FACTORS INFLUENCING PARTICIPATION IN A MULTI-STAGE STUDY OF HEAD INJURY: POTENTIAL BIASES IN THE VIETNAM HEAD INJURY STUDY

Bruce S. Jonas, Walter Reed Army Medical Center, Karen Schwab and Andres M. Salazar,
Uniformed Services University of the Health Sciences
Bruce S. Jonas, Vietnam Head Injury Study, ATTN: HSHL-CI, Walter Reed Army Medical Center,
Washington, DC 20307-5001

Abstract

The Vietnam Head Injury Study (VHIS) registry includes 1221 veterans who suffered brain wounds in the Vietnam war, and on whom we have initial and follow-up medical records. The entire registry was invited to participate in Phase II some 15 years later, of which 520 veterans (42.6%) participated. This involved an extensive, one-week, in-patient, reevaluation including neurological, computerized tomographic, neurobehavioral, speech and language, rehabilitation, electrophysiologic, audiologic and sociological parameters. The present study is an attempt to uncover factors influencing and potential biases associated with voluntary participation in Phase II. These include data describing the lesion and complications from the injury, other patient attributes that strongly affect recovery (e.g., I.Q. scores) and several life adjustment measures (e.g., work and marital status). Of the 183 comparisons made from data gathered in the records review, only 5% of the differences were statistically significant at the .05 level and 10% of the comparisons were different enough to reach the .10 level. These are precisely the percentages of significant findings one might expect to find were the two samples (participants/nonparticipants) drawn randomly from the same population. It is therefore concluded that overall the participant group is an unbiased sample of the VHIS Registry. Of the variables found marginally significant or significant, the ones that would require any caution extending findings to the entire registry include a somewhat higher percentage of participants with: (1) continuing academic activity and (2) associated medical injuries.

Introduction

The W. F. Caveness Vietnam Head Injury Study (VHIS) registry includes 1221 young veterans who survived penetrating brain wounds from shrapnel or bullets between 1967 and 1970 in the Vietnam War, and on whom we have detailed medical records of the initial and follow-up medical care. Phase I of the VHIS, conducted between 1976 and 1979, involved a review and computer codification of these records by experienced neurologists and neurosurgeons. The medical records included demographic data, in-country injury data, composite wound description, laboratory procedures and tests, surgical procedures, medications, seizure information and patient status reports. Phase II, which was formally begun in 1980 and is still ongoing, involves an extensive, one-week inpatient reevaluation of VHIS registrants who volunteered to be examined. The standardized evaluation included a detailed neurological examination; computerized tomographic (CT) brain scan (which gives the exact size and location of the injury); extensive neuropsychological, behavioral, and speech and language batteries; a physical rehabilitation and motor performance battery; EEG and brain evoked potentials testing; an audiological battery; an extensive social service family interview conducted in the veteran's home by trained American Red Cross personnel; and separate family/community adjustment questionnaires. By the end of the formal evaluation and data collection period of Phase II in October 1984, 520 brain-injured veterans had been evaluated. Over 22,000 data points have been collected on each of these men and computerized for subsequent analysis.

We wished to find out whether the patients who came to Walter Reed for a week of medical testing adequately represented the patients whose records had been studied in Phase I of the VHIS. If the sample studied at Walter Reed was a biased sample, we could take the biases into account when reporting findings from the clinical testing phase of the study. It seemed reasonable to expect that the patients who actually submitted to a week's worth of tests at Walter Reed might be different from those who chose not to participate.

