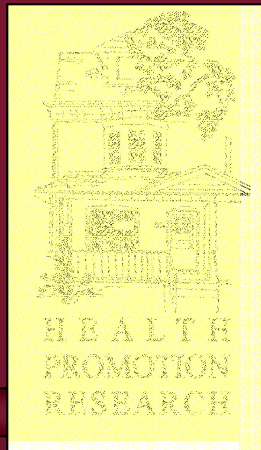


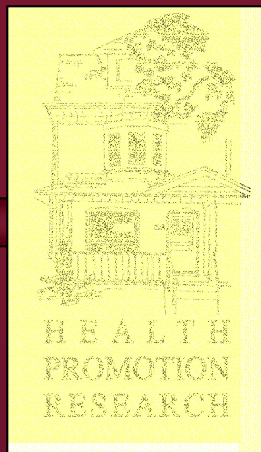
# Asthma and Once-Daily Administration of Inhaled Corticosteroids: Potential for Improved Compliance and Reduced Health Costs



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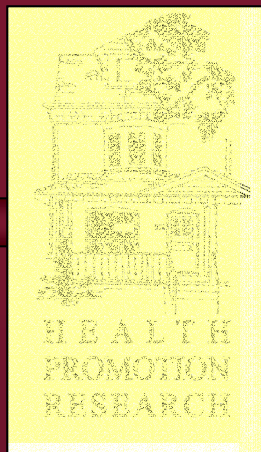
**Robert B. Coombs, PhD**  
**Health Promotion Research, Inc**  
**November 19, 2001**

# Inhaled Corticosteroids and Asthma in Canada



- Central role of inhaled corticosteroids (ICS) in the control of asthma
- Demonstrated decrease in costly asthma-related hospitalizations, morbidity, and mortality with ICS use (Goldman, 2000; Suissa, 2000; Rowe, 1999; Blaiss, 1998; Gerdtham, 1996; Wennegren, 1996)
- BUT, real-world effectiveness of ICS is compromised by poor patient compliance (25% - 40%)
- Complex therapeutic regimens are implicated in poor compliance: current ICS are recommended twice daily

# Inhaled Corticosteroids and Asthma in Canada

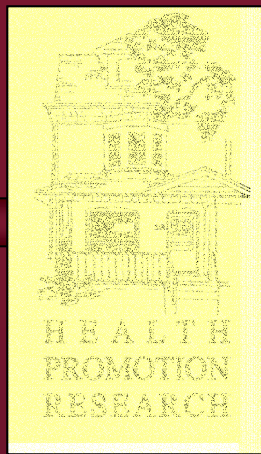


**Asthma + Poor ICS Compliance =  
Significant Cost (health and monetary)**

## *Possible Solution:*

- Reducing the number of ICS doses/d (ie: a once-daily formulation) will promote compliance with asthma treatment
- Evidence: improved compliance with asthma treatment with *bid*, in comparison to *qid*, dosing schedules (Malo 1995; Mann, 1992)

# Inhaled Corticosteroids and Asthma in Canada



## *Study Objectives*

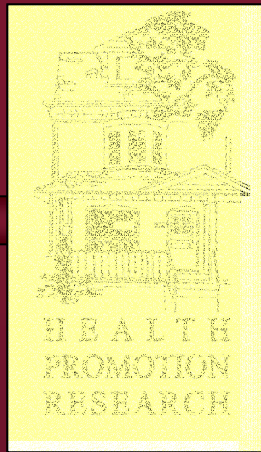
- **Investigate compliance with once-daily vs twice-daily medications in chronic illnesses:**
  - Estimate compliance with an expected improvement with use of once-daily ICS therapy
- 2) **Pharmacoeconomic analysis:**
  - Estimate current economic costs of asthma in Canada
  - Estimate the effect that improved compliance will have on health and economic costs in Canada

***No previous research has compared the compliance and cost effects of once-daily ICS and twice-daily ICS***

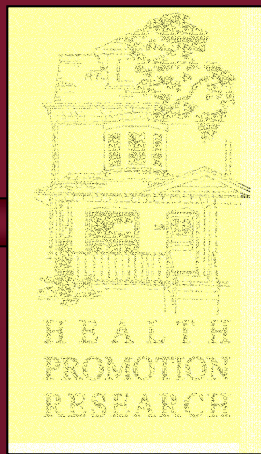
# Compliance: Once-Daily vs Twice-Daily ICS Formulations

