

## TWENTY-FIVE YEARS OF PROGRESS

Monroe J. Gershenson, M.B.A.  
Management Analyst

Veterans Administration Prosthetics Center  
252 Seventh Avenue, New York, N.Y. 10001

Wilfred G. Holsberg  
Chief, Prosthetics Field Operations Staff  
Surgical Service, Department of Medicine and Surgery  
Veterans Administration, 810 Vermont Avenue, N.W.  
Washington, D.C. 20420

The Veterans Administration's prosthetics research and development program, now over 25 years old, has been very successful in providing improved services to the disabled. Moreover, the cost of serving these patients has not risen as high as might have been expected during these

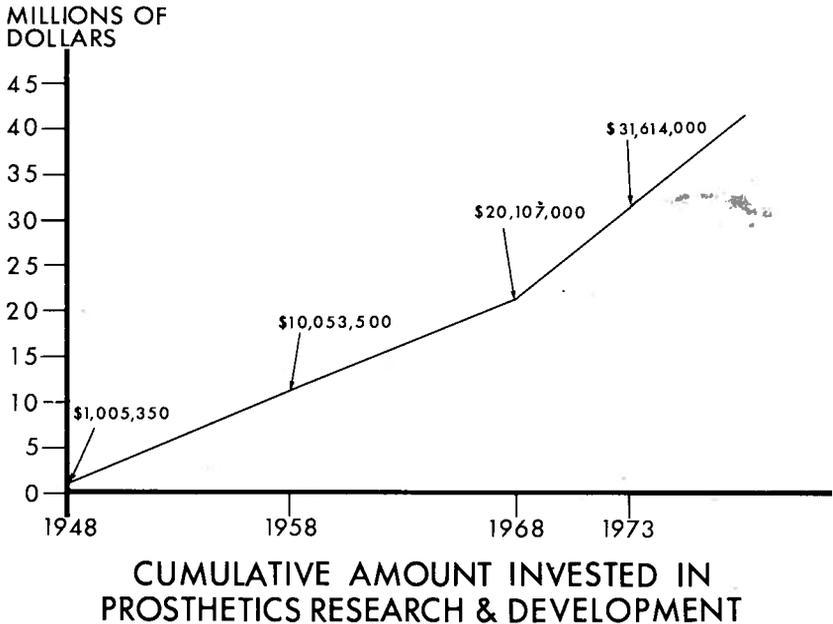


FIGURE 1

years. Talley in Reference 1 showed that in the 20-year period from 1948 to 1968, the research program more than paid for itself.

During the 25-year period from 1948 on, the Veterans Administration spent a total of \$31,614,000 on research and development, the products of which after thorough evaluation and with the support of a very dynamic educational program yielded significant improvements in clinical services (see Fig. 1). There have been many achievements in artificial limbs alone, such as improved prosthetic knee mechanisms, the SACH Foot, improved methods of socket fitting, better limb alignment systems, applications of new materials, early prosthetic care with rigid dressings, a practical low-cost electrically powered elbow, and a powered hand. Much of the funding resources also went into developments in orthotics, sensory aids, and equipment for spinal-cord-injured patients. Achieved as a result were new orthotic designs to reduce bulk and weight and improve cosmesis, powered wheelchairs with controls which can be used by quadriplegics, systems for increasing the independence of spinal-cord-injured patients at home and in the hospital, new types of vehicle systems for such patients, and a number of sensory aids developments which represented significant progress toward independence for this group of disabled.

