

METHODOLOGY BRIEF

Data-Driven Investment Case for Childbirth Spacing in Kaduna, Kano, and Gombe States, 2026



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This brief documents the data sources, analytical steps, and formulas used to produce the three state-level childbirth spacing investment briefs (Kaduna, Kano, Gombe). It is intended as a technical companion for reviewers and partners who wish to verify or replicate the underlying analysis. Resulting projection figures are presented in the state briefs; this document covers method only.

1. Purpose and Scope

Each state brief combines four elements: (a) budget and execution analysis, (b) commodity stock-out analysis, (c) commodity procurement gap costing, and (d) forward-looking health and economic outcome projections for 2026–2028. The same analytical framework and formulas were applied consistently across Kaduna, Kano, and Gombe; only the state-specific input parameters (population, mortality ratios, budget lines, commodity volumes) differ.

2. Key Baseline Inputs

These are the state-level inputs fed into the formulas in Section 4 (not projection outputs).

Parameter	Kaduna	Kano	Gombe
MMR (deaths/100,000 births) ¹	512	378	1,135
TFR (children per woman) ¹	5.6	5.8	5.5
Baseline mCPR ¹	13.1%	10.6%	30.3%
Unmet need (married women) ¹	25%	26%	13.2%

¹ MMR, TFR, and mCPR: NDHS 2024, cross-checked against state sources — Kaduna State Development Plan 2024–2028 (Kaduna); NHLMIS 2025 (Kano); Gombe FP & MNCH Quantification 2025 (Gombe). Unmet need: NDHS 2024 (Kaduna, Kano, Gombe).

3. Analytical Framework

The analysis proceeds through five linked stages, applied consistently across all three states:

Stage	What it does
1. Baseline profile	Establish population of reproductive age, TFR, MMR, baseline mCPR and unmet need from NDHS 2024 and state demographic data.
2. Budget and execution analysis	Compare allocations vs. releases across each childbirth-spacing budget line, 2023–2025 and Q1 2026, to compute an execution rate (releases ÷ allocation).
3. Stock-out analysis	Track bimonthly NHLMIS facility stock-out percentages by commodity to identify the commodities and LGAs with the most severe and persistent shortages.
4. Commodity gap costing	Apply state quantification demand forecasts (2026–2028) and published unit prices to unit shortfalls, adding a 20–25% freight/shipping allowance to reach the total funding gap.
5. Outcome projection	Project mCPR, additional women covered, pregnancies/deaths averted, and economic returns under multiple funding scenarios (no funds released; state funds only; state plus partners; full investment with LARC scale-up), using the formulas in Section 4.

4. Formulas Used for Health and Economic Projections

4.1 Projected mCPR

Baseline mCPR is grown forward using the state's population growth rate and an annual contraceptive-prevalence increment derived from the quantification demographic forecast:

$$mCPR(\text{year}) = mCPR(\text{baseline}) + (\text{annual CPR increment} \times \text{number of years elapsed})$$

Additional women covered is the increase in the number of women using a modern method implied by the mCPR change, applied to the state's women-of-reproductive-age (WRA) population base:

$$\text{Additional women covered} = [mCPR(\text{year}) - mCPR(\text{baseline})] \times \text{WRA population}$$

4.2 Unintended pregnancies prevented

Standard international Couple-Years of Protection (CYP) conversion factors (USAID) are applied per contraceptive method to the number of additional women/couples gaining access, converting CYP to pregnancies averted per year of protection:

$$\text{Pregnancies prevented} = \sum (\text{additional users of method } X \times \text{CYP factor for method } X \times \text{pregnancies-averted-per-CYP})$$

4.3 Unsafe abortions prevented

Applied as a conservative, lower-bound share of unintended pregnancies, based on WHO estimates for settings comparable to northern Nigeria:

$$\text{Unsafe abortions prevented} = \text{Unintended pregnancies prevented} \times 15\%$$

4.4 Obstetric fistula cases prevented

Calculated by isolating the share of prevented pregnancies occurring among high-risk groups (adolescents and high-parity women) and applying a published incidence rate for northern Nigeria:

$$\text{Fistula cases prevented} = \text{Prevented unintended births among high-risk groups} \times 0.3\text{--}0.5\%$$

4.5 Maternal deaths averted

Applies the Ahmed et al. (2012, The Lancet) finding that a 15-percentage-point increase in mCPR is associated with an approximate 25% reduction in maternal mortality, scaled to the state's confirmed Maternal Mortality Ratio (MMR):

$$\text{Maternal deaths averted} = [(\text{mCPR change} \div 15 \text{ percentage points}) \times 25\%] \times (\text{MMR} \times \text{live births in additional-user population})$$

4.6 Newborn deaths prevented

Applies Kozuki & Walker (2013), which found that births spaced at least 24 months apart are associated with 30–40% lower newborn mortality, applied to the subset of additional users adopting long-acting methods (implants/coils):

$$\text{Newborn deaths prevented} = \text{Births to additional LARC users} \times (30\text{--}40\% \times \text{baseline newborn mortality rate})$$

4.7 Commodity procurement gap and shipping

$$\text{Product cost (per commodity)} = \text{Unit shortfall} \times \text{Unit cost (USD)}$$

$$\text{Total funding gap} = (\sum \text{Product cost across commodities}) \times 1.20\text{--}1.25 [20\text{--}25\% \text{ freight/shipping allowance}]$$

4.8 Economic return on investment

Three empirically sourced return streams are summed per US\$1 invested:

$$\text{ROI (\$/\$1 invested)} = \$2.20 \text{ (avoided emergency care, Guttmacher 2017)} + \$0.90 \text{ (women's productivity gains, World Bank/Copenhagen Consensus 2014)} + \$0.50 \text{ (child outcomes, Bloom et al./USAID)} = \$3.60 \text{ per \$1 invested}$$

This ratio is applied to each state's total commodity funding gap to estimate annual combined economic return:

$$\text{Annual economic return} = \text{Total funding gap (US\$)} \times \$3.60$$

Per-woman-per-year cost is calculated as:

$$\text{Cost per woman per year} = \text{Total annual commodity funding requirement} \div \text{Total women of reproductive age served}$$

4.9 Budget execution rate

$$\text{Execution rate} = (\text{Funds released} \div \text{Funds budgeted}) \times 100\%$$

5. Limitations and Caveats

- All projection figures are planning estimates for advocacy purposes; they are not clinical predictions and should not be treated as precise forecasts.
- Formulas rely on published cross-country or regional coefficients (e.g., Ahmed et al. 2012; Kozuki & Walker 2013) applied to state-level baselines; local effect sizes may differ from the international literature.
- Unit costs and demand forecasts are drawn from each state's most recent quantification exercise and are subject to revision as new procurement data becomes available.

6. References

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