

Guidelines for Incorporating the Societal Perspective and Wider Societal Benefits in Health Technology Assessment - **Supplementary material**

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S1. Consequences of paid/unpaid productivity loss

Table S1. Possible societal impact of productivity loss

Type of productivity	Individual's productivity status	Individual consequences		Societal consequences/ possible impact
Paid productivity	Individual productivity unchanged			Overall productivity unchanged
	Individual productivity reduced	Without any change		Overall productivity reduced
		Compensation within the working team	Higher work commitment within the original working hours	Overall productivity unchanged
			Higher work commitment on top of the original working hours	Overall productivity unchanged
		Hiring a new employee		Overall productivity unchanged
			<ul style="list-style-type: none"> - hiring a person from the pool of unemployed - hiring a person already employed (need for another compensation - chaining) 	

Table S1 (continued).

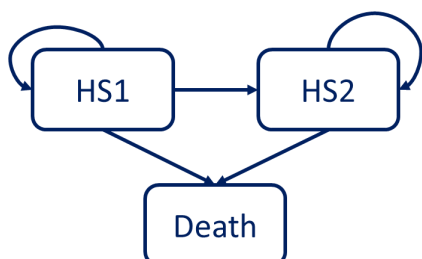
Unpaid productivity	Individual productivity unchanged		Overall productivity unchanged
	Individual productivity reduced	Without any change	Overall productivity reduced
		Use of the help of another person	Overall productivity unchanged <ul style="list-style-type: none"> - reduction of paid productivity of another person - reduction of unpaid productivity of another person - reduction of leisure productivity of another person
		Use of a paid service	Overall productivity unchanged <ul style="list-style-type: none"> - creation of new demand

S2. Example of health economic analysis from the societal perspective

Consider a simple Markov model of three health states HS1, HS2 and Death, where state Death is an absorbing state. Patients enter the model in HS1 and during the cycle they may remain in HS1, transit to HS2 or transit to Death. Patients in HS2 may remain in this health state or, in case of death, transit to Death. Transitions between health states are irreversible – see Figure S1 . The model is designed as cyclical, the cycle length is one year and, to simplify the case, half cycle correction is not applied. The time horizon is 30 years with a considered discount rate of 3%. The cohort size is 1000 and the mortality rate of the general population is based on the mortality tables of the CZSO – year 2019.

Prevalence of the disease: 10/100 000 (to simplify the case, the incidence is not considered), population: 10 669 324.

Figure S1. Structure of considered Markov model.



Data inputs

Table S2. Transition matrix.

from ↓ to →	Assessed health technology			Comparator		
	HS1	HS2	Death	HS1	HS2	Death
HS1	93%	2%	5%	80%	15%	5%
HS2	0%	92%	8%	0%	92%	8%
Death	0%	0%	100%	0%	0%	100%

Table S3. Baseline characteristics of the target population.

Parameter	Value
Age	50 years
Male proportion	50%
Cohort size	1000

Table S4. Considered productivity loss according to the health states (Note: expected work productivity is higher in HS1).

Health state	Productivity loss
HS1	-20%
HS2	-80%

Table S5. Productivity of the general population, data source: CZSO 2019 (Note: To simplify the case, we do not consider age and sex adjustment).

Productivity of the general population within the age group: 50-54 years	males	females
Employment rate	92,7%	89,0%
Number of paid hours/year per employed person	2 091,60	2 070,00
Effective number of paid hours/year per person in the whole population (considering the employment rate)	1 939,51	1 841,69
Average number of hours paid/year per person (considering the male/female proportion in the target population)	1 890,60	
value of a paid hour in CZK	331,84	

Calculation

Table S6. Patient flow (only the first five cycles).

Cycle no.	Assessed health technology			Comparator			Mortality in the general population
	HS1	HS2	Death	HS1	HS2	Death	
Symbol	HS1 _T	HS2 _T	D _T	HS1 _C	HS2 _C	D _C	D _p
0	1000	0	0	1000	0	0	0
1	930	20	50	800	150	50	3
2	865	37	98	640	258	102	7
3	804	51	144	512	333	155	11
4	748	63	189	410	383	207	15
5	696	73	231	328	414	258	19

Table S7. Productivity loss per patient (only the first five cycles).

Productivity loss (in patient-hour) Without discounting						
Cycle	Assessed health technology			Comparator		
Health State	HS1	HS2	Death	HS1	HS2	Death
Calculation	$HS1_T \times 0,2 \times 1\,890,60 / 1000$	$HS2_T \times 0,8 \times 1\,890,60 / 1000$	$(D_T - D_p) \times 1\,890,60 / 1000$	$HS1_C \times 0,2 \times 1\,890,60 / 1000$	$HS2_C \times 0,8 \times 1\,890,60 / 1000$	$(D_C - D_p) \times 1\,890,60 / 1000$
0	378	0	0	378	0	0
1	352	30	88	302	227	88
2	327	56	173	242	390	180
3	304	78	253	194	504	272
4	283	96	329	155	580	363
5	263	111	401	124	627	452

Table S8. Opportunity cost per patient (only the first five cycles).

Valuation of productivity loss (CZK) Without discounting						
Cycle	Assessed health technology			Comparator		
Health state	HS1	HS2	Death	HS1	HS2	Death
Calculation	Loss of productivity in patient-hours by particular health state x 331.84					
0	125 476	0	0	125 476	0	0
1	116 692	10 038	29 361	100 381	75 285	29 361
2	108 524	18 570	57 299	80 304	129 491	59 745
3	100 927	25 767	83 864	64 244	167 314	90 348
4	93 862	31 780	109 093	51 395	192 475	120 561
5	87 292	36 746	132 975	41 116	207 914	149 896

Results

Table S9. Results - productivity loss/ patient.

Loss of productivity/patient (in patient-hours) Discount rate of 3%		
	Assessed health technology	Comparator
Due to a disability (total)	6 103	10 398
Disaggregation by health states	HS1	3 730
	HS2	2 373
Due to a premature death (total)	13 113	15 386
Sum	19 216	25 784

Table S10. Results - opportunity cost/ patient.

Valuation of productivity loss/ patient (in CZK/ patient) Discount rate of 3%		
	Assessed health technology	Comparator
Due to a disability (total)	2 025 314	3 450 592
Disaggregation by health states	HS1	561 690
	HS2	2 888 902
Due to premature death (total)	4 351 497	5 105 677
Sum	6 376 811	8 556 269

Table S11. Results - opportunity cost/ society

Valuation of productivity loss/ society (in CZK/ society) Discount rate of 3%		
	Assessed health technology	Comparator
Due to illness (total)	2 160 872 758	3 681 548 779
Disaggregation by health conditions model	HS1	599 285 786
	HS2	3 082 262 993
Due to premature death (total)	4 642 753 628	5 447 411 836
Sum	6 803 626 386	9 128 960 615

Interpretation of the results: Rejection of assessed health technology will lead to the cumulative loss of CZK 2.2 million per patient generated over 30 years as a result of productivity loss, considering the annual discount rate of 3%. Of which 1.4 mil. CZK is due to patient's disability and 0.8 mil. CZK due to their premature death. Regarding the current epidemiological situation, the cumulative societal loss represents CZK 2.3 billion over the 30-years.