

## **Supplementary material**

### **Epidemiological and economic impact of monovalent and pentavalent rotavirus vaccines in low and middle-income countries: A cost-effectiveness modeling analysis**

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## **Appendix A. Country-groups**

Countries selected for analysis were stratified based on income and burden of disease.

**Income:** Income of every country was stratified by World Bank lending groups, as of 2010. This classification is estimated using Gross national income per capita using the Atlas method (1).

**Burden of disease:** The WHO classification of countries according to mortality is shown in Table A-2 (2).

**Table A-1. Countries selected for analysis, stratified by income according to the World Bank lending groups, and burden of disease according to World health Organization mortality stratum.**

| Income              | Burden of disease mortality stratum                                                                                                                                                                                                                                                                              |                                                          |                                                                                                                                                                                                                                                          |                                                                                                                                       |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                     | Stratum B                                                                                                                                                                                                                                                                                                        | Stratum C                                                | Stratum D                                                                                                                                                                                                                                                | Stratum E                                                                                                                             |
| <b>Low</b>          | Kyrgyz Republic<br>Cambodia<br>Tajikistan                                                                                                                                                                                                                                                                        | N.A.                                                     | Afghanistan<br>Benin<br>Burkina Faso<br>Bangladesh<br>Comoros<br>Guinea<br>Gambia, The<br>Guinea-Bissau<br>Haiti<br>Liberia<br>Madagascar<br>Mali<br>Myanmar<br>Malawi<br>Niger<br>Nepal<br>Sierra Leone<br>Chad<br>Togo                                 | Burundi<br>Central African Republic<br>Eritrea<br>Ethiopia<br>Kenya<br>Mozambique<br>Rwanda<br>Tanzania<br>Uganda<br>Congo, Dem. Rep. |
| <b>Lower-middle</b> | Armenia<br>Belize<br>Fiji<br>Micronesia, Fed. Sts.<br>Georgia<br>Guyana<br>Honduras<br>Indonesia<br>Lao PDR<br>Sri Lanka<br>Mongolia<br>Philippines<br>Papua New Guinea<br>Paraguay<br>Solomon Islands<br>El Salvador<br>Syrian Arab Republic<br>Tonga<br>Vietnam<br>Vanuatu<br>Samoa                            | Moldova<br>Ukraine                                       | Angola<br>Bolivia<br>Bhutan<br>Cameroon<br>Cape Verde<br>Egypt, Arab Rep.<br>Ghana<br>Guatemala<br>India<br>Iraq<br>Morocco<br>Mauritania<br>Nigeria<br>Nicaragua<br>Pakistan<br>Sudan<br>Senegal<br>Sao Tome and Principe<br>Timor-Leste<br>Yemen, Rep. | Cote d'Ivoire<br>Congo, Rep.<br>Lesotho<br>Swaziland<br>Zambia                                                                        |
| <b>Upper-middle</b> | Albania<br>Argentina<br>Azerbaijan<br>Bulgaria<br>Bosnia and Herzegovina<br>Brazil<br>Chile<br>China<br>Colombia<br>Costa Rica<br>Dominican Republic<br>Jamaica<br>Jordan<br>St. Lucia<br>Mexico<br>Macedonia, FYR<br>Malaysia<br>Panama<br>Romania<br>Thailand<br>Tunisia<br>Turkey<br>Uruguay<br>Venezuela, RB | Belarus<br>Kazakhstan<br>Lithuania<br>Russian Federation | Algeria<br>Gabon<br>Maldives<br>Mauritius<br>Peru                                                                                                                                                                                                        | Botswana<br>Namibia<br>South Africa                                                                                                   |

N.A.: Not applicable.

**Table A-2. World bank thresholds for classification of countries according to income levels.**

| <b>Income level</b> | <b>GNI per capita (Atlas method)</b> |
|---------------------|--------------------------------------|
| Low income          | Less than \$1025                     |
| Lower-middle income | \$1,026 to \$4,035                   |
| Upper-middle income | \$4,036 to \$12,475                  |
| High income         | More than \$12,476                   |

**Table A-3. Definition of the classification of countries by WHO mortality stratum.**

| <b>Mortality stratum</b> | <b>Child mortality</b> | <b>Adult mortality</b> |
|--------------------------|------------------------|------------------------|
| <b>Stratum A</b>         | Very Low               | Very Low               |
| <b>Stratum B</b>         | Low                    | Low                    |
| <b>Stratum C</b>         | Low                    | High                   |
| <b>Stratum D</b>         | High                   | High                   |
| <b>Stratum E</b>         | High                   | Very High              |

## **Appendix B. Country-specific parameters**

Parameters related to direct cost of disease were estimated based on WHO-CHOICE (World Health Organization - CHOosing Interventions that are Cost Effective) (3). Cost per bed per day was multiplied by duration of disease to obtain direct medical costs of rotavirus diarrheal disease. WHO-CHOICE costs were extracted in 2008 US dollars and transformed to 2010 international dollars for our analysis.

Live births, live expectancy, and life tables were extracted from World Bank and World Health Organization (WHO) databases for the year 2010 (1, 2). Fischer Walker et al. (2012) collected and reported diarrhea incidence estimates for most world countries (4). These rates were converted to probabilities following recommendations by Briggs et al. (2006) and Fleurence and Hollenbeak (2007) (5, 6).

Vaccination coverage was assumed as the third dose of Diphtheria-Tetanus-Pertussis (DPT3) vaccine coverage in the year 2010 (1). This vaccination target was selected because this vaccination coverage is at 6 months of age, and reflects the 'best-efforts' of vaccination in each country. This means that vaccination logistics adequate for handling and delivering the DTP vaccine reach a point that a vaccination coverage greater than DPT3 coverage is unlikely, at least in the short to medium term. In addition, the age of administration is the recommended for the RV5 vaccine, and 2 months after the RV1 vaccination schedule recommendation by WHO.

Currently, vaccination coverage of DPT3 in world children is 83.5%. Vaccination coverage is expected to be low in the first 1-2 years post vaccination. Previous experiences in Latin America and the Caribbean (7), a region with relatively high vaccination coverage in most countries, suggest that vaccination coverage after rotavirus vaccine implementation achieve DTP3 vaccination coverage beyond 2 years of implementation.

