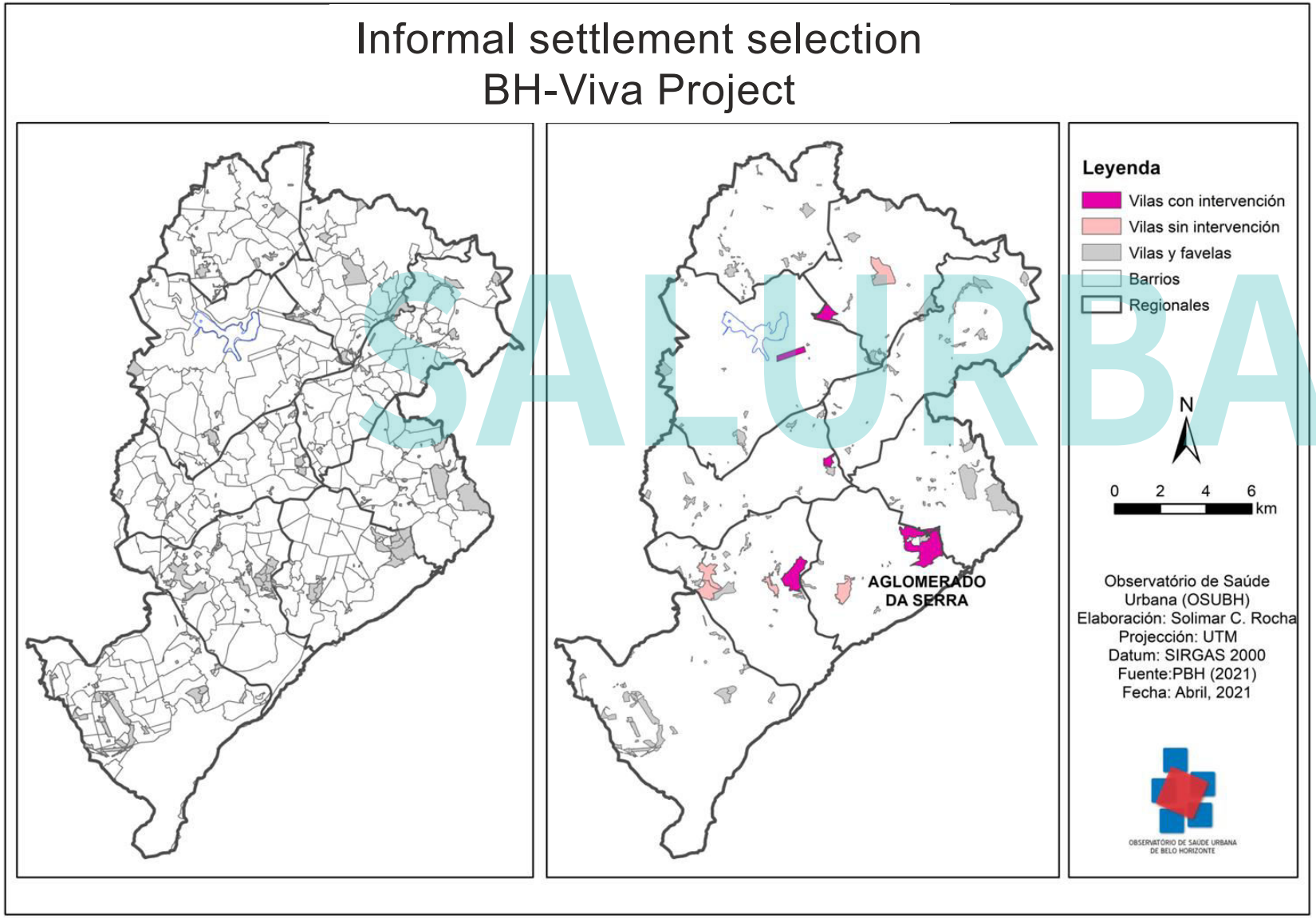
Understanding intervention and health impacts from different stakeholders' perspectives (urban and social policymakers, population in the slums and in the formal city) through:

1. Document analysis
2. Qualitative study of stakeholders and community involved in the participatory process since beginning

Monitor and measure the impact of interventions on segments in slums with different intervention times and their surroundings

QUALIS-SUS, MoH/Fiocruz; CNPq, PRPq-UFMG, Salurbal Ancilary

Study areas



Intervened areas

- Aglomerado da Serra
- Morro das Pedras
- Pedreira Prado Lopes
- São José
- São Tomaz

Non-Intervened areas

- Cabana Pai Tomás
- Ventosa
- Santa Lúcia
- Jardim Felicidade
- Vila Vista Alegre

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Intervention Data

ID_OBRA	ID_TIPOBRA	TIPOBRA	ID_PROJETO	NO_CAMADA	ID_BENEF	VILA_BENEF	END_OBRA	PROGRAMA
86	2	Moradia	5	SAO JOSE	5	SAO JOSE	GEOLOGOS, 50	PAC PPI
87	2	Moradia	5	SAO JOSE	5	SAO JOSE	GEOLOGOS, 250	PAC PPI
91	2	Moradia	5	SAO JOSE	5	SAO JOSE	GRANDE OTELO, 83	PAC PPI
92	2	Moradia	5	SAO JOSE	5	SAO JOSE	GRANDE OTELO, 143	PAC PPI
112	3	Equipamento Publico	5	SAO JOSE	5	SAO JOSE	CRISTIANO PEREIRA SALGADO, SN	PAC PPI
113	3	Equipamento Publico	5	SAO JOSE	5	SAO JOSE	JOAQUIM JOSE RIBEIRO, SN	PAC PPI
114	3	Equipamento Publico	5	SAO JOSE	5	SAO JOSE	CRISTIANO PEREIRA SALGADO, SN	SUDECAP
115	1	Intervencoes em Via	5	SAO JOSE	5	SAO JOSE	RUA ANTONIETA MARIA DE JESUS	PAC
116	1	Intervencoes em Via	5	SAO JOSE	5	SAO JOSE	RUA CRISTIANO PEREIRA SALGADO	PAC
117	1	Intervencoes em Via	5	SAO JOSE	5	SAO JOSE	RUA CRUCIFICACAO	PAC
118	1	Intervencoes em Via	5	SAO JOSE	5	SAO JOSE	RUA DA FLAGELACAO	PAC

