

The Spatial Dynamics of Oncogenic Human  
Papillomavirus Infection (HPV-HR) in women  
from San Luis Potosí, Mexico: Some  
Preliminary Results.

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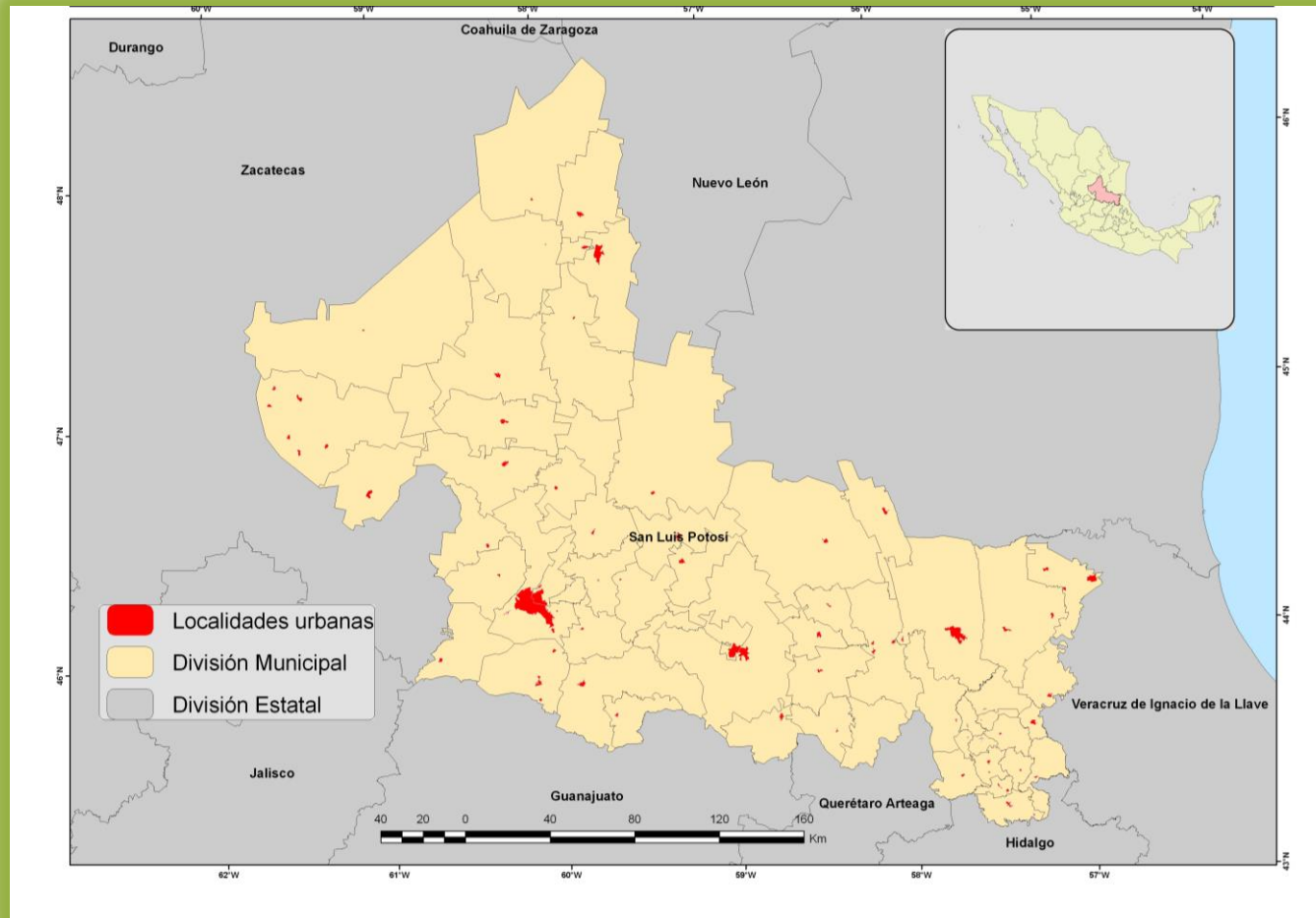


# 1. OBJECTIVE



To explain the spatial dynamics of oncogenic HPV-HR infection prevalence in women aged 15 to 69 years old from San Luis Potosí, México.

