2017 GiveWell cost-effectiveness analysis (CEA) — Version 3
Release notes

Summary

In this update, we moved content that was found in the tab titled *Intensity of worms* to an external workbook. In this workbook, we revised the structure of our worm intensity data to make it easier to engage with. We also updated aspects of this workbook, including the past treatments and planned treatments for Deworm the World, SCI, and Sightsavers.

Additionally, we moved three parameters from the *Parameters* tab to the *Deworming* tab. As a part of this change, the user-contributed values for these parameters were replaced with default input values. The table below shows how the median results of our model came out after these changes:

Charity	Median *[charity]* vs. cash[1] before	Median *[charity]* vs. cash after	Percentage change
AMF	3.8x	3.8x	-1.1%
Deworm the World	8.9x	11.9x	33.3%
Malaria Consortium	3.3x	3.3x	0.0%
SCI	6.6x	5.0x	-23.9%
Sightsavers	4.3x	3.7x	-14.1%

Change 1: Moved the *Average number of years between deworming and the beginning of long-term benefits* input off of the *Parameters* tab.

What changed? The *Average number of years between deworming and the beginning of long-term benefits* input was moved from the *Parameters* tab to the *Deworming* tab. By default we set the value of this parameter to "8".

Why did we make this change? We want to minimize the number of items on the *Parameters* tab to encourage engagement with our CEA. Since this input is not especially uncertain or subjective in nature, we thought it was worthwhile to move it to the *Deworming* tab.

[1] The tables in this document list "*[charity]* vs. cash" metrics. These metrics capture how cost-effective we expect a charity is relative to GiveDirectly. For example, if we listed AMF as 2x cash, that would indicate that our model suggests a dollar spent by AMF accomplishes twice as much good as a dollar spent by GiveDirectly.

How does the change affect the results? This change affected our model's results for both deworming charities and charities that carry out malaria control interventions. In our model, the development benefits conferred by malaria control interventions are estimated indirectly through our deworming cost-effectiveness model.[2]

Charity	Median *[charity]* vs. cash before	Median *[charity]* vs. cash after	Percentage change
AMF	3.8x	3.8x	-1.1%
Deworm the World	8.9x	8.9x	-0.7%
Malaria Consortium	3.3x	3.3x	0.0%
SCI	6.6x	6.6x	0.0%
Sightsavers	4.3x	4.1x	-5.3%

Change 2: Moved the *Proportion of deworming going to children* inputs off of the *Parameters* tab.

What changed? We moved the *Proportion of deworming going to children* parameter for SCI, Deworm the World, and Sightsavers from the *Parameters* tab to the *Deworming* tab. The parameter was set to a default value of 100% for Deworm the World and 85.35% for SCI and Sightsavers.

Why did we make this change? We want to minimize the number of items on the *Parameters* tab to encourage engagement with our CEA. Since these inputs are not especially uncertain or subjective in nature, we thought it was worthwhile to move them to the *Deworming* tab.

How does the change affect the results?

Charity	Median *[charity]* vs. cash before	Median *[charity]* vs. cash after	Percentage change
Deworm the World	8.9x	9.3x	5.2%
SCI	6.6x	6.6x	0.0%
Sightsavers	4.1x	4.0x	-2.6%

Change 3: Moved the *Intensity of worms* tab to an external workbook with a new structure
What changed? In past versions of the CEA, we have included a tab titled *Intensity of Worms.* On this tab, we would calculate adjustments that could be used to account for the fact that worm

[2] While the median value for *Malaria Consortium vs. cash* was unchanged, some individuals' values for the metric shifted.

burdens are different in the contexts of our charities' programs than they were in the contexts of Baird et al. 2016, the study we draw on to estimate the long-term benefits of deworming (https://doi.org/10.1093/qje/qjw022).

In this update, we moved the content found in the *Intensity of Worms* tab to an external workbook. This change involved significant alterations to the content's structure. Content that used to be found in a single spreadsheet tab is now spread across three.

