How to implement your own scenario related to a change in transition probabilities: A DYNAMO-HIA application using smoking as the risk factor

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EUPHA 2010 pre-conference workshop

Amsterdam, Nov. 11th 2010

Presentation Outline

- Scenario to be run: Increase in the probability to quit smoking (due to intervention)

- Setting up your own smoking transition probabilities
  - Calculating the effect of an intervention on the probability to quit
  - Creating and saving your .xml file
- Setting up and running your intervention scenario
- Inspecting your results
  - The different outputs

Scenario to be run

- Intervention-induced increase in the probability to quit smoking
- Effects taken from studies of the effect of group behavioral therapy on adolescents and adults
- Effects expressed as Odds Ratios (ORs):
  - adolescents: 2.04, adults: 2.17

Setting up your own smoking transition probabilities: Data (NL data used for this example scenario)

Data needed:

Smoking Prevalence:

- Smoking states: Never/Former/Current Smoker: NS/FS/CS

Smoking Transition Probabilities:

- Transition probabilities from: NS->CS, CS->FS, FS->CS

Calculating the effect of an intervention on the probability to quit

original probabilities	AGE	start never->cur	stop cur->for	restart for->cur	AGE	probability matrix	NS	to FS	CS	AGE	original probability x	odds x/(1-x)	odds after odds*OR	after intervention probability odds after/(1+odds after)
	0	0	**0**	0	0	**NS**	1	0	0	0	**0**	0		
	1	0	**0**	0	from	**FS**	0	1	0	1	**0**	0		
	2	0	**0**	0		**CS**	0	0	1	2	**0**	0		
	3	0	**0**	0	1	**NS**	1	0	0	3	**0**	0		
	4	0	**0**	0		**FS**	0	1	0	4	**0**	0		
	5	0	**0**	0		**CS**	0	0	1	5	**0**	0		
	6	0.001237	**0**	0	2	**NS**	1	0	0	6	**0**	0		
	7	0.004843	**0**	0		**FS**	0	1	0	7	**0**	0		
	8	0.010333	**0**	0		**CS**	0	0	1	8	**0**	0		
	9	0.017115	**0**	0	3	**NS**	1	0	0	9	**0**	0		
	10	0.024597	**0**	0		**FS**	0	1	0	10	**0**	0		
	11	0.032187	**0.003465**	0.028032		**CS**	0	0	1	11	**0.0034648**	0.003477	0.0070928	**0.007043**
	12	0.039294	**0.011264**	0.071279	4	**NS**	1	0	0	12	**0.0112639**	0.011392	0.0232401	**0.022712**
	13	0.045325	**0.02298**	0.134837		**FS**	0	1	0	13	**0.02298**	0.023521	0.0479818	**0.045785**
	14	0.05003	**0.037113**	0.208232		**CS**	0	0	1	14	**0.0371127**	0.038543	0.078628	**0.072896**
	15	0.053159	**0.052162**	0.280993	5	**NS**	1	0	0	15	**0.0521615**	0.055032	0.1122654	**0.100934**
	16	0.054461	**0.066626**	0.342645		**FS**	0	1	0	16	**0.0666257**	0.071382	0.1456184	**0.127109**
	17	0.053685	**0.079005**	0.382718		**CS**	0	0	1	17	**0.0790049**	0.085782	0.1749955	**0.148933**
	18	0.050581	**0.087799**	0.390737	6	**NS**	0.998763	0	0.001237	18	**0.0877986**	0.096249	0.2088606	**0.172775**
	19	0.045761	**0.093705**	0.374088		**FS**	0	1	0	19	**0.0937052**	0.103394	0.2243644	**0.18325**
	20	0.039838	**0.097423**	0.340154		**CS**	0	0	1	20	**0.0974231**	0.107939	0.2342273	**0.189776**
	21	0.033425	**0.099651**	0.296319	7	**NS**	0.995157	0	0.004843	21	**0.099651**	0.11068	0.2401765	**0.193663**
	22	0.027133	**0.101087**	0.249967		**FS**	0	1	0	22	**0.101087**	0.112455	0.2440267	**0.196159**
	23	0.021575	**0.10243**	0.208482		**CS**	0	0	1	23	**0.10243**	0.114119	0.2476387	**0.198486**
	24	0.016738	**0.103561**	0.172053	8	**NS**	0.989667	0	0.010333	24	**0.103561**	0.115525	0.250689	**0.200441**
	25	0.012607	**0.104361**	0.140873		**FS**	0	1	0	25	**0.104361**	0.116521	0.2528512	**0.201821**
	26	0.009167	**0.104711**	0.115131		**CS**	0	0	1	26	**0.104711**	0.116958	0.2537983	**0.202424**
	27	0.006406	**0.104492**	0.095017	9	**NS**	0.982885	0	0.017115	27	**0.104492**	0.116685	0.2532056	**0.202046**
	28	0.004308	**0.103584**	0.080723		**FS**	0	1	0	28	**0.103584**	0.115553	0.2507511	**0.20048**
	29	0.002778	**0.101972**	0.071235		**CS**	0	0	1	29	**0.101972**	0.113551	0.2464057	**0.197693**
	30	0.001722	**0.099637**	0.06554	10	**NS**	0.975403	0	0.024597	30	**0.0996371**	0.110663	0.2401393	**0.193639**
	31	0.001045	**0.096562**	0.062626		**FS**	0	1	0	31	**0.0965623**	0.106883	0.2319365	**0.18827**
	32	0	**0.09273**	0.061479		**CS**	0	0	1	32	**0.0927304**	0.102208	0.2217918	**0.18153**
	33	0	**0.088124**	0.061085	11	**NS**	0.967813	0	0.032187	33	**0.088124**	0.09664	0.2097095	**0.173355**
	34	0	**0.08298**	0.061138		**FS**	0	0.971968	0.028032	34	**0.0829799**	0.090489	0.1963603	**0.164131**
	35	0	**0.077535**	0.061327		**CS**	0	0.003465	0.996535	35	**0.0775345**	0.084051	0.1823915	**0.154256**
	36	0	**0.072025**	0.061345	12	**NS**	0.960707	0	0.039294	36	**0.0720247**	0.077615	0.1684243	**0.144147**

Creating and saving your .xml file

File Edit View Insert Format Tools Data Window DYNAMO-HIA Help

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This tool contains 3 sheets for entering information on categorical or compound risk factors.

This tool contains 3 sheets for entering information on categorical or compound risk factors. A categorical risk factor is a risk factor (exposure) for which the exposure is
categorized as filling in one of several classes. At most 10 classes can be entered for a risk factor.