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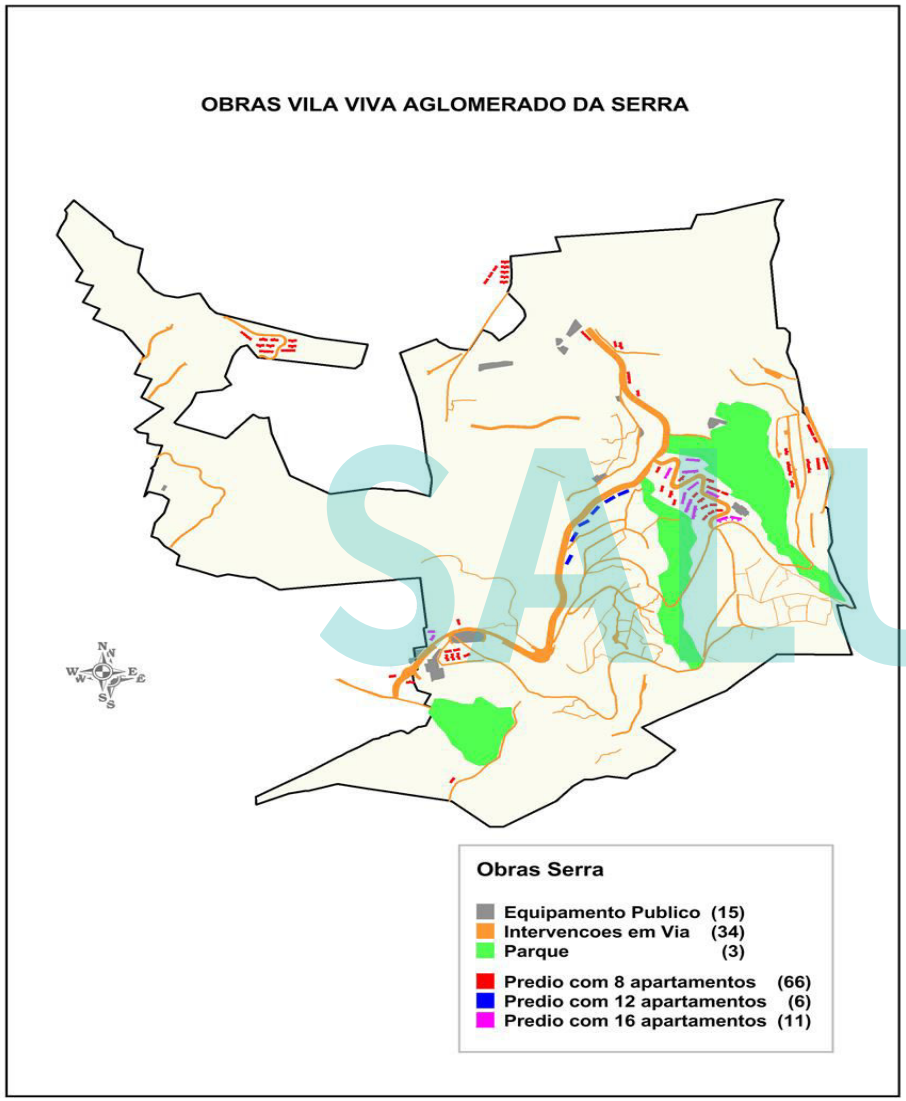
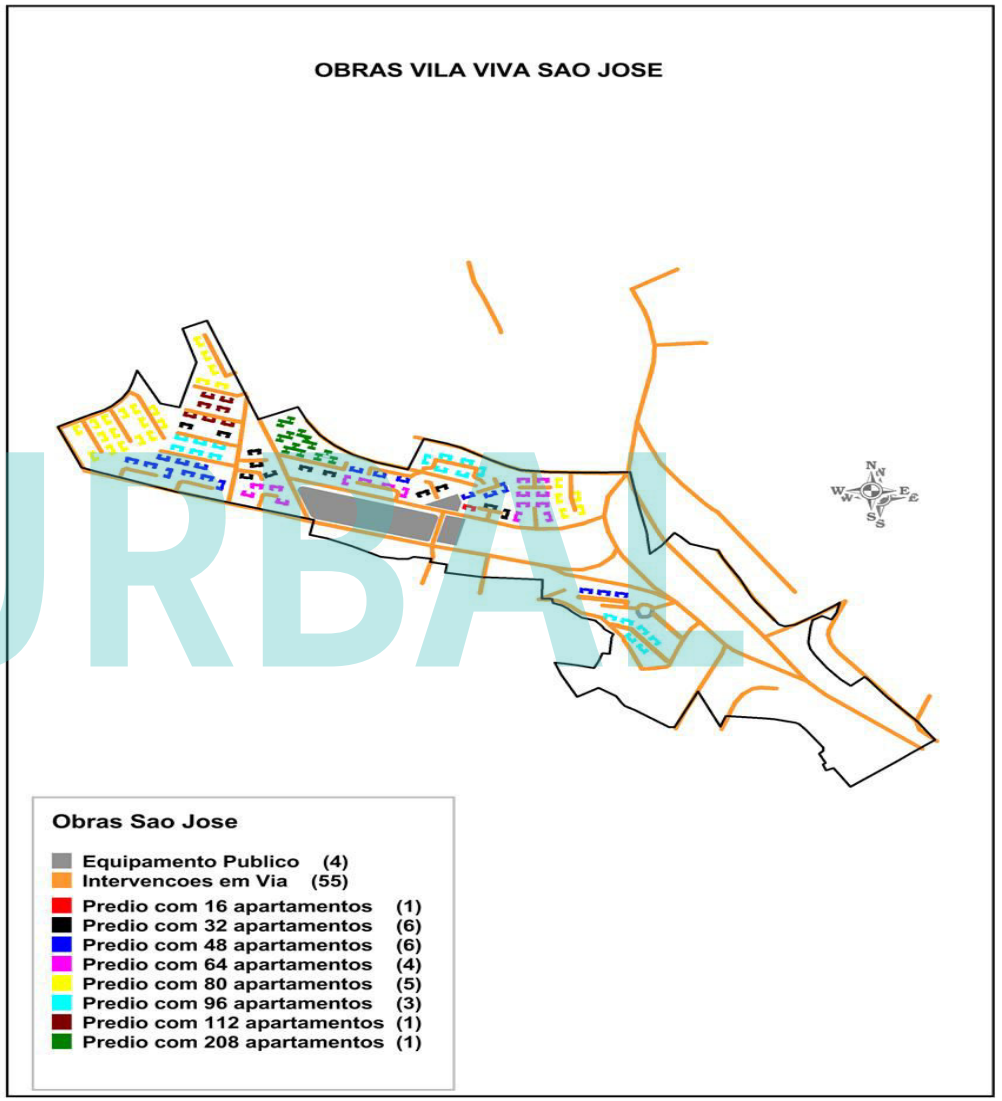
Mapping the intervention





