

**Erasmus MC**

University Medical Center Rotterdam



# 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. 11<sup>th</sup> 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

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	original probabilities	AGE	start never->cur	stop cur->for	restart for->cur		AGE	probability matrix	NS	FS	CS		AGE	original probability x	odds x/(1-x)	odds*OR	after intervention probability	odds after/(1+odds after)	
3		0	0	0	0		0	NS		1	0	0		0	0				
4		1	0	0	0		from	FS		0	1	0		1	0				
5		2	0	0	0			CS		0	0	1		2	0				
6		3	0	0	0		1	NS		1	0	0		3	0				
7		4	0	0	0			FS		0	1	0		4	0				
8		5	0	0	0			CS		0	0	1		5	0				
9		6	0.001237	0	0		2	NS		1	0	0		6	0				
10		7	0.004843	0	0			FS		0	1	0		7	0				
11		8	0.010333	0	0			CS		0	0	1		8	0				
12		9	0.017115	0	0		3	NS		1	0	0		9	0				
13		10	0.024597	0	0			FS		0	1	0		10	0				
14		11	0.032187	0.003465	0.028032			CS		0	0	1		11	0.0034648	0.003477	0.0070928	0.007043	
15		12	0.039294	0.011264	0.071279		4	NS		1	0	0		12	0.0112639	0.011392	0.0232401	0.022712	
16		13	0.045325	0.022298	0.134837			FS		0	1	0		13	0.022298	0.023521	0.0479818	0.045785	
17		14	0.05003	0.037113	0.208232			CS		0	0	1		14	0.0371127	0.038543	0.078628	0.072896	
18		15	0.053159	0.052162	0.280993		5	NS		1	0	0		15	0.0521615	0.055032	0.1122654	0.100934	
19		16	0.054461	0.066626	0.342645			FS		0	1	0		16	0.0666257	0.071382	0.1456184	0.127109	
20		17	0.053685	0.079005	0.382718			CS		0	0	1		17	0.0790049	0.085782	0.1749955	0.148933	
21		18	0.050581	0.087799	0.390737		6	NS	0.998763	0	0.001237		18	0.0877986	0.096249	0.2088606	0.172775		
22		19	0.045761	0.093705	0.374088			FS		0	1	0		19	0.0937052	0.103394	0.2243644	0.18325	
23		20	0.039838	0.097423	0.340154			CS		0	0	1		20	0.0974231	0.107939	0.2342273	0.189776	
24		21	0.033425	0.099651	0.296319		7	NS	0.995157	0	0.004843		21	0.099651	0.11068	0.2401765	0.193663		
25		22	0.027133	0.101087	0.249967			FS		0	1	0		22	0.101087	0.112455	0.2440267	0.196159	
26		23	0.021575	0.10243	0.208482			CS		0	0	1		23	0.10243	0.114119	0.2476387	0.198486	
27		24	0.016738	0.103561	0.172053		8	NS	0.989667	0	0.010333		24	0.103561	0.115525	0.250689	0.200441		
28		25	0.012607	0.104361	0.140873			FS		0	1	0		25	0.104361	0.116521	0.2528512	0.201821	
29		26	0.009167	0.104711	0.115131			CS		0	0	1		26	0.104711	0.116958	0.2537983	0.202424	
30		27	0.006406	0.104492	0.095017		9	NS	0.982885	0	0.017115		27	0.104492	0.116685	0.2532056	0.202046		
31		28	0.004308	0.103584	0.080723			FS		0	1	0		28	0.103584	0.115553	0.2507511	0.20048	
32		29	0.002778	0.101972	0.071235			CS		0	0	1		29	0.101972	0.113551	0.2464057	0.197693	
33		30	0.001722	0.099637	0.06554		10	NS	0.975403	0	0.024597		30	0.0996371	0.110663	0.2401393	0.193639		
34		31	0.001045	0.096562	0.062626			FS		0	1	0		31	0.0965623	0.106883	0.2319365	0.18827	
35		32	0	0.09273	0.061479			CS		0	0	1		32	0.0927304	0.102208	0.2217918	0.18153	
36		33	0	0.088124	0.061085		11	NS	0.967813	0	0.032187		33	0.088124	0.09664	0.2097095	0.173355		
37		34	0	0.08298	0.061138			FS		0	0.971968	0.028032		34	0.0829799	0.090489	0.1963603	0.164131	
38		35	0	0.077535	0.061327			CS		0	0.003465	0.996535		35	0.0775345	0.084051	0.1823915	0.154256	
39		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

U22 fx

A

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

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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 falling 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 one 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.