For one thing, the head injured veterans from the Vietnam War whose names appeared on the registry were being asked for the first time to invest their time and effort in the study. Their participation up until the Red Cross interviews and hospital testing had been indirect, a consequence of their injury in Vietnam and the Veteran's Administration accumulation of records on their subsequent contacts with the military and VA. Some individuals refuse to participate in any research study, and they are likely to differ from those who do participate. Another reason the individuals who came to Walter Reed might differ from those who did not come is that the hospital stay was lengthy--one week, and involved numerous tests. Any difficulty getting off work or any uneasiness about any of the proposed tests (and they were duly informed in detail about all of them before the testing began) might lead to a reluctance to participate. While transportation to and from Walter Reed and the hospital stay were paid for, compensation for leave from work could not be offered. In many instances, although, letters were written to employees that allowed the veterans to take sick leave. Thirdly, the very nature of the injuries studied--head injuries-- could lead to uneven participation rates. Site of brain injury has been associated in previous studies with depression, anxiety, difficulty controlling temper, and so forth (Grafman et al. 1986). Such personality traits might make participation in a hospital study less (or perhaps more) likely. Finally, research on participants and nonparticipants in several health examination surveys found some significant between-group differences (Criqui et al. 1979, Krueger 1957, Cobb et al. 1957, Napier 1962, Gordon et al. 1959, National Center for Health Statistics (NCHS) 1965, NCHS 1974, NCHS 1969, NCHS 1971, NCHS 1978). However, most of these studies found age, sex, race and health status differences as the major significant factors. Neither age nor sex can discriminate in this study due to the homogeneous nature of the population (i.e., young males). Data on race was not available. Moreover, this study provides a larger variety of medical factors to compare than those studies previously cited. Thus, here lies a unique opportunity to conduct a more indepth examination of nonparticipant bias.

The specific question addressed in this paper is, how well does the hospital sample represent the individuals whose records were searched during Phase I of the VHIS? More broadly, this paper seeks to identify the potential biases of doing large invitational clinical studies on chronically ill patients, and, in particular, on patients with penetrating head injuries. Do such studies have any hope of representing the larger populations from which they are drawn?

Hypotheses

(1) We hypothesized that individuals who worked would be less likely to show up for medical testing at Walter Reed because of the difficulties of arranging a week's leave and because some would have to forego a week's earnings. (2) We hypothesized that individuals with more severe injuries would be more likely to come to Walter Reed because they might need medical advice and consultation, and some might come hoping to obtain additional military benefits. (3) We hypothesized that site of brain injury would be associated with different rates of participation in the hospital testing phase of the study. (4) We hypothesized that married patients would be more likely to come to Walter Reed for medical tests since their lives are likely to be more structured and they would be more likely to see the value of further medical tests and the possibilities of getting medical Veterans benefits.

Methods

The sample of 1117 surviving members of the VHIS registry were divided into two groups: (1) the participants in Phase II who numbered 520 (46.6% of the surviving total) and (2) the nonparticipants in Phase II who numbered 597 (53.4% of the surviving total). All variables analyzed were divided into level of measurement category groups including: interval, ordinal or nominal levels. For variables that were interval, ordinal or dichotomous, means were computed and often reported as percentages of the presence of various conditions (e.g., the presence of aphasia). For variables that were nominal with three or more categories, percentage breakdowns by categories were reported. For the former group, comparisons between participants and nonparticipants were conducted using the General Linear Model with participant status as the only predictor variable in the model. This produced a statistical test commensurate with a two sample t test with pooled variance estimate. For the latter case, a 2xN table is analyzed using the Chi-Square statistic.

Results

Of the 1117 surviving sample members, 520 came to Walter Reed for extensive testing. This analysis compares these participants with the nonparticipants, the 597 who did not come to Walter Reed. Of the 597 who did not come, 201 had agreed at one time to the hospital testing, but were unable subsequently to schedule the week's hospital stay, or changed their minds about participating.

Participants and nonparticipants turned out to be surprisingly alike. Of the 183 comparisons we made from data gathered in the records review, only 5% of the differences were statistically significant at the .05 level. And, since we wished to analyze any tendencies toward significant differences that might point to biases in the sample, we further examined differences at the .10 level. Ten percent of the comparisons were different enough to reach the .10 level. These are precisely the percentages of significant findings one might expect to find were the two samples (participants/nonparticipants) drawn randomly from the same population.