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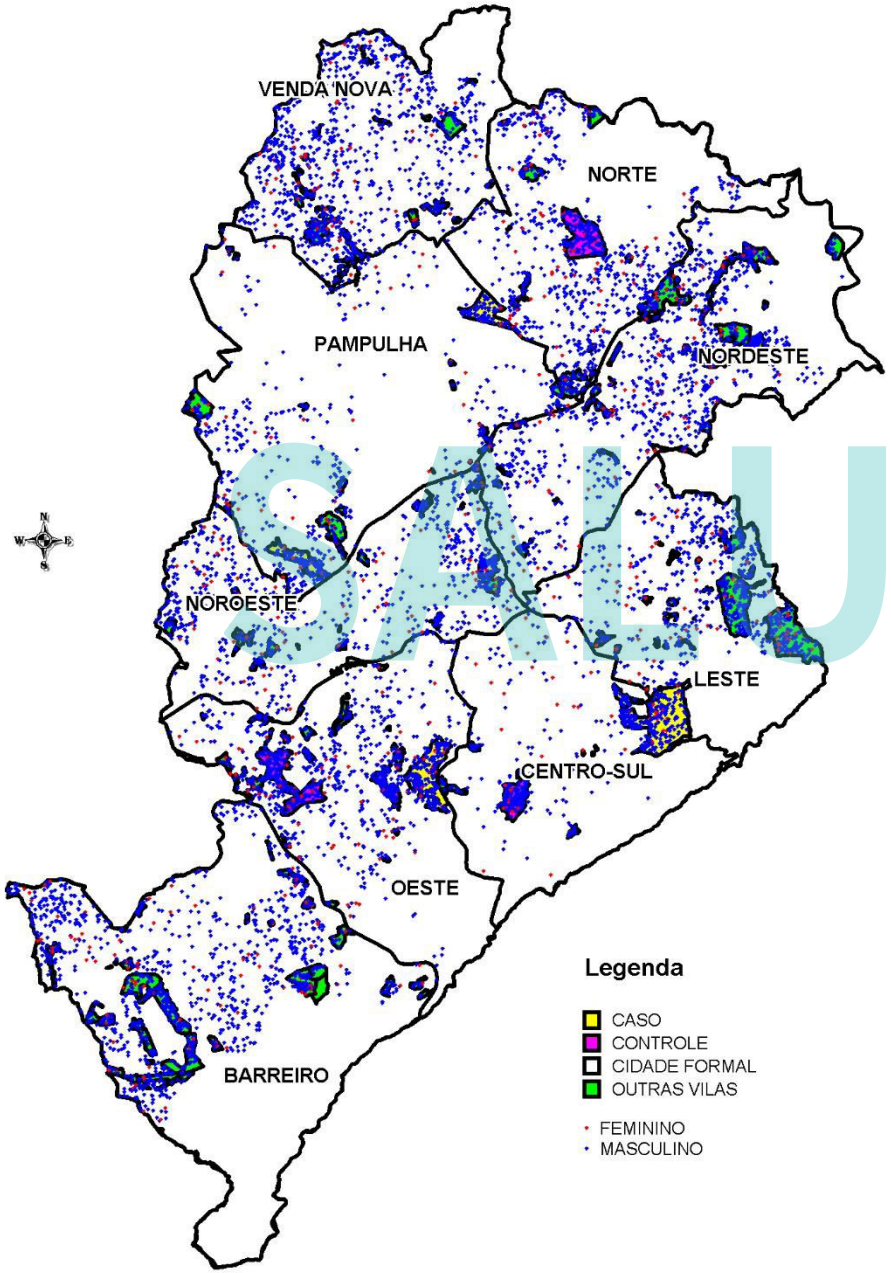
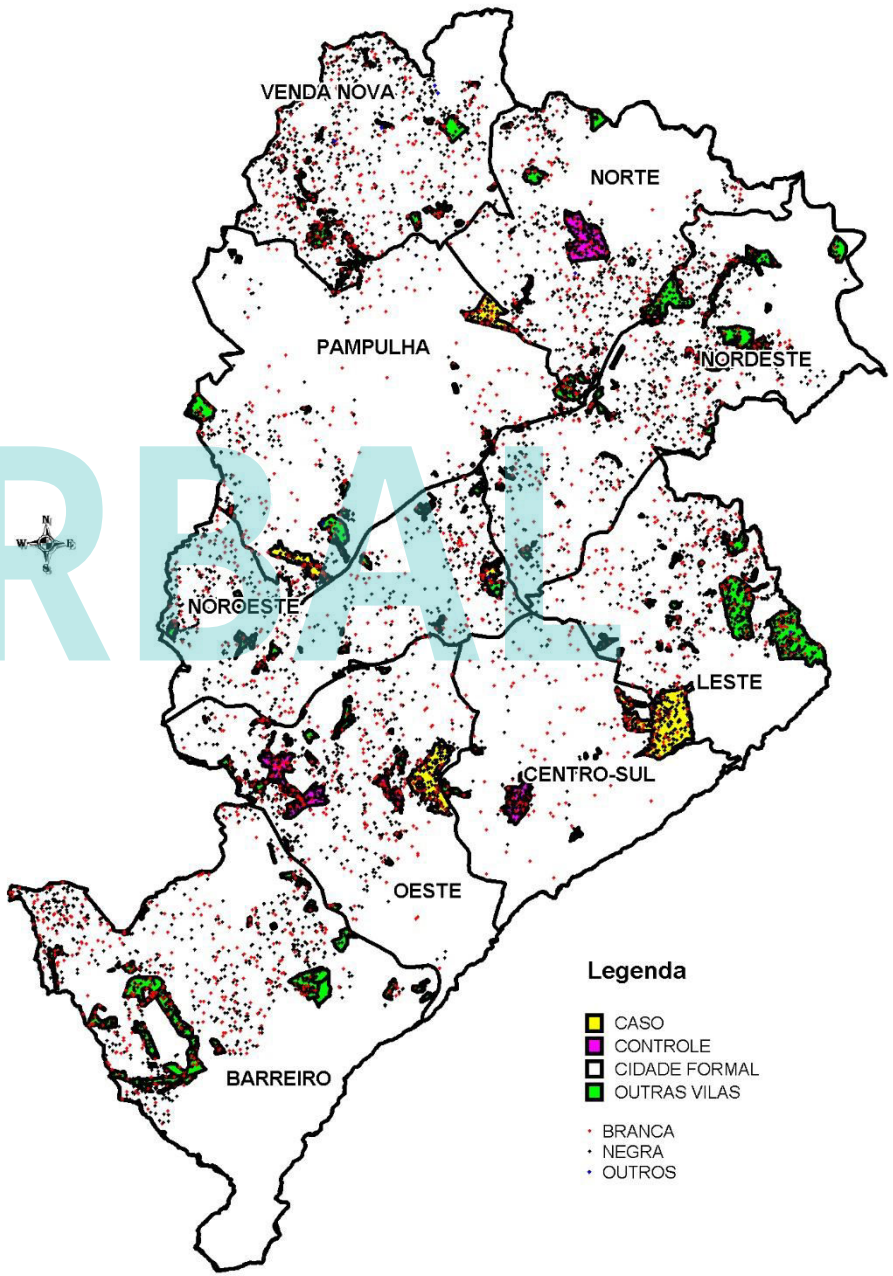
Homicide rates by sex and race