Why did we make this change?
The worm intensity adjustment plays a major role in our model. We wanted to structure this content in a manner that would be easy for individuals to understand and simple for staff at GiveWell to maintain.

How does this change affect the results?
The structural changes were purely presentational. Further changes to the content of the worm intensity workbook (detailed later in this document) affected the results of our model.

Change 4: Updated schistosomiasis data in the *Worm Intensity* workbook

What changed? We added a column to the *Worm Intensity* workbook to display the prevalence and intensity of *Schistosomiasis haematobium*.

In a small number of regions (Malawi, Zambia, Liberia, and Kenya), we had previously added the prevalence of *Schistosomiasis mansoni* and *Schistosomiasis haematobium* to form the final schistosomiasis prevalence figure for those regions. We were inconsistent in our approach to this in the past and are now making the figures consistent across countries.

Why did we make this change? We want information about the prevalence and intensity of *Schistosomiasis haematobium* in the contexts of our charities' programs to be easily accessible. However, we don't think rates of infection with *Schistosomiasis haematobium* in areas where our top charities work can be productively compared with the baseline data from the Baird et al. 2016 study. Although Baird et al. 2016's study population had some level of *Schistosomiasis haematobium* infections, no data about *Schistosomiasis haematobium* infection levels were collected at baseline. As a result, a rigorous quantitative comparison between *Schistosomiasis haematobium* in our charities programs and Baird's study population is not possible.

How does this change affect the results? In the previous version of the CEA, the values used for the worm intensity adjustments were user-selected. In that version, changes to our worm intensity data would lead to new suggested input values, but would not directly determine user-selected values. As a part of this CEA release, we changed the worm intensity adjustments to use a single default value rather than a user-selected value.

In this set of release notes, we track how changes to the *Worm Intensity* workbook alter the average prevalence and intensity estimates for each charity and worm species. The final entry in these notes provides information on how all of the changes to the *Worm Intensity* workbook combined with the move away from user-selected intensity adjustments alters our bottom line cost-effectiveness estimates.

Deworm the World:

	Weighted average before change	Weighted average after change	Percentage change
S. mansoni (prevalence)	0.4%	0.2%	-53.0%

SCI:

SCI	Weighted average before change	Weighted average after change	Percentage change
S. mansoni (prevalence)	10.4%	8.5%	-18.4%

Change 5: Accounting for Deworm the World's spending when assigning weights to different program areas

What changed? When calculating our *worm intensity adjustment*, we assign weights to different areas where Deworm the World operates. In the past, we assigned weights based on the number of treatments Deworm the World had conducted in each area. In this update, we refined the process of assigning weights. Now weights are assigned based on a combination of (a) the number of treatments Deworm the World was involved in and (b) the proportion of the overall treatment costs covered by Deworm the World.

Why did we make this change? In India, Deworm the World pays for a minority of the total costs of deworming treatments. On the other hand, Deworm the World pays most of the costs of deworming treatments in Kenya. We think it's appropriate for each treatment in Kenya to receive greater weight as a result.

How does the change affect the results? Here we first show changes in the estimates of average intensity and prevalence for each parasite and then changes in a couple of illustrative values that could be used for the *worm intensity adjustment* parameter, which compares infection levels in areas where our top charities work to infection levels in areas where the study described in Miguel and Kremer 2004 and Baird et al. 2016 was carried out.

Deworm the World:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG[3])	1,425	1,457	2.3%
Hookworm (EPG)	115	112	-3.3%
Trichuris (EPG)	10	13	20.1%
S. Mansoni (EPG)	2	3	58.9%
Ascaris (Prevalence)	35.4%	35.8%	1.2%
Hookworm (Prevalence)	24.4%	25.5%	4.5%
Trichuris (Prevalence)	3.5%	3.9%	12.5%
S. Mansoni (Prevalence)	0.2%	0.3%	78.0%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
14.5%	14.6%	0.7%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
24.1%	24.8%	3.0%

Change 6: Incorporated Lo et al's model to estimate worm intensity levels in areas where only prevalence data was available

What changed? Lo et al. 2016 (http://dx.doi.org/10.1016/S1473-3099(16)30073-1) presents a model of worm infection dynamics that makes it possible to estimate infection intensity in treatment-naive areas based on infection prevalence levels. We incorporated this model to estimate worm infection intensity in areas where we did not have direct measurements of intensity.