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

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	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

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10 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!

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13 **Creating XML files**

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- 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

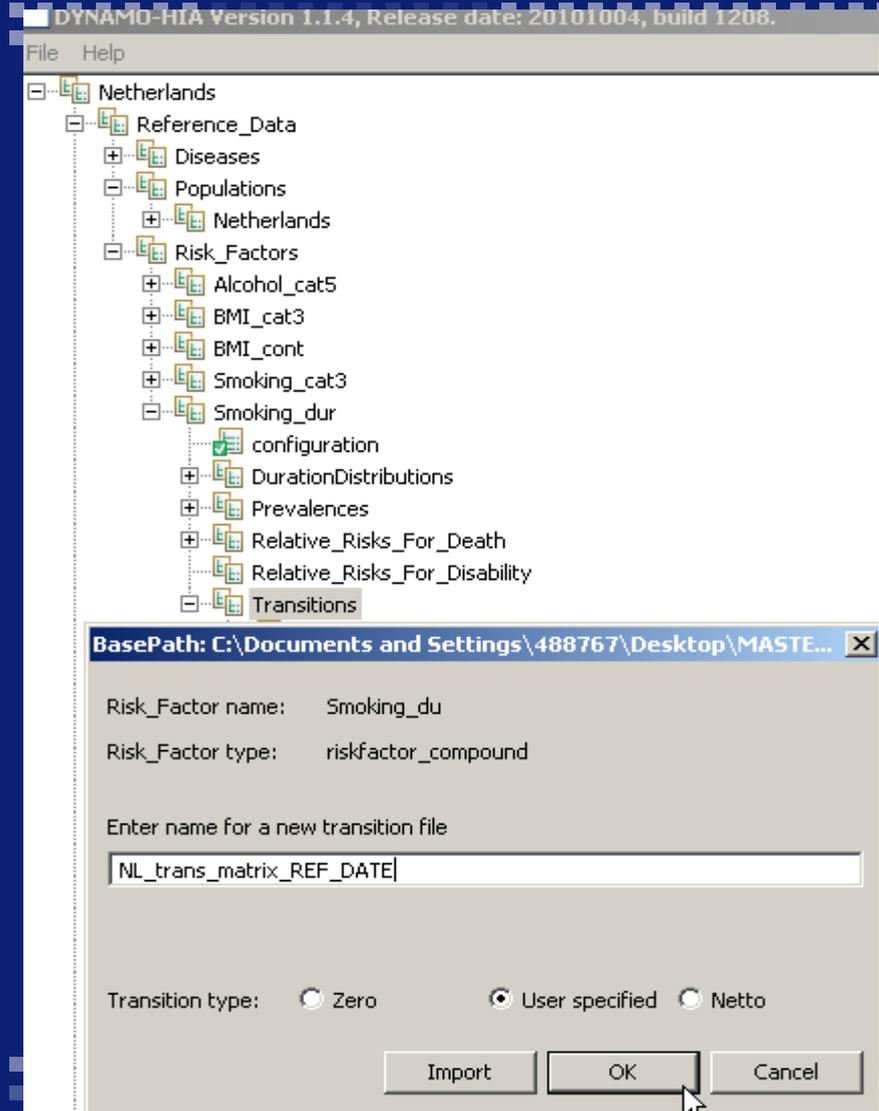
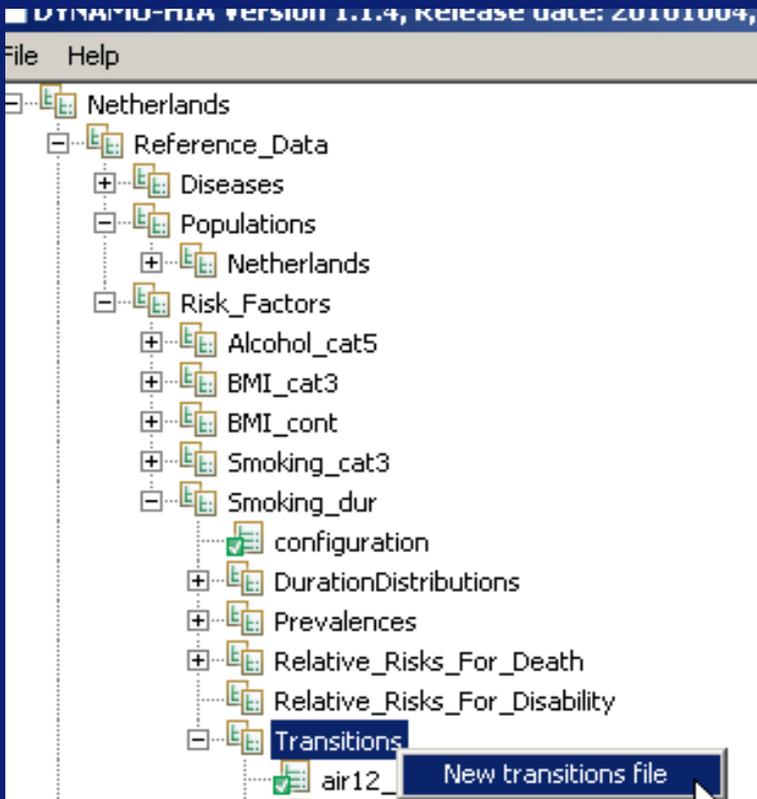
## Reference Scenario

