The Costs of Occupational Injuries and Diseases in Québec, 2005–2007

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Main objectives

- Evaluate the financial consequences of injuries and diseases in Québec.

- Use economic indicators to support the choice of research priorities, in addition to what is already done at the IRSST.

Methodological framework

- Population
  - All the workers covered by the Québec's Occupational Health and Safety Plan.
  - Accidents and diseases that have been accepted by the CSST and which causal event occurred between January 1st, 2005 and December 31, 2007.
- Data source
  - CSST (Québec workers' compensation board)
- Time dimension
  - An incidence approach is used. Compensation data have only a three-year maturity.

Methodological framework

- Perspective
  - Workers
  - Employers
  - Community

- Costs classification
  - Not a direct/indirect classification

Cost estimates

- Medical costs: All expenses incurred to treat and rehabilitate an injured worker

Medical costs generated by one year of injuries and diseases, Québec, 2005-2007

	Employers	Workers	Community	Total
Medical aids expenses (CSST)	213 746 031 $	-	-	213 746 031 $
Rehabilitation expenses (CSST)	22 144 046 $	-	-	22 144 046 $
Total	**235 890 077 $**	**-**	**-**	**235 890 077 $**

- Funeral costs: Expenses of funeral following a death

Funeral costs generated by one year of injuries and diseases, Québec, 2005-2007

	Employers	Workers	Community	Total
Compensation for funeral costs (CSST)	469 180 $	-	-	469 180 $
Net costs of funeral expenses	-	432 776 $	-	432 776 $
Death benefits (RRQ)	-	-	447 500 $	447 500 $
Total	**469 180 $**	**432 776 $**	**447 500 $**	**1 349 457 $**

Cost estimates

- Salary costs: Hours not worked but paid (salary and fringe benefits) to an injured worker

Salary costs generated by one year of injuries and diseases, Québec, 2005-2007

	Employers	Workers	Community	Total
Waste pay to an injured worker	**9 436 618 $**	**-**	**-**	**9 436 618 $**

Cost estimates

- Productivity losses: Losses in wages and unpaid housework
  - Lost wages: Based on the human capital method, it measures the lost output for society (GDP)

$$PV = \sum_{n=y}^{60} P_{s,y,n} \times S \times \left(\frac{1+g}{1+r} \right)^{n-y}$$

PV = present discounted value of lost wages due to death;

$P_{s,y,n}$ = probability that a person of sex *s* and age *y* survive to age *n*;

S = annual salary;

g = rate of increase of labor productivity (1 %);

r = real discount rate (3 %).

Cost estimates

- Productivity losses (cont.):
  - Fringe benefits (*FB*): Paid by employers, they are a part of the total remuneration of workers (dental, life, pensions…)

$$PV = \sum_{n=y}^{60} P_{y,s,n} \times (S \times (1 + FB)) \times \left(\frac{1+g}{1+r} \right)^{n-y}$$

  - Household production: Not included in GDP, but is a part of the total contribution of workers to output
    - Estimated values of household work for male and female in Canada are from a study by Statistics Canada.

Cost estimates

- Productivity losses (cont.):

Productivity losses generated by one year of injuries and diseases, Québec, 2005-2007

	Employers	Workers	Community	Total
Lost wages				
Compensation (income and death benefits) (CSST)	583 172 878 $	-	-	583 172 878 $
Lost of income (net of compensation)	-	92 427 774 $	-	92 427 774 $
Tax losses	-	-	242 495 130 $	242 495 130 $
Fringe benefits	160 522 248 $	28 160 400 $	87 385 813 $	276 068 461 $
Household production				
Compensation for household production (CSST)	4 577 710 $	-	-	4 577 710 $
Household production (net of compensation)	-	300 029 916 $	-	300 029 916 $
Total	**748 272 836 $**	**420 618 091 $**	**329 880 943 $**	**1 498 771 869 $**

Cost estimates

- Administrative costs: Administration fees generated by the replacement of the injured worker

Administration costs generated by one year of injuries and diseases, Québec, 2005-2007

	Employers	Workers	Community	Total
Turnover costs (recruiting, training...)	**32 595 212 $**	**-**	**-**	**32 595 212 $**

Cost estimates

- Human costs: The value of the change in the quality of life of the worker and those in his circle for the duration of such changes and, in cases of death, the potential years of life lost (e.g. pain, suffering and loss of enjoyment of life).