Why did we make this change? We believe that infection intensity is more closely related to disease morbidity than infection prevalence. While we have some uncertainties about how well this model's estimates match the true intensity levels in our charities' programs, we believe that

[3]EPG stands for "eggs per gram."

incorporating this model increases the reliability of our recommended worm intensity adjustments.

How does the change affect the results? Here we first show changes in the estimates of average intensity and prevalence for each parasite and then changes in a couple of illustrative values that could be used for the *worm intensity adjustment* parameter, which compares infection levels in areas where our top charities work to areas where the Miguel and Kremer 2004 study was carried out.

Deworm the World:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG)	1,457	1,338	-8.2%
Hookworm (EPG)	112	77	-30.8%
Trichuris (EPG)	13	9	-31.1%
S. Mansoni (EPG)	3	2	-32.0%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
14.6%	10.1%	-30.9%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
24.8%	20.7%	-16.7%

<u>Change 7: Changed the planned and past treatment numbers</u>

What changed? We updated the planned and past treatment numbers used for Deworm the World, SCI, and Sightsavers. These numbers are used to determine how much weight is given to each country when calculating the suggested worm intensity adjustments. We also began following a new principle for determining how many years of data to include in the treatment numbers we rely on. Going forward, we plan to include treatments from whichever of the following covers a smaller time frame: (a) all the years we have treatment data from or (b) the three most recent years covered by our treatment data. In addition, we may project treatment numbers for up to three years in the future.

Why did we make this change? We want our CEA to make use of the most up-to-date data, and we had received new information about treatment numbers from our recommended deworming charities. We implemented the new principle about which years of treatment data to include to promote consistency between our models for different deworming charities. We were worried that we may have been inconsistent between organizations, and we wanted to ensure that our estimates reflected a reasonable guess as to how funding would be used in the future (by using, as an approximation, recent treatment numbers and stated future plans).

How does the change affect the results? For Deworm the World and SCI, we first show changes in the estimates of average intensity and prevalence for each parasite and then changes in a couple of illustrative values that CEA contributors may choose for the *worm intensity adjustment* parameter, which compares infection levels in areas where our top charities work to areas where the Miguel and Kremer 2004 study was carried out.

Deworm the World:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG)	1,338	1,557	16.4%
Hookworm (EPG)	77	65	-17.6%
Trichuris (EPG)	9	9	4.2%
S. Mansoni (EPG)	2	2	27.6%
Ascaris (Prevalence)	35.8%	33.4%	-6.7%
Hookworm (Prevalence)	25.5%	22.6%	-11.2%
Trichuris (Prevalence)	3.9%	3.7%	-5.9%
S. Mansoni (Prevalence)	0.3%	0.4%	27.6%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
10.1%	8.9%	-11.2%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
20.7%	22.5%	8.9%

SCI:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG)	251	237	-5.6%
Hookworm (EPG)	12	13	5.0%
Trichuris (EPG)	19	18	-3.7%
S. Mansoni (EPG)	17	16	-2.4%
Ascaris (Prevalence)	3.1%	3.0%	-3.9%
Hookworm (Prevalence)	6.5%	6.9%	5.1%
Trichuris (Prevalence)	4.0%	3.9%	-3.0%
S. Mansoni (Prevalence)	8.5%	8.3%	-1.9%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
10.7%	10.5%	-1.4%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
10.9%	10.6%	-3.0%

Sightsavers:

	Weighted average before change	Weighted average after change	Percentage change
Prevalence of any STH	20.3%	20.5%	0.9%
Prevalence of any Schistosomiasis	22.1%	21.3%	-3.8%

Change 8: Corrections to worm intensity figures and sourcing issues

What changed? In the course of adjusting and restructuring the worm intensity data used in the CEA, we encountered a few issues with the data we had been relying on:

- In our data from Ethiopia, we erroneously used a prevalence figure for *Ascaris* in place of a prevalence figure for *Trichuris* and visa versa.
- In our data from Zambia, we used schistosomiasis prevalence and intensity figures from a subsample of the surveyed population when we should have used figures from the full sample.
- In Delhi, we cited a data source that only provided prevalence information. We are unsure where the intensity data we had been relying on was sourced from. We now use the previously discussed model from Lo et al. 2016 to estimate worm intensity in Delhi.

