



# PER CAPITA CLAIMS RATES FOR DECOMPRESSION SICKNESS (DCS) AMONG INSURED DIVERS ALERT NETWORK (DAN) MEMBERS

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## BACKGROUND

DCS incidence is difficult to estimate because the number of divers at risk is usually unknown. We estimated per capita DCS incidence rates based upon insurance claims in a known population of DAN members who purchased diving insurance from 2000-07.

## METHODS

De-identified membership data included age, sex, calendar year, first insured year, and DCS claim year. We investigated how these variables influenced per capita DCS claims rates (DCR) and diving insurance dropout rate. Selection criterion for claims was ICD-9 code 993.3 (“caisson disease, bends, DCS, compressed-air disease, divers’ palsy or paralysis”).

## RESULTS

2,672 claims were filed in 1,304,358 insured member-years (DCR=20.5 per 10,000 member-years [95% CI: 19.7, 21.3]). Male and female DCRs were 22.1 (95% CI: 21.1, 23.1) and 17.6 (95% CI: 16.4, 18.8), respectively. Males comprised 64% of member-years, and males submitted 69% of claims. Ages ranged from 15-80 years. DCR increased for younger divers reaching a maximum at ages 35-45 and declined progressively thereafter. Mean member age increased by 0.5 years per calendar year from 41 to 44.3 years. The highest annual DCR was 25.7 in 2002, and the lowest was 14.9 in 2006. Over a four year period, the dropout rate was 10-20% greater for divers who submitted a claim in their first insured year (Chi-sq=57.6, Df=1,  $p<0.0001$ ) although all divers were equally likely to submit claims subsequently.