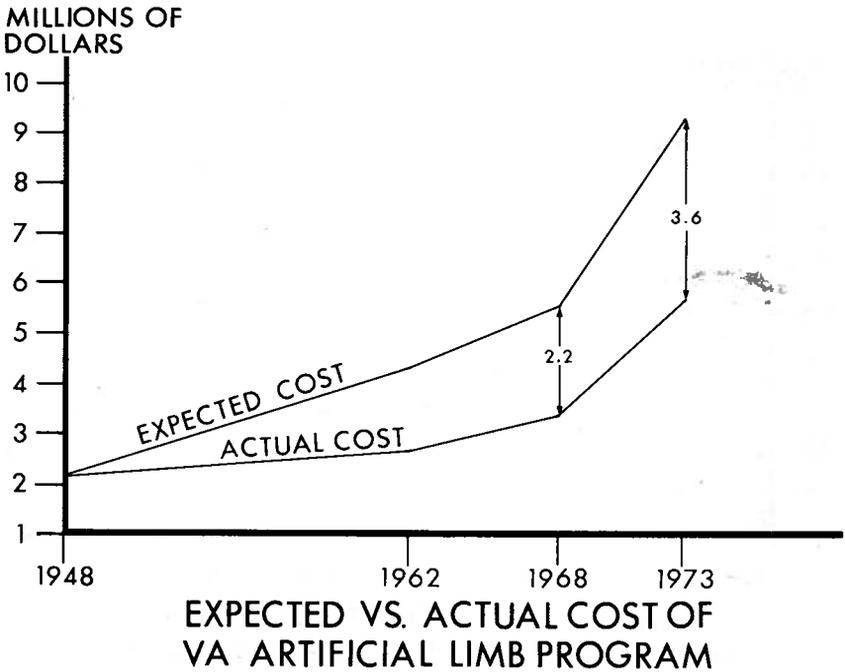


FIGURE 2

Even with all these, there have been results which show up as economic gains. For example, the *experienced* (actual) costs of prosthetic care (only artificial limbs) in 1948 was \$2,123,923 (Fig. 2) or \$94.72 per patient (Fig. 3).

As indicated by Talley, the *expected* cost of prosthetics care in 1968 was \$5,551,040 computed on the basis of the cost of living increase (Fig. 4) over the 20 years from 1948 on. The *experienced* cost in 1968, however, was \$3,309,691 or \$2,241,349 less than expected, or actually \$122.27 per patient rather than an expected \$205.07 per patient.

Using the same cost of living ratios shown in Figure 4, the expected cost of prosthetics care in 1972 based on actual 1948 figures was \$8,875,151 or \$248.75 per patient.

Based on 1968 figures the expected costs in 1972 would be \$4,084,159 or \$114.47 per patient.

The experienced cost in 1972 was \$5,553,080 (\$3,322,071 less than the 1948 estimated cost) or \$155.64 per patient and \$1,468,921 more

