Stage-Based Cost-of-Care Analysis for Cervical and Breast Cancer

Clinical & Economic Evaluation to Support Evidence-Based Health Financing Decisions

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Background

Public health systems in resource-constrained environments require accurate, evidence-based cost estimates to design sustainable benefit packages and ensure equitable access to specialized care. Cervical and breast cancer represent two of the highest-burden oncologic conditions affecting women and require complex, multi-stage clinical management.

The Nicaraguan Social Security Institute (INSS), with technical support from Management Sciences for Health (MSH) and USAID, commissioned a comprehensive cost-of-care analysis to estimate the full economic burden of treating these conditions and to inform payment mechanisms and coverage policies.

Conducted in collaboration with INSS, MSH, and USAID, engaging 20+ oncology specialists and reviewing 30 clinical cases to develop standardized, stage-based costing models.

Objective

To estimate total (direct and indirect) costs of care for cervical and breast cancer across clinical stages, using standardized clinical pathways validated by oncology specialists, in order to support health financing and purchasing decisions.

Methods

Study Design

Activity-Based Costing (ABC) methodology combined with:

- Clinical record review (30 patient charts)
- Expert consensus workshops with 20+ oncology specialists
- Standardized care pathways ("care flows") per FIGO stage
- Direct and indirect cost modeling

Cost Structure

Costs were estimated across:

Direct costs	Indirect costs
• Clinical staff (physicians, nurses, specialists) • Medications and chemotherapy • Diagnostic tests and imaging • Procedures and radiotherapy • Consumables	• Administration • Utilities and facility costs • Support services (cleaning, laundry, food services) • Depreciation

Analytical Approach

- Stage-specific clinical flows were mapped
- Resources assigned per activity
- Unit costs calculated and aggregated
- Average cost per patient per stage estimated

My Role

Health Economics & Clinical Data Lead

- Led the design and implementation of the Activity-Based Costing framework for stage-specific oncology care.
- Transformed unstructured clinical records into standardized, analysis-ready datasets for cost modeling.
- Developed validated cost models adopted to inform institutional budgeting and reimbursement strategy.

- Facilitated consensus workshops with 20+ oncology specialists to define evidence-based clinical pathways.
- Integrated clinical, operational, and financial data into decision-support tools for policymakers.
- Delivered actionable insights that supported sustainable benefit package and coverage design.

Key Findings

- Stage of diagnosis strongly influenced total cost of care
- Advanced stages required significantly higher resource utilization
- Early detection and treatment were substantially more cost-effective
- Standardized care flows enabled consistent and transparent costing
- Results supported the design of sustainable reimbursement mechanisms

Cost Pattern by Clinical Stage

Costs increased exponentially with later-stage diagnosis, reinforcing the value of early detection and prevention strategies.

Stage	Relative Cost of Care	Resource Intensity	Typical Interventions
I	Low	Preventive / Early	Screening, minor procedures
II	Moderate	Surgical + adjuvant	Surgery, chemo/radiotherapy
III–IV	High	Complex oncology	Multimodal treatment, hospitalization

Impact

This study provided:

- Evidence for benefit package design
- Inputs for payment mechanism definition
- Budget planning for oncology services
- Data-driven decision support for INSS leadership
- A replicable costing framework for other diseases

The methodology established a foundation for regulatory-grade healthcare costing and institutional capacity building.

Tools & Skills Demonstrated

- Healthcare cost modeling
- Activity-Based Costing (ABC)
- Clinical pathway mapping
- Structured dataset design
- Health economics evaluation
- Stakeholder facilitation with physicians
- Quantitative analysis & reporting
- Decision-support communication

Keywords

Clinical Data Analytics | Oncology | Health Economics | Cost-of-Care | Real-World Evidence | Healthcare Financing | SQL-ready structured datasets

Suggested Citation

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