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International Journal of *Environmental Research and Public Health*

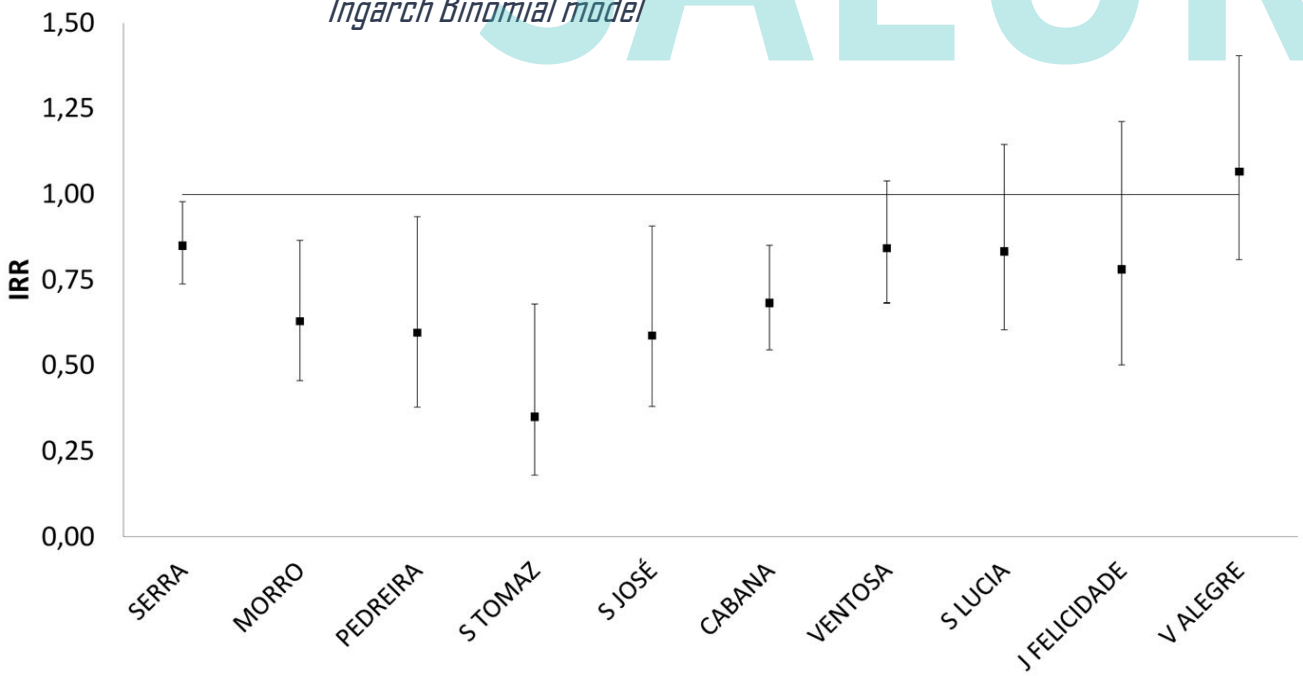
MDPI

Article

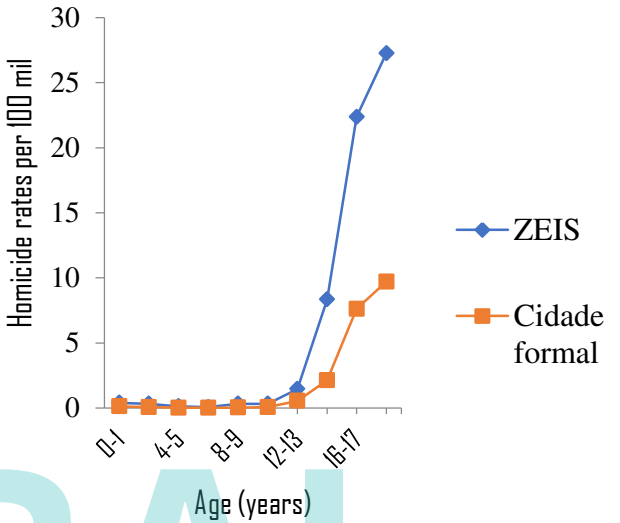
Mortality from Homicides in Slums in the City of Belo Horizonte, Brazil: An Evaluation of the Impact of a Re-Urbanization Project

Maria Angélica de Salles Dias [1,2,*], Amélia Augusta de Lima Friche [1,2], Sueli Aparecida Mingoti [3], Dário Alves da Silva Costa [1], Amanda Cristina de Souza Andrade [1,4], Fernando Márcio Freire [5], Veneza Berenice de Oliveira [1] and Waleska Teixeira Caiaffa [1,2]

Ingarch Binomial model



Homicide Rate (100.000 hab.) by age in Belo Horizonte, 2003 a 2012



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Salurbal Ancillary Study

- Through the Salurbal ancillary funding, we have updated and georreferencing of all databases from 2013 up to 2019 on:
  - Mortality (Deaths Information System - SIM)
  - Morbidity (Hospitalization Information System – SIH)
  - Live births (Live births Information System – SINASC)
  - Dengue fever (Notifiable Diseases System – SINAN)
  - Urban transformation interventions – collected at local offices from URBEL

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BH-Viva – Phase 3

Salurbal Ancillary Study - Methods

Homicides

- Differences-in-differences (DiD) analysis
- Sample
  - 5 intervened areas (Serra, Morro das Pedras, Pedreira Prado Lopes, São Tomaz and São José), 5 non-intervened areas (Cabana, Ventosa, Santa Lúcia, Jardim Felicidade and Vila Vista Alegre) and the formal city of Belo Horizonte (municipality minus the other informal settlements in the city)
- Outcome
  - Yearly homicide (ICD-10 codes X85 to Y09) rates, by area
- Exposure
  - Starting year of intervention jobs (2005 for Serra, 2007 for Morro das Pedras and São José, 2009 for Pedreira Prado Lopes and 2011 for São Tomaz)

