Injury Prevention Counseling by Pediatricians: A Benefit-Cost Comparison

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ABSTRACT. Objectives. The American Academy of Pediatrics believes that health education, through office-based counseling, can contribute to childhood injury prevention. This report extends previously published work on the effectiveness of primary care-based counseling and compares the costs and estimated monetary value of the benefits of safety counseling targeting children ages 0 to 4 years.

Methods. We estimate the savings achievable with comprehensive childhood injury prevention counseling organized around the three Framingham Safety Surveys used in the Injury Prevention Program (TIPP) developed by the American Academy of Pediatrics. We verify the estimated savings by comparing them with the effects of pediatrician counseling from separate analyses of the most fully evaluated interventions—in child motor vehicle occupant injuries, burns, and falls.

Results. TIPP pediatrician injury counseling sessions between the ages of 0 and 4 years can achieve estimated savings of $880 per child or $80 per visit. If all 19.2 million children ages 0 to 4 years completed TIPP, we estimate that $230 million would be saved annually in medical spending, and injury costs would decline $3.4 billion. Each dollar spent on TIPP childhood injury prevention targeting children ages 0 to 4 years returns nearly $13.

Conclusion. TIPP pediatrician injury counseling is a cost-effective method of preventing childhood injuries and should be more widely adopted. Pediatrics 1995;96:1-4; injury prevention, counseling, medical spending, disability, quality of life.

ABBREVIATION: TIPP, The Injury Prevention Program.
value of future work and quality of life. Survival value minus lost future work equals lost quality of life.

We view costs and benefits from society’s viewpoint, rather than the medical system’s. Therefore, we include both out-of-pocket savings in medical spending and the less direct savings in future work and quality of life. Inclusion of these categories is prescribed by the US Office of Management and Budget in Federal regulatory analyses and recommended almost universally by contemporary benefit-cost analysis textbooks.6,8

The American Academy of Pediatrics has developed The Injury Prevention Program (TIPP). TIPP consists of three components: (1) a policy statement making pediatric injury prevention counseling a standard of care for pediatricians; (2) a counseling schedule, which suggests age-appropriate topics to cover at each well-care visit; and (3) a set of counseling materials including three Framingham Safety Surveys, as well as counseling sheets to be administered at all visits.

TIPP encompasses up to 11 visits between the ages of 0 and 4 years. Parents complete the Framingham Safety Surveys in the waiting room at the 2-, 15-, and 24-month visits. The surveys allow the pediatrician to tailor the counseling to the educational needs of the parents. Topics covered before age 5 include child safety seat and smoke detector use, crib safety, water safety, firearm safety, pedestrian safety, play equipment safety, fall prevention, burn prevention, choking and suffocation prevention, and poisoning prevention.

We conservatively estimate the savings achievable with TIPP by evaluating a comprehensive effort organized around the three Framingham Safety Surveys used in TIPP.9 We verify this estimate by summing the effects from separate analyses of the most fully evaluated cause-specific interventions—pediatrician counseling on child safety seat use in motor vehicles,10 burn prevention,11 and fall prevention.14 This counseling addresses the causes of half of all injury costs for children ages 0 to 4 years.15

METHODS

Our analyses rely solely on studies of the effectiveness of physician-to-patient counseling. Such counseling programs differ in structure and content. Our comprehensive effort analysis is based on a counseling program that was a precursor to TIPP.9

The parents completed a safety survey (since incorporated into TIPP) while waiting to be seen by the physician. The physician then counseled the parent on the issues in which they lacked knowledge or failed to follow safe practices.

None of the separate effort studies used a safety survey. All used written safety instructions coupled with oral physician counseling. One also used a visible display,16 one used periodic safety device demonstrations,12 and one sold safety devices at a reduced price.15

Measures of counseling effectiveness differ across the studies used. Effectiveness measures based on changes in injury occurrence are preferable to those based on educational or behavioral change.1 Two of the seven effectiveness studies measured changes in injury rates.14,15 For the remaining studies,14,16 we estimated the behavioral change’s effect on injury occurrence.