## RESULTS

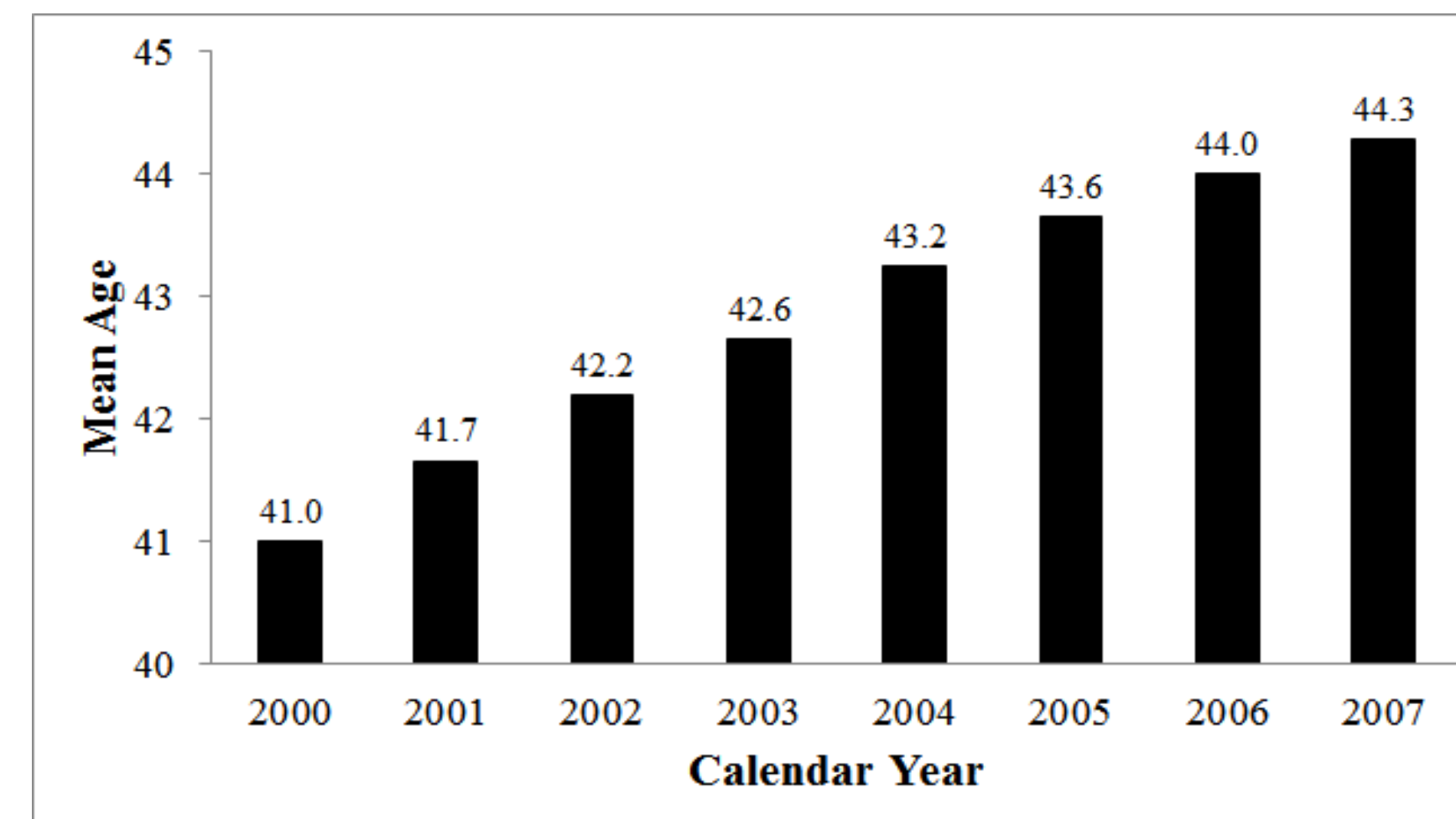


Figure 1. Mean Age of Insured Divers Alert Network Members From 2000-2007.