	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
0	99.87629	0	0.123709	0	100	0	0	0	100	6
1	99.51569	0	0.484307	0	100	0	0	0	100	7
2	98.96671	0	1.03329	0	100	0	0	0	100	8
3	98.28853	0	1.71147	0	100	0	0	0	100	9
4	97.54034	0	2.45966	0	100	0	0	0	100	10
5	96.78132	0	3.21868	0	97.19681	2.80319	0	0.34648	99.65352	11
6	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



BasePath: C:\Documents and Settings\488767\Desktop\MASTE... X

Risk\_Factor name: Smoking\_du  
Risk\_Factor type: riskfactor\_compound

Enter name for a new transition file

NL\_trans\_matrix\_REF\_DATE

Transition type:  Zero  User specified  Netto

Import OK Cancel

# Setting up your intervention scenario (Risk Factor Screen)

## Simulation

Name:	EUPHA_QUIT_RATE1		
Population:	<input type="text" value="Netherlands"/>	Simulated population size:	<input type="text" value="300"/>
Newborns:	<input checked="" type="radio"/> Yes <input type="radio"/> No		
Starting year:	<input type="text" value="2010"/>	Number of years:	<input type="text" value="50"/>
Minimum age:	<input type="text" value="0"/>	Maximum age:	<input type="text" value="95"/>
Calculation time step:	<input type="text" value="1"/>	Random seed:	<input type="text" value="1"/>

Scenarios Risk Factor Diseases Relative Risks

Risk Factor:

Risk Factor Prevalence:

Transition:

# Setting up your scenario (Scenarios Screen)

**Simulation**

Name: EUPHA\_QUIT\_RATE1

Population: Netherlands Simulated population size: 300

Newborns:  Yes  No

Starting year: 2010 Number of years: 50

Minimum age: 0 Maximum age: 95

Calculation time step: 1 Random seed: 1

Scenarios Risk Factor Diseases Relative Risks

Scenario1

Name: Scenario1 Success Rate: 100

Target of Intervention

Min. Age: 0 Max. Age: 95 Gender: Male and Female

Change with respect to baseline simulation

Transition: NL\_trans\_matrix\_SC1\_100813

Risk Factor Prevalence: NL\_RF\_smoking\_cat3\_Prev\_V1

# Setting up your scenario (Diseases Screen)

**simulation**

Name: EUPHA\_QUIT\_RATE1

Population: Netherlands Simulated population size: 300

Newborns:  Yes  No

Starting year: 2010 Number of years: 50

Minimum age: 0 Maximum age: 95

Calculation time step: 1 Random seed: 1

Scenarios Risk Factor Diseases Relative Risks

Disease1 Disease2 Disease3 Disease4 Disease5 Disease6 Disease7 Disease8 Disease9

Disease: COPD

Disease Prevalence: NL\_disease\_COPD\_Prev\_V1

Incidence: NL\_disease\_COPD\_Inc\_V1

Excess Mortality: NL\_disease\_COPD\_ExecMor\_V1

DALY Weights: NL\_disease\_COPD\_DALY\_V1

# Setting up your scenario (Relative Risks Screen)

**Simulation**

Name: EUPHA\_QUIT\_RATE1

Population: Netherlands Simulated population size: 300

Newborns:  Yes  No

Starting year: 2010 Number of years: 50

Minimum age: 0 Maximum age: 95

Calculation time step: 1 Random seed: 1

Scenarios Risk Factor Diseases **Relative Risks**

Relative Risk1 Relative Risk2 Relative Risk3 Relative Risk4 Relative Risk5 Relative Risk6 Relative Risk7 Relative Risk8 Relative Risk9 Relative Risk10 Relative Risk11 Relative Risk12