Comprehensive Effort

Bass et al.15 estimated the effectiveness of bread prevention counseling efforts by a small group of suburban pediatricians. Child injuries fell 15.3%. The 1987 National Medical Expenditure Survey shows that medical spending on injury during a child’s first 5 years averages $394 (in 1992 dollars).1 Multiplying counseling effectiveness times spending on injury yields the medical cost savings ($394 per child × 15.3% reduction = $60 in savings per child).

Preventing child deaths and permanent disabilities lets surviving children work as adults. Applying the average ratio of work loss to medical cost for injuries to children ages 0 to 4 years from Rice et al.14 yields work losses avoided ($60 per child × $2.85 work loss/$1 medical loss = $170 per child). In valuing future wages, we switched from the 6% discount rate used by Rice et al.14 to the 2.5% rate used by courts compensating wage losses due to injury. Injury also reduces the quality of life of children and their families. Multiplying by the average ratio of quality-of-life cost to wage loss for child passenger safety seats and smoke detectors (as reported in our specific effort analyses) yields the quality-of-life savings ($170 × $1.80 quality-of-life cost/$1 work loss = $60 per child).

Separate Efforts

The effectiveness estimates for counseling on child safety seat use range from a rise of 9.5% (low),10 to 12% (medium),12 to 27% (high).11 The use of child safety seats can be highly effective in reducing childhood motor vehicle injuries.10,11 Miller et al.11 computed the cost savings per 1% rise in the percentage of all infants using child safety seats when traveling in motor vehicles.

For burns, the TIPP sheet interventions include smoke detector installation, tap water temperature reduction, and counseling on stove safety. The primary effect studied is from smoke detector installation and maintenance. Counseling effectiveness is measured as a 17% rise in correct use after intervention (low- and midrange estimates) and a 26% rise in overall use (high-range estimate).12 Smoke detectors are 30% to 45% effective in reducing injuries from burns.1 Promisingly, we conservatively use an effectiveness rate of 33% in our calculations. For hot water temperature reductions, physician counseling effectiveness ranges from 9% to 14%, with nothing known about the resultant decrease in scald burns.10 We used the smoke detector intervention’s effectiveness for all burn interventions.

The whole family reaps benefits from a smoke detector. To recognize the broader family benefits, we used the fire-burn cost estimates for ages 0 to 14 years from Rice et al.14 Across this age range, 87% of scald burns injured children younger than 5 years. For our midrange and high estimates, we adjusted the costs using costs per case specific to burn and scald injuries from the report to Congress by Miller et al.11 and used quality-of-life costs (as a function of medical costs) from that document. The costs per case were weighted by the ratio of scald to burn injuries for this age group from the California hospital discharge survey during the second half of 1990. Causes for virtually all injuries were recorded during that time period.

Krivitz11 found that pediatrician counseling reduces falls dramatically—by 54.7%. For falls, we used the medical and work loss costs from Rice et al.14 We computed quality-of-life costs from the work losses. For a lower bound, we used the average ratio from child seats and burns. For a mid to upper bound, we used the values by treatment status from Miller et al.11 (using limb injury values for nonhospitalized cases and "any injury" values for hospitalized cases).

TIPP Program Cost

In 1991, a pediatric well-care visit lasted 16 minutes on average and cost $20 (in 1992 dollars).18 The three survey-based TIPP visits take 3 minutes 17 seconds each on average.25 Polling a dozen pediatricians suggested that counseling typically is less time consuming on the eight TIPP visits without surveys. We assumed it took 1.5 minutes on average. That means that TIPP counseling from 0 to 4 years of age takes a total of about 22 minutes of a pediatrician’s time. The written materials for the 11 TIPP visits are supplied by the American Academy of Pediatrics for $1.09.

