Equalize Health

## Step-by-step: How Equalize Health Calculates the Impact of Brilliance

The problem that we are tackling with Brilliance is the fact that over six million babies requiring treatment for severe jaundice each year are not receiving the treatment they need. One of the main reasons for this is a lack of access to affordable devices that provide phototherapy, the standard treatment for severe jaundice. By introducing a low-cost, high-quality phototherapy device to the global market, Equalize Health aims to increase the number of babies receiving treatment who otherwise would not have been treated effectively, and thereby, reduce the number of deaths and disabilities due to untreated severe jaundice.

To measure our progress against this goal, we track three indicators: (1) the number of babies treated with Brilliance, (2) the number of babies treated with Brilliance who otherwise would not have received effective treatment, and (3) the number of deaths and disabilities averted through the use of Brilliance. We calculate these numbers on a per-unit basis, using an algorithm based on machine data and assumptions drawn from fieldwork and academic research, and then sum the results to determine our total impact. Below are the step-by-step equations that represent how we tally our estimates.

### Indicator 1: Babies treated with Brilliance

*Overview*

We calculate the number of babies treated by each unit based on total machine time (or "total usage hours") and average time required for treating one baby. We then sum the number of babies treated per unit.

*Key assumptions*

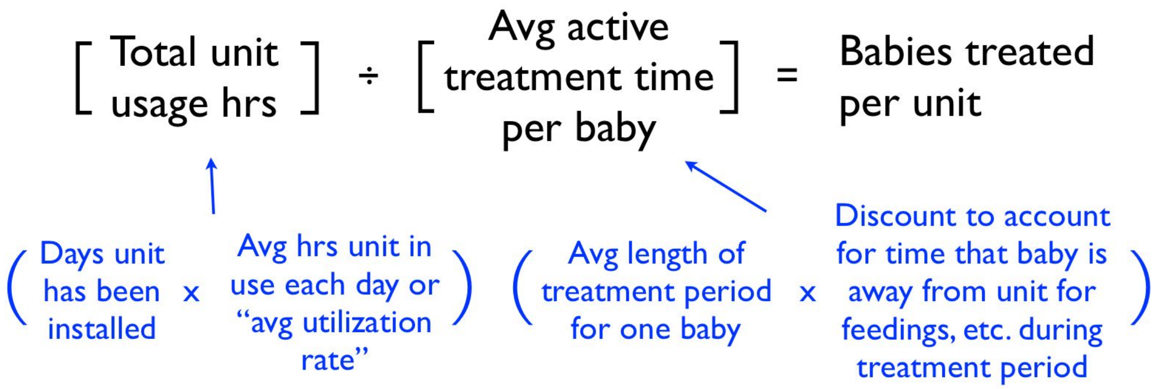
| # | Assumption | Current Value | Source of Current Value |
|---|---|---|---|
| **(a)** | Number of days that unit has been installed | varies, days since installation used as proxy | Brilliance distributor (Phoenix) or hospital |

| | | | |
|---|---|---|---|
| **(b)** | Average number of hours that Brilliance units are in use each day, every day | 5.4 hrs | Equalize Health fieldwork (2014) |
| **(c)** | Average number of hours that a baby with jaundice is treated with Brilliance (i.e., length of treatment period) | 40 hrs | Equalize Health fieldwork (2014) |
| **(d)** | Discount applied to treatment period length to account for time during phototherapy treatment that a baby is removed from lights to receive basic care (feeding, bath, diaper change, etc.) | 75% | Equalize Health fieldwork (2014) |

*Step-by-step*

Total usage hours are calculated by multiplying (a), the number of days that the unit has been installed (as indicated by Phoenix or fieldwork) by (b), the average number of hours that the units are in use every day ("average utilization rate"). To calculate babies treated, we then divide this number by (c), the average treatment time for each baby, discounted by the amount of time that the baby is removed from the lights during the treatment period. When we have actual data collected from the unit (total machine time, or "TMT"), we use those values for the total usage hours of the data collection period, and the average utilization rate it represents to calculate total utilization hours for that unit thereafter. Likewise, when we have received updated information about a more accurate date of first use, we substitute that for the original installation date provided to us.

*Equation*




*Example*

For a unit that has been installed at a private, rural Indian hospital for a year, we would estimate that it has treated 65 babies:

**(365 days x 5.4 hrs) ÷ (40 hrs x 75%) = 65 babies treated**

**Indicator 2: Babies treated who otherwise would not have received effective treatment ("babies otherwise")**

*Overview*

We calculate the number of babies treated by each unit who otherwise would not have received effective treatment by multiplying the number of babies treated by the machine by the percentage of hospitals of the type where the unit is installed that do not provide effective treatment for jaundice. We then sum the number of "babies otherwise" treated per unit.