## 2. STUDY AREA: San Luis Potosí, State, Central Mexico



Source: Instituto Nacional de Estadística y Geografía (INEGI). Scale: 1:1,000,000

### 3. Why is the HPV-HR infection a geographic problem?



#### GEOGRAPHIC EXPLANATION

Because it shows spatial (and territorial) patterns of location, distribution and diffusion, fundamental to a geographic explanation and understanding of cervical cancer (CC) for intervention, planning, prevention, control and other likely public health purpose.

#### PUBLIC HEALTH PROBLEM

The HPV-HR is one of the most common sexually transmitted pathogens that infect the cervix and contributes to CC, 2 to 44%\*<sup>1</sup>

#### CAUSE OF DEATH

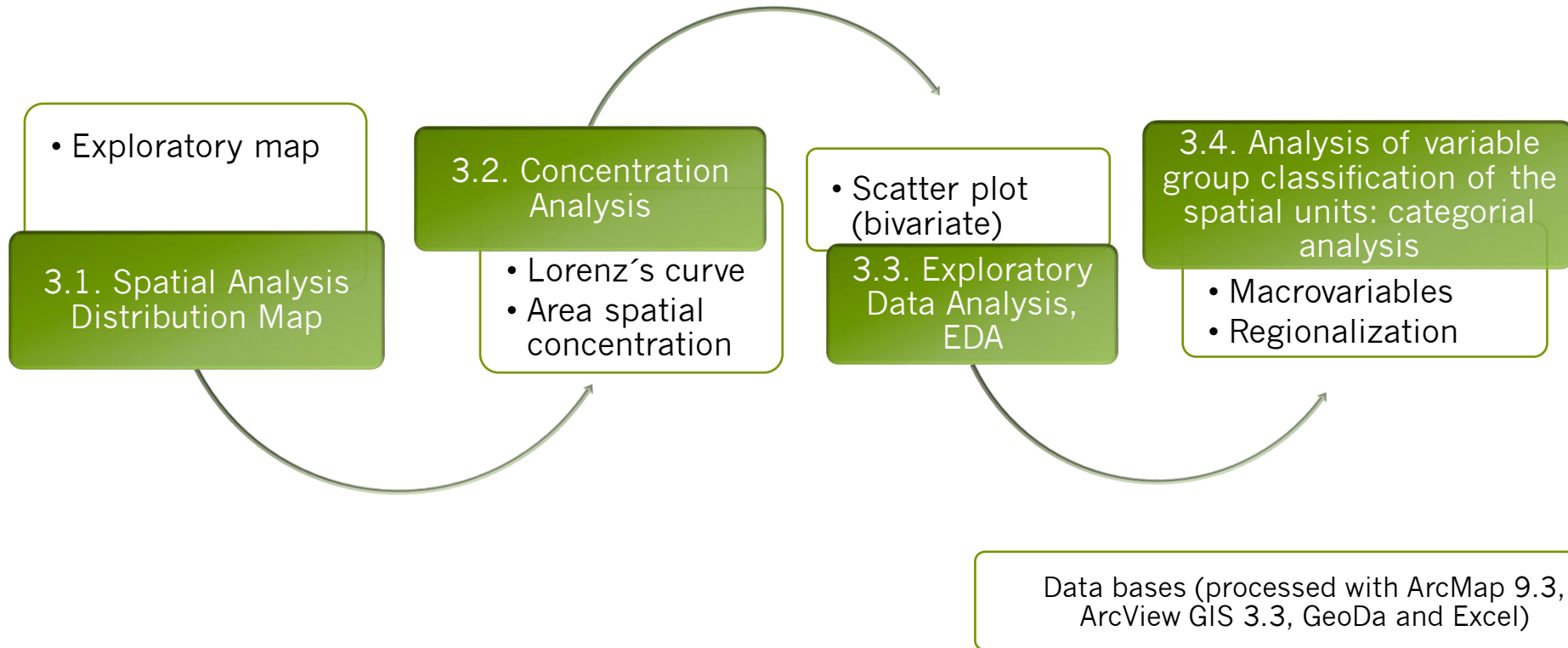
CC is the first cause of death by cancer among women in most developing countries.

The mortality rate per 100,000 in Mexico is 17\*<sup>2</sup>.