A compound risk factor is a categorical risk factor, in which on of the categories is a "duration category", that is, a category in which the risk also depends on how long a person is already in this risk class.
A categorical risk factor needs 2 input files:

- the risk factor prevalence (for each class, the percentage of persons that is in this class; this should sum to 100 over all classes)

- the transition file which indicates for each class which percent of those in this class will change their exposure into another exposure. The original class is given as "from", the class to which one moved is given by "to". All "from" values for a single class should add up to 100.

A compound risk factor additionally needs the prevalence in the duration class,

	A	B	C	D	E	F	G	H	I	J	K	L
1	age	male									female	
2		1			2			3			1	
3		1	2	3	1	2	3	1	2	3	1	2
4	0	0	0	0	0	0	0	0	0	0	0	0
5	1	0	0	0	0	0	0	0	0	0	0	0
6	2	0	0	0	0	0	0	0	0	0	0	0
7	3	0	0	0	0	0	0	0	0	0	0	0
8	4	0	0	0	0	0	0	0	0	0	0	0

o Exposure to the risk factor should be entered in "Risk factor prevalence_Cat"
NB: the values need to be entered as percentage (0-100) and should add up to 100 over all risk factor classes (per age and sex)
o Duration of exposure (compound risk factors only) should be entered in "Risk factor prevalence Dur"
NB: the values need to be entered as percentage (0-100) and should add up to 100 (per age and sex)
o The transition matrix should be entered in "transtion matrix"
NB: the values need to be entered as percentage (0-100) and should add up to 100 over all from values (per age and sex)

For the first and last sheet on first has to indicate the number of categories of the risk factor by clicking on DYNAMO_HIA, then "new", then enter the number of classes, then GO!

Creating XML files

o Prepare a sheet for data entry by going to the menu "DYNAMO-HIA" and press "New"

o After you enter the data on each sheet, you must create an individual population XML files for each sheet separately
o Go to the menu "DYNAMO-HIA" and press "Export to XML"

o Type a name and save in the same directory as the target file.

Creating and saving your .xml file

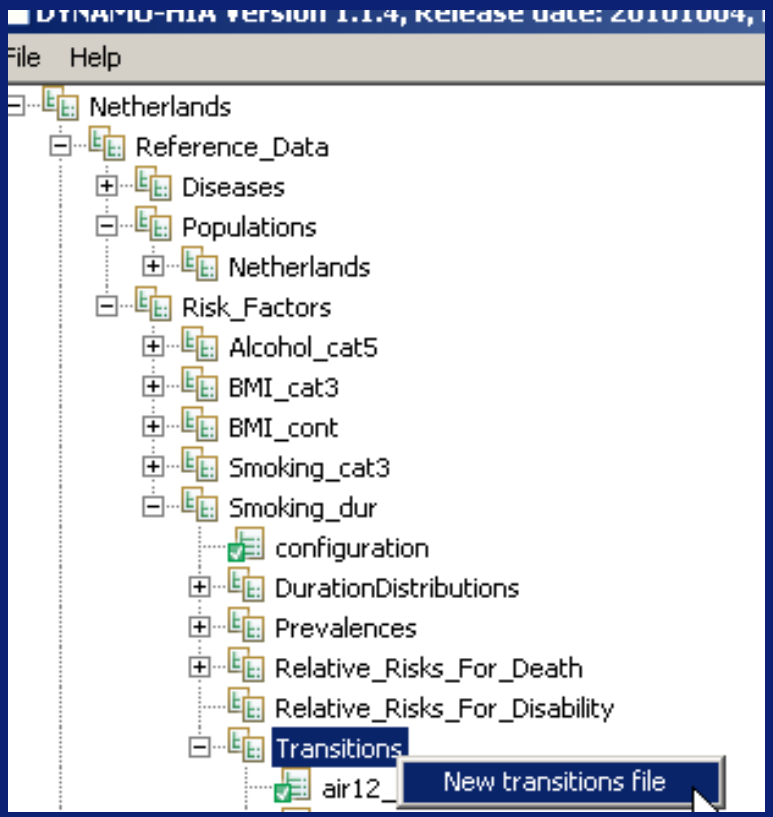
Reference Scenario

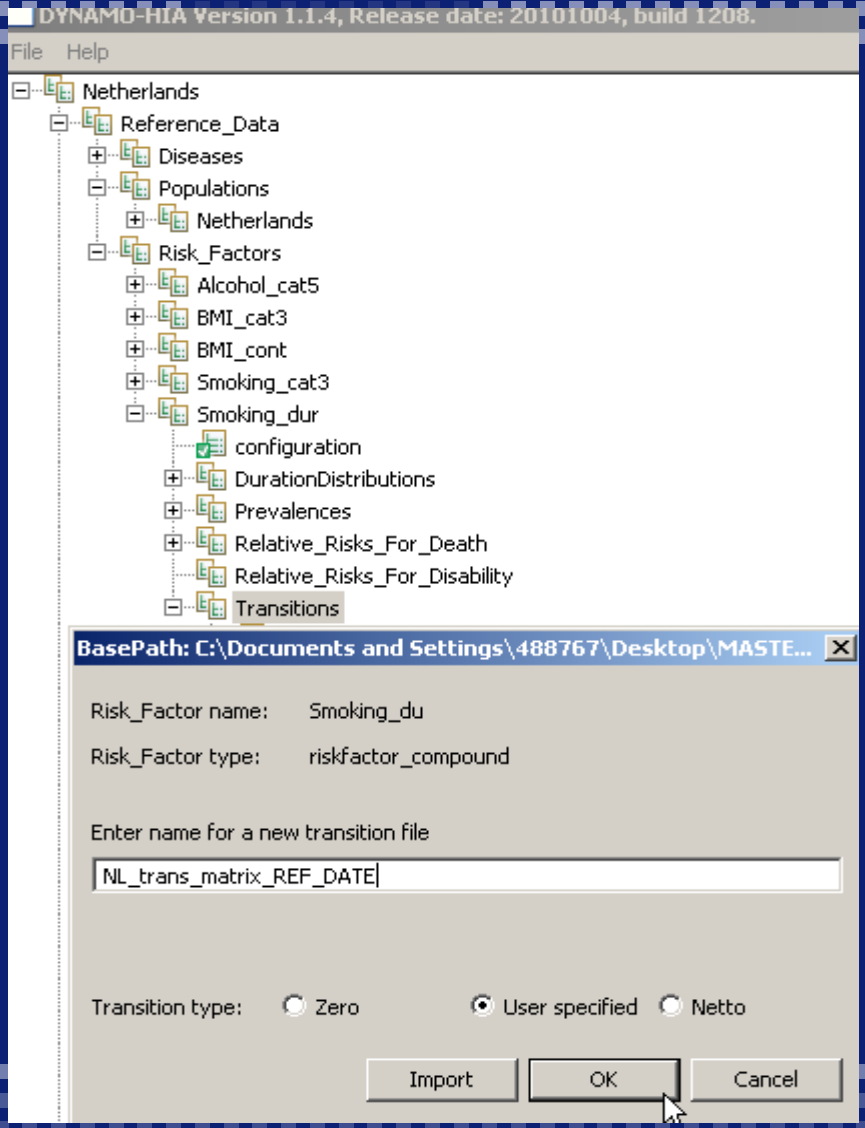
	K	L	M	N	O	P	Q	R	S	T
1	**female**									
2	**1**			**2**			**3**			AGE
3	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	
4	100	0	0	0	100	0	0	0	100	0
5	100	0	0	0	100	0	0	0	100	1
6	100	0	0	0	100	0	0	0	100	2
7	100	0	0	0	100	0	0	0	100	3
8	100	0	0	0	100	0	0	0	100	4
9	100	0	0	0	100	0	0	0	100	5
10	99.87629	0	0.123709	0	100	0	0	0	100	6
11	99.51569	0	0.484307	0	100	0	0	0	100	7
12	98.96671	0	1.03329	0	100	0	0	0	100	8
13	98.28853	0	1.71147	0	100	0	0	0	100	9
14	97.54034	0	2.45966	0	100	0	0	0	100	10
15	96.78132	0	3.21868	0	97.19681	2.80319	0	0.34648	99.65352	**11**
16	96.07065	0	3.92935	0	92.87206	7.12794	0	1.12639	98.87361	12