  - DALY: Disability-Adjusted Life Year. DALY extends the concept of potential life years lost due to premature death to include the equivalent in terms of life years in good health lost due to health problems or disabilities (WHO, 2011). One DALY equals one year of healthy life lost.

Cost estimates

- Human costs (cont.)
  - Occupational injuries and diseases occurring in one year in Québec generates on average of 22 960 DALYs. In other words, it's 22 960 healthy years of life lost because of occupational injuries and diseases happening every year in Québec.
  - The value of a DALY?
  - Using a value of statistical life of 3 234 381 $ (Québec Department of Transportation, 2006), obtained by using the willingness-to-pay approach, we can estimate the value of a life year, and therefore the value of a DALY.

Cost estimates

- Human costs (cont.)

Human costs generated by one year of injuries and diseases, Québec, 2005-2007

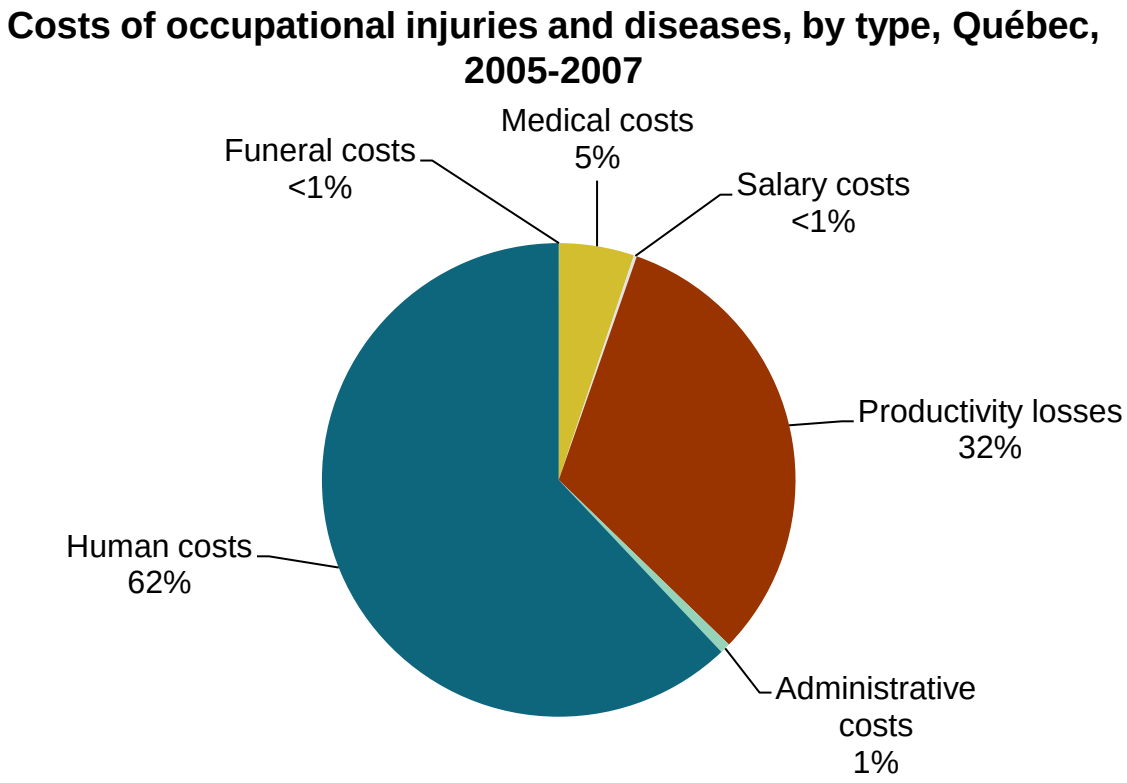
	Employers	Workers	Community	Total
Bodily injury indemnity (CSST)	69 419 261 $	-	-	69 419 261 $
Human costs (net of compensation)	-	2 791 737 694 $	-	2 791 737 694 $
Total	**69 419 261 $**	**2 791 737 694 $**	**-**	**2 861 156 955 $**