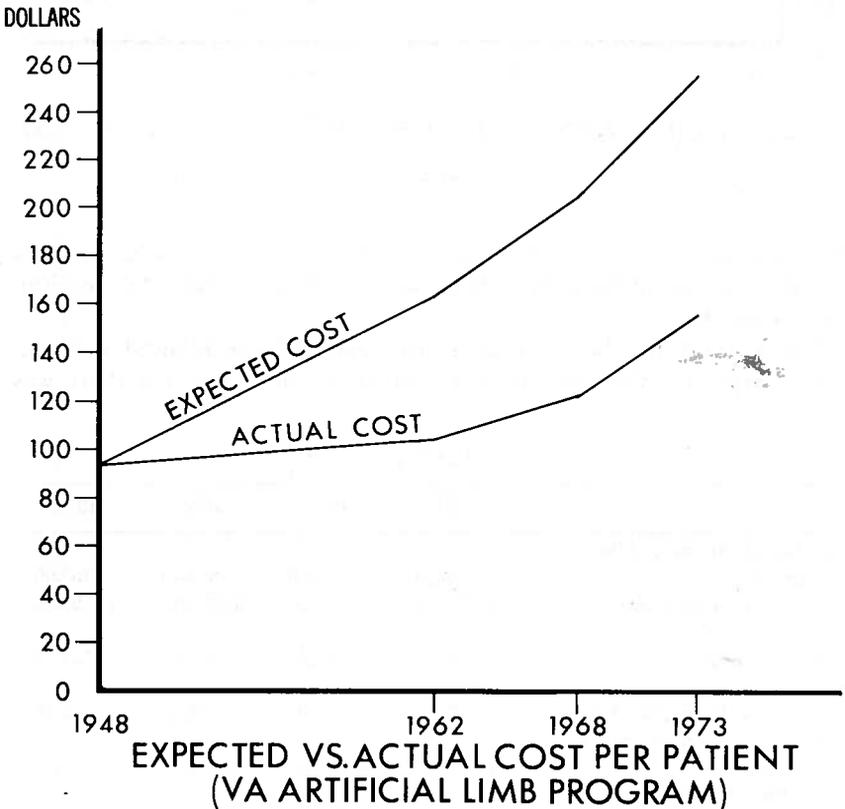
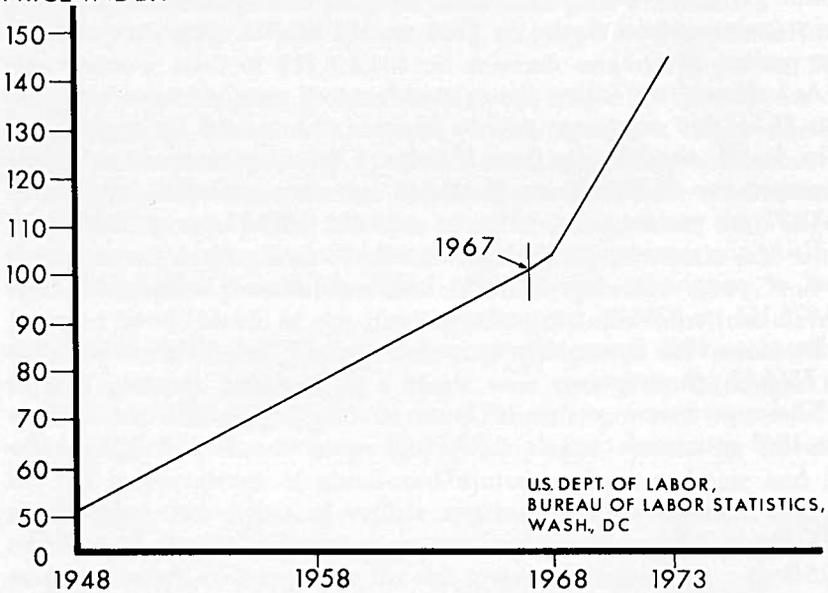


FIGURE 3

CONSUMER'S  
PRICE INDEX



COST OF LIVING (MEDICAL SERVICES - 1967= 100)

FIGURE 4

than the expected costs extrapolated from 1968 (see Table 1). This was due to the introduction of complex hardware into the development program.

The average number of repairs per patient has evidenced a downward trend over the years as indicated in Table 2. Actually there was

TABLE 1

	1948	1968	1972	1973
Number of Artificial Limb Patients	22,424	27,069	35,679	36,500
Total Cost (Experienced)	2,123,923	3,309,691	5,553,080	5,730,050
Average Cost Per Patient (Experienced)	94.72	122.27	155.64	157.00
Average Cost Per Patient Estimated from 1968 Base	94.72	205.07	248.75	256.95
Total Cost Estimated from 1948 Base	2,123,923	5,551,040	8,875,151	9,378,675
Total Cost Estimated from 1968 Base	—	3,309,691	4,084,159	—

a 21 percent overall decrement in repair frequency from 1951 to 1972. This has been brought about primarily as a result of the development of more durable as well as functional devices and by means of effective training of prosthetists in the fitting of new socket designs. These benefits of reduced repair frequency attributable to the benefits of research and education, not only reduce costs as shown, but of greater significance also reduce inconvenience to patients.