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Homicides

- Using mixed Negative Binomial regression with homicide rates as the outcome and the intervention effect as the exposure
  - including area-level and time period random intercepts to account for unobserved longitudinal effects
- Sensitivity analysis: lagged starting year of intervention jobs' by 1-7 years
  - e.g. Serra jobs start in 2005, so we re-estimate the model as if interventions started in 2006 through 2012

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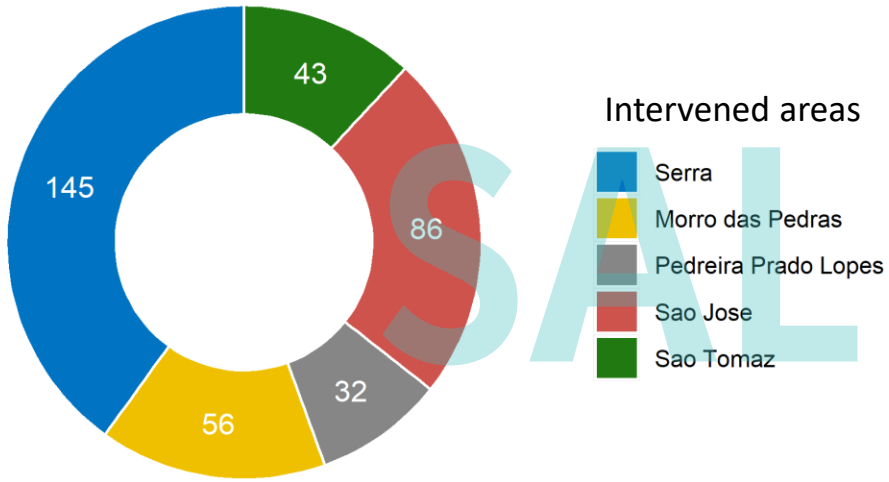
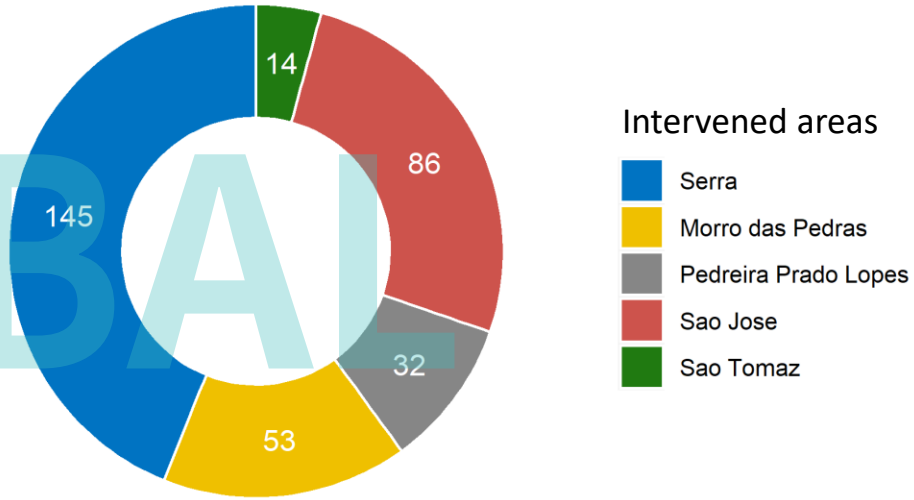
Interventions

Total number of intervention jobs*, by area



*starting years of jobs are 2005 (Serra), 2007 (Morro das Pedras & Sao Jose), 2009 (Pedreira Prado Lopes) and 2011 (Sao Tomaz)

Number of finished intervention jobs*, by area



*29 unfinished jobs in Sao Tomaz and 3 in Morro das Pedras

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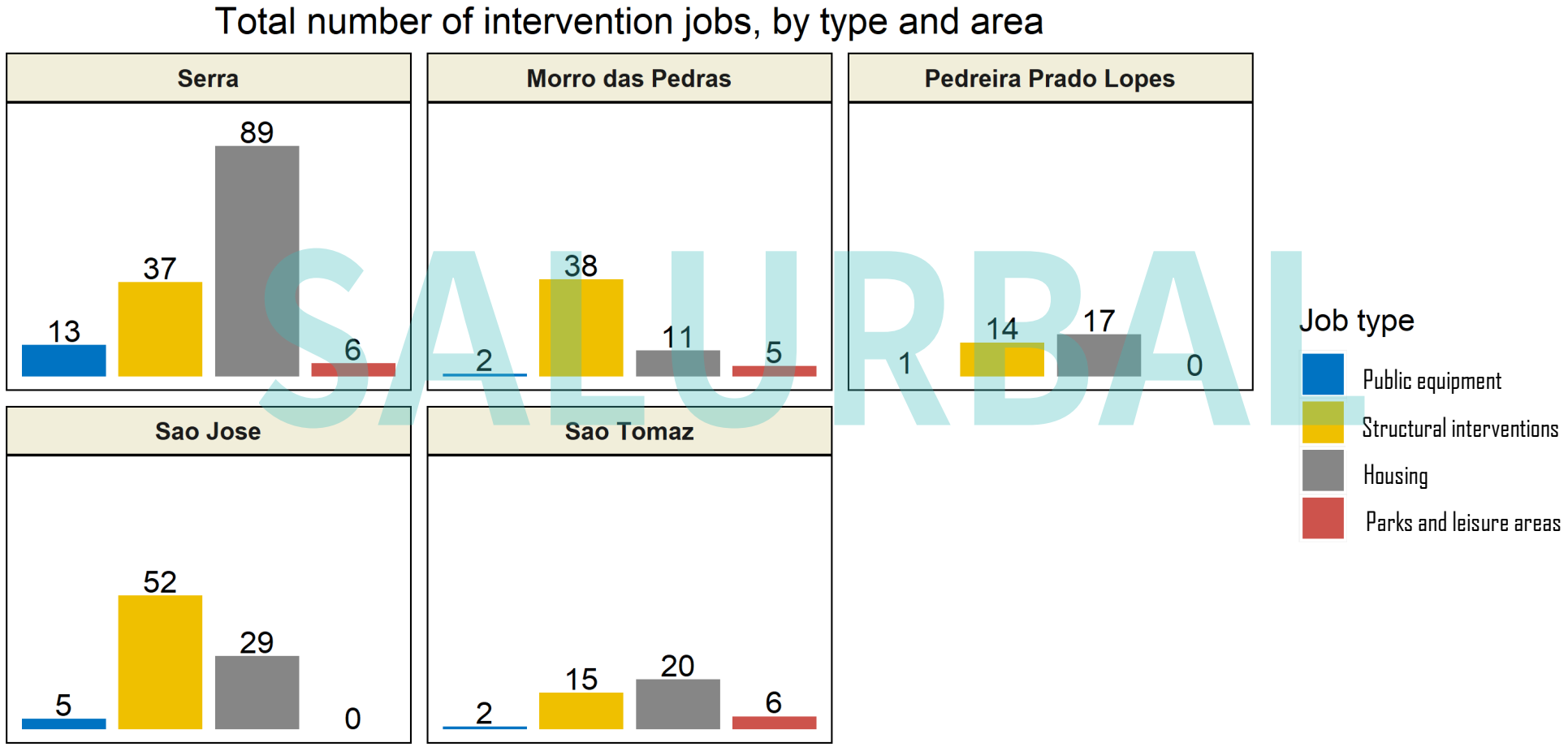
BH-Viva – Phase 3