*Key assumptions*

| # | Assumption | Current Value | Source of Current Value |
|---|---|---|---|
| (e) | Percentage of public hospitals in lower-middle-income countries that do not provide effective treatment for jaundice | 96% | Equalize Health fieldwork with Stanford University (2010) |
| (f) | Percentage of private, rural hospitals in lower-middle-income countries | 96% | Equalize Health fieldwork with Stanford University (2010) |

| | | | |
|---|---|---|---|
| | that do not provide effective treatment for jaundice | | |
| **(g)** | Percentage of private, urban hospitals in lower-middle-income countries that do not provide effective treatment for jaundice | 80% | Equalize Health fieldwork with Stanford University (2010) |

*Step-by-step*

To calculate "babies otherwise", we multiply the estimated number of babies treated for each unit by (e), (f), or (g), the ineffective treatment rate associated with the type of hospital where unit is installed. Hospitals are categorized by how they are financed (public/private), and where they are located (urban/rural) in target countries. See chart above for current values used.

*Equation*

[ Babies treated ] x [ % of hospitals of type indicated that do not provide effective treatment for jaundice ] = Babies otherwise per unit

Applicable rates vary from 80-96%, based on whether hospital is private or public, urban or rural

*Example*

From the example above, we would calculate a total of 62 babies treated who otherwise would not have received effective treatment:

**65 x 96% = 62 "babies otherwise" treated**

**Indicator 3: Deaths and disabilities averted through the use of Brilliance**

*Overview*

We calculate the number of newborns who have avoided death and disabilities from ineffective treatment by multiplying the number of newborns treated who otherwise would not have received effective treatment ("babies otherwise") by the rate at which these babies would have experienced D&D if they hadn't been treated effectively.

*Key assumptions*

| # | Assumption | Current Value(s) | Source of Current Value |
|---|---|---|---|
| **(h)** | Percentage of all babies who require treatment for jaundice | 18% | Bhutani, Vinod K., et al. "Neonatal hyperbilirubinemia and Rhesus disease of the newborn: incidence and impairment estimates for 2010 at regional and global levels." Pediatric research 74.S1 (2013): 86-100. |
| **(i)** | Regional burdens of deaths and disabilities (D&D) associated with Rh disease and extreme hyperbilirubinemia (EHB) (per 100,000 births) | 70 (East Asia, SE Asia, Pacific); 189 (Latin America); 192 (North Africa, Middle East); 277 (Eastern Europe, Central Asia); 292 (South Asia); 309 (sub-Saharan Africa)[1] | Bhutani, Vinod K., et al. "Neonatal hyperbilirubinemia and Rhesus disease of the newborn: incidence and impairment estimates for 2010 at regional and global levels." Pediatric research 74.S1 (2013): 86-100. |

[1] See Appendix A for a more in-depth discussion of these regional disease burdens.

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| **(j)** | Effective rate at which babies otherwise would die or experience disability if they weren't treated with Brilliance | 0.39% (East Asia, SE Asia, Pacific); 1.05% (Latin America); 1.07% (North Africa, Middle East); 1.54% (Eastern Europe, Central Asia); 1.62% (South Asia); 1.71% (sub-Saharan Africa) | Percentage of all babies who would experience death or disability due to ineffectively treated jaundice (see (i) rates above) divided by the percentage of all babies who require treatment for neonatal jaundice (18%). This gives us the applicable D&D rate for babies receiving treatment, as opposed to the D&D rate for the general population. |

*Step-by-step*

We determine the effective D&D rate, (j), by dividing (i), the percentage of babies who statistically would experience death or disability in that region due to ineffectively treated jaundice, by (h), the percentage of all babies who require treatment for neonatal jaundice. This gives us the effective rate at which babies who require treatment for jaundice would experience death and disability due to ineffectively treated jaundice (instead of the rate at which the general newborn population would experience death and disability in the absence of effective treatment). We then multiply the number of babies treated who otherwise would not have received effective treatment ("babies otherwise") by the effective D&D rate. This tells us statistically how many of the babies otherwise would have experienced death or disability in the absence of effective treatment with Brilliance.

*Equation*

$$\left[\text{Babies otherwise}\right] \times \left[\text{Effective D\&D rate of babies receiving treatment for jaundice}\right] = \text{D\&D averted per unit}$$

$$\text{Effective D\&D rate of babies receiving treatment for jaundice} \leftarrow \left(\text{\% of babies who experience D\&D due to ineffective treatment for jaundice} \div \text{\% of babies who require treatment for jaundice}\right)$$

*Example*

From the example above, we would calculate a total of 1 death or disability averted:

**62 x 1.62% = 1 D&D averted**