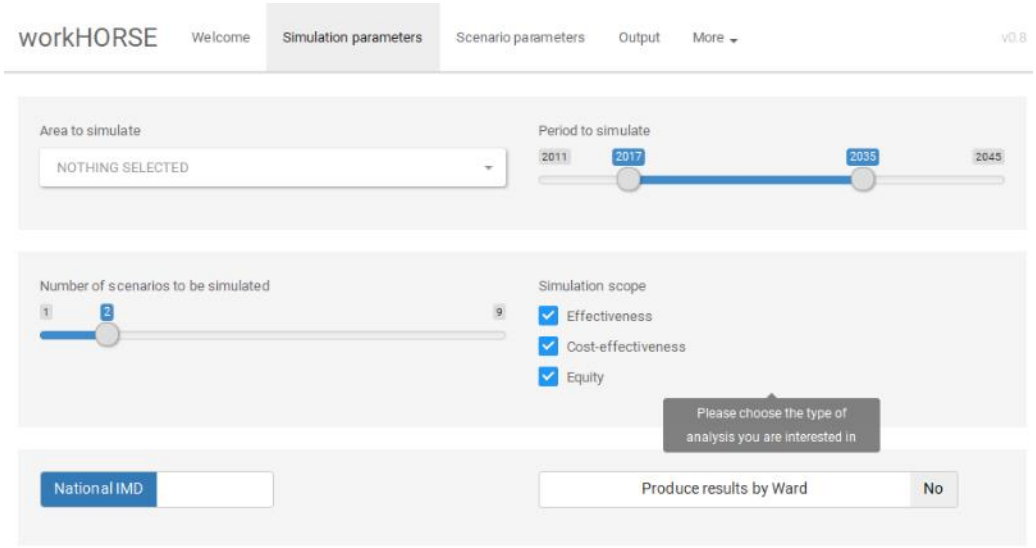
Interface sample tutorial: Setting up scenarios for analysis, with examples.

Note: The interface is evolving and might not entirely represent the current version. These tutorials need regular review and updates.

Basic settings

To start using the workhorse tool, you need to provide some basic information in the simulation parameter sheet (Figure 1): the geographical area you are interested in, the time horizon you want to simulate, how many scenarios you want to test (including the baseline or business as usual scenario) and the scope of the analysis: whether you are interested in evaluating the effectiveness, cost-effectiveness or equity of each scenario.

Figure 1 Simulation parameters tab



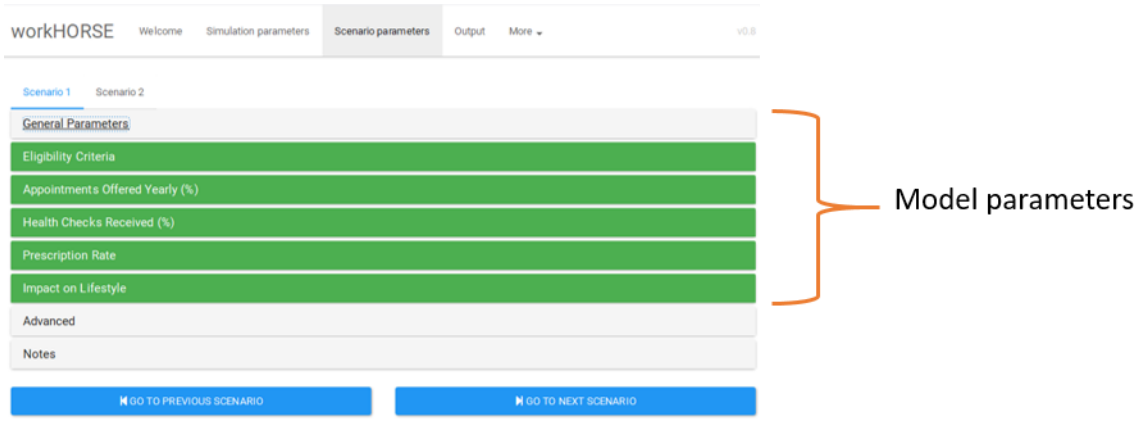
Also, you can decide whether you want to use the National Index of Multiple deprivation (IMD) or the area-specific IMD. For more detailed information on each of these parameters, please refer to the main report, Chapter 5.

Setting scenarios

Once you have defined the number of scenarios you want to evaluate, you need to define them in the ***scenario parameter*** sheet (Figure 2). To set any scenario, including the baseline scenario, you need to provide information about the model parameters. Each parameter has a tab in the **scenario parameters** sheet.

Currently in the tool, all these parameters have default values; therefore, you do not need to provide new information for all of them unless you have new/different information.

Figure 2 Scenario parameters tab



In the **General Parameters** tab, you can define: 1) the name of your scenario (i.e., scenario A, Baseline scenario, etc.), 2) whether this scenario is the baseline against which you will compare future scenarios and 3) the starting year of implementation for this scenario.

Once you have defined the scenario, you can also save it to use it later as a template for a new scenario. To do this, go to the general parameters tab and click the “Save scenario” button. If you need to use this scenario later as a template, you can click in “Load scenario” in the general parameters tab.

In the **Eligibility Criteria** tab, you can play with 1) the age of eligibility to be invited, 2) how often (in time) you will provide HCs and 3) whether you want to invite known diabetics or hypertensive individuals. Remember this tab already have default values corresponding to the current implementation.

In the **Appointments Offered Yearly** tab, you can specify **changes related to coverage** of the HC programme by changing the parameter “Invitations (percentage of eligible population)” and the “Cost per invitation”. If you wish to vary the above parameters by IMD, you can do this by clicking detailed input (see example B below).

In the **Health Checks Received** tab, you can specify **changes related to uptake** of the HC programme by changing the parameter “Proportion of invitees attending a Health” and changes related to **the payment providers received for each participant** by changing the “Cost per completed Health Check”. If you wish to vary the above parameters by IMD, you can do this by clicking detailed input. Look for an example below.

In the **Prescription Rate** tab relates to what happens after the HC has taken place. Here you can specify changes to **prescription rates of statins and antihypertensive** for those participants with QRISK score greater than 10 or participants with hypertension, respectively.

As it can be done with the other parameters described above, you can vary these parameters my IMD.

In the **Impact on Lifestyle** tab, you can evaluate the potential outcomes of **referrals to lifestyle services** such as smoking cessation, weight management and physical activity (PA) programs. You would need to specify the percentage of people successfully achieving smoke cessation, losing weight or increasing their PA and the associate overhead and per participant costs. Additionally, for the weight management and PA programmes, you would need to specify the average weight loss (in kg) or the number of days PA increased.

