HIV Prevalence in the Comarca Ngäbe-Buglé

A Vulnerability Assessment of HIV in an Indigenous Population in Rural Panama

Introduction

Recently in Panama, the indigenous peoples' reservation for the Ngäbe and Buglé people, the Comarca Ngäbe-Buglé, has seen a drastic rise in HIV rates (Gabster et. al., 2019). Studies, specifically coming from the CTARV clinic in San Felix that caters to the Southwestern Comarca, are being done to understand the implications of the disease (Gabster et. al., 2019). However, because of the rapid spread of the disease, the taboo surrounding infection, and a lack of resources including knowledge about the disease and transportation to help, more information is needed to understand how the Ngäbe population is being affected (McCleland, 2018).

Current efforts include education, prevention, and treatment, but because of the difficult access to clinics, high poverty rates in the area, and cultural differences between those affected and typical care givers, more efforts are needed. With a limited amount of resources to dedicate to this issue, a spatial analysis of the spread of HIV in relation to the Ngäbe population should tell us where to focus future training to be most effective. In this spatial analysis, the top locations that will be most effective for HIV training and outreach will be created.

Question: Where is it most important to focus future HIV outreach and education efforts in the southern Comarca Ngäbe-Buglé?

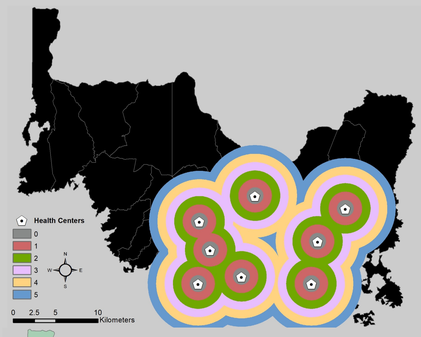

Figure 1: Multiple ring buffers around the health centers. As specified in the discussion, there are no known centers in the western part of the comarca.

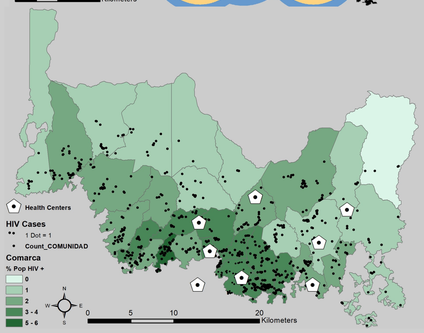

Figure 2: The rate of HIV positive individuals per county population records. Each black dot represents one individual that is HIV positive.

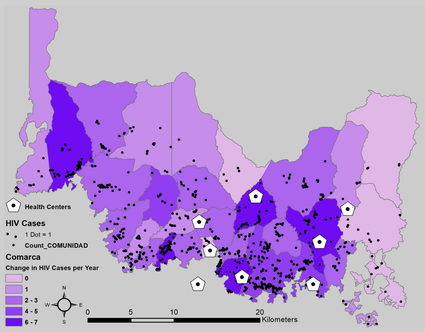

Figure 3: The change in rate per year of HIV positive individuals per county. Each black dot represents one individual that is HIV positive.

Data

Data necessary for this spatial analysis include Panamanian geography layers such as population and locations of towns, counties, and districts in the Comarca Ngäbe-Buglé, clinic locations, and HIV data including percent of town infected with HIV, gender, and year of infection.

Panamanian geography and population data were obtained through the online GIS resources provided by the national mapping and statistics agency of Panama. Population, clinics, and all HIV data including percent infected were obtained from a current HIV study and program happening at the CTARV Clinic.

Methods

Country geographical data were cut and edited, as some of the layers were not matched up. This was done through selection by location and by attributes. HIV data, including the population, percent infected, and rate of population infected were cleaned before importing into GIS. Then, once uploaded, the HIV information tables were joined to the district, county, and towns layers. The latitude and longitude of the clinic locations were acquired from Google Maps, put into a spreadsheet, uploaded into GIS, and geocoded by latitude and longitude.

From the HIV data, percent per population and percent change of HIV rate per counties were calculated to see which areas have the highest percentage and which areas have the highest growing percentage of HIV. These were then converted into raster using polygon to raster, and reclassified into 6 values, using the reclassify tool. A multiple ring buffer of six different layers was then created around the geocoded health centers, with each buffer measuring a mile larger than the previous in radius length from the health center. These buffers were then converted into raster, using the polygon to raster tool. Raster calculator was then used to add up the values from these three raster layers, in order to create a vulnerability calculation: rate per population, rate change per population, and distance from health center. Counties with higher vulnerability ratings are more vulnerable to HIV spread.

Next, this vulnerability calculation was converted into a table, through the 'zonal statistics as a table' tool, which was joined to the county layer in GIS, and displayed on the county map through the mean vulnerability calculation. This vulnerability calculation was converted into a table a second time, in order to join the vulnerability to towns information, for more specific targeting of future outreach and education efforts.

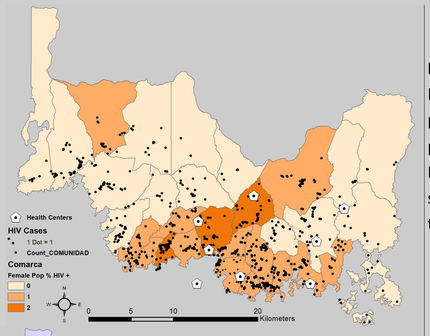

Figure 4: The rate of HIV positive women per female county population records. Each black dot represents one individual that is HIV positive.