Furthermore, we could not reject the null when we tested three of the four hypotheses. Participants and nonparticipants did not differ on work status or marital status. They also did not differ on more than a few of the multitude of items describing site of lesion, depth of lesion, or most outcomes attributable to brain injury (such as epilepsy, memory or visual problems, etc.). However, a dimension of associated injury may somewhat differentiate participants from nonparticipants. Participants were more likely to have sustained motor impairments, more often reported receiving injuries to their extremities and their brain wounds more often exuded blood at the time of injury in Vietnam ($p \leq .05$). Furthermore, participants were slightly more often sustaining associated injuries, undergoing medical procedures to their limbs, a little less likely to have satisfactory head wound healing or to be ambulatory independent ($p \leq .10$).

Two items distinguished participants from nonparticipants, which we had not anticipated. Participants differed from nonparticipants in continuing their education after Vietnam (they more often pursued it), and they were less likely to have received steroids. These differences may only reflect sampling error (that is, another study of participation may not find these exact differences). But, the difference in schooling received ($p \leq .01$) combined with a tendency for participants to show slightly higher AFQT scores ($p \leq .10$) suggests that the head-injured studied in the Phase II, in-hospital phase of the study were slightly more aggressive in getting schooling, and may have had slightly higher intelligence levels than the average nonparticipant.

Form A. Looking at the data form-by-form, we see that participants had a higher average in-service grade level than nonparticipants, and they tended to have higher AFQT scores. Furthermore, they were more likely to have gotten some schooling after Vietnam than were nonparticipants. They did not differ on any of the other demographic items included on the form, including age, work and marital status, or last disability ratings.

Form B. As already noted, participants more often had received injury to an extremity, and had motor impairments immediately after injury. They did not differ on numerous other descriptors of the injury abstracted from the records.

Forms C&D. This form included a number of descriptors of the brain wound, as well as some further detail on associated injuries. Again, few of the sampled items distinguished participants from nonparticipants. They were slightly less likely to have sustained penetration to the frontal midline area of the brain (0.8% versus 2.3%). They were also more likely to exude blood from their wounds (27.7% versus 21.5%). They were less likely to have multiple metal fragments (41.9% versus 50.9%). Finally, on a three point Likert scale rating associated injuries as None, Minor or Major, participant were slightly more likely to rate higher.

Form E. Participants and nonparticipants did not vary on any of the numerous items selected which referred to surgical procedures. There was a tendency (i.e., significant at .10 level) for participants to have had enucleation and to have had some surgery on soft tissue (limbs).

Form F. Participants tended to have received the anticonvulsant Dilantin, and the antibiotic Keflin. They were less likely to have received steroids. We did not predict differences regarding medication. The differences found may only reflect sampling variability.

Form G. None of the variables analyzed from the Seizure Form showed significant differences between participants and nonparticipants.

Form H. Again, there were few differences on the status reports of participants and nonparticipants. Participants tended to be classified as ambulatory-independent, and they tended to have more problems with wound healing (level=.10). Participants less often had stable hearing when compared to a prior exam (that is, physicians had noted in their record either worsening or improvement more often for them). And out of a list of possible problems that had resolved, participants as a group had less often resolved sphincter problems.

Discussion

For the class of variables as a whole, it is reasonable to assume that the participant-nonparticipant comparison reveals very little bias. Only 5% of the comparisons were different enough to reject the hypothesis of no difference between participants and nonparticipants (.05 level). It appears then that an invitational clinical study can be done with a legitimate hope of adequately representing the population from which the sample is invited.