**Table B-1. Selected country specific parameters of the study assessing the potential epidemiological and economic impact of different rotavirus vaccines in low and middle income countries.**

| Countries                        | Live births (2010) | Life expectancy (2010) | DTP3 coverage |
|----------------------------------|--------------------|------------------------|---------------|
| Afghanistan                      | 1500802            | 48                     | 66%           |
| Albania                          | 40909              | 77                     | 99%           |
| Algeria                          | 714822             | 73                     | 95%           |
| Angola                           | 792876             | 51                     | 91%           |
| Argentina                        | 693227             | 76                     | 94%           |
| Armenia                          | 47280              | 74                     | 94%           |
| Azerbaijan                       | 167499             | 71                     | 72%           |
| Bangladesh                       | 3025585            | 69                     | 95%           |
| Belarus                          | 108186             | 70                     | 98%           |
| Belize                           | 8453               | 76                     | 96%           |
| Benin                            | 350203             | 56                     | 83%           |
| Bhutan                           | 14841              | 67                     | 91%           |
| Bolivia                          | 262692             | 66                     | 80%           |
| Bosnia and Herzegovina           | 32073              | 75                     | 90%           |
| Botswana                         | 47287              | 53                     | 96%           |
| Brazil                           | 3018934            | 73                     | 98%           |
| Bulgaria                         | 75340              | 74                     | 94%           |
| Burkina Faso                     | 711401             | 55                     | 95%           |
| Burundi                          | 284577             | 50                     | 96%           |
| Cote d'Ivoire                    | 670224             | 55                     | 85%           |
| Cambodia                         | 317576             | 63                     | 92%           |
| Cameroon                         | 709209             | 51                     | 84%           |
| Cape Verde                       | 10260              | 74                     | 99%           |
| Central African Republic         | 153828             | 48                     | 54%           |
| Chad                             | 502206             | 49                     | 59%           |
| Chile                            | 245462             | 79                     | 92%           |
| China                            | 16220196           | 73                     | 99%           |
| Colombia                         | 914141             | 73                     | 88%           |
| Comoros                          | 27567              | 61                     | 74%           |
| Congo                            | 142876             | 57                     | 90%           |
| Costa Rica                       | 73184              | 79                     | 88%           |
| Democratic Republic of the Congo | 2868026            | 48                     | 63%           |
| Dominican Republic               | 216389             | 73                     | 88%           |
| Ecuador                          | 298905             | 75                     | 99%           |
| Egypt                            | 1879411            | 73                     | 97%           |
| El Salvador                      | 125668             | 72                     | 92%           |
| Eritrea                          | 190132             | 61                     | 99%           |
| Ethiopia                         | 2607119            | 59                     | 86%           |
| Fiji                             | 18533              | 69                     | 99%           |
| Gabon                            | 40816              | 62                     | 45%           |
| Gambia                           | 65820              | 58                     | 98%           |
| Georgia                          | 53050              | 73                     | 91%           |
| Ghana                            | 769251             | 64                     | 94%           |
| Guatemala                        | 465153             | 71                     | 94%           |
| Guinea-Bissau                    | 58071              | 48                     | 76%           |
| Guinea                           | 387681             | 54                     | 57%           |
| Guyana                           | 13631              | 70                     | 95%           |
| Haiti                            | 266204             | 62                     | 59%           |
| Honduras                         | 203004             | 73                     | 98%           |
| India                            | 27153388           | 65                     | 72%           |
| Indonesia                        | 4369952            | 69                     | 83%           |
| Iraq                             | 1134186            | 68                     | 65%           |
| Jamaica                          | 43151              | 73                     | 99%           |
| Jordan                           | 151326             | 73                     | 98%           |
| Kazakhstan                       | 365635             | 68                     | 99%           |
| Kenya                            | 1523653            | 56                     | 83%           |
| Kyrgyzstan                       | 144650             | 69                     | 96%           |
| Lao People's Democratic Republic | 141104             | 67                     | 74%           |
| Lesotho                          | 60323              | 47                     | 83%           |
| Liberia                          | 156197             | 56                     | 64%           |
| Lithuania                        | 35500              | 73                     | 95%           |
| Madagascar                       | 730272             | 66                     | 74%           |
| Malawi                           | 660099             | 53                     | 93%           |
| Malaysia                         | 575546             | 74                     | 94%           |
| Maldives                         | 5302               | 77                     | 96%           |
| Mali                             | 713153             | 51                     | 76%           |
| Mauritania                       | 116813             | 58                     | 64%           |
| Mauritius                        | 14988              | 73                     | 99%           |
| Mexico                           | 2217079            | 77                     | 95%           |
| Micronesia (Fed. States of)      | 2739               | 69                     | 85%           |
| Moldova                          | 43873              | 69                     | 90%           |
| Mongolia                         | 64733              | 68                     | 96%           |
| Morocco                          | 623045             | 72                     | 99%           |
| Mozambique                       | 881850             | 50                     | 74%           |
| Myanmar                          | 829136             | 65                     | 90%           |
| Namibia                          | 59956              | 62                     | 83%           |
| Nepal                            | 722311             | 68                     | 82%           |
| Nicaragua                        | 138062             | 74                     | 98%           |
| Niger                            | 752782             | 54                     | 70%           |
| Nigeria                          | 6319018            | 51                     | 69%           |
| Pakistan                         | 4735270            | 65                     | 88%           |
| Panama                           | 69981              | 76                     | 94%           |
| Papua New Guinea                 | 207146             | 62                     | 56%           |

|                                    |         |    |     |
|------------------------------------|---------|----|-----|
| Paraguay                           | 156213  | 72 | 90% |
| Peru                               | 592976  | 74 | 93% |
| Philippines                        | 2339639 | 68 | 87% |
| Romania                            | 212236  | 73 | 97% |
| Russian Federation                 | 1771875 | 69 | 97% |
| Rwanda                             | 435743  | 55 | 80% |
| Sao Tome and Principe              | 5143    | 64 | 98% |
| Saint Lucia                        | 2262    | 74 | 97% |
| Samoa                              | 4530    | 72 | 87% |
| Senegal                            | 464795  | 59 | 70% |
| Sierra Leone                       | 226507  | 47 | 90% |
| Solomon Islands                    | 17169   | 67 | 79% |
| South Africa                       | 1058709 | 52 | 63% |
| Sri Lanka                          | 378901  | 75 | 99% |
| Sudan                              | 1427243 | 61 | 90% |
| Swaziland                          | 31017   | 48 | 89% |
| Syrian Arab Republic               | 465967  | 76 | 80% |
| Tajikistan                         | 191587  | 67 | 93% |
| TFYR Macedonia                     | 22170   | 75 | 95% |
| Thailand                           | 838795  | 74 | 99% |
| Timor-Leste                        | 43222   | 62 | 72% |
| Togo                               | 193131  | 57 | 92% |
| Tonga                              | 2825    | 72 | 99% |
| Tunisia                            | 186717  | 75 | 98% |
| Turkey                             | 1298987 | 74 | 96% |
| Turkmenistan                       | 108897  | 65 | 96% |
| Uganda                             | 1510464 | 54 | 60% |
| Ukraine                            | 495407  | 70 | 90% |
| United Republic of Tanzania        | 1855565 | 57 | 91% |
| Uruguay                            | 48408   | 76 | 95% |
| Uzbekistan                         | 657350  | 68 | 99% |
| Vanuatu                            | 7085    | 71 | 68% |
| Venezuela (Bolivarian Republic of) | 594269  | 74 | 78% |
| Viet Nam                           | 1451263 | 75 | 93% |
| Yemen                              | 916059  | 65 | 87% |
| Zambia                             | 588928  | 48 | 82% |

