

Counting indirect maternal and newborn deaths resulting from a humanitarian crisis

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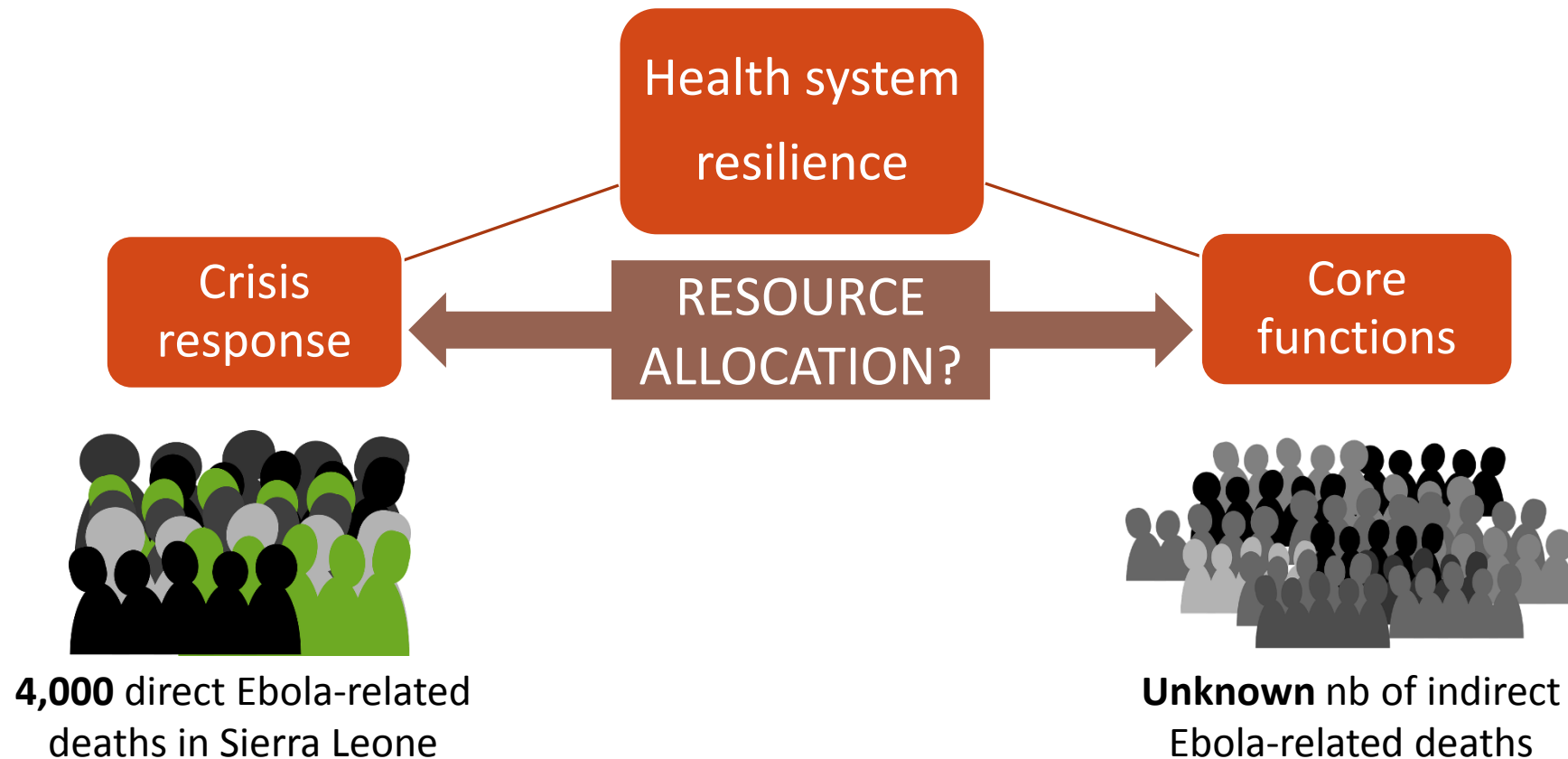
Context of the study

Mixed methods rapid assessment of the impact of EVD on RMNCH in Sierra Leone (Dec 2014 to Jan 2015). PI Dr Sara Nam

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Update of findings with support from Dr Amos Channon, University of Southampton

Why count indirect deaths in a humanitarian crisis?