Intervention Scenario

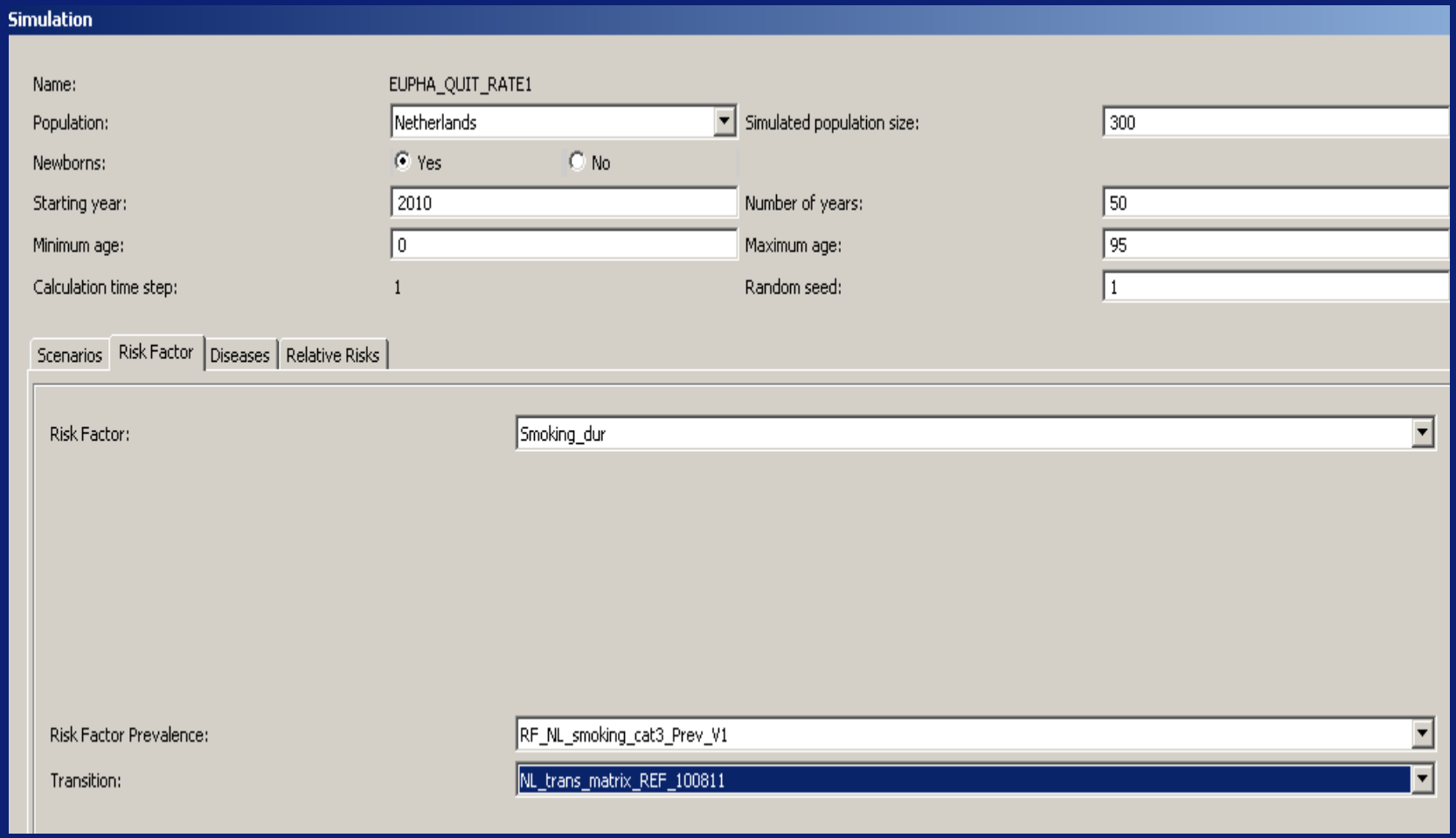
14	97.54034	0	2.45966	0	100	0	0	0	100	10
15	96.78132	0	3.21868	0	97.19681	2.80319	0	0.704281	99.29572	**11**
16	96.07065	0	3.92935	0	92.87206	7.12794	0	2.271229	97.72877	12

