Supplemental File 2: One-way sensitivity analyses

As described in the main text, all of the parameters included in the tornado diagrams were further examined through one-way sensitivity analyses. Together, these parameters represent the most parsimonious combination of parameters that account for at least 95% of the variation in the expected costs and at least 95% of the variation in the expected number of cases for both interventions. Figures 1–3 graphically display the results of the one-way sensitivity analyses, and Table 1 shows the numerical inputs for these figures. In both the figures and tables, the indicators are grouped by the decision tree outcomes they affect.

Two parameters were identified for sensitivity analysis that affect only the IRS portion of the IRS + ITN combination intervention: the number of IRS rounds required and the costs of insecticides for IRS. Their analyses appear in Figure 1. Increasing the value of either of these parameters leads to a linear positive increase in the expected costs per person in the target population in the IRS + ITN intervention, but it does not affect the expected number of cases in either intervention. Since these parameters effect only the costs of the IRS + ITN intervention, increasing the value of these parameters increases the expected cost per case averted in the target population.

Five parameters that affect the ITN portion of both interventions were included in the sensitivity analyses: the cost of ITNs, the cost of administrative labor for ITNs, the cost of ITN distributors' labor, the cost of information, education, and communication (IEC) campaigns for ITNs, and the number of people covered by a single ITN. Their analyses appear in Figure 1. For each of these parameters, varying their value produces parallel effects on the costs of both interventions. Increasing the number of people sleeping under a single ITN decreases the cost of both interventions at the same decreasing rate of decline; increasing the value any of the four

other parameters in this figure drives a parallel linear increase in the costs in both interventions. None of these parameters affect the expected number of cases. Since changes in these parameters drive the costs to vary at the same rate for both interventions and do not change their expected case outcomes, none of these parameters affect the cost-effectiveness of the IRS + ITN intervention compared to the ITN-only intervention.

Three probability parameters were examined through one-way sensitivity analyses: the prevalence of ITN use, the prevalence of parasitemia, and the probability of a person infected with the malaria parasite developing symptoms. Their analyses appear in Figure 3. In a similar fashion to the ITN parameters shown in Figure 2, increasing the prevalence of ITN use increases the cost of both interventions in parallel. It also decreases the number of cases expected in both interventions, but due to the additional protective effect of combining IRS and ITNs, the number of expected cases declines more steeply for the IRS + ITN intervention than for the ITN-only intervention. The expected cost per case averted by the IRS + ITN intervention therefore decreases as ITN coverage increases.

The prevalence of parasitemia and the probability of developing malaria symptoms affect the outcomes in similar ways, though the probability of developing malaria symptoms produces larger effects. As the values of these parameters increase, the expected cost of each intervention increases, with a higher rate of increase in the ITN-only intervention. Also, the expected number of cases in each intervention increases, with a higher rate of increase in the ITN-only intervention. These two trends combine so that increasing the prevalence of parasitemia or the probability of developing symptoms after infection decreases the cost per case averted by the IRS + ITN intervention, with a declining rate of decrease as the parameter values approach their maximum value.

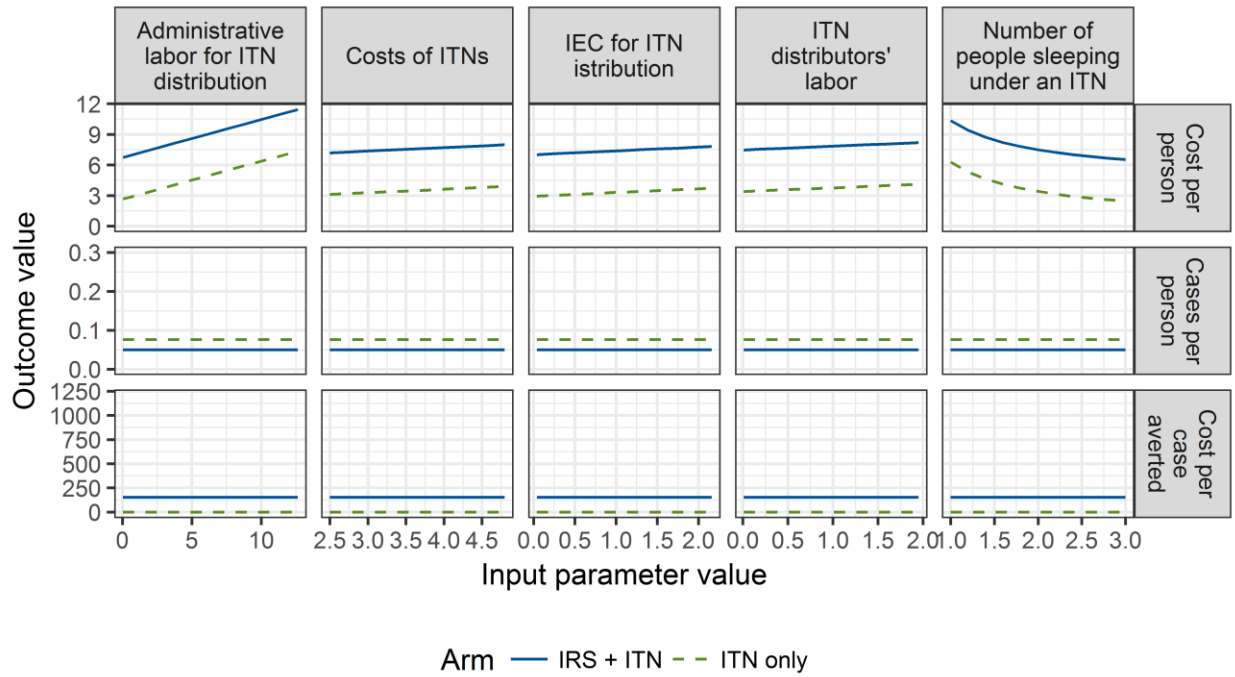**Figure 1: One-way sensitivity analyses of parameters affecting IRS costs (2011 USD)**

