Synthetic Cohorts for Estimating Medical and Lost Production in Costs of Torts

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I. Introduction.

We sought to estimate the medical costs, and lost wages, costs associated with three dangerous products: Firestone Tires, Baycol, and ATV rollovers.We first searched for a large data set that described demographic characteristics of victims as well as the costs. We searched published scholarly and popular legal, economic, and medical literature. We searched articles in newspapers. We consulted government bureaus and departments.. We contacted plaintiff and defense lawyers for a number of prominent cases and products. We concluded that detailed data on dollar amounts for all jury verdicts and settlements in the US associated with any given product (e.g. Baycol or a type of Firestone tire) were not available. As a result of similar searches, we also concluded that

detailed data on the dollar amount of awards that were meant to compensate victims for medical costs, lost wages, and pain and suffering for more than roughly 10 or 20 cases for any given product were also not available. In short, the data required for a cost study of the five products (similar to costs studies in medicine, economics and business) were not available. This is one of the most important conclusions of our study: legal data sets need to be created so that the myriad questions asked by legal scholars, social scientists, and citizens regarding the functioning of our legal system can be answered. The lack of data was frankly shocking to the social scientists conducting this research.

Because of this gap in data, we created synthetic cohorts of victims and related per-unit costs for the products. These cohorts and per-unit costs were generated after thorough review of the existing literature and extensive discussions with as many lawyers involved in these cases as would consent to talk to us. These synthetic cohorts represent our best judgments regarding the age and gender characteristics, dollar amounts of settlements, and percents of settlement amounts intended for the three forms of compensation for all five dangerous products. We recognize that the assumptions we made in developing the cohorts are open to some criticism. In response, we developed one-way and multi-way sensitivity analyses involving varying assumptions in an attempt to estimate reasonable bounds for the estimates. Ultimately, we believe that our method will be helpful for future researchers armed with more complete data than we were available to us regarding the age and gender composition of victims as well as verdict and settlement amounts.

II.General Method

The synthetic cohort technique is an established method for estimating effects and outcomes in medicine and economics when necessary data are not available[1-4]. In fact, it is the method of choice for investigating the cost-effectiveness of pharmaceuticals.[4] We assumed that awards were comprised of two parts: 1)medical costs; 2) lost work and home production These medical costs were comprised of hospital costs, physician fees, pharmaceutical costs, nursing home costs, medical equipment costs among others[7-9.]. We assumed that lost wages could be estimated from the same and similar cost-of-injury literature.[7-10] .

We created synthetic cohorts for each of the three products.

III. Specific Method for Ford/Firestone Tires

We assumed 271 deaths were caused by crashes from Explorers with Firestone tires .[11-15] Ford estimated "approximately 1500 cases" and Firestone estimated "over 1300 cases" of the combined number of fatal and non-fatal cases.[11,13-15] . The National Highway Traffic Safety Administration, on the other hand, estimated "over 800" nonfatal cases.[12] We assumed that nonfatal Ford/Firestone injuries would be in proportion to nonfatal injuries for "motor vehicle occupant" in Finkelstein.. Gender and age compositions were assumed to be the same as those for all motor vehicle crash deaths in the Fatal Accident Reporting System from the National Highway Traffic Safety Administration.[16]

Costs were matched to the fatal and nonfatal injury categories as well as the age and gender categories identified above. Medical costs were drawn from Finkelstein et al [8]. Fatal costs were adjusted to reflect motor vehicle occupants only.

Table 1

Estimating Percentages within Age, Gender Categories

Table 1 Panel A. Deaths, 1998, from FARS (Fatal Accident Reporting System for National Highway Traffic Safety Administration) (www-fars.nhtsa.dot.gov/People/PeopleAllVictims.aspx)			
Age		Gender	
Description	Number		Number
<5	758	Male	27,608
5-15	2239	Female	13,885
16-25	9507	Unknown	8
25-44	13,626	Both – unknown	41,493
45-64	7,992		
65+	7,288		
unknown	91		
All ages – unknown	41,410		

7. We assume 67% of all injuries among men and 33% among women (Table 1, above, NHTSA). NHTSA estimate roughly 31% of all injuries among persons age <=25; 33% among persons > 25 but <=44; and 36% for persons over 45. We assume our cohort consists of three ages: exactly 20 years old, 40 year olds, and 60 years old. We assume

the 20 year olds account for 31%, the 40 year olds account for 33%, and the 60 year olds account for 36% of all injuries and deaths. These assumptions are summarized in **Table 2**.

Table 2		
Ages	Men, 67%	Women, 33%
Age = 20, 31%	0.2077	0.1023
Age = 40, 33%	0.2211	0.1089
Age = 60, 36%	0.2412	0.1188

8. We assume that the percent of hospitalized-to-deaths ratio as well as the non-hospitalized-to-deaths ratio from Finkelstein et al (2006, Appendix 1.3, page 46) for "motor vehicle occupant" applies. (Finkelstein et al do not have data on exclusively SUVs. We reasoned that "motor vehicle occupant" was closer to SUVs than the other Finkelstein categories such as "motorcyclist", "pedal cyclist", or "pedestrian".) The hospitalized-to-death ratio was 182,634/33,448 = 5.4602 and the non-hospitalized-to-death ratio was 3,194,119/33,448 = 95.4951. Our estimate of hospitalizations is therefore 5.4602x271(deaths) = 1,480 and for non-hospitalizations is 95.4951x271(deaths) = 25,879

9. **Table 3** combines the percentages in Table 2 with the deaths (271) and the ratios in # 8 above.

Table 3

Numbers of Deaths, Hospitalizations, and Injuries without Hospitalization			
	Deaths, 271	Hospitalizations, 1480	Injuries without hospitalizations, 25,879
Men	.67x271=182	.67x1480=992	.67x25,879=17,339
Age=20	.2077x271=56	.2077x1480=307	.2077x25,879=5,375
Age=40	.2211x271=60	.2211x1480=327	.2211x25,879=5,722
Age=60	.2412x271=65	.2412x1480=357	.2412x25,879=6,239
Women	.33x271=89	.33x1480=488	.33x25,879=8,540
Age=20	.1023x271=28	.1023x1480=151	.1023x25,879=2,647
Age=40	.1089x271=30	.1089x1480=161	.1089x25,879=2,818
Age=60	.1188x271=32	.1188x1480=176	.1188 x25,879=3,074
Total	271	1480	25,879

10. Regarding direct (medical) costs, we used numbers from Appendix 2.1 and 2.2, pages 91 and 92 in Finkelstein to estimate per-injury cost. We used the 15-24 age bracket for 20 year olds, the 25 to 44 bracket for 40 year olds, and the 44 to 64 bracket for 60 year olds. Whereas Finkelstein et al have data for fatal and hospitalized, they do not for just "non-hospitalized" alone. We used, instead, their category for "outpatient" which appeared to be near the middle of the difference between their "ED treated" and "Doctor's office" categories.

11. The age-adjustment factor should reflect the 20 year old risk versus all persons, which, in our case, would be all 20, 40, 60 years old.

11a. Age adjustment for fatalities: The per-injury cost for 15-24 year olds in Finkelstein et al is $4555 ; $4609 for 25-44 year olds; and $6,747 for 45-64 year olds. The average of these three is (4555+4609+6747)/3=5304. The age adjustment for 20 year old fatal injuries in our cohort is 4555/5304=0.8588. The age adjustment for 40 year old fatal injuries in our cohort is 4609/5304=0.8690. The age adjustment for 60 year old fatal injuries in our cohort is 6747/5304 = 1.2721.

11b. Age adjustment for hospitalizations: The per-injury cost for 15-24 year olds in Finkelstein et al is $20165; for 25-44 year olds is $18130; and for 45-64 year olds us $19,215. The average of these three is (20165+18130+19215)/3=19170. The age adjustment for 20 year olds hospitalized injuries in our cohort is 20165/19170=1.0519. The age adjustment for 40 year old hospitalized injuries in our cohort is 18130/19170=0.9457. The age adjustment for 60 year old hospitalized injuries is 19,215/19170=1.0023.