*Review of literature over the past 10 years (11 studies):*

- Better compliance with once-daily vs twice-daily dosing on all measures of compliance
- **13.9%** (our conservative estimate: **10.0%**) to **40.0%** increase in the number of compliant patients on a once-daily dosing regimen
- Patients benefit more from a once-daily formulation, with increased hours of therapeutic coverage

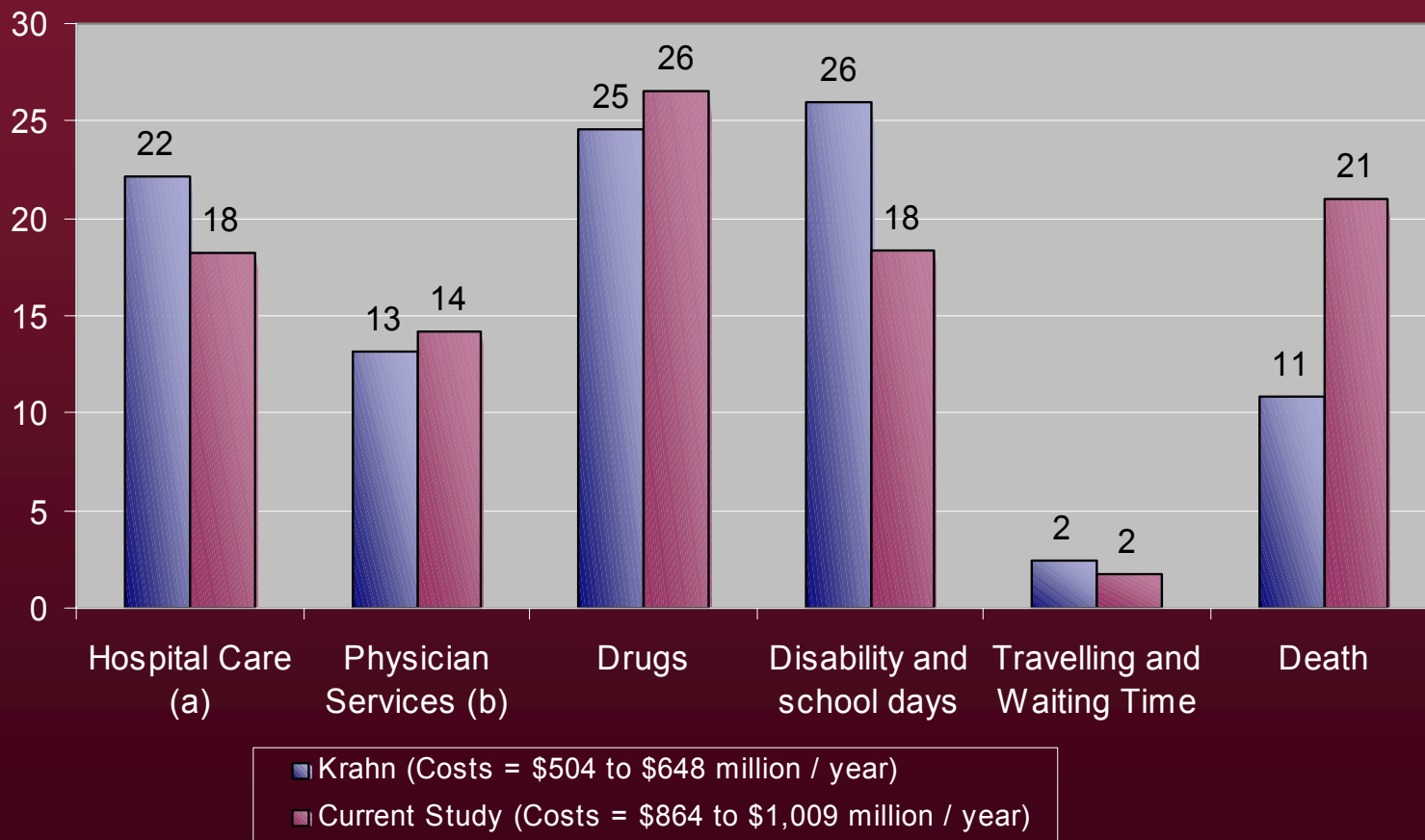
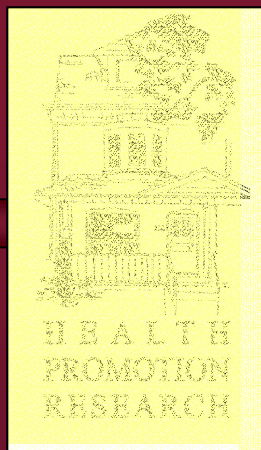