Approach

1. Quantify drop in utilisation of health services by using interrupted time-series regression to analyse HMIS data
2. Convert this drop in utilisation to changes in population coverage of key interventions using recent DHS data
3. Model mortality impact of changes in coverage of key interventions using the Lives Saved Tool

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Decrease in health service utilisation

HMIS data: April 2011 to December 2014, by month, by health service, by district. Primary health facilities only. Start of the outbreak set as June 2014.

Six services:

1. Family planning visits
2. ANC 4
3. 2nd Tetanus Toxoid vaccination
4. 2nd IPT dose (malaria prevention)
5. Facility delivery
6. Mother's PNC

Analysis: segmented linear regression with month-year and district fixed effects; controlling for rain; clustered standard errors; dummies for outliers.

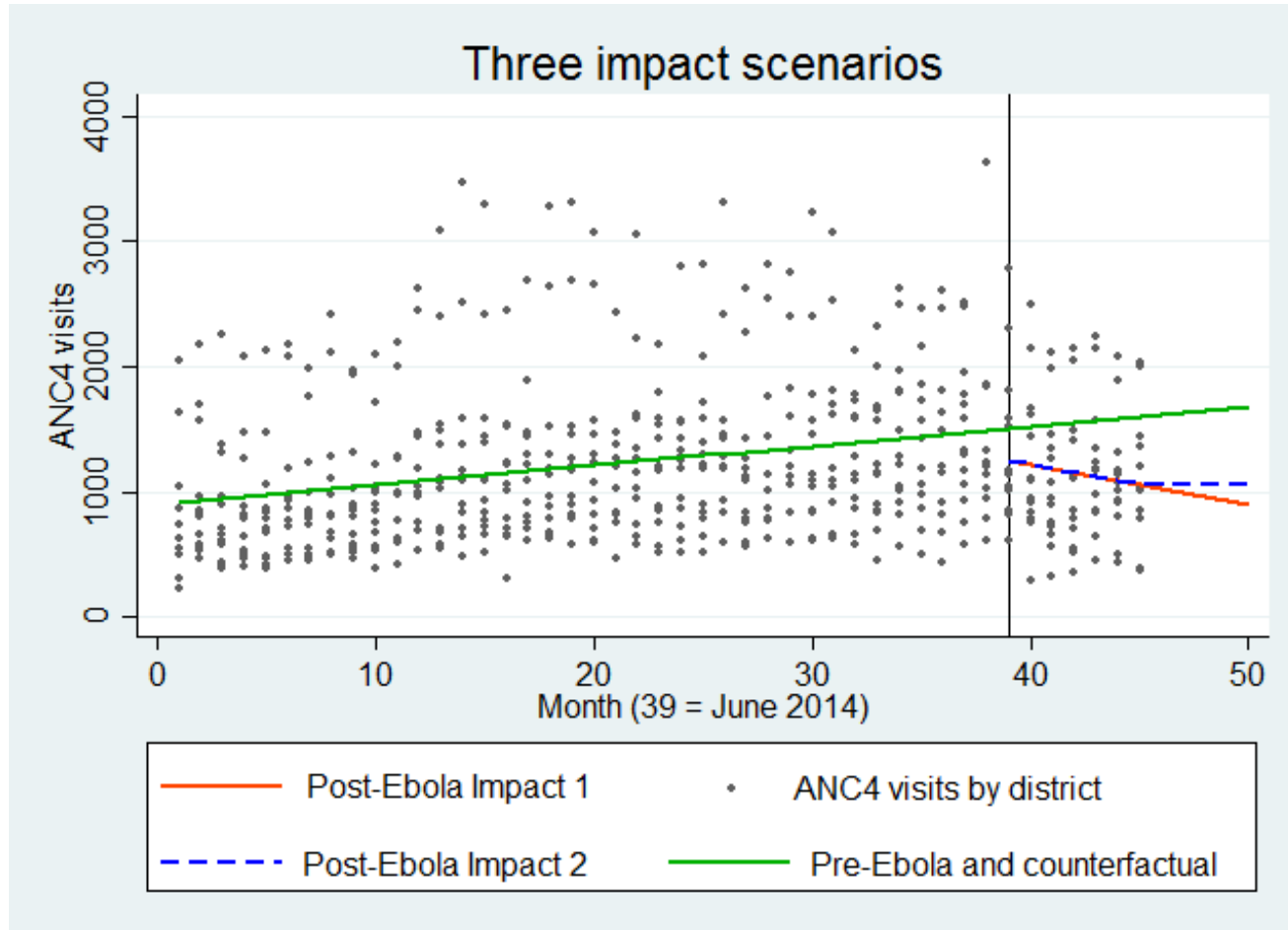
Decrease in health service utilisation

	Average # clients per district per month		Post-Ebola change (expressed in terms of pre-Ebola monthly progress)	
	March 2011	April 2011-May 2014: additional clients per month	June 2014: one-off drop	June 2014 – Dec 2014: Monthly trend post- ebola
FP clients	2,232 clients	86 clients	-14 months**	-0.6 months*
ANC4	906 clients	15 clients	-13 months***	-2.1 months***
TT2	1,006 clients	6 clients	-26 months***	-1.8 months
IPT2	811 clients	15 clients	-16 months**	-0.7 months*
Delivery	973 clients	9 clients	-8 months**	-2.3 months***
PNC	846 clients	12 clients	-8 months**	-1.8 months***

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Summarising change in utilisation



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Baseline utilisation: average number of clients at district level, June 2012 – May 2013

Impact utilisation: average number of clients at district level, June 2014 – May 2015

1. Impact 1 scenario: Utilisation decreases as observed, June-Dec 2014, and continues to decline until May 2015
2. Impact 2 scenario: Utilisation decreases as observed, June-Dec 2014, and stays at Dec 2014 level until May 2015
3. Counterfactual: Utilisation continues to progress according to pre-Ebola trend

