User guide for the Excel interface utilisation for the core model in Major Depression Disorder

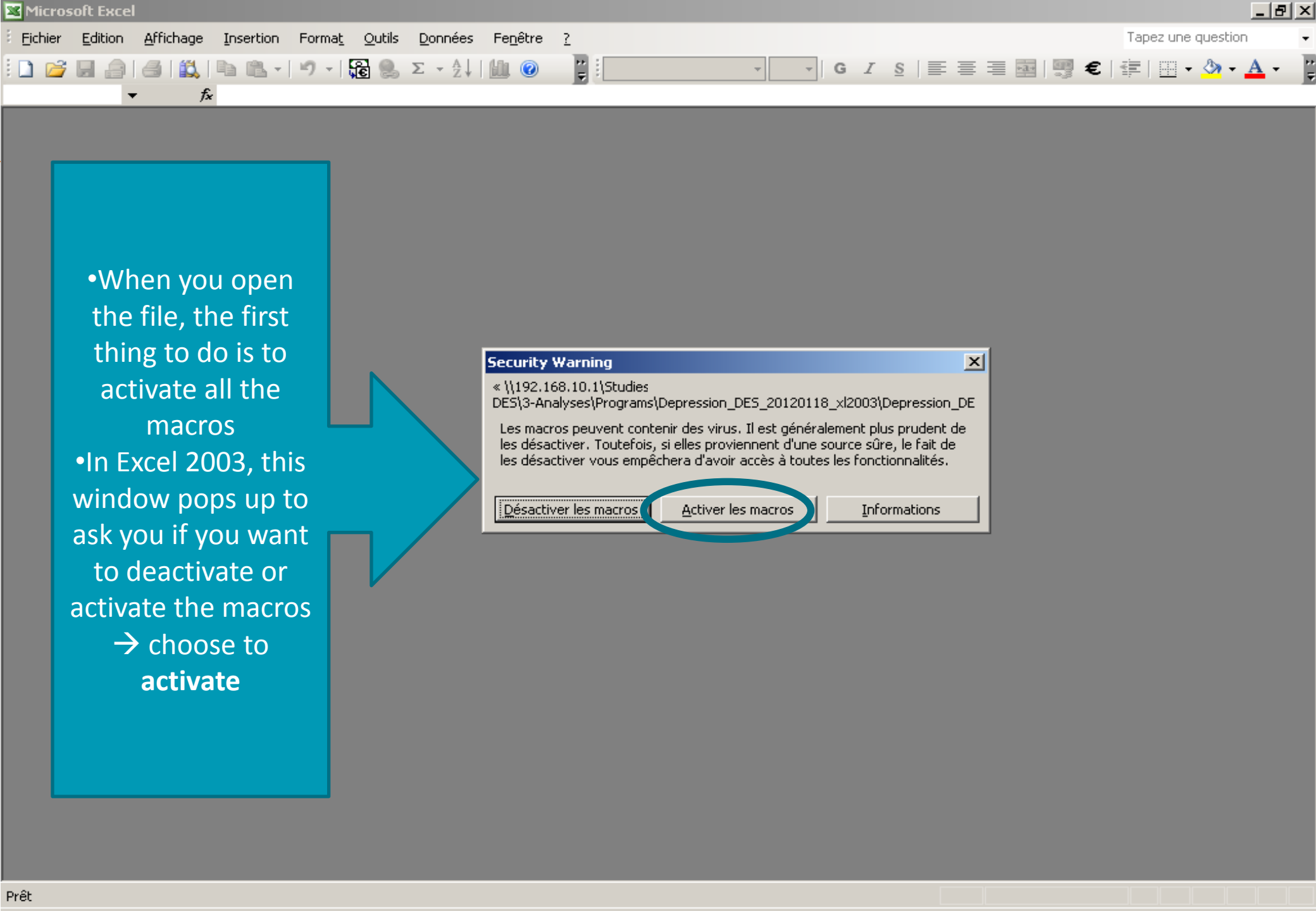
(Discrete event simulation model)

Summary

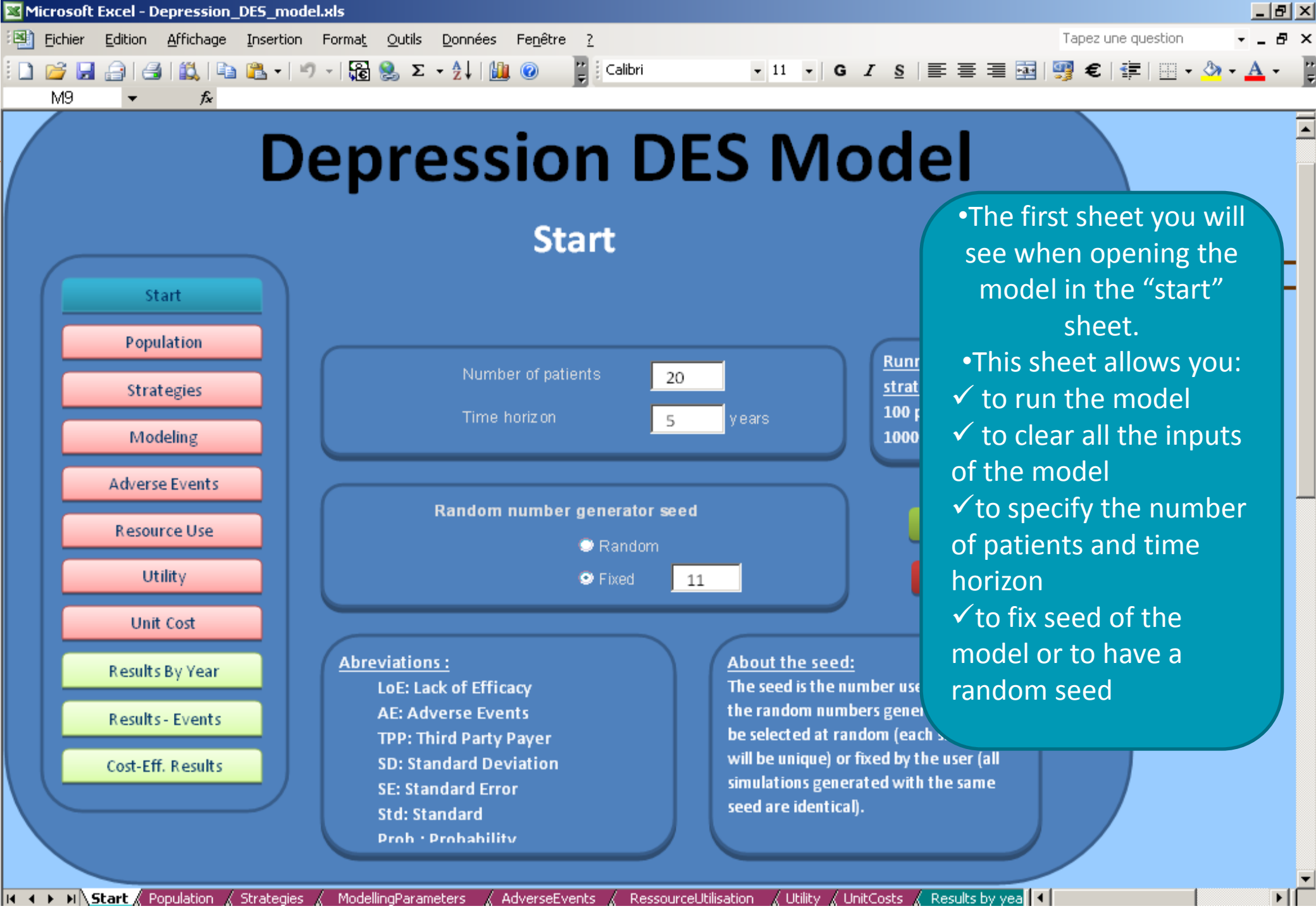
General instructions

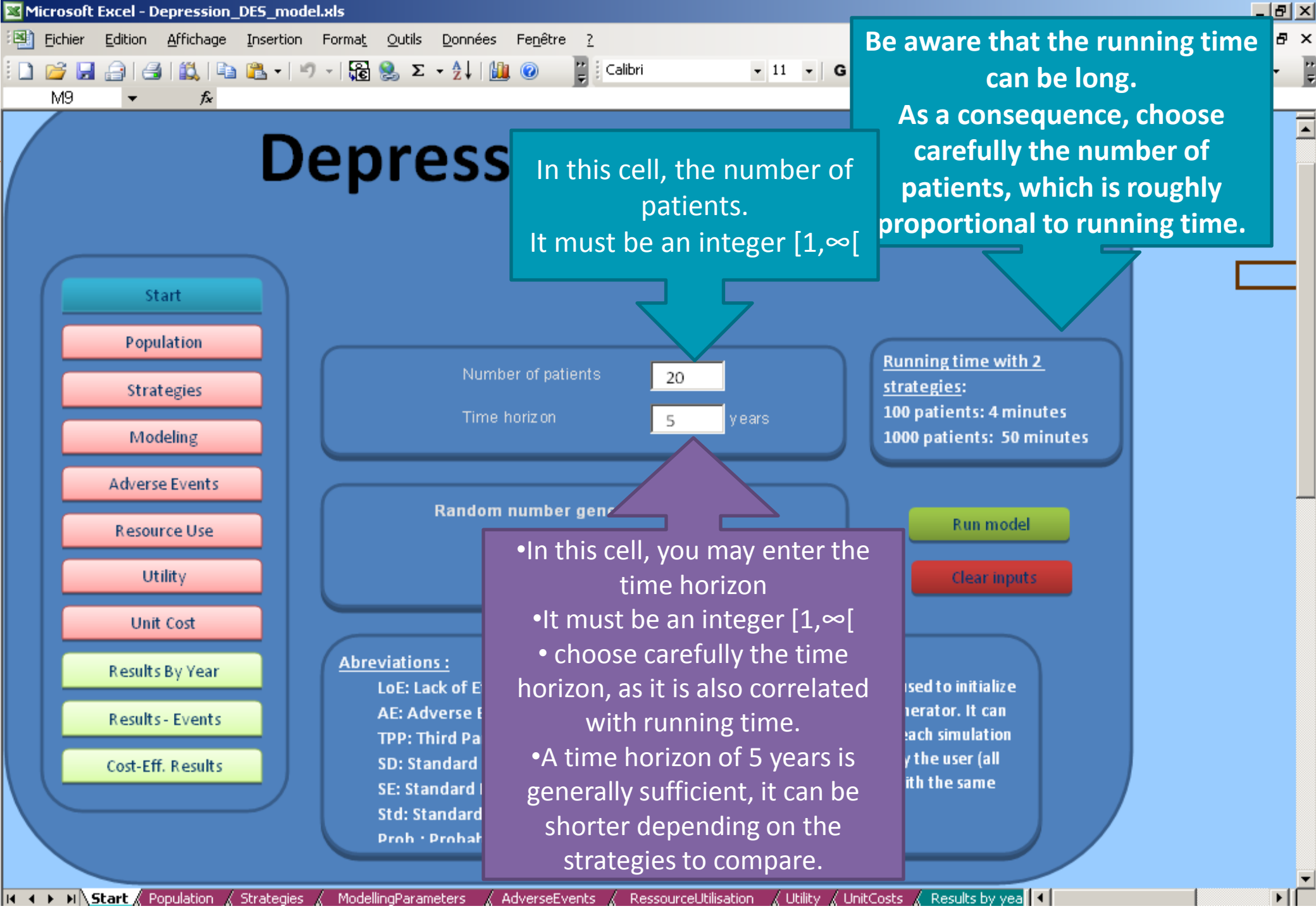
- The launch the interface, open the file named « Depression_DES_model.xls ».
- This file is in a specific folder that contains subfolders with scilab programs and other important files.

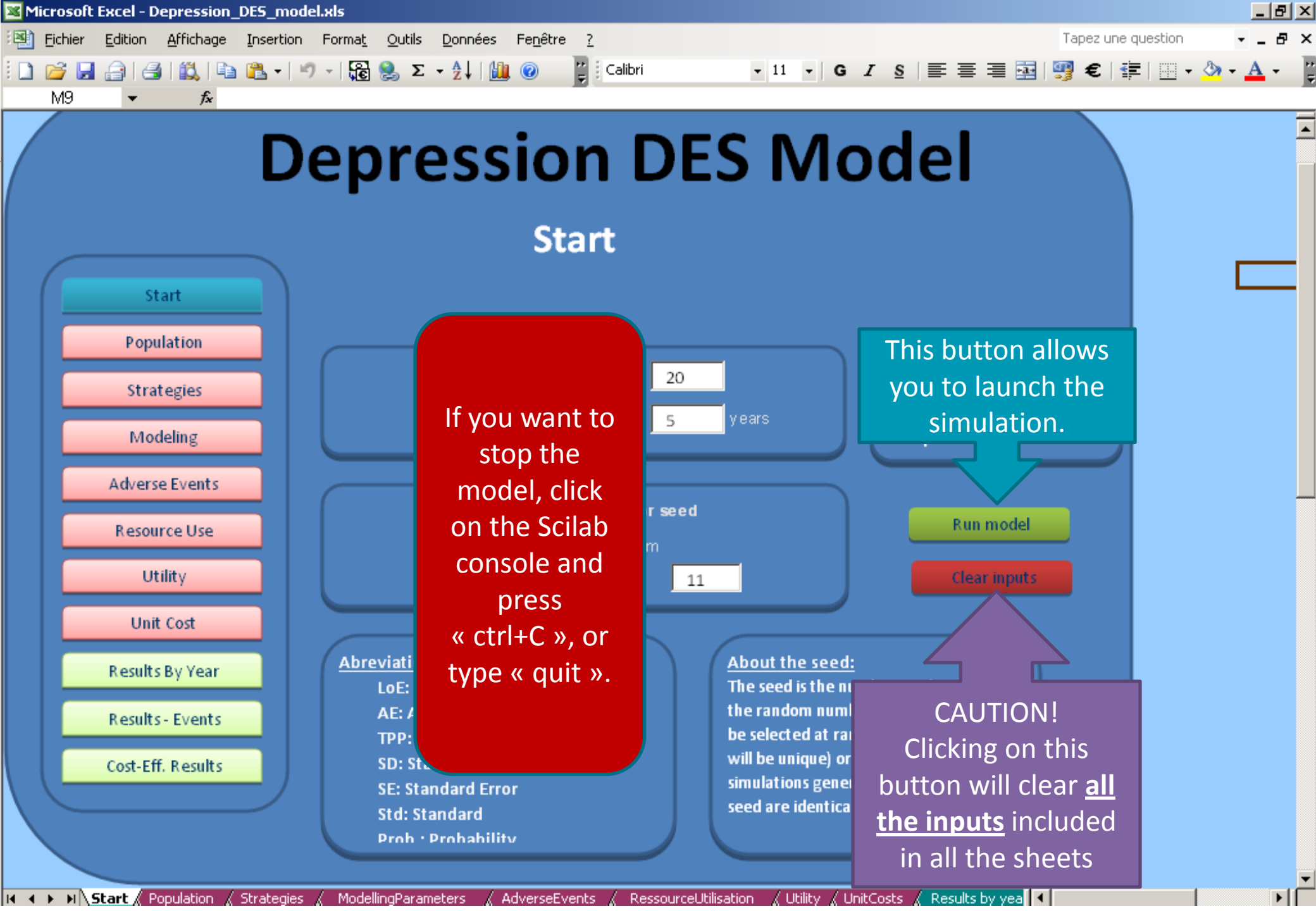
  ➔ It is important NOT to change this folder or rename any subfolder or file.

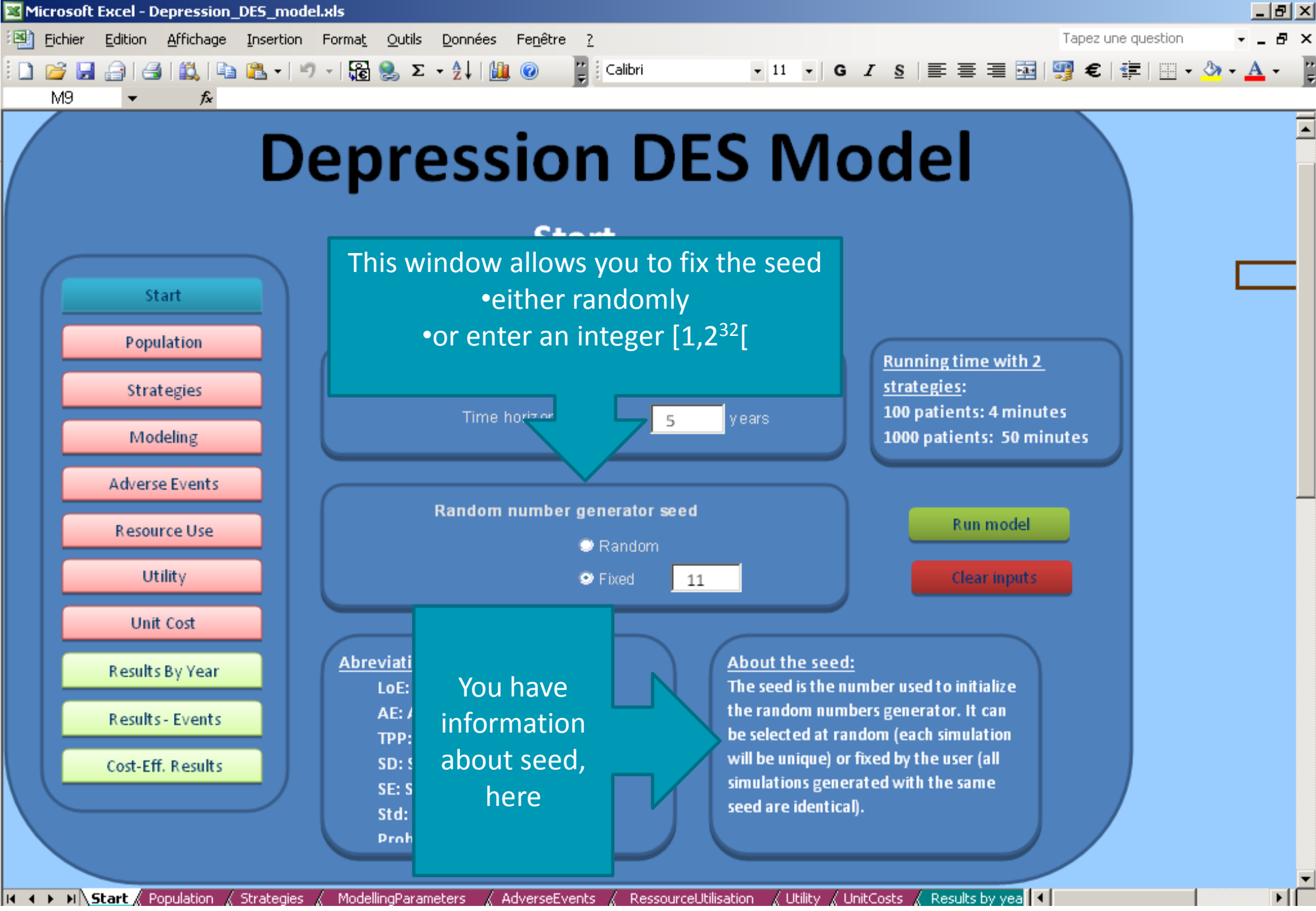

Microsoft Excel
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
•When you open the file, the first thing to do is to activate all the macros
•In Excel 2003, this window pops up to ask you if you want to deactivate or activate the macros
→ choose to **activate**
Security Warning
« \\192.168.10.1\Studies DES\3-Analyses\Programs\Depression_DES_20120118_xl2003\Depression_DE
Les macros peuvent contenir des virus. Il est généralement plus prudent de les désactiver. Toutefois, si elles proviennent d'une source sûre, le fait de les désactiver vous empêchera d'avoir accès à toutes les fonctionnalités.
Désactiver les macros
Activer les macros
Informations
Prêt