\*<sup>1</sup>International Agency for Research on Cancer, IARC. WHO 2007

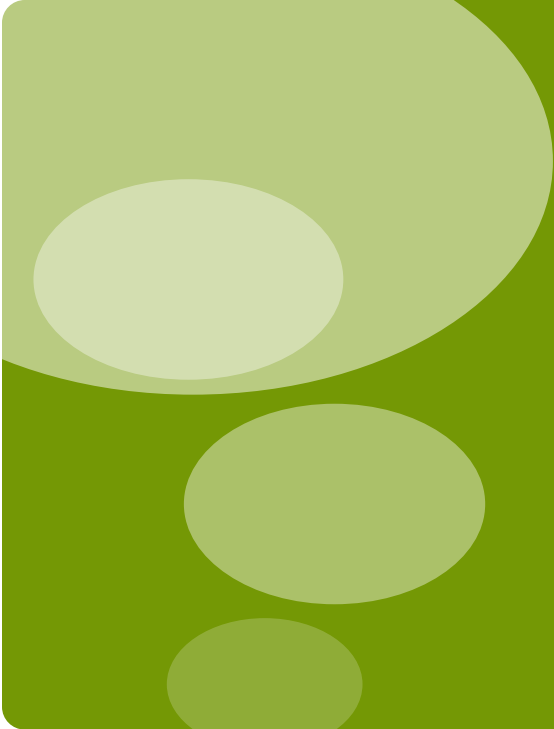
\*<sup>2</sup>Death Statistics and Epidemiology, 2006; and the National Action Program of Cervical Cancer 2007–2012.

# 4. METHODOLOGY



\*1 Cartographic data (58 polygons) and 6 Sociodemographic variables: Based on Instituto Nacional de Estadística y Geografía, INEGI 2000 and 2005 census information.

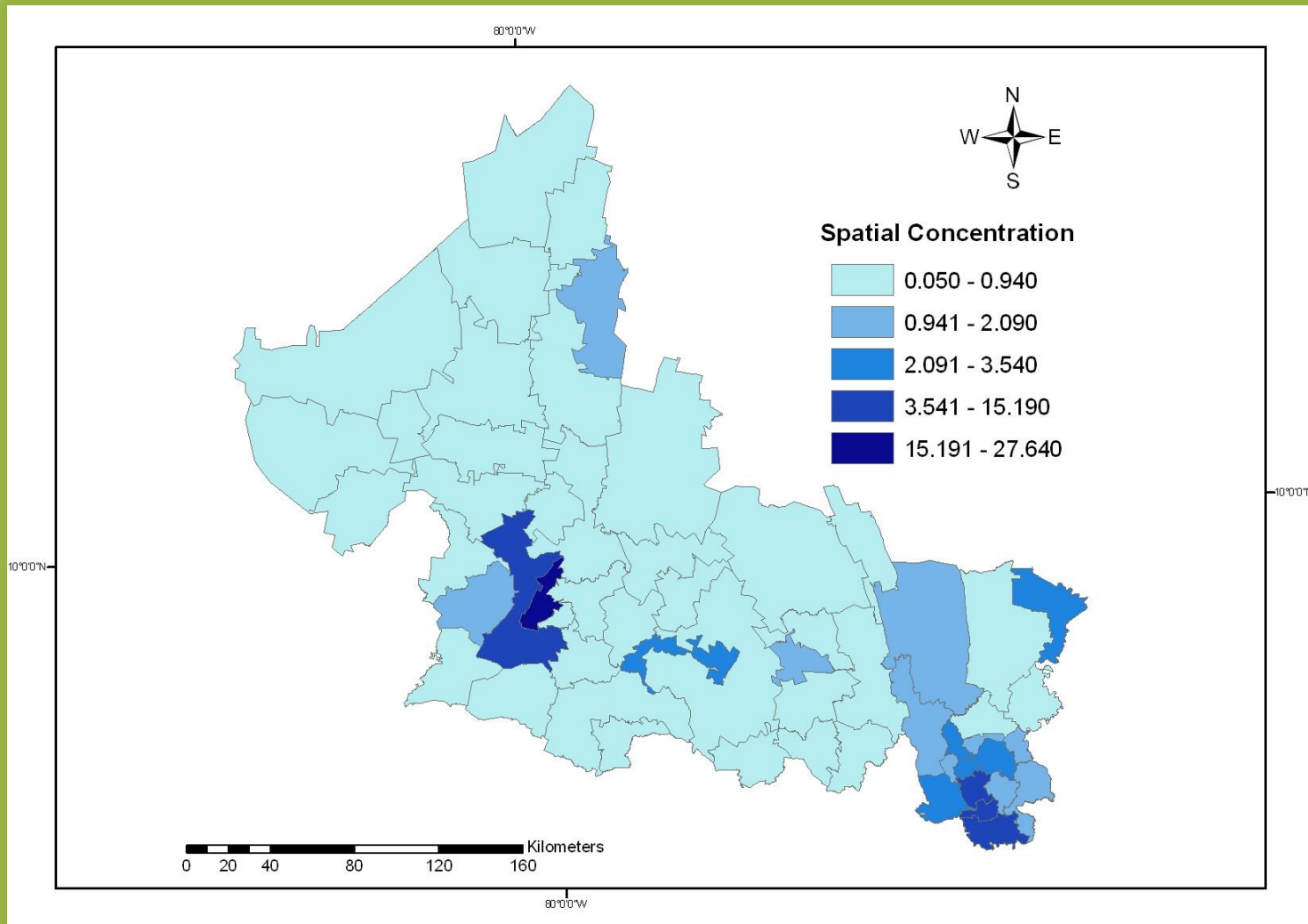
\*2 8 Health variables: Statistics and Epidemiological data provided by Secretaría de Salud, Instituto Mexicano del Seguro Social (IMSS) and Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE).