Examples

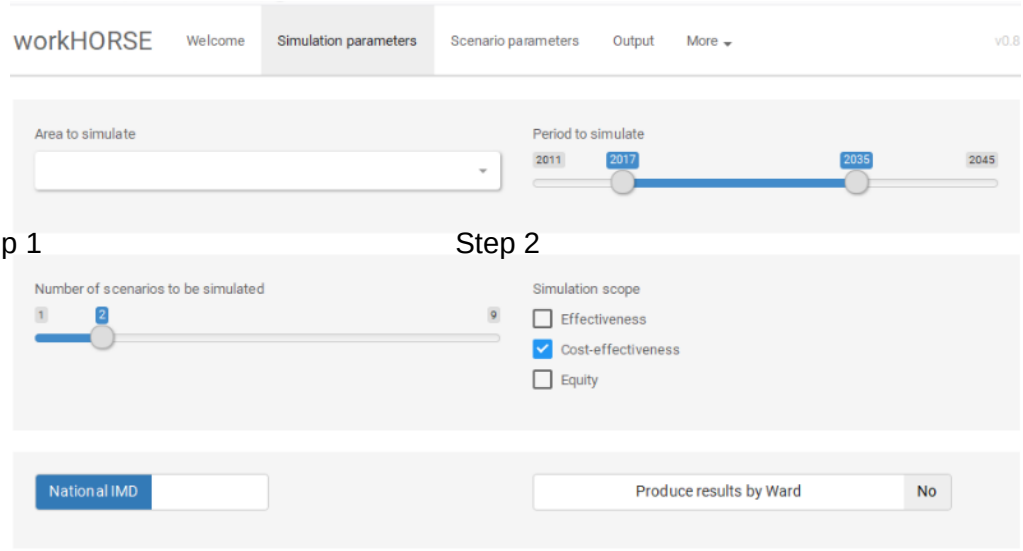
Example A

In your area, you have identified that the annual coverage of NHS Health Checks is suboptimal (15% with no socioeconomic gradient).

You are considering increasing the payment providers receive for each participant from £5 to £10, and you expect that this, will increase coverage to the national target of 20%. You are interested in whether this change can make the program more cost-effective.

Here you want to compare the cost-effectiveness of two scenarios, a baseline scenario with suboptimal annual coverage and a Scenario 1 with better coverage. The first step is then to specify in the **Simulation parameters** sheet that you will run two scenarios (Figure 3, Step 1) and the scope of the simulation is cost-effectiveness (Figure 3, step 2)

Figure 3 Example A, Steps 1-2



Then we need to define the Baseline scenario in the **Scenario parameters** sheet by assigning it a name and clicking the “Baseline scenario” button in the *General Parameters* tab (step 3). For this scenario, we only know that the coverage is suboptimal (15% with no socioeconomic gradient) so this is the only parameter we need to change in the *Appointments Offered Yearly (%)* tab (step 4), and we can safely leave the rest of the default values. Then click “GO TO THE NEXT SCENARIO” button ant the bottom of the page (step 5). (figure 4, Steps 3-5)

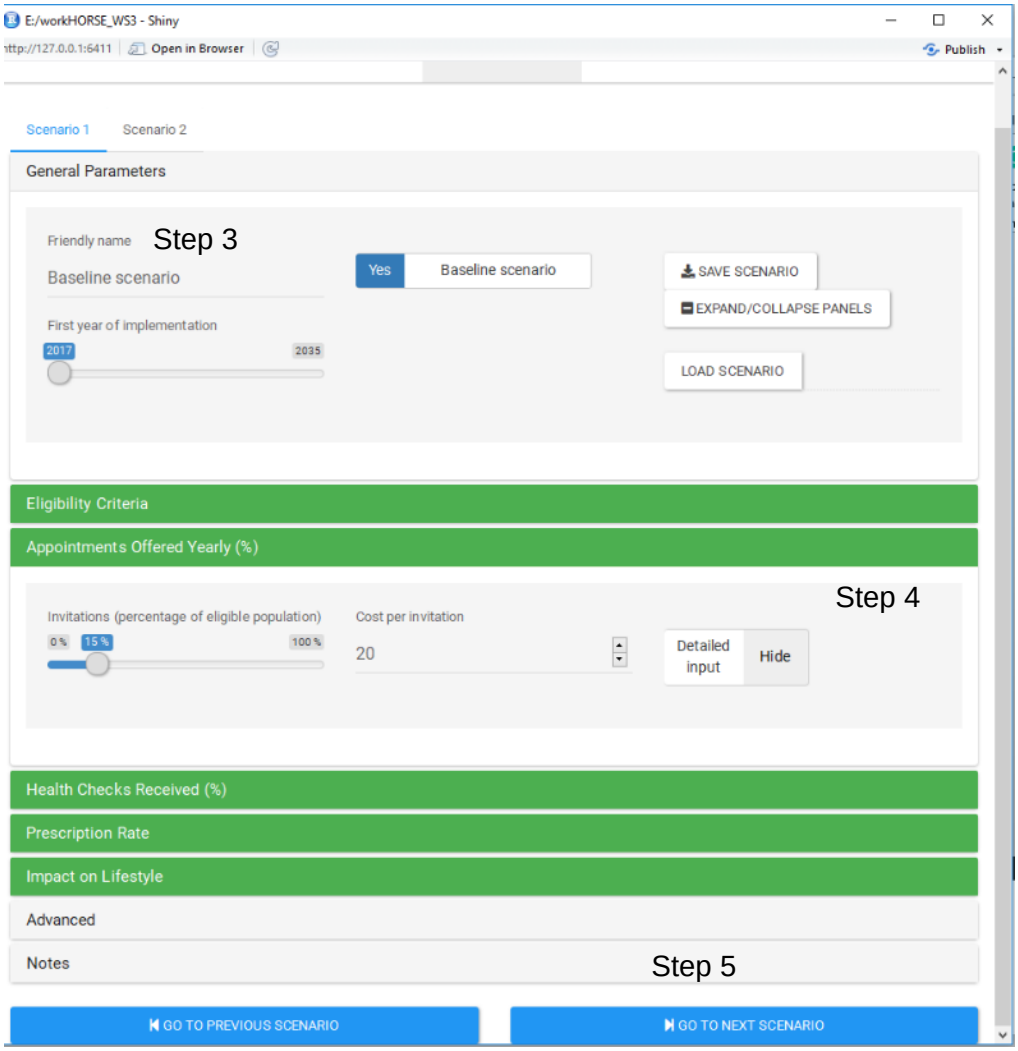


Figure 4 Example A, steps 3, 4 and 5

Now let's define scenario 1 by assigning it a name in the *General Parameters* tab (step 6). We know that the “Cost per completed Health Check” will increase to £10, so we can specify this in the *Health Checks Received* tab (step 7). Also, we are expecting an increase to 20% in the coverage (i.e., the % of the eligible population) (step 8). After setting the scenarios, we can run the simulation by clicking “RUN SIMULATION (ALL SCENARIOS)” button at the bottom of the page. (Figure 5, Steps 6-9)