It should be pointed out that the successful recruitment of this sample required prodigious effort on the part of the research coordinator, Herbert Brown, and the Red Cross field workers. Patients on the Caveness Head Injured Registry were issued two written invitations and personally contacted by Red Cross workers. The Red Cross field worker remained the patient's personal contact if he agreed to participate until the patient reached Walter Reed. Red Cross workers drove patients to and from the Air Force planes. The research coordinator smoothed the way when problems developed. For instance, if a patient needed a letter for their employer, a letter was written. Symbolic of the positive relationships built between participants and the research staff, letters and phone calls continue to this day from patients to the physician (Andres Salazar) and the research coordinator letting them know how they are doing or requesting advice.

If we assume the 10% of the variables we found to be marginally significant to highly significant are truly different, then a possible pattern emerges. It would appear that participants were potentially a slightly more motivated group of consumers of these Phase II hospital procedures as inferred by their higher percentage of pursuance of further education. Further, it appears that several severity-of-injury variables, particularly those relating to associated injuries, suggest that this may have also contributed somewhat to their decision to participate.

The question now is does this group of participants represent one group or more? Specifically, we hypothesize that the participants may actually represent two extreme subgroups. One would be those veterans who, despite their head injuries, are faring rather well as evidenced by an absence of associated medical problems and have taken advantage of the continued medical screening for other reasons. The second would be those veterans who are still experiencing associated medical problems and saw Phase II as a chance to get further treatment and/or benefits relative to their condition. To answer this question, a count of the associated injuries was abstracted as a measure of additional medical problems to be used to cross-tabulate with participant/nonparticipant status. This cross-tabulation revealed a significant ($p=.01$) unidirectional shift towards more associated injuries for participants, thus indicating that the data as a whole does not support the hypothesis of two extreme subgroups. We, therefore, conclude that the participants were generally characterized by having a somewhat higher percentage of associated injuries.

Our conclusion is that overall the participant group is an unbiased sample of the VHIS registry. Of the variables found marginally significant or significant, the ones that would require any caution extending findings to the entire registry include: (1) continuing academic activity which implies that participants are potentially better able to perform well on tests, thus their performance on the neuropsychological battery may somewhat over-represent the performance level of the entire registry; (2) when the analysis focuses upon motor skills, it should be remembered that more participants had immediate motor impairments; therefore, estimates of motor functioning may differ somewhat from the entire registry.

As was mentioned, other health examination surveys found participants to vary on age, sex, race and health status. In this study, sex is not relevant, race was not collected, and the age variable is virtually constant (i.e., all veterans were 22±3 years in 1970). Since this study found differences in continuing educational attainment and associated medical problems, it is of interest to compare these two findings with other studies. Three studies also reported health status in the form of no chronic condition and no usage of health services (NCHS, 1965) or fewer self-reported problems and lower usage of health services (NCHS 1969, NCHS 1974) as factors associated with nonresponse. This is similar to our finding of presence of associated injuries other than head injury as promoting participation. Additionally, three studies (Cobb et al. 1957, NCHS 1969, NCHS 1974) reported uncooperativeness of respondents associated with nonresponse. While this study did not directly measure this, we would postulate that measures of motivation, such as the percent of veterans who exploit continuing educational benefits offered by the Veterans Administration, may influence participation in health examination surveys generally. It is therefore recommended that other investigators planning such surveys should include such motivational measures in prescreening all potential respondents to determine the extent of this bias.

Acknowledgments

We thank the staffs of the Neurology Service and the Department of Clinical Investigation of Walter Reed Army Medical Center (WRAMC), Mrs. Pat West for manuscript preparation, and especially Navy Master Chief (Ret.) Herbert R. Brown for his administrative expertise and sharing his extensive historical knowledge of this project. This paper is dedicated to the memory of Dr. William F. Caveness; but for his foresight, tireless efforts, and determination, this research project would never have been possible. The VHIS is supported by VA Contract #IGA V101 (91) M-79031-2 with the cooperation and support of the U.S. Army, Air Force, Navy, and the American Red Cross. The views expressed herein are those of the authors and not of the Department of Defense.