Creating and saving your .xml file

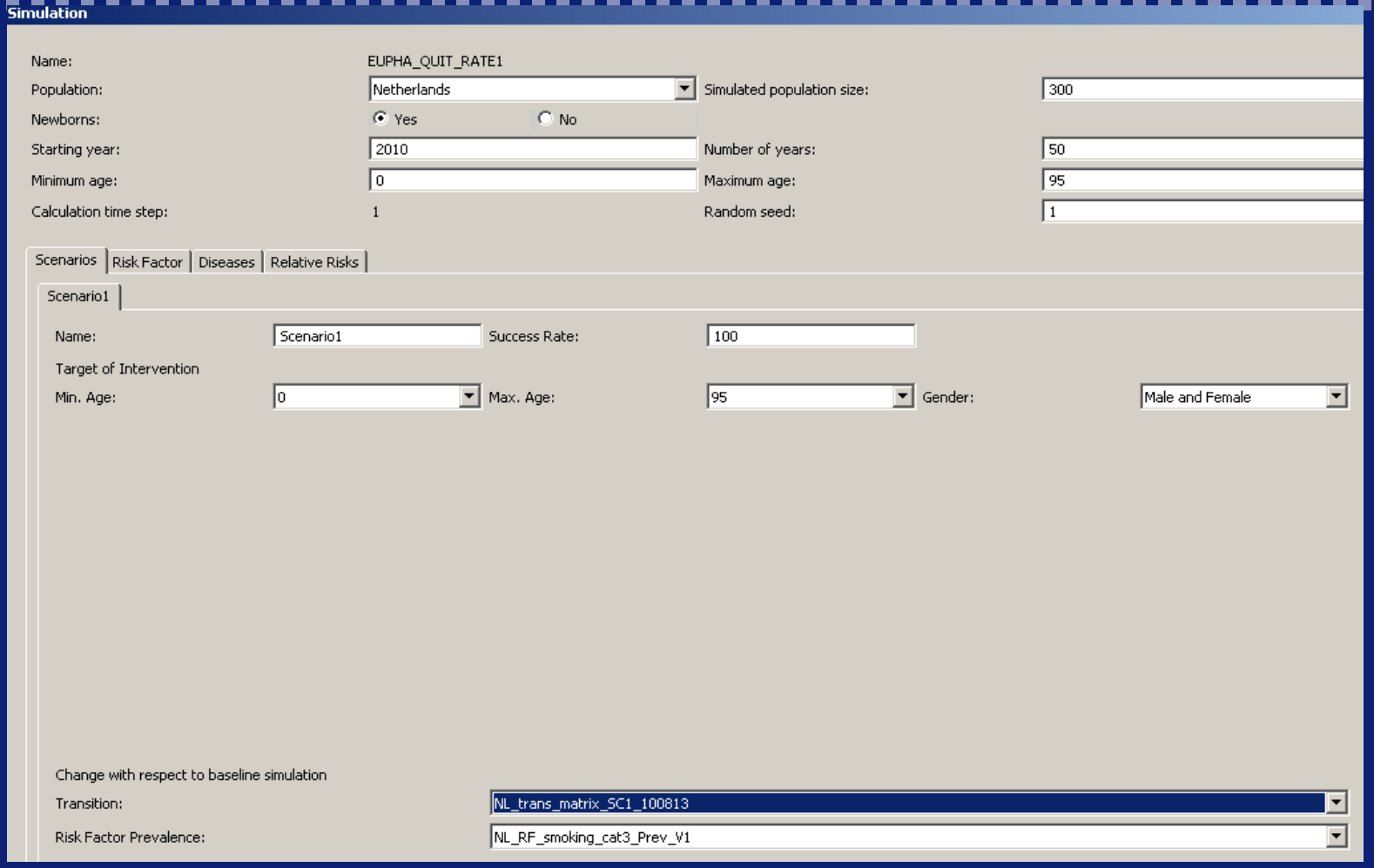




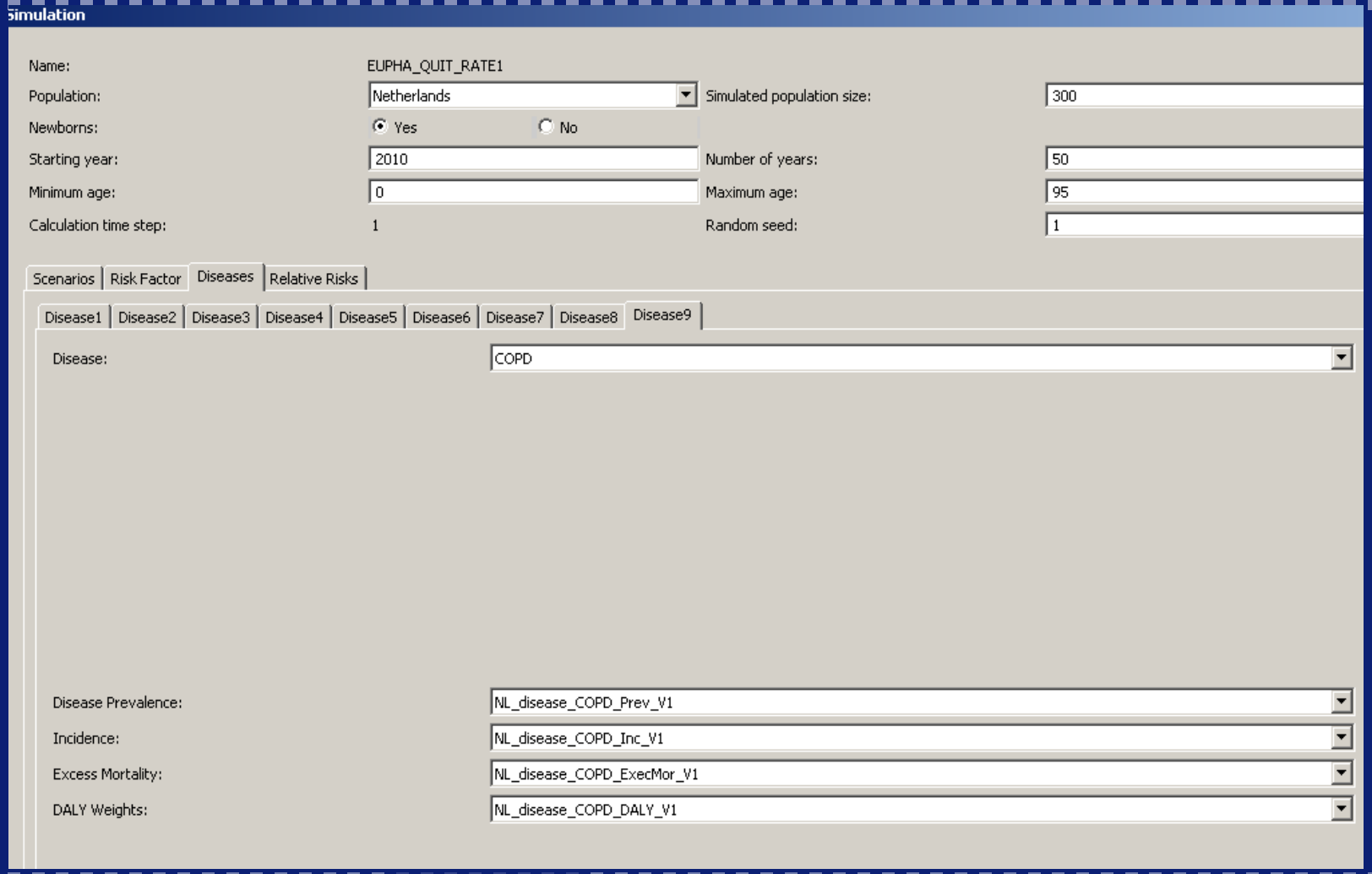
Setting up your intervention scenario (Risk Factor Screen)