# Current Direct and Indirect Costs of Asthma in Canada

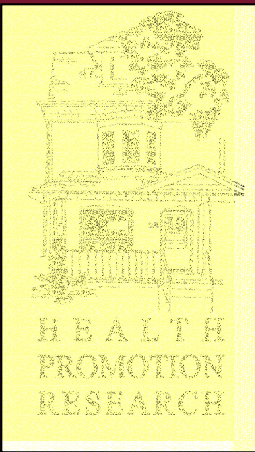


- Asthma and its treatment is expensive
- Krahn et al (1996) estimated that the direct and indirect costs of asthma in Canada in 1990 were between Can \$504 million and Can \$648 million
- Our study extends Krahn et al (1996):
  - Places cost estimates in 1999-2000 dollars
  - Improves on several estimating methods

# Percentage of Costs Attributable to Selected Categories: Asthma in Canada 1990-2000

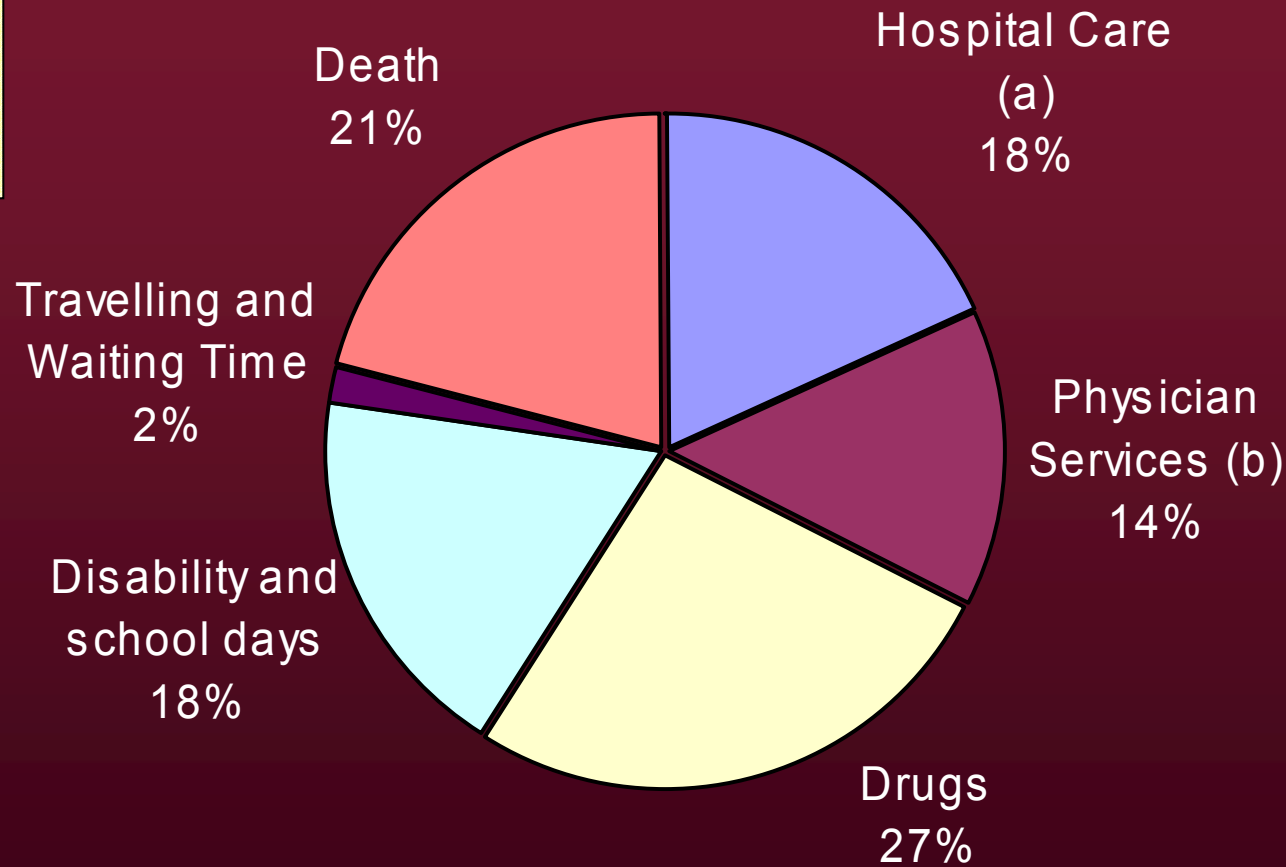


Notes: data are based on low estimates of costs; (a) includes inpatient care, ER visits, ambulance services, and nurse services; (b) includes outpatient costs and diagnostic tests.