# **5. SOME PRELIMINARY RESULTS**



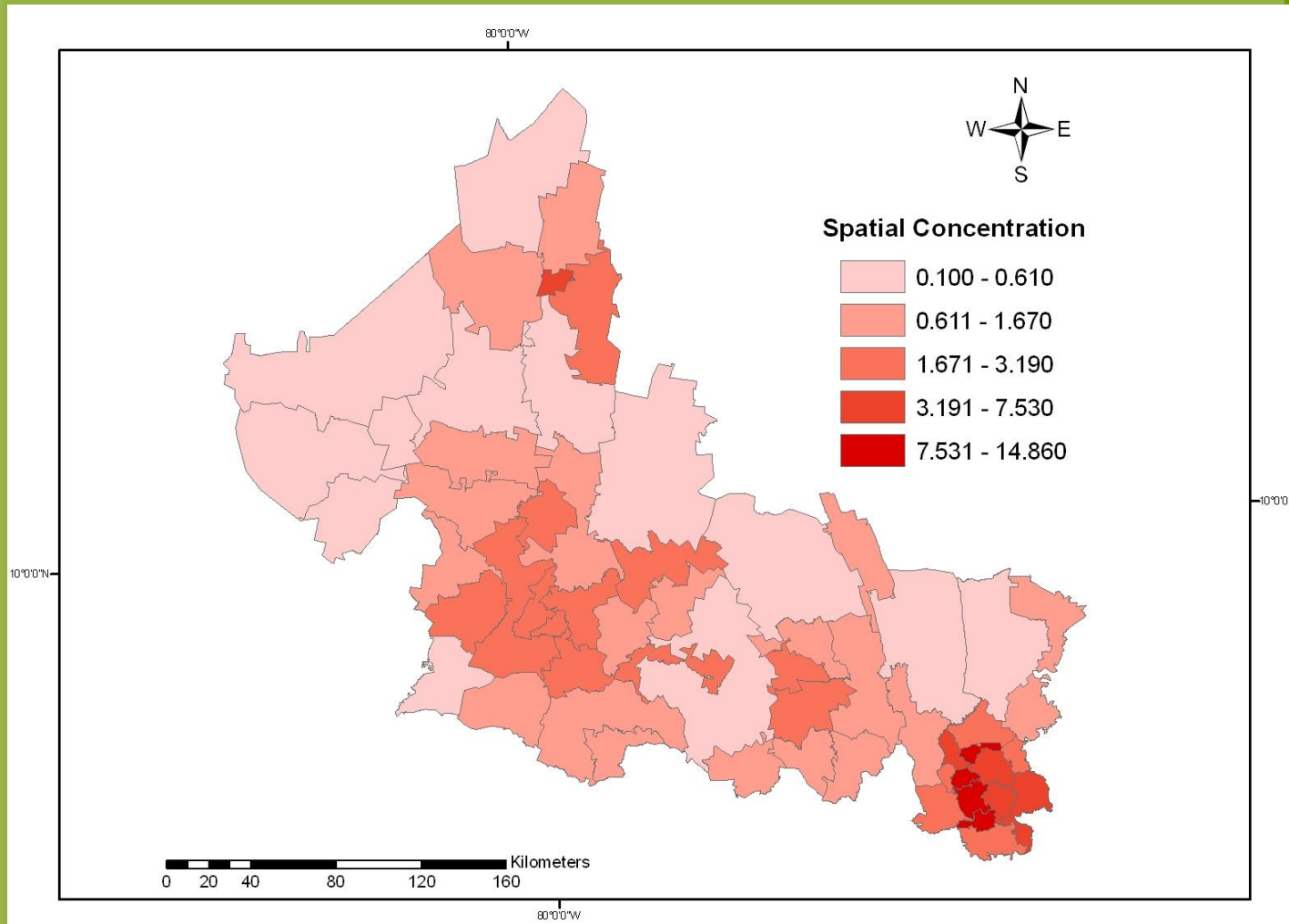
# Spatial concentration of female population aged 15 to 69 years, San Luis Potosí, Mexico, 2010.



