

# Statistical Value of Life : An Instrument for Health Project Decision

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Aim :

Evaluation of health capital for a  
medium brazilian

Why?

In order to compare  
efficiently the costs and  
benefits of a health project

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In this setting we transform  
an CUA instrument – the  
QALY – to an CBA  
instrument

For this, we need to know the  
value that people give to a  
life year in perfect health

Two ways:  
Contingent Evaluation  
Hedonistic Price

And then, we adjust the  
value obtained by the  
Quality of Life

- **Estimation of the Value of Statistical Life**

- **Estimation of QALY**

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## **Estimation of the Value of Statistical Life**

- **Data**

Combination of 2 Sources :

- Household survey (IBGE)
- Fatal and non-fatal risks (Ministro do Trabalho e Emprego)

- **Strategy of Estimation and Results**

- **Meta-analysis**

Tableau 2 – Estimation de la Fonction de Salaire Hédonique

	(1)	(2)	(3)	(4)	(5)
Taux Accidents Mortels	-0,165*** (0,012)	-0,092*** (0,014)	-0,518*** (0,033)	-0,092*** (0,014)	-0,292*** (0,068)
Taux Accidents Non-mortels	-0,006*** (0,0003)	-0,002*** (0,0003)	-0,006*** (0,0008)	-0,002*** (0,0003)	-0,003** (0,001)
Taux Accidents Mortels <sup>2</sup>			0,504*** (0,037)		
Taux Accidents Non-mortels <sup>2</sup>			0,0001*** (0,00002)		
Éducation	0,117*** (0,0006)	0,108*** (0,0006)	0,107*** (0,0006)	0,109*** (0,0009)	
Age	0,065*** (0,0009)	0,063*** (0,0009)	0,063*** (0,0009)	0,067*** (0,0003)	
Age <sup>2</sup>	-0,0006*** (1,00e-05)	-0,0006*** (1,00e-05)	-0,0006*** (1,00e-05)	-0,0007*** (0,00003)	
Homme	0,324*** (0,004)	0,304*** (0,005)	0,308*** (0,005)	0,322*** (0,013)	
Assurance Prévoyance	0,228*** (0,005)	0,158*** (0,005)	0,157*** (0,005)	0,158*** (0,005)	
Expérience spécifique	0,0006*** (0,00003)	0,0009*** (0,00003)	0,0009*** (0,00003)	0,0009*** (0,00003)	
Syndicat	0,134*** (0,006)	0,157*** (0,006)	0,156*** (0,006)	0,157*** (0,006)	
Logement Fonction	0,039*** (0,010)	0,037*** (0,010)	0,044*** (0,010)	0,037*** (0,010)	
Inverse Ratio Mills				0,038 (0,024)	
Variables Muettes		Incluses	Incluses	Incluses	Incluses
N	128412	128412	128412	128412	11278

Écarts-types entre parenthèses.

\*\*\* significatif au seuil de 1%

\*\* significatif au seuil de 5%

\* significatif au seuil de 10%

## Meta-Analysis

$$\ln(VSL) = 9.45 + 0.63 \times \ln(Wage) - 0.28 \times Risk$$

(2,33) (1,56) (4,10)

