

Objective: To perform a surveillance study of sporadic amyotrophic lateral sclerosis (ALS) within the state of Vermont (VT) and to determine if spatial variation of ALS exists while controlling for age and gender influences of the underlying population.

Background: The majority of cases of Amyotrophic Lateral Sclerosis (ALS) are not familial, but sporadic. Detailed epidemiology studies can be used to generate hypotheses for disease etiology and potential contributing environmental factors. Geographic disparities in ALS have been identified in other parts of the world, but lack of detailed spatial and demographic data has limited spatial analysis of ALS in the United States.

Design/Methods: Incident cases of ALS diagnosed 1997-2011 in VT were identified through Fletcher Allen Health Care, Dartmouth-Hitchcock Medical Center, the Muscular Dystrophy Association, and private neurologists. Dwelling addresses at time of diagnosis were geocoded into spatial coordinates using Google Maps API. Landsat Global 2008 and 2000 US Census data were integrated using ArcGIS(c) 10 software and used to create a high resolution background population layer. The expected number of ALS cases was calculated based on disease incidence rates and the background population. A Monte Carlo simulation of the distribution of ALS cases was then performed based on the location of actual cases compared to the location of expected cases.

Results: High resolution maps were generated, demonstrating geographic variation in ALS. Spatial analysis revealed four regions with higher than expected ALS incidence.

Conclusions: Our data suggest that ALS occurs at a higher frequency within certain locations, specifically around water bodies. Environmental exposures could play a role in this geographic variation. Detailed surveillance studies and case control studies could help further investigation of environmental influences in the development of ALS.

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