Computing the gradual average cost increases and increases in numbers of amputees on a year-by-year basis, we find that the artificial limb program over the 25-year period could reasonably be expected to have cost a total of \$117,000,000 (1). Over the entire 25-year period, actual costs were only \$74,000,000 or \$43,000,000 less than expected (see Fig. 5). (The program averaged out to \$2,960,000 per year.) This savings was more than the total cost of the Research Program.

It is conceivable that the expected average cost per patient will continue to rise in line with cost of living increases over the next 5 years. The consumer price index for urban wage earners reflects increases in the medical care series on a graduated scale from 1968 to 1973 reflecting a 33.4 percent increase. This cost of living factor undoubtedly

TABLE 2

Year	Patients	(Arms-Legs) No. of repairs	Average no. of repairs per patient
1951	22,400	27,464	1.23
52	22,700	29,904	1.32
53	23,100	31,895	1.38
54	23,600	33,096	1.40
55	23,994	32,995	1.38
56	24,599	32,952	1.34
57	25,032	32,344	1.29
58	25,455	31,544	1.24
59	25,565	31,881	1.25
60	25,961	31,308	1.21
61	26,169	30,180	1.15
62	26,384	30,818	1.17
63	26,600	30,988	1.16
64	26,848	31,558	1.18
65	26,686	31,694	1.19
66	26,581	30,562	1.15
67	26,895	30,023	1.11
68	27,594	29,613	1.07
69	29,618	30,530	1.03
70	31,992	32,769	1.02
71	33,229	34,814	1.05
72	35,679	39,258	1.10
73	36,500	—	—

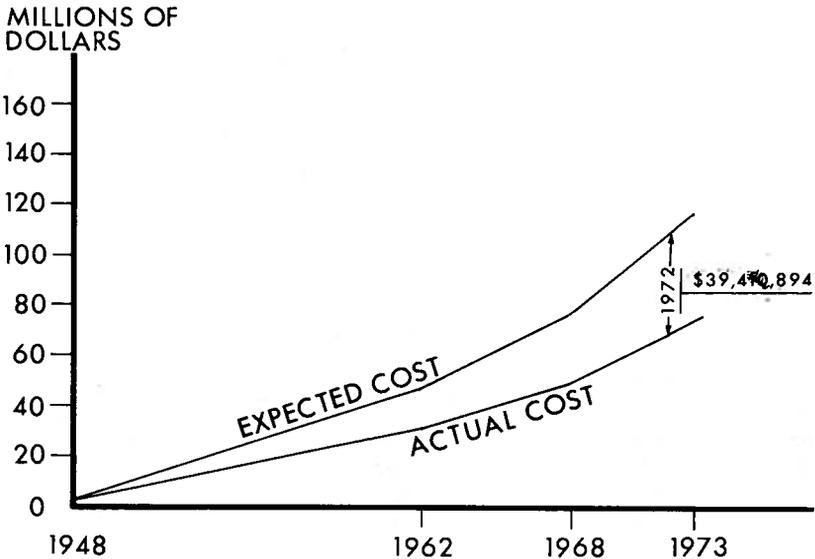
will have an effect on the cost of all types of appliances in the future (see Fig. 4).

In order to combat the anticipated price increases resulting primarily from an economy that is beset by inflation, ingenuity must be exercised in the design and development of new devices to assure that the program provides veterans with the best prosthetic devices available. These devices should provide still better service to the patient in future years.

The true value of research in the benefits derived from its application cannot be determined in accordance with strict management principles. However, the fact that a number of potentially hospital-bound patients are now able to function as productive workers purely as a result of any number of innovating research devices, reflects the merits of the program. And strictly from a dollar and cents viewpoint, the program has succeeded in holding costs down as reflected in the actual average-cost-per-patient over the years.

#### REFERENCE

1. Talley, William H.: Prosthetics Research, A Cost Reduction Program, Bull. Prosthetics Res., BPR 10-10:1-4, Fall 1968.



VA EXPECTED VS. ACTUAL COST OF ARTIFICIAL LIMBS & REPAIRS (CUMULATIVE)

FIGURE 5