Salurbal Ancillary Study – Preliminary results

Interventions



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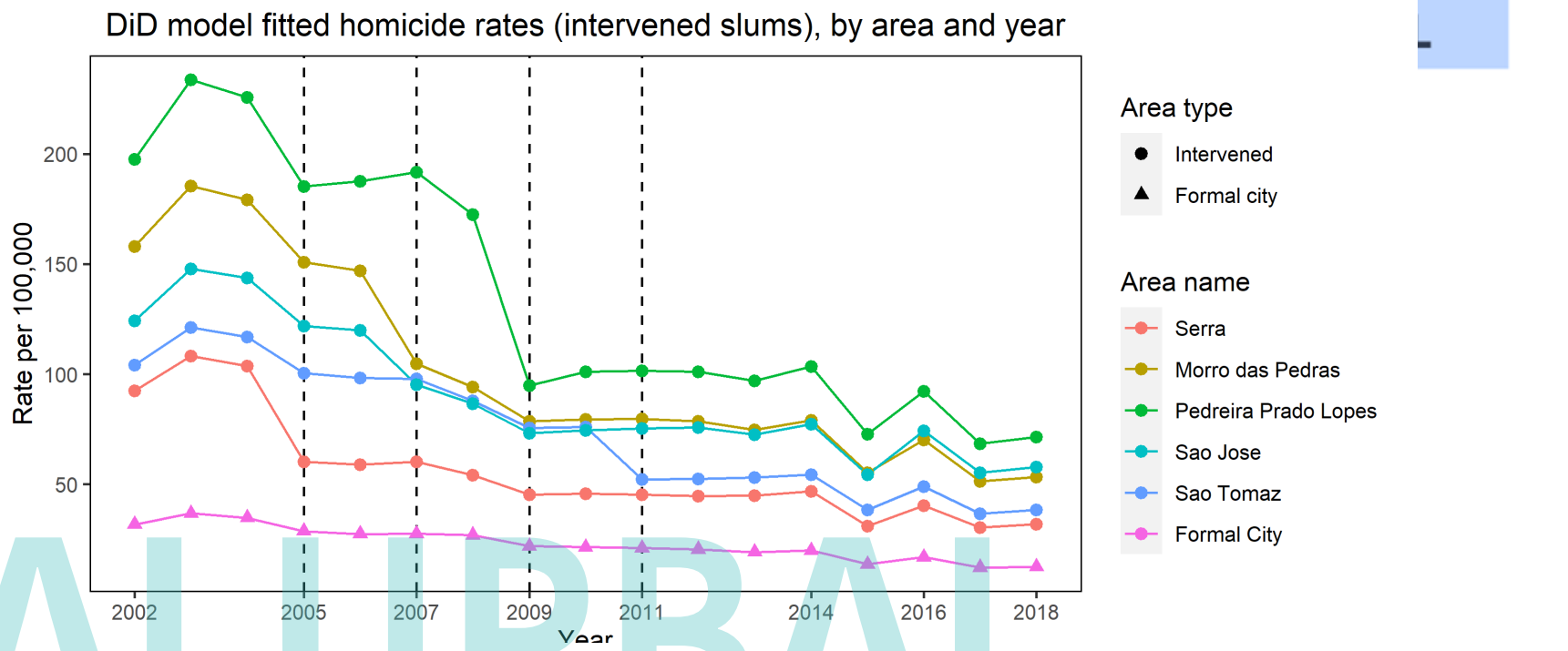
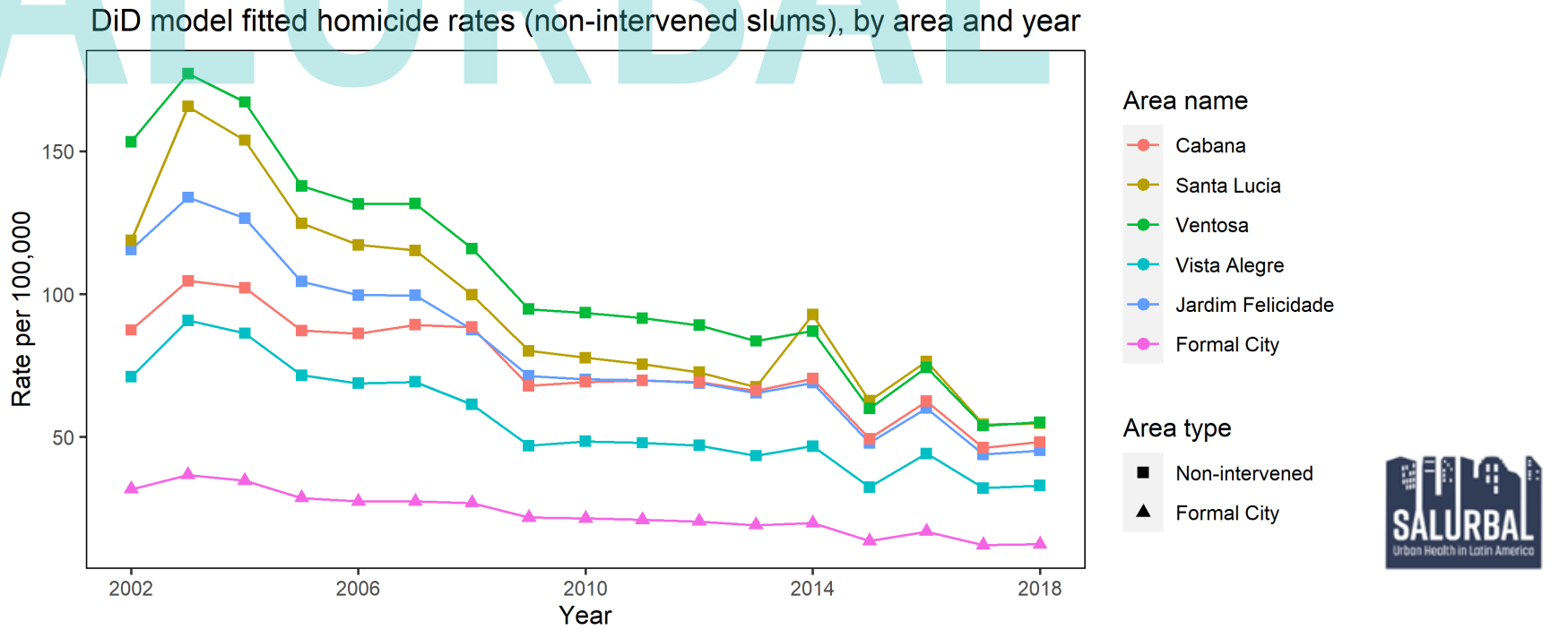
BH-Viva – Phase 3
Salurbal Ancillary Study
Preliminary results
Homicides





