Mwencha M, Rosen JE, Spisak C, Watson N, Kisoka N, Mberesero H. Upgrading supply chain management systems to improve availability of medicines in Tanzania: evaluation of performance and cost effects. *Glob Health Sci Pract*. 2017;5(3). https://doi.org/10.9745/GHSP-D-16-00395

SUPPLEMENT 3. Methodology for Sensitivity Analysis

We identified the throughput, cost, and performance parameters holding a substantial degree of uncertainty (see Table, next page). For each parameter, we assumed an underlying normal distribution of possible values. We defined our base case assumption as the mean of this distribution and assigned a standard deviation, minimum, and maximum based on either (1) a reasonable notion of the range of possible values that the parameter might take, or (2) on the 95% confidence interval for the sample parameter distribution. Next, for the baseline and round 1 values, we allowed each of these parameters, simultaneously, to vary randomly; each time calculating a total cost, total throughput, performance, and associated cost and cost-effectiveness measures. We repeated this procedure 10,000 times and derived a mean, standard deviation, and 95% confidence intervals for cost and cost-effectiveness measures.

Mwencha M, Rosen JE, Spisak C, Watson N, Kisoka N, Mberesero H. Upgrading supply chain management systems to improve availability of medicines in Tanzania: evaluation of performance and cost effects. *Glob Health Sci Pract*. 2017;5(3). https://doi.org/10.9745/GHSP-D-16-00395

TABLE. Throughput and Cost Parameters Used in the Sensitivity Analysis (US\$)

Dispensary 12.00 31.24 9.60 14.40	Parameter	Mean (base)	SD	Minimum	Maximum
Dispensary 12.00 31.24 9.60 14.40	Storage cost	•	1.00	5.00	10.00
Health center 20.00 35.53 12.40 27.60 District hospital 56.00 62.15 14.56 97.44 SDP storage space estimates, round 1 (m²)					
Health center 20.00 35.53 12.40 27.60 District hospital 56.00 62.15 14.56 97.44 SDP storage space estimates, round 1 (m²)		12.00	31.24	9.60	14.40
Dispensary		20.00	35.53	12.40	27.60
Dispensary	District hospital	56.00	62.15	14.56	97.44
Health center 20.00 16.48 14.20 25.80	SDP storage space estimates, round 1 (m²)				
District hospital 132.00 21.07 108.24 155.7	Dispensary	12.00	13.71	10.56	13.44
Supply chain performance Stock-out rate, baseline EPI baseline performance 23% 45% 18% 27% HIV baseline performance 27% 45% 25% 30% Other ILS baseline performance 40% 49% 38% 42% Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1 47% 30% 35% HIV round 1 performance 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs Sample mean Sample SD 95% CI 95% CI acosts, baseline 35% CI 35% CI 35% CI 35% CI 35% CI costs, round 1 35% CI 35% CI 35% CI 3	Health center	20.00	16.48	14.20	25.80
Stock-out rate, baseline 23% 45% 18% 27% HIV baseline performance 27% 45% 25% 30% Other ILS baseline performance 40% 49% 38% 42% Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs Sample mean Sample SD 95% CI 95% CI All surveyed SPP, district, and regional costs, baseline Sample mean Sample SD 95% CI 95% CI costs, baseline Sample mean Sample SD 95% CI 95% CI 95% CI costs, round 1 Mean SD Min value as Max value	District hospital	132.00	21.07	108.24	155.76
EPI baseline performance 23% 45% 18% 27% MIV baseline performance 27% 45% 25% 30% Other ILS baseline performance 40% 49% 38% 42% Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1	Supply chain performance				
HIV baseline performance 27% 45% 25% 30% Other ILS baseline performance 40% 49% 38% 42% Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1 HIV round 1 performance 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean SD Min value as Max value value value value	Stock-out rate, baseline				
Other ILS baseline performance 40% 49% 38% 42% Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1 HIV round 1 performance 19% 39% 17% 21% 25% Malaria round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline Sample mean Sample SD 95% CI around mean around mean around mean around 1 mean around mea	EPI baseline performance	23%	45%	18%	27%
Malaria baseline performance 39% 49% 37% 41% Family planning baseline performance 32% 47% 30% 35% Stock-out rate, round 1 HIV round 1 performance 19% 39% 17% 21% 25% Malaria round 1 performance 23% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean SD Min value as % of base value walue	HIV baseline performance	27%	45%	25%	30%
Family planning baseline performance Stock-out rate, round 1 HIV round 1 performance 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean SD Min value as % of base value Value	Other ILS baseline performance	40%	49%	38%	42%
Stock-out rate, round 1 HIV round 1 performance 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean SD Min value as % of base value value	Malaria baseline performance	39%	49%	37%	41%
HIV round 1 performance 19% 39% 17% 21% Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% Family planning round 1 performance 25% 43% 23% 27% SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean SD Min value as % of base value value Max value Note 19% 029% 029% 029% 029% 029% 029% 029% 02	Family planning baseline performance	32%	47%	30%	35%
Other ILS round 1 performance 23% 42% 21% 25% Malaria round 1 performance 22% 42% 20% 24% 50% 24% 50P, district, and regional costs All surveyed SPD, district, and regional costs, baseline Sample mean Sample SD 95% CI around mean around mean costs, round 1 Mean SD Min value as % of base value value value	Stock-out rate, round 1				
Malaria round 1 performance Earnily planning round 1 performance Ear	HIV round 1 performance	19%	39%	17%	21%
Family planning round 1 performance SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean Sample SD 95% CI around mean	Other ILS round 1 performance	23%	42%	21%	25%
SDP, district, and regional costs All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Sample mean Sample SD 95% CI around mean walue walue value value	Malaria round 1 performance	22%	42%	20%	24%
All surveyed SPD, district, and regional costs, baseline All surveyed SDP, district, and regional costs, round 1 Sample mean Sample SD 95% CI around mean walue value value	Family planning round 1 performance	25%	43%	23%	27%
costs, baseline All surveyed SDP, district, and regional costs, round 1 Mean Sample mean Sample SD 95% CI around mean aro	SDP, district, and regional costs				
All surveyed SDP, district, and regional costs, round 1 Sample mean Sample SD 95% CI around mean around mean around mean SD Min value as % of base value value value	All surveyed SPD, district, and regional	Sample mean	Sample SD	95% CI	95% CI
costs, round 1 Mean SD Min value as % of base value value value	costs, baseline			around mean	around mean
Mean SD Min value as Max value % of base % of base value value	All surveyed SDP, district, and regional	Sample mean	Sample SD	95% CI	95% CI
% of base % of base value value	costs, round 1			around mean	around mean
value value		Mean	SD	Min value as	Max value as
				% of base	% of base
Throughput value 0% 4% -10% 10%				value	value
11110ugnput value 0/0 4/0 -10/0 10/0	Throughput value	0%	4%	-10%	10%

Abbreviations: CI, confidence interval; EPI, Expanded Programme on Immunization; ILS, integrated logistics system; SD, standard deviation; SDP, service delivery point.