11c. Age adjustment for non-hospitalizations ("outpatient"): The per-injury cost for 15-24 year olds in Finkelstein et al is $967; for 25-44 year olds is $891; and for 45-64 year olds is $876. The average of these three is (967+891+876)/3=911. The age adjustment for 20 year olds non-hospitalized injuries in our cohort is 967/911=1.0614. The age

adjustment for 40 year old non-hospitalized injuries in our cohort is 891/911=0.9780. The age adjustment for 60 year old non-hospitalized injuries in our cohort is 876/911=0.9616.

12. The per-injury medical cost for all ages for males for motor vehicle occupant was $6,882 for fatal, $32,553 for hospitalized and $683 for outpatient. The per-injury medical cost for all ages for females for motor vehicle occupant was $7,918 for fatal, $25,062 for hospitalized and $732 for outpatient. These figures are collected together into Table 4 to estimate per-injury costs within age and gender categories.

Table 4

Per-unit Medical Costs of Deaths, Hospitalizations, and Injuries without Hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations
Men			.
Age=20	0.8588x$6882=$5,910	1.0519x$32,553=$34,243	1.0614x$683=$725
Age=40	0.8690x$6882=$5,980	0.9457x$32,553=$30,785	0.9780x$683=$668
Age=60	1.2721x$6882=$8,755	1.0023x$32,553=$32,628	0.9616x$683=$657
Women	.	.	.
Age=20	0.8588x$7918=$6,800	1.0519x$25,062=$26,363	1.0614x$732=$766
Age=40	0.8690x$7918=$6,881	0.9457x$25,062=$23,701	0.9780x$732=$716
Age=60	1.2721x$7918=$10,072	1.0023x$25,062=$25,120	0.9616x$732=$704

Table 5

Total Medical Costs of Deaths, Hospitalizations, and Injuries without Hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men				
Age=20	$5910x56= $330,960	$34,243x307= $10,512,601	$725x5375= $3,896,875	$14,740,436
Age=40	$5980x60= $358,800	$30,785x327= $10,066,695	$668x5722= $3,822,296	$14,247,791
Age=60	$8755x65= $569,075	$32,628x357= $11,648,196	$657x6239= $4,099,023	$16,316,294
Women				
Age=20	$6800x28= $190,400	$26,363x151= $3,980,813	$766x2647= $2,027,602	$6,198,815
Age=40	$6881x30= $206,430	$23,701x161= $3,815,861	$716x2818= $2,017,688	$6,039,979
Age=60	$10,072x32= $322,304	$25,120x176= $4,421,120	$704x3074= $2,164,096	$6,907,520
Total				$64,450,835

13. Regarding indirect costs, we used numbers from Appendix 3.1 and 3.3, pages 119 and 121 in Finkelstein to estimate per-injury indirect cost. We used the same age brackets identified above. We follow Finkelstein et al categories for fatal hospitalized and non-hospitalized. We use data for “productivity losses” rather than just “wages and fringe benefits” reasoning that lost home production should be counted in lost indirect cost from society’s perspective. This inclusion, in fact, is standard in the literature (see Finkelstein et al)

14. The age-adjustment factor should reflect the 20 year old risk versus all persons, which, in our case, would be all 20, 40, and 60 year olds. The same applies to 40 and 60 year olds.

14a. Age adjustment for fatalities: The per-injury indirect cost for 15-24 year olds in Finkelstein et al is $1,550,398; for 25-44 year olds is $1,404,748, and for 45-64 year olds is $797,098. The average of these three is (1,550,398+1,404,748+797,098)/3=$1,250,748. The age adjustment for 20 year olds fatal injuries in our cohort is 1,550,398/1,250,748=1.2396. The age adjustment for 40 year old fatal injuries in our cohort is 1,404,748/1,250,748=1.1231. The age adjustment for 60 year old fatal injuries is 797,098/1,250,748=0.6373

14b. Age adjustment for hospitalizations: The per-injury indirect cost for 15-24 year olds in Finkelstein et al is $55,151; for 25-44 year olds is $53,677; and for 45-64 is $35,562. The average of these three is (55,151+53,677+35,562)/3=$48,130. The age adjustment for 20 year olds hospitalized injuries in our cohort is 55,151/48,130=1.1459. The age adjustment for 40 year old hospitalized injuries in our cohort is 53,766/48,130=1.1171. The age adjustment for 60 year old hospitalized injuries is 35,562/48,130=0.7389

14c. Age adjustment for non-hospitalizations: The per-injury indirect cost for 15-24 year olds in Finkelstein et al is $2,116, for 25-44 year olds is $3,301, and for 45-64 is $3,417. The average of these three is ((2116+3301+3417)/3=$2,945. The age adjustment for 20 year olds non-hospitalized injuries in our cohort is 2116/2945=0.7185. The age adjustment for 40 year old non-hospitalized injuries in our cohort is 3301/2945=1.1209. And for 60 year old is 3417/2945=1.1603.

15. The per-injury indirect cost for all ages for males for "motor vehicle/other road user" (closest Finkelstein category) was $1,132,395 for fatal, $58,004 for hospitalized and $2,436 for non-hospitalized. The per-injury indirect cost for all ages for females for "motor vehicle/other road user" was $688,073 for fatal, $34,041 for hospitalized and $2042 for non-hospitalized. These figures are collected together into Table 6 to estimate per-injury indirect costs within age and gender categories.

Table 6, Ford/Firestone

Per-unit Indirect Costs of Deaths, Hospitalizations, and Injuries without Hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations
Men			
Age=20	1.2396x$1,132,395= $1,403,717	1.1459x$58,004= $66,467	0.7185x$2,436= $1,750
Age=40	1.1231x$1,132,395= $1,271,793	1.1171x$58,004= $64,796	1.1209x$2,436= $ 2,731
Age60	0.6373x$1,132,395= $721,675	0.7389x$58,004= $42,859	1.1603x$2436= $2,289
Women	.	.	.
Age=20	1.2396x$688,073= $852,935	1.1459x$34,041= $39,008	0.7185x$2,042= $1,467
Age=40	1.1231x$688,073= $772,775	1.1171x$34,041= $38,027	1.1209x$2,042= $2,271
Age=60	0.6373x$688,073= $438,509	0.7389x$34,041= $25,153	1.1603x$2,042= $2,369

Table 7, Ford/Firestone

Total Indirect Costs of Deaths, Hospitalizations, and Injuries without Hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men				
Age=20	$1,403,714x56= $78,607,984	$66,467x307= $20,405,369	$1750x5375= $9,406,250	$108,419,603
Age=40	$1,271,793x60= $76,307,580	$64,796x327= $21,188,292	$2,731x5722= $15,626,782	$113,122,654
Age=60	$721,675x65= $46,908,875	$42,859x357= $15,300,663	$2826x6239= $17,631,414	$79,840,952
Sub-total				$301,383,209
Women				
Age=20	$852,935x28= $23,882,180	$39,008x151= $5,890,208	$1467x2647= $3,883,149	$33,655,537
Age=40	$772,775x30= $23,183,250	$38,027x161= $6,122,347	$2289x2818= $6,450,402	$35,755,999
Age=60	$438,509x32= $14,032,288	$25,153x176= $4,426,928	$2369x3074= $7,282,306	$25,741,522
Sub-total				$95,153,058
Total				$396,536,267

Table 8, Ford/Firestone

Total Medical plus Indirect Costs of Deaths, Hospitalizations, and Injuries without hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men				
Age=20	$330,960+ $78,607,984= $78,938,944	$10,512,601+ $20,405,369= $30,917,970	$3,896,875+ $9,406,250= $13,303,125	$123,160,039
Age=40	$358,800+ $76,307,580= $76,666,380	$10,066,695+ $21,188,292= $31,254,987	$3,822,296+ $15,500,898= $19,323,194	$127,244,561
Age=60	$569,075+ $46,908,875= $47,477,950	$11,648,196+ $15,300,663= $26,948,859	$4,099,023+ $17,631,414= $21,730,437	$96,157,246
Sub-total				$346,561,846
Women				
Age=20	$190,400+ $23,882,180= $24,072,580	$3,980,813+ $5,890,208= $9,871,021	$2,027,602+ $3,883,149= $5,910,751	$39,854,352
Age=40	$206,430+ $23,183,250= $23,389,680	$3,815,861+ $6,122,347= $9,938,208	$2,017,688+ $6,399,678= $8,417,366	$41,745,254
Age=60	$322,304+ $14,032,288= $14,354,592	$4,421,120+ $4,426,928= $8,848,048	$2,164,096+ $7,282,306= $9,446,402	$32,649,042
Sub-total				$114,248,648
Total				$460,810,494