## Appendix C. Country-specific results

Country-specific results of the cost-effectiveness analysis are presented in Table C-1 and Table C-2.

**Table C-1. Selected country-specific results of the study assessing the potential epidemiological and economic impact of different rotavirus vaccines in low and middle income countries.**

| Countries                        | Monovalent vaccine |                |               | Pentavalent vaccine |                |               |
|----------------------------------|--------------------|----------------|---------------|---------------------|----------------|---------------|
|                                  | Vaccination costs  | Deaths averted | DALYs averted | Vaccination costs   | Deaths averted | DALYs averted |
| Afghanistan                      | \$ 19,937,375      | 11296          | 288112        | \$ 20,912,056       | 10343          | 263802        |
| Albania                          | \$ 1,283,349       | 1              | 24            | \$ 1,213,042        | 1              | 24            |
| Algeria                          | \$ 14,499,737      | 132            | 3918          | \$ 14,972,377       | 114            | 3376          |
| Angola                           | \$ 13,099,869      | 2971           | 77370         | \$ 14,144,626       | 2584           | 67307         |
| Argentina                        | \$ 15,641,818      | 31             | 947           | \$ 15,688,735       | 31             | 958           |
| Armenia                          | \$ 1,036,588       | 2              | 49            | \$ 1,046,899        | 2              | 50            |
| Azerbaijan                       | \$ 3,821,550       | 62             | 1811          | \$ 3,612,190        | 62             | 1825          |
| Bangladesh                       | \$ 50,231,364      | 942            | 27421         | \$ 54,853,248       | 811            | 23626         |
| Belarus                          | \$ 3,359,634       | 3              | 99            | \$ 3,175,579        | 3              | 100           |
| Belize                           | \$ 158,374         | 2              | 71            | \$ 167,527          | 2              | 72            |
| Benin                            | \$ 5,297,148       | 656            | 17743         | \$ 5,713,386        | 581            | 15715         |
| Bhutan                           | \$ 224,997         | 11             | 313           | \$ 249,306          | 9              | 272           |
| Bolivia                          | \$ 4,101,351       | 139            | 3994          | \$ 4,338,404        | 124            | 3559          |
| Bosnia and Herzegovina           | \$ 914,691         | 1              | 30            | \$ 864,580          | 1              | 30            |
| Botswana                         | \$ 969,284         | 24             | 650           | \$ 1,000,879        | 21             | 558           |
| Brazil                           | \$ 71,017,156      | 191            | 5748          | \$ 71,230,172       | 194            | 5813          |
| Bulgaria                         | \$ 2,244,131       | 1              | 28            | \$ 2,121,189        | 1              | 28            |
| Burkina Faso                     | \$ 12,316,346      | 2083           | 56072         | \$ 13,284,136       | 1794           | 48313         |
| Burundi                          | \$ 4,978,691       | 1083           | 28033         | \$ 5,369,905        | 931            | 24094         |
| Cote d'Ivoire                    | \$ 10,343,292      | 1067           | 28683         | \$ 11,168,203       | 941            | 25294         |
| Cambodia                         | \$ 4,907,287       | 636            | 17958         | \$ 5,423,844        | 643            | 18148         |
| Cameroon                         | \$ 10,816,181      | 2444           | 63870         | \$ 11,678,807       | 2160           | 56447         |
| Cape Verde                       | \$ 184,413         | 3              | 77            | \$ 199,121          | 2              | 66            |
| Central African Republic         | \$ 1,513,817       | 575            | 14578         | \$ 1,632,769        | 537            | 13620         |
| Chad                             | \$ 5,399,801       | 2921           | 75131         | \$ 5,824,105        | 2707           | 69626         |
| Chile                            | \$ 5,420,696       | 2              | 67            | \$ 5,436,955        | 2              | 68            |
| China                            | \$ 324,307,248     | 1444           | 43038         | \$ 339,851,386      | 1461           | 43533         |
| Colombia                         | \$ 19,309,877      | 63             | 1877          | \$ 19,367,797       | 63             | 1896          |
| Comoros                          | \$ 371,761         | 45             | 1245          | \$ 400,973          | 40             | 1123          |
| Congo                            | \$ 2,334,644       | 214            | 5841          | \$ 2,520,840        | 187            | 5093          |
| Costa Rica                       | \$ 1,545,895       | 1              | 31            | \$ 1,550,532        | 1              | 31            |
| Democratic Republic of the Congo | \$ 32,928,154      | 14299          | 364004        | \$ 35,515,572       | 13162          | 335053        |
| Dominican Republic               | \$ 4,570,892       | 39             | 1171          | \$ 4,584,602        | 40             | 1183          |
| Egypt                            | \$ 36,322,030      | 465            | 13798         | \$ 38,203,395       | 399            | 11829         |
| El Salvador                      | \$ 2,256,340       | 19             | 575           | \$ 2,386,754        | 20             | 582           |
| Eritrea                          | \$ 3,430,311       | 165            | 4610          | \$ 3,699,857        | 140            | 3932          |
| Ethiopia                         | \$ 40,860,430      | 5240           | 144692        | \$ 44,071,148       | 4610           | 127317        |
| Fiji                             | \$ 321,892         | 3              | 81            | \$ 351,101          | 3              | 82            |
| Gabon                            | \$ 392,173         | 34             | 961           | \$ 404,956          | 32             | 910           |
| Gambia                           | \$ 1,175,506       | 101            | 2778          | \$ 1,267,875        | 86             | 2375          |
| Georgia                          | \$ 1,125,978       | 2              | 72            | \$ 1,137,178        | 2              | 73            |
| Ghana                            | \$ 13,128,521      | 428            | 12177         | \$ 14,175,564       | 370            | 10518         |
| Guatemala                        | \$ 8,533,254       | 174            | 5109          | \$ 9,026,465        | 150            | 4413          |
| Guinea-Bissau                    | \$ 804,304         | 243            | 6170          | \$ 867,504          | 219            | 5544          |
| Guinea                           | \$ 4,027,105       | 970            | 25874         | \$ 4,343,546        | 902            | 24058         |
| Guyana                           | \$ 252,717         | 2              | 48            | \$ 267,324          | 2              | 49            |
| Haiti                            | \$ 2,969,064       | 261            | 7357          | \$ 3,168,844        | 242            | 6818          |
| Honduras                         | \$ 3,882,582       | 49             | 1458          | \$ 4,106,990        | 50             | 1474          |
| India                            | \$ 325,710,324     | 26801          | 767164        | \$ 360,901,116      | 24270          | 694714        |
| Indonesia                        | \$ 60,426,818      | 1284           | 37454         | \$ 66,955,525       | 1296           | 37805         |
| Iraq                             | \$ 14,688,385      | 511            | 14858         | \$ 15,449,197       | 468            | 13628         |
| Jamaica                          | \$ 1,025,437       | 11             | 316           | \$ 1,028,513        | 11             | 320           |
| Jordan                           | \$ 3,690,882       | 26             | 782           | \$ 3,670,713        | 27             | 791           |
| Kazakhstan                       | \$ 11,470,386      | 78             | 2279          | \$ 10,841,990       | 79             | 2305          |
| Kenya                            | \$ 23,046,660      | 1621           | 44147         | \$ 24,857,613       | 1436           | 39100         |
| Kyrgyzstan                       | \$ 3,304,960       | 47             | 1380          | \$ 3,321,623        | 48             | 1395          |
| Lao People's Democratic          | \$ 1,831,888       | 199            | 5761          | \$ 1,998,119        | 201            | 5809          |