Figure 2: One-way sensitivity analyses of parameters affecting ITN costs (2011 USD)
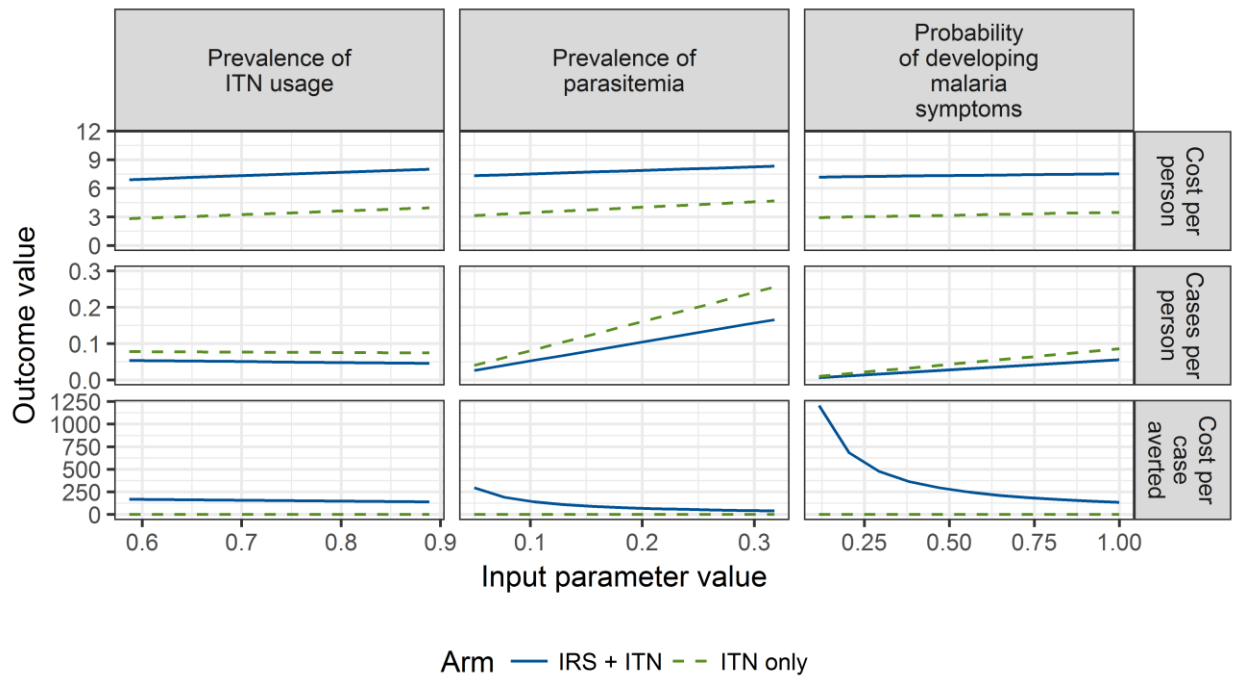
Figure 3: One-way sensitivity analyses of probability parameters (2011 USD)
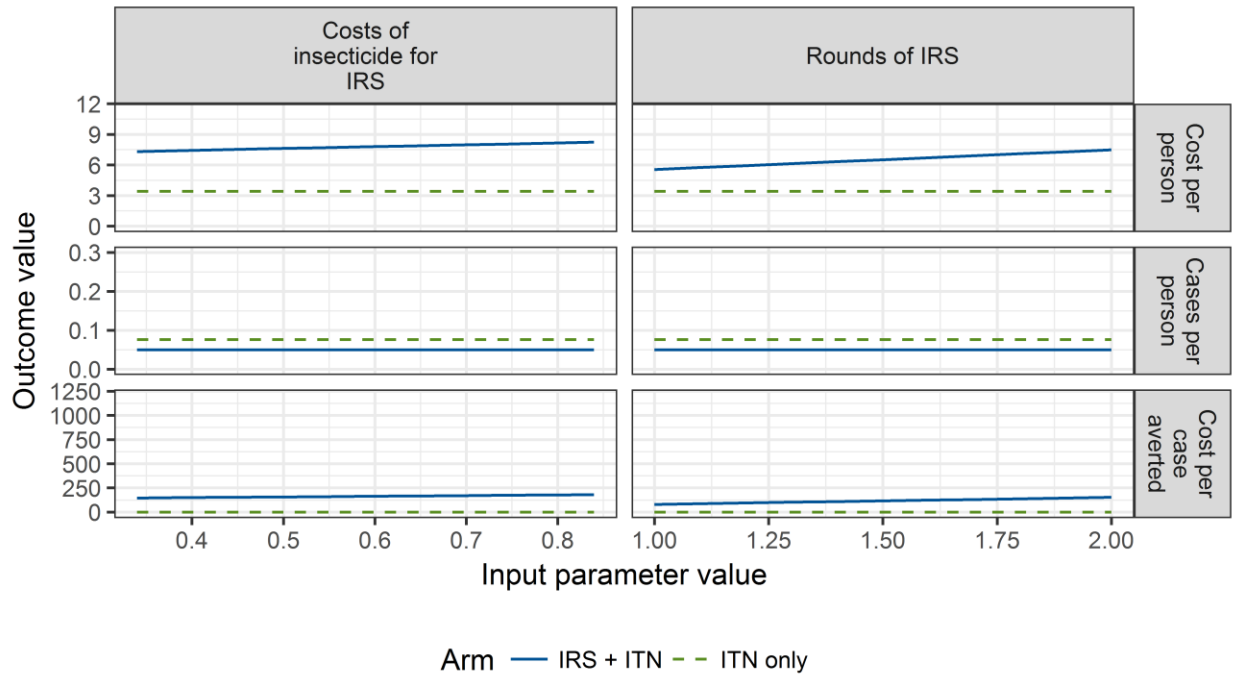
Table 1: Sensitivity analysis outcomes (2011 USD)