Table N5: Ford/Firestone COI Across Age and Gender, Year 2000			
Age	**Medical**	**Lost Production**	**Total**
Men			
Age=20	$14,740,436	$108,419,603	$123,160,039
Age=40	$14,247,791	$112,996,770	$127,244,561
Age=60	$16,316,294	$79,840,952	$96,157,246
Sub-total, men	$45,304,521	$301,257,325	$346,561,846
Women			
Age=20	$6,198,815	$33,655,537	$39,854,352
Age=40	$6,039,979	$35,705,275	$41,745,254
Age=60	$6,907,520	$25,741,522	$32,649,042
Sub-total, women	$19,146,314	$95,102,334	$114,248,648
Total	$64,450,835	$396,359,659	$460,810,494

Note: Now multiply Table N5 numbers by inflation factor from 2000 to 2007;

207.34/172.2= 1.204065.

Table N6: Ford/Firestone COI Across Age and Gender, Year 2007			
Age	**Medical**	**Lost Production**	**Total**
Men			
20	$17,748,443	$130,544,249	$148,292,692
40	$17,155,266	$136,055,456	$153,210,722
60	$19,645,879	$96,133,696	$115,779,574
Sub-total, men	$54,549,588.08	$362,733,401	$417,282,989
Women			
20	$7,463,776	$40,523,454	$47,987,230
40	$7,272,527	$42,991,472	$50,263,999
60	$8,317,103	$30,994,466	$39,311,569
Sub-total, women	$23,053,407	$114,509,392	$137,562,798
Total			$554,845,787

IV Baycol

Table 1.. Assumptions for Baycol Cohor

Assumption	Explanation	Sources
3023 total fatal and nonfatal injuries from old estimate from July 2008. But new estimate from February 10, 2009 is 3067		US District Court, Minnesota, Dec 2005) for old estimate. But for new estimate is footnote 131 in text and ref 22 below
assumed 3.6% or 110 of these 3067 resulted in deaths	(Omar and Wilson—but not sure what their definition of disability is, yet they do have separate category for hospitalizations which implies our disability definitions coincide).	Omar and Wilson , Ann Pharmaco 2002) ????
additional 5.2 % or 159 resulted in long-term disability		Omar and Wilson , Ann Pharmaco 2002
The remainder 2798 (= 3067 – 110 – 159 = 2798) we assumed resulted in acute disease and hospitalization		Omar and Wilson , Ann Pharmaco 2002
Two age categories: 50-64 and 65+. 30% all cases in 50-64 age category. 70% in age 65 + category.		
52.35% male		Omar and Wilson
$17,762 and $22,733 hospital charges for age 50-64 and age 65+ for rhambo in 2003	Applied to hospitalizations.	H-CUP AHRQ
100/31.7 total cost-to-hospital		Health US, 2004
$7,900/$22,300 cost-to-charge ratio		H-CUP Fact sheet Fiures

(not sure what their (Omar and Wilson) definition of disability is, yet they do have separate category for hospitalizations which implies our disability definitions coincide). The remainder 2757 (= 3023 – 109 – 157 = 2757) we assumed resulted in acute disease and a single hospitalization. We assumed two age categories: 50-64(age=60) and 65+(age = 70). . We assumed 30% of cases in the 54-64 category and 70% of cases in the 65+ category. We assumed 52.35% male (Omar and Wilson) [19]

Second, we made assumptions about costs. Costs were matched to the fatal and nonfatal injuries as well as the age and gender categories identified above. Hospital medical costs were drawn from H-CUP, the Healthcare Utilization Project from the Agency for Healthcare Research and Quality. http://hcupnet.ahrq.gov/ [20]. We obtained data for rhabdomyolsis (ICD9 = 728.88). We sought data as close as possible to the time of the Baycol recall. Nationwide data on rhabdomyolsis were only available for 2003, however. We estimated all medical costs with the traditional total-to-hospital costs method whereby a multiplication factor is calculated based upon the ratio of the percent all medical costs for all diseases and injuries(100%) divided by only hospital costs for all diseases and injuries (in our case for 2003, 30.7%) (100%/30.7%) The ratio was 100/30.7 = 3.25733. We assumed a cost-to-charge ratio of 0.354 (=$7900/$22,300). (HCUP Facts and Figures, http://www.hcupus.ahrq.gov/reports/factsandfigures/HAR_2005.pdf). [21] We assumed average charges would apply to our "hospitalizations" category but that for our categories of death and disability, charges would be much larger. For deaths, we assumed twice the mean for both age brackets. For permanent disability, we assumed an eight-fold increase for ages 50-64 and a four-fold increase for age 65+. We

reasoned that younger ages would generate more lifetime medical costs. Whereas acute hospitalization and death would generally accrue over only one year and therefore be captured by the H-CUP statistic, permanent disability would not (H-Cupnet shows mean at $17,762 and median at $11,857). Permanent disability would lead to additional medical costs, perhaps every year until the person dies.

Lost production estimates included fringe benefits. We assumed lost production estimates were the same for fatal and permanent disability injuries. We used Finkelstein et al estimates for lost production for their "hospitalizations" category, also applied to our "hospitalization" category. We adjusted upward for inflation by 6.852 % from 2000 to 2003. The 1.06852 is 2003/2000 inflation from www.b/s.gov. Finkelstein numbers were for 2000 whereas medical rhabdomyolsis numbers were for 2003.

Table15. Per-person Medical Costs, 2003

	Men	Women (same as for men)
Fatal		
Age		
50-64 (= age 60)	$17,762x2x (100%/30.7%) x $7,900/$22,300(cost-to-charge ratio = 0.354) = $17,762x2.30619 = $40,963	$17,762x2x (100%/30.7%) x $7,900/$22,300(cost-to-charge ratio = 0.354) = $17,762x2.30619=$40,963
65+ (= age 70)	$22,733x2.30619=$52,427	$22,733x2.30619=$52,427
Permanent Disability		
Age		
50-64(quadruple fatal) (= age 60)	$40,963x4=$163,852	$40,963x4=$163,852
65+(double fatal) (= age 70)	$52,427x2=$104,854	$52,427x2=$104,854
Hospitalization		
Age		
50-64 (= age 60)	$17,762x(2.30619/2)= $20,481	$17,762x(2.30619/2)=$20,481
65+ (= age 70)	$22,733x (2.30619/2)=$26,213	$22,733x(2.30619/2)=$26,213

Other Assumptions

1. The ICD9 code 728.88 not available before 2003. After 2003 would not be relevant for recall was earlier
2. $17,762 is for ages 45-64 in H-CUP. We assumed applied to 50-64 or age 60
3. 30.7% is percent of all medical spending attributed to hospitals.
4. Assume fatal medical costs are twice mean. Using standard error is not correct. Need standard deviation. H-Cupnet shows mean at $17,762 and median at $11,857. Because mean so much higher and because we know costs have long right tail, is reasonable to assume fatal costs at least twice the average.
5. For permanently disabled, Assume age 50-64 (age 60) will live longer and require quadruple as much medical care as fatal, and assume age 65+ will require four times as much fatal care, not quadruple since age 65+ do not live as long as age 50-64.