|                                    |               |       |        |               |       |        |
|------------------------------------|---------------|-------|--------|---------------|-------|--------|
| Republic                           |               |       |        |               |       |        |
| Lesotho                            | \$ 909,042    | 46    | 1171   | \$ 981,541    | 41    | 1037   |
| Liberia                            | \$ 1,821,786  | 285   | 7732   | \$ 1,964,938  | 262   | 7105   |
| Lithuania                          | \$ 1,068,666  | 0     | 10     | \$ 1,010,120  | 0     | 10     |
| Madagascar                         | \$ 9,848,274  | 592   | 17053  | \$ 10,622,129 | 534   | 15383  |
| Malawi                             | \$ 11,187,576 | 798   | 21268  | \$ 12,066,670 | 691   | 18415  |
| Malaysia                           | \$ 10,926,308 | 15    | 452    | \$ 11,450,009 | 15    | 456    |
| Maldives                           | \$ 110,760    | 0     | 3      | \$ 113,814    | 0     | 3      |
| Mali                               | \$ 9,877,335  | 2850  | 74429  | \$ 10,653,473 | 2561  | 66879  |
| Mauritania                         | \$ 1,357,349  | 227   | 6255   | \$ 1,465,602  | 209   | 5747   |
| Mauritius                          | \$ 316,817    | 0     | 0      | \$ 327,144    | 0     | 0      |
| Mexico                             | \$ 50,557,835 | 247   | 7480   | \$ 50,709,483 | 250   | 7562   |
| Micronesia (Fed. States of)        | \$ 40,841     | 1     | 36     | \$ 44,547     | 1     | 37     |
| Moldova                            | \$ 920,968    | 2     | 61     | \$ 930,128    | 2     | 62     |
| Mongolia                           | \$ 1,090,248  | 29    | 843    | \$ 1,189,180  | 29    | 852    |
| Morocco                            | \$ 12,289,403 | 205   | 6040   | \$ 12,925,955 | 175   | 5152   |
| Mozambique                         | \$ 11,892,414 | 1982  | 51217  | \$ 12,826,893 | 1788  | 46202  |
| Myanmar                            | \$ 13,040,989 | 550   | 15707  | \$ 14,240,915 | 480   | 13696  |
| Namibia                            | \$ 1,062,552  | 20    | 574    | \$ 1,097,188  | 18    | 508    |
| Nepal                              | \$ 10,350,955 | 185   | 5376   | \$ 11,303,366 | 164   | 4771   |
| Nicaragua                          | \$ 2,640,527  | 36    | 1065   | \$ 2,793,146  | 31    | 910    |
| Niger                              | \$ 9,603,087  | 2627  | 70388  | \$ 10,357,676 | 2388  | 63981  |
| Nigeria                            | \$ 79,162,385 | 15441 | 404769 | \$ 85,475,843 | 14062 | 368606 |
| Pakistan                           | \$ 83,024,055 | 6881  | 197005 | \$ 87,324,437 | 6027  | 172573 |
| Panama                             | \$ 1,579,040  | 23    | 702    | \$ 1,583,777  | 24    | 710    |
| Papua New Guinea                   | \$ 2,035,134  | 286   | 8070   | \$ 2,219,809  | 288   | 8119   |
| Paraguay                           | \$ 2,743,781  | 17    | 506    | \$ 2,902,368  | 17    | 512    |
| Peru                               | \$ 13,237,429 | 70    | 2084   | \$ 13,277,135 | 60    | 1804   |
| Philippines                        | \$ 35,710,561 | 958   | 27890  | \$ 38,951,054 | 968   | 28166  |
| Romania                            | \$ 6,523,580  | 2     | 70     | \$ 6,166,192  | 2     | 71     |
| Russian Federation                 | \$ 54,462,760 | 36    | 1093   | \$ 51,479,064 | 36    | 1105   |
| Rwanda                             | \$ 6,352,790  | 870   | 23443  | \$ 6,851,977  | 775   | 20895  |
| Sao Tome and Principe              | \$ 91,504     | 6     | 173    | \$ 98,802     | 5     | 148    |
| Saint Lucia                        | \$ 52,668     | 0     | 6      | \$ 52,826     | 0     | 6      |
| Samoa                              | \$ 69,141     | 1     | 28     | \$ 75,415     | 1     | 28     |
| Senegal                            | \$ 5,907,177  | 537   | 14866  | \$ 6,378,294  | 488   | 13512  |
| Sierra Leone                       | \$ 3,715,082  | 895   | 22647  | \$ 4,007,004  | 781   | 19748  |
| Solomon Islands                    | \$ 237,953    | 8     | 234    | \$ 259,546    | 8     | 236    |
| South Africa                       | \$ 14,241,505 | 583   | 15364  | \$ 14,705,728 | 536   | 14142  |
| Sri Lanka                          | \$ 6,249,366  | 16    | 473    | \$ 6,924,568  | 16    | 478    |
| Sudan                              | \$ 25,592,743 | 2998  | 83993  | \$ 26,918,366 | 2615  | 73240  |
| Swaziland                          | \$ 501,196    | 26    | 663    | \$ 541,168    | 23    | 580    |
| Syrian Arab Republic               | \$ 7,427,136  | 88    | 2625   | \$ 7,811,838  | 88    | 2648   |
| Tajikistan                         | \$ 4,240,587  | 195   | 5637   | \$ 4,261,968  | 197   | 5698   |
| TFYR Macedonia                     | \$ 667,388    | 1     | 15     | \$ 630,826    | 1     | 16     |
| Thailand                           | \$ 18,069,668 | 41    | 1224   | \$ 18,567,912 | 41    | 1238   |
| Timor-Leste                        | \$ 518,460    | 30    | 850    | \$ 574,476    | 27    | 770    |
| Togo                               | \$ 3,238,051  | 262   | 7136   | \$ 3,492,490  | 227   | 6193   |
| Tonga                              | \$ 49,067     | 0     | 11     | \$ 53,520     | 0     | 11     |
| Tunisia                            | \$ 4,554,080  | 24    | 729    | \$ 4,529,194  | 25    | 738    |
| Turkey                             | \$ 39,515,807 | 44    | 1328   | \$ 37,350,967 | 44    | 1342   |
| Uganda                             | \$ 16,516,017 | 3789  | 101054 | \$ 17,813,808 | 3506  | 93494  |
| Ukraine                            | \$ 10,399,381 | 29    | 866    | \$ 10,502,822 | 29    | 875    |
| United Republic of Tanzania        | \$ 30,772,400 | 2913  | 79761  | \$ 33,190,424 | 2534  | 69387  |
| Uruguay                            | \$ 1,103,885  | 2     | 59     | \$ 1,107,196  | 2     | 60     |
| Vanuatu                            | \$ 84,521     | 1     | 24     | \$ 92,191     | 1     | 24     |
| Venezuela (Bolivarian Republic of) | \$ 11,126,565 | 86    | 2568   | \$ 11,159,939 | 87    | 2590   |
| Viet Nam                           | \$ 23,678,690 | 596   | 17796  | \$ 25,827,372 | 603   | 17986  |
| Yemen                              | \$ 15,878,848 | 901   | 25793  | \$ 16,701,322 | 791   | 22646  |
| Zambia                             | \$ 8,767,917  | 1306  | 33374  | \$ 9,467,187  | 1159  | 29622  |