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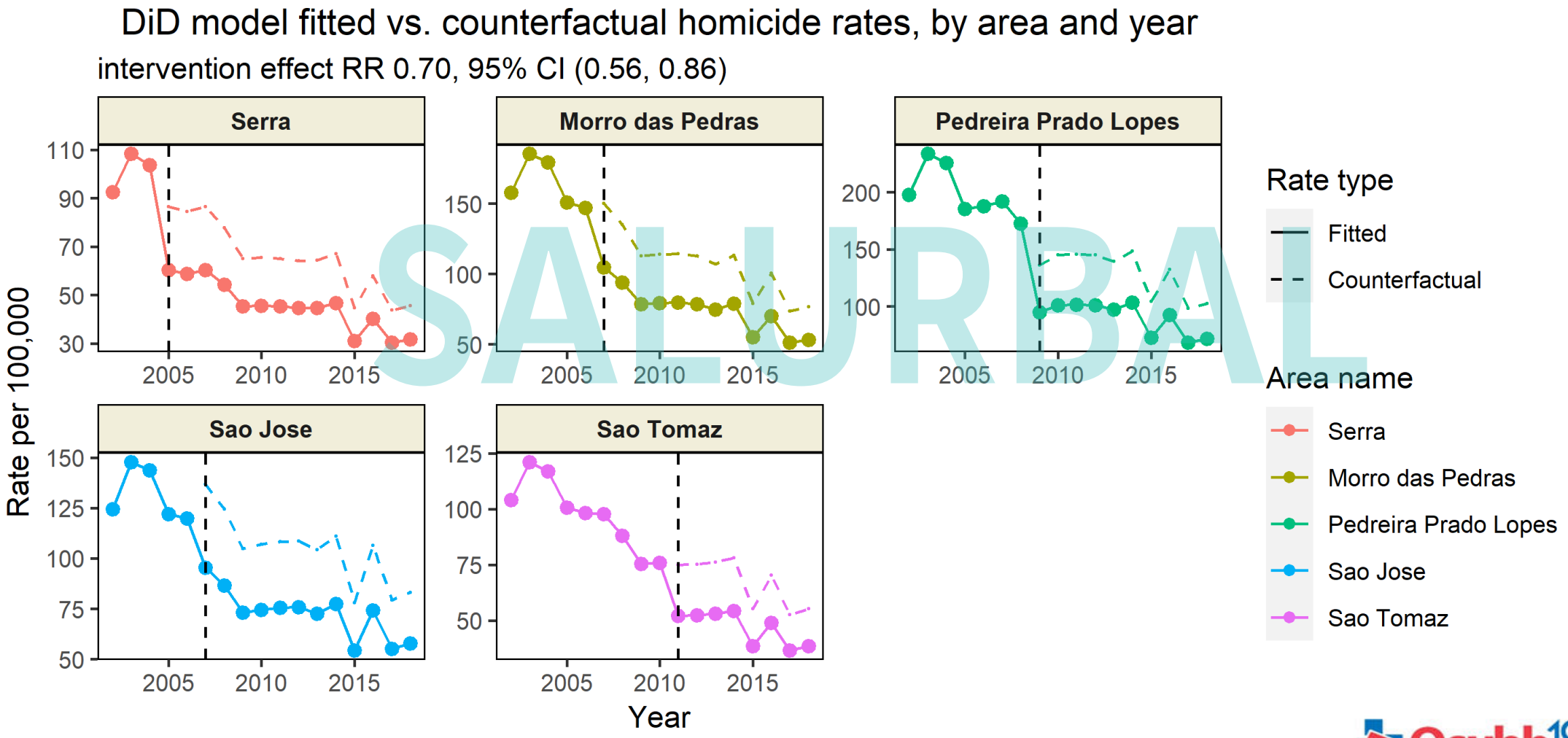
Salurbal Ancillary Study – Preliminary results ***Homicides***