Table 16 Per-Person Lost Production, 2003

	Men	Women
Fatal		
Age		
50-64 (=age 60)	$884,503x1.06852= $945,109	$560,764x1.06852 = $599,188
65+ (=age 70)	$202,366x1.06852 = $216,232	$179,897x1.06852 = $ 192,224
Permanent Disability(same as fatal)		
Age		
50-64(=age 60)	$945,109	$599,188
65+ (=age 70)	$216,232	$ 192,224
Hospitalization		
Age		
50-64 (=age 60)	$44,081x1.06852 = $47,101	$25,423x1.06852=$27,165
65+ (=age 70)	$13,420x1.06852 = $14,340	$11,308x1.06852=$12,083

6. The 1.06852 is 2003/2000 inflation from www.b/s.gov.
7. For lost productivity, we used the 45-64 Finkelstein age bracket to estimate 50-64 age bracket. We used the Finkelstein 65-74 bracket for our 65+ bracket. p.119, Finkelstein et al.

From February 11, 2009To calculate the number of injuries within gender, age, and outcome categories we used the following assumptions. Men were 52.35% in all categories; 30% of all cases in age 50-64 ; 70% of all cases in age 65+; 110 were deaths, 159 were permanent disability, and 2798 were hospitalizations. The corresponding percents for each category were male, age 50-64 = 52.35%x 30% = 15.705%; female age 50-64 = 47.65x30 = 14.296; male age 65+ = 52.35%x70% = 36.645%; female age 65+ = 47.65x70 = 33.355%

Male, age 50-64, deaths = .15705 x 110 = 17.2755
Male, age 65+ , deaths = .36645 x 110 = 40.3095
Female, age 50-64, deaths = .14296 x 110 = 15.7256
Female, age 65+, deaths = .33355 x 110 = 36.6905
Subtotal = 110.00011, close enough.

Male, age 50-64, disabilities = .15705 x 159 = 24.97095
Male, age 65+ , disabilities = .36645 x 159 = 58.26555
Female, age 50-64, disabilities = .14296 x 159 = 22.73064
Female, age 65+, disabilities = .33355 x 159 = 53.03445
Subtotal = 159.00159, close enough.

Male, age 50-64, hospitalizations = .15705 x 2798 = 439.4259
Male, age 65+ , hospitalizations = .36645 x 2798 = 1025.3271
Female, age 50-64, hospitalizations = .14296 x 2798 = 400.00208
Female, age 65+, hospitalizations = .33355 x 2798 = 933.2729
Subtotal = 2798.0279, close enough.

Really no need to re-do calculations for 2004. So tables 20-22 are irrelevant. Jump to Table 23 , which has been changed in Febru, 2009

CHANGES FROM FEBRU 10, 2009below to Tables 23,24,25. Notice the "numbers of cases" columns have several places to right of decimal. Did not do this in the July, 2008 version.

Table 23. Costs for B Cohort in 2007 Dollars

	Nbr#	Medical, per-person	Col2xcol3	Lost Production, per-person	Col2xcol5	Total, per-person	Col2xcol7
Fatal men							
Age							
50-64 (age=60)	17.2755	$46,042	$795,399	$1,062,303	$18,351,815	$1,108,345	$19,147,214
65+ (age=70)	40.3095	$58,928	$2,375,358	$243,045	$9,797,022	$301,973	$12,172,381
Fatal women							
Age							
50-64 (age=60)	15.7256	$46,042	$724,038	$673,487	$10,590,987	$719,530	$11,315,041
65+ (age=70)	36.6905	$58,928	$2,162,098	$216,060	$7,927,349	$274,988	$10,089,447
Disabled men							
Age							
50-64 (age=60)	24.97095	$184,170	$4,598,900	$1,062,303	$26,526,715	$1,246,472	$31,125,590
65+ (age=70)	58.26555	$117,856	$6,866,945	$243,045	$14,161,151	$360,901	$21,028,095
Disabled women							
Age							
50-64 (age=60)	22.73064	$184,170	$4,186,302	$673,487	$15,308,791	$857,657	$19,495,093
65+ (age=70)	53.03445	$117,856	$6,250,428	$216,060	$11,458,623	$333,916	$17,709,051
Hospital men							
Age							
50-64 (age=60)	439.4259	$23,021	$10,116,024	$52,942	$23,264,086	$75,962	$33,379,670
65+ (age=70)	1025.3271	$29,463	$30,209,212	$16,118	$16,526,222	$45,582	$46,736,460
Hospital women							
Age							
50-64 (age=60)	400.00208	$23,021	$9,208,448	$30,533	$12,213,264	$53,554	$21,421,711

65+ (age=70)		$29,463		$13,581		$43,045	
	933.2729		$27,497,019		$12,674,779		$40,172,732
Total							
	3067		**$104,990,171**		**$178,800,805**		**$283,792,485**

Table 24. "2007 Dollars"

	Medical, per-person	Lost Production, per-person	Total, per-person
Fatal men			
Age			
50-64 (age=60)	$46,042	$1,062,303	$1,108,345
65+ (age=70)	$58,928	$243,045	$301,973
Fatal women			
Age			
50-64 (age=60)	$46,042	$673,487	$719,530
65+ (age=70)	$58,928	$216,060	$274,988
Disabled men			
Age			
50-64 (age=60)	$184,170	$1,062,303	$1,246,472
65+ (age=70)	$117,856	$243,045	$360,901
Disabled women			
Age			
50-64 (age=60)	$184,170	$673,487	$857,657
65+ (age=70)	$117,856	$216,060	$333,916
Hospital men			
Age			
50-64 (age=60)	$23,021	$52,942	$75,962
65+ (age=70)	$29,463	$16,118	$45,582
Hospital women			
Age			
50-64 (age=60)	$23,021	$30,533	$53,554
65+ (age=70)	$29,463	$13,581	$43,045

Table 25. “2007 Dollars”

	Col2xcol3	Col2xcol5	Col2xcol7
Fatal men			
Age			
50-64 (age=60)	$795,399	$18,351,815	$19,147,214
65+ (age=70)	$2,375,358	$9,797,022	$12,172,381
Fatal women			
Age			
50-64 (age=60)	$724,038	$10,590,987	$11,315,041
65+ (age=70)	$2,162,098	$7,927,349	$10,089,447
Disabled men			
Age			
50-64 (age=60)	$4,598,900	$26,526,715	$31,125,590
65+ (age=70)	$6,866,945	$14,161,151	$21,028,095
Disabled women			
Age			
50-64 (age=60)	$4,186,302	$15,308,791	$19,495,093
65+ (age=70)	$6,250,428	$11,458,623	$17,709,051
Hospital men			
Age			
50-64 (age=60)	$10,116,024	$23,264,086	$33,379,670

65+ (age=70)	$30,209,212	$16,526,222	$46,736,460
Hospital women			
Age			
50-64 (age=60)	$9,208,448	$12,213,264	$21,421,711
65+ (age=70)	$27,497,019	$12,674,779	$40,172,732
Total	**$104,990,171**	**$178,800,805**	**$283,792,485**

Important Comment on Ford/Firestone and Baycol that does NOT apply to ATVs. : these ford/firestone figures ignore any sales of tires or baycol that would have occurred without legal action. For the tires this is especially significant since sales were growing rapidly before the recall.

V ATVs

Background Calculations for Traditional Direct and Indirect Costs for ATV Injuries.

Result : $ 3.2 billion (2000 dollars) combining years from 1990 through 2002 .

Versus: $113 million (1990 dollars ??) paid by industry "through 1990" according to footnote # 204 in Shapiro, Ruttenberg, and Leigh

1.Goal: estimate lives saved and costs avoided as a result of substitution of 4-wheel for 3-wheel ATVs from 1990 through 2002. In other words, estimate what would have happened if 3-wheel ATVs had never been taken off market.

2. Ingle(2005. page 3) (and everybody else) says 3-wheelers virtually end production in mid,late-1980s due to law suits and the April, 1988 agreement between US Consumer Product Safety Commission(CPSC) and major ATV manufactures. But consumers continue to use old 3-wheelers. Over time, by roughly 1999, likely that 90% or more deaths due to 4-wheelers. According to Ingle, 91% of deaths due to 4-wheelers in 1999. (IN 2000, 91%; in 2001, 92%; in 2002, 93%)

3. According to Ingle, percent of deaths due to 4-wheelers (and years) are 19%(1985), 27%(1986), 45%(1987), 53%(1988), 59%(1989), 60%(1990) and then gradual increases to 91%(1999) and 93%(2002). So big annual increases from 1985 to 1989, but gradual thereafter.