$$R^2 = 0.51$$

$$VSL = 1.624 \text{ Millions dollars}$$

# Evaluation of QALY and Health Capital

- **Definitions:**

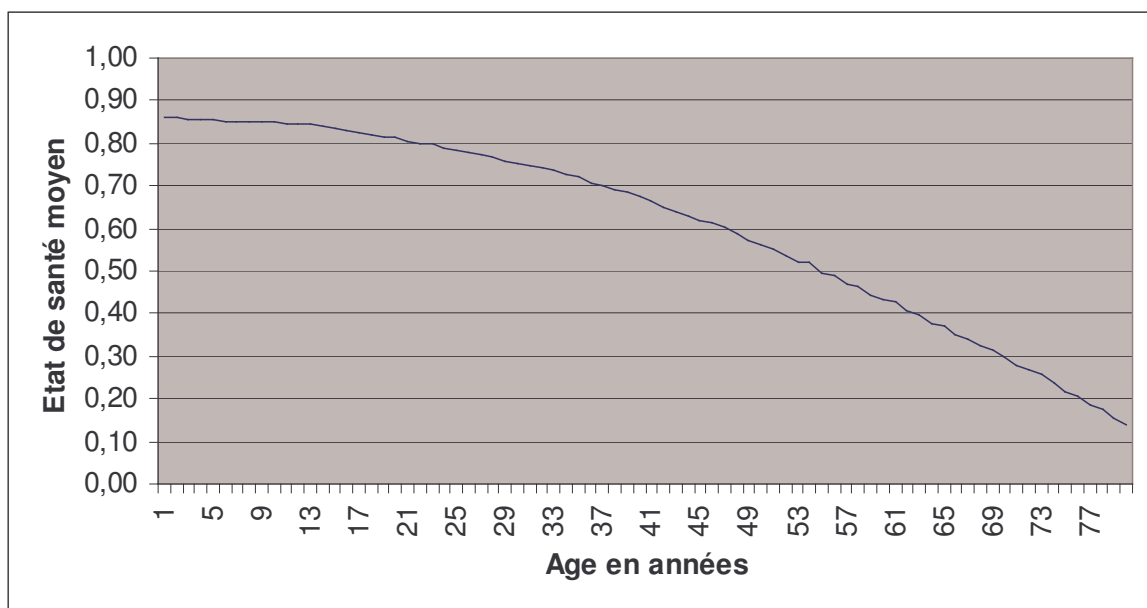
$$H_t(s) = Pr[\text{alive at } s] \prec Q_t(s)$$

$$QALY_t(s) = \sum_{k=0}^{\infty} \frac{H_t(s+k)}{(1+r)^k}$$

- **Estimation of the Quality of life  $Q_t(s)$**

- **Evaluation of Health Capital**

Quality of life by age



## QALY's by age



## • *Health Capital Evaluation*

- Value of a life year in perfect health :

$$V = 124\,475 \$$$

- Health Capital

$$HC_t(s) = V \wedge QALY_t(s)$$

Age	VSV	Age	VSV	Age	VSV
1	2.836.314	28	1.942.108	55	805,66
2	2.810.771	29	1.902.079	56	766,06
3	2.784.751	30	1.861.736	57	726,57
4	2.758.308	31	1.821.109	58	688,08
5	2.731.261	32	1.779.858	59	649,21
6	2.703.782	33	1.738.359	60	611,67
7	2.675.602	34	1.696.289	61	574,58
8	2.646.530	35	1.654.049	62	536,96
9	2.616.918	36	1.611.414	63	500,74
10	2.586.520	37	1.568.977	64	464,71
11	2.555.304	38	1.526.087	65	430,16
12	2.523.578	39	1.483.350	66	395,56
13	2.490.863	40	1.439.768	67	362,67
14	2.457.498	41	1.396.385	68	329,75
15	2.423.560	42	1.353.062	69	298,03
16	2.389.219	43	1.310.148	70	266,83
17	2.354.367	44	1.267.313	71	236,22
18	2.319.125	45	1.224.379	72	207,59
19	2.283.509	46	1.181.565	73	179,48
20	2.247.474	47	1.138.562	74	151,9
21	2.210.790	48	1.095.634	75	125,95
22	2.173.778	49	1.053.050	76	101,77
23	2.136.314	50	1.011.346	77	78,33
24	2.098.078	51	969,54	78	56,83
25	2.059.876	52	927,95	79	36,1
26	2.020.954	53	887,16	80	17,42
27	1.981.492	54	846,85		

## Conclusion

- An Instrument which can improve efficiency in allocation.
- An instrument which can be used to compare different projects taking into account both reduction in mortality and improvement in quality of life.