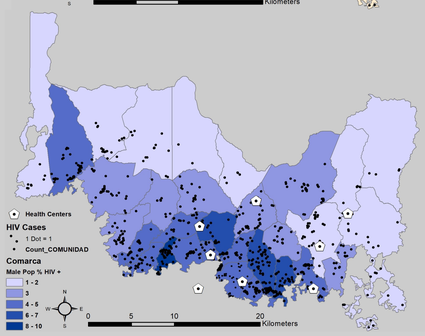

Figure 5: The rate of HIV positive men per male county population records. Each black dot represents one individual that is HIV positive.

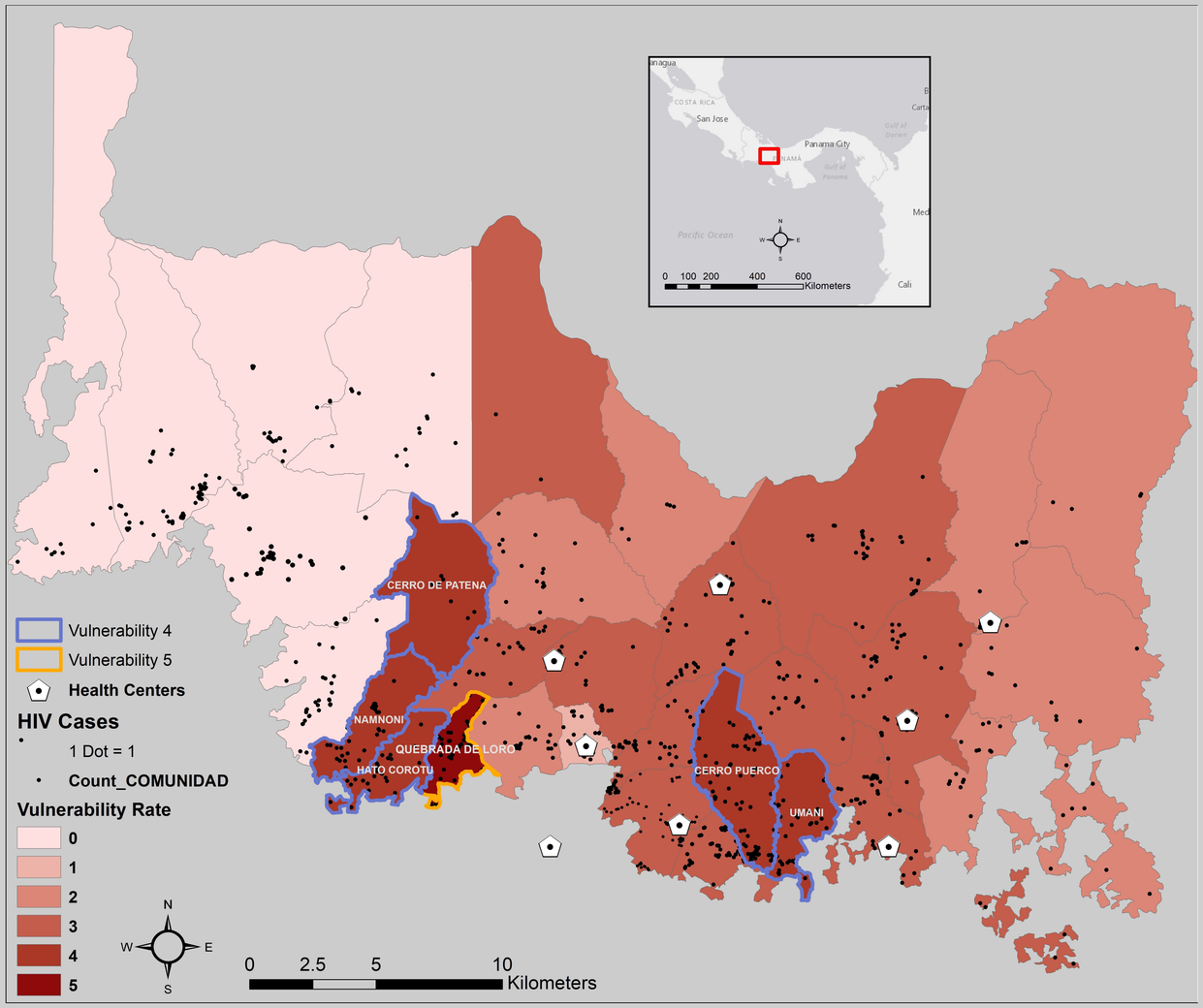

Figure 6: Final analysis, the compilation of 5 mile buffers around health centers, the county rate per population of HIV positive individuals, and change in rate per year of HIV positive individuals per county.

Discussion

The output of this analysis includes multiple maps of this area: HIV rates per gender (Figures 4 & 5), HIV rates per county (Figure 2), the rate change per year from before 2014 compared to 2015 to 2019 (Figure 3), 5-1 mile buffers around the health centers (Figure 1), and the final analysis of the most vulnerable districts and towns that take the buffers, rate change, and rate per county into consideration (Figure 6). As seen above, only one county received a vulnerability rating of 5 (Quebrada de Loro), while 5 received a rating of 4 (Cerro de Patena, Namnoni, Hato Corotu, Cerro Puerco, and Umani). Due to the lack of information on health centers in the Western part of the Comarca Ngäbe-Buglé, vulnerability analyses in this part of the country received scores of 0. Future studies are recommended to focus on this area.

Because there are few resources to this specific area, and efforts are limited towards stopping the spread of HIV, maps and associated tables produced through this analysis are critical to current research efforts. These research programs provide HIV trainings, education, and outreach to various groups, including those infected, and local leadership. Hopefully with these final products, the program team can further target efforts towards the areas in most need.

References

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Maps Created by Sarah Laves

December 12, 2019