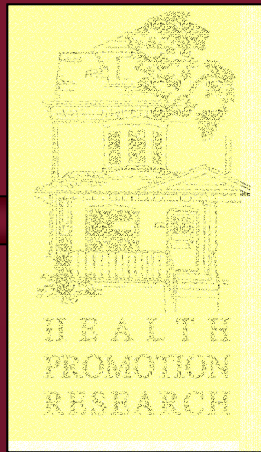
# Costs of Asthma in Canada, 1999-2000

(percentage of total costs, based on low estimate of \$864 million)



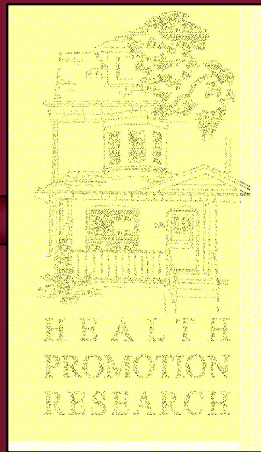
Notes: (a) includes inpatient care, ER visits, ambulance services, and nurse services; (b) includes outpatient costs and diagnostic tests.

# *If compliance increases by 1%, how much would health costs change?*



- Increasing ICS utilization from *none* to *full* clinical use reduced asthma-related hospitalizations by **50%** (Donahue et al, 1997)
- Therefore, a **1%** increase in compliance would produce approximately a **0.5%** reduction in hospital costs
- ***Remember: patient compliance is expected to improve by 10% – 40% with once-daily formulations***