From: Diabetes

To: Stroke

Relative Risk: RR\_from\_Diabetes\_to\_Stroke-Diabetes

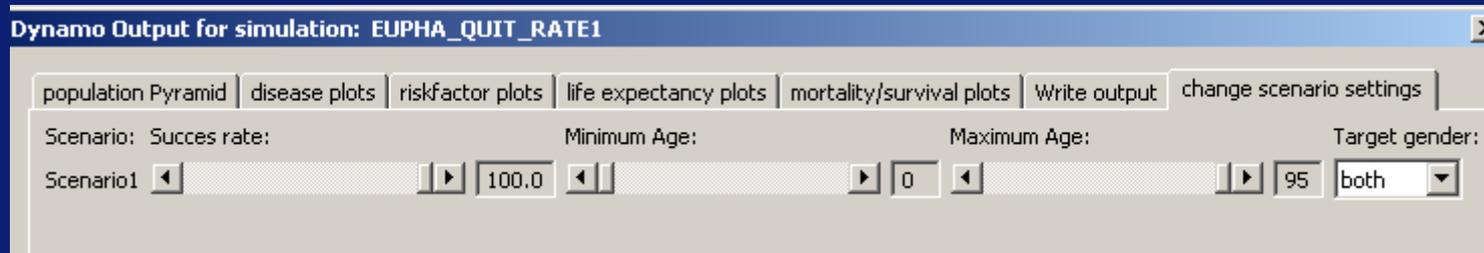
create delete

Save and Run

Import Save Save and close Close

# Inspecting your results: adjustment of your scenario settings

- Default scenario settings:



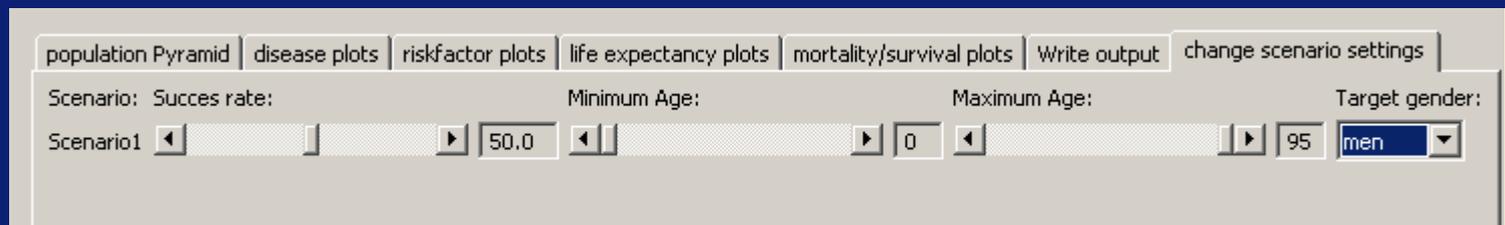
Dynamo Output for simulation: EUPHA\_QUIT\_RATE1

population Pyramid | disease plots | riskfactor plots | life expectancy plots | mortality/survival plots | Write output | change scenario settings

Scenario: Succes rate: Minimum Age: Maximum Age: Target gender:

Scenario1 | 100.0 | 0 | 95 | both

## Adjustment example:

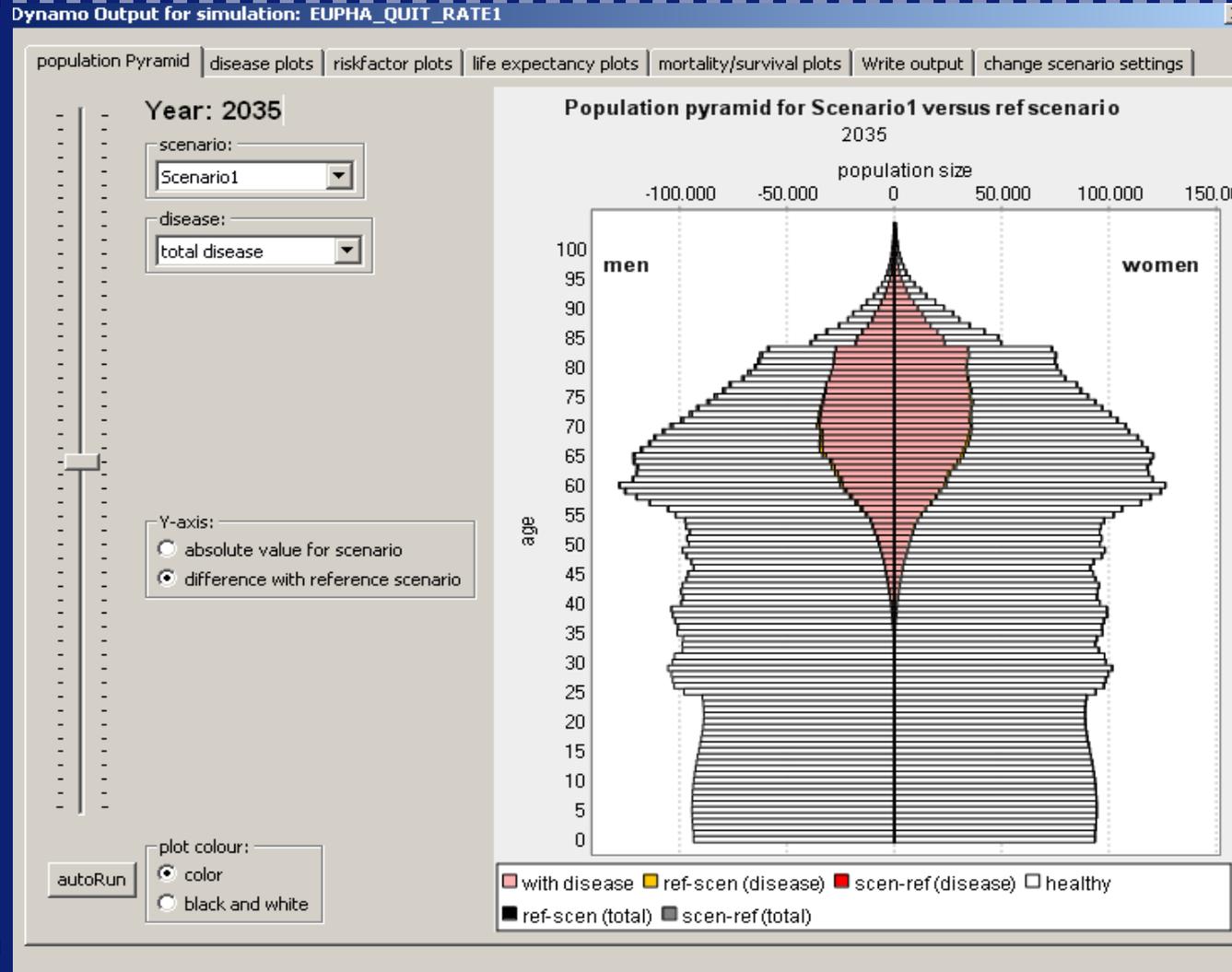


population Pyramid | disease plots | riskfactor plots | life expectancy plots | mortality/survival plots | Write output | change scenario settings