RESULTS

Comprehensive Effort (Table 1)

TIPP counseling sessions between ages 0 and 4 years can achieve savings of $880 per child. TIPP
TABLE 1. Estimated Cost Savings From TIPP Injury Prevention Counseling

<table>
<thead>
<tr>
<th></th>
<th>Per Visit</th>
<th>Per Child</th>
<th>Total/Year*</th>
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<tbody>
<tr>
<td>Medical</td>
<td>$5.50</td>
<td>$60</td>
<td>$230</td>
</tr>
<tr>
<td>Work</td>
<td>15.50</td>
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<td>660</td>
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<tr>
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* In millions.

pediatrician labor, valued at the average cost per minute of well care, costs $68. Adding the cost of materials, TIPP costs $69 per child counseled. Dividing the costs into the benefits yields a benefit-cost ratio; each dollar spent on TIPP returns nearly $13. TIPP savings include an estimated 85 cents in medical spending, $2.50 in future work, and $9.50 in quality of life.

Our best estimate is that TIPP counseling saves $80 per visit. If all 19.2 million children 0 to 4 years of age completed TIPP, annual injury costs would decline by $5.4 billion. Table 1 breaks these estimates down by cost category.

Injury counseling as part of a pediatric injury visit saves $5.50 in future medical spending on injury treatment. It preserves future earnings and quality of life valued at $74.50. Universal adoption of TIPP injury prevention counseling for children 0 to 4 years of age would save $230 million in medical spending annually. That's one sixth of the injury spending in this age group.

Separate Efforts (Table 2)

The separate effort analyses examine only part of the overall TIPP effort and are intended as a check that the comprehensive savings estimate is reasonable. Pediatrician counseling promoting child safety seat use, smoke detector use, and fall prevention accounts for $37 to $44 in medical cost savings per child, with $40 our best estimate. These estimates account for 67% of the estimated TIPP medical savings of $60 per child. They account for 74% of the total savings per child counseled. These analyses of separate studies examining the effects of physician counseling in three of TIPP's many focus areas are fully consistent with our estimate of TIPP's overall effect.

Fall prevention accounts for more than 90% of the savings from fall, burn, and child occupant injury counseling. By comparison, falls account for about 55% of injury costs among the three categories. We suspect that the larger impact on falls results from the paucity of other injury prevention information about this safety problem. In contrast, many sources educate parents about the need for child safety seats and smoke detectors, and many parents acquire these devices without pediatrician intervention.

DISCUSSION

This article uses counseling effectiveness studies based on predominately white, middle- and upper-middle-class populations. TIPP counseling may be less effective with lower socioeconomic groups. Conversely, childhood injury rates are higher in low-income neighborhoods. Therefore, the overall effect with respect to demographic status is unclear.

None of the studies reviewed by Bass et al evaluated a program lasting more than four visits in 2 years. The literature suggests that safety messages work better with repetition.

Our analysis misses any added benefits of TIPP's cumulative approach. Our analysis covers ages 0 to 4 years. TIPP currently extends through 12 years. For children 5 to 12 years of age, annual medical spending on injury is higher, so TIPP's return may be larger.

Conclusion

Pediatricians can keep young children healthier by using TIPP to counsel parents about injury prevention. Current pressure by payers to increase throughput forces pediatricians to do less counseling. From the perspective of annual medical spending, cutbacks are likely to be counterproductive. Each visit at which TIPP counseling occurs saves an estimated $5.50 in future medical spending and preserves future earnings and quality of life valued at $74.50.

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REFERENCES

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ARTICLES 3

RATS!

The mouse-is-a-little-man premise has spawned unprecedented increases in environmental regulation (purportedly to protect us from cancer) and has contributed substantially to the cost of most goods and services, insurance premiums, legal fees, and federal taxes while reducing job opportunities and incentives for innovation.


Noted by J.F.L., MD.