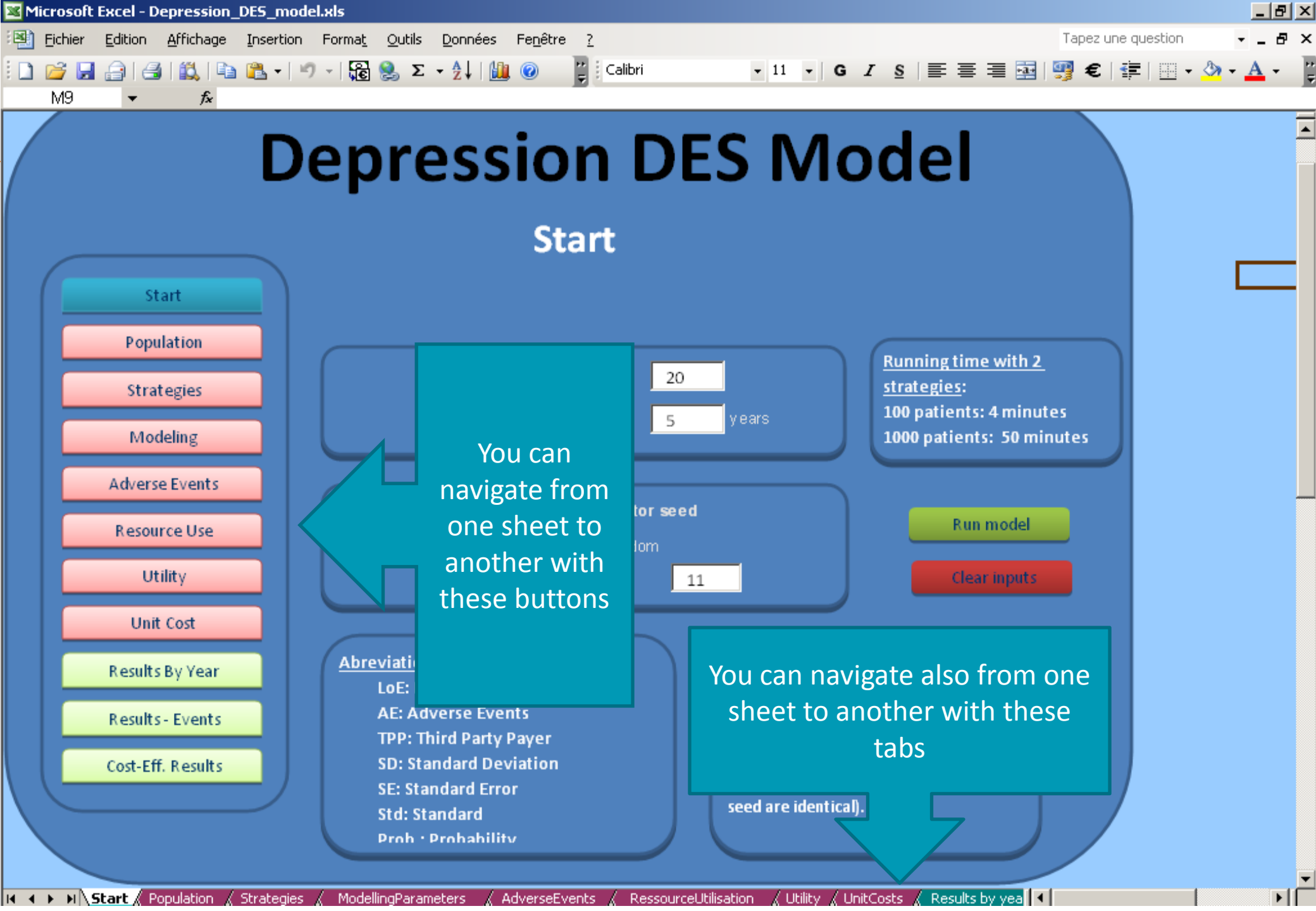
Start


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
M9
Depression DES Model
Start
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Results
Number of patients 20
Time horizon 5 years
Random number generator seed
Random
Fixed 11
Abreviations :
LoE: Lack of Efficacy
AE: Adverse Events
TPP: Third Party Payer
SD: Standard Deviation
SE: Standard Error
Std: Standard
About the seed:
simulations generated with the same seed are identical).
•The first sheet you will see when opening the model in the “start” sheet.
•This sheet allows you:
✓ to run the model
✓ to clear all the inputs of the model
✓to specify the number of patients and time horizon
✓to fix seed of the model or to have a random seed
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

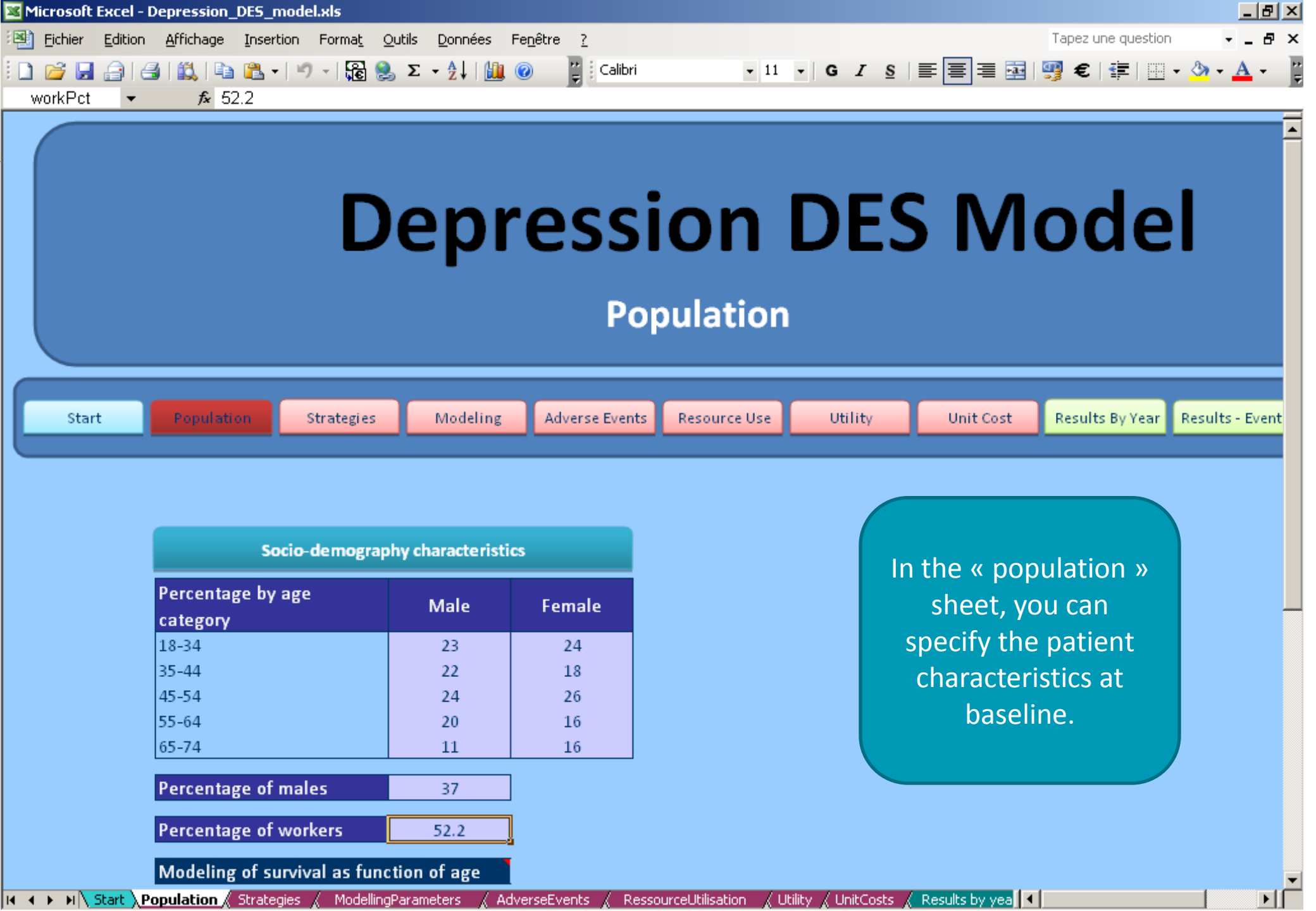

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Calibri 11
M9
Depress
In this cell, the number of patients.
It must be an integer [1,∞[
Be aware that the running time can be long.
As a consequence, choose carefully the number of patients, which is roughly proportional to running time.
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Results
Number of patients 20
Time horizon 5 years
Running time with 2 strategies:
100 patients: 4 minutes
1000 patients: 50 minutes
Random number gen
Run model
Clear inputs
Abreviations :
LoE: Lack of E
AE: Adverse E
TPP: Third Pa
SD: Standard
SE: Standard
Std: Standard
Prob : Probab
sed to initialize
erator. It can
ach simulation
y the user (all
ith the same
•In this cell, you may enter the time horizon
•It must be an integer [1,∞[
• choose carefully the time horizon, as it is also correlated with running time.
•A time horizon of 5 years is generally sufficient, it can be shorter depending on the strategies to compare.
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

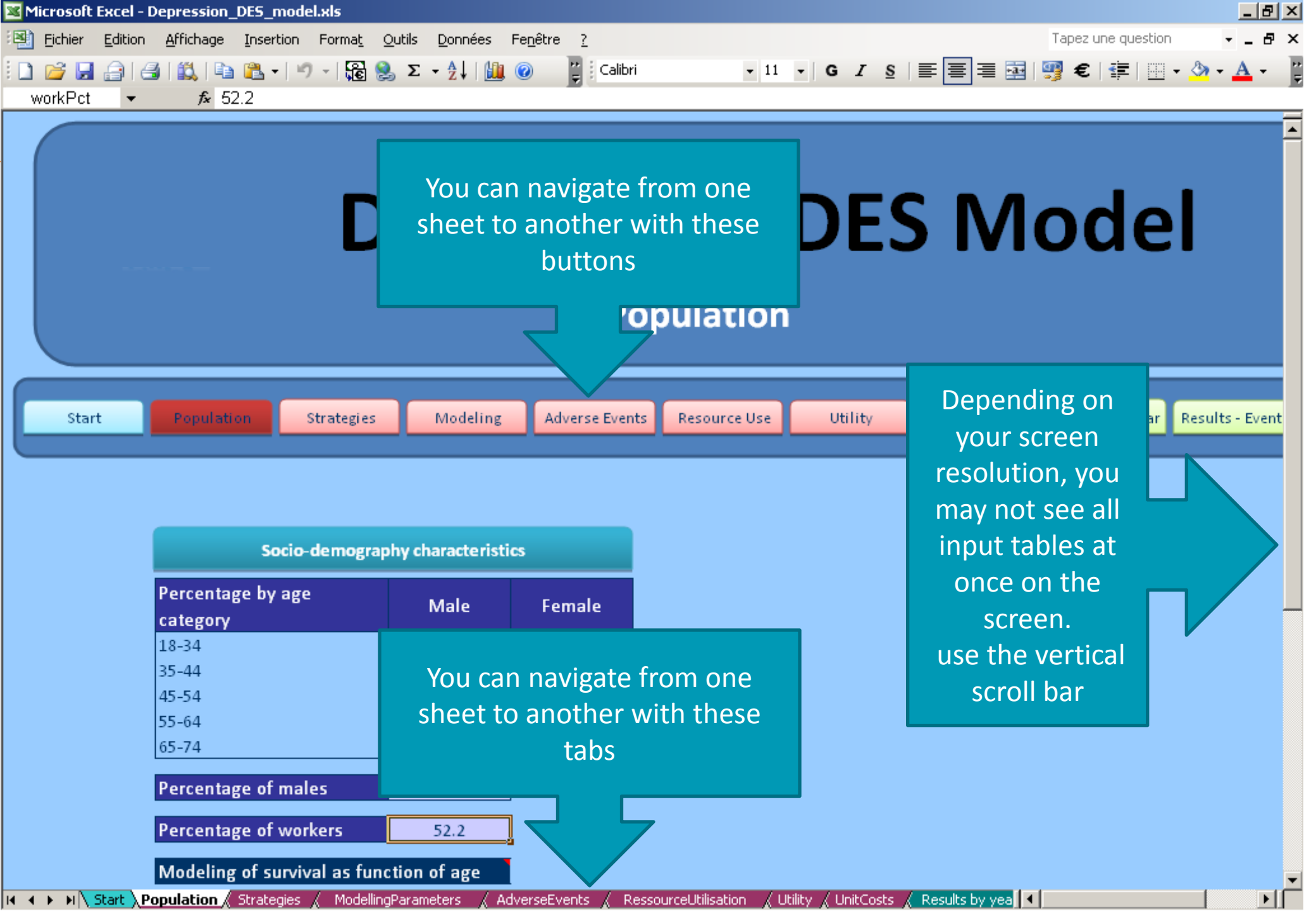

Microsoft Excel - Depression_DES_model.xls
Depression DES Model
Start
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Results
20
5
years
11
If you want to stop the model, click on the Scilab console and press « ctrl+C », or type « quit ».
This button allows you to launch the simulation.
Run model
Clear inputs
CAUTION! Clicking on this button will clear all the inputs included in all the sheets
LoE:
SE: Standard Error
Std: Standard
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts

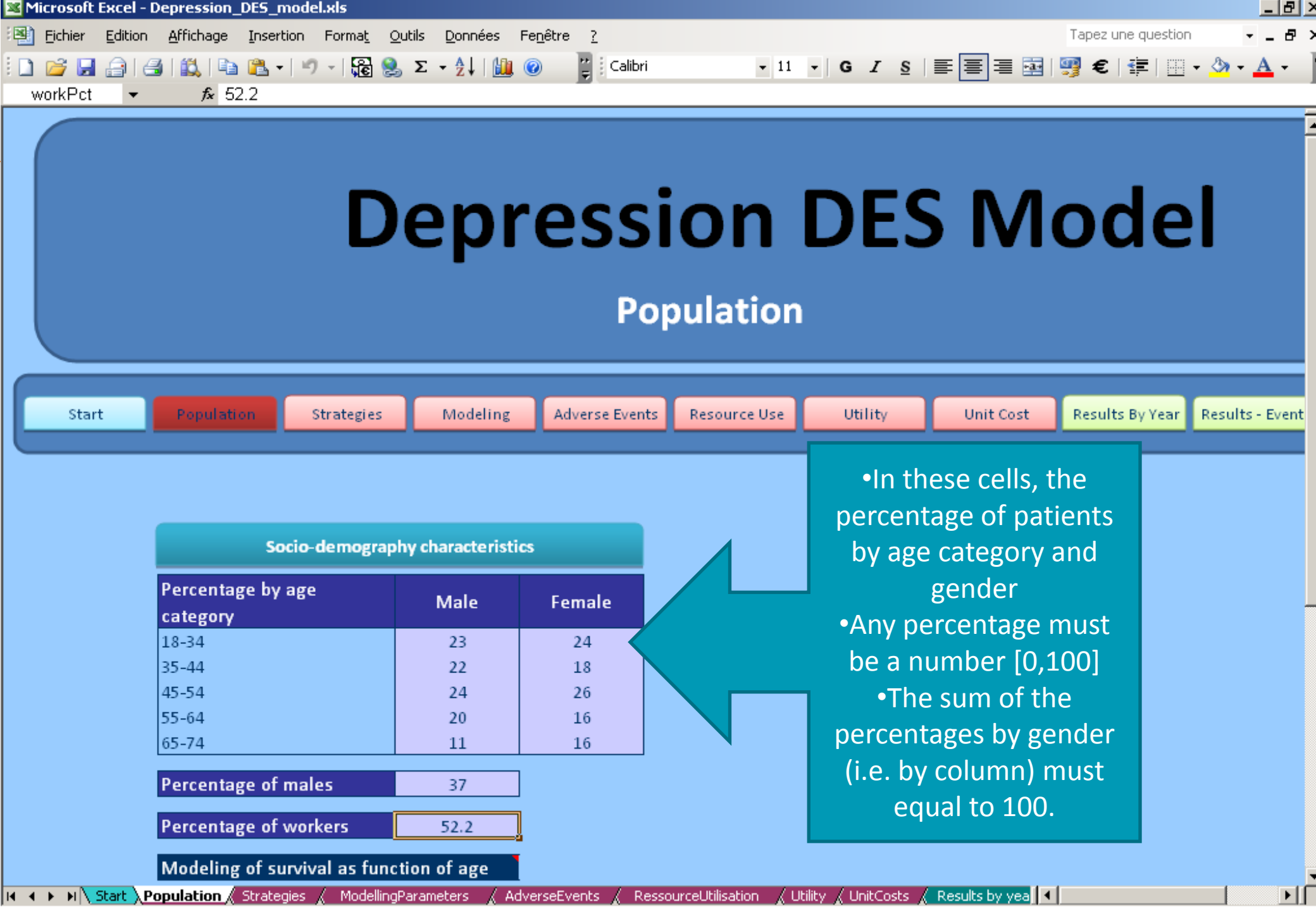

Microsoft Excel - Depression_DES_model.xls
Depression DES Model
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Results
This window allows you to fix the seed
•either randomly
•or enter an integer [1,2^32[
Time horizon
5
years
Running time with 2 strategies:
100 patients: 4 minutes
1000 patients: 50 minutes
Random number generator seed
Random
Fixed
11
Run model
Clear inputs
Abreviati
LoE:
AE:
TPP:
SD:
SE:
Std:
Proh
You have information about seed, here
About the seed:
The seed is the number used to initialize the random numbers generator. It can be selected at random (each simulation will be unique) or fixed by the user (all simulations generated with the same seed are identical).
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea

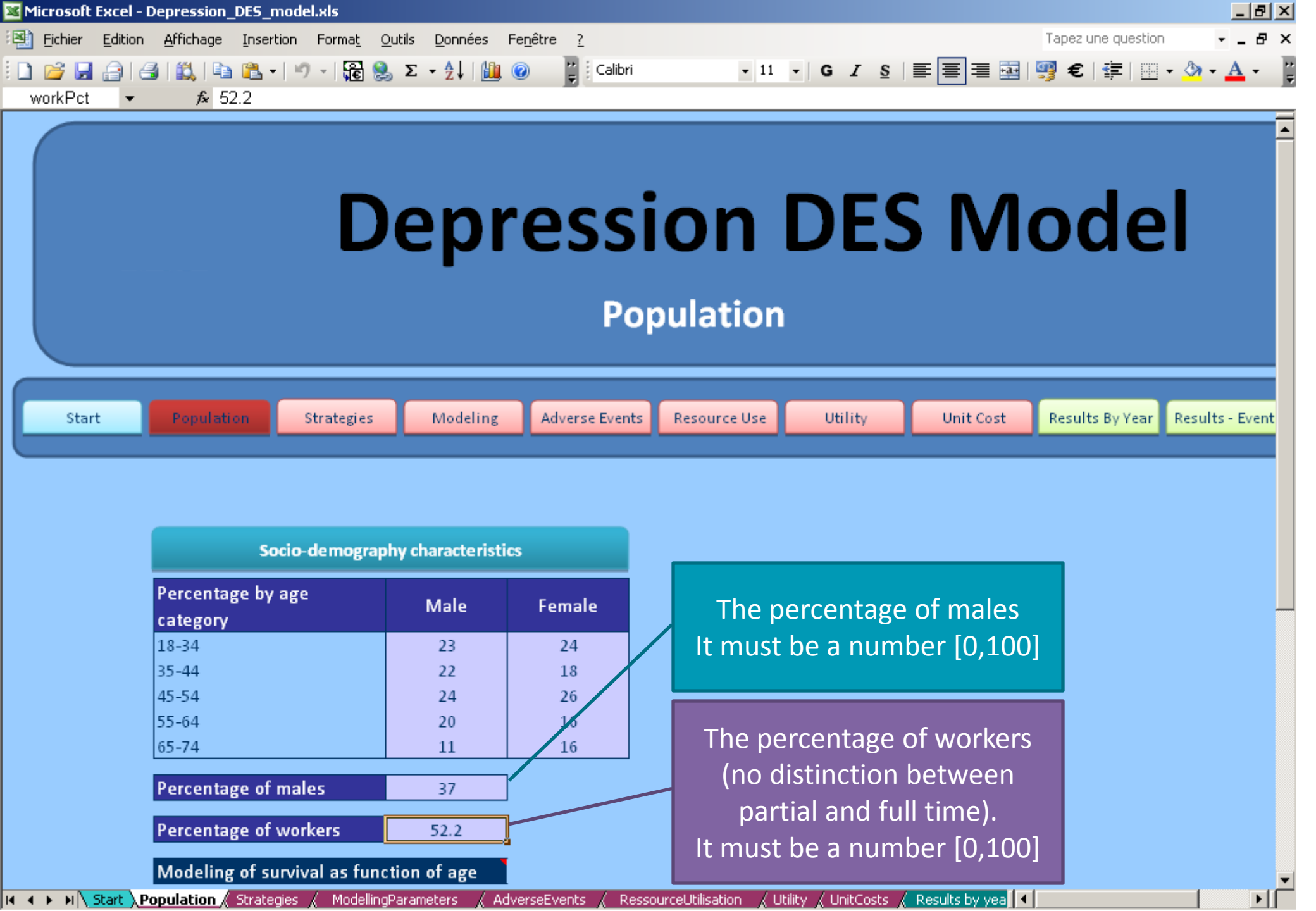

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
M9
Depression DES Model
Start
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Results
20
5
years
Running time with 2 strategies:
100 patients: 4 minutes
1000 patients: 50 minutes
tor seed
dom
11
Run model
Clear inputs
You can navigate from one sheet to another with these buttons
Abreviati
LoE:
AE: Adverse Events
TPP: Third Party Payer
SD: Standard Deviation
SE: Standard Error
Std: Standard
Prob : Probability
You can navigate also from one sheet to another with these tabs
seed are identical).
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea

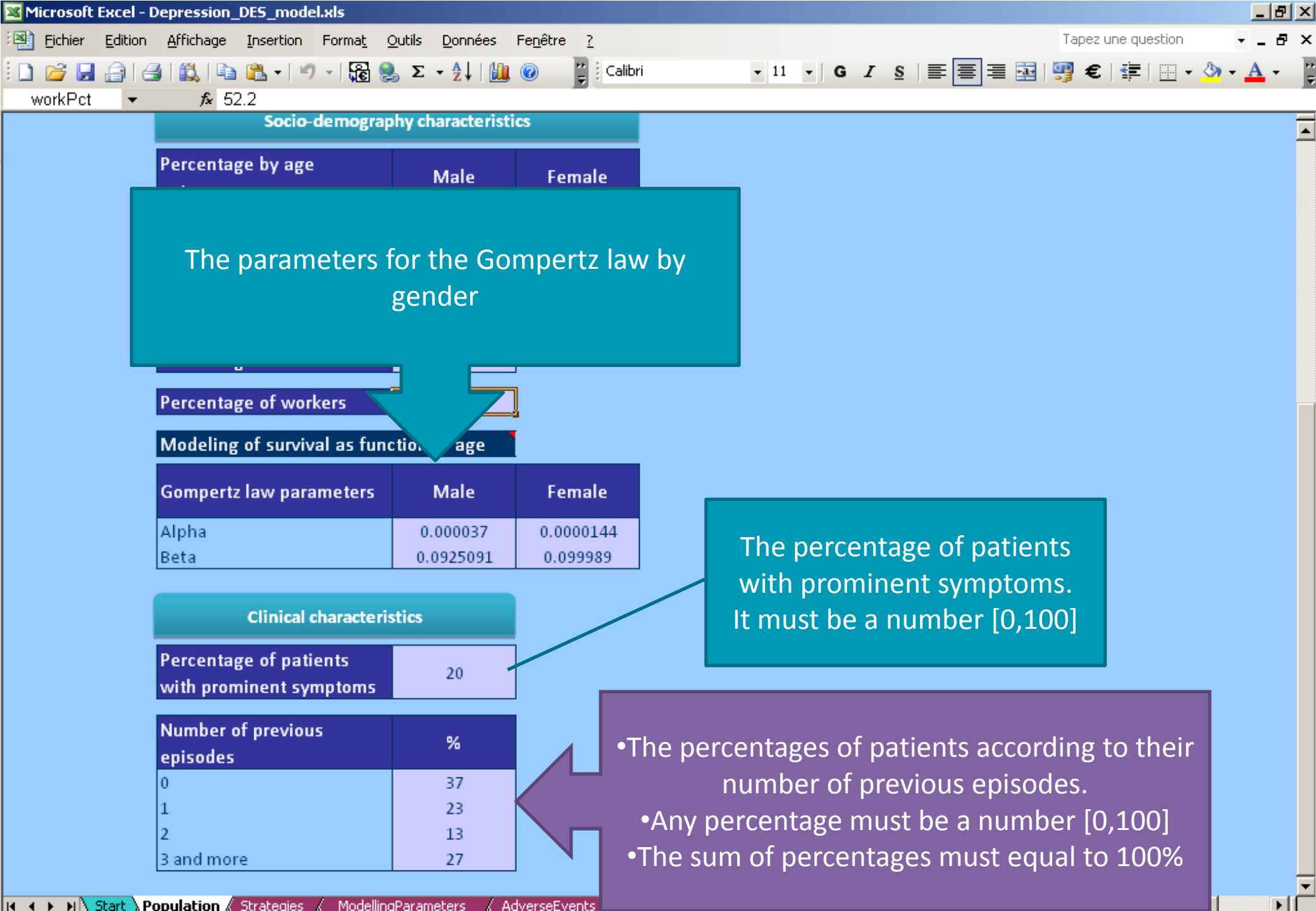
Input sheet: population


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
workPct
52.2
Depression DES Model
Population
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Event
Socio-demography characteristics
Percentage by age category
Male
Female
18-34 23 24
35-44 22 18
45-54 24 26
55-64 20 16
65-74 11 16
Percentage of males 37
Percentage of workers 52.2
Modeling of survival as function of age
In the « population » sheet, you can specify the patient characteristics at baseline.
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
workPct
52.2
DES Model
opulation
You can navigate from one sheet to another with these buttons
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Results - Event
Depending on your screen resolution, you may not see all input tables at once on the screen.
use the vertical scroll bar
Socio-demography characteristics
Percentage by age category
Male
Female
18-34
35-44
45-54
55-64
65-74
Percentage of males
Percentage of workers
52.2
Modeling of survival as function of age
You can navigate from one sheet to another with these tabs
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
workPct
52.2
Depression DES Model
Population
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Event
Socio-demography characteristics
Percentage by age category
Male
Female
18-34 23 24
35-44 22 18
45-54 24 26
55-64 20 16
65-74 11 16
Percentage of males
37
Percentage of workers
52.2
Modeling of survival as function of age
•In these cells, the percentage of patients by age category and gender
•Any percentage must be a number [0,100]
•The sum of the percentages by gender (i.e. by column) must equal to 100.
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
workPct
52.2
Depression DES Model
Population
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Event
Socio-demography characteristics
Percentage by age category
Male
Female
18-34 23 24
35-44 22 18
45-54 24 26
55-64 20 16
65-74 11 16
Percentage of males
37
Percentage of workers
52.2
Modeling of survival as function of age
The percentage of males
It must be a number [0,100]
The percentage of workers
(no distinction between
partial and full time).
It must be a number [0,100]
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea

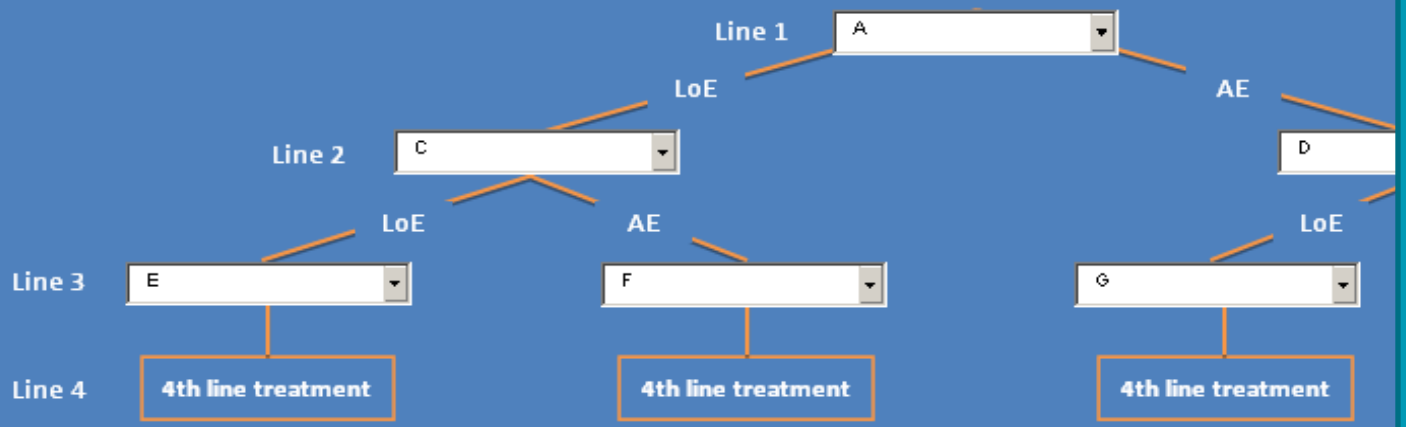

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
workPct
52.2
Socio-demography characteristics
Percentage by age
Male
Female
The parameters for the Gompertz law by gender
Percentage of workers
Modeling of survival as functio age
Gompertz law parameters
Male
Female
Alpha
0.000037
0.0000144
Beta
0.0925091
0.099989
Clinical characteristics
Percentage of patients with prominent symptoms
20
The percentage of patients with prominent symptoms. It must be a number [0,100]
Number of previous episodes
%
0
37
1
23
2
13
3 and more
27
•The percentages of patients according to their number of previous episodes.
•Any percentage must be a number [0,100]
•The sum of percentages must equal to 100%
Start
Population
Strategies
ModellingParameters
AdverseEvents

Input sheet: Strategies

Depression DES Mode

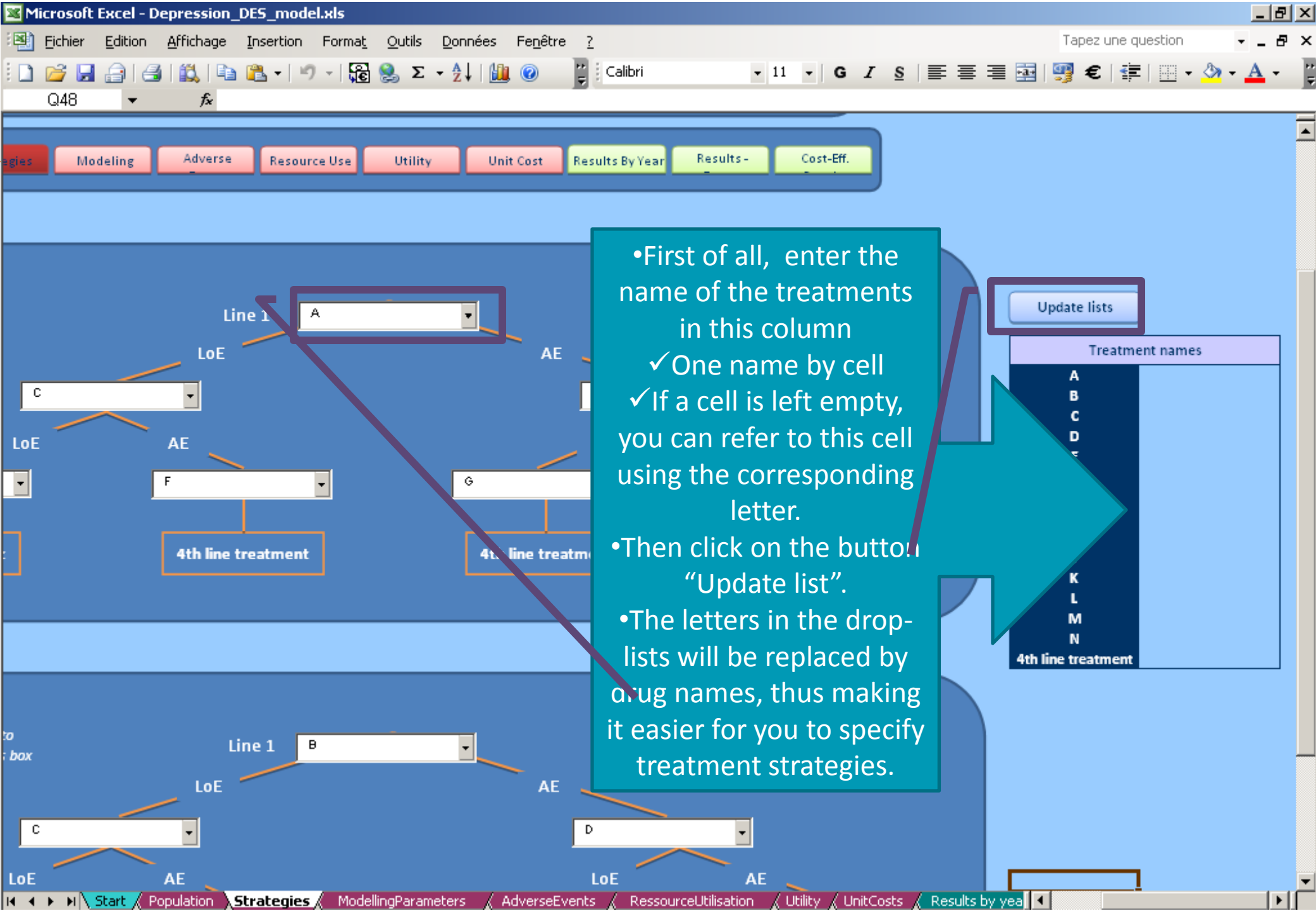
Strategies

Strategy 1

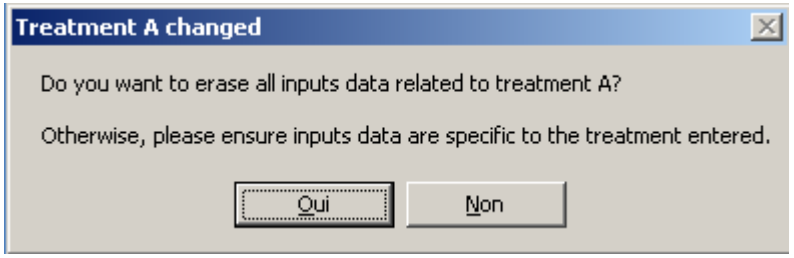


This sheet allows you to specify the treatments for each treatment line, by strategy.

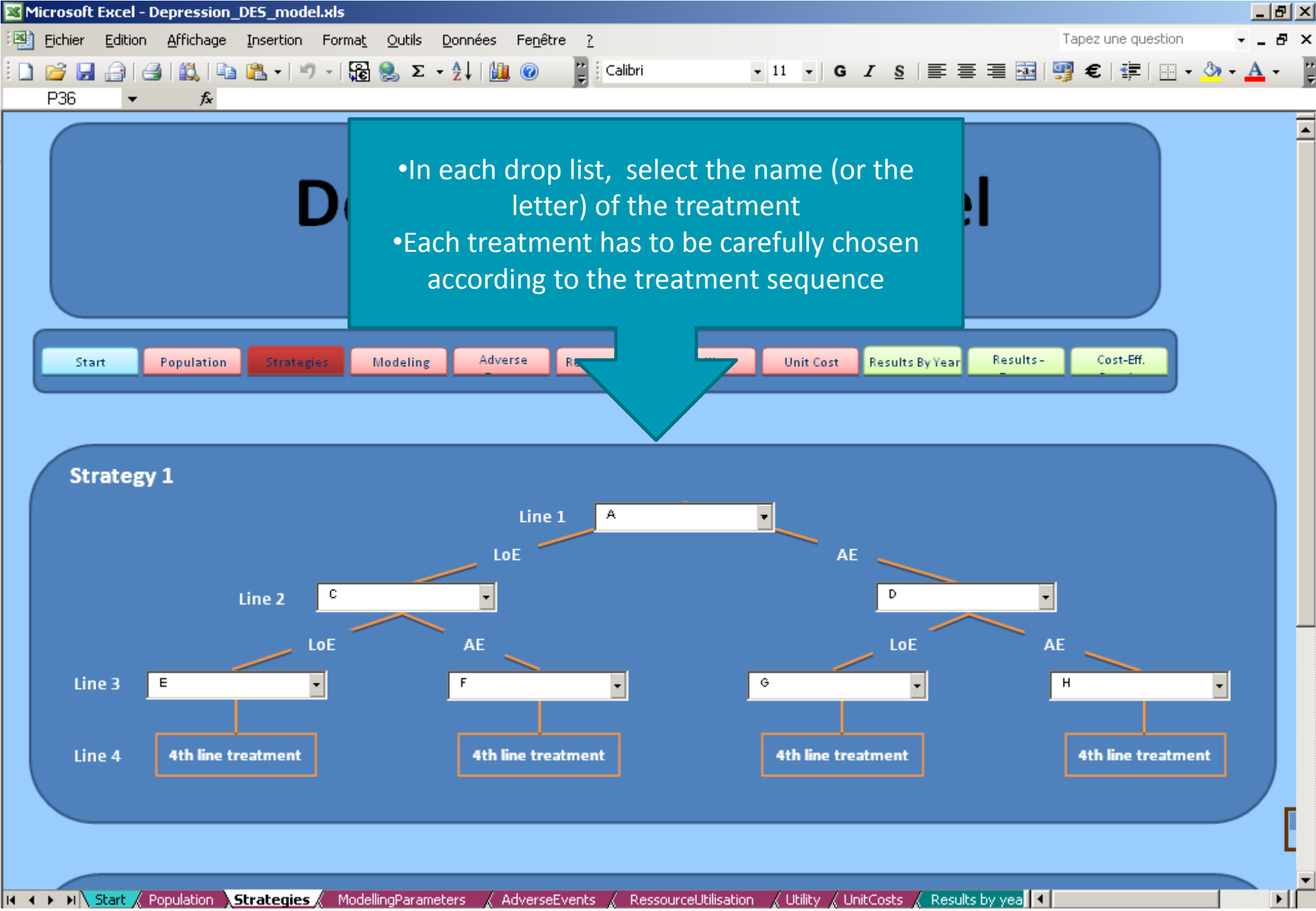
A treatment strategy consists of up to 4 lines of treatment. You can specify different 2nd lines and 3rd lines according to reason of switch (lack of efficacy or adverse events).