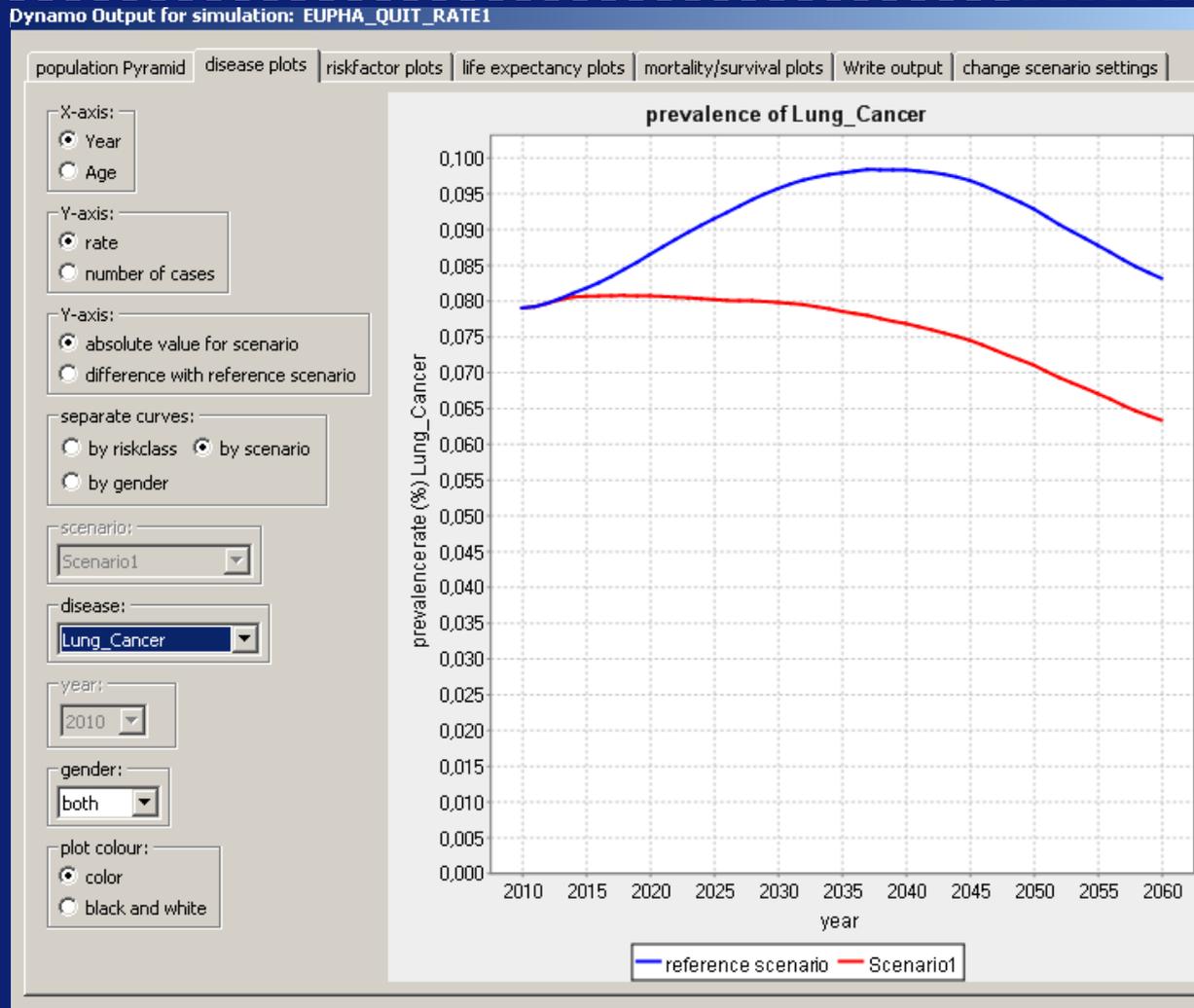
Scenario: Succes rate: Minimum Age: Maximum Age: Target gender:

Scenario1 | 50.0 | 0 | 95 | men

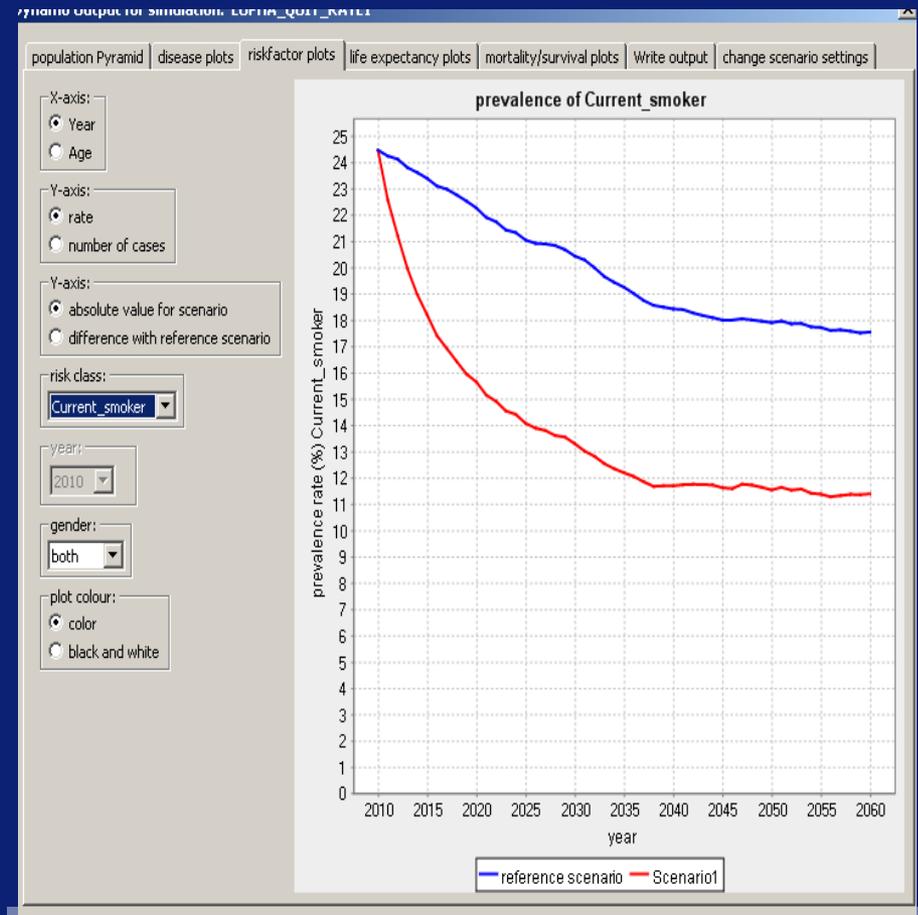
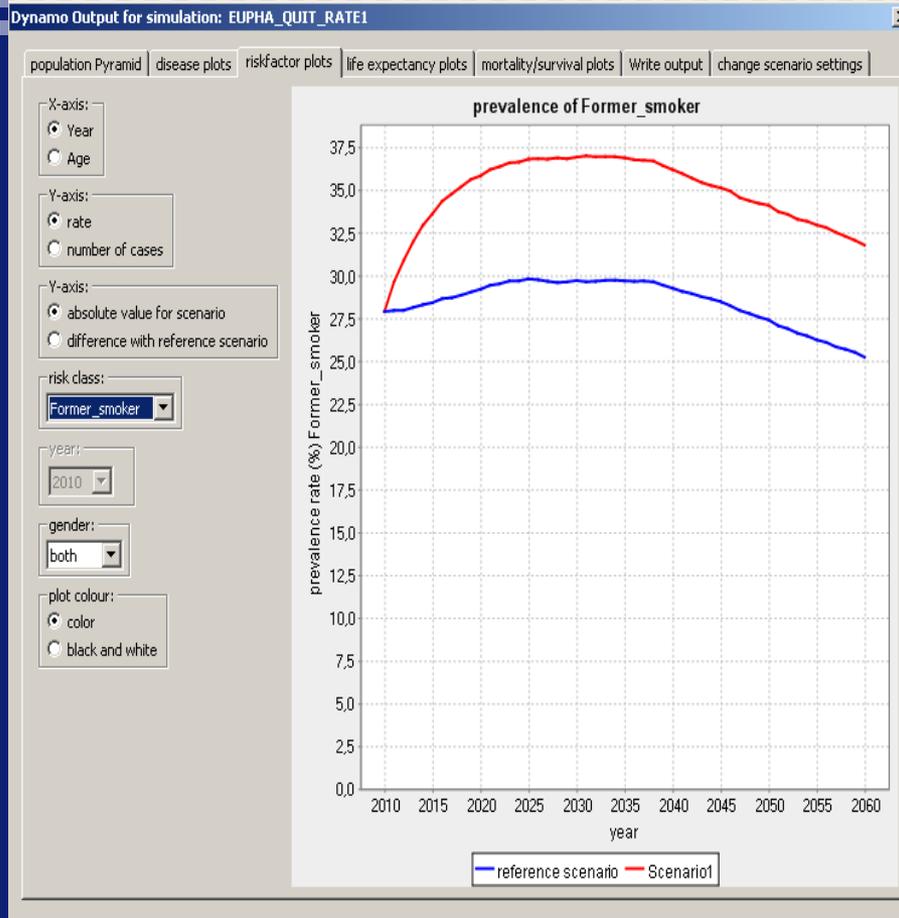
# Inspecting your results: the population pyramid