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TABLE 1: PHASE I: **Demographic Data** (Selected Variables from Form A)

Description		Overall	Participate	Non-Participate	Sig Level†
Age at injury (N=1117)		21.30	21.43	21.18	NS
Branch of service: (N=1117)	Navy	3.9%	4.8%	3.2%	NS
	Marines	26.6%	26.0%	27.1%	
	Army	68.5%	68.0%	68.9%	
	Air Force	1.0%	1.2%	0.8%	
Grade (N=1117)		3.69	3.78	3.61	**
Handedness: (N=1105)	Right	90.1%	90.3%	90.0%	NS
	Left	9.9%	9.7%	10.0%	
AFQT Score (N=1117)		50.64	52.24	49.26	*
Marital status: (N=1096)	Married	69.2%	70.5%	68.0%	NS
	Single	23.8%	21.7%	25.7%	
	Divorced	7.0%	7.8%	6.3%	
Residence: (N=1097)	Hospital	0.5%	0.8%	0.2%	NS
	Nursing Home	0.5%	0.2%	0.8%	
	Home	98.8%	99.0%	98.6%	
	Other	0.2%	0.0%	0.4%	
Employed?: (N=946)	Yes?	39.4%	38.8%	40.0%	NS
Full time?: (N=369)	Yes?	91.9%	92.9%	91.0%	NS
Regular employment: (N=369)	Yes?	97.0%	96.4%	97.1%	NS
Disabled Veteran job: (N=369)	Yes?	2.2%	1.2%	3.0%	NS
Academic activity since injury: (N=1096)	Yes?	60.3%	64.5%	56.7%	***
Last disability % (N=117)		76.5%	77.4%	75.7%	NS

TABLE 2: PHASE I: **In-Country Injury Data** (Selected Variables from Form B)

Agent: (N=1116)	Bullet	14.9%	14.9%	14.9%	NS
	Fragment	78.0%	78.0%	78.1%	
	Vehicular	4.2%	4.8%	3.7%	
	Other, non-missile	2.9%	2.3%	3.3%	
Injury to: (N=1115)	Scalp	95.4%	95.0%	95.8%	NS
	Skull	97.3%	97.1%	97.5%	NS
	Brain	89.5%	89.3%	89.7%	NS
	Eye	19.2%	20.5%	18.0%	NS
	Face	21.8%	22.0%	21.6%	NS
	Neck	7.6%	7.7%	7.5%	NS
	Spine	1.2%	1.0%	1.4%	NS
	Extremities	50.2%	53.4%	47.4%	**
	Thorax	16.9%	16.9%	17.0%	NS
	Abdomen	13.3%	12.4%	14.1%	NS
Immediate impairments: (N=1117)	Conscious	56.6%	57.2%	56.0%	NS
	Vision	16.3%	17.3%	15.4%	NS
	Hearing	3.8%	4.2%	3.3%	NS
	Speech	9.6%	11.0%	8.4%	NS
	Motor	18.4%	21.0%	16.2%	**
	Other	0.6%	0.6%	0.6%	NS
Loss of conscious: (N=641)	Transient	46.6%	45.2%	47.9%	NS
	Persistent to time of exam	53.1%	54.5%	51.8%	
	Lucid interval	0.3%	0.3%	0.3%	
Responds to pain: (N=1117)	Likert (2-7)	5.35	5.27	5.41	NS
Pain response: (N=190)	Extensor/decerebrate	15.3%	11.1%	18.7%	NS
	Flexor/defensive/purposeful	58.4%	58.6%	58.2%	
	Not differentiated	26.3%	29.3%	28.1%	
Duration: (N=653)	Likert (1-7)	3.13	3.17	3.09	NS
Memory impaired: (N=444)	Yes?	15.8%	14.1%	17.1%	NS
Vital signs: (N=1035)	Abnormal?	29.7%	30.1%	29.3%	NS