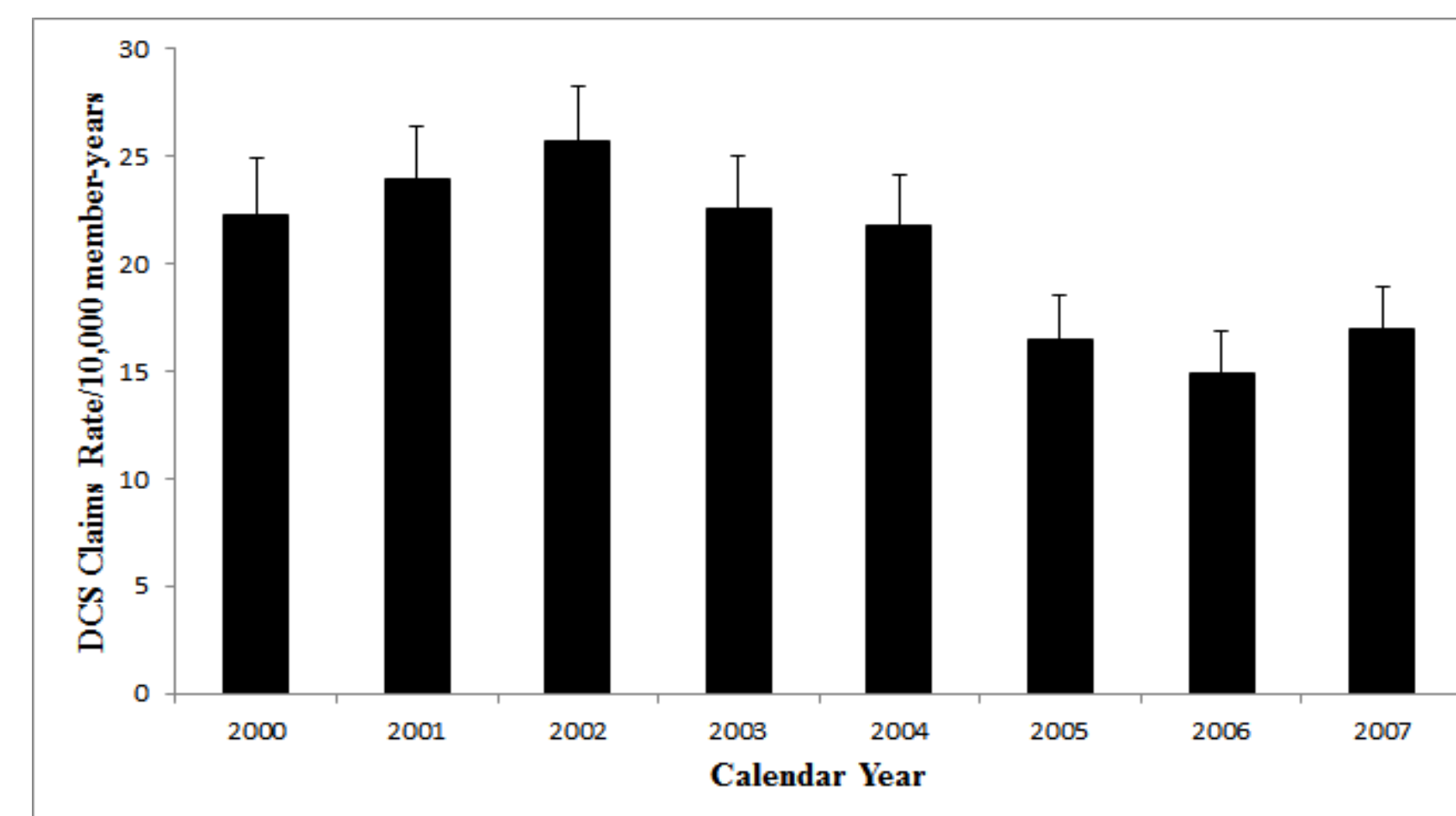


Figure 2. Decompression Sickness Claims Rates of Insured Divers Alert Network Members versus Calendar Years (2000-2007) and 95% Confidence Intervals.

Table 1. Age Specific Estimates and Confidence Intervals for the Total DAN Member								
Population From 2000-2007.								
Age Group <sup>†</sup>	Member years	Cases	DCR <sup>‡</sup>	95% Confidence Intervals	Rate Ratio	95% Confidence Intervals	Rate Difference <sup>‡</sup>	95% Confidence Intervals
<20	60,984	33	5.41	3.56, 7.26	0.27	0.19, 0.38	-14.69	-17.01, -12.36
20-29	136,970	346	25.26	22.60, 27.91	1.26	1.11, 1.43	5.16	2.15, 8.17
30-39	281,994	750	26.60	24.69, 28.49	1.32	1.20, 1.46	6.49	4.12, 8.86
40-49	385,017	774	20.10	18.68, 21.51	1.00		0.00	
50-59	314,425	614	19.53	18.00, 21.07	0.97	0.87, 1.08	-0.58	-2.68, 1.52
60-69	85,674	135	15.76	13.10, 18.41	0.78	0.65, 0.94	-4.35	-7.35, -1.33
≥70	13,112	11	8.39	3.43, 13.34	0.42	0.23, 0.76	-11.71	-16.86, -6.56
Missing	26,182	9						
Total	1,304,358	2,672	20.49	19.49, 21.50				

DCR=decompression sickness claims rate; Cases = number of decompression sickness claims; <sup>‡</sup> number / 10,000 insured DAN member-years over an eight-year period; # in years