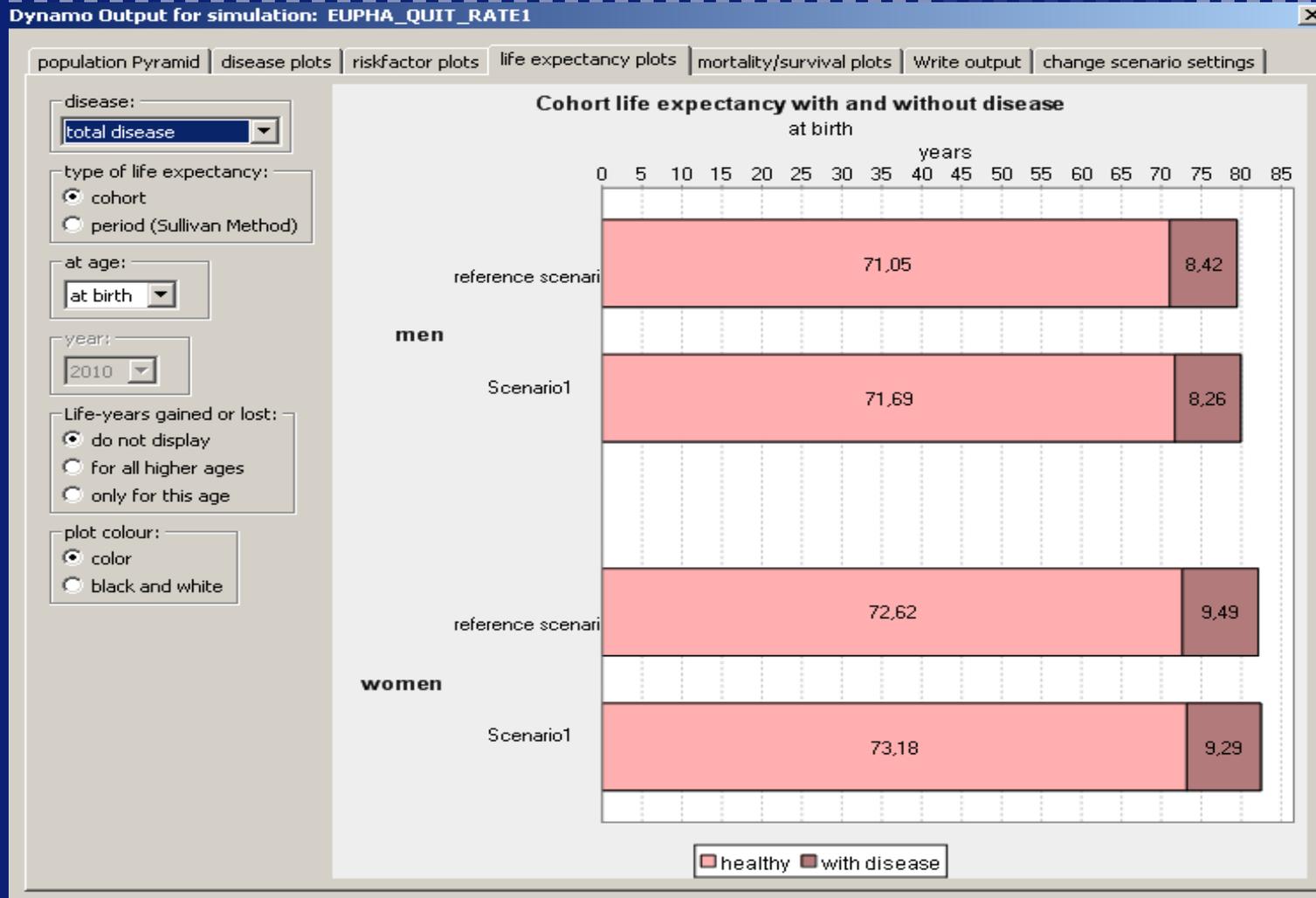
# Inspecting your results: disease plots



# Inspecting your results: risk factor plots



# Inspecting your results: life expectancy plots



# Inspecting your results: rounding it off

Dynamo Output for simulation: EUPHA\_QUIT\_RATE1

population Pyramid | disease plots | riskfactor plots | life expectancy plots | mortality/survival plots | **Write output** | change scenario settings

files to write:

- per year of simulation
- by cohort

files to write:

- separate for men and women
- total population

disease information to write:

- per disease
- per combination of disease

Write data

- [www.dynamo-hia.eu](http://www.dynamo-hia.eu)



- THANK YOU FOR YOUR ATTENTION!