4. We assume years 1985 through 1989 as base-line for measuring percent of deaths due to 3 and 4-wheelers . No good CPSC data before 1985. We assume 1985-1989 captures deaths occurring among 3-wheelers that would have prevailed into 1990 and beyond if there had been no law suits and no CPSC intervention. The percent of all deaths due to 4-wheelers from 1985 through 1989 was 39.6% (calculation : (55+95+126+152+153)divided by (258+286+282+347+295) where the first set of numbers are deaths due to 4-wheelers 1985-1989 and second set are all deaths, In Ingle, her Table 4) . This means that 60.4% (=100% - 39.6%) of all deaths due to 3-wheelers.

5. Moore and Magat(1997) interpret Rubinfeld and Rodgers(1992) data this way: " 3-wheel ATVs are likely to experience between 57 and 86% more injuries than 4-wheel ATVs." The average between these percentages is 67%. This means that if we only had data on 4-wheelers and if we want to estimate numbers of injuries among 3-wheelers, we could take the 4-wheeler

injuries and multiply by 1.67. But to estimate *excess* deaths due to 3-wheelers, we must subtract the number of deaths due to 4-wheelers that we are "transforming" into 3-wheelers for our thought experiment. This means that *excess* deaths will require multiplying by 0.67, not 1.67. Fortunately, Ingle provides numbers of deaths due to 4-wheelers from 1985 through 2002. We assume that the main effects of the law suits and CPSC Agreement do not begin until 1990.

6. The 60.4% in # 4 above can be combined with the 0.67 in # 5 above to estimate the numbers of deaths and other injuries *that would have occurred* from 1990 on based upon the actual numbers of 4-wheeler deaths that did occur .For example, 1990 4-wheeler deaths were estimated to be 151 by Ingle (his Table 4). We assume 60.4% of these would have been come from riding 3-wheelers. But 3-wheelers would have injured 0.67 *more* than 4-wheelers. Hence, 151x.604x0.67=61. And these 61 deaths would be in addition to the 151. Using the Ingle data for 1990 to 2002 for 4-wheelers, we calculate 1543 *excess* deaths

7. We assume 80% of all injuries among men and 20% among women (Helmkamp et al 2008). Helmkamp et al estimate roughly 30% of all injuries among persons age <=17 and 70%> age 17. We assume our cohort consists of only two ages: exactly 17 years old and exactly 35 years old. We assume the 17 year olds account for 30% and the 35 year olds account for 70% of all injuries and deaths. These assumptions are summarized in **Table 1**.

Table 1

Percentages of Men, Women, age= 17, and age = 35

	Men, 80%	**Women, 20%**
Age=17, 30%	24%	6%
Age=35, 70%	56%	14%

8. We assume that the percent of hospitalized-to-deaths ratio as well as the non-hospitalized-to-deaths ratio from Finkelstein et al (2006, Appendix 1.3, page 46) for motorcyclist applies. (Finkelstein et al do not have data on exclusively ATVs. We reasoned that motorcyclist was closer to ATV than "motor vehicle occupant" was close to ATV) The hospitalized-to-death ratio was 22,957/2,862 = 8.0213 and the non-hospitalized-to-death ratio was 230,983/2862 = 80.602. Our estimate of hospitalizations is therefore 8.0213x1543(deaths) = 12,377 and for non-hospitalizations is 80.602x1543(deaths) = 124,369

9. Table 2 combines the percentages in Table 1 with the deaths (1543) in # 6 above and the ratios in # 8 above.

Table 2	

Numbers of Deaths, Hospitalizations, and Injuries without hospitalization			
	Deaths, 1543	Hospitalizations, 12,377	Injuries without hospitalizations, 124,369
Men	.8x1543=1234	.8x12,377=24,674	.8x124,369=99,495
Age=17	.24x1543=370	.24x12,377=2970	.24x124,369=29,849
Age=35	.56x1543=864	.56x12,377=6931	.56x124,369=69,646
Women	.2x1543=309	.2x12,377=2475	.2x124,369=24,874
Age=17	.06x1543=93	.06x12,377=742	.06x124,369=7462
Age=35	.14x1543=216	.14x12,377=1733	.14x124,369=17,412
Total	1543	12,377	124,369

10. We used numbers from Appendix 2.1 and 2.2 , pages 91 and 92 in Finkelstein to estimate per-injury cost. We used the 15-24 age bracket for 17 year olds and the 25 to 44 bracket for 35 year olds. Whereas Finkelstein has data for fatal and hospitalized, they do not for just "non-hospitalized" alone. We used, instead, their category for "outpatient" which appeared to be near the middle of the difference between their "ED treated" and "Doctor's office" categories.

****JPL wants to save this ***** paragraph, may be relevant later. The ratio of the 15-24 category to all ages, all injuries, not just those for motorcyclists was 4555/7463 = 0.61034 for fatal; it was 20165/18042 = 1.11767 for hospitalization ; and it was 967/891 = 1.085297 for

"outpatient" which will we use to estimate "non-hospitalization." The ratio of the 25-44 category to all ages, all injuries, not just those for motorcyclists was 4609/7463 = 0.61758 for fatal; it was 18130/18042 = 1.0048775 for hospitalization ; and it was 891/891 = 1.0000 for "outpatient" which will we use to estimate "non-hospitalizationThese calculations NOT included in overall estimates ……the 35 year old risk and vice-versa. We therefore generate the age 17 factor with the ratio of 0.61034/0.61758 = 0.98828 for fatalities. Similarly, we generate the 35-year-old factor to be 0.61758/0.61034 = 1.01186 for fatalities.The factors for hospitalized would be 1.11767/1.0048775=1.112245 for the 17-year-old and 0.89908 for the 35-year old. The factors for non-hospitalized (outpatient) would be 1.085297/1.000=1.085297 for the 17-year-old and 0.921407 for the 35-year old******

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11.The age-adjustment factor should reflect the 17 year old risk versus all persons, which, in our case, would be both 17 and 35-year olds.

11a.Age adjustment for fatalities: The per-injury cost for 15-24 year olds in Finkelstien et al is $4555 and for 25-44 year olds is $4609. The average of these two is ((4555+4609)/2=4582. The age adjustment for 17 year olds fatal injuries in our cohort is 4555/4582=0.9941. The age adjustment for 35 year old fatal injuries in our cohort is 4609/4582=1.0059.

11b.Age adjustment for hospitalizations: The per-injury cost for 15-24 year olds in Finkelstien et al is $20165 and for 25-44 year olds is $18130. The average of these two is ((20165+18130)/2=19147.5 . The age adjustment for 17 year olds hospitalized injuries in our

cohort is 20165/19147.5=1.05314. The age adjustment for 35 year old hospitalized injuries in our cohort is 18130/19147.5=0.94686.

11c.Age adjustment for non-hospitalizations("outpatient"): The per-injury cost for 15-24 year olds in Finkelstien et al is $967 and for 25-44 year olds is $891. The average of these two is ((967+891)/2=929 . The age adjustment for 17 year olds non-hospitalized injuries in our cohort is 967/929=1.0409. The age adjustment for 35 year old non-hospitalized injuries in our cohort is 891/929=0.9591.

12.The per-injury medical cost for all ages for males for motorcyclist was $8934 for fatal, $36,151 for hospitalized and $1063 for outpatient. The per-injury medical cost for all ages for females for motorcyclist was $10,891 for fatal, $33,505 for hospitalized and $908 for outpatient. These figures are collected together into Table 3 to estimate per-injury costs within age and gender categories.

