Using LiST to aid country planning in meeting mortality targets: a case study from Mali

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Background

The National Evaluation Platform (NEP) is a rigorous new approach to helping countries answer evaluation questions by compiling and analyzing health and nutrition data from diverse sources. The Government of Canada is funding the implementation of NEPs in Mali, Malawi, Mozambique, and Tanzania, to build local capacity to answer evaluation questions for maternal, newborn, and child health and nutrition (MNCH&N). In the first year of NEP implementation in Mali (2014), the country finalized its 10-year health strategy, the *Plan Décennal de Développement Sanitaire et Social* (PDDSS 2014-23), and its 5-year health plan, the *Programme de Développement Sanitaire et Social* (PRODESS 2014-18). Malian stakeholders asked NEP-Mali to assess whether the intervention coverage targets in the country's plans would allow Mali to achieve its MNCH mortality targets, and to assess the effectiveness of alternative intervention packages and targets in achieving those mortality targets.

Methods

Our analysis focused on the regions included in the 2012 Demographic and Health Survey (2012 DHS), which was the most recent source of coverage data: Kayes, Koulikoro, Sikasso, Segou, Mopti and Bamako district. We used LiST, which is a mathematical model that incorporates the best available data on intervention effectiveness to estimate the impact of changes in intervention coverage on mortality [1]. We estimated changes in maternal and under-five mortality rates under three scenarios, or "projections." The starting year for all projections was 2014 and the end year was 2023. Baseline coverage estimates were primarily drawn from the 2012 DHS [2]. We recalculated indicators using DHS data in order to match indicator definitions used in LiST. We also used WHO/UNICEF immunization coverage data [3] and under-five mortality estimates from the United Nations Interagency Group for Child Mortality Estimate (IGME) for 2013 [4]. We created three projections (***Table 1***): one based on the PRODESS/PDDSS coverage targets (PRODESS/PDDSS projection), one focused on reducing malnutrition (Projection 1), and one focused on curative interventions for childhood illness (Projection 2). We included interventions in Projection 1 and 2 based on their relevance and feasibility in the Malian context, and on their potential impact on MNCH&N.

Results

This poster shows estimated changes in maternal and child mortality rates at national level. If Mali were to achieve the MNCH&N coverage targets in its health strategy, under-five mortality would be reduced from 121 per 1000 live births to 93 per 1000 from 2013 to 2023, far from the target of 69 deaths per 1000. Projections 1 and 2 produced estimated mortality reductions from 121 deaths per 1000 to 70 and 68 deaths per 1000, respectively (***Figure 1***). The neonatal mortality rate would be reduced from 39 to 32 deaths per 1000 live births under the current health strategy, and to 25 per 1000 under Projections 1 and 2 (***Figure 2***). Neither the PRODESS/PDDSS projection nor Projections 1 or 2 would allow the maternal mortality target to be met by 2023 (***Figure 3***).

Table 1 *Baseline and endline coverage levels for each of the three projections at national level*

Interventions	2014 Baseline (%)	2023 Endline		
		Projection 1 target (%)	Projection 2 target (%)	PRODESS/PDDSS target (%)
Contraceptive prevalence	11	20	20	20
Antenatal care	41	55	50	65
Tetanus toxoid vaccination	42	80	80	
Pregnant women protected by ITN	73	90	90	
Iron Supplementation	22	30	30	
Malaria case management	0	5	5	
Skilled birth attendance	60	90	90	90
Health facility delivery	60	90	90	
BEmOC	9	30	35	9
Exclusive breastfeeding (0 – 1 month)	59	90	90	
Exclusive breastfeeding (1 – 5 month)	31	70	70	
Clean postnatal practices	16	30	30	
Vitamin A supplementation	61	70	80	
Zinc supplementation	0	4	4	
Improved water source	66	80	80	
Water connection in the home	9	10	10	
Utilization of latrines or toilets	24	30	30	30
Hand washing with soap	17	50	50	
Ownership of ITN	84	95	95	
DPT-three doses	74	98	98	98
HiB – three doses	74	98	98	98
HepB – three doses	74	98	98	98
Measles – single dose	72	98	98	98
BCG – single dose	87	98	98	
Rotavirus	0	20	20	
Pneumococcal – three doses	74	98	98	
Polio – three doses	81	98	98	
Thermal care	16	45	45	
Oral antibiotic for newborn	7	20	15	
Vitamin A for Measles treatment	61	70	70	
Newborn sepsis case management	27	55	55	
ORS – oral rehydration solution	37	50	60	
Antibiotic for treatment of dysentery	15	30	50	
Zinc – for treatment of diarrhea	2	30	20	
Oral antibiotic for pneumonia	27	40	50	
Artemisinin for malaria	15	40	50	
Stunting	38	8	15	15
Wasting	13	4	5	5

When a cell is empty it means that there is no target for that intervention in the projection
ITN: insecticide treated bednet, BEmOC: Basic Emergency Obstetric and Newborn Care, HepB: Hepatitis B vaccine, ORS: Oral Rehydration Solution, HiB: Hemophilus influenzae B.

