2021 NPCR PUERTO RICO SUCCESS STORY

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The Puerto Rico Central Cancer Registry - Geocoding Project: Right on Track

National Program of Cancer Registries
SUCCESS STORY

SUMMARY

Collaboration with the Puerto Rico Planning Board (PRPB) set the first steps of the Puerto Rico Central Cancer Registry - Geocoding Project (PRCCR-GP). As a pilot project, 87.0% of 12,767 records were successfully geocoded with at least 70% accuracy for four common cancer sites in a five-year period. An interactive reference map was created by PRPB GIS experts to facilitate the geocoding process of rural addresses. PRCCR staff received basic training and a geocoding manual was created.

CHALLENGE

The successful geocoding of residential addresses in the PRCCR database was hindered by the fact that most rural addresses are often reported in terms of distance in kilometers (e.g., Road 18, Km 18.5), or by PO box. In a previous effort to geocode residential addresses using batch geocoding services, we were able to geocode approximately 70% of residential addresses, but many cases were not coded accurately. We reached out to GIS experts at the Puerto Rico Planning Board to determine how to improve geocoding accuracy for residential addresses of cancer cases in Puerto Rico, in particular the rural addresses.

SOLUTION

In 2019, PRCCR began the geocoding pilot project in collaboration with PRPB to geocode 12,767 residential addresses of breast, thyroid, liver, and cervical cancer cases. The PRPB is a state government agency that has a GIS department that acts as a repository of geo data; they are responsible for the implementation of controls needed to maintain the integrity and confidentiality of the GIS in PR (1). PRPB GIS experts were able to successfully geocode 87% of the residential addresses with at least 70% certainty. The following table summarizes geocoding results by level of certainty.

Geocode	Cancer Site				
Certainty	Liver	Breast	Thyroid	Cervix	Total
0%	2	24	7	6	39
10%	78	848	193	170	1289
40%	25	230	45	27	327
70%	220	2375	578	287	3460
80%	382	4801	1009	535	6727
90%	43	632	111	139	925
Total	750	8910	1943	1164	12767

Cases that had 40% certainty or less are being reviewed individually by graduate students and PRCCR staff using a reference map created by PRPB GIS experts. This map has been custom made so that rural addresses can be located using longitude and latitude coordinates as well as the corresponding census tract number of any address on the map.

The review of 203 residential addresses of cervical cancer cases with ≤40% geocoding certainty showed that most of these cases had PO boxes or incomplete physical addresses. Using PRCCR pathology reports and health insurance claims data, the PRCCR epidemiologist was able to improve residential addresses of 178 cervical cancer cases. A total of 173 cancer cases were geocoded using the PRPB reference map. US Census Bureau 2010 Reference Maps were used to validate the census tract provided by the PRPB reference map. In addition, an official list of Puerto Rico's Housing Department was used to complete and validate public housing addresses.

RESULTS

Out of 12,767 cancer cases, PRPB was able to geocode 11,112 (87.0%) with at least 70% certainty: 7,808 (87.6%) of breast cancer, 1,698 (87.4%) of thyroid cancer, 645 (86.0%) liver and intrahepatic bile duct cancer, and 961 (82.6%) of cervical cancer. In addition, 173 cervical cancer addresses with ≤40% certainty were successfully reviewed and geocoded. This effort brought the successful geocoding of cervical cancer residential addresses with at least 70% certainty to 97.4% of all cases. Out of 93 PO boxes listed, 72 physical addresses were identified and geocoded with 100% certainty. This was an important breakthrough since PO boxes as residential addresses in the PRCCR database are a major limitation in geocoding.

A manual for geocoding was created for use at the PRCCR. We plan to complete the review and verification of the remaining cancer cases with ≤40% geocoding certainty. Furthermore, we seek to continue improving the geocoding process and training PRCCR staff as well as hospital registrars.

SUSTAINING SUCCESS

Collaboration with the PRPB helped us achieve an important landmark in our efforts to geocode residential addresses. This pilot project gave us an understanding of tools to improve geocoding of residential addresses and strategies to improve physical address documentation.

Once geocoding of the four cancer sites reaches at least 95% with at least 70% certainty, the PRCCR will be able to initiate geospatial analysis studies with emphasis on cancer disparities at the census tract level. At this time there are three doctoral students that will benefit from the geocoding pilot project in their dissertation projects.

REGISTRY CONTACT INFORMATION

787-772-8300 ext. 1100
www.rcpr.org

SOURCE

1. Junta de Planificación de Puerto Rico. 2010. Resolución Número: JP-2010-298. Para adoptar las especificaciones de sistemas de información geográfica (GIS) para la creación de geodatos de calificación y clasificación de Puerto Rico. http://jp.pr.gov/Portals/0/GIS/Resoluci%C3%B3n%20JP-2010-298%20(Con%20Guias%20incluidas).pdf?ver=2017-03-31-101140-450

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