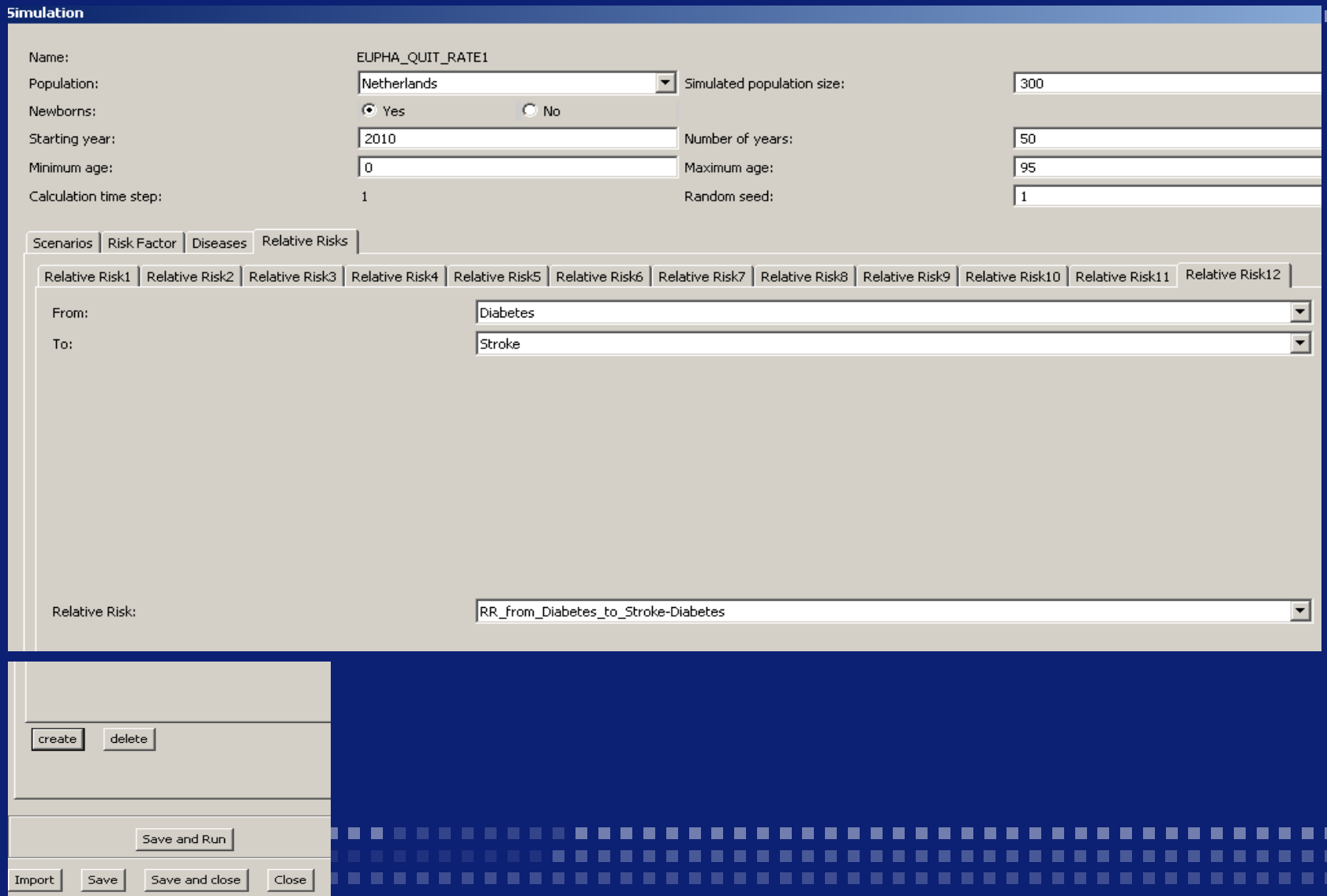
Setting up your scenario (Scenarios Screen)



Setting up your scenario (Diseases Screen)

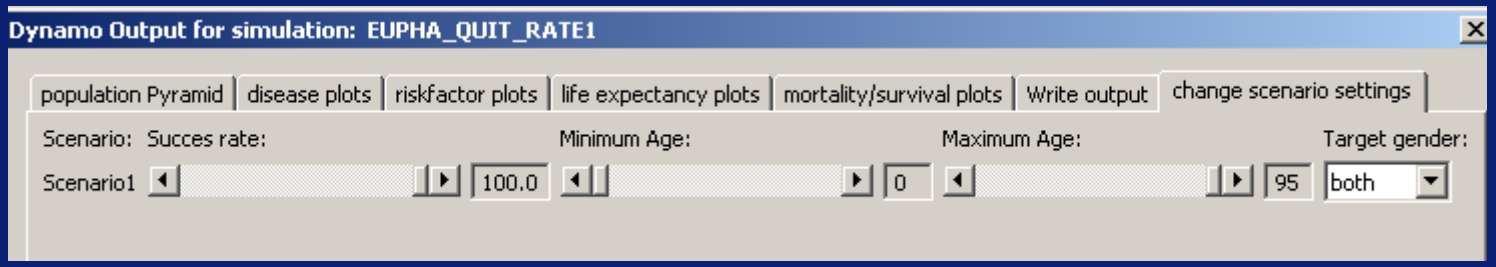


Setting up your scenario (Relative Risks Screen)

