

## AMPUTEE SURVEY, 1973-74: PRELIMINARY FINDINGS AND COMPARISONS\*

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Twelve years ago the late Dr. Harold W. Glattly, then Executive Secretary of the Committee on Prosthetic-Orthotic Education, Division of Engineering and Industrial Research, National Research Council, initiated a study which he hoped would provide answers to a number of questions: What was the character, in terms of sex, age, and site, of the group of individuals in the United States upon whom limb amputations were being performed? What proportion of the amputations derived from the various causes—disease, trauma, and tumor? With the cooperation of the American Orthotics and Prosthetics Association and the help of some 200 prosthetics facilities in the United States, Glattly's "Amputee Census"<sup>2</sup> provided a profile of the "new"<sup>§</sup> amputee population being fitted with prostheses during a two-year period. Perhaps even more significantly, this study brought into sharp focus major regional differences in surgical practices for elderly patients with vascular disease.

In 1973 the Committees on Prosthetics Research and Development and Prosthetic-Orthotic

Education (CPRD-CPOE), Division of Medical Sciences, National Research Council, felt that it would be appropriate to conduct a survey of the same type so that any changes in the amputee population since the October 1961-September 1963 study could be identified. As Dr. Glattly himself reported, the term "Amputee Census" was a misnomer because no actual head count of amputees on a national basis was involved. Hence, the new study was initiated as a "survey," rather than a "census." Again, almost 200 prosthetics facilities of the American Orthotic and Prosthetic Association volunteered to accumulate data on "new" amputees fitted with prostheses from July 1, 1973, through June 30, 1974.

When Glattly reported the first results<sup>1</sup> of his "Amputee Census," he compared the findings to "early election returns," which can often reveal national trends, but are sometimes misleading. A similar analogy may be made in presenting this first sampling of statistical data for the 1973-74 Amputee Survey conducted by CPRD-CPOE in collaboration with the American Orthotic and Prosthetic Association. Some ratios will probably not change significantly during the remainder of the one-year study. These stable ratios might include males to females, right to left sides, and upper to lower limbs. Findings with regard to the frequency of less common levels of amputation may be unreliable at this date because of the small number of cases in the present sample. Information relating to these amputation levels should become more accurate as the study progresses.

Dr. Glattly's earlier report<sup>1</sup> was based on data from more than 5,000 patients accumulated during an 11-month period. The current sampling (Table 1) is much smaller, and is based on 1,654 cards received primarily during the three months of August, September, and October, although

\*This report was prepared as part of the work under Contract V101(134)-P-75 between the Veterans Administration and the National Academy of Sciences, and Contract No. SRS 72-6 between the Social and Rehabilitation Service, Department of Health, Education, and Welfare, and the National Academy of Sciences.

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§ A "new" case was defined as an amputee who had not been fitted previously. Those patients who were furnished replacement prostheses were not included.