TABLE 3: PHASE I: **Composite Wound Description** (Selected Variables from Forms C&D)

Description		Overall	Participate	Non-Participate	Sig Level†
Multiple lobes: (N=1115)	Yes?	39.9%	42.2%	37.9%	NS
X-midline: (N=1115)	Yes?	18.4%	19.5%	17.4%	NS
Site entry: (N=1115)	Right	49.7%	50.5%	49.0%	NS
	Midline	3.3%	2.1%	4.4%	
	Left	45.9%	46.2%	45.6%	
	Right and left	1.1%	1.2%	1.0%	
Dural/brain sites: (N=1115)	Frontal right	19.1%	18.9%	19.3%	NS
	Frontal mid	1.6%	0.8%	2.3%	**
	Frontal left	18.7%	18.1%	19.1%	NS
	Parietal right	11.5%	11.4%	11.6%	NS
	Parietal mid	0.3%	0.4%	0.2%	NS
	Parietal left	10.4%	9.4%	11.2%	NS
	Temporal right	6.9%	6.6%	7.2%	NS
	Temporal mid	0.1%	0.0%	0.2%	NS
	Temporal left	6.4%	7.1%	5.7%	NS
	Occipital right	4.3%	4.8%	3.9%	NS
	Occipital mid	0.3%	0.2%	0.3%	NS
	Occipital left	2.5%	3.3%	1.8%	NS
Lesion Side Summary	Right	41.8%	42.1%	41.6%	NS
	Left	37.8%	35.8%	39.3%	
	Bilateral	20.4%	22.1%	19.1%	
Bone: (N=552)	Multiple fragments	97.5%	96.4%	98.3%	NS
Metal: (N=635)	Multiple fragments	46.6%	41.9%	50.9%	**
Wound inspection: (N=855)	Exud brain	18.6%	19.1%	18.2%	NS
	Exud blood	24.4%	27.7%	21.5%	**
	Exud CSF	8.3%	8.2%	8.5%	NS
	Otorrhea	2.9%	2.5%	3.3%	NS
	Rhinorrhea	1.1%	1.5%	0.7%	NS
Associated injuries: (N=1114)	Likert (2-4)	3.03	3.08	2.99	*

TABLE 4: PHASE I: **Surgical Procedure** (Selected Variables from Form E)

Debridement: (N=1094)	Yes?	82.9%	83.7%	82.2%	NS
Evacuation: (N=1079)	Yes?	73.9%	75.9%	72.1%	NS
Sepsis (N=384)	Yes?	26.3%	27.0%	25.7%	NS
Cerebral edema (N=377)	Yes?	17.0%	17.6%	16.4%	NS
Hematoma (N=377)	Yes?	5.8%	6.3%	5.5%	NS
CSF leak (N=376)	Yes?	16.8%	18.9%	14.9%	NS
Summary: (N=1099)	Complicated?	22.0%	23.7%	20.6%	NS
Cranial sinus procedure: (N=1076)	Yes	10.6%	10.9%	10.3%	NS
Dural procedure: (N=1073)	Opened	70.0%	72.4%	67.3%	NS
	Debrided	18.7%	18.9%	18.6%	NS
Closed:	Primarily	50.3%	47.7%	52.5%	NS
	Graft	45.5%	48.0%	43.4%	
	Incomplete	4.2%	4.3%	4.1%	
Graft:	Autogenous	87.4%	87.8%	87.0%	NS
	Homologous	11.7%	12.2%	11.3%	
	Synthetic	0.9%	0.0%	1.7%	
Autogenous location:	Fascia lata	1.7%	3.0%	0.5%	NS
	Temporal fascia	40.8%	38.5%	42.9%	
	Pericranium	57.5%	58.6%	56.5%	
Associated procedures: (N=1083)	Thoracic	9.5%	10.7%	8.5%	NS
	Abdominal	11.1%	10.1%	11.9%	NS
	Face/ENT	16.9%	17.9%	16.0%	NS
	Vascular	2.3%	2.6%	2.1%	NS
	Orthopedic	14.1%	14.1%	14.0%	NS
	Soft tissue (limbs)	43.4%	46.4%	40.8%	*
	Tracheostomy	7.9%	7.4%	8.4%	NS