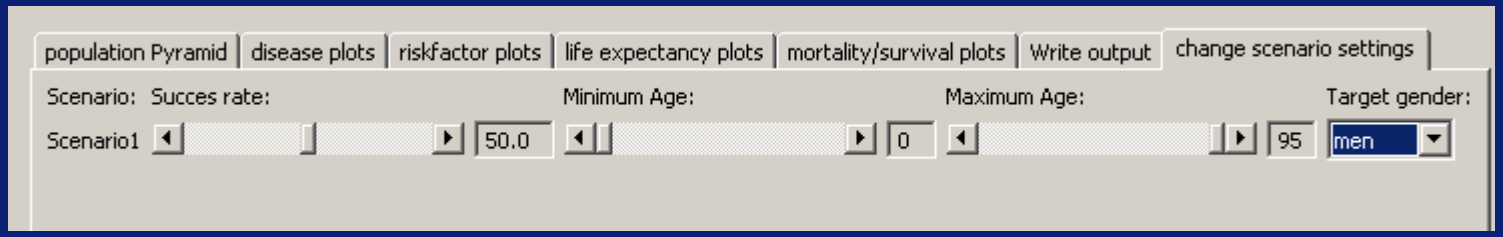


Inspecting your results: adjustment of your scenario settings

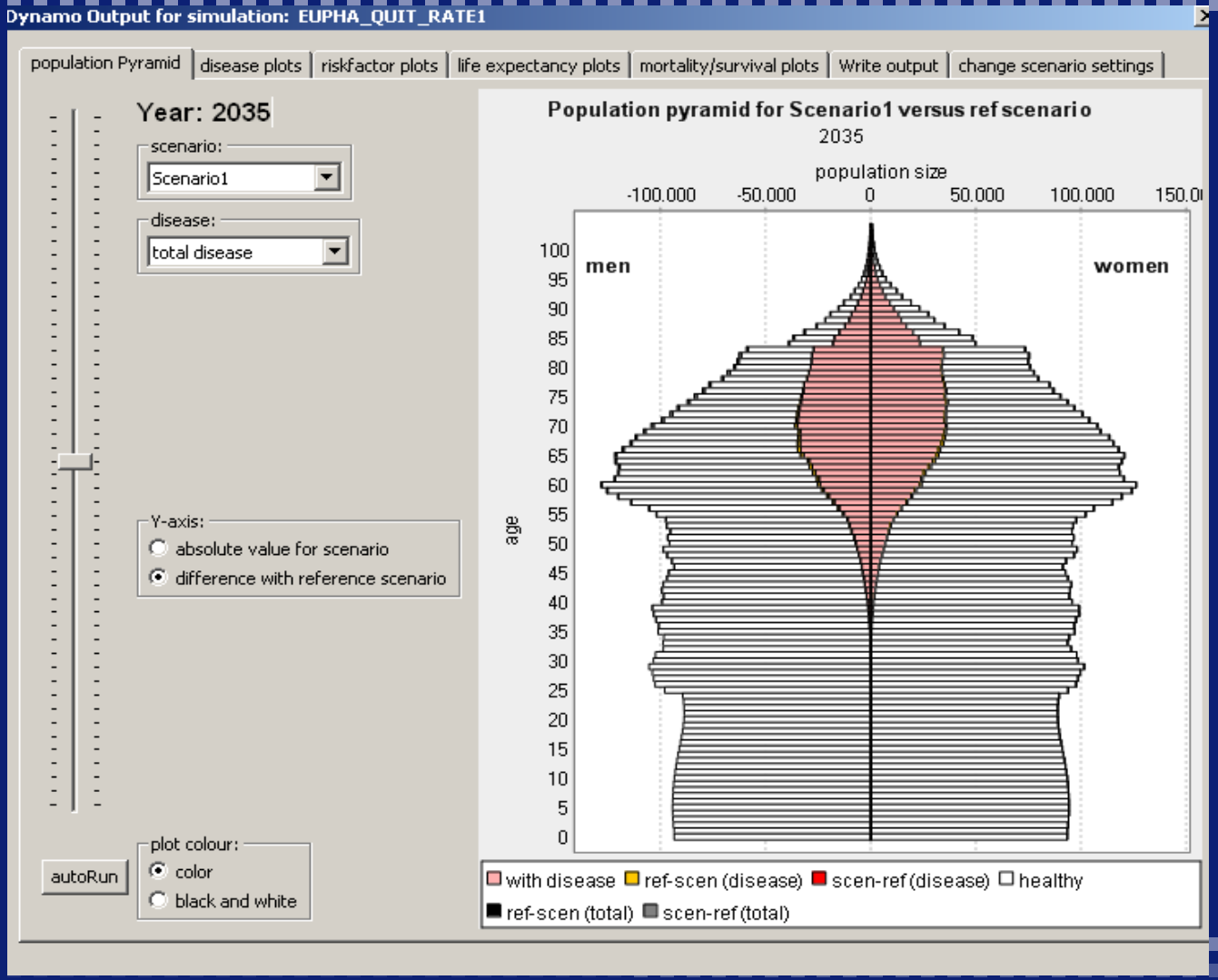
- Default scenario settings:



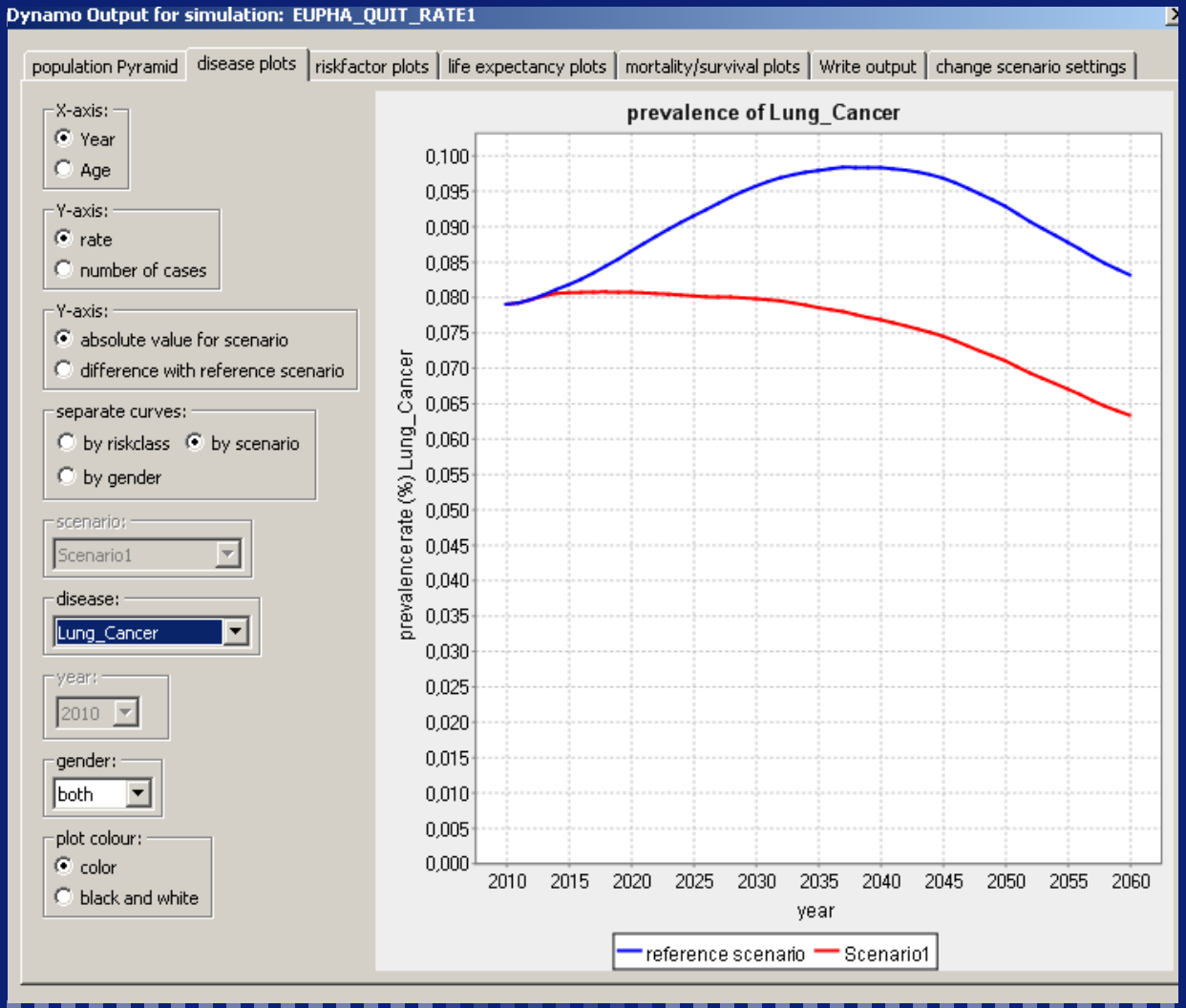
Adjustment example:



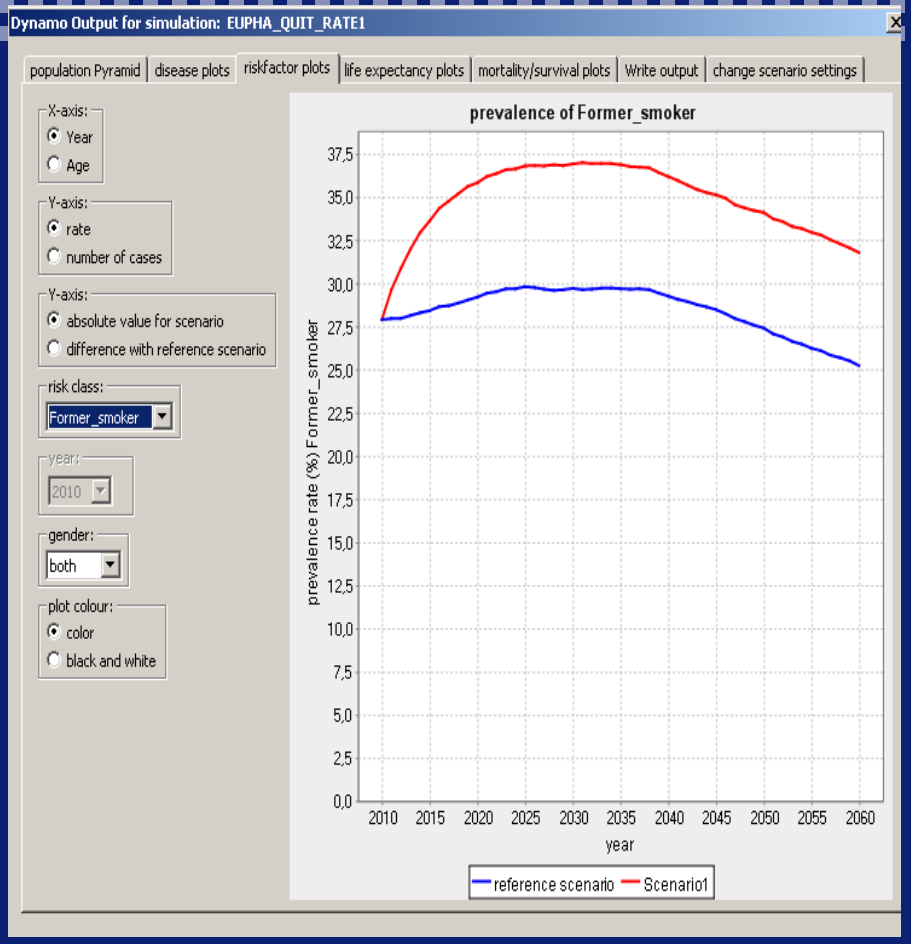
Inspecting your results: the population pyramid

