Comprehensive Case Study: AI-Powered Market Strategy for PPEC of Palm Beach

Project Background & Objective

PPEC of Palm Beach, a well-regarded Prescribed Pediatric Extended Care (PPEC) center, is nearing capacity due to increased demand from Medicaid-eligible families with medically complex children.
To enable growth while maintaining high standards of care, this project aimed to identify strategic expansion opportunities using AI and location data. The goal was to pinpoint underserved zip codes with high Medicaid populations and minimal existing competition, and then convert those insights into actionable resource allocation and outreach plans.

I developed an AI-powered clustering model to identify high-potential zip codes for expansion. Using publicly available demographic and Medicaid-related data, I segmented the regional market into three opportunity zones based on key attributes such as child population density, Medicaid eligibility, household income, and proximity to existing centers.

Data Sources Used

- U.S. Census Bureau (Child population, income by zip code)
- AHCA (Florida Medicaid data)
- Public listings of PPEC centers within 20 miles (via HealthFinder)

Key Features of the Model

- **Clustering Algorithm:** K-Means with 3 clusters
- **Variables Considered:**
    - Child population (age 0–19)
    - Median household income
    - Estimated % of Medicaid eligibility
    - Distance to nearest PPEC center
- **Tools Used:** Python (Pandas, Scikit-learn, Folium), MinMaxScaler for normalization

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Cluster Insights

- **Cluster 0 (Green):** High child population, high Medicaid %, far from competitors = **"High Opportunity"**
- **Cluster 1 (Orange):** Mid-level values = "Monitor / Mixed Potential"
- **Cluster 2 (Red):** Low population, close to existing PPECs = "Saturated / Lower Opportunity"

Interactive Map A live visual map was created using Folium, color-coding each zip code by its assigned opportunity cluster. This can support both real estate acquisition and geo-targeted ad campaigns.

Example Recommendation

- **Zip Code 33413**:
    - Child population: 8,300
    - Medicaid estimate: 75%
    - Nearest PPEC: 10 miles away
    - Cluster: High Opportunity (Green)

Strategic Applications

- Prioritize outreach and advertising in green-cluster zip codes
- Identify underserved areas for future facility planning
- Use insights in partner/franchise pitch decks to justify white-space entry

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Step 1: Data Gathering

I compiled publicly available datasets from the following sources:

- Child population (ages 0–19) at the zip code level from https://data.census.gov
- Median household income by zip code from Census Reporter
- Estimated Medicaid eligibility percentages by zip code
- Distance to nearest PPEC centers (manually calculated or approximated using map coordinates)
- PPEC locations within Palm Beach County from the Florida Health Finder website (https://quality.healthfinder.fl.gov/)

Step 2: Methodology & Analysis

1. Data Normalization: Using MinMax scaling to standardize variables for fair clustering analysis.
2. Clustering Algorithm: K-Means clustering was applied to segment zip codes into three clusters based on:
   - Child population
   - Medicaid %
   - Income level
   - Distance to nearest PPEC
3. Cluster Identification:
   - Cluster 0: High Opportunity
   - Cluster 1: Moderate Opportunity
   - Cluster 2: Lower Opportunity or Saturated
4. Mapping & Visualization: Created an interactive map using Folium to visualize the distribution of clusters.

Step 3: Zip Code Opportunity Segmentation

The clustering model yielded the following zip code groupings:
- High Opportunity: 33401, 33407, 33409, 33413, 33415, 33417
- Moderate Opportunity: 33403, 33405
- Lower Opportunity: 33411, 33418

Step 4: Insights & Strategic Takeaways

The following insights emerged from the clustering and visualization:
1. High-Potential Zip Codes Identified – 33413, 33417, and 33415 show high Medicaid %, large youth population, and few nearby PPECs.
2. Service Gap Identification – Zip codes with poor accessibility to PPEC services despite qualifying demographics were highlighted as 'white space'.
3. Data-Driven Growth Decisions – Our cluster-based model provides a foundation for franchise targeting, marketing investments, and capacity planning.
4. Marketing Opportunity – Zip codes with high potential can be targeted with hyperlocal ads and outreach campaigns to attract Medicaid-eligible families.
5. Optimized Resource Deployment – Insights allow for tailored allocation of staff, outreach, transport, and school partnerships based on zip code potential.
6. Scalable Framework – This methodology is replicable in other counties for statewide or multi-regional expansion.

Step 5: Sub-Projects & Actionable Outputs

A. Resource Allocation Plan (Cluster Analysis)

Each zip code was evaluated for recommended resource allocation:
- High Priority (33401, 33407, 33409, 33413, 33415, 33417): Full deployment of outreach, transport, and school tie-ups.
- Moderate Priority (33403, 33405): Maintain presence, monitor demand.
- Low Priority (33411, 33418): Minimal resource allocation.

B. White Space Analysis

Underserved areas with high Medicaid % and significant distance to a PPEC were prioritized:
- Top targets: 33413 (75%, 10 mi), 33417 (74%, 6 mi), 33415 (72%, 7 mi)
- Recommendations: Launch pilot outreach in these areas, test mobile units, incorporate data in franchise applications.

Tools Used

- Python (Pandas, Scikit-Learn, Folium for clustering and mapping)
- Excel for data organization
- Public data sources (US Census, Florida AHCA, Google Maps)
- Jupyter Notebook for analysis and documentation

Final Deliverables

- AI clustering model and normalized zip code dataset
- Interactive zip-code clustering map
- Executive slide deck and summary documents
- Zip code-level resource plan and underserved zone list

Conclusion

This comprehensive analysis enabled PPEC of Palm Beach to make targeted, data-backed decisions about expansion, outreach, and resource allocation.
The combination of AI clustering, Medicaid demographic mapping, and strategic planning equips leadership with a scalable model to extend care
to families who need it most. This project showcases how technology and mission-driven strategy can intersect to solve real problems in pediatric healthcare.