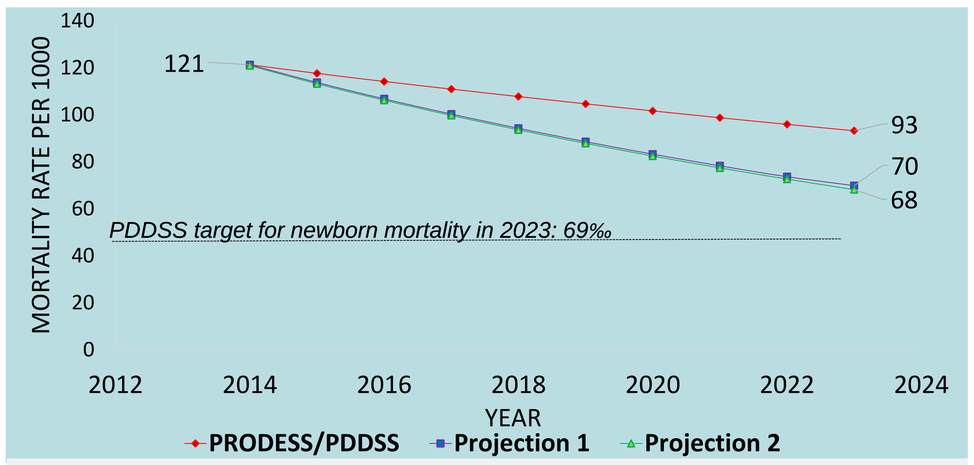

Figure 1. *Modeled under-5 mortality rate from 2014 to 2023 in Mali based on three LiST projections, 2015*

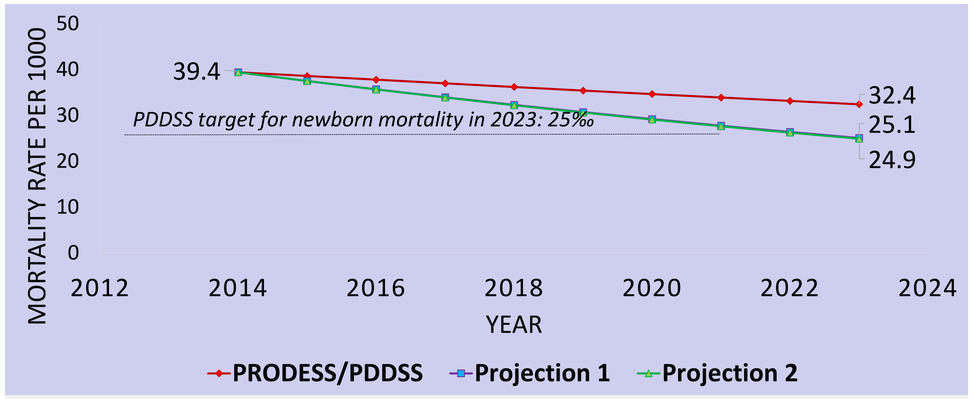

Figure 2. *Modeled neonatal mortality rate from 2014 to 2023 in Mali based on three LiST projections, 2015*

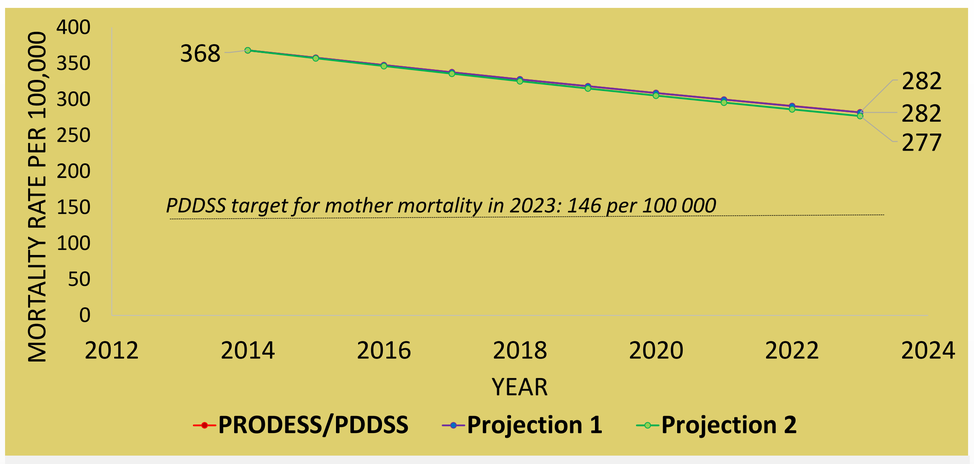

Figure 3. *Modeled maternal mortality ratio from 2014 to 2023 in Mali based on three LIST projections, 2015*

Discussion

Achieving the coverage targets for the MNCH&N interventions in the 2014-23 PDDSS and 2014-18 PRODESS would likely not allow Mali to achieve its mortality targets. A related finding is that many of the most effective child health interventions, including curative interventions and preventive interventions such as insecticide treated bednets and breastfeeding practices, were not included among the PRODESS or PDDSS targets. The NEP-Mali team identified two packages of MNCH&N interventions that achieved under-five and neonatal mortality rates at, or very near, the PDDSS targets. One package required very large reductions in malnutrition, while the other paired modest increases in coverage of curative and childbirth interventions with more moderate reductions in malnutrition. None of the projections produced by NEP-Mali led to reductions in maternal mortality large enough to achieve the PDDSS target. This highlights the need for larger increases in maternal health interventions and strategies to achieve those increases. The analysis did not address the inputs and processes needed to achieve the coverage targets, although the NEP working group, which included epidemiologists, nutritionists, and public health doctors, tried to select targets that it deemed achievable.

Conclusions

This study used the Lives Saved Tool (LiST) to conduct a prospective analysis of the effects of various intervention packages on maternal, neonatal, and under-5 mortality in Mali, from 2014 to 2023. The Malian Ministry of Health and Public Hygiene indicated that they plan to use the results of the analysis to revise the coverage and mortality targets in its plans and strategies. This analysis provides an example of how LiST can be used to facilitate evidence-based planning in countries to improve the health of women and children.

References

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