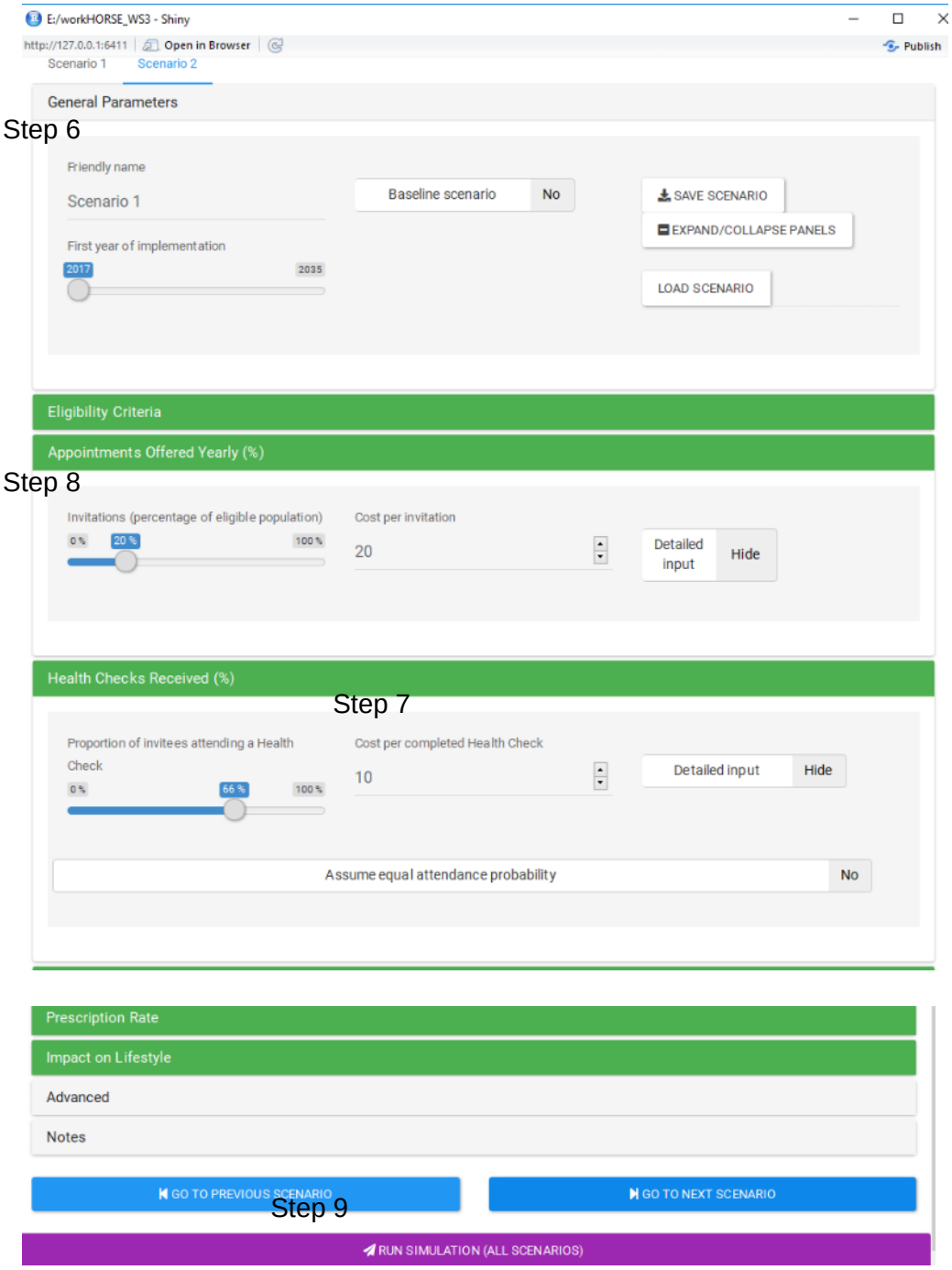


Figure 5 Example A, steps 8-9

Example **B**

In your area, you have identified that the prescription rate of statins and antihypertensive medication after a Health Check is 15% lower than expected, especially among participant with a high 10-year risk of CVD.

You have informed those delivering the Health Checks about the issue, and you expect this will increase prescription rate among people with a high 10-year risk of CVD (QRISK > 20) by

10% with no socioeconomic gradient. You are interested in whether this change can make the program more cost-effective and/or more equitable.

Here you want to compare the cost-effectiveness and equity of two scenarios, a baseline scenario with suboptimal prescription rate of statins and antihypertensive medication and a Scenario 1 with higher prescription rate among those on higher risk. First step is then to specify in the **Simulation parameters** sheet that you will run two scenarios (step 1) and the scope of the simulation is cost-effectiveness and equity (step 2). (Figure 6, steps 1-2)

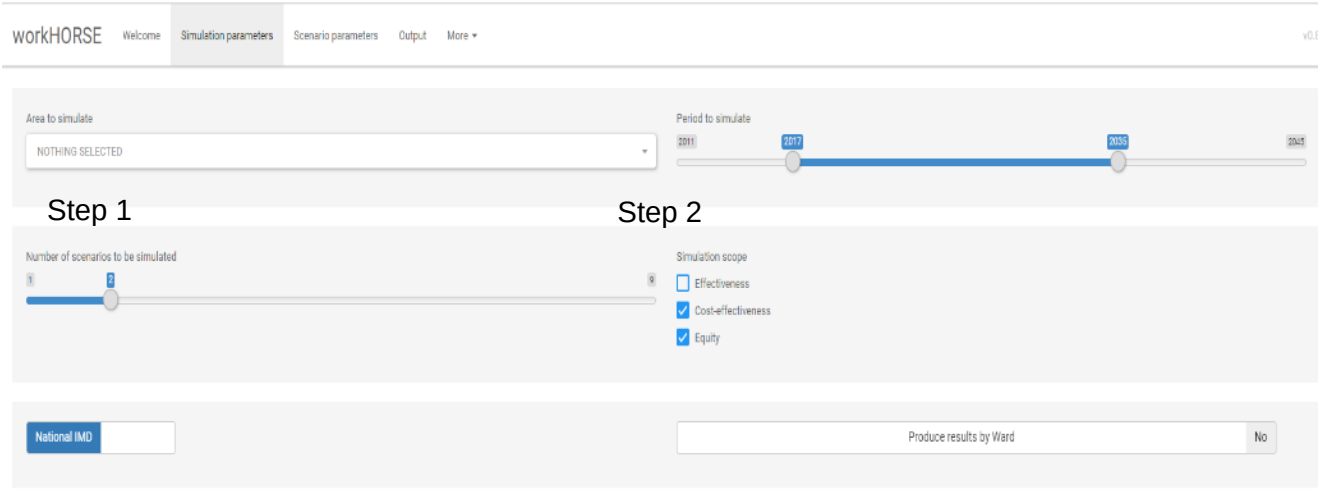


Figure 6 Example B, steps 1-2

Then we need to define the Baseline scenario in the **Scenario parameters** sheet by assigning it a name and clicking the “Baseline scenario” button in the *General Parameters* tab (step 3). For this scenario, we can use most of default values for all parameters except the prescription rates. In the *Prescription Rate* tab, we can input the prescription rates for those with high systolic blood pressure or a QRISK higher than 10. However, for this scenario, we are interested in those with a QRISK higher than 20. Therefore, we need to click “Detailed input” in the *Prescription Rate* tab to input this information (step 4).(Figure 7, Steps 3-4)