Table 3

Per-unit Medical Costs of Deaths, Hospitalizations, and Injuries without hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men	.	.	.	
Age=17	. 0.9941x$8934=$8881	1.05314x$36,151=$38072	1.0409 x. $1063= $1106	
Age=35	1.0059.x$8934=$8987	0.94686x$36,151=$34,230.	0.9591x$1063=$1020	
Women	.	.	.	
Age=17	0.9941x$10,891=$10,827.	1.05314x$33,505=$35,285	. 1.0409x$908=$945	
Age=35	1.0059x$10,891=$10,955..	0.94686x$33,505=$31,725.	0.9591x$908=$871	
Total				

Table 4

Total Medical Costs of Deaths, Hospitalizations, and Injuries without hospitalization

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men	.	.	.	
Age=17	$8881 x 370 = $3,285,970	$38072 x 2970 = $113,073,840	$1106 x 29,849 = $33,012,994	$149,372,804
Age=35	$8987 x 964 = $8,663,468	$34,230 x 6931= $237,248,130.	1020 x 69,646 = $71,038,920	$316,950,518
Women	.	.	.	
Age=17	$10,827 x 93 = $1,006,911.	$35,285x742 = $26,181,470	$945x7462 = $7,051,590	$34,239,971
Age=35	$10,955x216 = $2,366,280.	$31,725x1733 = $54,979,425.	$871x17,412 = $15,165,852	$72,511,557
Total				$573,074,830

13. We used numbers from Appendix 3.1 and 3.3 , pages 191 and 121 in Finkelstein to estimate per-injury indirect cost. We used the 15-24 age bracket for 17 year olds and the 25 to 44 bracket for 35 year olds. We follow Finkelstein et al categories for fatal ,hospitalized and non-hospitalized. We use data for "productivity losses" rather than just "wages and fringe benefits" reasoning that lost home production should be counted in lost indirect cost from society's perspective. This inclusion, in fact, is standard in the literature (see Finkelstein et al)

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14.The age-adjustment factor should reflect the 17 year old risk versus all persons, which, in our case, would be both 17 and 35-year olds.

14a.Age adjustment for fatalities: The per-injury indirect cost for 15-24 year olds in Finkelstien et al is $1,550,398 and for 25-44 year olds is $1,404,748. The average of these two is ((1,550,398+1,404,748)/2=$1,477,573. The age adjustment for 17 year olds fatal injuries in our cohort is 1,550,398/1,477,573=1.049867. The age adjustment for 35 year old fatal injuries in our cohort is 1,404,748/1,477,573=0.95071.

14b.Age adjustment for hospitalizations: The per-injury indirect cost for 15-24 year olds in Finkelstien et al is $55,151 and for 25-44 year olds is $53,677. The average of these two is ((55,151+53,677)/2=$54,414. The age adjustment for 17 year olds hospitalized injuries in our cohort is 55,151/54,414=1.01354. The age adjustment for 35 year old hospitalized injuries in our cohort is 53,766/54,414=0.9864557.

14c.Age adjustment for non-hospitalizations: The per-injury indirect cost for 15-24 year olds in Finkelstein et al is $2,116 and for 25-44 year olds is $3,301. The average of these two is ((2116+3301)/2=$2708.5 The age adjustment for 17 year olds non-hospitalized injuries in our cohort is 2116/2708.5=0.78124. The age adjustment for 35 year old non-hospitalizedl injuries in our cohort is 3301/2708.5=1.21876.

15.The per-injury indirect cost for all ages for males for “motor vehicle/other road user” (closest Finkelstein category) was $1,132,395 for fatal, $58,004 for hospitalized and $2,436 for non-hospitalized. The per-injury indirect cost for all ages for females for “motor vehicle/other road user” was $688,073 for fatal, $34,041 for hospitalized and $2042 for non-hospitalized. These figures are collected together into Table 5 to estimate per-injury indirect costs within age and gender categories.

Table 5

Per-unit Indirect Costs of Deaths, Hospitalizations, and Injuries without hospitalization, 2000

	Deaths	Hospitalizations	Injuries without hospitalizations	
Men	.	.	.	
Age=17	1.049867x$1,132,395 = $1,188,864.14	1.01354x$58,004 = $58,789.37	0.78124x$2,436 = $1,903.10	
Age=35	0.95071x$1,132,395 = $1,076,579.25	0.9864557x$58,004 = $57,218.38	1.21876x$2,436 = $2,968.90	
Women	.	.	.	
Age=17	1.049867x$688,073 = $722,385.14	1.01354x$34,041 = $34,501.92	0.78124x$2042 = $1,595.29	
Age=35	0.950711,188,864.14x$688,073 = $654,157.88	0.9864557x$34,041 = $33,579.94	1.21876x$2042 = $2,488.71	

Table 6

Total Indirect Costs of Deaths, Hospitalizations, and Injuries without hospitalization, 2000

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men	.	.	.	

Age=17	$1,188,864.14x370 = $439,879,731.80	$58,789.37x2970 =$174,604,428.90	$1,903.10x29849 = $56,805,631.90	$671,289,792.60
Age=35	$1,076,579.25x964 =$1,037,822,397.00	$57,218.38x6931 =$396,580,591.78	$2,968.90x69646 =$206,772,009.40	$1,641,174,998.18
Women	.	.	.	
Age=17	$722,385.14 x 93 = $67,181,818.02	$34,501.92 x 742 = $25,600,424.64	$1,595.29 x 7462 =$11,904,053.98	$104,686,296.64
Age=35	$654,157.88x216 = $141,298,102.08	$33,579.94 x1733 = $58,194,036.02	$2,488.71x17412 = $43,333,418.52	$242,825,556.62
Total	$1,686,182,048.90	$654,979,481.34	$318,815,113.80	$2,659,976,644.04

Table 7

Total Medical plus Indirect Costs of Deaths, Hospitalizations, and Injuries without hospitalization, 2000

	Deaths	Hospitalizations	Injuries without hospitalizations	Total
Men	.	.	.	
Age=17	3,285,970 + 439,879,731.80= $443,165,701.80	113,073,840 + 174,604,428.90 = $287,678,268.90	33,012,994 + 56,805,631.90 = $89,818,625.90	$820,662,596.60
Age=35	8,663,468.00 + 1,037,822,397 = $1,046,485,865.00	237,248,130.00 + 396,580,591.78 = $633,828,721.78	71,038,920 + 206,772,009.40 = $277,810,929.40	$1,958,125,516.18
Women	.	.	.	
Age=17	1,006,911.00 + 67,181,818.02 = $68,188,729.02	26,181,470 + 25,600,424.64 = $51,781,894.64	7,051,590 + 11,904,053.98 = $18,955,643.98	$138,926,267.64
Age=35	2,366,280.00 + 141,298,102.08 = $143,664,382.08	54,979,425.00 + 58,194,036.02 = $113,173,461.02	15,165,852 + 43,333,418.52 = $58,499,270.52	$315,337,113.62
Total	$1,701,504,677.90	$1,086,462,346.34	$445,084,469.80	**$3,233,051,494.04**

Table 15: ATV Total COI Costs, 2007

	Deaths	Injuries with Hospitalizations	Injuries without hospitalizations	Total
Men				
Age 17	$533,571,500	$346,344,620	$108,141,620	$988,057,740
Age 35	$1,259,968,900	$763,129,770	$334,448,434	$2,357,547,000

Women				
Age 17	$82,099,229	$62,345,400	$22,822,595	$167,267,210
Age 35	$172,971,910	$136,260,840	$70,433,121	$379,665,870
TOTAL	**$2,048,611,500**	**$1,308,080,500**	**$535,845,760**	**$3,892,537,700**

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18. United States District Court, District of Minnesota, "Bayer and GSK's Baycol litigation update, December 16, 2005" Re : Baycol Products Litigation, MDL No 1431 (MJD) . Section II Settlement A. Defendents have settled 3,023 cases with a total value of $1,143,748,591. Of this total, 915 cases have been determined to be subject to the MDL assessment, with a total value of $345,359,662. B. As of the last status conference, Defendants had settled 2,968 cases with a total value of $1,130,668,591. Section IV…..*"the claims of 2,959 plaintiffs remain active…."* *JPL note: Another* statement about Plaintiffs Active (n = 1748) " on page 4. JPL not sure if 3,023 is final number, but likely is close. This in JPL e-mail under marialazo 7/16/07.