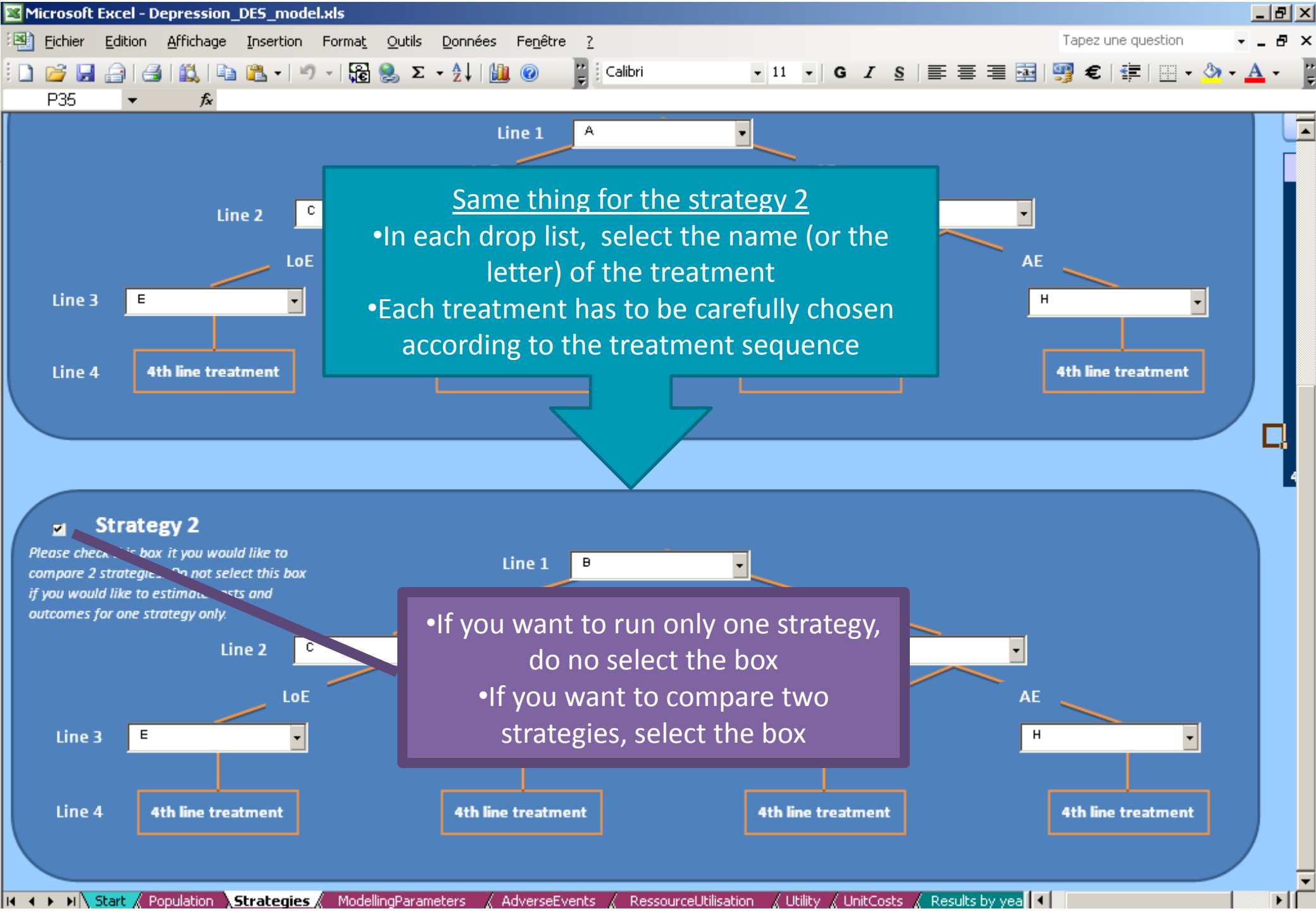

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
Q48
Modeling
Adverse
Resource Use
Utility
Unit Cost
Results By Year
Results -
Cost-Eff.
Line 1
A
LoE
AE
C
LoE
AE
F
4th line treatment
G
Line 1
B
LoE
AE
C
D
LoE
AE
•First of all, enter the name of the treatments in this column
✓One name by cell
✓If a cell is left empty, you can refer to this cell using the corresponding letter.
•Then click on the button "Update list".
•The letters in the drop-lists will be replaced by drug names, thus making it easier for you to specify treatment strategies.
Update lists
Treatment names
A
B
C
D
K
L
M
N
4th line treatment
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea

- When you update the list of treatments this window pops up

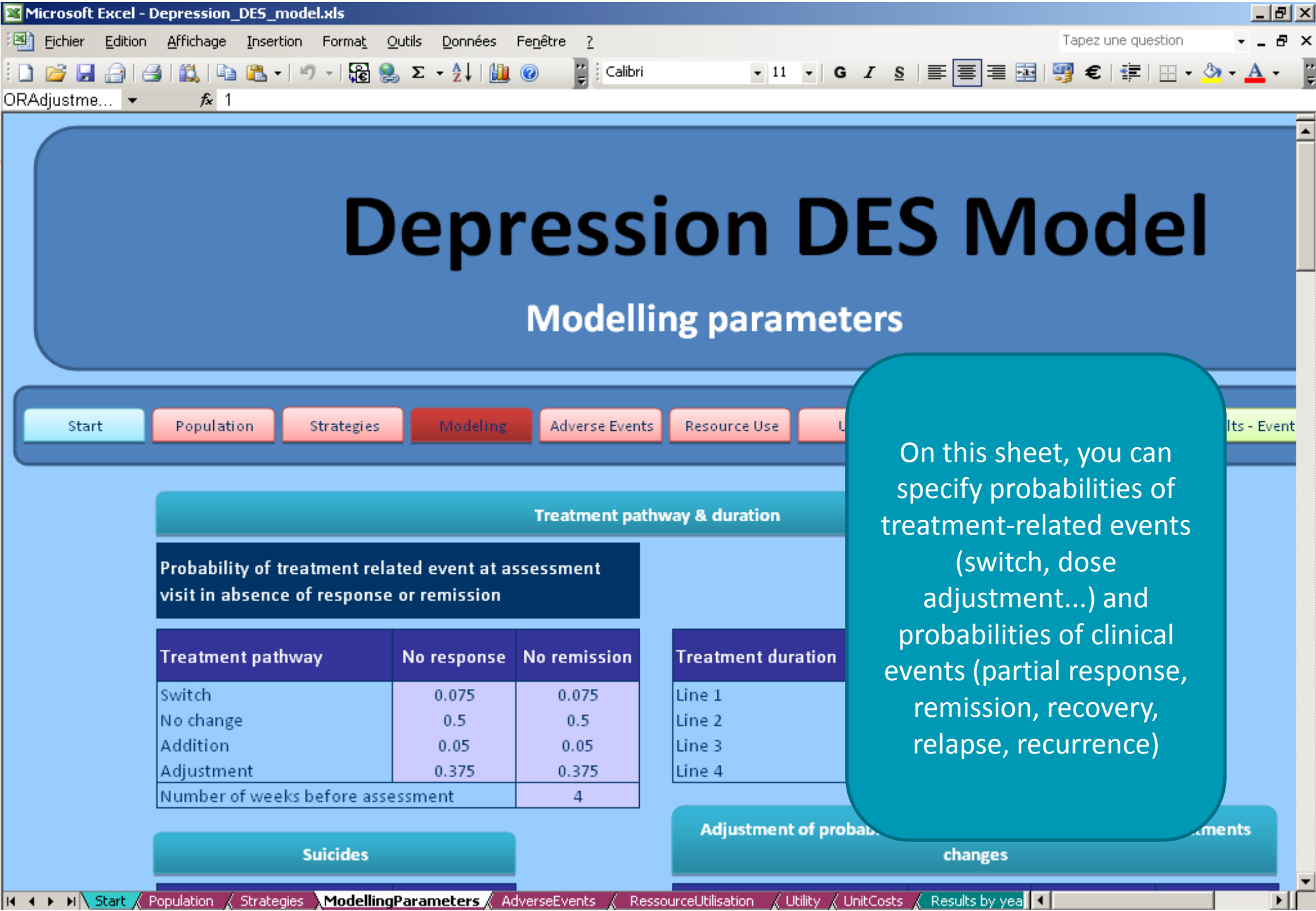


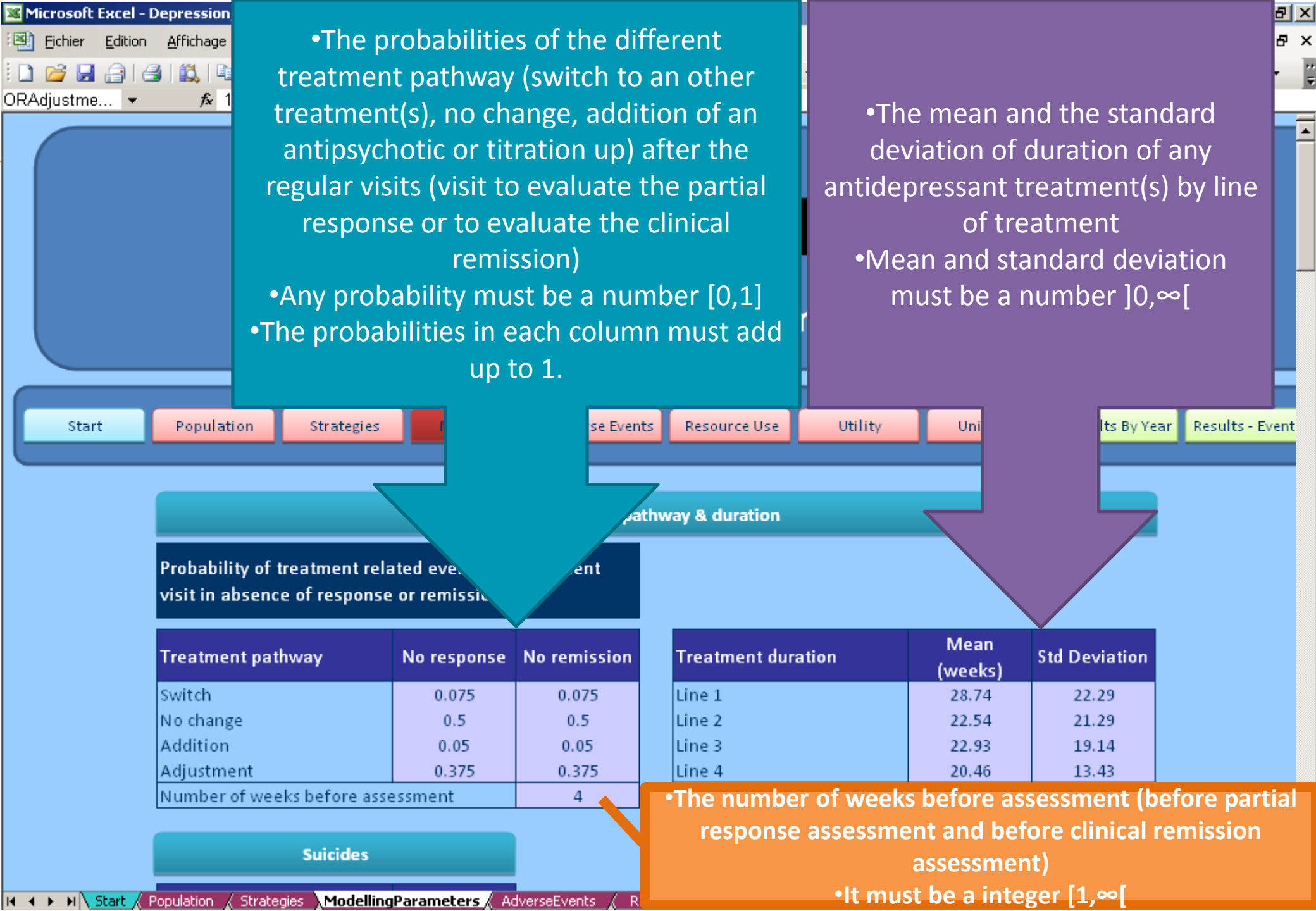
- Choose Yes if you want to erase all input data related to the treatment (in all inputs sheets) for which you just changed the name
- Choose No if you do not want to erase input data, but make sure to change the treatment-related inputs in all the sheets

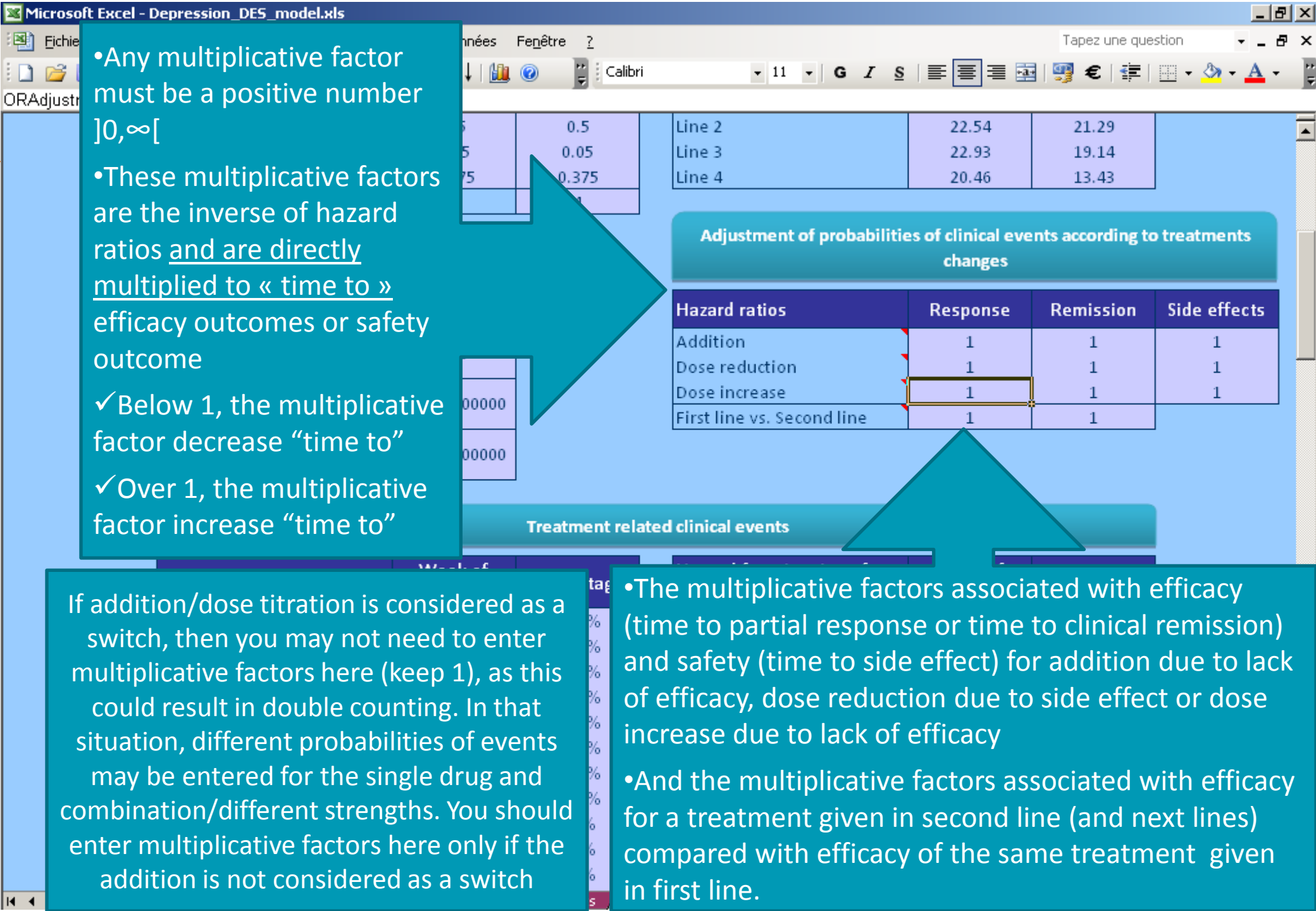

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
P36
•In each drop list, select the name (or the letter) of the treatment
•Each treatment has to be carefully chosen according to the treatment sequence
Start
Population
Strategies
Modeling
Adverse
Unit Cost
Results By Year
Results -
Cost-Eff.
Strategy 1
Line 1
A
LoE
AE
Line 2
C
D
LoE
AE
LoE
AE
Line 3
E
F
G
H
Line 4
4th line treatment
4th line treatment
4th line treatment
4th line treatment
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea

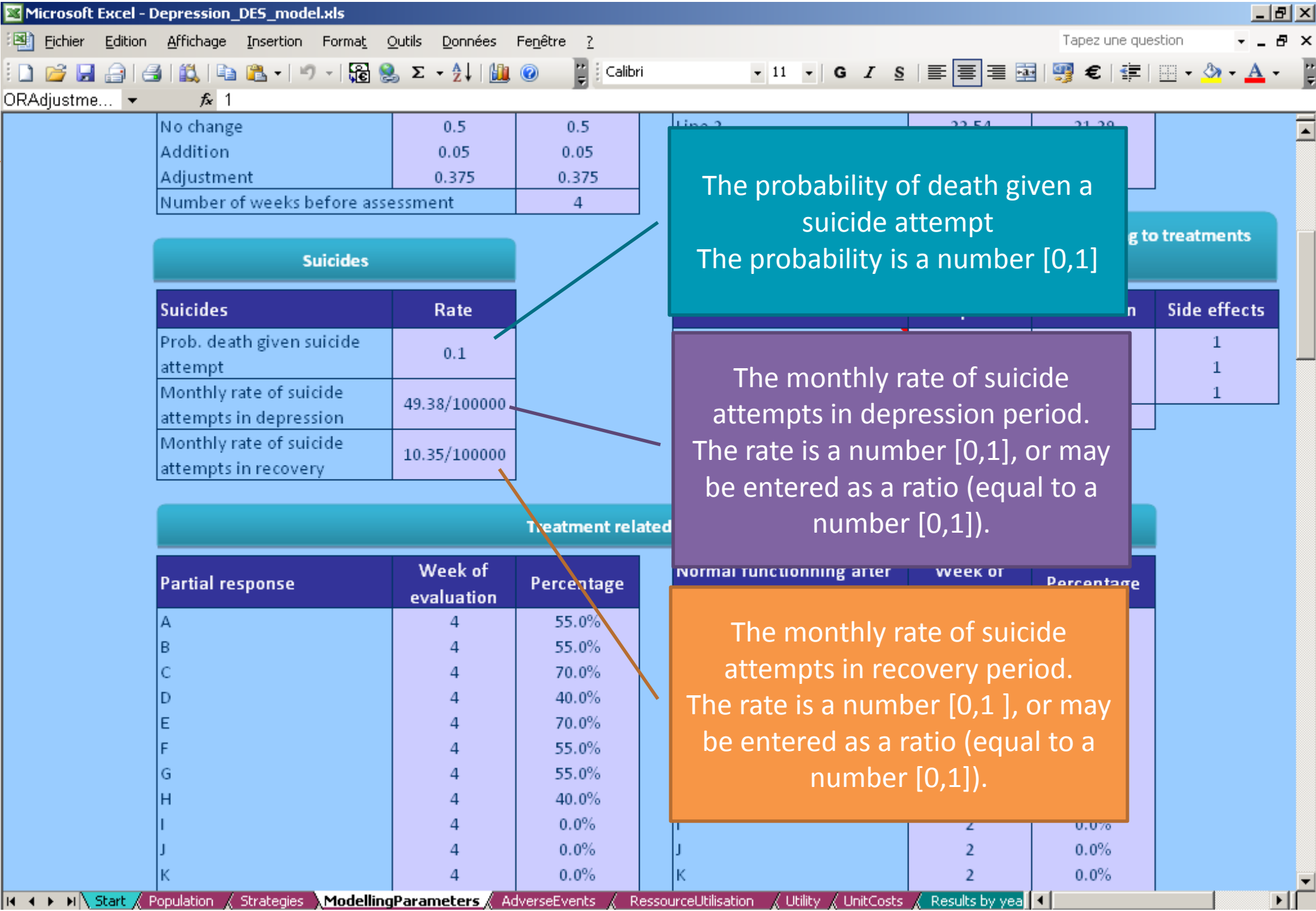

Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
P35
Line 1
A
Line 2
C
LoE
Line 3
E
Line 4
4th line treatment
AE
H
4th line treatment
Same thing for the strategy 2
•In each drop list, select the name (or the letter) of the treatment
•Each treatment has to be carefully chosen according to the treatment sequence
Strategy 2
Please check this box it you would like to compare 2 strategies. Do not select this box if you would like to estimate costs and outcomes for one strategy only.
Line 1
B
Line 2
C
LoE
Line 3
E
Line 4
4th line treatment
AE
H
4th line treatment
4th line treatment
4th line treatment
•If you want to run only one strategy, do no select the box
•If you want to compare two strategies, select the box
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

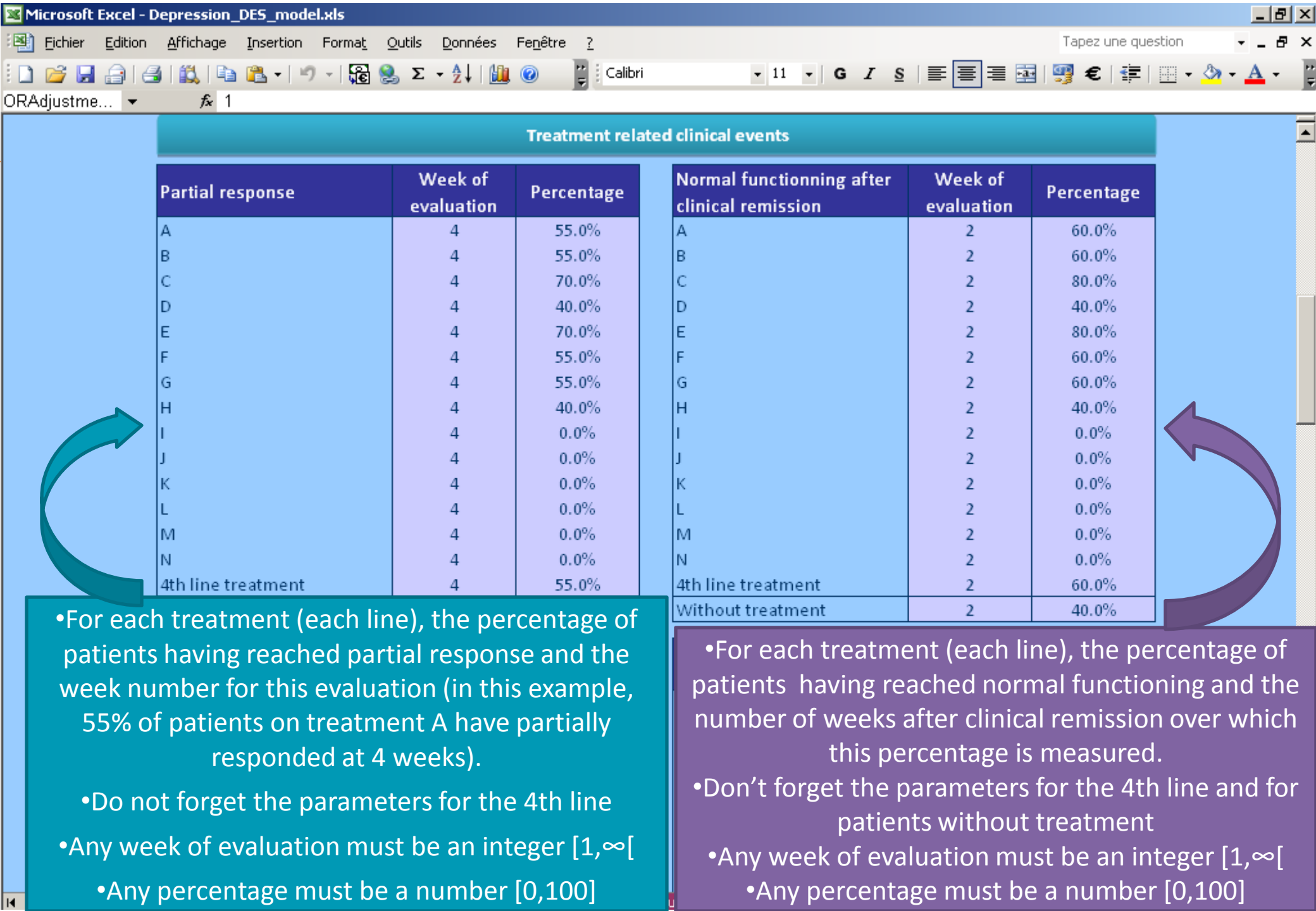
Input sheet: Modeling


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
ORAdjustme...
1
Depression DES Model
Modelling parameters
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Treatment pathway & duration
Probability of treatment related event at assessment visit in absence of response or remission
Treatment pathway
No response
No remission
Switch 0.075 0.075
No change 0.5 0.5
Addition 0.05 0.05
Adjustment 0.375 0.375
Number of weeks before assessment 4
Treatment duration
Line 1
Line 2
Line 3
Line 4
Suicides
changes
On this sheet, you can specify probabilities of treatment-related events (switch, dose adjustment...) and probabilities of clinical events (partial response, remission, recovery, relapse, recurrence)
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea


•The probabilities of the different treatment pathway (switch to an other treatment(s), no change, addition of an antipsychotic or titration up) after the regular visits (visit to evaluate the partial response or to evaluate the clinical remission)
•Any probability must be a number [0,1]
•The probabilities in each column must add up to 1.
•The mean and the standard deviation of duration of any antidepressant treatment(s) by line of treatment
•Mean and standard deviation must be a number]0,∞[
Microsoft Excel - Depression
Fichier Edition Affichage
Start Population Strategies Resource Use Utility Results - Event
Probability of treatment related eve ent visit in absence of response or remissi
Treatment pathway | No response | No remission
Switch | 0.075 | 0.075
No change | 0.5 | 0.5
Addition | 0.05 | 0.05
Adjustment | 0.375 | 0.375
Number of weeks before assessment | 4
Treatment duration | Mean (weeks) | Std Deviation
Line 1 | 28.74 | 22.29
Line 2 | 22.54 | 21.29
Line 3 | 22.93 | 19.14
Line 4 | 20.46 | 13.43
Suicides
•The number of weeks before assessment (before partial response assessment and before clinical remission assessment)
•It must be a integer [1,∞[


Microsoft Excel - Depression_DES_model.xls
Fenêtre
Tapez une question
Calibri
11
0.5
0.05
0.375
Line 2 22.54 21.29
Line 3 22.93 19.14
Line 4 20.46 13.43
Adjustment of probabilities of clinical events according to treatments changes
Hazard ratios | Response | Remission | Side effects
Addition 1 1 1
Dose reduction 1 1 1
Dose increase 1 1 1
First line vs. Second line 1 1
Treatment related clinical events
•Any multiplicative factor must be a positive number]0,∞[
•These multiplicative factors are the inverse of hazard ratios and are directly multiplied to « time to » efficacy outcomes or safety outcome
✓Below 1, the multiplicative factor decrease “time to”
✓Over 1, the multiplicative factor increase “time to”
If addition/dose titration is considered as a switch, then you may not need to enter multiplicative factors here (keep 1), as this could result in double counting. In that situation, different probabilities of events may be entered for the single drug and combination/different strengths. You should enter multiplicative factors here only if the addition is not considered as a switch
•The multiplicative factors associated with efficacy (time to partial response or time to clinical remission) and safety (time to side effect) for addition due to lack of efficacy, dose reduction due to side effect or dose increase due to lack of efficacy
•And the multiplicative factors associated with efficacy for a treatment given in second line (and next lines) compared with efficacy of the same treatment given in first line.


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
ORAdjustme...
1
No change 0.5 0.5
Addition 0.05 0.05
Adjustment 0.375 0.375
Number of weeks before assessment 4
Suicides
Suicides Rate
Prob. death given suicide attempt 0.1
Monthly rate of suicide attempts in depression 49.38/100000
Monthly rate of suicide attempts in recovery 10.35/100000
Treatment related
Partial response Week of evaluation Percentage
A 4 55.0%
B 4 55.0%
C 4 70.0%
D 4 40.0%
E 4 70.0%
F 4 55.0%
G 4 55.0%
H 4 40.0%
I 4 0.0%
J 4 0.0%
K 4 0.0%
g to treatments
Side effects
1
1
1
Normal functionning after
Week of
Percentage
J 2 0.0%
K 2 0.0%
The probability of death given a suicide attempt
The probability is a number [0,1]
The monthly rate of suicide attempts in depression period.
The rate is a number [0,1], or may be entered as a ratio (equal to a number [0,1]).
The monthly rate of suicide attempts in recovery period.
The rate is a number [0,1], or may be entered as a ratio (equal to a number [0,1]).
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea



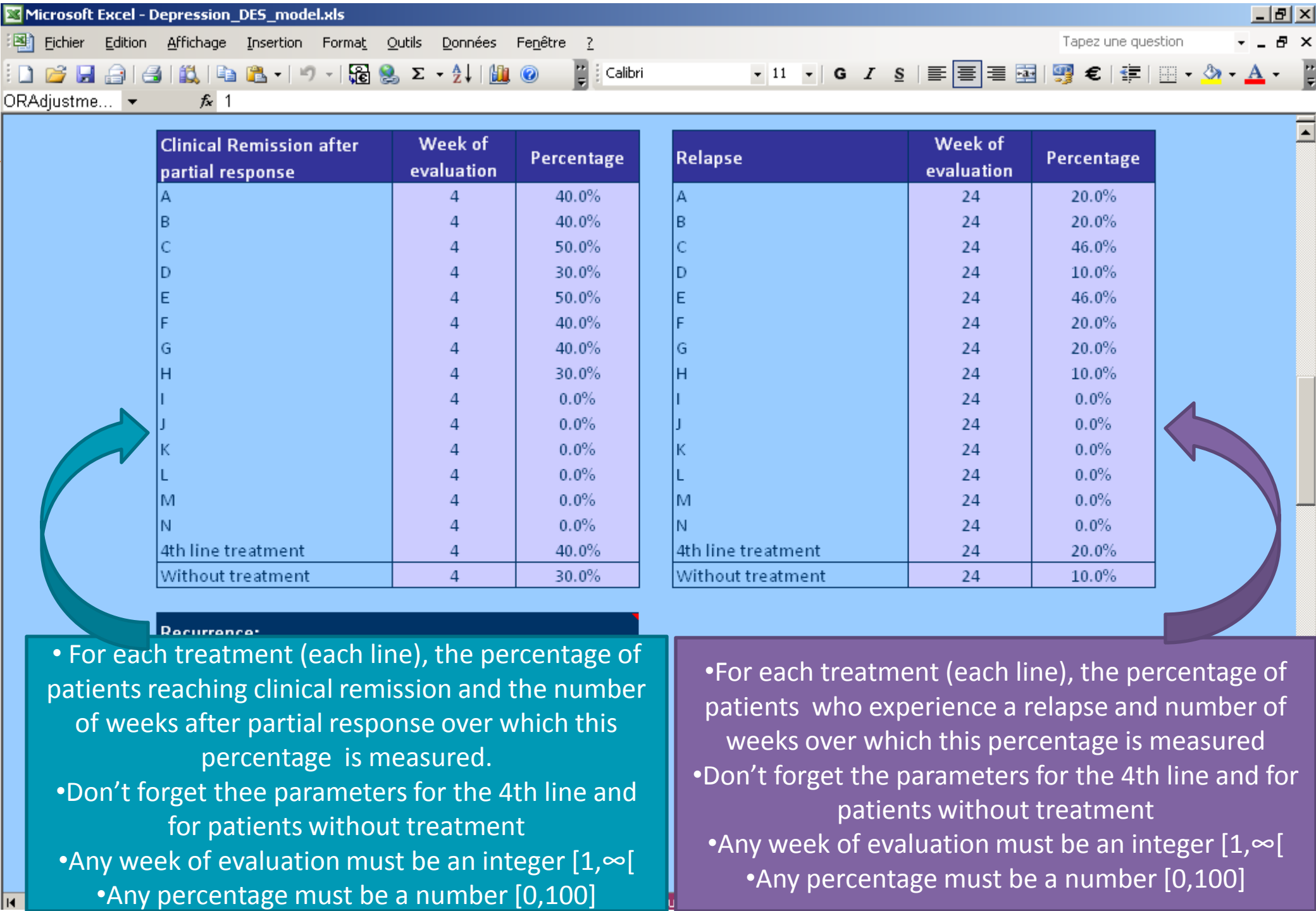
Treatment related clinical events

Partial response	Week of evaluation	Percentage
A	4	55.0%
B	4	55.0%
C	4	70.0%
D	4	40.0%
E	4	70.0%
F	4	55.0%
G	4	55.0%
H	4	40.0%
I	4	0.0%
J	4	0.0%
K	4	0.0%
L	4	0.0%
M	4	0.0%
N	4	0.0%
4th line treatment	4	55.0%

Normal functionning after clinical remission	Week of evaluation	Percentage
A	2	60.0%
B	2	60.0%
C	2	80.0%
D	2	40.0%
E	2	80.0%
F	2	60.0%
G	2	60.0%
H	2	40.0%
I	2	0.0%
J	2	0.0%
K	2	0.0%
L	2	0.0%
M	2	0.0%
N	2	0.0%
4th line treatment	2	60.0%
Without treatment	2	40.0%

- For each treatment (each line), the percentage of patients having reached partial response and the week number for this evaluation (in this example, 55% of patients on treatment A have partially responded at 4 weeks).
- Do not forget the parameters for the 4th line
- Any week of evaluation must be an integer [1,∞[
- Any percentage must be a number [0,100]

- For each treatment (each line), the percentage of patients having reached normal functioning and the number of weeks after clinical remission over which this percentage is measured.
- Don't forget the parameters for the 4th line and for patients without treatment
- Any week of evaluation must be an integer [1,∞[
- Any percentage must be a number [0,100]



Clinical Remission after partial response	Week of evaluation	Percentage
A	4	40.0%
B	4	40.0%
C	4	50.0%
D	4	30.0%
E	4	50.0%
F	4	40.0%
G	4	40.0%
H	4	30.0%
I	4	0.0%
J	4	0.0%
K	4	0.0%
L	4	0.0%
M	4	0.0%
N	4	0.0%
4th line treatment	4	40.0%
Without treatment	4	30.0%

Relapse	Week of evaluation	Percentage
A	24	20.0%
B	24	20.0%
C	24	46.0%
D	24	10.0%
E	24	46.0%
F	24	20.0%
G	24	20.0%
H	24	10.0%
I	24	0.0%
J	24	0.0%
K	24	0.0%
L	24	0.0%
M	24	0.0%
N	24	0.0%
4th line treatment	24	20.0%
Without treatment	24	10.0%

Recurrence:

• For each treatment (each line), the percentage of patients reaching clinical remission and the number of weeks after partial response over which this percentage is measured.

•Don’t forget thee parameters for the 4th line and for patients without treatment

•Any week of evaluation must be an integer [1,∞[

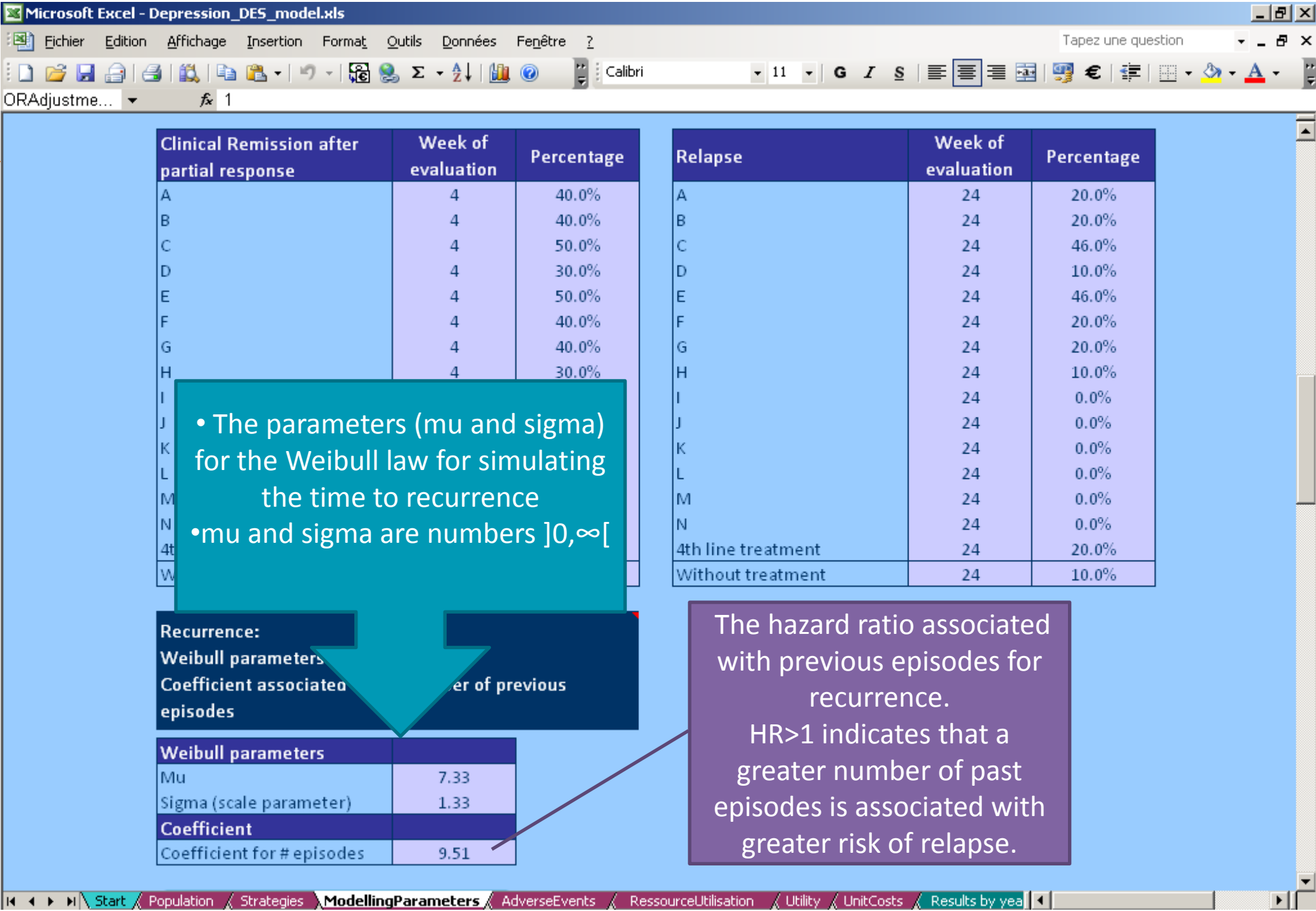
•Any percentage must be a number [0,100]

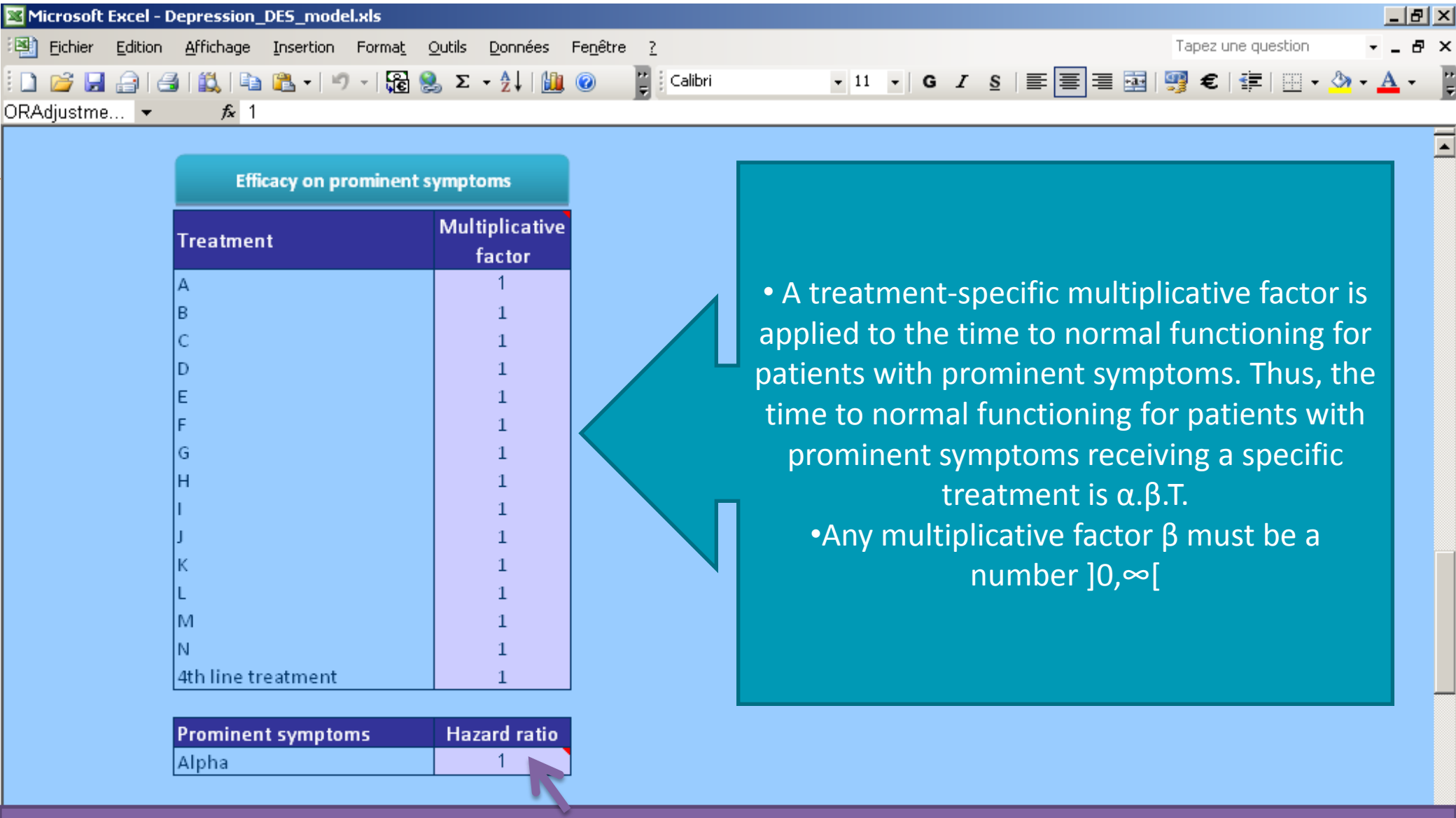
•For each treatment (each line), the percentage of patients who experience a relapse and number of weeks over which this percentage is measured

•Don’t forget the parameters for the 4th line and for patients without treatment

•Any week of evaluation must be an integer [1,∞[

•Any percentage must be a number [0,100]


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
ORAdjustme...
1
Clinical Remission after partial response
Week of evaluation
Percentage
A 4 40.0%
B 4 40.0%
C 4 50.0%
D 4 30.0%
E 4 50.0%
F 4 40.0%
G 4 40.0%
H 4 30.0%
Relapse
Week of evaluation
Percentage
A 24 20.0%
B 24 20.0%
C 24 46.0%
D 24 10.0%
E 24 46.0%
F 24 20.0%
G 24 20.0%
H 24 10.0%
I 24 0.0%
J 24 0.0%
K 24 0.0%
L 24 0.0%
M 24 0.0%
N 24 0.0%
4th line treatment 24 20.0%
Without treatment 24 10.0%
• The parameters (mu and sigma) for the Weibull law for simulating the time to recurrence
•mu and sigma are numbers]0,∞[
Recurrence:
Weibull parameters
Coefficient associated
episodes
Weibull parameters
Mu 7.33
Sigma (scale parameter) 1.33
Coefficient
Coefficient for # episodes 9.51
The hazard ratio associated with previous episodes for recurrence.
HR>1 indicates that a greater number of past episodes is associated with greater risk of relapse.
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea



Efficacy on prominent symptoms

Treatment	Multiplicative factor
A	1
B	1
C	1
D	1
E	1
F	1
G	1
H	1
I	1
J	1
K	1
L	1
M	1
N	1
4th line treatment	1

Prominent symptoms	Hazard ratio
Alpha	1

- A treatment-specific multiplicative factor is applied to the time to normal functioning for patients with prominent symptoms. Thus, the time to normal functioning for patients with prominent symptoms receiving a specific treatment is $\alpha.\beta.T$.
- Any multiplicative factor β must be a number $]0,\infty[$

- A multiplicative factor is applied to times to normal functioning for patients with prominent symptoms. If T is the time from clinical remission to normal functioning for a patient without prominent symptoms, then the time to normal functioning for a patient with prominent symptoms is $\alpha.T$.
- The multiplicative factor α must be a number $]0,\infty[$

Input sheet: Adverse events

Adverse events

- The proportion of major cases among the sexual dysfunction events
- Any probability must be a number [0,1]

Long term adverse events

Sexual dysfunction	Probability	Duration (days)
Proportion of major cases	0.05	
A	0.065	45
B	0.065	45
C	0.09	60
D	0.04	30
E	0.09	60
F	0.065	45
G	0.065	45
H	0.04	30
I	0.09	45
J	0	45
K	0	45
L	0	45
M	0	45
N	0	45
4th line treatment	0.065	45

- For each treatment, the probability of patients experiencing sexual dysfunction (after clinical remission) and the duration of this dysfunction
- Don't forget the parameters for the 4th line
- Any probability must be a number [0,1]
- Any duration of evaluation must be an integer [1,∞[

• The proportion of major cases among the nausea events
•Any probability must be a number [0,1]

•The proportion of major cases among the insomnia events
•Any probability must be a number [0,1]

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Calibri 11
Short term adverse events

Nausea	Week of evaluation	Probability
Proportion of major cases		0.01
A	8	0.19
B	8	0.19
C	8	0.26
D	8	0.12
E	8	0.26
F	8	0.19
G	8	0.19
H	8	0.12
I	8	0.19
J	8	0
K	8	0
L	8	0
M	8	0
N	8	0
4th line treatment	8	0.19

Insomnia	Week of evaluation	Probability
Proportion of major cases		0.03
A	8	0.105
B	8	0.105
C	8	0.14
D	8	0.07
E	8	0.14
F	8	0.105
G	8	0.105
H	8	0.07
I	8	0.105
J	8	0
K	8	0
L	8	0
M	8	0
N	8	0
4th line treatment	8	0.105

• For each treatment (each line), the probability of experiencing nausea and the number of weeks over which this probability is assessed.
•Don’t forget the parameters for the 4th line
•Any probability must be a number [0,1]
•Any week number of evaluation must be an integer [1,∞[

• For each treatment (each line), the probability of experiencing insomnia and the number of weeks over which this probability is assessed.
•Don’t forget the parameters for the 4th line
•Any probability must be a number [0,1]
•Any week number of evaluation must be an integer [1,∞[

•The proportion of major cases among the headache events
•Any probability must be a number [0,1]

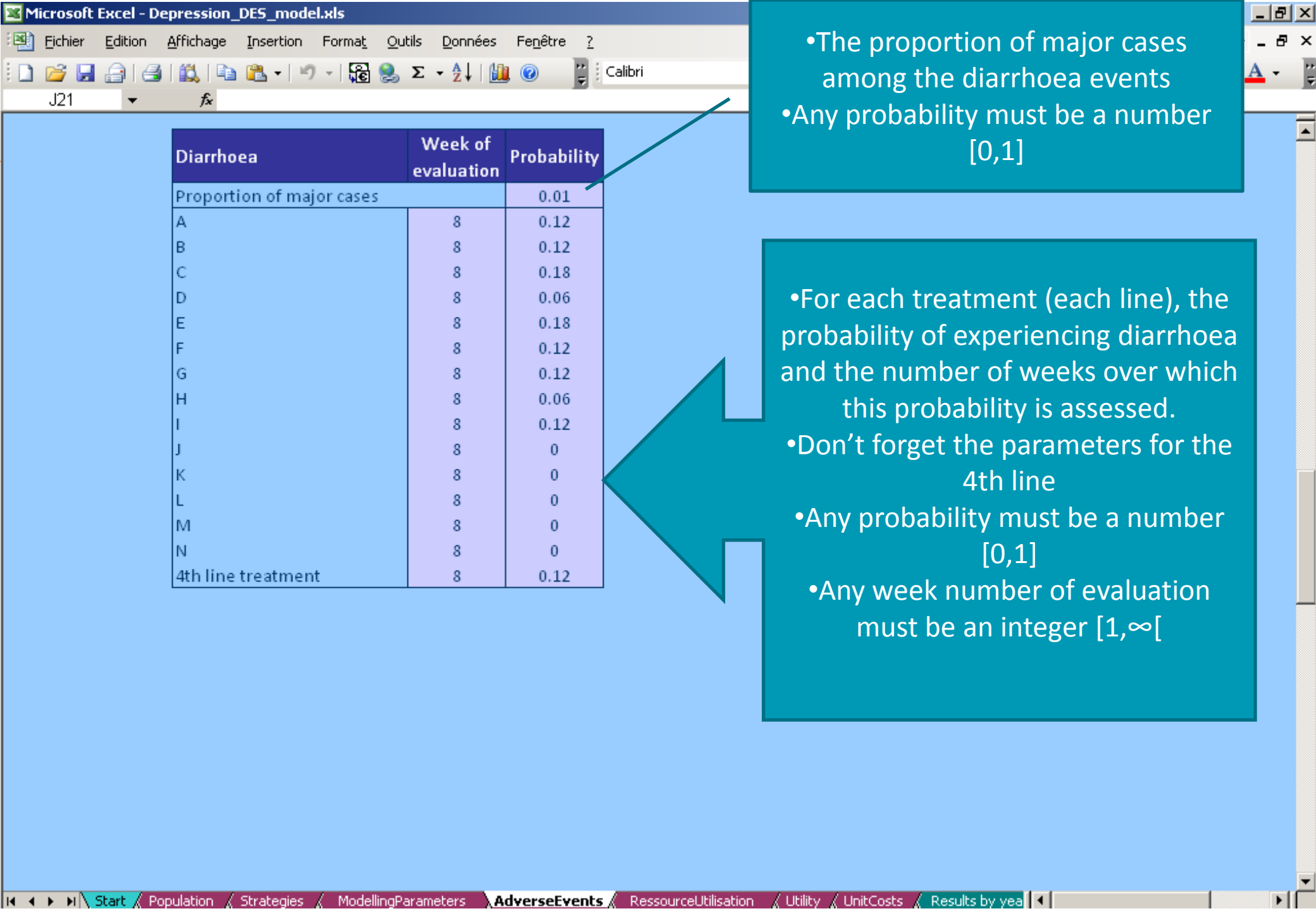
•The proportion of major cases among the other adverse events
•Any probability must be a number [0,1]

Headache	Week of evaluation	Probability
Proportion of major cases		0.02
A	8	0.155
B	8	0.155
C	8	0.2
D	8	0.11
E	8	0.2
F	8	0.155
G	8	0.155
H	8	0.11
I	8	0.155
J	8	0
K	8	0
L	8	0
M	8	0
N	8	0
4th line treatment	8	0.155

Other	Week of evaluation	Probability
Proportion of major cases		0.03
A	8	0.29
B	8	0.29
C	8	0.37
D	8	0.21
E	8	0.37
F	8	0.29
G	8	0.29
H	8	0.21
I	8	0.29
J	8	0
K	8	0
L	8	0
M	8	0
N	8	0
4th line treatment	8	0.29

•For each treatment (each line), the probability of experiencing headaches and the number of weeks over which this probability is assessed.
•Don’t forget the parameters for the 4th line
•Any probability must be a number [0,1]
•Any week number of evaluation must be an integer [1,∞[

•For each treatment (each line), the probability of other adverse events and the number of weeks over which this probability is assessed.
•Don’t forget the parameters for the 4th line
•Any probability must be a number [0,1]
•Any week number of evaluation must be an integer [1,∞[


Microsoft Excel - Depression_DES_model.xls
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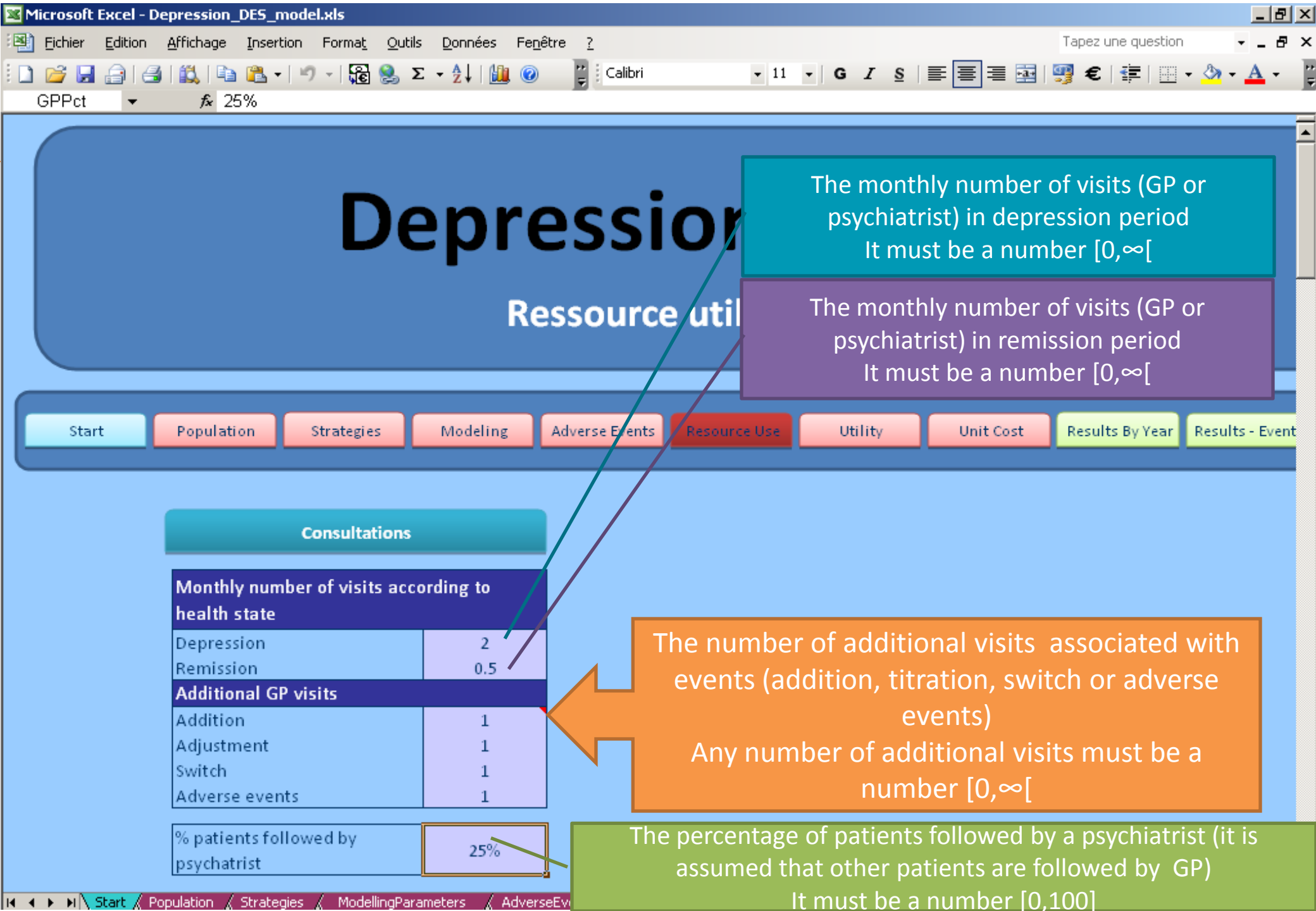
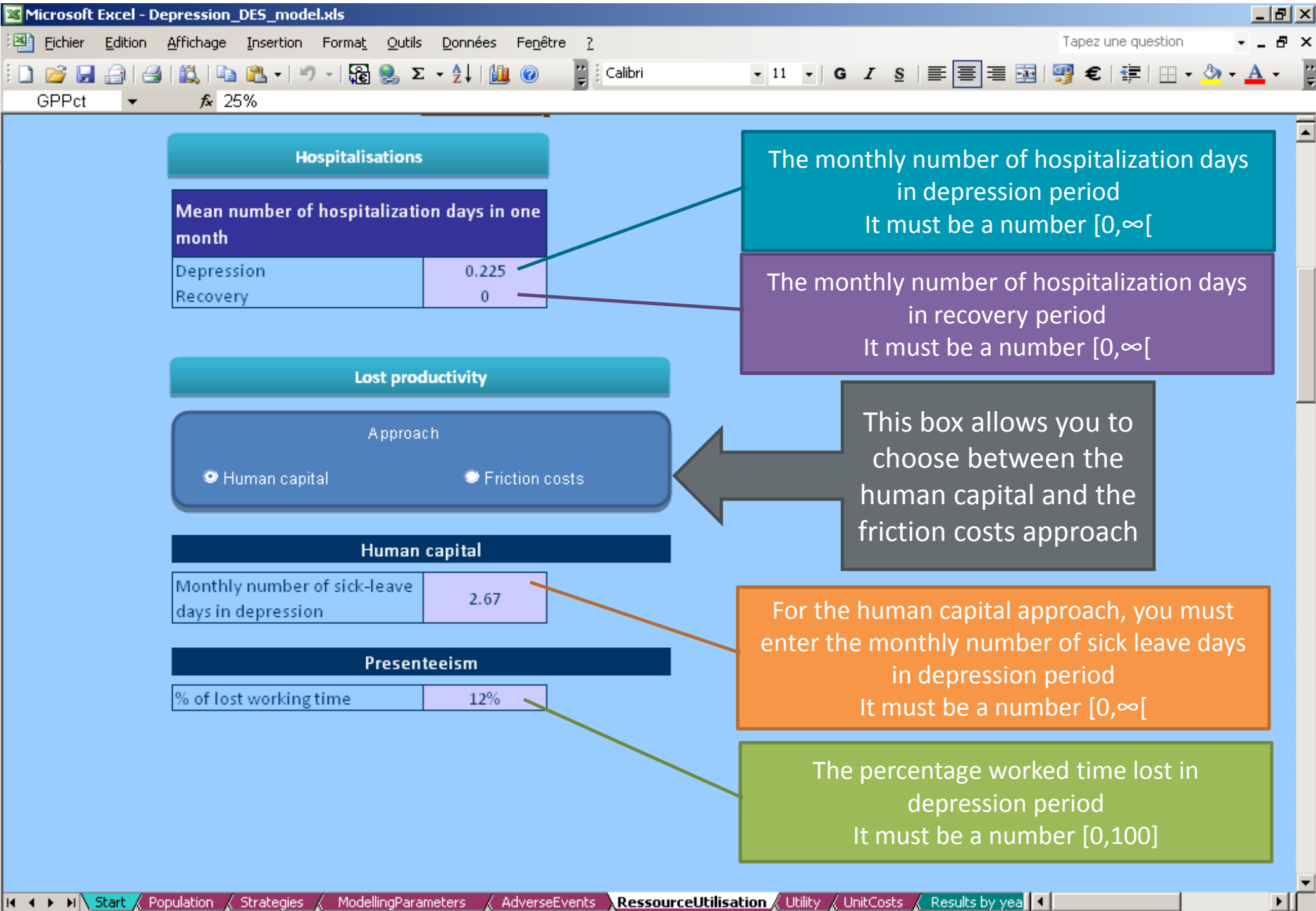
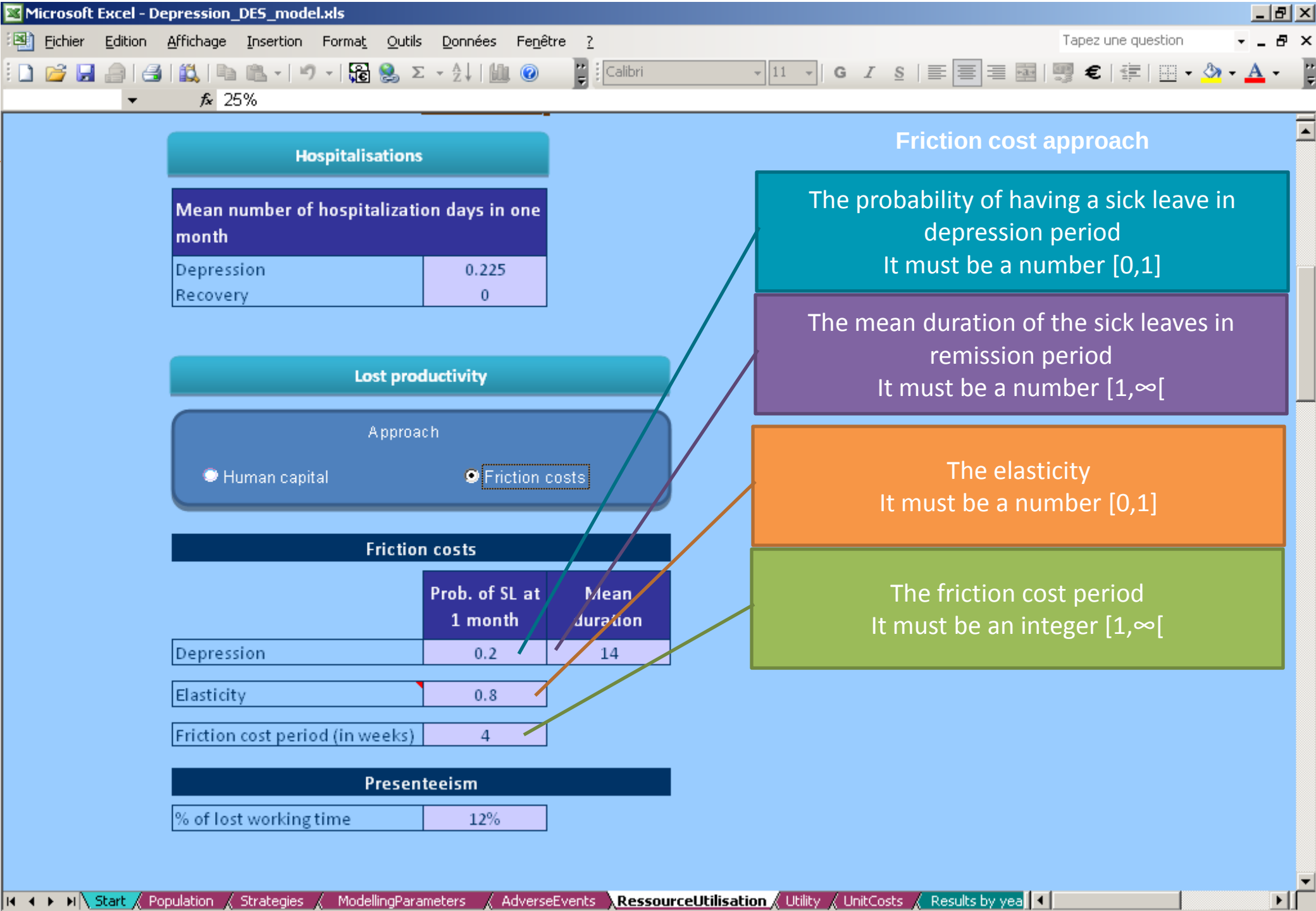
Diarrhoea
Week of evaluation
Probability
Proportion of major cases
0.01
A 8 0.12
B 8 0.12
C 8 0.18
D 8 0.06
E 8 0.18
F 8 0.12
G 8 0.12
H 8 0.06
I 8 0.12
J 8 0
K 8 0
L 8 0
M 8 0
N 8 0
4th line treatment 8 0.12
•The proportion of major cases among the diarrhoea events
•Any probability must be a number [0,1]
•For each treatment (each line), the probability of experiencing diarrhoea and the number of weeks over which this probability is assessed.
•Don’t forget the parameters for the 4th line
•Any probability must be a number [0,1]
•Any week number of evaluation must be an integer [1,∞[
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