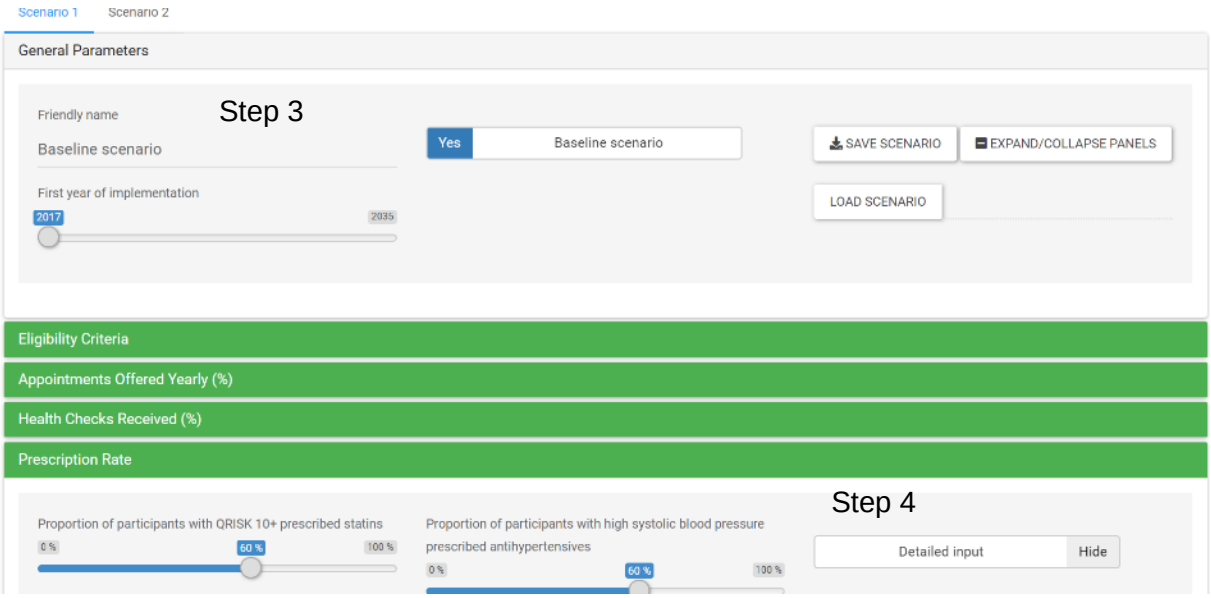


Figure 7 Example B, steps 3-4

Now you will see two tables to input the number of people that were prescribed statins and antihypertensive medication after a Health Check by QIMD, and QRISK score. You might not have the exact numbers at hand. This should not be a problem; you just need to keep the proportions between subgroups right. For example, for this scenario, we know the prescription rate for those with a QRISK >20 is 15% lower than the other subgroups, and there is no social gradient. So, an easy solution is presented below (Figure 8, step 5). Notice that we input the same figures for all the subgroups except those with a QRISK >20, which have now prescription rates 15% lower compared to the rest. Remember you can input any number if you keep the proportions (or ratios) between subgroups correct.

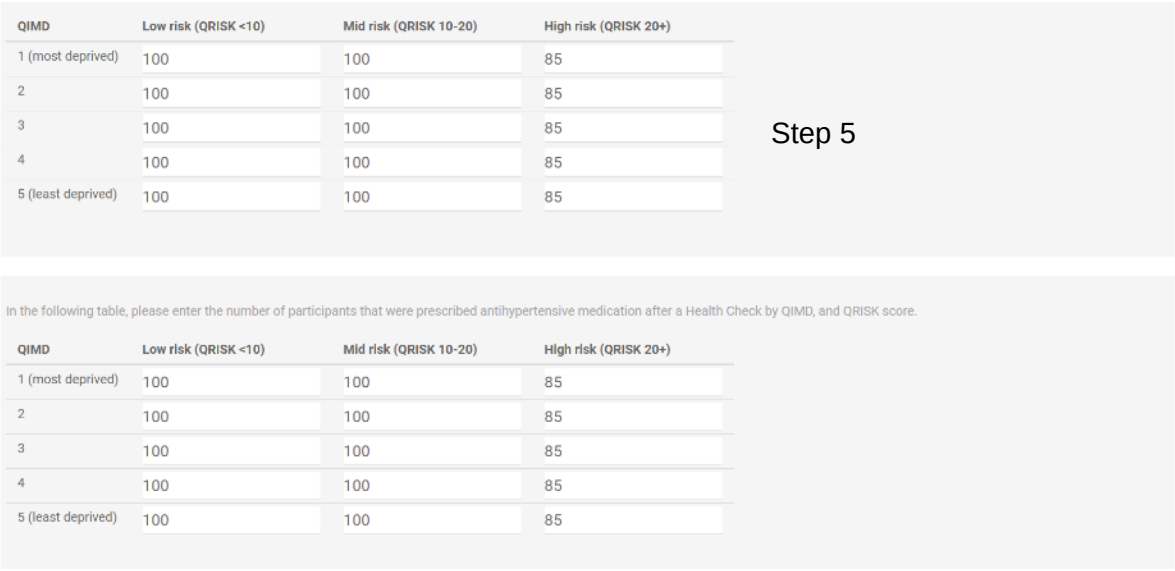


Figure 8 Example B, Step 5

It could be useful to save this baseline scenario as a template for the next scenario. We can do this by clicking “SAVE SCENARIO” in the *General Parameters* tab (Figure 9, step 6). A file named Baseline scenario.yml will be automatically saved in your machine Downloads folder.

Figure 9 Example B, step 6

Next step is to click “GO TO THE NEXT SCENARIO” button ant the bottom of the page (step 7).

You can open the template you just save by clicking “LOAD SCENARIO” in the *General Parameters* (step 8) and search for the file in your machine downloads folder. As the figure below shows, we can see when the “baseline scenario.yml” file has been downloaded. Now we can make any changes, let us start by changing the name to Scenario 1 and indicating this is not the baseline scenario (step 9).(Figure 10, Steps 8-9)