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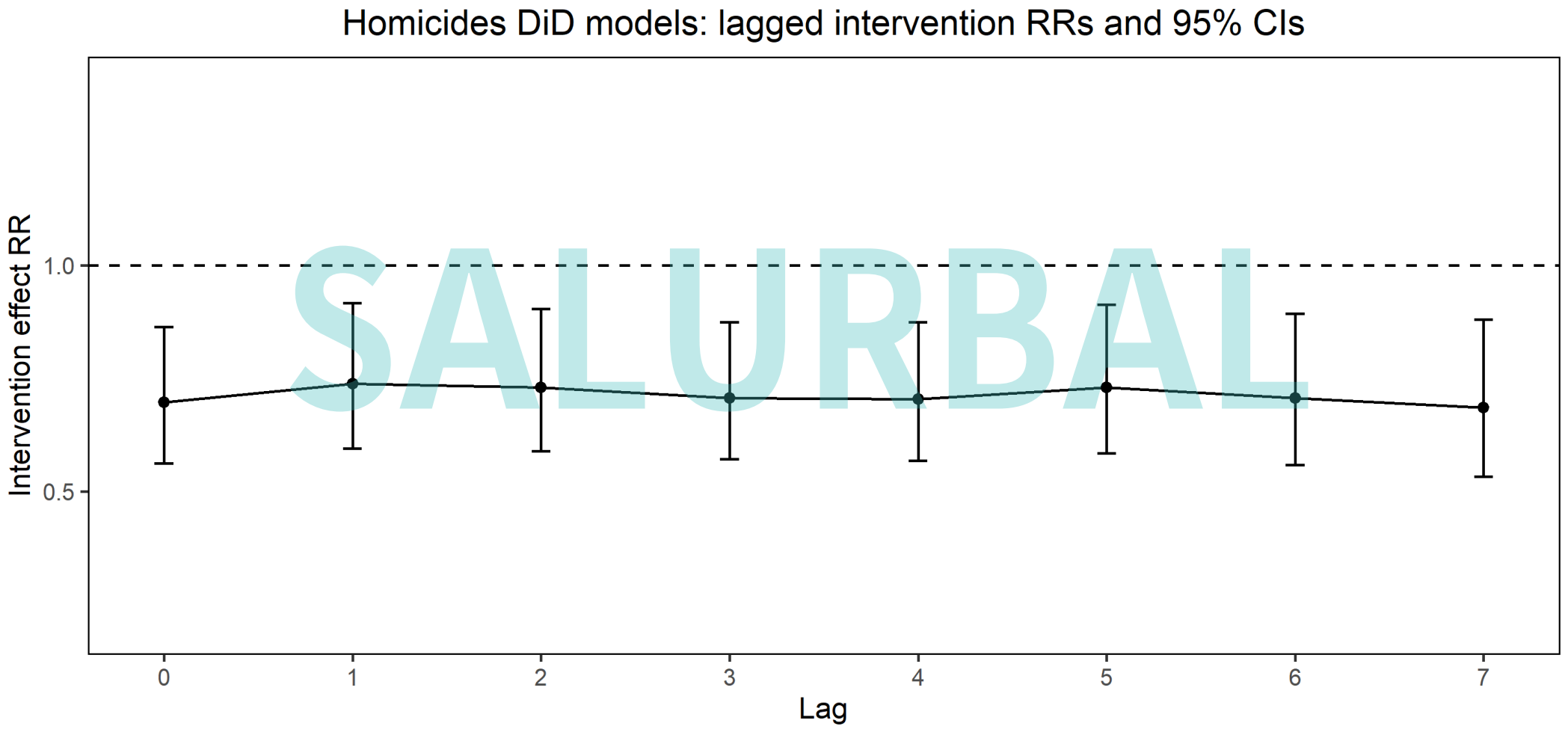
BH-Viva – Phase 3

Salurbal Ancillary Study – Preliminary results ***Homicides***



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Salurbal Ancillary Study

Conclusions

- The urban transformations from the Vila Viva Program seems to had influenced the decrease of homicide rates
  - Homicides are related to social and physical environment, as drug traffic and other social ties in the alive territory
- Further analyses are need to account for confounders like health, safety and social policies, as the *Bolsa Família Program*, besides the economic and political crises that might happened during the study period
- These preliminary results highlight the relevance of local and multisectorial policies to mitigate the violent deaths in urban vulnerable areas and to reduce inequities in urban scenarios.

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BH-Viva Salurbal Ancillary Study

Acknowledgments

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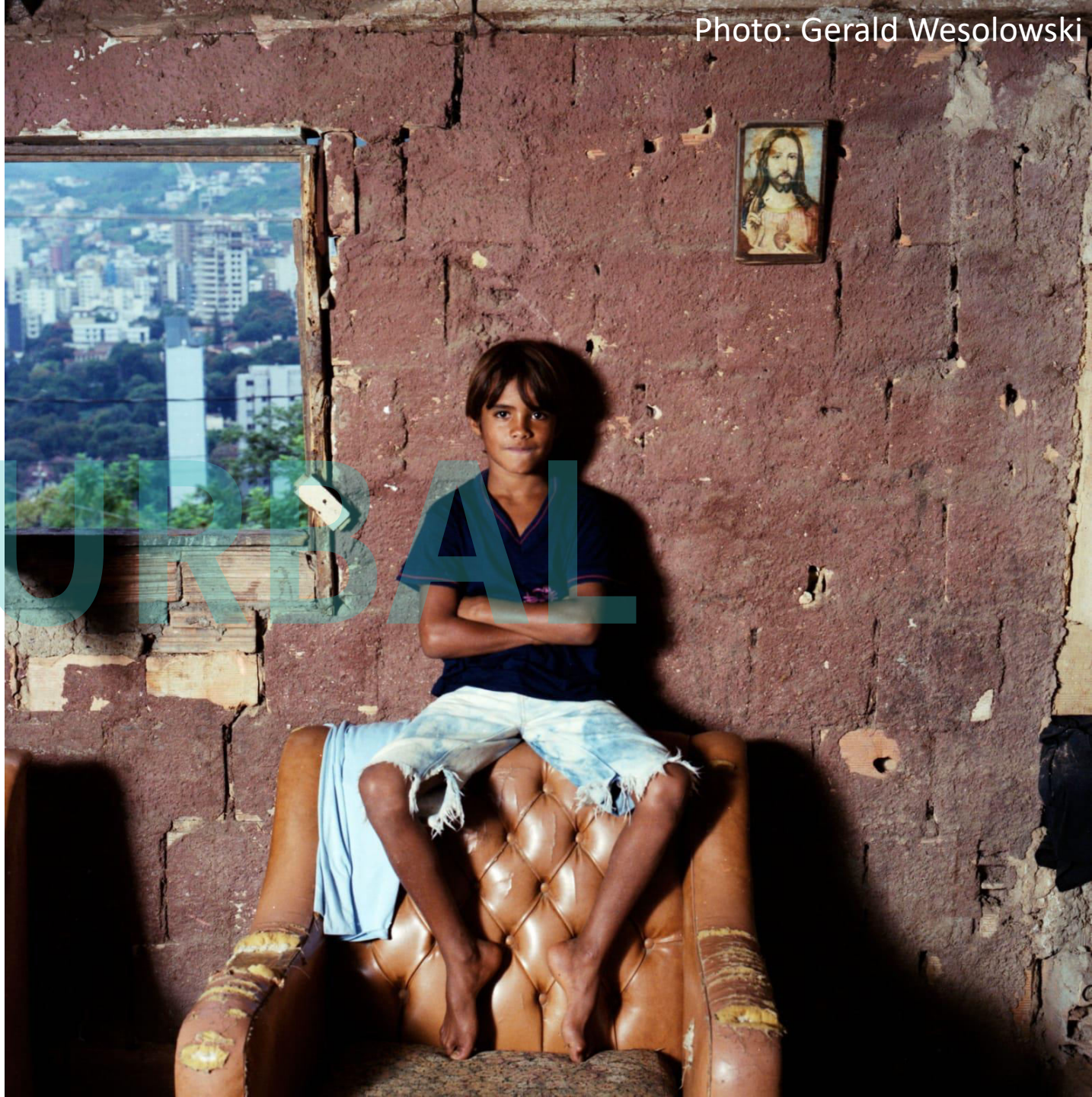
- Welcome Trust
- ICUH organizers



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Gracias!

Obrigada!

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