Source: INEGI, Population Projection (Censo 2005) .



# Spatial concentration of women with low-grade and high-grade lesions cervical cancer, San Luis Potosí, Mexico, 2009\*.



\*Typical terminology regarding cervical intraepithelial neoplasia grade (CIN). World Health Organization, WHO. IARC. Human Papillomaviruses, Lyon, France 2007.  
Source: Statistics and Epidemiological data provided by Secretaría de Salud, Instituto Mexicano del Seguro Social (IMSS) and Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE).

# Table 1. Pearson correlation (r) of the health variables.



	1	2	3	4	5	6	7	8
1	1	<b>0.63</b>	-0.06	-0.03	<b>0.85</b>	0.37	<b>0.91</b>	0.17
2	<b>0.63</b>	1	0.06	0.01	<b>0.60</b>	0.19	<b>0.55</b>	0.18
3	0.01	0.06	1	-0.19	0.03	-0.21	-0.06	-0.02
4	-0.03	0.01	-0.9	1	-0.19	0.43	0.04	-0.29
5	<b>0.85</b>	<b>0.60</b>	0.03	-0.19	1	0.46	<b>0.77</b>	0.08
6	0.37	0.19	-0.21	0.43	0.46	1	0.42	-0.45
7	<b>0.91</b>	<b>0.55</b>	-0.06	0.04	<b>0.77</b>	0.42	1	0.15
8	0.17	0.18	-0.02	-0.29	0.08	-0.45	0.15	1

$$r = \frac{\sum x^z y^z}{n}$$

In this analysis, the variables included are: <sup>1</sup>low grade cervical lesions, <sup>2</sup>high grade cervical lesions, <sup>3</sup>adenocarcinoma, <sup>4</sup>index's positive of the papsmear, <sup>5</sup>good cytologicorpapsmear, <sup>6</sup>coverage, <sup>7</sup>early detection, and <sup>8</sup>women population with healthservice.

