MULTIDISCIPLINARY APPROACH TO HEALTH CARE THROUGH SPATIAL ANALYSIS WITH QGIS SOFTWARE.

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1. Introduction

In rural regions, healthcare coverage remains uneven and difficult to monitor. Visualizing this gap requires digital tools that connect public health with the spatial dimension.

This study presents the integration of Quantum Geographic Information System (QGIS) into a collaborative educational experience between Nursing and Agroforestry students to identify health disparities in three underserved communities in the municipality of Tetela de Ocampo, Puebla, Mexico.

2. Objectives

To integrate QGIS into higher education as a practical tool for analyzing public health data.
To promote multidisciplinary collaboration between health and engineering students.
To produce spatial outputs (maps, graphs, tables) that support health planning in rural settings.

Figure 1
Preventive coverage by family and community

Figure 2. Thematic map "Preventive health coverage in three communities of Tetela de Ocampo, Puebla".

3. Methodology

A mixed-methods approach was used, involving fieldwork in three rural communities: La Cañada, Cuapancingo, and San Nicolás.
Data collected included vaccination status, deworming coverage, and presence of chronic diseases.
Students used QGIS 3.14 to georeference and stratify the data using thematic cartography and visual outputs.

4. Results

A bar chart revealed disparities in preventive coverage per community.
A summary table displayed key indicators by family and intervention type.
Thematic map was created using QGIS to visualize areas with no healthcare coverage.

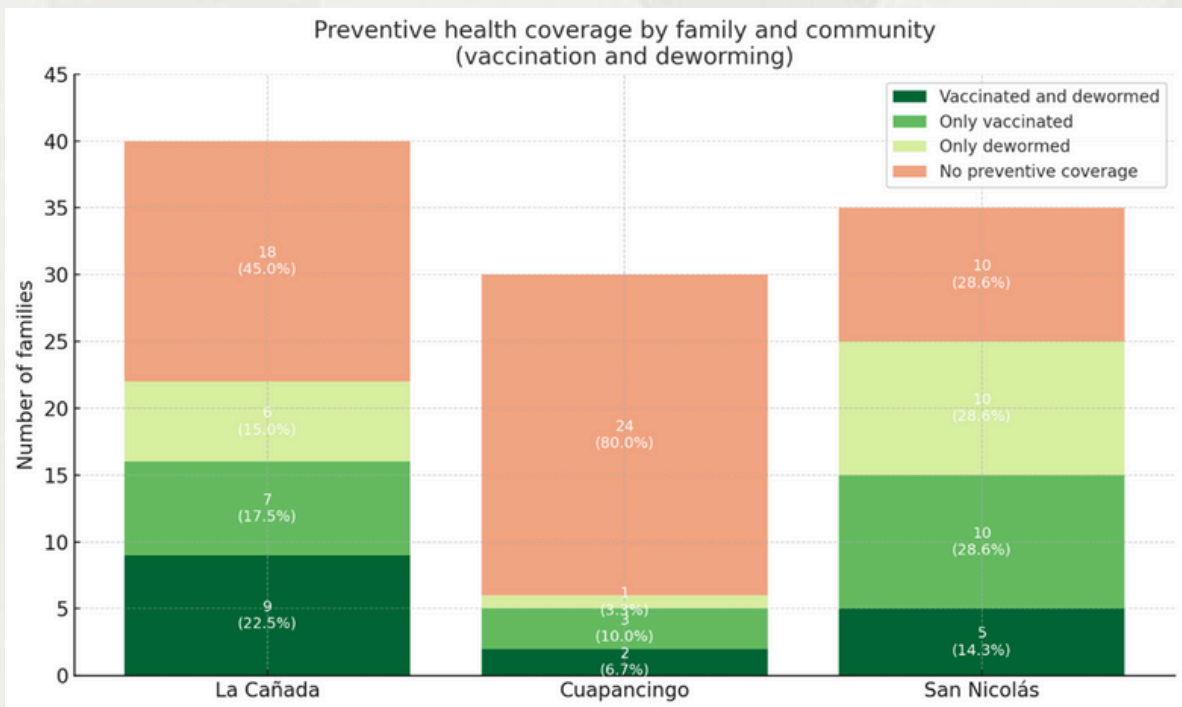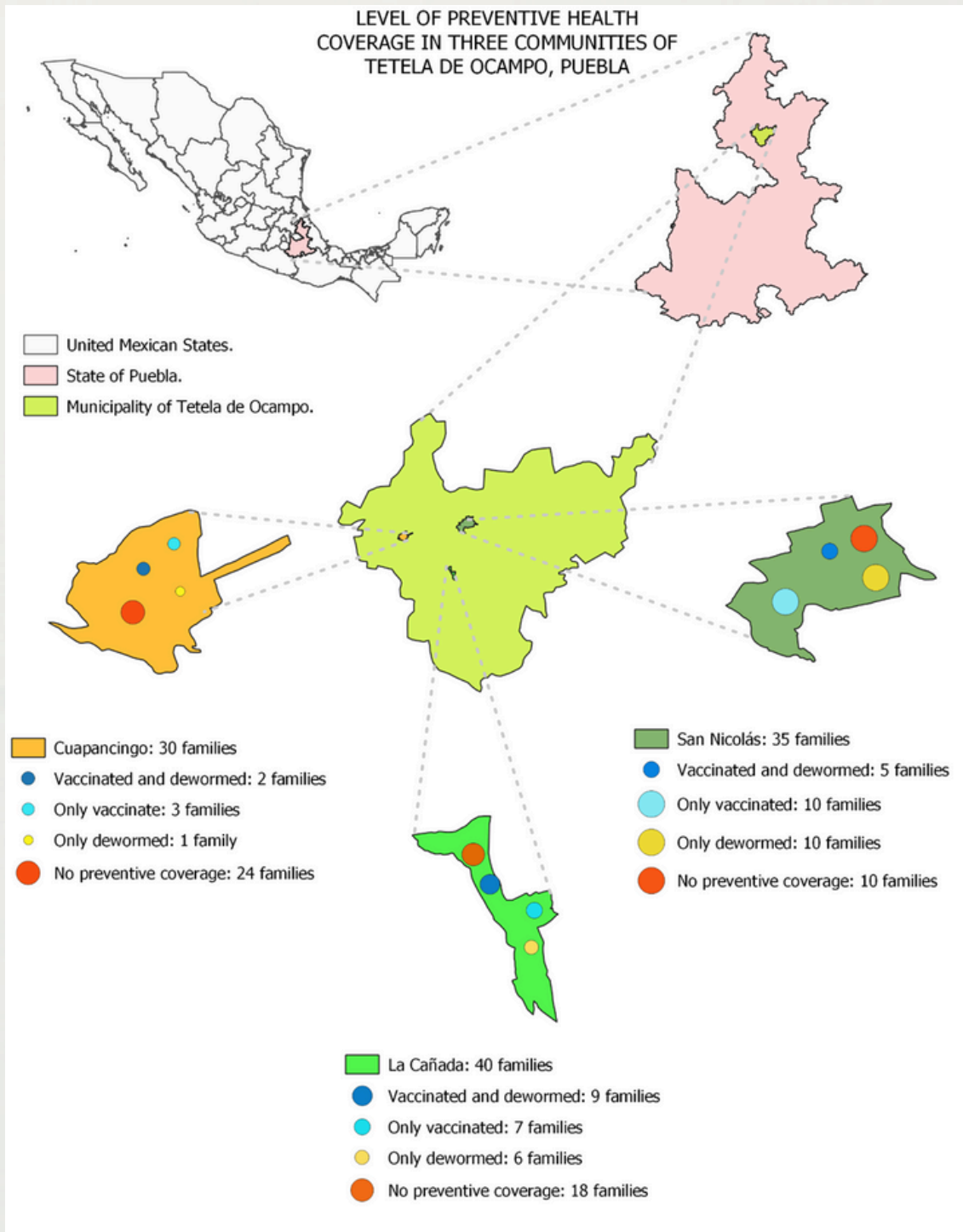Table 1
Distribution of preventive coverage by family and community (n=105)