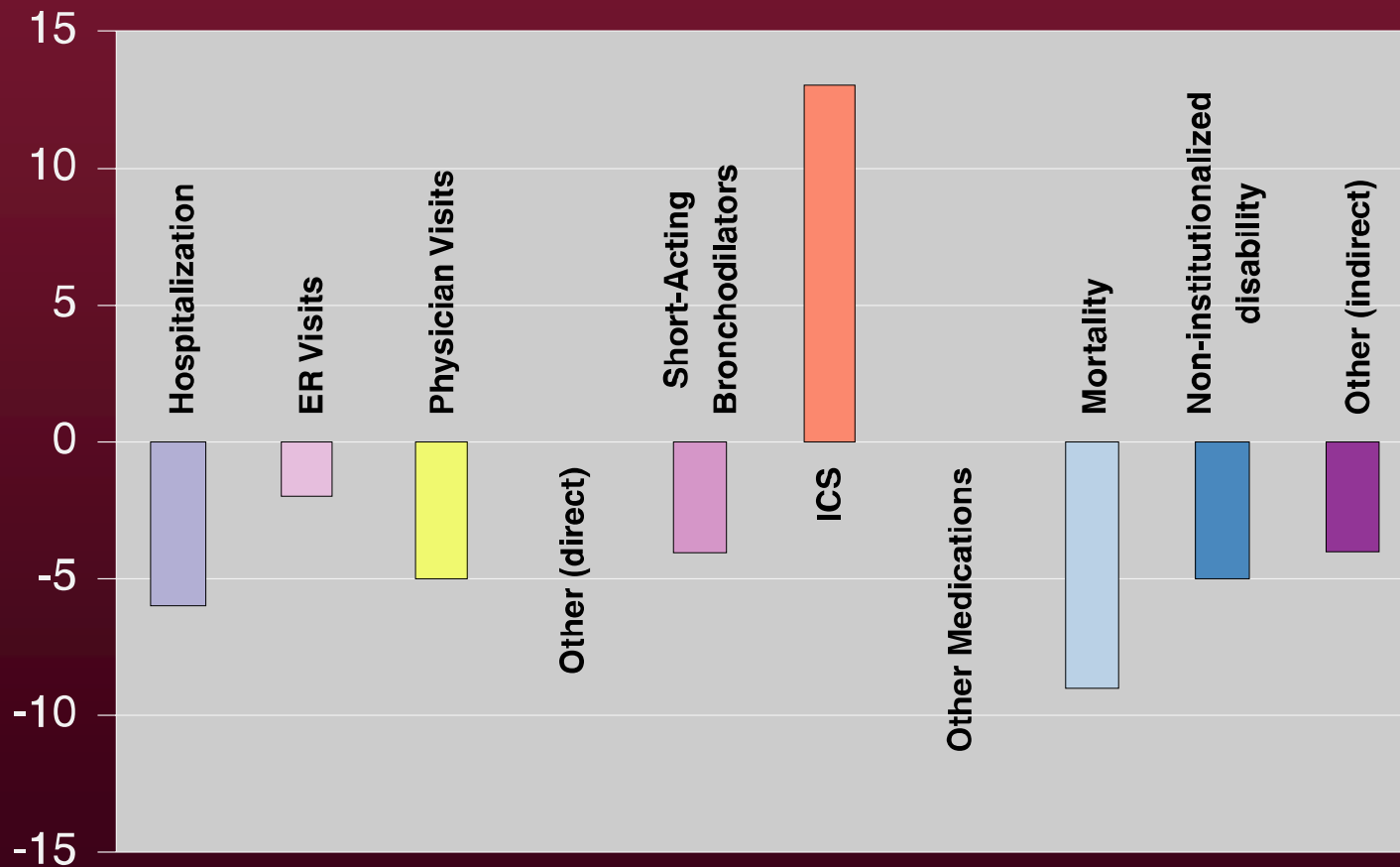
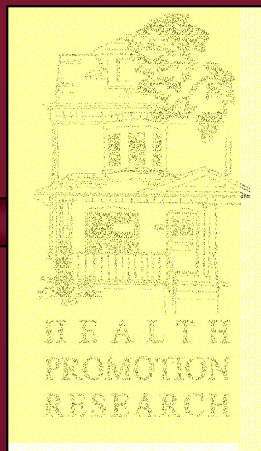
# Compliance Improvement and Health Care Costs



- With an expected improvement in ICS compliance with a once-daily formulation, Canadian health care cost savings ranges from:  
**Can \$22 million to \$107 million per year**
- These savings are attributable to reductions in asthma-related mortality and morbidity

# Estimated cost reductions expected from the widespread use of once-daily ICS

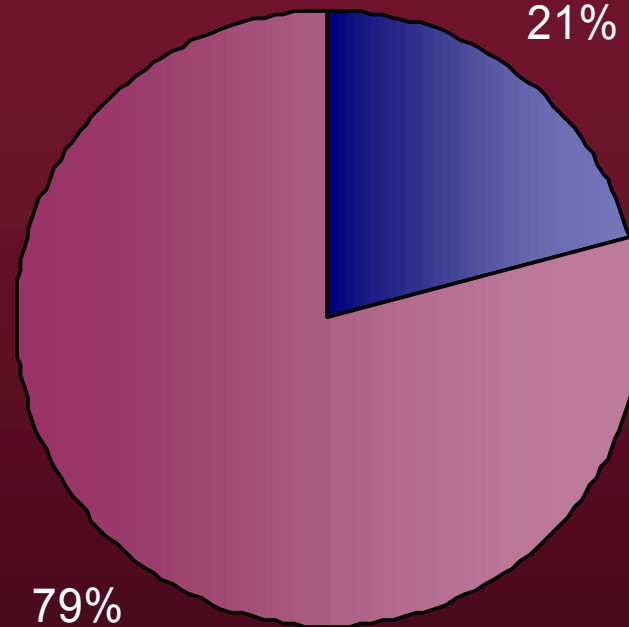
(based on the low estimate of total savings, \$22 million)