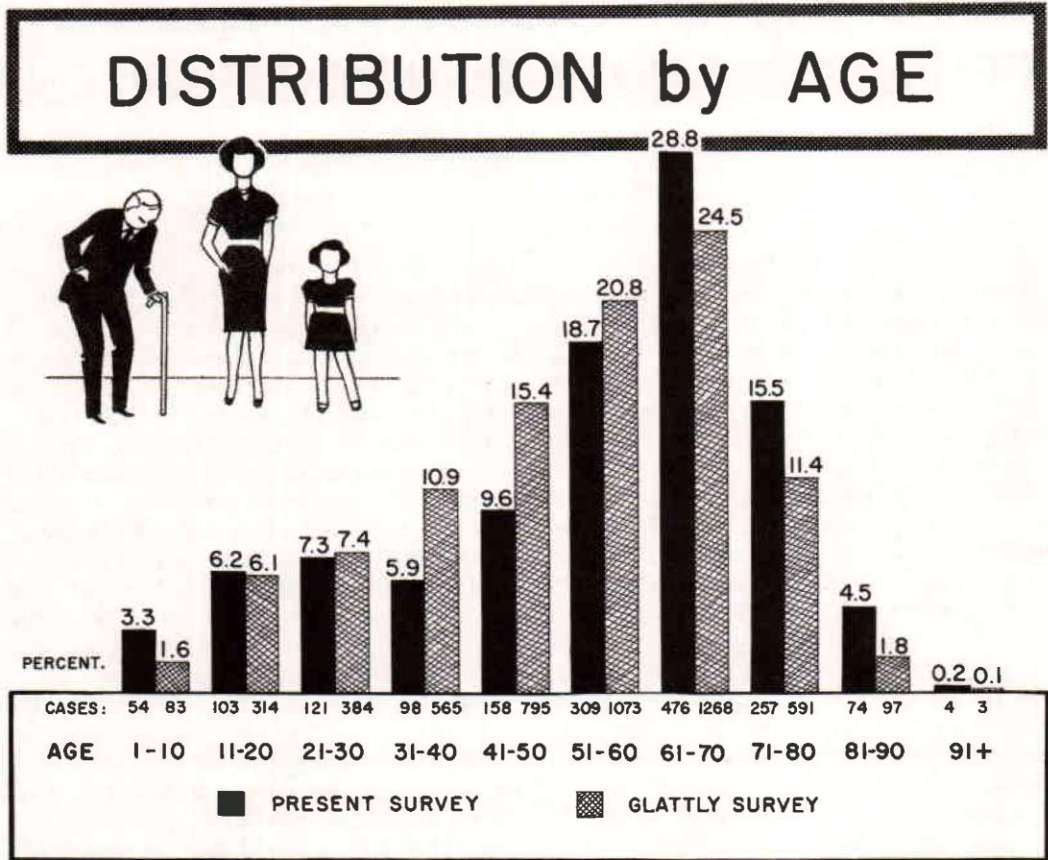


TABLE 1

the period covered spans July 1 through November 15, 1973. Nevertheless, it is evident that some different trends have been occurring in the amputee population of the United States in the 10-plus years since completion of the Glattly study.

Glattly's findings clearly documented the fact that a significant number of surgeons were performing amputations for vascular disease at an unnecessarily high level, thereby depriving many amputees of maximal rehabilitation. In the years following the publication of his final report,<sup>2</sup> much attention and publicity were given to the advantages of preserving the knee joint in elderly patients, and surgeons were urged to amputate at lower levels whenever possible. During that same period, immediate postsurgical fitting procedures came to the attention of Americans. Dr. Marian Weiss of Konstancin, Poland, had presented his modification of the Berlemont tech-

nique at the Sixth International Prosthetics Course in Copenhagen in 1963<sup>3</sup> and visited the United States later that same year. Subsequently, the Prosthetics Research Study in Seattle applied the procedures to extensive numbers of patients, and the practice was later introduced to physicians through short-term courses at the university level. The resultant trend toward an increase in the rate of below-knee amputations is clearly evident in the data obtained so far. Glattly's early report showed a 44 percent incidence of above-knee and a 37 percent incidence of below-knee amputations. In the current findings (Table 2) below-knee amputations have risen to 57.3 percent, with a consequent decline to 29.3 percent in above-knee amputations.

Male amputees outnumbered their female counterparts by a ratio of roughly 4 to 1 in the first Glattly report, based on the higher incidence of amputation in males by reason of trauma and

