

SPATIAL PATTERNS OF UPPER AERO-DIGESTIVE TRACT, LUNG AND STOMACH CANCERS IN URUGUAY

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ABSTRACT

Objective: To explore geographic patterns in cancer incidence of upper aero-digestive tract and stomach cancer in Uruguay and to identify the existence of spatial dependence.

Subjects and Methods. For each cancer and geographical unit (departments), years 2003 to 2014 were analyzed by triennia. Besag, York and Mollie model (BYM) was used for mapping. The regions with Prob(RelativeRisk (RR)>1) >0.8 were considered higher risk areas. For the evaluation of spatial autocorrelation, the global Moran index was used.

Results: In men, esophageal and stomach cancer risk was higher in the northern and northeastern region of the country, with gradient in a southerly direction. Lung cancer exhibited elevated RR in the northeast and east (Rivera, Cerro Largo and Rocha) and in Montevideo. For laryngeal cancer, elevated RR was observed in the southern region. Cancers of the oral cavity and pharynx do not show a clearly defined distribution pattern. In women, similar geographic patterns were found for esophagus and lung cancer, in men. In laryngeal cancer, no spatial pattern was identified. Autocorrelation was significant for every studied site in men, but only significant for stomach and oesophagus in women. Some regions with persistent Prob(RelativeRisk (RR)>1) >0.8 for at least 3 periods were identified for men and women for lung, esophagus and stomach.

Conclusions: Spatial patterns have been shown for cancers of stomach, esophagus, lung and larynx in Uruguay, as well as the identification of regions of greater RR, mostly in north and northeast departments. This findings suggest regional differences in exposure to risk factors like tobacco, alcohol, and dietary factors, that grants further investigation.



METHODS

Cancer incidence data, corresponding to the period 2003-2014, were obtained from the National Cancer Registry of Uruguay. The tumors were coded according to ICD-10. Oral cavity and pharyngeal tumors (C0-C14), oesophagus (C15), stomach (C16), laryngeal cancer (C32), and lung and tracheal cancer (C33-C34) were analyzed separately. Person-years were calculated through linear interpolation from the information of the censuses of 1996, 2004 and 2011 (National Institute of Statistics).

Uruguay is politically divided into 19 departments with very heterogeneous populations. In the capital (Montevideo), 41% of the country's population is concentrated.

For the mapping, the posterior Relative Risk were calculated according to the method of Besag York and Mollie (BYM). In order to verify a systematic spatial variation, the Moran I coefficient was used. The statistical significance was obtained by simulations using Monte-Carlo methods.

For statistical calculations were used: R (ver.3.51), Openbugs and Geoda.

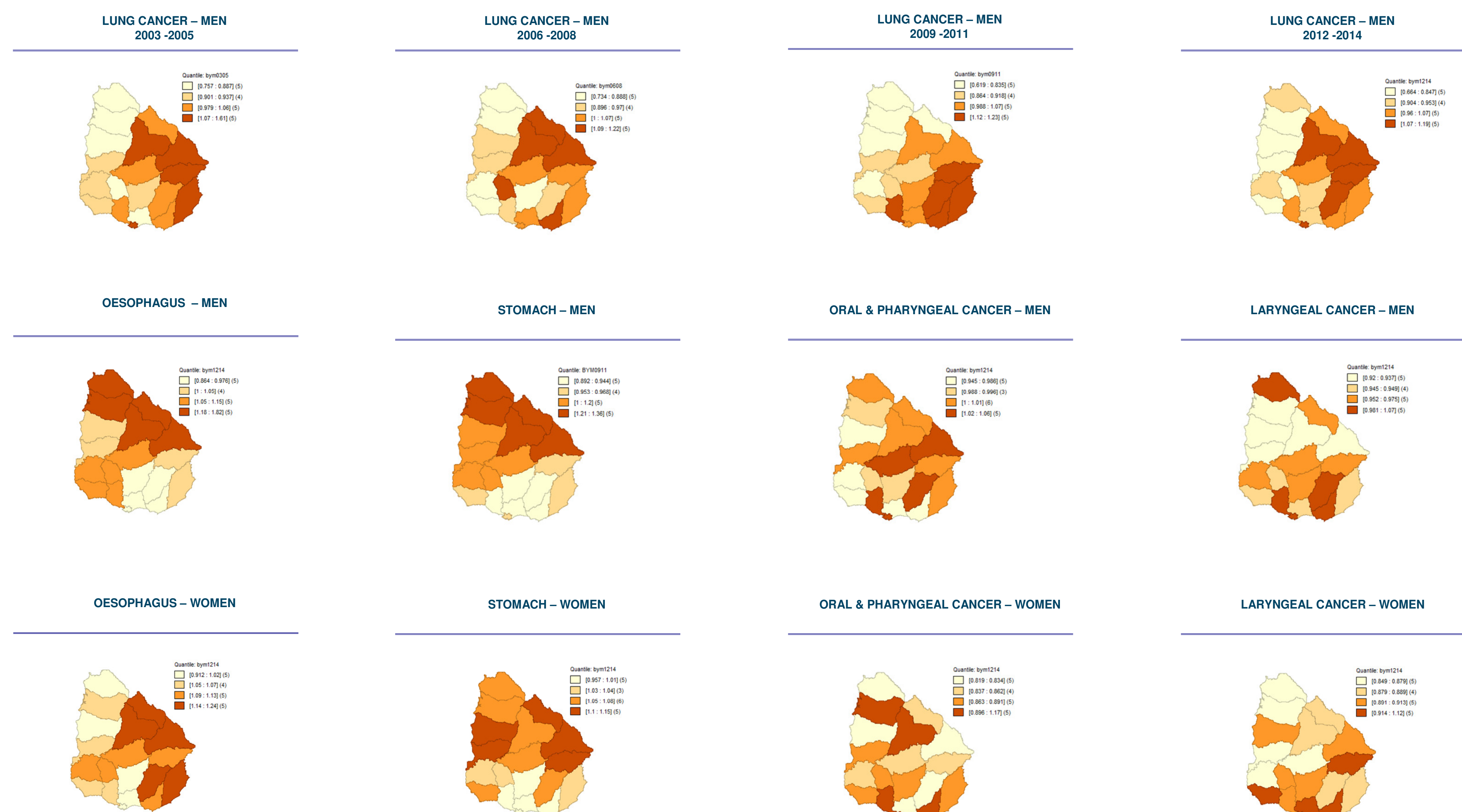
RESULTS

MORAN I

Hombres	2003-2005	2006-2008	2009-2011	2012-2014
O&P	0.27	0.27	0.08	0.01
Esophagus	0.65*	0.61*	0.63*	0.44*
Stomach	0.37*	0.81*	0.80*	0.57*
Larynx	0.38*	0.22*	0.46*	0.17
Lung	0.20*	0.01	0.54*	0.29*

* p<0.05

Women	2003-2005	2006-2008	2009-2011	2012-2014
O&P	0.14	0.08	0.17	-0.08
Esophagus	0.53*	0.28*	0.10	0.20
Stomach	0.67*	0.87*	0.47*	0.50*
Larynx	-0.04	0.21	-0.09	0.14
Lung	-0.03	0.02	0.08	0.03



CONCLUSIONS

In men, patterns have been shown for cancers of stomach, esophagus, lung and larynx, as well as the identification of regions of greater RR. In women, similar pattern but not so strong.

This findings suggest regional differences in exposure to risk factors like tobacco, alcohol, and dietary factors, that grants further investigation.

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