**Table C-2. Country-specific cost-effectiveness and willingness-to-pay of the study assessing the potential epidemiological and economic impact of different rotavirus vaccines in low and middle income countries.**

| Country                          | Monovalent vaccine     |                       | Pentavalent vaccine    |                       | GDP per capita |
|----------------------------------|------------------------|-----------------------|------------------------|-----------------------|----------------|
|                                  | Cost per death averted | Cost per DALY averted | Cost per death averted | Cost per DALY averted |                |
| Afghanistan                      | \$ 1,462.7             | \$ 57.3               | \$ 1,732.7             | \$ 67.9               | \$ 1,207       |
| Albania                          | \$ 1,027,240.4         | \$ 32,703.0           | \$ 926,603.5           | \$ 29,499.2           | \$ 8,592       |
| Algeria                          | \$ 79,231.5            | \$ 2,672.4            | \$ 102,445.8           | \$ 3,455.4            | \$ 8,433       |
| Angola                           | \$ 2,750.9             | \$ 105.6              | \$ 3,894.5             | \$ 149.5              | \$ 6,186       |
| Argentina                        | -\$ 27,474.7           | -\$ 901.8             | -\$ 24,964.9           | -\$ 819.5             | \$ 16,012      |
| Armenia                          | \$ 379,723.9           | \$ 12,462.9           | \$ 383,099.4           | \$ 12,573.6           | \$ 5,463       |
| Azerbaijan                       | \$ 11,152.5            | \$ 379.4              | \$ 7,797.8             | \$ 265.3              | \$ 9,936       |
| Bangladesh                       | \$ 50,528.1            | \$ 1,735.1            | \$ 64,995.8            | \$ 2,231.9            | \$ 1,659       |
| Belarus                          | \$ 330,218.7           | \$ 10,954.4           | \$ 272,253.9           | \$ 9,031.5            | \$ 13,929      |
| Belize                           | \$ 25,793.1            | \$ 859.7              | \$ 29,465.5            | \$ 982.1              | \$ 6,670       |
| Benin                            | \$ 7,327.8             | \$ 270.9              | \$ 9,127.9             | \$ 337.4              | \$ 1,587       |
| Bhutan                           | \$ 16,021.7            | \$ 554.9              | \$ 21,943.5            | \$ 760.0              | \$ 5,328       |
| Bolivia                          | \$ 17,126.1            | \$ 594.3              | \$ 23,163.9            | \$ 803.8              | \$ 4,849       |
| Bosnia and Herzegovina           | \$ 484,651.1           | \$ 15,781.3           | \$ 429,661.7           | \$ 13,990.7           | \$ 8,690       |
| Botswana                         | \$ 16,624.2            | \$ 625.4              | \$ 25,584.1            | \$ 962.4              | \$ 13,893      |
| Brazil                           | \$ 319,627.1           | \$ 10,642.3           | \$ 317,313.5           | \$ 10,565.3           | \$ 11,210      |
| Bulgaria                         | \$ 501,158.8           | \$ 15,728.9           | \$ 360,624.8           | \$ 11,318.3           | \$ 13,931      |
| Burkina Faso                     | \$ 5,452.4             | \$ 202.5              | \$ 6,974.4             | \$ 259.0              | \$ 1,256       |
| Burundi                          | \$ 4,496.3             | \$ 173.8              | \$ 5,676.8             | \$ 219.4              | \$ 409         |
| Cote d'Ivoire                    | \$ 8,685.2             | \$ 323.0              | \$ 10,918.3            | \$ 406.0              | \$ 1,899       |
| Cambodia                         | \$ 6,630.7             | \$ 234.8              | \$ 7,374.3             | \$ 261.2              | \$ 2,194       |
| Cameroon                         | \$ 3,813.5             | \$ 145.9              | \$ 4,826.5             | \$ 184.7              | \$ 2,294       |
| Cape Verde                       | \$ 60,990.1            | \$ 2,051.1            | \$ 80,443.9            | \$ 2,705.3            | \$ 3,875       |
| Central African Republic         | \$ 2,395.5             | \$ 94.5               | \$ 2,809.8             | \$ 110.8              | \$ 789         |
| Chad                             | \$ 1,535.6             | \$ 59.7               | \$ 1,848.8             | \$ 71.9               | \$ 1,370       |
| Chile                            | \$ 111,879.0           | \$ 3,361.9            | \$ 121,962.2           | \$ 3,664.9            | \$ 15,779      |
| China                            | \$ 165,085.9           | \$ 5,539.2            | \$ 174,126.0           | \$ 5,842.5            | \$ 7,599       |
| Colombia                         | \$ 57,009.3            | \$ 1,897.9            | \$ 59,909.3            | \$ 1,994.4            | \$ 9,453       |
| Comoros                          | \$ 7,792.5             | \$ 278.9              | \$ 9,451.3             | \$ 338.3              | \$ 1,096       |