Results

Total costs: 4,6 billions ($ CA 2006)

Average cost: 38 507 $

- Costs by type, share of total (%)



Results

- Costs by type of injuries

Costs of occupational injuries and diseases, by type of injuries, Québec, 2005-2007

Type of injuries	Annual number of injuries	%	Total costs (per year)	Average cost (per injury)
Accidents	115 300	95,70	3 803 403 000 $	32 987 $
Diseases	5 177	4,30	835 797 187 $	161 444 $
Total	**120 477**	**100,00**	**4 639 200 187 $**	**38 507 $**
Deaths	179	0,15	446 946 611 $	2 496 908 $
Deaths by accident	102	0,08	318 623 288 $	3 123 758 $
Deaths by disease	77	0,06	128 323 323 $	1 666 537 $

Results

- Costs by event or exposure

Costs of occupational injuries and diseases, by event or exposure, in decreasing order of average cost, Québec, 2005-2007

Event or exposure	n	Total costs (per year)	Average cost (per injury)	Rank
Exposure to noise	2 402	370 521 987 $	154 277 $	1
Transportation accidents	1 951	243 916 172 $	125 000 $	2
Exposure to harmful substances	2 642	279 634 442 $	105 855 $	3
Fall and jump to lower level	5 907	387 597 593 $	65 613 $	4
Caught or crushed	6 305	329 588 273 $	52 274 $	5
Violent acts	2 165	100 050 320 $	46 213 $	6
Contact with temperature extremes	1 904	85 861 989 $	45 096 $	7
Repetitive motion	2 751	110 521 675 $	40 180 $	8
Other event or exposure NEC or UNS	7 764	269 507 845 $	34 712 $	9
Fall on same level, slip, tripping	13 150	416 905 664 $	31 703 $	10
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Total	**120 477**	**4 639 200 187 $**	**38 507 $**	**-**

Results

- Costs by industry

Costs of occupational injuries and diseases, by industry, in decreasing order of costs by FTE, Québec, 2005-2007

Industry	Occ. Cat.	n	Total costs (per year)	Costs/FTE	Rank
Mining (except Oil and Gas)	Man.	1 001	89 286 429 $	15 062 $	1
Support Activities for Mining and Oil and Gas Extraction	Man.	150	16 886 155 $	10 296 $	2
Waste Management and Remediation Services	Man.	684	26 842 940 $	10 099 $	3
Specialty Trade Contractors ; Telecommunications	Man.	6 185	497 039 507 $	8 813 $	4
Non-Metallic Mineral Product Manufacturing	Man.	1 323	63 065 958 $	8 597 $	5
Support Activities for Agriculture and Forestry	Man.	430	17 833 579 $	7 720 $	6
Truck Transportation	Mix.	127	8 916 140 $	7 518 $	7
Forestry and Logging	Man.	291	41 242 986 $	7 485 $	8
Petroleum Product Wholesaler-Distributors	Man.	132	7 147 825 $	6 913 $	9
Local, Municipal and Regional Public Administration	Man.	2 601	67 663 221 $	6 368 $	10
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Total		**120 477**	**4 639 200 187 $**	**1 713 $**	-

Limits

- This study underestimates the costs of occupational injuries and diseases, especially for employers.
  - Compensation data have an average maturity of only three years.
  - There's many costs borne by the employers that cannot properly be estimated on a macro-level analysis (property damage, overtime, legal costs…).
  - Only reported injuries and diseases are considered.

Conclusion

- To evaluate the costs of occupational injuries and diseases can be very useful for establishing research priorities in OHS.

- To be better informed of those costs at company level can be an incentive to invest in OHS.

- Report on the website www.irsst.qc.ca

- THANK YOU !
- QUESTIONS ?