COMMUNITY	TOTAL FAMILIES	VACCINATED AND DEWORMED	VACCINATED ONLY	DEWORMED ONLY	NO PREVENTIVE COVERAGE	% NOT COVERED
LA CAÑADA	40	9	7	6	18	45%
CUAPANCINGO	30	2	3	1	24	80%
SAN NICOLÁS	35	5	10	10	10	28.6%

Note: Based on information gathered through surveys applied in rural communities of Tetela de Ocampo.

5. Discussion

The integration of QGIS demonstrated how ICTs (Information and Communication Technology) can provide a better understanding of health challenges through their mapping.
Collaboration between disciplines allowed students to combine clinical knowledge with geospatial analysis, resulting in stronger interpretations and meaningful outputs.
GIS applications have proven effective in healthcare planning (Soto et al., 2024) and promote deeper learning when used in health education (Salud Pública de México, 2023).

6. Conclusions

- The students were able to transform the collected information into applicable knowledge through QGIS.
- Spatial analysis enhanced decision-making and gave visibility to underserved populations.
- The multidisciplinary model bridged technical and humanistic approaches, making the learning experience both practical and socially relevant.

7. References (shortened)

- Salud Pública de México. (2023). Information and communication technologies in health education. Salud Pública de México, 65(2), 123–130. https://saludpublica.mx/index.php/spm/article/view/16245
- Soto Provoste, S., Rebolledo Poblete, A., & González González, G. (2024). Geographic information system tools for delimiting areas in Chilean family health centers. Revista de Salud Pública, 26(5), 1–6. https://doi.org/10.15446/rsap.v26n5.116376