Parameter	Expected cost per person in target population				Expected cases per person in target population				Expected cost per case averted in target population	
	IRS + ITN		ITN only		IRS + ITN		ITN only		IRS + ITN	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Parameters affecting IRS costs										
Rounds of IRS required	$5.55	$7.49	$3.41	$3.41	0.076	0.076	0.05	0.05	$80.18	$152.36
Cost of insecticides	$7.32	$8.23	$3.41	$3.41	0.076	0.076	0.05	0.05	$146.26	$180.15
Parameters affecting ITN costs										
Cost of an ITN	$7.19	$7.98	$3.11	$3.90	0.076	0.076	0.05	0.05	$152.36	$152.36
Cost of ITN distributors' labor	$7.47	$8.20	$3.39	$4.11	0.076	0.076	0.05	0.05	$152.36	$152.36
Cost of IEC for ITNs	$7.02	$7.81	$2.94	$3.73	0.076	0.076	0.05	0.05	$152.36	$152.36
Cost of administrative labor	$6.70	$11.40	$2.70	$7.40	0.076	0.076	0.05	0.05	$152.36	$152.36
Number of people covered by a single ITN	$6.53	$10.35	$2.45	$6.27	0.076	0.076	0.05	0.05	$152.36	$152.36
Prevalence of ITN use	$6.91	$8.01	$2.81	$3.95	0.046	0.054	0.075	0.078	$140.20	$168.24
Probability parameters										
Prevalence of parasitemia	$7.32	$8.32	$3.15	$4.68	0.026	0.166	0.04	0.256	$40.53	$295.89
Probability of developing symptoms	$7.18	$7.53	$2.93	$3.47	0.007	0.056	0.01	0.086	$134.82	$1,205.98