TABLE 5: PHASE I: **Medications** (Selected Variables from Form F)

Description		Overall	Participate	Non-Participate	Sig Level†
Anticonvulsants: (N=1109)	Dilantin	89.1%	90.9%	87.5%	*
	Phenobarbital	14.5%	14.1%	14.8%	NS
	Other	0.9%	1.3%	0.7%	NS
Steroids (N=1073)		41.8%	38.3%	44.7%	**

TABLE 6: PHASE I: **Seizure History** (Selected Variables from Form G)

Seizures (N=1101)	Yes?	33.1%	34.9%	31.5%	NS
Frequency: 1 per: (N=182)	Day	9.9%	7.9%	11.8%	NS
	Week	9.9%	9.0%	10.8%	
	Month	42.9%	47.2%	38.7%	
	Year	37.4%	36.0%	38.7%	
Total number of (N=366)		8.17	8.74	7.61	NS
First seizure year (N=370)		69.25	69.38	69.14	NS
Seizure types:	Generalized (N=366)	77.0%	73.5%	80.5%	NS
	Focal (N=318)	42.8%	45.6%	39.9%	NS
Focal with secondary generalization (N=314)		20.1%	18.2%	21.9%	NS

TABLE 7: PHASE I: **Status Report** (Selected Variables from Form H)

Behavior: (N=1108)	Abnormal?	37.1%	35.7%	38.3%	NS
Aggressive: (N=809)	Hyperactive	4.2%	5.1%	3.4%	NS
Organic brain or mental syndrome (N=832)		48.9%	48.7%	49.1%	NS
Aphasia (N=1108)		13.5%	13.9%	13.3%	NS
Vision: (N=1115)	Abnormal?	32.6%	32.8%	32.3%	NS
Activity level: (N=1117)	Normal	64.7%	64.4%	65.1%	NS
	capable of self-care	95.3%	94.2%	96.3%	NS
	Ambulatory independent	88.2%	86.2%	89.9%	*
	Ambulatory independent with aid	20.3%	22.2%	18.5%	NS
	Requires some nursing	3.6%	3.7%	3.5%	NS
	Requires comprehensive nursing	0.7%	0.9%	0.6%	NS
	Incontinent of urine	1.9%	2.2%	1.6%	NS
	Indwelling foley	0.8%	1.3%	0.4%	NS
	Incontinent of feces	1.1%	1.6%	0.6%	NS
Wound healing for head: (N=1093)	Healed satis.	87.6%	84.9%	90.1%	*
	Lax	0.0%	0.0%	0.0%	
	Skull defect	3.9%	5.3%	2.7%	
	Cranioplasty	8.0%	9.2%	6.9%	
	Delayed	0.5%	0.6%	0.3%	
Disposition (N=1115)	Duty full	1.3%	1.5%	1.2%	NS
	Duty limited	1.3%	0.8%	1.8%	
	Retired	26.8%	24.3%	29.0%	
	Home	69.3%	72.2%	66.8%	
	Nursing facility	0.4%	0.2%	0.5%	
	Hospital	0.4%	0.6%	0.2%	
	Remains in same hospital	0.4%	0.4%	0.5%	
	Evac	0.0%	0.0%	0.0%	
Hearing compared to prior exam: (N=812)	Stable	95.3%	93.8%	96.7%	**
	Better	3.7%	4.4%	3.1%	
	Worse	1.0%	1.8%	0.2%	

†NS = Nonsignificant ($p > .10$)
* = $p \leq .10$
** = $p \leq .05$
*** = $p \leq .01$