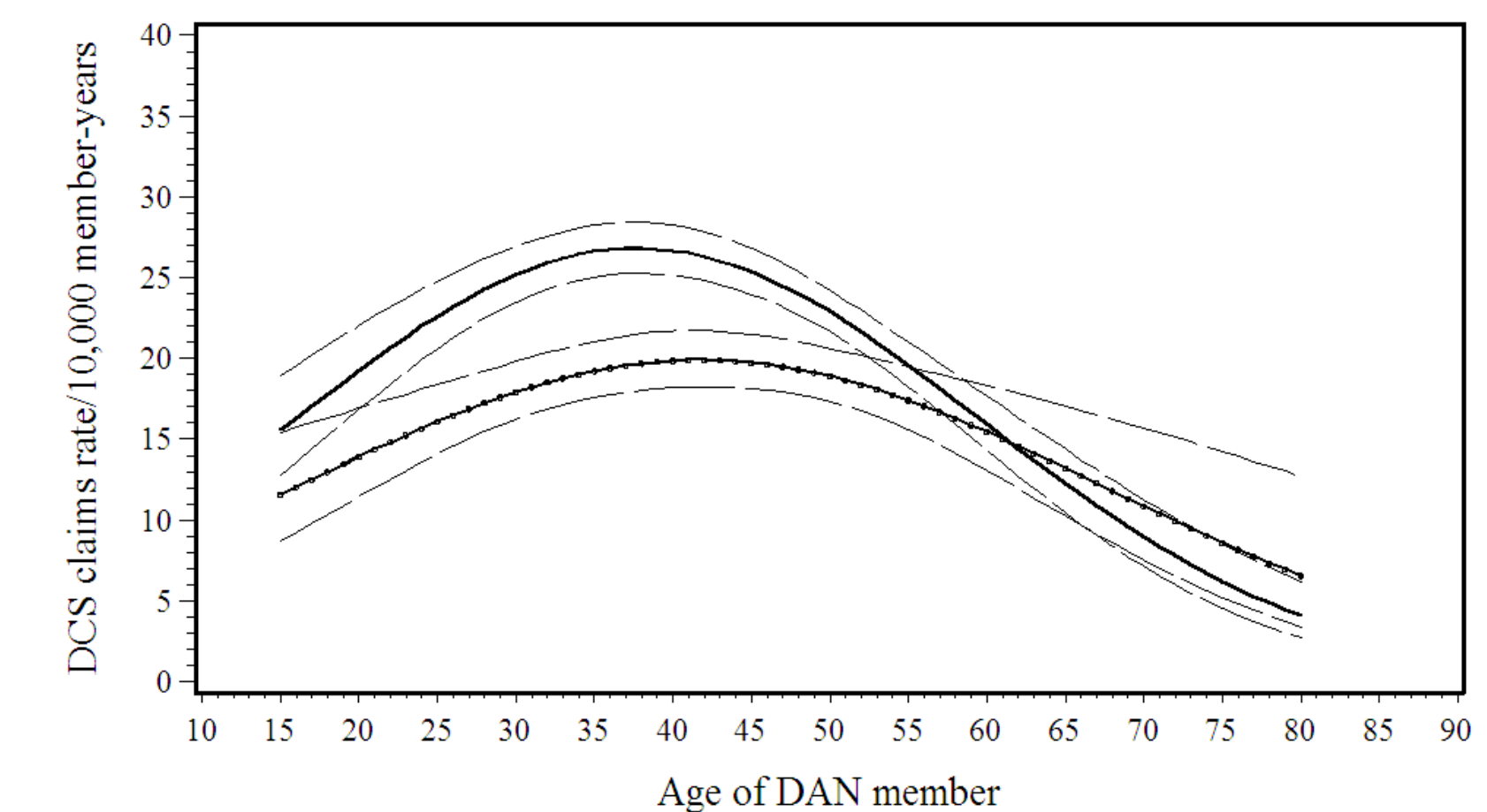


Figure 3. Male and Female Decompression Sickness Claim Rates Versus Age, in Insured Divers Alert Network Members From 2000-2007  
-----males; -o-o-o-o-o- Females; - - - - 95% confidence limits