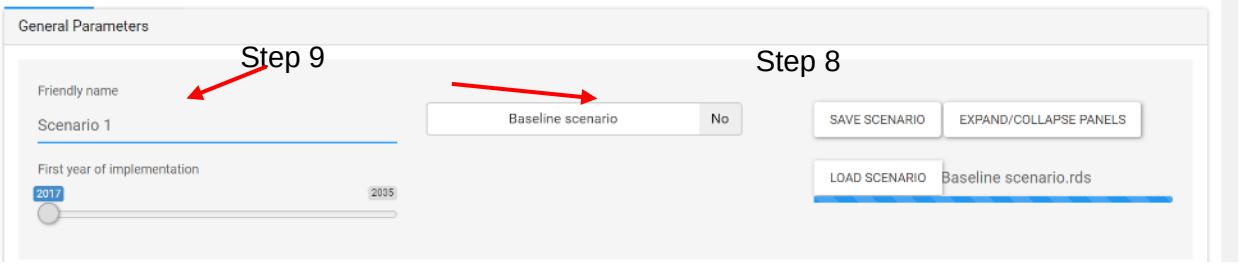
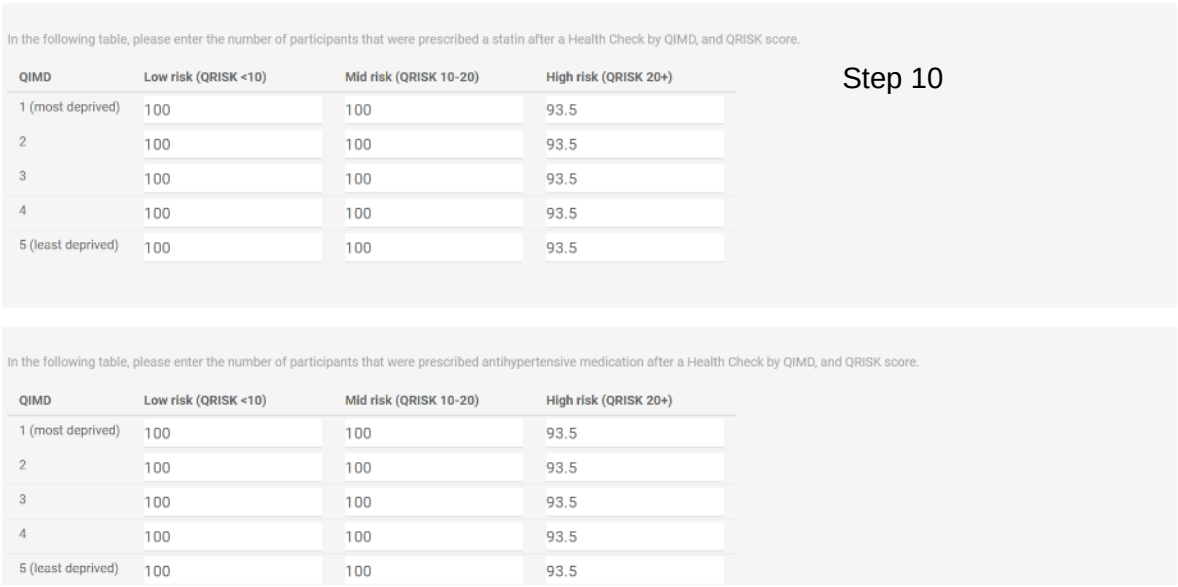


Figure 10 Example B, steps 8-9

In this scenario, we will increase the prescription rate by 10%. Therefore, this scenario’s prescription rates tables (in the *Prescription Rate* tab) will look at the figure below (Figure 11, Step 10). Notice that the rates for those with a QRISK >20 are 10% higher than in the baseline scenario (Figure 8, step 5).



Step 10

Figure 11 Example B, Step 10

After setting the scenarios, we can run the simulation by clicking “RUN SIMULATION (ALL SCENARIOS)” at the bottom of the page .

Example C

In your area, you have identified that the annual uptake of NHS Health Checks is suboptimal (from 50% in the least deprived areas to 30% in the more deprived areas).

You are considering inviting people with SMS additional to the letter invitation. You expect that this will increase the cost by £1 (from £5 to £6) per invitation but will also improve uptake by 5% in all IMD quintiles (i.e., from 50% to 55%). To address the socioeconomic gradient in uptake, you plan to invite people living in the most deprived IMD quintile by phone. You expect this to increase the cost by £20 (from £5 to £25) per invitation but also further increase uptake by an additional 15% for these areas. You are interested in whether this change can make the program more cost-effective and/or more equitable.

Here you want to compare the cost-effectiveness and equity of two scenarios, a baseline scenario with suboptimal annual uptake of the NHS health checks with a social gradient and another scenario with higher invitation costs that would result in higher uptakes of NHS Health Checks.

The first step is then to specify in the **Simulation parameters** sheet that you will run two scenarios (step 1) and the scope of the simulation is cost-effectiveness and equity (step 2). (Figure 12, Steps 1-2)

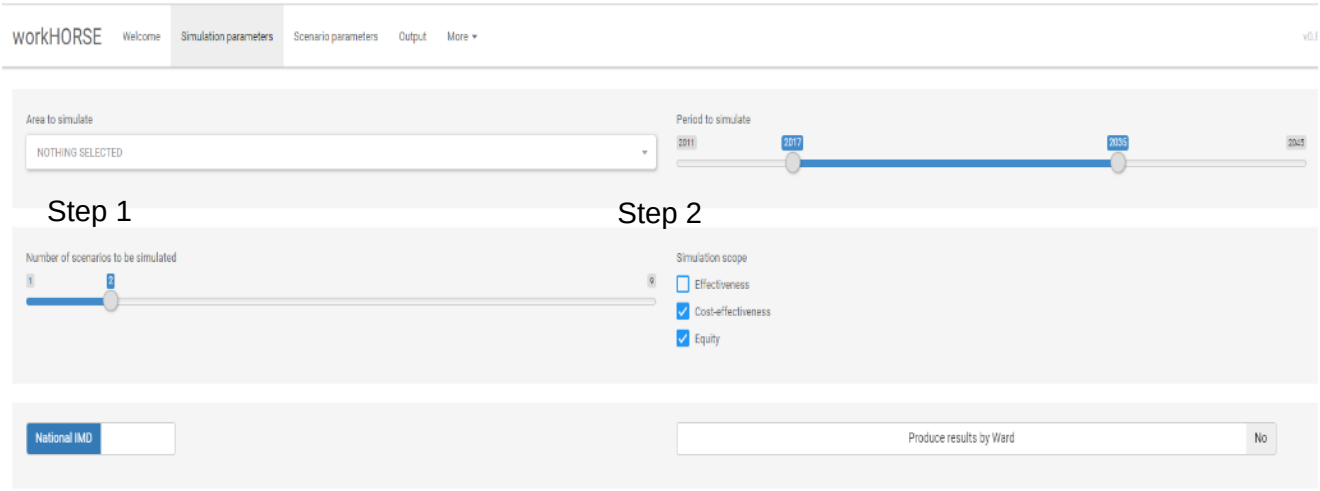


Figure 12 Example C steps 1-2

Then we need to define the Baseline scenario in the **Scenario parameters** sheet by assigning it a name and clicking the "Baseline scenario" button in the *General Parameters* tab (step 3). For this scenario, we know the cost per invitation is £5, we can change this in the *Appointments Offered Yearly (%)* tab (step 4). We can input the overall proportion of invitees attending a health check directly in the *Health Checks Received (%)* tab. However, for this scenario, we know the proportion varies according to the level of deprivation. Therefore, we need to click "Detailed input" in the *Health Checks Received (%)* tab to input this information (step 5). (Figure 13, Steps 3-5)