Input sheet: resource use


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
GPPct
25%
Depressior
Ressource util
The monthly number of visits (GP or psychiatrist) in depression period
It must be a number [0,∞[
The monthly number of visits (GP or psychiatrist) in remission period
It must be a number [0,∞[
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Event
Consultations
Monthly number of visits according to health state
Depression 2
Remission 0.5
Additional GP visits
Addition 1
Adjustment 1
Switch 1
Adverse events 1
% patients followed by psychatrist 25%
The number of additional visits associated with events (addition, titration, switch or adverse events)
Any number of additional visits must be a number [0,∞[
The percentage of patients followed by a psychiatrist (it is assumed that other patients are followed by GP)
It must be a number [0,100]
Start
Population
Strategies
ModellingParameters
AdverseEv


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
GPPct
25%
Hospitalisations
Mean number of hospitalization days in one month
Depression 0.225
Recovery 0
Lost productivity
Approach
Human capital
Friction costs
Human capital
Monthly number of sick-leave days in depression 2.67
Presenteeism
% of lost working time 12%
The monthly number of hospitalization days in depression period
It must be a number [0,∞[
The monthly number of hospitalization days in recovery period
It must be a number [0,∞[
This box allows you to choose between the human capital and the friction costs approach
For the human capital approach, you must enter the monthly number of sick leave days in depression period
It must be a number [0,∞[
The percentage worked time lost in depression period
It must be a number [0,100]
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea


Microsoft Excel - Depression_DES_model.xls
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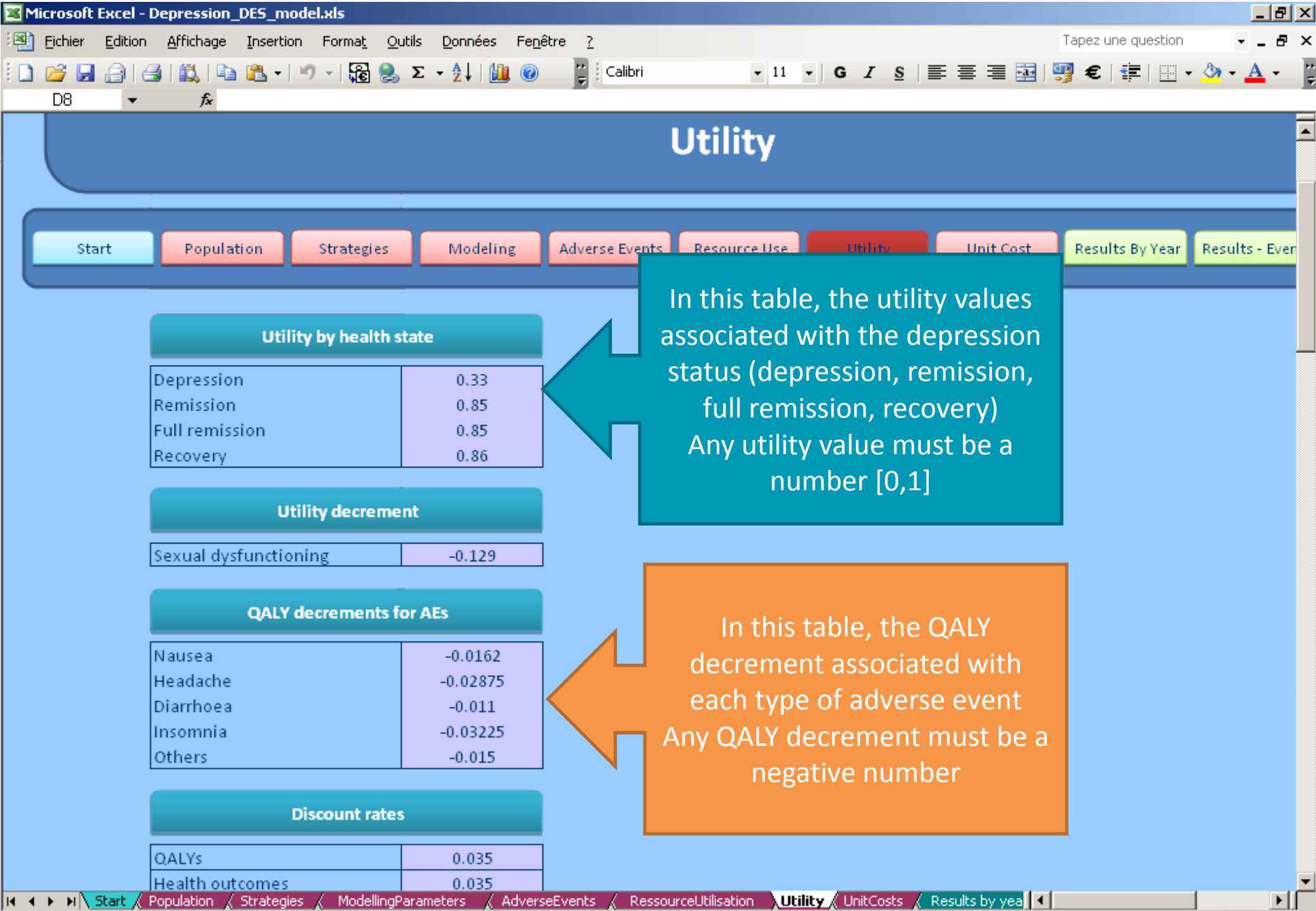
Tapez une question
Calibri 11
25%
Hospitalisations
Mean number of hospitalization days in one month
Depression 0.225
Recovery 0
Lost productivity
Approach
Human capital
Friction costs
Friction costs
Prob. of SL at 1 month
Mean duration
Depression 0.2 14
Elasticity 0.8
Friction cost period (in weeks) 4
Presenteeism
% of lost working time 12%
Friction cost approach
The probability of having a sick leave in depression period
It must be a number [0,1]
The mean duration of the sick leaves in remission period
It must be a number [1,∞[
The elasticity
It must be a number [0,1]
The friction cost period
It must be an integer [1,∞[
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

Input sheet: utility


Microsoft Excel - Depression_DES_model.xls
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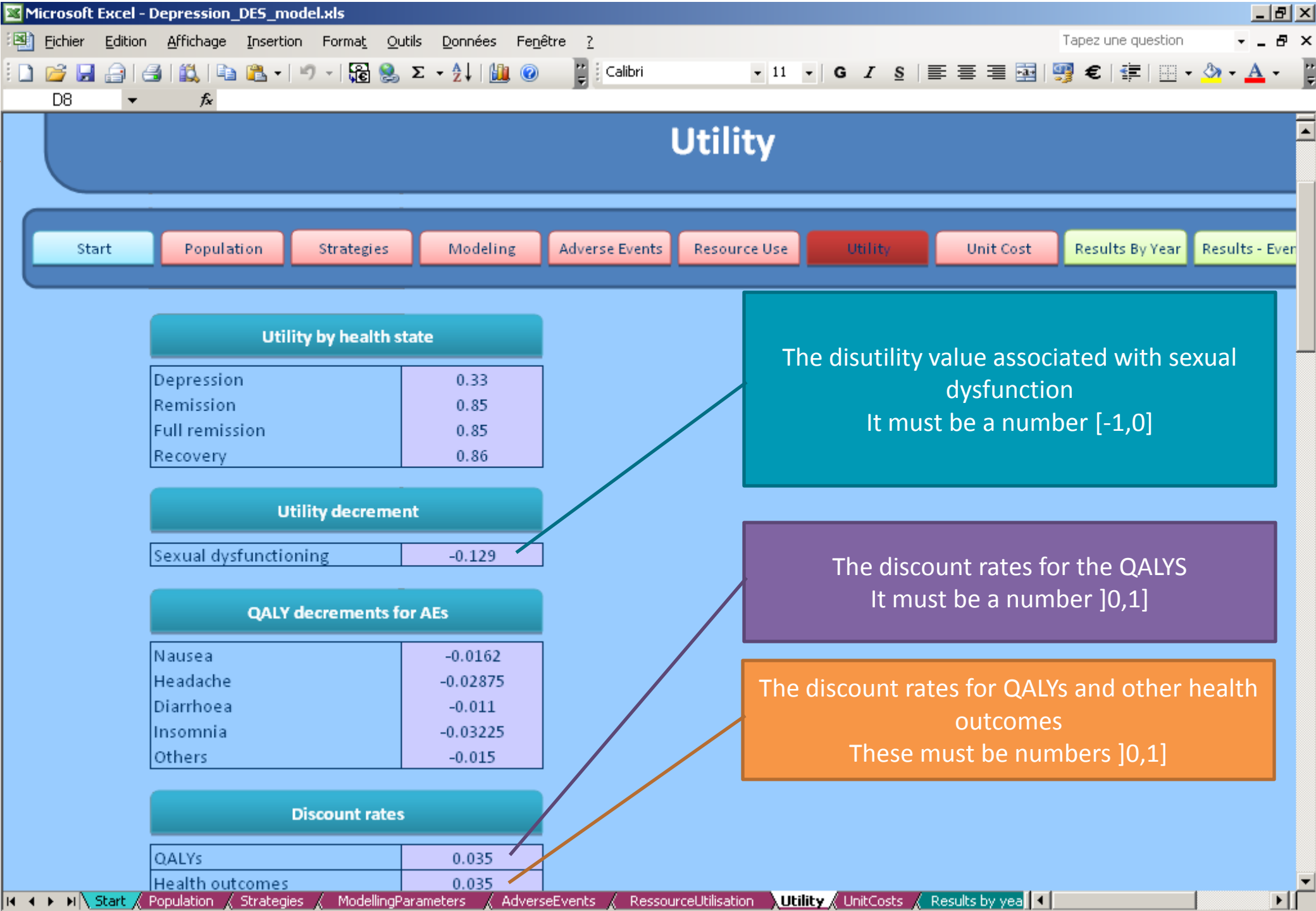
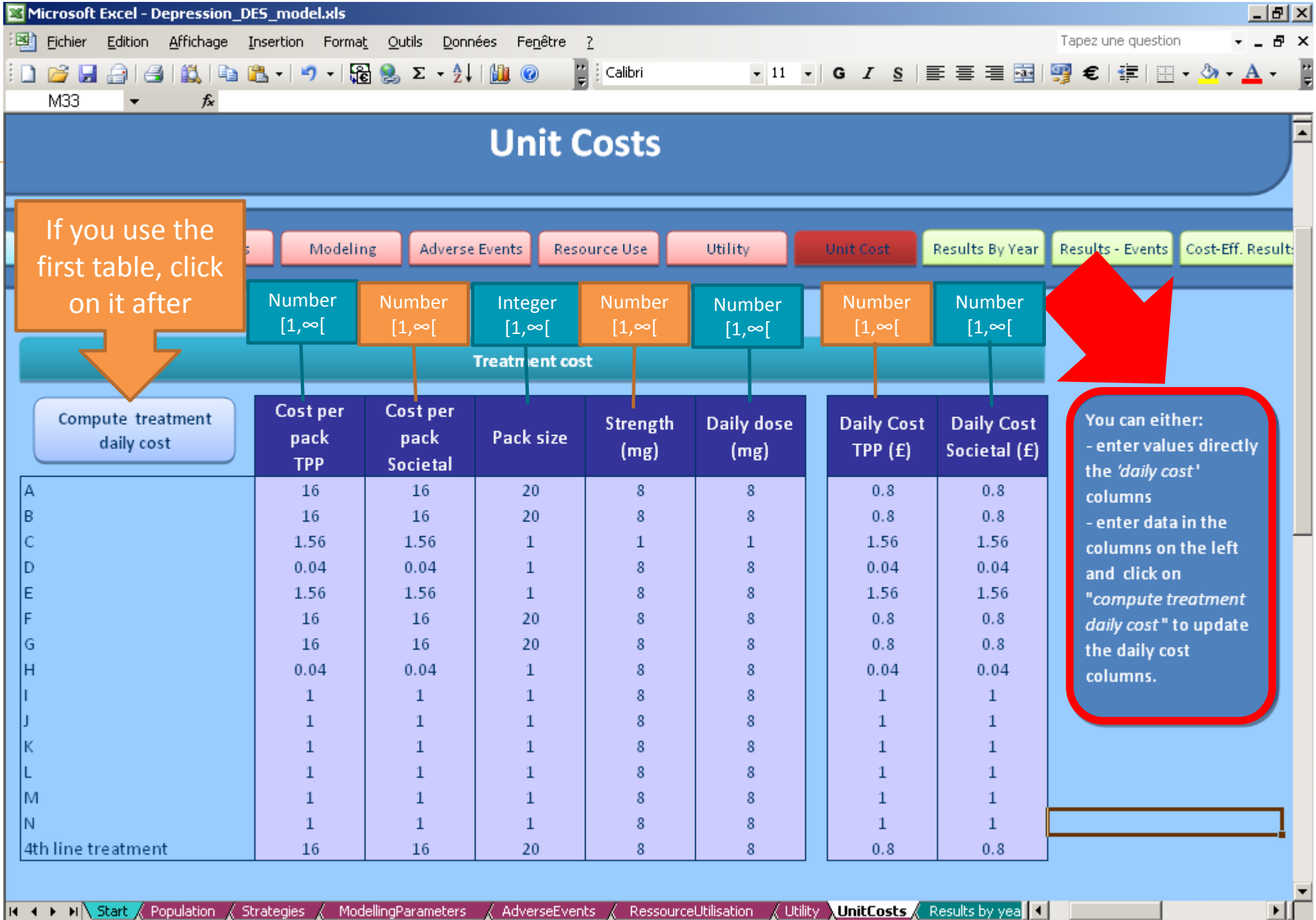
Tapez une question
Calibri 11
D8
Utility
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Ever
Utility by health state
Depression 0.33
Remission 0.85
Full remission 0.85
Recovery 0.86
In this table, the utility values associated with the depression status (depression, remission, full remission, recovery)
Any utility value must be a number [0,1]
Utility decrement
Sexual dysfunctioning -0.129
QALY decrements for AEs
Nausea -0.0162
Headache -0.02875
Diarrhoea -0.011
Insomnia -0.03225
Others -0.015
In this table, the QALY decrement associated with each type of adverse event
Any QALY decrement must be a negative number
Discount rates
QALYs 0.035
Health outcomes 0.035
Start
Population
Strategies
ModellingParameters
AdverseEvents
RessourceUtilisation
Utility
UnitCosts
Results by yea


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
D8
Utility
Start
Population
Strategies
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Ever
Utility by health state
Depression 0.33
Remission 0.85
Full remission 0.85
Recovery 0.86
Utility decrement
Sexual dysfunctioning -0.129
QALY decrements for AEs
Nausea -0.0162
Headache -0.02875
Diarrhoea -0.011
Insomnia -0.03225
Others -0.015
Discount rates
QALYs 0.035
Health outcomes 0.035
The disutility value associated with sexual dysfunction
It must be a number [-1,0]
The discount rates for the QALYS
It must be a number]0,1]
The discount rates for QALYs and other health outcomes
These must be numbers]0,1]
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