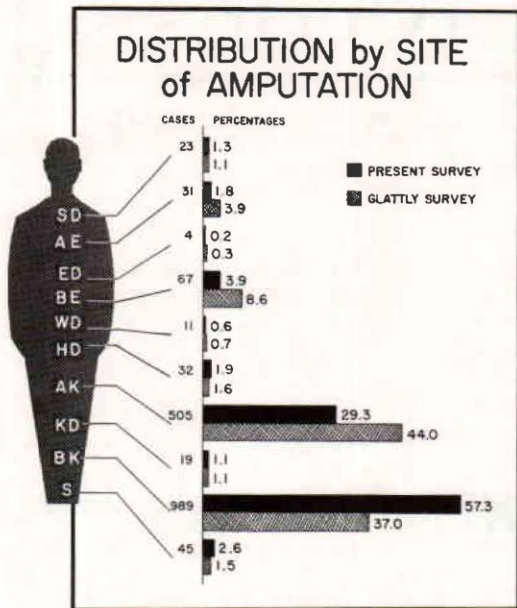


TABLE 2

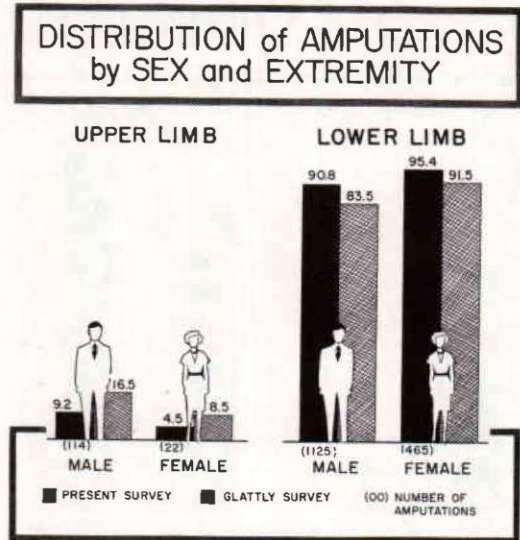


TABLE 4

disease. The gap is narrowing. Current findings (Tables 3 and 4) indicate a ratio of approximately 2-1/2 to 1, males over females, for all amputations.

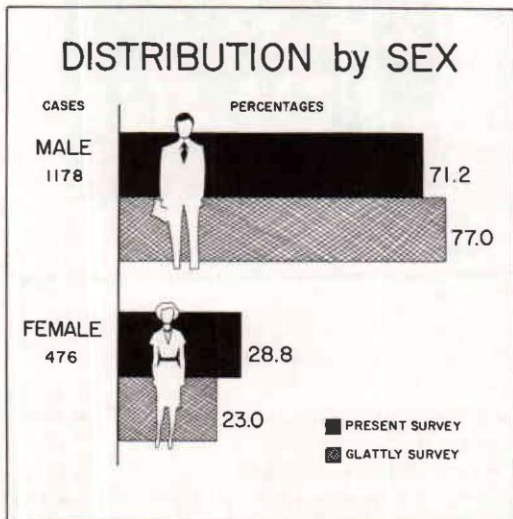


TABLE 3

Moreover, Glattly reported that amputations by reason of injury were nine times as frequent in males as in females. The trauma ratio is 7.33 to 1 in the present report (Table 5), with males still in the lead. "Women's Lib" notwithstanding, vocational hazards apparently are still greater for males, although decreasingly so. For amputations performed by reason of disease, the ratio of males to females has remained fairly constant. Dr. Glattly found that such amputations were 2-1/2 times as frequent in males as in females. This corresponds roughly to the current finding of a 2-to-1 ratio of male to female amputees (Table 5).

Disease is the major reason for amputation, and its incidence, particularly for those persons over 50 years of age, is increasing. For males of all ages, disease is the cause of amputation in 66.8 percent of cases reported—a substantial increase over Glattly's figure of 54.0 percent. For females of all ages, there is a similar rise to 79.6 percent from the earlier figure of 70.4 percent. Individuals 51 years of age and older constitute 88 percent of the entire group amputated because of disease, and 62.2 percent of all amputations for any reason.

As in the Glattly study, trauma is the second most frequent reason for amputation, although the trend seems to be downward. Current findings (Table 5) are that trauma accounts for 28.0