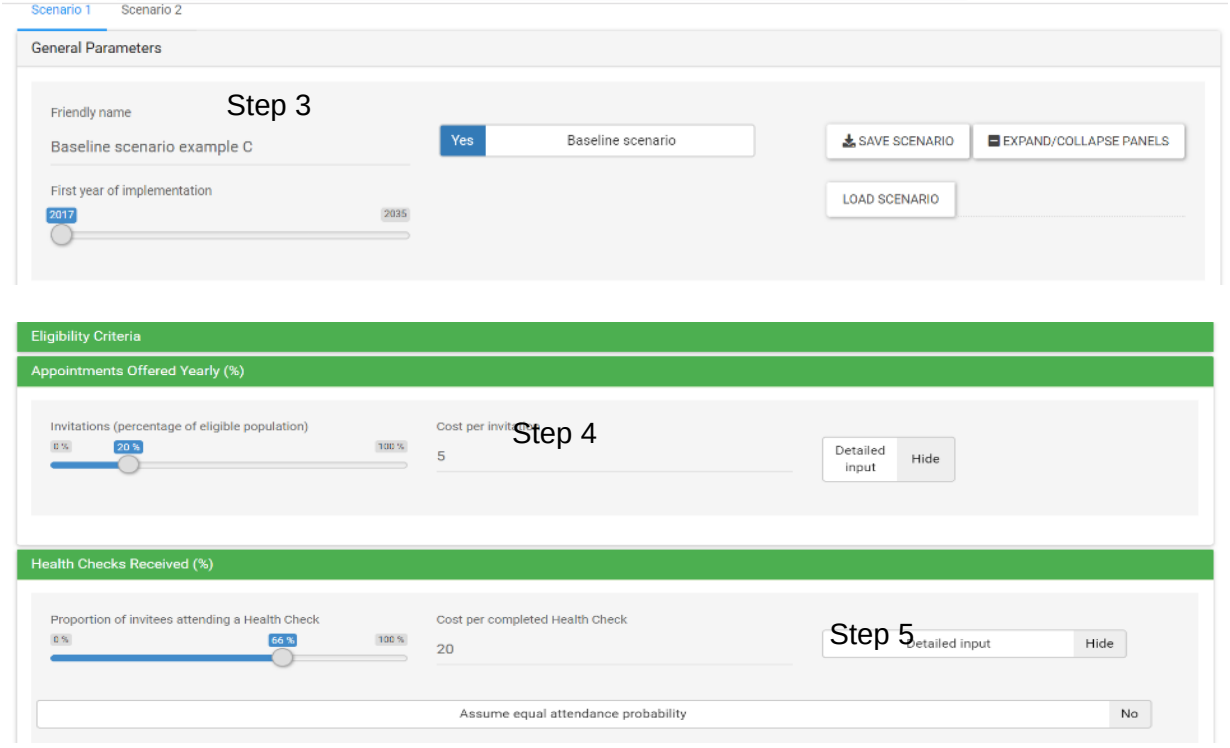


Figure 13 Example C, steps 3-5

Now a table to input the number of participants by sex, age, QIMD and QRISK score is displayed. For this scenario, we know that there are differences by QIMD: uptakes levels from 50% in the least deprived areas to 30% in the more deprived areas. Like in the previous example, it is not needed to input the real numbers, as long the proportions between groups are correct. A suggested solution depicted below (Figure 14, Step 6), is to assume we have 100 participants for each QIMD and calculate the number of participants for each group based on the uptake levels ranging from 30%-50%.

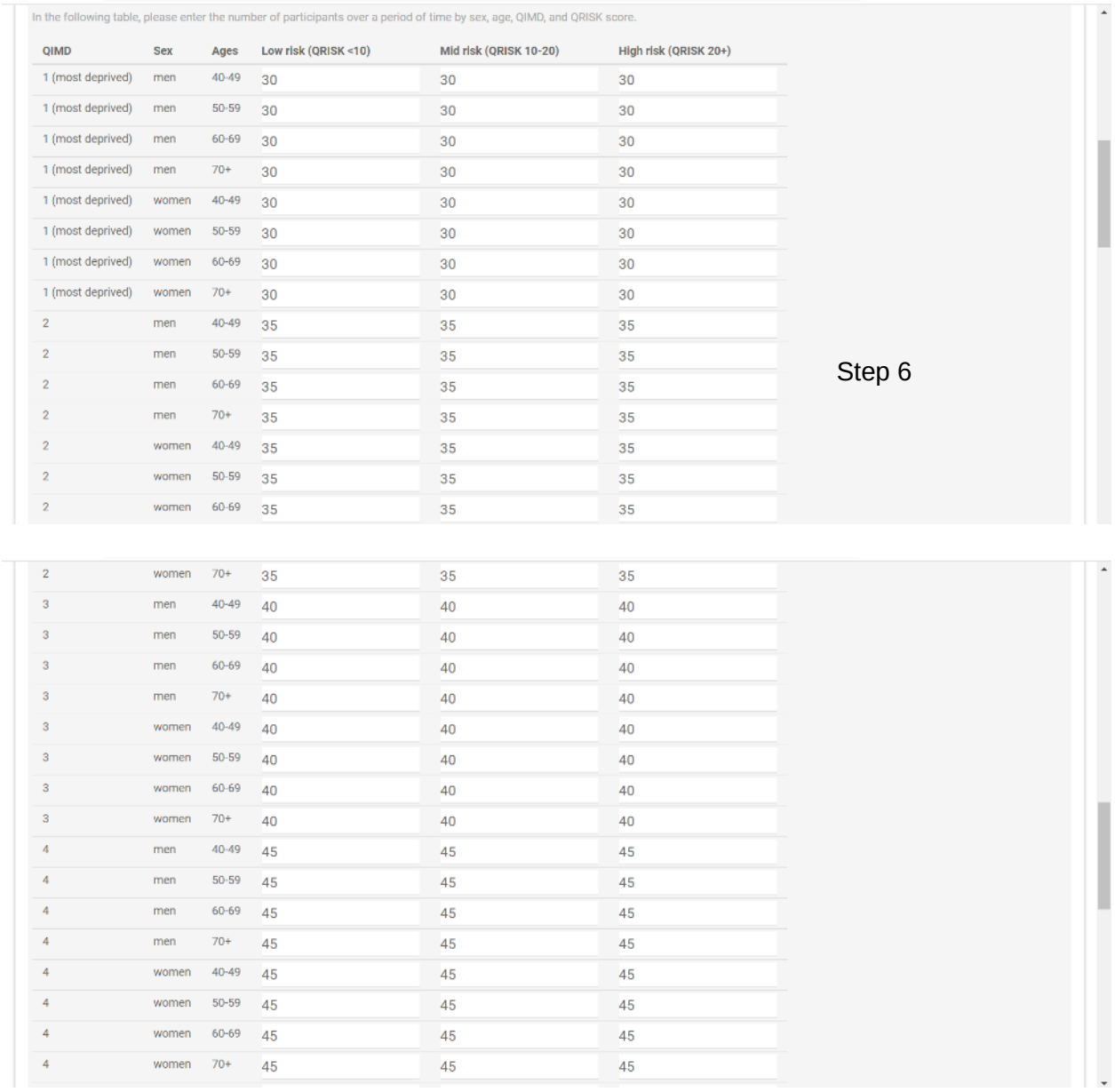


Figure 14 Example C, step 6

The rest of the parameters can remain at their default values.

