

Dashboard for Brigadas de Salud Materna in Conflict-Affected Mexico

Deliverable 3: Predictive Metric and Data Source Evaluation and Documentation

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What CRS and Cáritas Need to Predict



CRS and Caritas Mexico require forward-looking insights to guide both immediate humanitarian response and long-term program planning.

Predictive metrics can help decision makers anticipate where maternal and infant health outcomes may worsen—whether from *chronic vulnerabilities* or *acute disruptions* linked to insecurity.

Translating Prediction into Action

Guiding Question:

- How can predictive metrics help CRS and Cáritas anticipate where mothers and infants are most at risk—whether from chronic conditions or emerging crises?

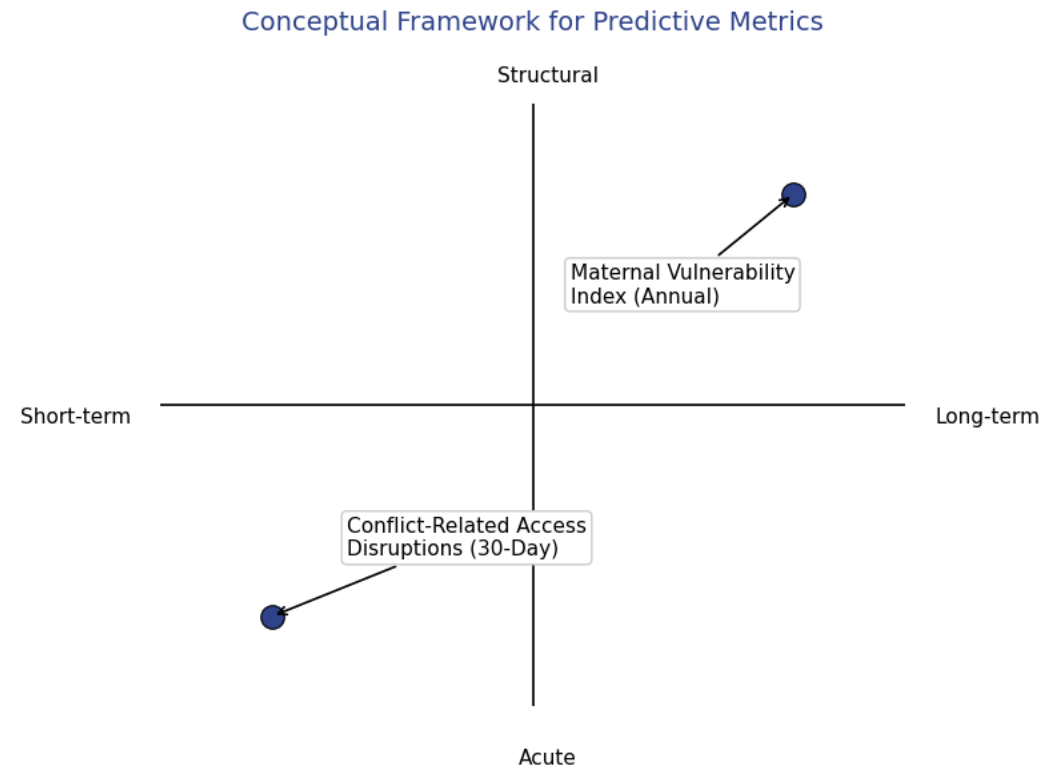
Decision Context:

- Predictions will inform:
 - **Strategic planning:** allocating health and development resources to high-risk regions.
 - **Operational deployment:** directing mobile health brigades and supplies to areas facing acute disruptions.

Criteria for Selecting a Predictive Metric

Conceptual Framework for Predictive Metrics:

- Predictive metrics can be understood along two conceptual dimensions:
 - **Time Horizon** — whether they anticipate change over weeks, months, or years.
 - **Type of Risk** — whether they capture *acute disruptions* (e.g., conflict-related access loss) or *structural vulnerabilities* (e.g., poverty, weak infrastructure).
- Both perspectives are essential for humanitarian decision-making.
- Short-term, acute metrics support operational response, while long-term, structural metrics inform strategic planning and program design.



Operational Evaluation Criteria



While both conceptual approaches are valuable, this dashboard's focus on **real-time humanitarian decision-making** requires metrics that can be updated frequently and act as near-term predictors of service disruption.

To evaluate each metric's suitability for this purpose, six operational criteria were applied:

Operational Evaluation Criteria



Criteria	Explanation	1 (Low)	2 (Moderate)	3 (High)
Predictive Horizon	How far into the future the metric anticipates change.	Days	Months	Year or more
Lead Time	How quickly it provides an actionable signal before disruption occurs.	Reactive	Short notice	Early warning
Temporal Sensitivity	How frequently the metric updates to reflect changing conditions.	Annual	Quarterly	Monthly or real-time
Spatial Resolution	Geographic granularity of the data.	National	State	Municipal
Predictive Value	Strength of empirical relationship between metric behavior and observed disruptions.	Weak	Moderate	Strong
Relevance to Program	Alignment with CRS/Cáritas operational planning and deployment cycles.	Indirect	Partial	Direct operational use

Predictive Metric Options Considered



To anticipate disruptions to maternal and infant health services, two predictive approaches were considered. Each reflects a different time horizon and type of risk.

- **Metric 1:** *Conflict-Related Access Disruptions (30-Day)* — short-term, acute risk derived from conflict and access data.
- **Metric 2:** *Maternal Vulnerability Index (Annual)* — long-term, structural risk derived from socio-demographic indicators.

Metric 1 — Conflict-Related Access (30-Day)



Integrates conflict forecasts from **ACLED CAST (Conflict Alert System)** with recent event data to predict municipalities at risk of maternal and infant health service disruption. CAST projects political violence 1–6 months ahead at the state (ADM1) level. Within high-risk states, the previous 60 days of ACLED event data are used to identify active conflict zones and model road travel routes to health facilities (CLUES / OSM network).

Municipalities whose access routes intersect these zones are classified as *likely disrupted within 30 days*.

Primary Data Sources:

- **ACLED CAST (Conflict Alert System)** – forecasts subnational political violence risk (1–6 months ahead)
- **ACLED (Event Data)** – historical and recent conflict incidents (daily updates)
- **Secretaría de Salud, DGIS – CLUES Registry (2025)** – national health facility database
- **OpenStreetMap** – road network for travel-time modeling

Metric 2 — Maternal Vulnerability Index (Annual)



A composite indicator capturing chronic maternal and infant vulnerability based on poverty, health access, and demographic variables. Built from annual and multi-year datasets (CONEVAL, ENSANUT, INEGI), the index identifies municipalities where structural conditions make mothers and infants persistently at risk of poor outcomes. Because its underlying sources update annually, the index forecasts **long-term vulnerability** rather than short-term shocks.

Primary Data Sources:

- **CONEVAL (2010–2020)** – Municipal poverty and social deprivation indicators
- **ENSANUT (INEGI / INSP)** – National Health and Nutrition Survey on maternal and child health access
- **INEGI Census (2020)** – Population and household characteristics by municipality

Comparative Evaluation of Predictive Metrics

Category	Predictive Metric	Predictive Horizon	Lead Time	Temporal Sensitivity	Spatial Resolution	Predictive Value	Relevance to Program	Inclusion
Short-term / Acute	Conflict-Related Access Disruptions (30-Day)	3	3	3	3	3	3	Yes
Long-term / Structural	Maternal Vulnerability Index (Annual)	1	1	1	3	2	2	No

While both metrics have predictive value, only the Conflict-Related Access Disruptions metric provides the temporal precision and operational relevance required for real-time deployment of maternal health brigades.

References



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