Day 1

IDSI Plenary

**Group work:**

**The health impact of different resource allocation scenarios**

*This exercise is being used in a fictional setting, primarily aimed at applying concepts discussed in the previous sessions but a lot of it is from existing data and evidence (e.g. Disease priorities Control, Gavi, IHME).*

You will need:

* This instruction sheet
* A pen
* A computer to load the **excel spreadsheet** with the exercise (please ask a staff member if you do not have a computer or have difficulties opening the spreadsheet).

You are the budget holder of the child immunization programme. Your country has made major strides in decreasing under-5-mortality (U5M) in the last decade. Deaths from diphtheria, tetanus, whooping cough and meningitis have declined drastically from the introduction of the Pentavalent vaccine. However, U5M is still high compared to the regional average and much of the U5M has been attributed to vaccine preventable diseases. Despite the expansion of the immunization programme, coverage for some key vaccines is still incomplete, resulting in lost lives.

This year the Ministry of Health decided to increase funding to the vaccine programme to $4 million to further increase immunisation rates. You will have to allocate programme resources to the 5 vaccines that are currently in your programme portfolio (Table 1).

Table 1. Vaccines and the diseases targeted, with corresponding burden of disease

|  |  |  |
| --- | --- | --- |
| Vaccine | Target | Share of total burden of disease attributed to the diseases targeted by vaccine[[1]](#footnote-1) |
| Pentavalent (combined vaccine) | Diphteria, Tetanus, pertussis, HiB and HepB | 40% |
| Measles vaccine | Measles | 20% |
| BCG vaccine | Tuberculosis | 15% |
| Pneumococcal conjugate vaccine | Pneumococcal disease | 15% |
| Rotavirus vaccine | Rotavirus  | 10% |

The costs and cost-effectiveness ratios for each vaccine are in Table 2.

Table 2. Cost and cost-effectiveness ratios

|  |  |  |  |
| --- | --- | --- | --- |
| **Vaccine** | **$ per immunization** | **$/DALYs averted** | **DALYs averted per immunization** |
| Pentavalent (combined vaccine) | 10 | 20 | 0.50 |
| Measles vaccine | 6 | 60 | 0.10 |
| BCG vaccine | 4 | 120 | 0.03 |
| Pneumococcal conjugate vaccine | 8 | 100 | 0.08 |
| Rotavirus vaccine | 8.5 | 120 | 0.07 |

For this exercise, we have made some simplifications.

1. One **unique cohort of 200,000 children** (no differences in vaccination schedule)
2. One given child can **receive between 0-5 vaccines** from the programme.
3. All children have **equal probability** of contracting each of the disease (i.e. no targeting is possible).
4. All vaccines are handled in the same supply chain and administered in the same fixed health facility i.e. the **same health systems constraints apply to all vaccines**.
5. The **cost per immunisation** for one vaccine is set independently from the rest of the portfolio. The cost-effectiveness ratios are calculated on the basis of universal coverage.

As the budget holder, your main concern is to ensure that your budget is spent in the most efficient manner: you will prioritise the most cost-effective interventions and your allocated budget will **produce the maximum health.** For this reason, you need to understand the health impacts of the decisions you make. We want you to look at the cost and health impacts of six different spending scenarios.

To do so, we have developed a simple excel spreadsheet. The information requested from you for each scenario is highlighted in blue. **You need to enter your answers in the corresponding cells highlighted in pink**. The health gains are in cells highlighted in yellow.

**Please do not touch ANY of the other cells that are not highlighted in pink. Formulas have been pre-entered so that you don’t need to calculate everything manually. Once your answers are entered in the pink cells, the other cells with calculate everything automatically.**

You have 35 minutes to complete the answers for each spending scenario. Please enter answers to the scenarios sequentially. If you are stuck on a scenario, don’t hesitate to ask a staff member!

**To set a priority or not?**

**Scenario 1: No fixed budget**

At first glance, we find that all of the interventions listed cost less than $150 per DALY averted and are therefore likely to be highly cost effective. In the absence of a fixed budget for vaccinations, all of the interventions would be funded. Please fill out the following information using the accompanying excel spreadsheet.

|  |  |  |
| --- | --- | --- |
| **Total cost per immunised child** |  |   |
| **Total DALYs averted per immunised child** |   |
| **Cost of full immunisation programme** |   |
| **Total DALYs generated** |   |   |

**Scenario 2: Allocation based on the burden of disease**

You do not have enough information on the clinical effectiveness or the cost-effectiveness for any of the vaccines. However, you have information on the burden of disease, which you could use to allocate resources. As a reminder, burden of disease figures are reported in Table 1.

|  |  |
| --- | --- |
| **Vaccine** | **DALYs averted** |
| Pentavalent |  |
| Measles vaccine |  |
| BCG vaccine |  |
| Pneumococcal conjugate vaccine |  |
| Rotavirus vaccine |  |
| Total |  |

**Scenario 3: priority to the cheapest vaccines**

The only information that is given to you is information on the cost for procurement and providing the vaccines (including delivery, supply chain etc.). You decide to cover the maximum number of children, with as many vaccinations as possible. In other words, **you prioritise coverage for the cheapest vaccines in the portfolio**.

Please rank the vaccines in order of price (1 = cheapest, 5 = most expensive)

1.

2.

3.

4.

5.

To start, priority is given to providing full coverage to the cheapest vaccine.

Once coverage for the cheapest vaccine is complete, we use the remaining budget to cover the second cheapest vaccine; and so on until the budget is exhausted.

**NB. You need to careful that you do not overspend your capped budget of $4 million.**

|  |  |
| --- | --- |
| **Vaccine** | **DALYs averted** |
| Pentavalent |  |
| Measles vaccine |  |
| BCG vaccine |  |
| Pneumococcal conjugate vaccine |  |
| Rotavirus vaccine |  |
| Total |  |

**Scenario 4: Priority Setting**

Here we use the ‘bookshelf’ metaphor used by Culyer (2016) that was presented earlier. Interventions are ranked according to their cost-effectiveness – please rank below (1 = most cost effective, 5, least cost-effective)

1.

2.

3.

4.

5.

Priority is given to providing full coverage to the most cost-effective vaccine.

Once coverage for the most cost-effective vaccine is complete, we use the remaining budget to cover the second most cost effective vaccine; and so on until the budget is exhausted.

NB. You need to careful that you do not overspend your capped budget of $4 million.

|  |  |
| --- | --- |
| Vaccine | **DALYs averted** |
| Pentavalent |  |
| Measles vaccine |  |
| BCG vaccine |  |
| Pneumococcal conjugate vaccine |  |
| Rotavirus vaccine |  |
| Total |  |

**Summary of the exercise – what have you learned?**

Please fill out this summary table of your results

|  |  |  |
| --- | --- | --- |
| **Scenario** | **Cost** | **DALYs averted** |
| 1. No budget constraints
 |  |  |
| 1. Burden of disease
 |  |  |
| 1. Cheapest vaccine
 |  |  |
| 1. Priority setting
 |  |  |

What scenario gives the maximum health gained?

What scenario gives you the least health?

How many DALYS would be lost by choosing the scenario with the least heath compared to the best scenario? (excluding ‘no priority’ scenario)

1. Here the denominator is the total DALYs caused by the conditions featured on the table. [↑](#footnote-ref-1)