You can save this baseline scenario to use it as template for the next scenario by clicking “SAVE SCENARIO” in the *General Parameters* (Figure 15, step 7). A file with a yaml extension

will be automatically saved in your machine. Next step is to click “GO TO THE NEXT SCENARIO” button ant the bottom of the page (step 8).

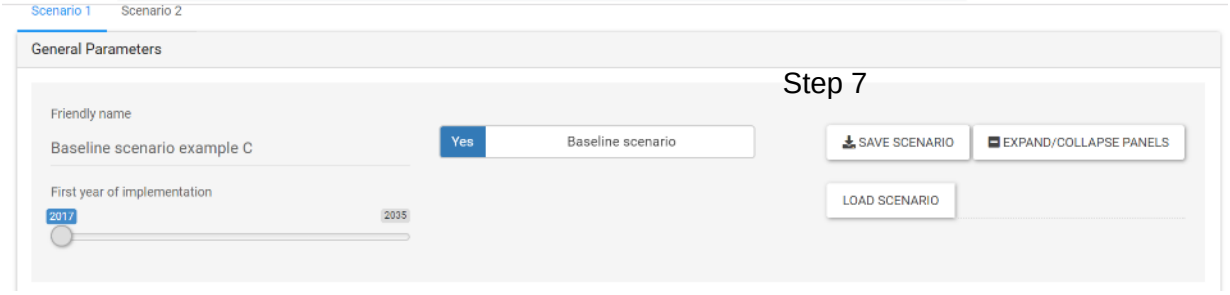


Figure 15 Example C, step 7

We can open the recently saved template by clicking “LOAD SCENARIO” in the *General Parameters* tab (step 9) and search for the file. As the figure below depicts, we can check when the file “baseline scenario example C.yml” has been downloaded and it is ready to use. Now you can make changes, start by changing the name to Scenario 1 and indicating this is not the baseline scenario (Figure 16, step 10).

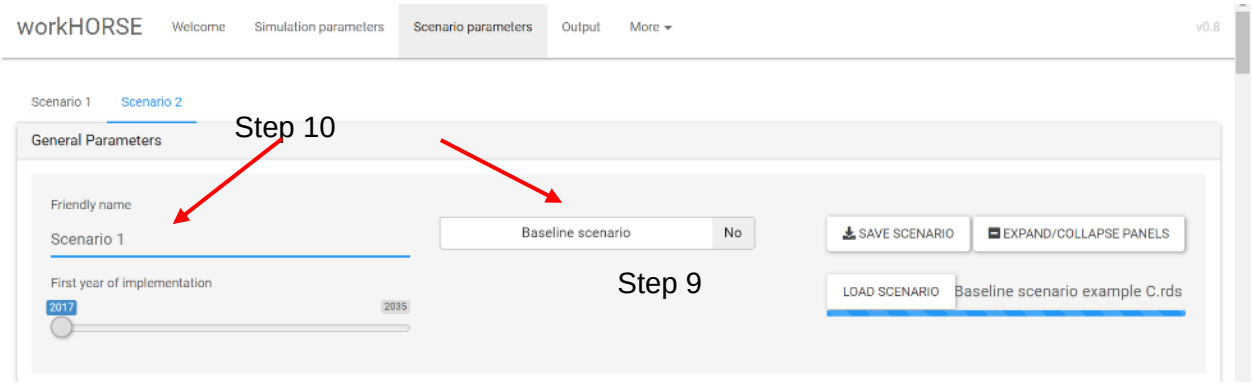


Figure 16, Example C steps 9-10

In this scenario, we are increasing the cost of invitation by £1 for all the QIMD groups except the most deprived which costs per invitation will increase by £20. You need to click “Detailed input” in the *Appointments Offered Yearly (%)* tab to input these figures (Figure 17, step 11).