Input sheet: unit costs


Microsoft Excel - Depression_DES_model.xls
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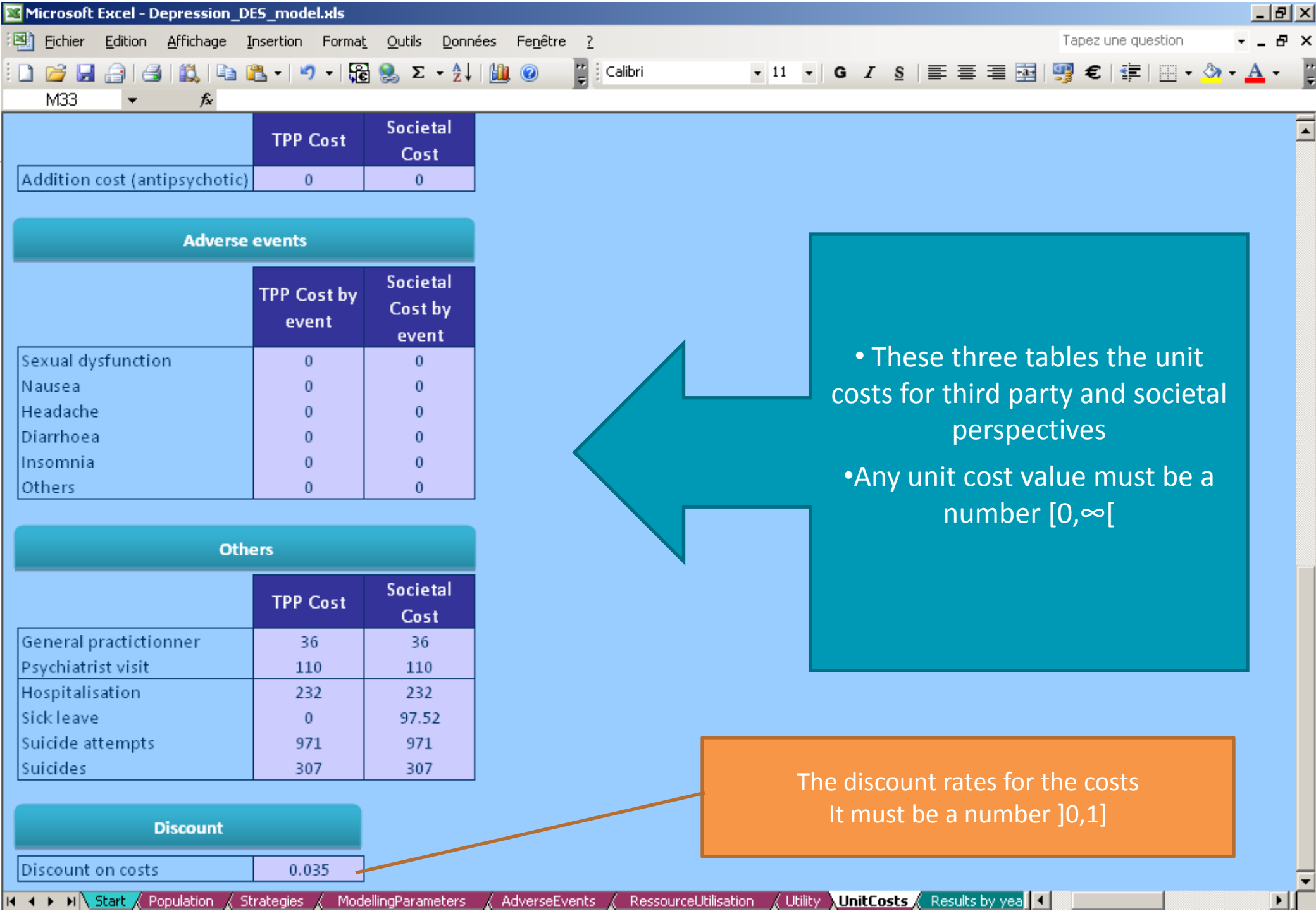
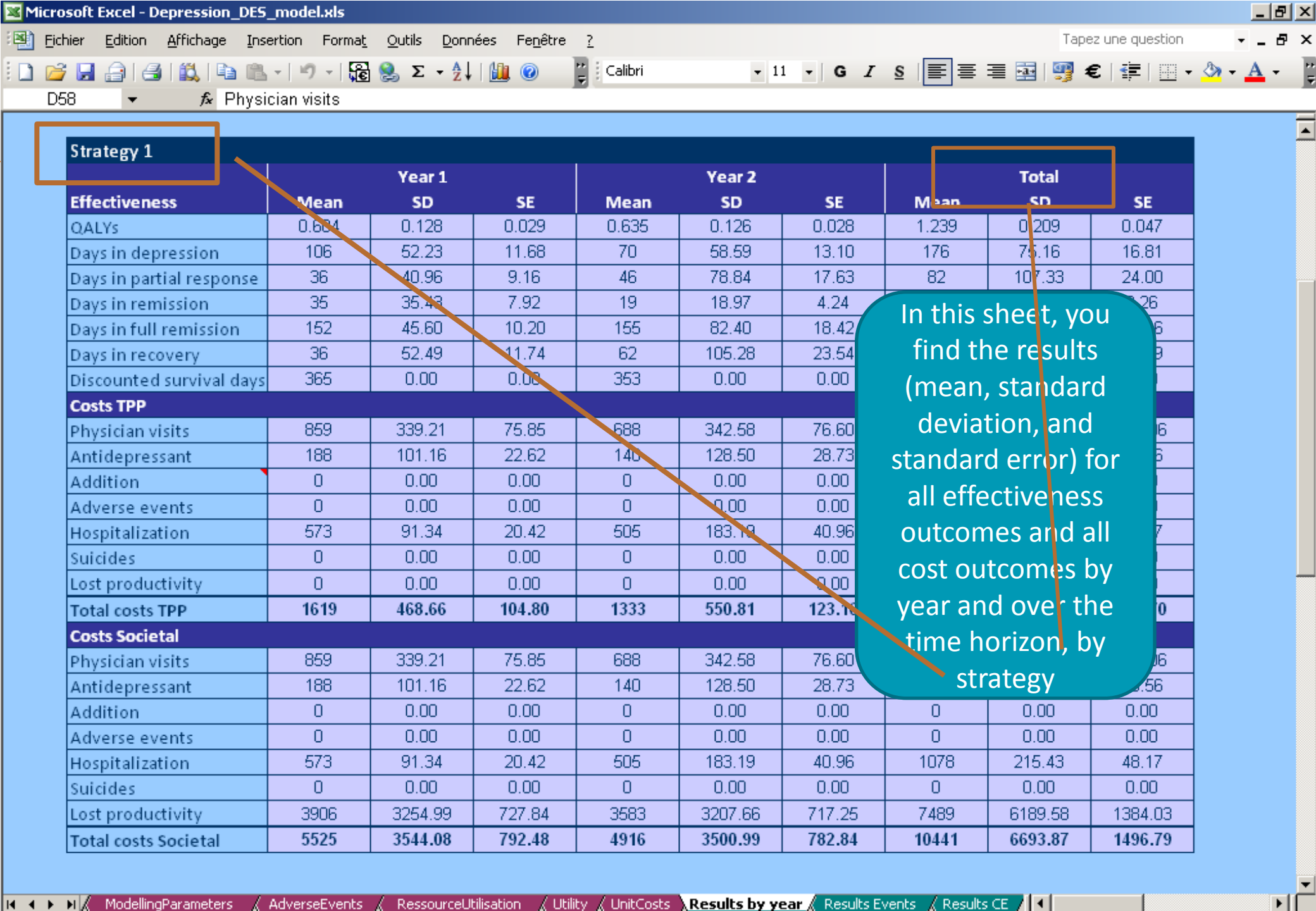
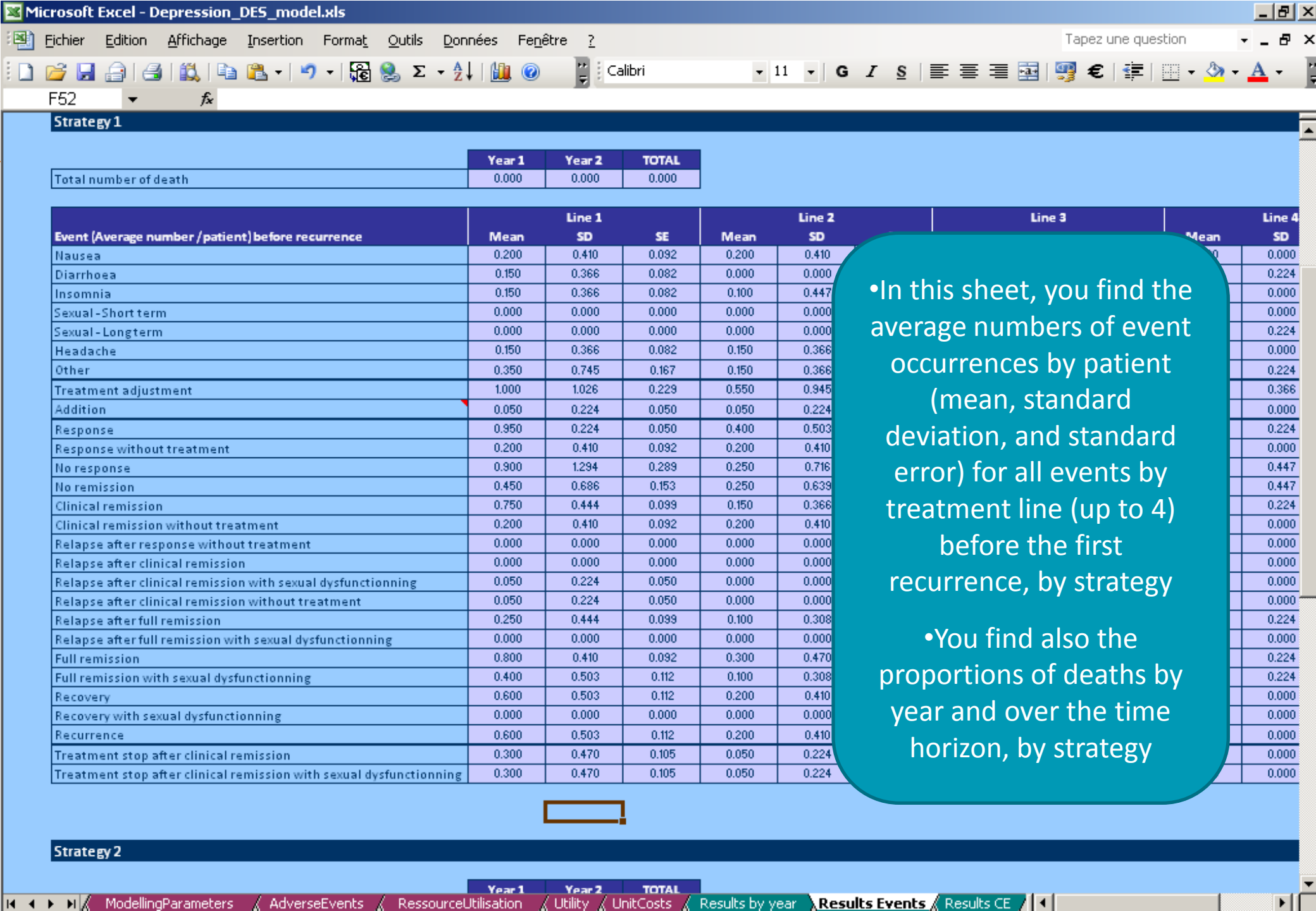
Tapez une question
Calibri 11
M33
Unit Costs
If you use the first table, click on it after
Modeling
Adverse Events
Resource Use
Utility
Unit Cost
Results By Year
Results - Events
Cost-Eff. Result
Number [1,∞[
Number [1,∞[
Integer [1,∞[
Number [1,∞[
Number [1,∞[
Number [1,∞[
Number [1,∞[
Treatment cost
Compute treatment daily cost
Cost per pack TPP
Cost per pack Societal
Pack size
Strength (mg)
Daily dose (mg)
Daily Cost TPP (£)
Daily Cost Societal (£)
A 16 16 20 8 8 0.8 0.8
B 16 16 20 8 8 0.8 0.8
C 1.56 1.56 1 1 1 1.56 1.56
D 0.04 0.04 1 8 8 0.04 0.04
E 1.56 1.56 1 8 8 1.56 1.56
F 16 16 20 8 8 0.8 0.8
G 16 16 20 8 8 0.8 0.8
H 0.04 0.04 1 8 8 0.04 0.04
I 1 1 1 8 8 1 1
J 1 1 1 8 8 1 1
K 1 1 1 8 8 1 1
L 1 1 1 8 8 1 1
M 1 1 1 8 8 1 1
N 1 1 1 8 8 1 1
4th line treatment 16 16 20 8 8 0.8 0.8
You can either:
- enter values directly the 'daily cost' columns
- enter data in the columns on the left and click on "compute treatment daily cost" to update the daily cost columns.
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
M33
TPP Cost
Societal Cost
Addition cost (antipsychotic) 0 0
Adverse events
TPP Cost by event
Societal Cost by event
Sexual dysfunction 0 0
Nausea 0 0
Headache 0 0
Diarrhoea 0 0
Insomnia 0 0
Others 0 0
Others
TPP Cost
Societal Cost
General practictionner 36 36
Psychiatrist visit 110 110
Hospitalisation 232 232
Sick leave 0 97.52
Suicide attempts 971 971
Suicides 307 307
Discount
Discount on costs 0.035
• These three tables the unit costs for third party and societal perspectives
•Any unit cost value must be a number [0,∞[
The discount rates for the costs
It must be a number]0,1]
Start Population Strategies ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

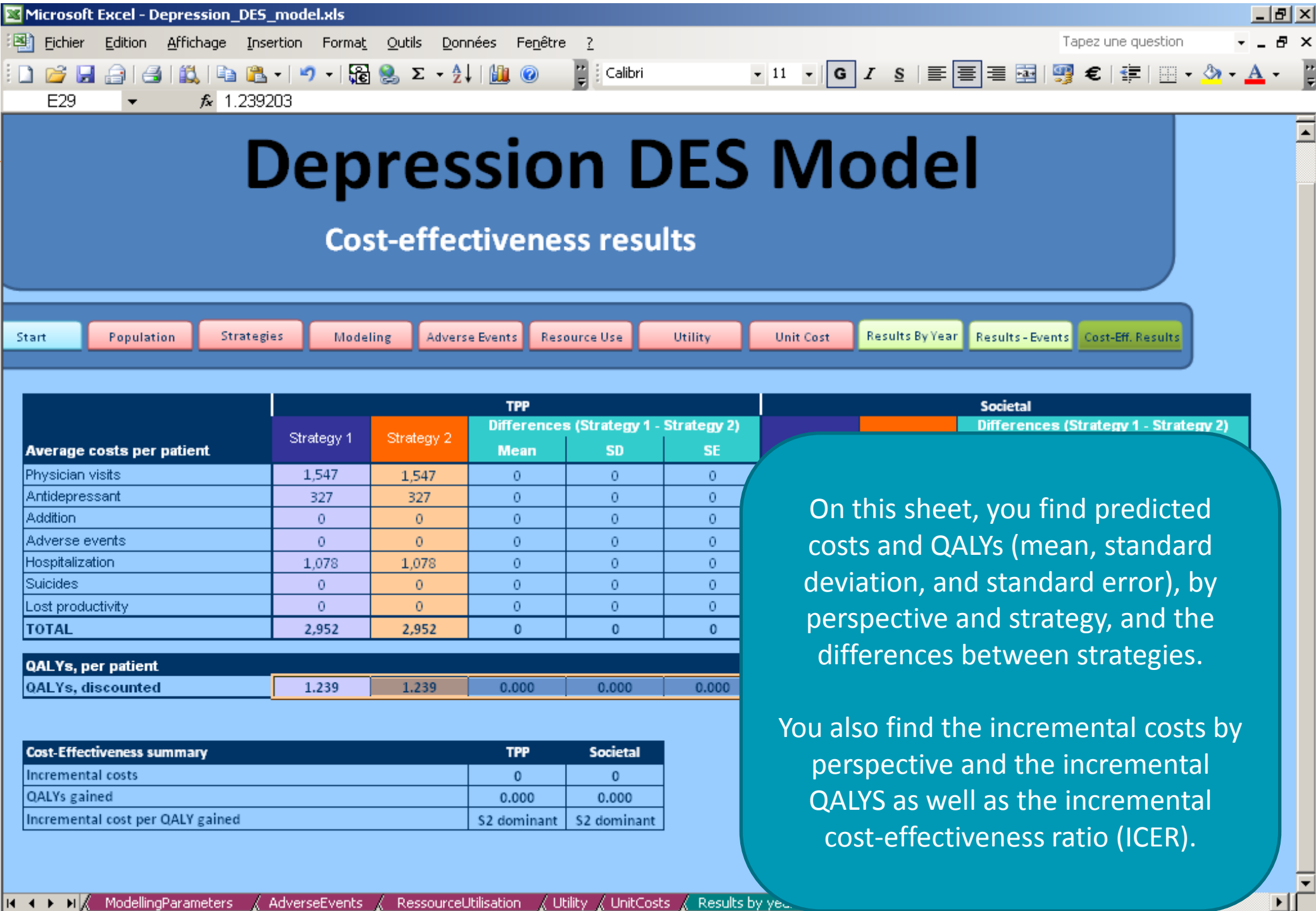
Output sheet: results by year


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
D58
Physician visits
Strategy 1
Year 1
Year 2
Total
Effectiveness Mean SD SE Mean SD SE Mean SD SE
QALYs 0.634 0.128 0.029 0.635 0.126 0.028 1.239 0.209 0.047
Days in depression 106 52.23 11.68 70 58.59 13.10 176 75.16 16.81
Days in partial response 36 40.96 9.16 46 78.84 17.63 82 107.33 24.00
Days in remission 35 35.43 7.92 19 18.97 4.24 26
Days in full remission 152 45.60 10.20 155 82.40 18.42 6
Days in recovery 36 52.49 11.74 62 105.28 23.54 9
Discounted survival days 365 0.00 0.00 353 0.00 0.00
Costs TPP
Physician visits 859 339.21 75.85 688 342.58 76.60 6
Antidepressant 188 101.16 22.62 140 128.50 28.73 6
Addition 0 0.00 0.00 0 0.00 0.00
Adverse events 0 0.00 0.00 0 0.00 0.00
Hospitalization 573 91.34 20.42 505 183.19 40.96 7
Suicides 0 0.00 0.00 0 0.00 0.00
Lost productivity 0 0.00 0.00 0 0.00 0.00
Total costs TPP 1619 468.66 104.80 1333 550.81 123.1 0
Costs Societal
Physician visits 859 339.21 75.85 688 342.58 76.60 06
Antidepressant 188 101.16 22.62 140 128.50 28.73 56
Addition 0 0.00 0.00 0 0.00 0.00 0 0.00 0.00
Adverse events 0 0.00 0.00 0 0.00 0.00 0 0.00 0.00
Hospitalization 573 91.34 20.42 505 183.19 40.96 1078 215.43 48.17
Suicides 0 0.00 0.00 0 0.00 0.00 0 0.00 0.00
Lost productivity 3906 3254.99 727.84 3583 3207.66 717.25 7489 6189.58 1384.03
Total costs Societal 5525 3544.08 792.48 4916 3500.99 782.84 10441 6693.87 1496.79
In this sheet, you find the results (mean, standard deviation, and standard error) for all effectiveness outcomes and all cost outcomes by year and over the time horizon, by strategy
ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by year Results Events Results CE

Output sheet: results - events


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
F52
Strategy 1
Year 1 Year 2 TOTAL
Total number of death 0.000 0.000 0.000
Event (Average number /patient) before recurrence
Line 1 Mean SD SE
Line 2 Mean SD
Line 3
Line 4 Mean SD
Nausea 0.200 0.410 0.092 0.200 0.410 0.000
Diarrhoea 0.150 0.366 0.082 0.000 0.000 0.224
Insomnia 0.150 0.366 0.082 0.100 0.447 0.000
Sexual - Short term 0.000 0.000 0.000 0.000 0.000 0.000
Sexual - Long term 0.000 0.000 0.000 0.000 0.000 0.224
Headache 0.150 0.366 0.082 0.150 0.366 0.000
Other 0.350 0.745 0.167 0.150 0.366 0.224
Treatment adjustment 1.000 1.026 0.229 0.550 0.945 0.366
Addition 0.050 0.224 0.050 0.050 0.224 0.000
Response 0.950 0.224 0.050 0.400 0.503 0.224
Response without treatment 0.200 0.410 0.092 0.200 0.410 0.000
No response 0.900 1.294 0.289 0.250 0.716 0.447
No remission 0.450 0.686 0.153 0.250 0.639 0.447
Clinical remission 0.750 0.444 0.099 0.150 0.366 0.224
Clinical remission without treatment 0.200 0.410 0.092 0.200 0.410 0.000
Relapse after response without treatment 0.000 0.000 0.000 0.000 0.000 0.000
Relapse after clinical remission 0.000 0.000 0.000 0.000 0.000 0.000
Relapse after clinical remission with sexual dysfunctionning 0.050 0.224 0.050 0.000 0.000 0.000
Relapse after clinical remission without treatment 0.050 0.224 0.050 0.000 0.000 0.000
Relapse after full remission 0.250 0.444 0.099 0.100 0.308 0.224
Relapse after full remission with sexual dysfunctionning 0.000 0.000 0.000 0.000 0.000 0.000
Full remission 0.800 0.410 0.092 0.300 0.470 0.224
Full remission with sexual dysfunctionning 0.400 0.503 0.112 0.100 0.308 0.224
Recovery 0.600 0.503 0.112 0.200 0.410 0.000
Recovery with sexual dysfunctionning 0.000 0.000 0.000 0.000 0.000 0.000
Recurrence 0.600 0.503 0.112 0.200 0.410 0.000
Treatment stop after clinical remission 0.300 0.470 0.105 0.050 0.224 0.000
Treatment stop after clinical remission with sexual dysfunctionning 0.300 0.470 0.105 0.050 0.224 0.000
•In this sheet, you find the average numbers of event occurrences by patient (mean, standard deviation, and standard error) for all events by treatment line (up to 4) before the first recurrence, by strategy
•You find also the proportions of deaths by year and over the time horizon, by strategy
Strategy 2
Year 1 Year 2 TOTAL
ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by year Results Events Results CE

Ouput sheet:
Cost effectiveness results


Microsoft Excel - Depression_DES_model.xls
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?
Tapez une question
Calibri 11
E29 1.239203
Depression DES Model
Cost-effectiveness results
Start Population Strategies Modeling Adverse Events Resource Use Utility Unit Cost Results By Year Results - Events Cost-Eff. Results
TPP
Societal
Average costs per patient
Strategy 1
Strategy 2
Differences (Strategy 1 - Strategy 2)
Mean SD SE
Differences (Strategy 1 - Strategy 2)
Physician visits 1,547 1,547 0 0 0
Antidepressant 327 327 0 0 0
Addition 0 0 0 0 0
Adverse events 0 0 0 0 0
Hospitalization 1,078 1,078 0 0 0
Suicides 0 0 0 0 0
Lost productivity 0 0 0 0 0
TOTAL 2,952 2,952 0 0 0
QALYs, per patient
QALYs, discounted 1.239 1.239 0.000 0.000 0.000
Cost-Effectiveness summary TPP Societal
Incremental costs 0 0
QALYs gained 0.000 0.000
Incremental cost per QALY gained S2 dominant S2 dominant
On this sheet, you find predicted costs and QALYs (mean, standard deviation, and standard error), by perspective and strategy, and the differences between strategies.
You also find the incremental costs by perspective and the incremental QALYS as well as the incremental cost-effectiveness ratio (ICER).
ModellingParameters AdverseEvents RessourceUtilisation Utility UnitCosts Results by yea

Statistical distributions used in the model

Gompertz function

- Gompertz (1825) suggested that a "law of geometric progression pervades" in mortality after a certain age
- Gompertz mortality can be represented as

  $\mu(x) = \alpha e^{\beta x}$

  α is known as the baseline mortality, whereas β is the senescent component
- Note that since the Gompertz model is for a mortality hazard, we can integrate it to obtain the survival function:

$$S(x) = \exp\left[\frac{\alpha}{\beta}(1 - \exp^{\beta x})\right]$$

Weilbull function

- The Weibull distribution is characterized by two parameters: the location parameter and the scale parameter . This distribution is used by the software SAS in the Lifereg procedure and allows calculating odds ratio associated with covariables and therefore to include them in the model.
- The survival function G(t) are respectively the following:

$$G(t) = \exp(-\exp(-\frac{\mu + \beta X}{\sigma})t^{\frac{1}{\sigma}})$$

More information in the technical report

MODEL IMPLEMENTATION

Excel Interface

- Allows to specify the strategy(ies)
- Allows to modify all the inputs data, time horizon, number of patients, to fix seed
- Allows to obtain all the outputs

- If it is needed to change the structure of the model → Scilab programs
- If it is needed to change a type of distribution for a *time to event* or a distribution for attributes→Scilab programs
- If it is needed to add input data→Scilab+Excel+vba

Modeling process

DES interface – Start sheet

VBA

Main program: Creation a text file containing the folder pathway and the main scilab program

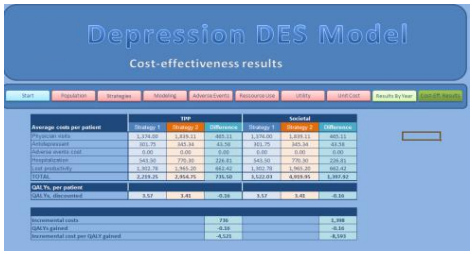
Parameters file: Creation a text file containing inputs data written in a scilab form (i.e. parameter statements) which is launched by the main program

Scilab opening

Execute the main program by scilab

scilab

Outputs in text files (scilab form)



DES interface – Results sheets

VBA