## Table 2. Pearson correlation (r) of the social variables.



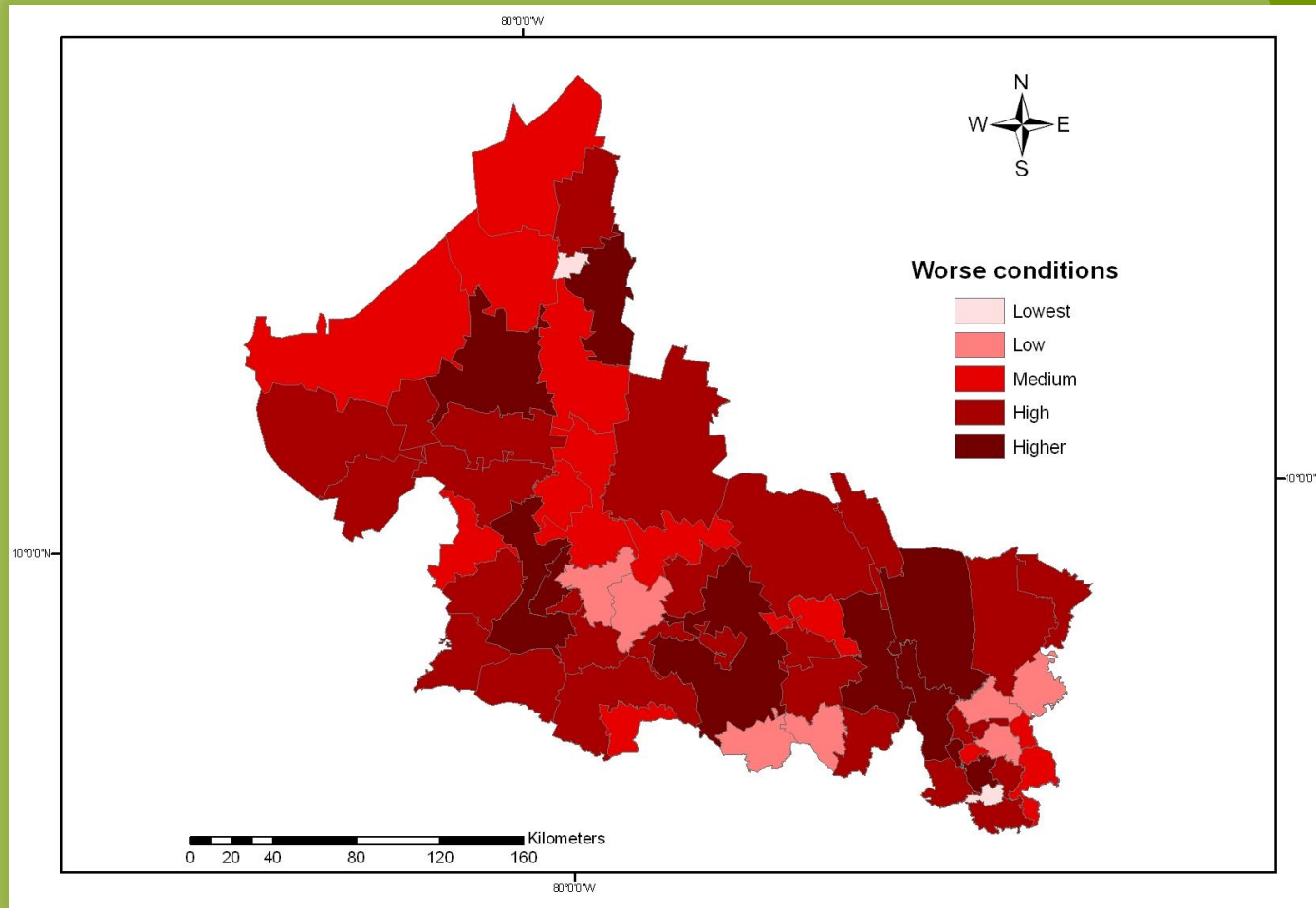
	1	2	3	4	5	6	7
1	1	-0.36	0.16	0.38	-0.43	<b>-0.61</b>	-0.47
2	-0.36	1	0.15	-0.16	0.44	0.28	0.44
3	0.16	0.15	1	-0.30	0.43	-0.28	0.32
4	0.38	-0.16	-0.30	1	<b>-0.52</b>	-0.01	0.45
5	-0.43	0.44	0.43	<b>-0.52</b>	1	0.26	<b>0.65</b>
6	<b>-0.61</b>	0.28	-0.28	-0.01	0.26	1	0.41
7	-0.47	0.44	0.32	-0.45	<b>0.65</b>	0.41	1

$$r = \frac{\sum xz y}{n}$$

In this analysis the variables included are: <sup>1</sup>illiterate population, <sup>2</sup>migration, <sup>3</sup>less of one minimum salary, <sup>4</sup>Human development loss due to inequity sex, <sup>5</sup>active worker women, <sup>6</sup>basic education, and <sup>7</sup> 2-3 minimum salaries.