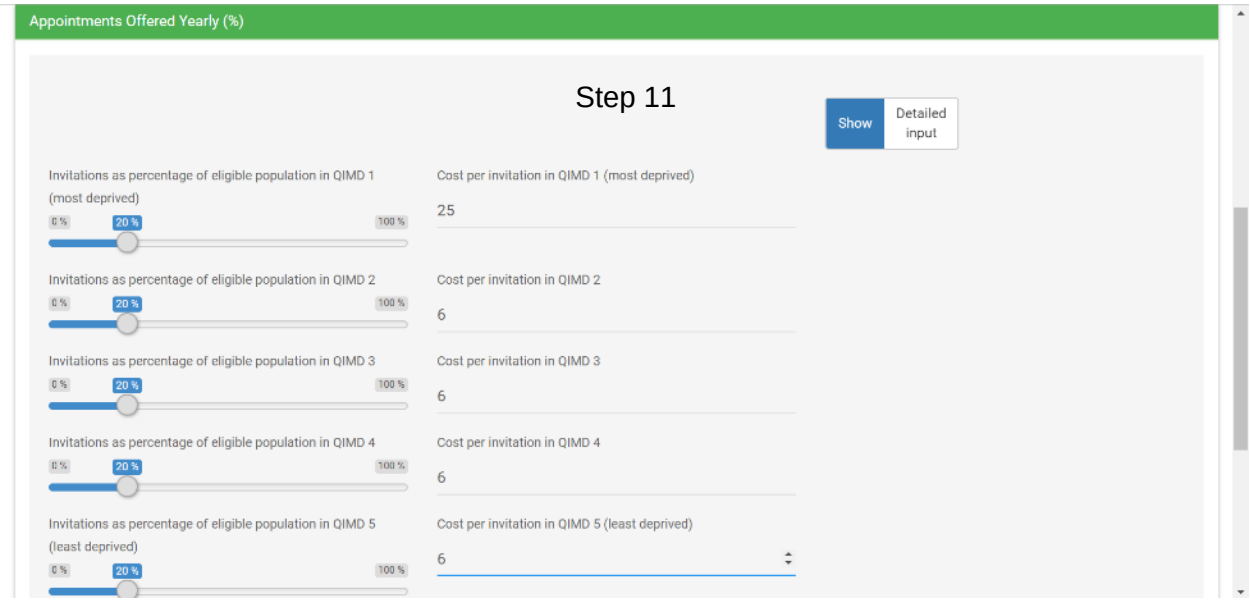
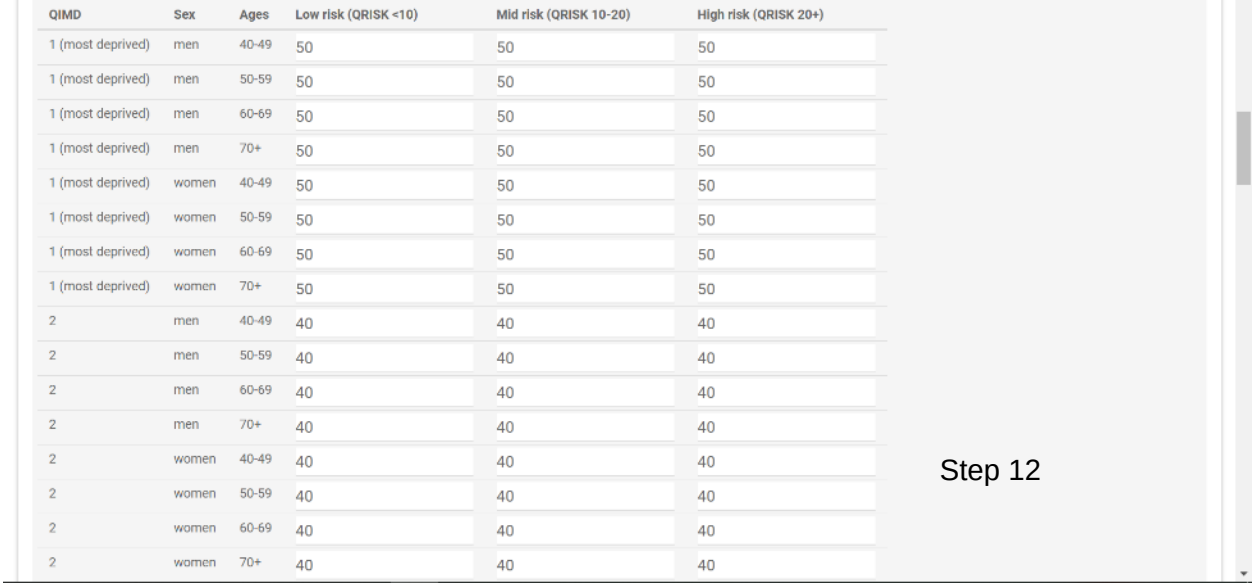
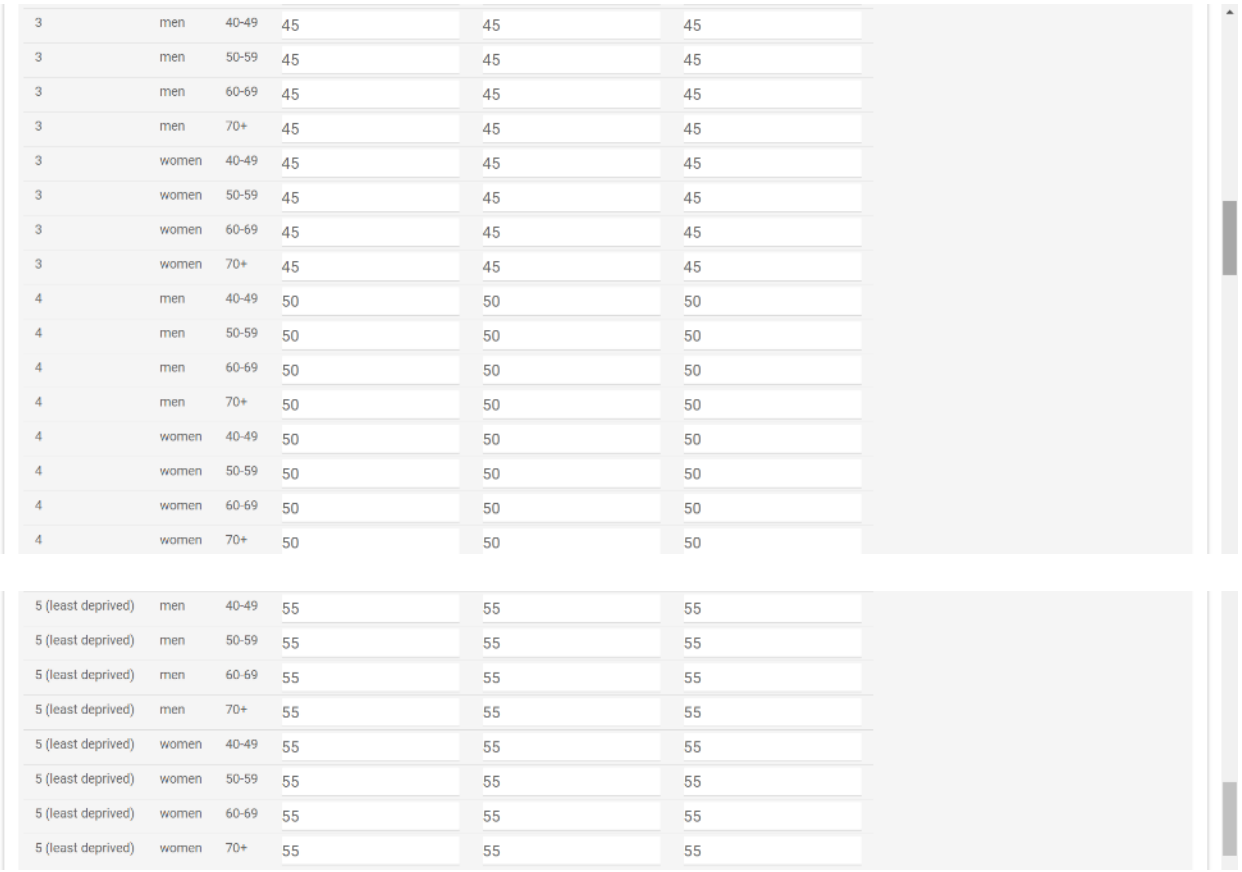


Figure 17, Example C, Step 11

We know the new invitation strategy will likely increase the uptake of health checks: 5% increase in all IMD quintiles and a further 15% increase for the most deprived QIMD. We can update the new uptake levels in the *Health Checks Received (%)* tab by clicking "Detailed input" and filling the table (Figure 18, step 12).

After setting the scenarios we can run the simulation by clicking "RUN SIMULATION (ALL SCENARIOS)" at the bottom of the page





3	men	40-49	45	45	45
3	men	50-59	45	45	45
3	men	60-69	45	45	45
3	men	70+	45	45	45
3	women	40-49	45	45	45
3	women	50-59	45	45	45
3	women	60-69	45	45	45
3	women	70+	45	45	45
4	men	40-49	50	50	50
4	men	50-59	50	50	50
4	men	60-69	50	50	50
4	men	70+	50	50	50
4	women	40-49	50	50	50
4	women	50-59	50	50	50
4	women	60-69	50	50	50
4	women	70+	50	50	50
5 (least deprived)	men	40-49	55	55	55
5 (least deprived)	men	50-59	55	55	55
5 (least deprived)	men	60-69	55	55	55
5 (least deprived)	men	70+	55	55	55
5 (least deprived)	women	40-49	55	55	55
5 (least deprived)	women	50-59	55	55	55
5 (least deprived)	women	60-69	55	55	55
5 (least deprived)	women	70+	55	55	55

Figure 18 Example C, step 12