

Economic Evaluation of Road Traffic Interventions

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Economic Evaluation

- Why is Economic Evaluation important?
 - Resources are scarce → Choices must be made
 - Choices are made on the basis of many criteria
 - Economic Evaluation use a systematic analysis to identify clearly the relevant alternatives and uses for scarce resources
- Economic Evaluation → the comparative analysis of alternative courses of action in terms of both their cost and consequences

Economic Evaluation in Health

Are both costs (inputs) and consequences (outputs) of alternatives examined?

Is there comparison of two or more alternatives?

	No		Yes
	Examines only Consequences	Examines only Costs	
No	Partial Evaluation		Partial Evaluation
	Outcome Description	Cost Description	Cost-outcome Description
yes	Partial Evaluation		Full Economic Evaluation
	Efficacy or effectiveness evaluation	Cost analysis	Cost-effectiveness analysis Cost-utility analysis Cost-benefit analysis

Economic Evaluation in Health

- **Analysis Perspective**
 - Health Sector
 - Government
 - Patient
 - Society

Economic Evaluation in Health

- **Partial Evaluation**

- **Cost of Illness**

- Description of cost
 - Provide to society the Economic Impact of the disease

- **Cost Analysis**

- Just compare costs of interventions

Economic Evaluation in Health

- **Full Economic Evaluation**

- **Cost-effectiveness analysis**

- Single effects of interest, common to both alternatives, but achieved to different degrees
 - Measurement in natural units
 - life-years saved, disability-days saved
 - Incremental cost for each additional unit of outcome (Incremental Cost-effectiveness ratio - ICER)

- **Cost-utility analysis**

- Outcomes adjusted by society or individual preferences
 - quality-adjusted life-years – QALY, disability-adjusted life-years-DALY

Economic Evaluation in Health

- **Full Economic Evaluation**
 - **Cost-benefit analysis**
 - Cost and consequences are valued in monetary units
 - Permits comparison with the same outcome for not related areas (Health vs Education)

Cost Effectiveness/Utility Analysis

- The effects of a project are always determined in comparison to a reference situation ('zero-situation' or 'do-nothing').
- The CEA can be described as an analysis by which the alternative is identified that can be most efficiently implemented to reach a fixed amount of intended social effects

Cost Effectiveness/Utility Analysis

- The cost-effectiveness of a road safety measure can be defined as the number of accidents/lives prevented/saved per unit cost of implementing the measure:

= Number of accidents prevented by a given measure / Unit costs of implementation of measure

Cost-Benefit Analysis

- The cost-benefit analysis derived directly from the traditional theory of economic welfare
- Monetary valuation of health outcomes
 - Capital Human approach
 - Revealed preferences
 - Stated preferences – Willingness-to-pay

Cost-Benefit Analysis

- The cost-benefit ratio is defined as:

Cost-Benefit ratio = Present value of all benefits / Present value of implementation costs

Cost-Benefit Analysis

- Where the benefits come from the accidents prevented only (and no influences on travel expenses and the environment are expected), the numerator of the benefit-cost ratio will be estimated as:

Present value of benefits = number of accidents prevented by the measure X average accident cost X the accumulated discount factor

- where the accumulated discount factor depends on the interest rate and the length of life of the measure.

Recommended valuation methods for accident costs

Costs group	Fatal victims	Non-fatal victims
Medical costs	Restitution costs →direct cost	Restitution costs →direct cost
Loss of production capacity	Human capital: net loss	Human capital: gross loss
Loss in 'quality of life'	Willingness-to-pay	Willingness-to-pay
Property damage	Restitution costs →direct cost	Restitution costs →direct cost
Settlement costs	Restitution costs →direct cost	Restitution costs →direct cost

Source: Wesemann 2000

Cost of Traffic Injuries

Direct Costs

Medical

hospitalization;
outpatient care;
medicines;
diagnostic exams;
ambulance services;
nursing services

Non Medical

transportations
costs for health ;
police and legal
costs;
damage to vehicle
and property;
vehicle removal

Productivity Changes/Loss

Morbidity

absence of work-
victim and
companion;
disability

Mortality

life-years lost

Human Capital Approach

Cost of Traffic Accidents with victims associated to Alcohol Use – Porto Alegre/Brazil (Sousa et al 2010)

Costs	Number of Units	Total Cost SUS	%	Total Cost AMB	%	Total Cost CBHPM	%
TOTAL COST		66,445,528.63	100	69,981,223.87	100	71,925,254.17	100
Direct Costs		15,796,021.35	23.8	19,331,716.60	27.6	21,275,746.90	29.6
Medical Costs		4,349,042.90	6.5	7,884,738.14	11.3	9,828,768.44	13.7
Outpatient Costs*	5.821	306,978.76	0.5	1,215,051.52	1.7	1,619,700.05	2.3
Hospitalizations*	717	334,956.90	0.5	1,251,269.53	1.8	1,722,682.65	2.4
Medical (post-emerg)*	6.531	1,368,642.99	2.1	3,079,952.86	4.4	4,147,921.50	5.8
Cost of Rescue - SAMU	6.664	2,338,464.24	3.5	2,338,464.24	3.3	2,338,464.24	3.3
Non-Medical Costs		11,446,978.46	17.2	11,446,978.46	16.4	11,446,978.46	15.9
Locomotion	6.531	429,329.53	0.6	429,329.53	0.6	429,329.53	0.6
Rescue Cost - EPTC	6.664	404,238.24	0.6	404,238.24	0.6	404,238.24	0.6
Damage to Property	2.155	2,112,896.90	3.2	2,112,896.90	3.0	2,112,896.90	2.9
Removal and Vehicle Impound	6.901	8,500,513.78	12.8	8,500,513.78	12.1	8,500,513.78	11.8
Indirect Costs		50,649,507.27	76.2	50,649,507.27	72.4	50,649,507.27	70.4
Due to Morbidity							
Lost Workdays	33.932	5,649,240.77	8.5	5,649,240.77	8.1	5,649,240.77	7.9
Due to Mortality							
Deaths	155	45,000,266.50	67.7	45,000,266.50	64.3	45,000,266.50	62.6
		5881 years of life					

Cost of Traffic Accidents with victims associated to Alcohol Use – Porto Alegre/Brazil (Sousa et al 2010)

Costs	Total cost that can be attributed to Alcohol SUS	%	Proportion (%) of cost that can be attributed to alcohol over total cost
TOTAL COST	31,443,367.91	100	47.3
Direct Costs	3,647,301.33	11.6	5.5
Medical Costs	1,004,194.01	3.2	1.5
Outpatient Costs *	70,881.40	0.2	0.1
Hospitalizations*	77,341.55	0.2	0.1
Medical (post-emerg.)*	316,019.67	1.0	0.5
Cost of Rescue - SAMU	539,951.39	1.7	0.8
Non-Medical Costs	2,643,107.33	8.4	4.0
Locomotion	99,132.19	0.3	0.1
Cost of Rescue - EPTC	93,338.61	0.3	0.1
Damage to Property - vehicles	487,867.89	1.6	0.7
Removal and Impound - vehicles	1,962,768.63	6.2	3.0
Indirect Costs	27,796,066.58	88.4	41.8
Due to Morbidity			
Loss of Workdays	1,304,409.69	4.1	2.0
Due to Mortality			
Deaths	26,491,656.89	84.3	39.9

Note: The only costs are those of victims over 18 years old. Monetary Values in 2008 reais.

Thank You!!

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