| Congo                            | \$ 8,408.0             | \$ 307.9              | \$ 11,137.0            | \$ 407.8              | \$ 4,245       |
| Costa Rica                       | \$ 219,974.8           | \$ 6,831.0            | \$ 225,367.3           | \$ 6,998.4            | \$ 11,569      |
| Democratic Republic of the Congo | \$ 2,242.0             | \$ 88.1               | \$ 2,640.5             | \$ 103.7              | \$ 347         |
| Dominican Republic               | \$ 39,607.3            | \$ 1,330.0            | \$ 39,791.8            | \$ 1,336.2            | \$ 9,350       |
| Egypt                            | \$ 60,996.0            | \$ 2,056.9            | \$ 79,631.9            | \$ 2,685.3            | \$ 6,180       |
| El Salvador                      | -\$ 506,179.1          | -\$ 17,082.5          | -\$ 491,858.1          | -\$ 16,599.2          | \$ 6,668       |
| Eritrea                          | \$ 20,354.5            | \$ 726.9              | \$ 25,910.4            | \$ 925.3              | \$ 546         |
| Ethiopia                         | \$ 7,359.9             | \$ 266.5              | \$ 9,149.2             | \$ 331.3              | \$ 1,041       |
| Fiji                             | \$ 90,179.3            | \$ 3,081.8            | \$ 99,694.4            | \$ 3,407.0            | \$ 4,658       |
| Gabon                            | -\$ 8,531.0            | -\$ 302.4             | -\$ 7,229.9            | -\$ 256.3             | \$ 15,054      |
| Gambia                           | \$ 11,030.4            | \$ 400.8              | \$ 14,119.8            | \$ 513.1              | \$ 1,410       |
| Georgia                          | \$ 302,295.0           | \$ 9,993.6            | \$ 304,665.8           | \$ 10,071.9           | \$ 5,074       |
| Ghana                            | \$ 29,486.7            | \$ 1,036.5            | \$ 37,240.0            | \$ 1,309.0            | \$ 1,644       |
| Guatemala                        | \$ 32,444.9            | \$ 1,103.1            | \$ 44,365.4            | \$ 1,508.4            | \$ 4,785       |
| Guinea-Bissau                    | \$ 3,143.3             | \$ 123.9              | \$ 3,815.4             | \$ 150.4              | \$ 1,186       |
| Guinea                           | \$ 3,769.3             | \$ 141.3              | \$ 4,446.2             | \$ 166.7              | \$ 1,091       |
| Guyana                           | \$ 129,535.2           | \$ 4,400.6            | \$ 137,083.5           | \$ 4,657.1            | \$ 3,432       |
| Haiti                            | \$ 9,143.6             | \$ 324.9              | \$ 10,942.0            | \$ 388.8              | \$ 1,111       |
| Honduras                         | \$ 54,860.0            | \$ 1,847.5            | \$ 58,917.8            | \$ 1,984.1            | \$ 3,923       |
| India                            | \$ 9,895.4             | \$ 345.7              | \$ 12,697.7            | \$ 443.6              | \$ 3,425       |
| Indonesia                        | \$ 34,947.3            | \$ 1,198.3            | \$ 39,721.2            | \$ 1,362.0            | \$ 4,325       |
| Iraq                             | \$ 19,404.6            | \$ 666.9              | \$ 23,916.8            | \$ 822.0              | \$ 3,562       |
| Jamaica                          | \$ 45,084.0            | \$ 1,518.4            | \$ 45,048.8            | \$ 1,517.2            | \$ 7,673       |
| Jordan                           | \$ 112,221.7           | \$ 3,774.9            | \$ 110,348.1           | \$ 3,711.8            | \$ 5,749       |
| Kazakhstan                       | \$ 55,221.5            | \$ 1,893.2            | \$ 46,847.4            | \$ 1,606.1            | \$ 12,169      |
| Kenya                            | \$ 12,904.1            | \$ 473.9              | \$ 16,071.2            | \$ 590.2              | \$ 1,651       |
| Kyrgyzstan                       | \$ 58,878.5            | \$ 2,012.0            | \$ 58,681.5            | \$ 2,005.3            | \$ 2,239       |
| Lao People's Democratic Republic | \$ 7,722.3             | \$ 267.3              | \$ 8,495.5             | \$ 294.1              | \$ 2,551       |
| Lesotho                          | \$ 17,764.7            | \$ 702.0              | \$ 22,170.9            | \$ 876.1              | \$ 1,601       |
| Liberia                          | \$ 6,210.1             | \$ 228.7              | \$ 7,331.2             | \$ 269.9              | \$ 419         |
| Lithuania                        | -\$ 663,507.9          | -\$ 20,394.9          | -\$ 842,364.6          | -\$ 25,892.6          | \$ 18,148      |
| Madagascar                       | \$ 15,601.5            | \$ 541.4              | \$ 18,908.0            | \$ 656.2              | \$ 969         |
| Malawi                           | \$ 13,516.7            | \$ 507.3              | \$ 16,999.0            | \$ 638.0              | \$ 882         |