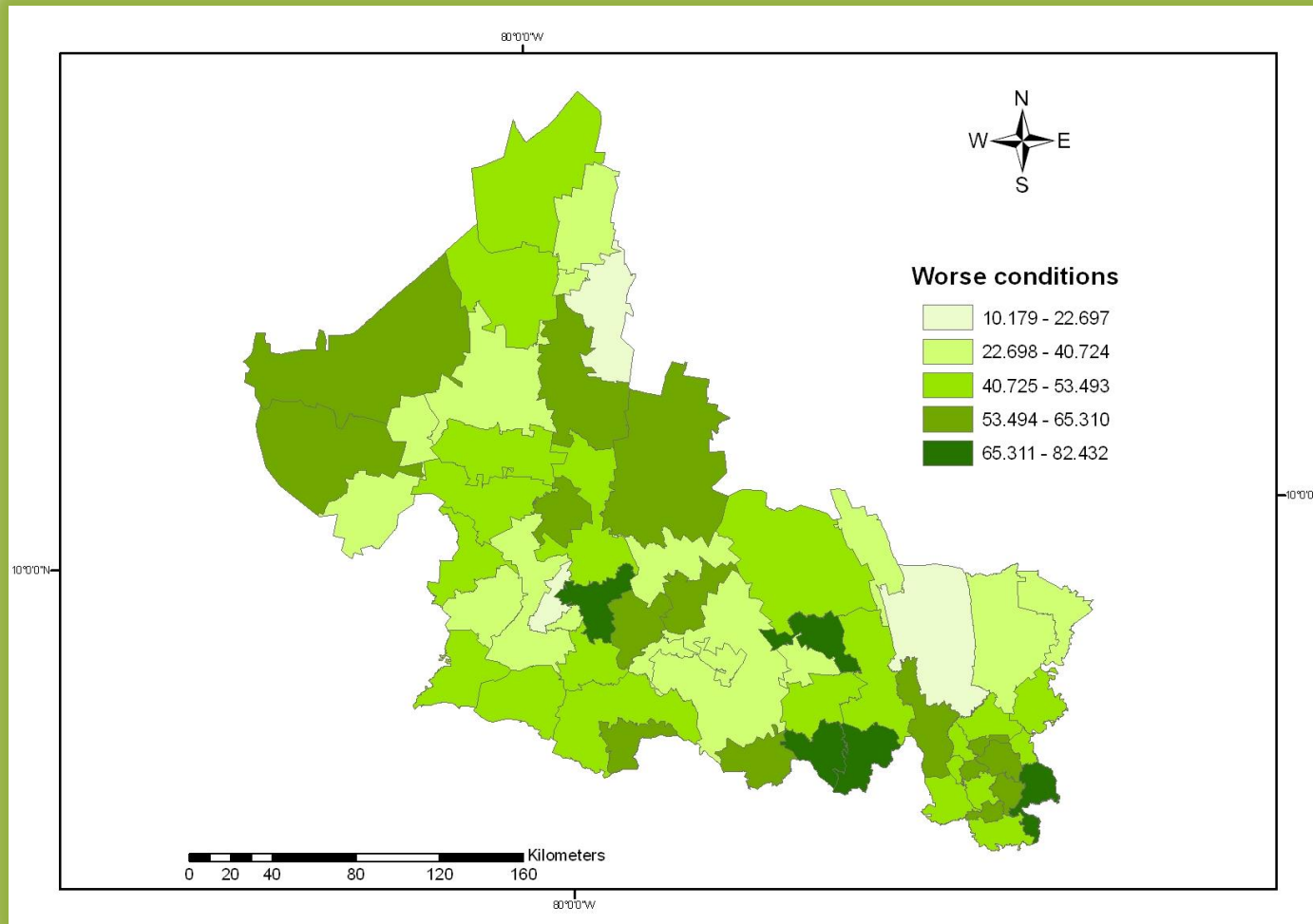
Source: INEGI, Population Projection (Censo 2005).

# Summary map of health conditions by spatial category, San Luis Potosí, Mexico, 2010.



$$\text{SpatialCategoryScore (macrovariable)} = \left( \frac{X_1 + X_2 + X_3 \dots X_n}{X_n} \right)$$

by  
spatial category, San Luis Potosí, Mexico,  
2010.



$$\text{Spatial Category Score (macrovariable)} = \left( \frac{X1 + X2 + X3...n}{Xn} \right)$$

# SOME PRELIMINARY CONCLUSIONS

There is an unequal distribution of HPV-HR prevalence in SLP state.

Female population suffering from HPV-HR expresses a regional difference: poor socioeconomic conditions and coverage of cervical cancer screening program do not correspond with the cervical lesions concentration. Who has more chances of getting access to health services prevention?

HPV-HR detection concentrates on women aged 25 to 44 years old. Probably, this is related with the Mexican Official Norm that prescribes citologic testing from 25 to 34 years of age and Hybrid capture HPV from 35 to 64 years of age.

If 30% of infected women are aged 15 to 25 years old, what is happening with the early detection?

This methodology allows to find indicators to distinguish the most affected HPV-HR areas in SLP and predict its likely diffusion and distribution patterns

Also, this GIS, spatial analysis can include three more factors to define the Mexican health HPV-HR strategy: cost-effectivity, health priorities, and the burden of disease.



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THANKS