. 19.MA Omar and JP Wilson. FDA Adverse event reports..The Annals of Pharmacotherapy. 2002 Febru, vol 36 n = 231 or 192, mean age 67.6, death n = 7; disability n = 10; hospitalization n = 140; life-threatening n = 20; other n = 30; required intervention n = 14 so

total here is 221. But "each case may have more than 1 outcome". We assume death and disability are unique and 192 is correct sample size so that (evidence for this is Omar says 3.6 % are deaths and 7/.036 = 194 which is very close to 192.) deaths are 3.6% and disabilies are 10/192 = 5.2 %. Then "all other" would be 100% - 5.2% - 3.6% = 91.2 %.

20.Healthcare Utilization Project from the Agency for Healthcare Research and Quality. http://hcupnet.ahrq.gov/

21. (HCUP Facts and Figures, http://www.hcup-us.ahrq.gov/reports/factsandfigures/HAR_2005.pdf

22. Baycol Product Liability Litigation, Current Developments, United States, District Court, District of Minnesota, available at http://www.mnd.uscourts.gov/MDL-Baycol/#current

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1. Ingle RL. 2003 Annual report of ATV deaths and injuries. Directorate of Epidemiology, Division of Hazard Analysis, US Consumer Product Safety Commission, Washington DC 20207. January, 2005.

2. Helmkamp JL, Furbee PM, Coben JH, Tadros A. All-terrain vehicle-related hospitalizations in the U.S. , 2000-2004. *American Journal of Preventive Medicine*. 2008. 34(1) : 39-45

Finkelstein EA, Corson PS, Miller TR, et al. The Incidence and Economic Burden of Injuries in the United States. Oxford University Press. New York, NY, 2006.

Rubinfeld DL, Rodgers GB. Evaluating the injury risk associated with all-terrain vehicles: An application of Bayes' rule. *Jo of Risk and Uncertainty.* 1992. vol. 5 , pages 145-158.

Moore MJ , Magat WA. The injury risk consequences of the all-terrain vehicle consent decrees. *International Review of Law and Economics.* Vol 17, (3): pages 379-393.

Additional Material for FORD FIRESTONE

1. Assume 271 deaths from 1993 through 1999 (1-6).
2. Assume 1029 non-fatal cases. Reasons?
    a. McDonald in Shapiro narrative says Ford settled approximately 1500 cases and Firestone more than 1300 cases. We assume Firestone number is correct. So 1300 – 271 = 1029.
    b. St. Petersburg Times stories and investigations reported in virtually all cases victims sued Ford and Firestone together. (May 20, 2001, "Deadly Combination: Ford, Firestone, and Florida")
    c. Many sources cite "over 800" non-fatal injuries. (Krueger AB, Mas A. Strikes, scabs, and tread separations; Labor strife and the production of defective Bridgestone/Firestone tires. Jo. Political Economy. 2004. 112(2):253-270). Krueger and Mas cite NHTSA.
    d. Vernick (1)
    e. It could be that the 1300, 1500 numbers are exaggerations and/or include cases from overseas. The 271 might be low also. NHTSA says only "over 800" non-fatal injuries.
3. Assume 60% of non-fatal cases (1026) major permanent disability such as paraplegia. (Leigh et al. Costs of Occupational, 2000, estimate "permanent total" disability to be 1.9 times as large as numbers of deaths and "permanent partial" to be 116.3 times as many as deaths.) From Shapiro, SUV Rollovers data (7/16/07

email) find 12/33 or 36% deaths so roughly 211 for serious non-fatal to fatal, 60% x 1029 = 617, notice is 617/271 = 2.2 times as large as number deaths.

4. Assume 40% of 1026 were very serious, but not permanent disability

Pain and Suffering

1. Assume $500,000 for each death? No.
2. Assume equals 58/42 or 1.381 times medical costs plus lost wages. MA Cohen and TR Miller, IRLF 2003. Or with median, is 52/48 or 1.083.
3. 22/20 from Ruth from Council of Econ Advisors.
4. Median award $961,000 or $2,242,000 "Civil Trial Cases & Verdicts in Large Counties, 2001"
5. Posner & Sunstern Vol (not pain & suffering) mean = $3.1 million; median = $1.1 million CJS, mean $3.76 million, median $961,000 for 2001. VOL ≠ pain & suffering.
6. 50% NWULR v 87
7. Looks like will be different for deaths vs all others.
8. From Jury Verdict Research. May 1996 – May 2005.

   Minor females. median award = $1m; mean = $6,415,907 VERDICT did not see reliable trend for ages 1-17 VERDICT SETTLEMENTS < VERDICT. median settlement = $300,000; mean settlement = $1,216,101. Did not find any med costs for minor females.

   Adult females. Verdict median = $1m, verdict mean = $2,733,353 appears to fall after age 60, say 10%. No trend age 18-60. Settlement median = $300,000; mean = $1,216,101. Again no trend 18-60, but definite trend after 60. Cut by 50%!. 1 example med/total = $39,614/$295,000; $242/960; wage/total = 400/960.

   Minor males. Verdict median = $1m; mean = $5,201,144. No clear age trend 1-17. Settlement, median = $300,000, mean = $913,683. SETTLEMENTS < VERDICTS. No clear trend age 1-17.

Adule males. Verdict median = $1,033,000; verdict mean = $2,849,793 trend down after age 60. Maybe 30-40% settlement median = $320,449, mean = $842,774. SETTLEMENTS < VERDICTS.

	Settlements mean	Verdicts mean
	882,774	6,415,907
	913,683	2,733,353
	1,216,101 (JUR pblm)	5,201,144
	1,216,101 (JUR pblm)	2,849,793
avg =	1,057,165	$4,300,049

factor is 4.0675!

	Settlements median	Verdicts median
	320,449	1,033,000
	300,000	1,000,000
	300,000	1,000,000
	300,000	1,000,000
avg =	305,112	1,008,250

factor = 3.3045!

"Jury Verdict Research maintains a nationwide database of plaintiff and defense verdicts and settlements resulting from personal injury claims."

"Although Jury Verdict Research does not receive 100 percent of the personal injury jury verdicts rendered nationwide, Jury Verdict Research does believe that it receives a sufficient sample of data to produce descriptive statistics for specific areas of personal injury litigation."

"JVR cautions the reader concerning the interpretation of the mean." Severe skewness, they have probability range. Is middle …….. of awards arrange in ascending order.

For adult women, medians, 18-24 = 941,104; 25-29 = 1,880,000; 30-39 = 1,636,575; 40-49 = 1,005,600; 50-59 = 750,000; 60-69 = 775,000; 70-79 = 600,000; 80+ = 300,000.

Avg 18-60 = $1,242,656

Avg 60+ = $558,333

ratio = 0.4493 so, < ½ if go over age 60 for women.

For adult men verdict, Age 18-24 = 1,002,590; 25-29 = 1,137,500; 30-34 = 1,211,995; 35-39 = 1,507,623; 40-44 = 1,445,000; 45-49 = 1,352,510; 50-54 = 1,623,500; 55-59 = 1,300,000; 60-69 = 1,000,000; 70-79 = 810,000; 80+ = 425,000 ÷ 8 = $1,322,590 for 18-59. 60+ = $745,000, ratio = 56.3% for age 60+.

From Product Liability Claims, different JVR book
only Verdict data:

autos

median	$4,000,000
50% range	$1,200,000 - $9,500,000
actual range	$13,090 - $285,000,000
mean	$10,001,388
awards > $1m	71%

rollover tendency

median	$5,336,205
50% range	$2,575,000 - $21,435,453
range	$58,656 - $169,606,004
awards>$1m	90%

tires

median	$3,000,000
50% range	$348,500 - $10,802,619
range	$55,400 - $29,000,000
mean	$6,769,634

thus Product Liability Claims say page “V”: “Both plaintiff and defense verdicts rendered nationwide from April 1995 through April 2005 were included in this study.”