|                                    |                 |              |                  |              |           |
|------------------------------------|-----------------|--------------|------------------|--------------|-----------|
| Malaysia                           | \$ 201,630.1    | \$ 6,659.2   | \$ 234,945.7     | \$ 7,759.5   | \$ 14,731 |
| Maldives                           | \$ 808,021.9    | \$ 26,510.2  | \$ 1,010,599.5   | \$ 33,156.5  | \$ 8,519  |
| Mali                               | \$ 3,110.2      | \$ 119.1     | \$ 3,822.2       | \$ 146.4     | \$ 1,065  |
| Mauritania                         | \$ 5,082.3      | \$ 184.6     | \$ 6,158.6       | \$ 223.7     | \$ 2,456  |
| Mauritius                          | \$ 89,389,309.9 | \$ 828,027.4 | \$ 124,136,716.3 | #####        | \$ 13,697 |
| Mexico                             | -\$ 24,521.5    | -\$ 811.2    | -\$ 23,341.7     | -\$ 772.2    | \$ 14,564 |
| Micronesia (Fed. States of)        | \$ 27,087.0     | \$ 929.8     | \$ 29,820.0      | \$ 1,023.6   | \$ 3,333  |
| Moldova                            | \$ 360,352.9    | \$ 12,144.1  | \$ 361,667.1     | \$ 12,188.4  | \$ 3,110  |
| Mongolia                           | \$ 30,524.0     | \$ 1,050.3   | \$ 33,609.4      | \$ 1,156.5   | \$ 4,036  |
| Morocco                            | \$ 49,354.3     | \$ 1,672.2   | \$ 63,993.1      | \$ 2,168.1   | \$ 4,790  |
| Mozambique                         | \$ 5,630.0      | \$ 217.9     | \$ 6,822.6       | \$ 264.1     | \$ 942    |
| Myanmar                            | \$ 23,707.3     | \$ 830.0     | \$ 29,691.8      | \$ 1,039.5   | \$ 1,950  |
| Namibia                            | \$ 35,901.9     | \$ 1,273.3   | \$ 45,203.6      | \$ 1,603.1   | \$ 6,475  |
| Nepal                              | \$ 53,380.7     | \$ 1,834.3   | \$ 66,439.2      | \$ 2,283.0   | \$ 1,199  |
| Nicaragua                          | \$ 60,265.3     | \$ 2,024.6   | \$ 78,647.1      | \$ 2,642.1   | \$ 2,913  |
| Niger                              | \$ 3,408.5      | \$ 127.2     | \$ 4,102.6       | \$ 153.1     | \$ 728    |
| Nigeria                            | \$ 4,005.6      | \$ 152.8     | \$ 4,999.7       | \$ 190.7     | \$ 2,399  |
| Pakistan                           | \$ 10,485.0     | \$ 366.2     | \$ 12,993.9      | \$ 453.8     | \$ 2,688  |
| Panama                             | \$ 3,200.4      | \$ 106.7     | \$ 3,477.9       | \$ 115.9     | \$ 13,608 |
| Papua New Guinea                   | \$ 5,315.0      | \$ 188.3     | \$ 5,933.4       | \$ 210.2     | \$ 2,472  |
| Paraguay                           | \$ 92,856.5     | \$ 3,119.2   | \$ 101,487.0     | \$ 3,409.1   | \$ 5,181  |
| Peru                               | \$ 98,085.4     | \$ 3,283.4   | \$ 132,282.1     | \$ 4,428.2   | \$ 9,538  |
| Philippines                        | \$ 29,514.6     | \$ 1,014.2   | \$ 32,619.2      | \$ 1,120.9   | \$ 3,969  |
| Romania                            | \$ 307,747.6    | \$ 9,559.9   | \$ 145,624.7     | \$ 4,523.7   | \$ 14,524 |
| Russian Federation                 | -\$ 295,442.9   | -\$ 9,723.5  | -\$ 373,690.3    | -\$ 12,298.7 | \$ 19,891 |
| Rwanda                             | \$ 6,764.5      | \$ 251.0     | \$ 8,328.8       | \$ 309.0     | \$ 1,163  |
| Sao Tome and Principe              | \$ 13,870.0     | \$ 486.5     | \$ 17,919.3      | \$ 628.6     | \$ 1,899  |
| Saint Lucia                        | \$ 105,953.7    | \$ 3,527.0   | \$ 105,931.2     | \$ 3,526.2   | \$ 10,838 |
| Samoa                              | \$ 55,344.3     | \$ 1,869.7   | \$ 61,537.3      | \$ 2,079.0   | \$ 4,374  |
| Senegal                            | \$ 9,520.3      | \$ 344.2     | \$ 11,644.6      | \$ 421.0     | \$ 1,935  |
| Sierra Leone                       | \$ 3,963.4      | \$ 156.7     | \$ 4,960.1       | \$ 196.1     | \$ 827    |
| Solomon Islands                    | \$ 24,461.2     | \$ 844.5     | \$ 26,926.3      | \$ 929.6     | \$ 2,710  |
| South Africa                       | \$ 6,703.5      | \$ 254.2     | \$ 10,085.8      | \$ 382.4     | \$ 10,565 |
| Sri Lanka                          | \$ 312,732.4    | \$ 10,387.4  | \$ 352,184.6     | \$ 11,697.8  | \$ 5,078  |
| Sudan                              | \$ 7,509.7      | \$ 268.1     | \$ 9,330.2       | \$ 333.1     | \$ 2,256  |
| Swaziland                          | \$ 13,443.0     | \$ 526.4     | \$ 18,265.0      | \$ 715.2     | \$ 5,952  |
| Syrian Arab Republic               | \$ 79,452.0     | \$ 2,650.0   | \$ 83,124.7      | \$ 2,772.5   | \$ 5,285  |
| Tajikistan                         | \$ 18,643.1     | \$ 644.4     | \$ 18,582.6      | \$ 642.3     | \$ 2,163  |
| TFYR Macedonia                     | \$ 530,436.0    | \$ 17,154.2  | \$ 454,360.7     | \$ 14,693.9  | \$ 11,311 |
| Thailand                           | \$ 315,898.4    | \$ 10,539.4  | \$ 324,820.1     | \$ 10,837.1  | \$ 8,554  |
| Timor-Leste                        | \$ 16,211.2     | \$ 575.6     | \$ 20,098.1      | \$ 713.6     | \$ 928    |
| Togo                               | \$ 11,616.2     | \$ 426.4     | \$ 14,668.5      | \$ 538.5     | \$ 998    |
| Tonga                              | \$ 104,125.9    | \$ 3,514.9   | \$ 115,045.4     | \$ 3,883.5   | \$ 4,532  |
| Tunisia                            | \$ 125,494.7    | \$ 4,196.7   | \$ 123,288.6     | \$ 4,123.0   | \$ 9,550  |
| Turkey                             | \$ 89,389.6     | \$ 2,929.8   | \$ 40,426.6      | \$ 1,325.0   | \$ 15,687 |
| Uganda                             | \$ 3,810.7      | \$ 142.9     | \$ 4,551.9       | \$ 170.7     | \$ 1,272  |
| Ukraine                            | \$ 148,647.6    | \$ 4,999.1   | \$ 151,375.3     | \$ 5,090.8   | \$ 6,721  |
| United Republic of Tanzania        | \$ 9,874.8      | \$ 360.6     | \$ 12,454.9      | \$ 454.8     | \$ 1,399  |
| Uruguay                            | \$ 55,059.1     | \$ 1,799.5   | \$ 57,100.3      | \$ 1,866.2   | \$ 14,108 |
| Vanuatu                            | \$ 68,199.9     | \$ 2,312.4   | \$ 77,106.8      | \$ 2,614.4   | \$ 4,443  |
| Venezuela (Bolivarian Republic of) | -\$ 890.5       | -\$ 29.8     | -\$ 312.4        | -\$ 10.4     | \$ 12,233 |
| Viet Nam                           | \$ 33,985.1     | \$ 1,139.0   | \$ 37,232.6      | \$ 1,247.8   | \$ 3,205  |
| Yemen                              | \$ 15,349.5     | \$ 536.5     | \$ 18,957.2      | \$ 662.6     | \$ 2,653  |
| Zambia                             | \$ 6,123.7      | \$ 239.7     | \$ 7,609.5       | \$ 297.8     | \$ 1,562  |