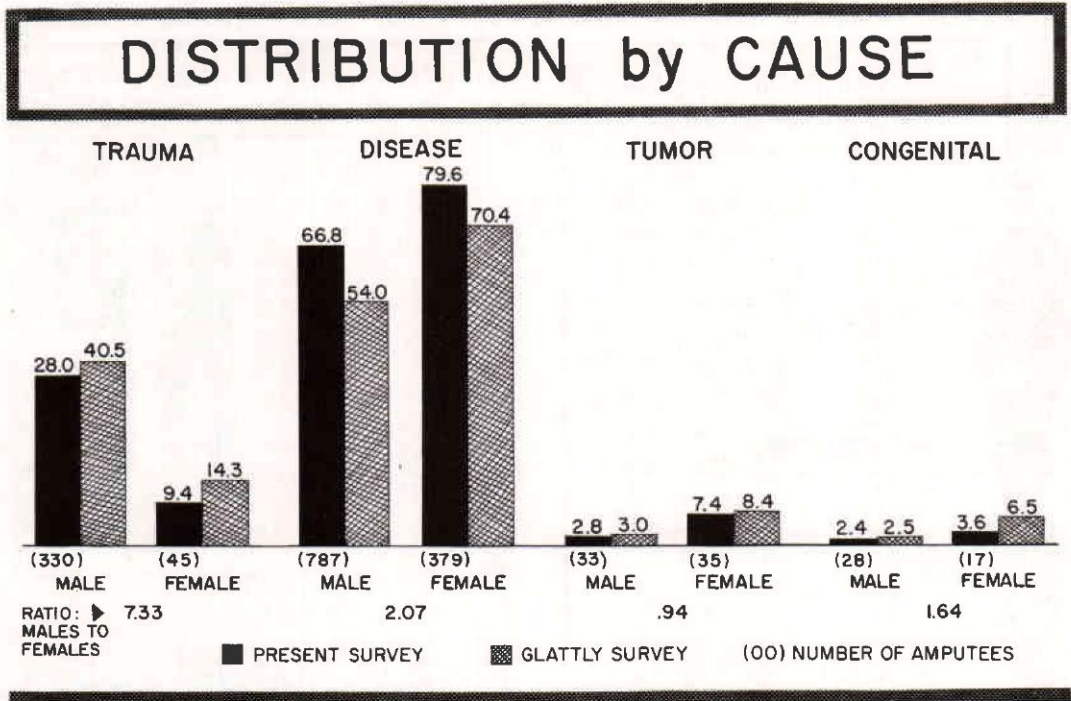


TABLE 5

percent of amputations in males, down from Glattly's 14.3 percent to the current rate of 9.4 percent.

Findings regarding congenital amputations and amputations due to tumor are roughly comparable to those reported by Glattly (Table 5). His figures for male and female amputations due to tumor were 120 and 122, respectively; CPRD-CPOE/AOPA Amputee Survey figures are 33 and 35. Similarly, Glattly reported that 103 males and 84 females were amputated for congenital deficiencies; current findings are 28 and 17. Percentage comparisons are close.

The current study shows a definite correlation between age and cause of amputation (Table 6). While disease is the major cause of amputation for persons 50 years of age and older, trauma is the major cause of amputation for persons under 50. Those in the latter category account for 80.5 percent of all trauma amputees and 61.5 percent of all amputees below the age of 50 who lose their limbs for any reason.

To his apparent surprise, Dr. Glattly found that 13.5 percent of all lower-limb amputees being fitted with prostheses were 70 years of age and over. Current figures for the presently smaller

### DISTRIBUTION by AGE and CAUSE of AMPUTATION\*

| AGE   | TRAUMA    | DISEASE    | TUMOR   | TOTAL      |
|-------|-----------|------------|---------|------------|
| 1-10  | 17 (54)   | 0 (18)     | 2 (11)  | 19 (83)    |
| 11-20 | 64 (210)  | 8 (42)     | 24 (62) | 96 (314)   |
| 21-30 | 105 (315) | 7 (42)     | 3 (27)  | 120 (384)  |
| 31-40 | 58 (386)  | 29 (148)   | 11 (31) | 98 (565)   |
| 41-50 | 58 (408)  | 93 (358)   | 7 (29)  | 158 (795)  |
| 51-60 | 41 (268)  | 260 (767)  | 7 (38)  | 308 (1073) |
| 61-70 | 24 (160)  | 446 (1090) | 6 (18)  | 476 (1268) |
| 71-80 | 5 (48)    | 248 (543)  | 3 (0)   | 256 (591)  |
| 81-90 | 3 (19)    | 71 (87)    | 0 (1)   | 74 (97)    |
| 91+   | 0 (0)     | 4 (3)      | 0 (0)   | 4 (3)      |

(OO) GLATTLY SURVEY

\* TOTAL NUMBER OF AMPUTEES = 1609; 45 CONGENITAL CASES NOT INCLUDED

TABLE 6

study group show that this figure has risen even higher—to 23 percent (Table 7).

As was found in the early Amputee Census report, there is no significant difference between the incidence of left- and right-sided amputations in either the upper or lower limbs (Table 8).