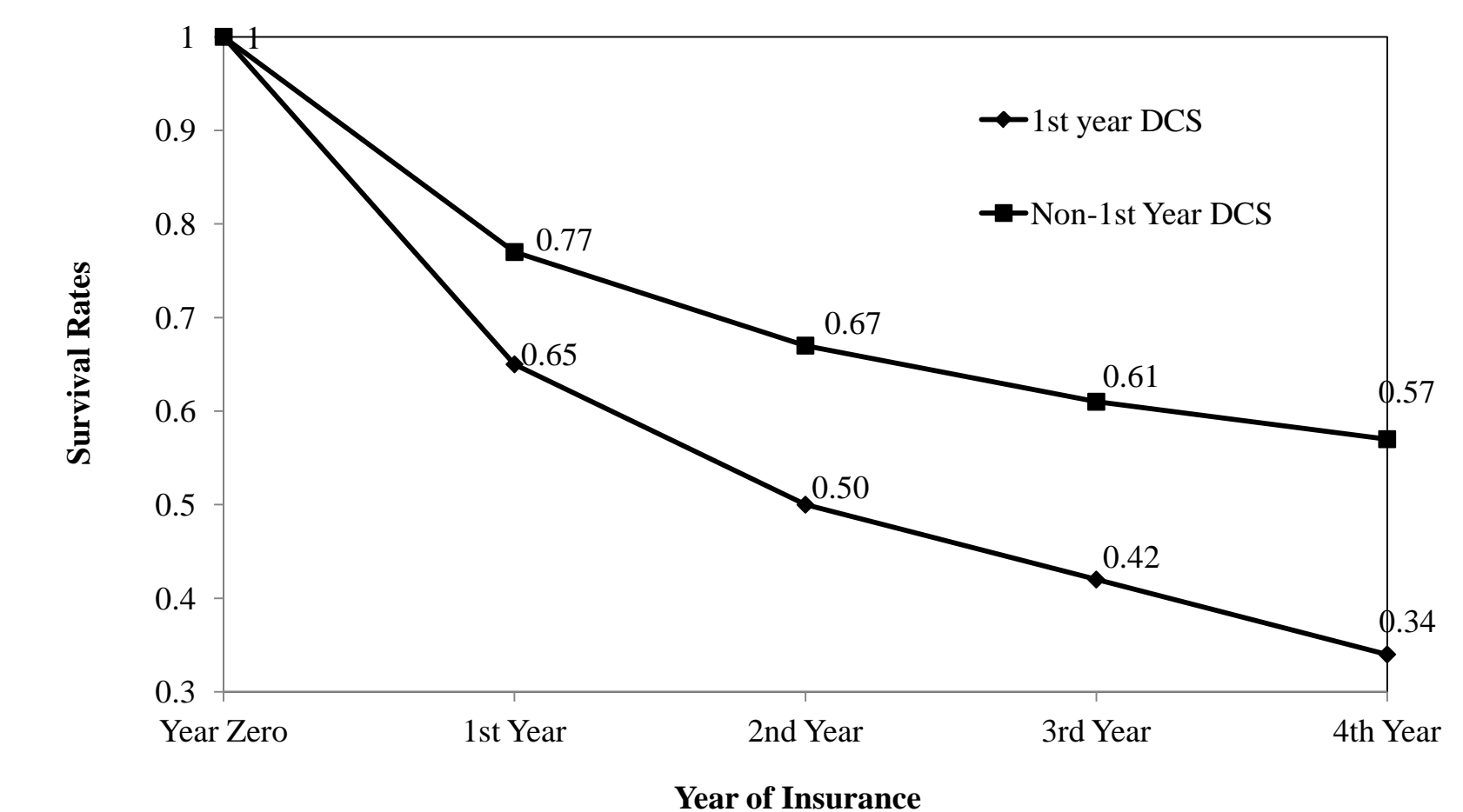


Figure 4. Survival Rates of Renewing Insurance Plan in the 1st Year and Non-1st Year Claims Groups Of Insured Divers Alert Network Members for a Four Year Period Between the Years 2000-2007.

## DISCUSSION

- ❖ One in 490 insured DAN members submitted a DCS claim, and one in 6,100 died while diving (Denoble, DHM 38:182,2008).
- ❖ DCS during the first insured year was a disincentive to continued diving.
- ❖ Claims may be used as a surrogate for DCS incidence.
- ❖ DAN members may not represent all recreational divers,.
- ❖ “Per capita” rates are less informative of exposure than ‘per dive’ rates, but a well-defined population has clear advantages in accuracy.