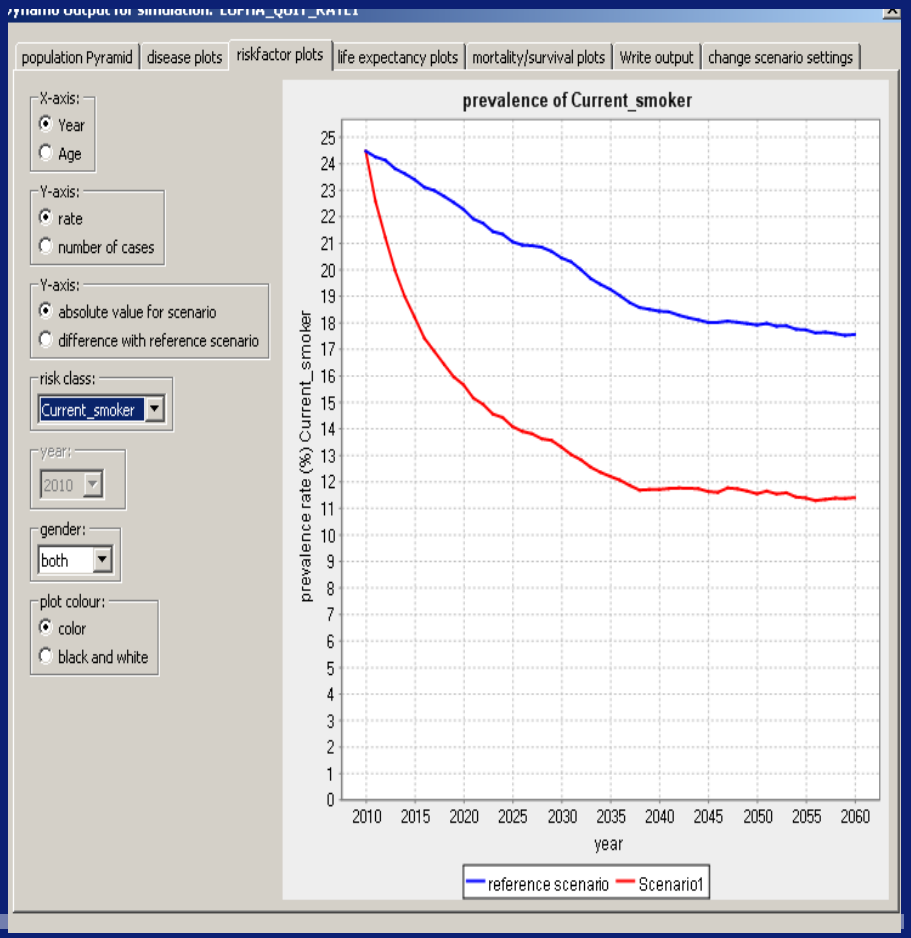


Inspecting your results: disease plots

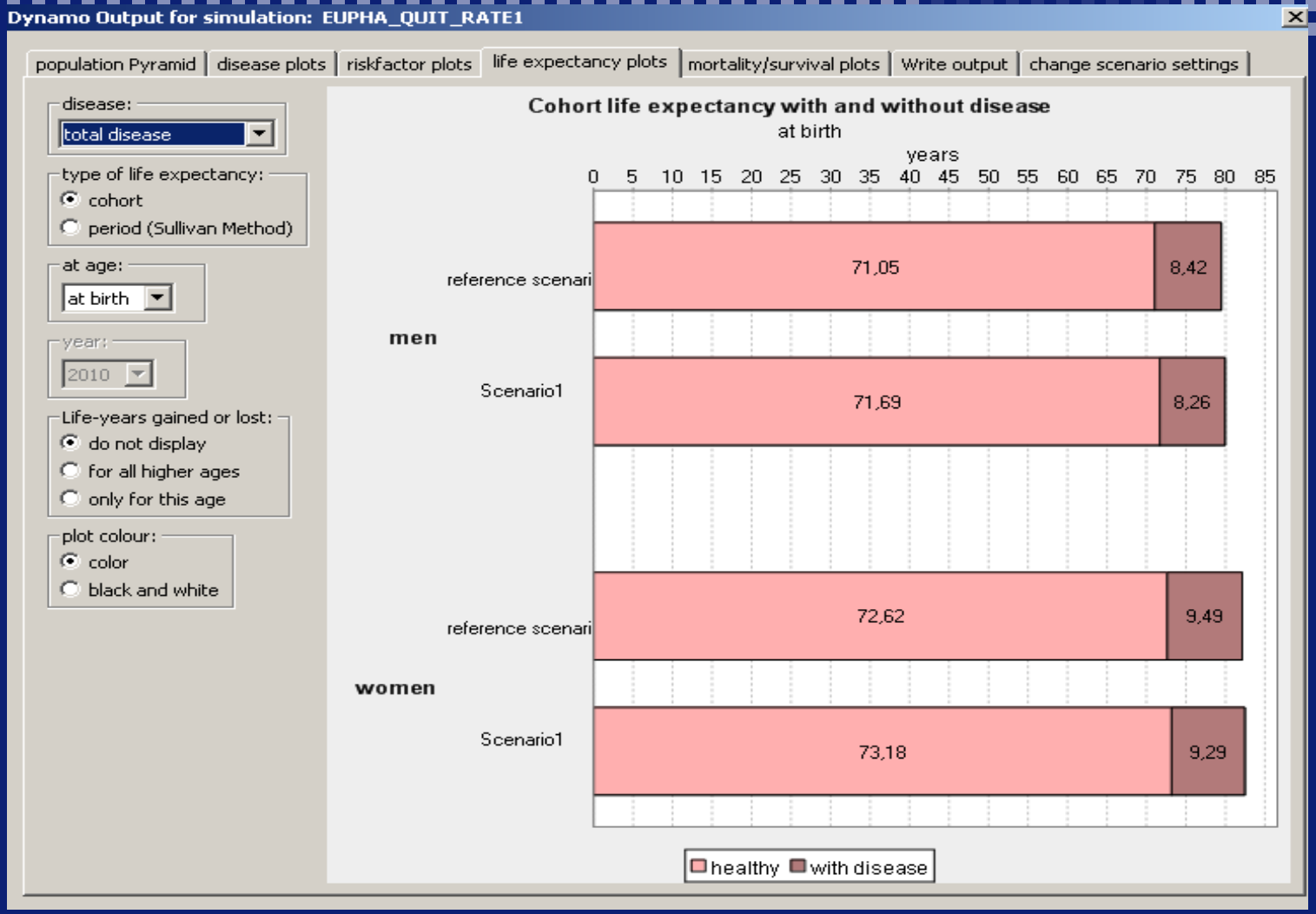


Inspecting your results: risk factor plots

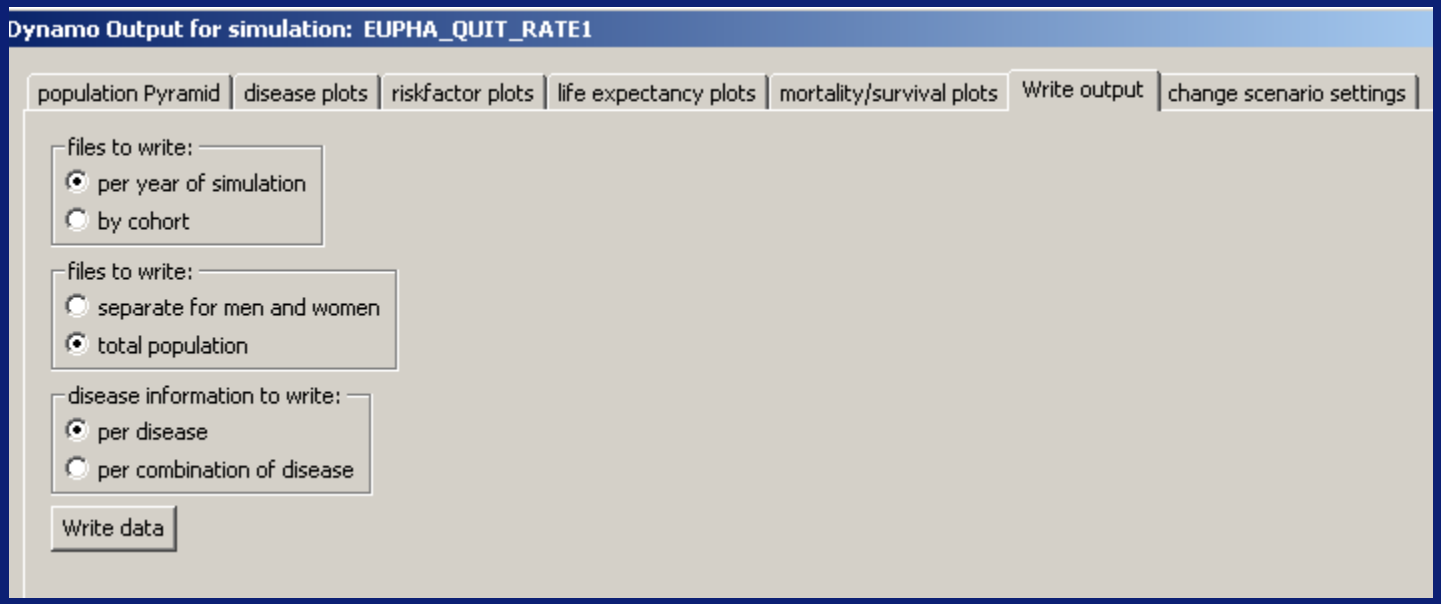




Inspecting your results: life expectancy plots



Inspecting your results: rounding it off



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- THANK YOU FOR YOUR ATTENTION!