Status of Health Services in Micronesia Since the 1963 Poliomyelitis Epidemic

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IN THE SUMMER of 1965 a rehabilitation evaluation team visited the Trust Territory of the Pacific to evaluate and advise on the rehabilitation of victims of the 1963 poliomyelitis epidemic in Micronesia. In addition to onsite study, extensive consultations concerning rehabilitation needs and resources were held with High Commissioner Wilfred Goding and his staff, and with Dr. Ivar Larsen at the Shriners' Hospital in Honolulu, Dr. Richard Lee, director of the School of Public Health at the University of Hawaii, and Dr. Delmar Ruthig, associate director for program services in the Office of International Health, Public Health Service.

The administration and delivery of medical care and public health measures in Micronesia must necessarily be geared to the peculiar features of the area. The observations are reviewed and discussed in context with subsequent progress in health care and the outlook for the future.

Micronesia comprises 2,000 islands of volcanic or coral origin in four major archipelagoes: the Carolines, the Marshalls, the Marianas, and the Gilbert Islands. The Gilbert Islands and Guam are excluded from the Trust Territory (fig. 1).

While temperatures are not generally excessive, rainfall is heavy and humidity averages 80 percent. Paradoxically, some of the islands near the equator suffer severe droughts. Major storms are characteristic of this part of the Pacific and are capable of inflicting damage of disastrous proportions.

Despite the fact that there are many similarities among the Micronesian populations, there are significant differences in customs and in the nine major languages which are spoken with dialectic variations. Most people know only the language that is used on their own home island.

Offsetting the difficulties related to geography, climate, population differences, and health personnel is the fact that the total population of approximately 95,000 lives on just under 100 islands. This relative concentration of population helps to reduce the problem of delivery of services to manageable proportions, assuming the availability of health resources and personnel and appropriate transportation facilities.

The Epidemic and Its Initial Effects

Between January 4 and March 3, 1963, 196 cases of paralytic poliomyelitis were recognized in the Marshall Islands. Of these, 194 occurred among an indigenous population of only 16,000, and 90 percent of these patients were under 7 years of age.

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A 9-year-old girl, living on Kwajalein Island, acquired an illness characterized by fever, headache, malaise, vomiting, and subsequent paralysis. This illness was the first clinically recognized case of paralytic poliomyelitis in the Marshall Islands. A week later a Marshallese boy, living on nearby Ebeye, another islet in Kwajalein Atoll, became paralyzed in his right leg.

During these episodes, two ships, the *Ran Annim* and the *Mieco Queen*, and a local schooner, sailed from Kwajalein throughout the neighboring atolls. The temporal relationship between a ship's arrival and the onset of epidemic poliomyelitis was well documented by Dr. James A. Bryan, a Public Health Service physician, and his associates in a report to the National Communicable Disease Center, and Dr. Carl R. Peterson, a Navy physician, in his report to the Navy's Preventive Medicine Unit at Honolulu. Figure 2 illustrates routes of the ships and the number of cases of poliomyelitis reported on each island. The epidemic was most severe on Ebeye (56 cases) and Majuro (64 cases).

An immediate mass vaccination program with Sabin oral vaccine and enforcing strict quarantine regulations confined the epidemic to the Marshall Islands. A mass oral vaccination program also was started for all the territory.

Medical and Rehabilitation Needs

In the acute phase of the illnesses there was a remarkable lack of pain and muscle spasm. Facial paralysis occurred in 29, or slightly less than 15 percent, of the patients with paralysis, and in 18 of these, or approximately 9.2 percent of all patients paralyzed, facial paralysis was an isolated finding.

In evaluating clinical severity, Bryan classified cases according to the following criteria.