Converting utilisation to coverage

1. Estimate % change in utilisation between:
 - i. Baseline utilisation vs. Impact 1 utilisation
 - ii. Baseline utilisation vs. Impact 2 utilisation
 - iii. Baseline utilisation vs. Counterfactual utilisation
2. Define baseline population coverage
 - Obtained from DHS
 - Average % of pregnant women who accessed the six services
 - June 2012 - May 2013
3. Apply % change from Step 1 to baseline population coverage, to obtain:
 - i. Impact 1 population coverage (June 2014 – May 2015)
 - ii. Impact 2 population coverage (June 2014 – May 2015)
 - iii. Counterfactual population coverage (June 2014 – May 2015)

Decrease in population coverage

	June 2012 to May 2013*	June 2014 to May 2015			Decrease in coverage
	2013 DHS estimates	Impact 1	Impact 2	Counterfactual	= [impact 2 – counterfactual]
	<i>% of population in need accessing key health services</i>				
FP clients	22.1	17.1	17.3	25.7	-8.4
ANC4	74.2	64.8	67.2	95.5	-28.3
TT2	86.0	76.6	77.6	95.6	-18.0
IPT2	71.6	68.0	68.9	93.6	-24.8
Delivery	57.4	54.4	55.7	67.4	-11.8
PNC	68.3	66.0	67.7	85.8	-18.1

*Except FP clients: June 2013 - October 2013

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Modelled mortality impact

Create a Lives Saved Tool projection for each scenario

Input population coverage values for 2012-13 and 2014-15, for each health service, within each scenario

	Excess deaths	
	=[Impact 1 – counterfactual]	=[Impact 2 – counterfactual]
Maternal deaths	714	710
Neonatal deaths	3,023	2,791
Stillbirths	1,230	1,169
TOTAL	4,967	4,670

Discussion

Indirect maternal and newborn deaths as least as high as direct deaths

Roll-back of significant progress made between 2008 and 2013

Differential effect for hospitals? Long-term effects?

To what extent is deterioration of HMIS during the outbreak a concern?

- Researcher-collected quantitative data corroborates fall in utilisation (Ribacke et al 2016, Jones and Ameh 2015)
- Triangulation from qualitative data
- December 2014 study on Sierra Leone HMIS suggests that among districts with any reporting, % of facilities reporting remains high throughout the outbreak.