## Appendix D. Probabilistic analysis inputs.

**Table D-1. Probabilistic distributions of the cost-effectiveness model.**

| Inputs                                                        | Probabilistic distributions  |
|---------------------------------------------------------------|------------------------------|
| <b>Demographic inputs</b>                                     |                              |
| Population, live births, NMR, life-tables and life expectancy | No variation                 |
| <b>Burden of disease inputs</b>                               |                              |
| Percentage of U5MR due to rotavirus                           |                              |
| • EMR                                                         | Beta(BCVx100, (1-BCV)x100)   |
| • AFR                                                         | Beta(BCVx100, (1-BCV)x100)   |
| • EUR                                                         | Beta(BCVx100, (1-BCV)x100)   |
| • AMR                                                         | Beta(BCVx100, (1-BCV)x100)   |
| • SEA                                                         | Beta(BCVx100, (1-BCV)x100)   |
| • WPR                                                         | Beta(BCVx100, (1-BCV)x100)   |
| Diarrhea incidence                                            | Lognormal(ln(BCV),ln(BCV/4)) |
| Inpatient admissions                                          |                              |
| • <1 year old                                                 | Beta(BCVx100, (1-BCV)x100)   |
| • 1-4 years old                                               | Beta(BCVx100, (1-BCV)x100)   |
| Outpatient admissions                                         |                              |
| • <1 year old                                                 | Beta(BCVx100, (1-BCV)x100)   |
| • 1-4 years old                                               | Beta(BCVx100, (1-BCV)x100)   |
| Diarrhea due to rotavirus                                     |                              |
| • Inpatient                                                   | Beta(BCVx100, (1-BCV)x100)   |
| • Outpatient                                                  | Beta(BCVx100, (1-BCV)x100)   |
| • Home care                                                   | Beta(BCVx100, (1-BCV)x100)   |
| Duration of disease                                           | Lognormal(ln(BCV),ln(BCV/4)) |
| <b>Costs inputs</b>                                           |                              |
| Cost of bed per day                                           | Gamma(1,BCV)                 |
| Costs of clinic visit                                         | Gamma(1,BCV)                 |
| <b>Vaccination-related inputs</b>                             |                              |
| Target vaccine coverage                                       | Beta(BCVx100, (1-BCV)x100)   |
| Vaccine wastage                                               | Beta(BCVx100, (1-BCV)x100)   |
| Monovalent                                                    |                              |
| • Efficacy to prevent severe rotavirus diarrhea               | Beta(BCVx100, (1-BCV)x100)   |
| • Efficacy to prevent mild rotavirus diarrhea                 | Beta(BCVx100, (1-BCV)x100)   |
| • Vaccine price (per dose)                                    | No variation                 |
| • Number of doses                                             | No variation                 |
| Pentavalent                                                   |                              |
| • Efficacy to prevent severe rotavirus diarrhea               | Beta(BCVx100, (1-BCV)x100)   |
| • Efficacy to prevent mild rotavirus diarrhea                 | Beta(BCVx100, (1-BCV)x100)   |
| • Vaccine price (per dose)                                    | No variation                 |
| • Number of doses                                             | No variation                 |

NMR: Neonatal mortality rates; U5MR: Under-5 mortality rate; PAHO R.F.: Pan American Health Organization/World Health Organization Revolving Fund.

## References

1. World Bank. World Development Indicators. Washington DC 2010; Available from: <http://data.worldbank.org/indicator>.
2. World Health Organization. World Health Organization. Geneva 2012; Available from: <http://www.who.int>.
3. World Health Organization. WHO CHOosing Interventions that are Cost Effective. Geneva: World Health Organization; 2012; Available from: <http://www.who.int/choice/en/>.
4. Fischer Walker CL, Perin J, Aryee MJ, Boschi-Pinto C, Black RE. Diarrhea incidence in low- and middle-income countries in 1990 and 2010: a systematic review. BMC Public Health. 2012;12:220.
5. Briggs AH, Claxton K, Sculpher MJ. Decision modelling for health economic evaluation. Oxford: Oxford University Press; 2006.
6. Fleurence RL, Hollenbeak CS. Rates and probabilities in economic modelling: transformation, translation and appropriate application. Pharmacoeconomics. 2007;25(1):3-6.
7. de Oliveira LH, Danovaro-Holliday MC, Sanwogou NJ, Ruiz-Matus C, Tambini G, Andrus JK. Progress in the introduction of the rotavirus vaccine in Latin America and the Caribbean: four years of accumulated experience. Pediatr Infect Dis J. 2011 Jan;30(1 Suppl):S61-6.