Additional Material for BAYCOL

1. 3,023 cases with total awards of $1,143,748,591 ($378,349 per case) December 16, 2005 sources. ***But Cornell editors found more recent number of 3,067 in February, 2009***…**a**. United States District Court, District of Minnesota, "Bayer and GSK's Baycol litigation update, December 16, 2005" Re : Baycol Products Litigation, MDL No 1431 (MJD) . Section II Settlement A. Defendents have settled 3,023 cases with a total value of $1,143,748,591. Of this total, 915 cases have been determined to be subject to the MDL assessment, with a total value of $345,359,662. B. As of the last status conference, Defendants had settled 2,968 cases with a total value of $1,130,668,591. Section IV…."*the claims of 2,959 plaintiffs remain active…." JPL note: Another* statement about Plaintiffs Active (n = 1748) " on page 4. JPL not sure if 3,023 is final number, but likely is close. This in JPL e-mail under marialazo 7/16/07.

b. Alison Frankel, "It's Over." *The American Trail Lawyer*. 12-01- 2006. (I could not find issue number , vol number, pages, but this might be only web-publication) Anyway,…."With the litigation now winding down, Beck says, Bayer has settled 3,050 Baycol cases for $1.15 billion.." or $377,049 per case.
www.americanlawyer.com

cMost (all ?) must have rhabdomyolysis which has mortality rate of 5% (need better citation than this.) Rhabdomyolysis, updated Nov 30, 2006, e-medicine from WebMD, www.emedicine.com/emerg/topic508.htm

2. 58 yr old woman, Vivian Collins, acute renal failure, rhabdomyolyosis, intensive care unit at hospital, 26 days in icu then transferred to general hospital ward, remained hospitalized "several weeks" , discharged after 2 months of hospitalization, wheelchair, NO lost wages, settled for $830,000. In
www.panterlaw.com/CM/WerdictsandSettlements305.asp

3. other related estimates in my file…**a**. Mr Beck, Mr Zimmerman April 15,2003, approximately 8,200 cases pending same Minnesota District Court. **b** Staffa NEJM and Graham JAMA (10/12,695) x 9,815,000 prescriptions = 7,731 hospitalized from

baycol/rhamdo, probably too high , also in my file **c** Carey and Danis L.L.C. Attorneys at Law…represented dozens of individuals.." settled and litigated "hundreds of individual cases resulting in multiple six-figure settlements…ranged from $100,000 to over $1 million. "…also fda report of 32 deaths and average "in excess of $250,000" for all cases with at least one day of hospital. www.careydanis.com/case in my file **d.** Staffa NEJM letter 31 deaths and some small deaths from other statins, too, so there is opportunity cost…compared to other statins ? . **e.** $69.9 million for 122 plaintiffs or $572,951 per case and $68.5 for 168 plaintiffs, or $407,738, baycol.legalview in my file **f.** official fda report…31 deaths as of 8/8/01. rhabdom accounts for estimated 8-15% cases acute renal failure…overall mortality rate about 5%(see my file). **G.** Attorney D Michael Noonan mnoonan@shaheengordon.com 1-800-451-1002 handles Baycol for shaheengordon **h.** 3 cases in Verdictsearch Products Liability, Minn, Pharmaceutical, Baycol caused renal failure and deaths, Collins settled for $830,000(still alive); Hernandez for $375,000(still alive); Rodriguez for $899,000(dead). **i.** another case report..(actually, looks like Hernadez, above) Hernandez vs Bayer US District Court of Minn case no MDL No 1431 28 days in hospital, NO lost wages, settle $375,000. **j.** New York Times, March 19, 2003," Bayer cleared of liability in lawsuit over a drug"… 82-year-old retired oil company executive, this lawsuit was first to go to trial of more than 8,400 cases*"Bayer stock price soared 37 %..."* **k.** from Shapiro's student 7/18/07..Garcia $2 million 2006, 68 yers old, now needs dialysis, Rosenmeier v gubitz 2004, $240,000, 79 yr old 23 days in hospital, then Collins, Hernandez and Rodeiguez again, then $300,000 thrice from shaheengordon and $2.1 million from panterlaw the $407,738 average for 168 people from anapolschwartz, and then $572,951 for 122 people from lopezhodes

4. "1.138 billion $ to settle 3,017 cases worldwide, averaging about $375,000, compensation for physical and mental pain, medical expense, lost earnings…*"when baycol removed from market, it accounted for 3.5% of market share of statins in US. ..one of fastest growing segments od drug industry.. $14 billion 2000 to $20 billion in 2005. Trend reports say sales will continue to climb…so JPL says, must factor in growth that would have occurred !* http://baycol.legalview.com/153929 in my file

5. Bonus…Baycol problem helped lead to new law…see my file

6. Anapol Schwartz (my file) $68.5 million settlement for 168 people = $407,738

7. Punitive damages likely small or zero. **a.** TH Cohen, SK Smith, BJS statisticians, Civil trail cases and verdicts in large countires, 2001, Bureau of Justics Statistics Bulletin, NCJ 202803, April 2004. only 1 case with punitive damages ($177,000 punitive) for non-asbestos product liability, out of total of 126 cases "disposed of" in 2001 in 75 largest counties. Also in same Bulletin, 51 plaintiff winners, sum of all awards $112,878,000 or mean of $2,213,294 and median of $311,000 with 31% awards over $1 million. **b.** Eisenberg T. et al, **The predictability of punitive damages**
JOURNAL OF LEGAL STUDIES 26 (2): 623-661 Part 2, JUN 1997, 69 citations !
"With respect to award frequency, juries rarely award punitive damages and appear to be especially reluctant to do so in the areas of law that have captured the most attention,

products liability and medical malpractice. Punitive damages are most frequently awarded in business/contract cases and intentional tort cases."

8. MA Omar and JP Wilson. FDA Adverse event reports..The Annals of Pharmacotherapy. 2002 Febru, vol 36 n = 231 or 192, mean age 67.6, death n = 7; disability n = 10; hospitalization n = 140; life-threatening n = 20; other n = 30; required intervention n = 14 so total here is 221. But "each case may have more than 1 outcome". We assume death and disability are unique and 192 is correct sample size so that (evidence for this is Omar says 3.6 % are deaths and 7/.036 = 194 which is very close to 192.) deaths are 3.6% and disabilies are 10/192 = 5.2 %. Then "all other" would be 100% - 5.2% - 3.6% = 91.2 %.

9. data on jury awards from MA Cohen and TR Miller Internal Rev Law and Econ 2003, vol 23: pages: 165-181 for sample of 728 consumer product injuries, all mean $$, not specifically baycol or any other product we have

Jury award for compensatory damages only	$641,390
past wages	$30,173 (4.7%)
future wages	$78,944 ((12.3%)
past medical	$53,674 (8.4%)
future medical	$106,711 (16.6%)
pain and suffering	$371,888 ((58.0%)

Assumptions and Calculations

Assume: A1. 3,023 cases, total award $1,143,748,591 (# 1 above). A2. assume 3.6% or cases ended in death or 109 deaths and 5.2 % in disabilities or 157 and remainder are 3023 – 109 – 157 = 2757. (see # 8 above) A3. $1 million for deaths and $2 million for disabilities (see Roderiguez # 3 above who died and $899,000) ; $2 million for Garcia in # 3 above for renal failure and dialysis. Sum of products is 109x$1million = $109 million and 157x$2 million = $314 million and sum = $423 million and subtract from $1,143,748,591 yields = $720,748,591 and divide by 2757 yields $ 261,425 for non-fatal, non-dialysis. A4. assume 5 % of total due to past and future wages = $57,187,450 leaving $1,086,561,600 for past and future medical and pain and suffering. Must allocate 95 %. Assume 40% medical and 55% pain and suffering. A5. Assume zero punitive compensation.

Results

Fatalities: 109 people, average age = 68 , award total = $109 million of which $59.95 million pain and suffering; $43.6 million medial and $5.45 lost wages.. the per-person medical is $400,000

Dialysis disability: 157 people, average age = 68 , award total = $314 million of which $172.7 million pain and suffering; $125.6 million medical; $15.7 million lost wages… the per-person medical is $800,000

Nonfatal, non-dialysis: 2757 people, average age = 68 , award total = $720,748,591 of which $396,411,720 pain and suffering; $288,299,430 medical; $36,037,429 lost wages. .. the per-person medical is $104,570.