Why did we make this change? Two of the corrected issues were data errors. Being able to trace data used in our CEA to its original source is important to us, and we didn't want to rely on data from Delhi that we do not know the origin of.

How did this change affect the results?

Deworm the World:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG)	1,557	1,554	-0.2%
Hookworm (EPG)	65	65	0.0%
Trichuris (EPG)	9	9	0.5%
S. Mansoni (EPG)	2	2	0.0%
Ascaris (Prevalence)	33.4%	33.4%	0.0%
Hookworm (Prevalence)	22.6%	22.6%	0.0%
Trichuris (Prevalence)	3.7%	3.7%	0.0%
S. Mansoni (Prevalence)	0.4%	0.4%	0.0%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
8.9%	8.9%	0.0%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
22.5%	22.5%	-0.1%

SCI:

	Weighted average before change	Weighted average after change	Percentage change
Ascaris (EPG)	237	237	0.0%
Hookworm (EPG)	13	13	0.0%
Trichuris (EPG)	18	18	0.0%
S. Mansoni (EPG)	16	16	0.7%
Ascaris (Prevalence)	3.0%	4.6%	56.3%
Hookworm (Prevalence)	6.9%	6.9%	0.0%
Trichuris (Prevalence)	3.9%	2.2%	-42.8%
S. Mansoni (Prevalence)	8.3%	8.4%	0.1%

Intensity of infection relative to Miguel and Kremer 2004 (average of ratios)

- *Schistosomiasis mansoni* and hookworm:

Before	After	Percent change
10.5%	10.6%	0.6%

- *Schistosomiasis mansoni*, hookworm, whipworm, and *Ascaris*:

Before	After	Percent change
10.6%	10.6%	0.3%

Change 9: Added *Custom adjustment* tab

What changed? We added an additional tab to the *Worm intensity* spreadsheet that allows individuals to calculate custom adjustments based on weights users assign to each worm species.

Why did we make this change? Infections from different species of helminths are known to have different clinical effects. Individuals may expect that certain species of worms were more likely than others to have contributed to the treatment effect observed in Baird et al. 2016. In the future, we aim to provide more information from clinical research or other sources that could inform these weights.

How does the change affect the results? All else equal, cost-effectiveness is unchanged. However, this new tab was used to to calculate new values for the worm intensity adjustments (discussed below).

Change 10: Updated input values for the worm intensity adjustments

What changed? We removed the worm intensity adjustments from the *Parameters* tab and now use a single default adjustment value for each deworming charity. The default adjustment values are calculated by giving 40% of the overall weight to *Schistosomiasis mansoni*, 30% of the overall weight to hookworm, and 15% of the overall weight to each of *Ascaris* and *Trichuris*. Since we have had limited data on the prevalence and intensity of worm infections in areas where Sightsavers operates, the Sightsavers CEA makes use of the value calculated for SCI's intensity adjustment. Our best guess has been that Sightsavers will work in areas similar to those where SCI works. (We have received more data from Sightsavers and plan to incorporate this in a future CEA update.)

Why did we make this change? We want to minimize the number of items on the *Parameters* tab to encourage engagement with our CEA. We have refined our methodology for calculating this adjustment and no longer think it makes as much sense for individuals to use their discretion in choosing values.

How does the change affect the results?

Charity	**Median *[charity]* vs. cash before**	**Median *[charity]* vs. cash after**	**Percentage change**
Deworm the World	9.3x	11.9x	27.6%
SCI	6.6x	5.0x	-23.9%
Sightsavers	4.0x	3.7x	-6.8%