# Source of Savings

(total = \$22 million to \$107 million per year)

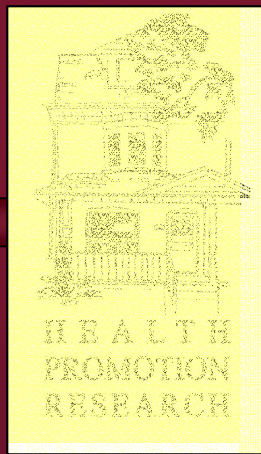


51% of the savings in indirect costs are attributable to reduced mortality



Based on low estimates of savings

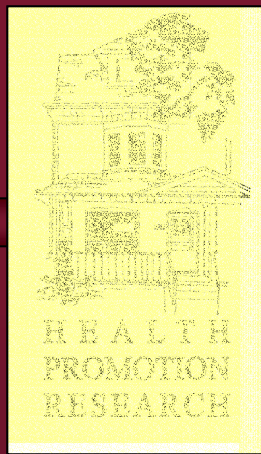
# Compliance improvement with once-daily ICS therapy and costs (health and monetary)



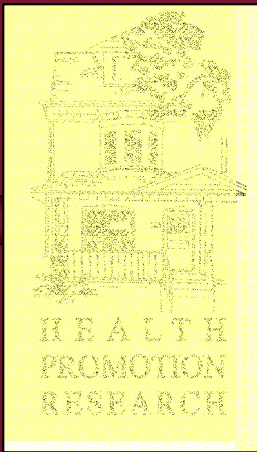
- The total cost of ICS would rise with increased compliance
- BUT, the resultant increase in compliance would reduce indirect and direct costs:
  - Hospitalizations
  - ER visits
  - Physician services
  - Usage of rescue meds
  - Absenteeism (work and school)
  - Disability requiring institutional care

**The quality of life of asthmatics would improve significantly**

# Compliance improvement with once-daily ICS therapy and costs (health and monetary)

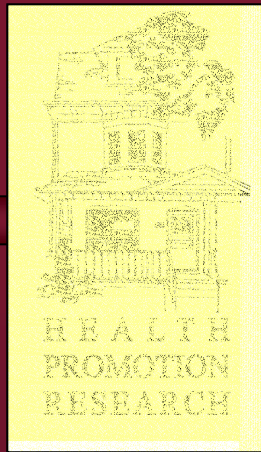


- The widespread utilization of once-daily ICS is likely to increase real-world effectiveness of asthma treatment, save lives, and reduce total treatment costs
- Further research is necessary to determine the savings that could be realized in the United States through once-daily administration of ICS



# EXTRA SLIDES

# Study Limitations



- We had to make accurate assessments of the potential benefits of once-daily ICS dosing, with the use of previous studies of chronic illnesses
- Our estimates of the savings to the Canadian economy are based on widespread use of once-daily ICS formulations

Table 1: Cost changes that can be expected to occur by increasing compliance 10% - 40%. This increase is expected with the use of once-daily inhaled corticosteroids.

Category	Unit Costs	Current Cost Estimates	Cost Change Estimates
<u>Direct Costs</u>			
Health care resources:			
Hospitalizations	\$425	\$123 M	\$6 M - \$25 M
ER visits	\$170	\$32 M - \$122 M	\$2 M - \$24 M
Physician visits	\$25	\$100 M	\$5 M - \$20 M
Other		\$26 M	\$0.14 M - \$0.6 M
Medications:			
Short-acting $\beta_2$ -agonists	\$16	\$75 M	\$4 M - \$16 M
ICS	\$50	\$125 M	(\$13 M - \$5 M)
Other		\$28 M	\$0
Subtotal (direct costs)		\$510 M - \$601 M	\$5 M - \$36 M
<u>Indirect Costs</u>			
Death	\$400,000	\$182 M	\$9 M - \$36 M
Non-institutionalized disability		\$92 M - \$118 M	\$5 M - \$24 M
Other		\$81 M - \$109 M	\$4 M - \$22 M
Subtotal (indirect costs)		\$355 M - \$409 M	\$18 M - \$82 M
<b>Total</b>		<b>\$864 M - \$1,009 M</b>	<b>\$22 M - \$117 M</b>

*Note: All data has been rounded for clarity.*