DISTRIBUTION by AGE and LEVEL

● AGE GROUP 70 AND OVER ● LOWER-LIMB AMPUTEES ONLY

| AGE    | HD | AK  | KD | BK  | SYME | Total |
|--------|----|-----|----|-----|------|-------|
| 70-80  | 2  | 107 | 2  | 191 | 1    | 303   |
| 81-90  |    | 21  |    | 53  |      | 74    |
| 91+    |    |     |    | 4   |      | 4     |
| Totals | 2  | 128 | 2  | 248 | 1    | 381   |

23% OF 1654 AMPUTEES

TABLE 7

DISTRIBUTION by SIDE of AMPUTATION

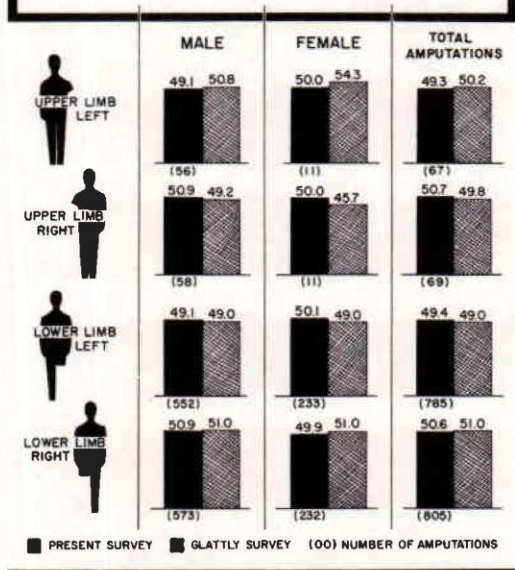


TABLE 8

For the last table (Table 9) comparisons for above- and below-knee levels only are shown, since percentages for other amputation levels would be misleading in view of the few cases recorded thus far. Again, the proportionate increase in incidences of disease and decrease in trauma are evident. Percentage increases in disease for both males and females at the AK level are slight, but at the BK level the increases are significant. Trauma-related amputations show a definite de-

DISTRIBUTION by SITE, CAUSE, and SEX

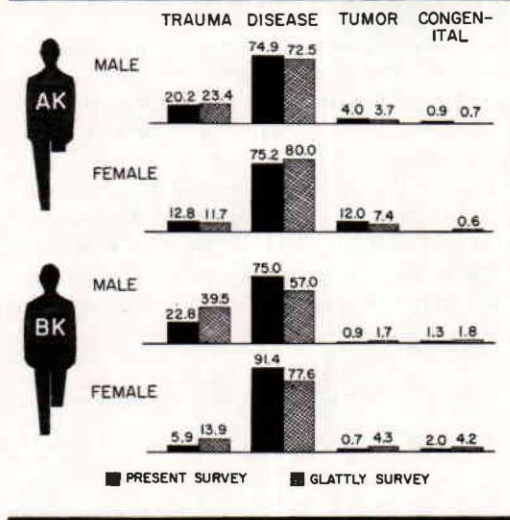


TABLE 9

cline at the BK level for both sexes, but at the AK level changes in percentages from Glattly's first report are minor. Comparisons of incidences of amputations for tumor and congenital deficiencies may or may not be significant in view of the small numbers of amputees in these two categories.

Glattly's results were essentially the same for the 12,000 cases reported at the end of his two-year study as they were for the 5,000 cases accumulated during the initial 11-month period. In the current survey an attempt will be made to determine how few cases will suffice to give an accurate picture of the types of amputees being fitted with prostheses. The present study, therefore, will be terminated on June 30, 1974, at which time a further analysis of the data will be made and compared to these preliminary findings. If no substantial changes in ratios are evident in the larger number of cases, it will be assumed that the data accurately reflect current incidences of amputation practice. The results of the later analysis will also be compared with those presented in Glattly's final report.

It is hoped that, as greater numbers of cases are reported, the accumulated data will document the character and magnitude of the amputee popula-

tion of the United States in terms of sex, levels of amputation, causes of amputation, and ages of amputees.

For those individuals with long experience in the field of prosthetics who have developed their own impressions of the amputee population, the figures presented here and in the future report may contain few surprises. For others, the new reading may reveal significant changes in amputation statistics.

To all of the facility owners and managers who have participated in this survey to date, we express gratitude and look forward to continued support. Those who are not as yet contributing to the study are urged to do so immediately. The

final available information will only be as complete and accurate as the data supplied by the facilities.

#### LITERATURE CITED

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