1. Paralytic poliomyelitis with no residual paralysis
2. Minor residua

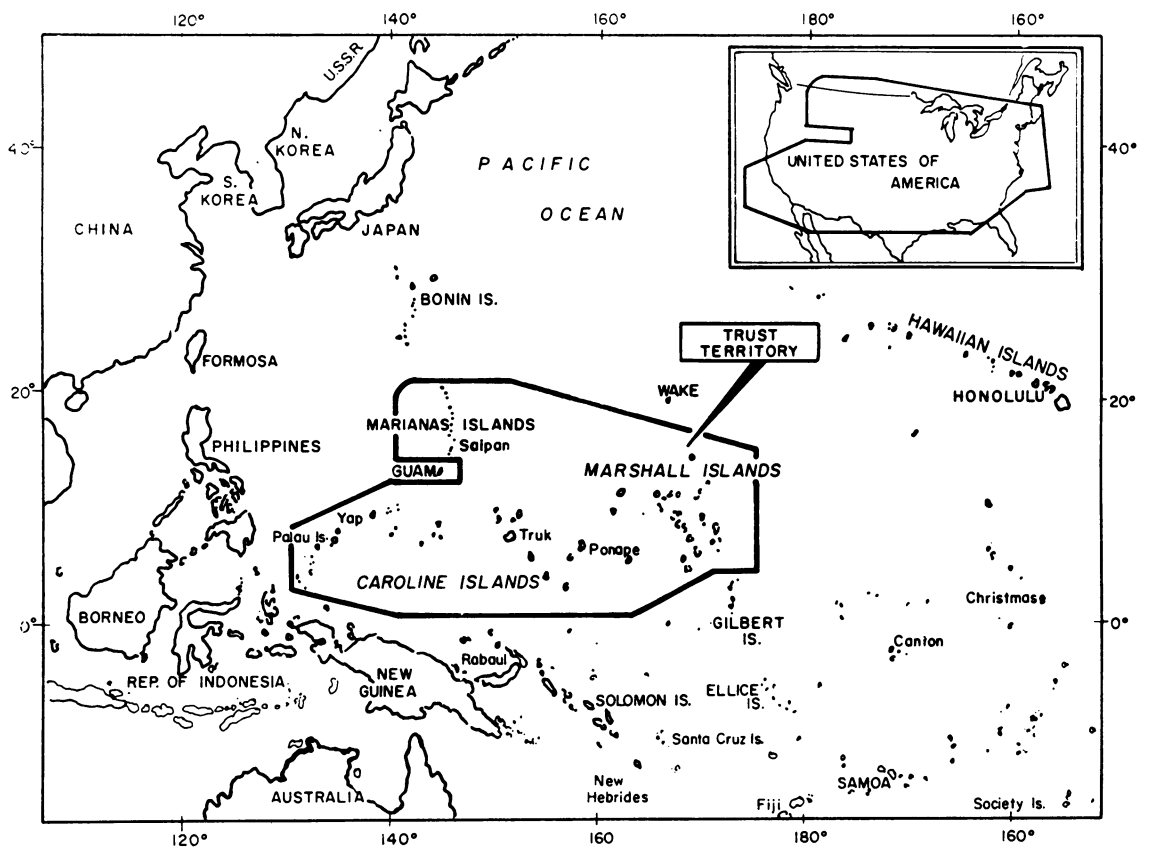

Figure 1. Trust Territory of the Pacific Islands

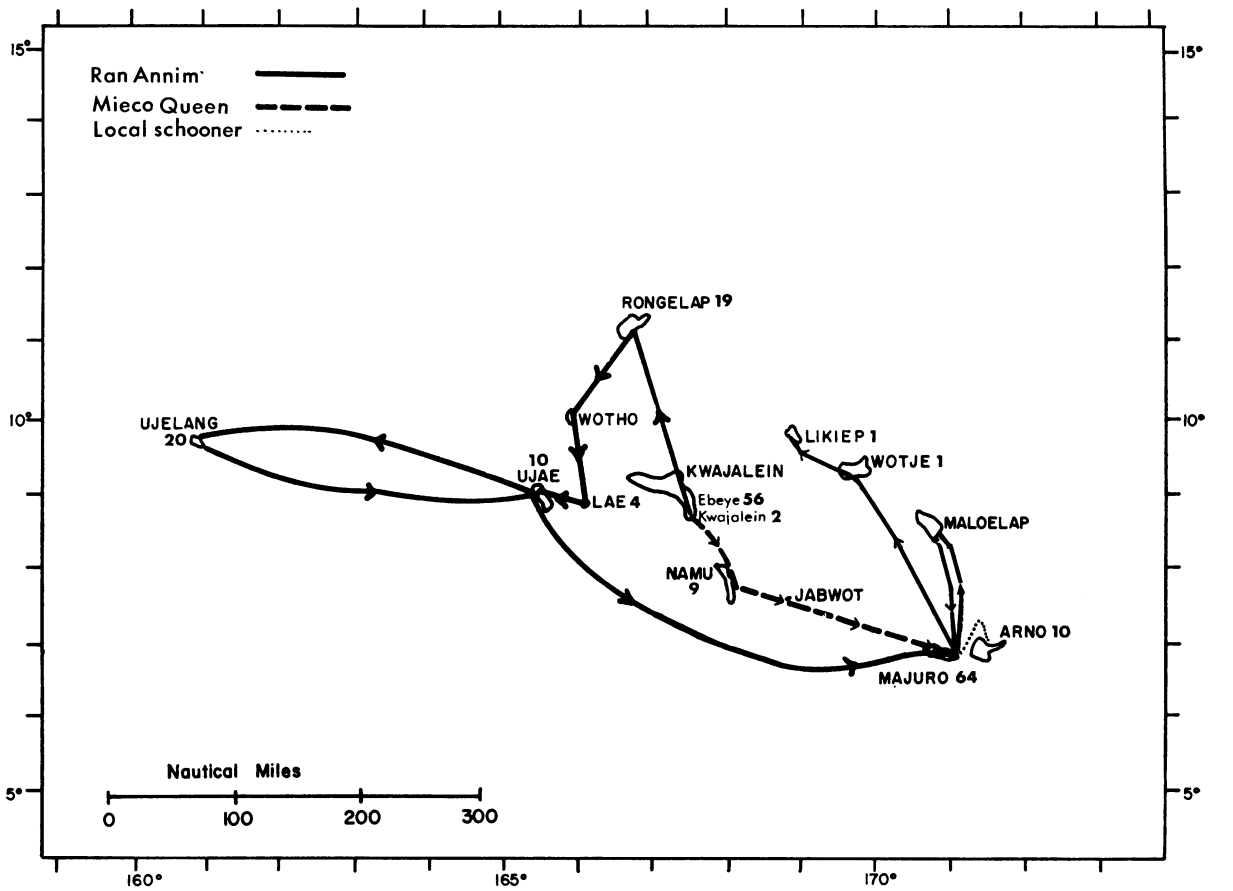

Figure 2. Routes of inter-island ships and distribution of cases of poliomyelitis, Marshall Islands, 1963

3. Significant residua leading to functional impairment of one or more limbs

4. Severe involvement leading to one or more limbs extensively involved, or severe trunk musculature involvement or both

5. Death

Table 1 shows the paralytic cases by severity, based on a 30-day post paralysis evaluation. Classes 3 and 4 required intensive rehabilitative care and followup because of the severity of the disease.

In assaying the medical needs of the patients, Dr. John E. Affeldt of the Rancho Los Amigos Hospital, Downey, Calif., and Dr. William H. Gulledge of the Shriners' Hospital for Crippled Children, Honolulu (Hawaii) Unit, in separate documents outlined extensively and comprehensively the total health needs of the 185 surviving patients.

Schneider and Tarlow (*1*) have described the efforts to develop a rehabilitation program. Indeed, the therapy program provided favorable recovery of function despite limitations in staff and facilities.

Medical treatment and surveillance. In the majority of cases the patient's medical condition had stabilized by 1965. At least two patients will need custodial care the rest of their lives. Of the 80 severely paralyzed patients, only 66 were under treatment and surveillance, and only 30 of these patients were receiving regular treatment from a physical therapist (table 2). Residing on the outer islands were 54 patients seen by a physician only once during the epidemic.

Braces and corsets. The 1965 records indicated that 37 patients were using some type of extremity bracing and 15 were issued corsets, a total of 52 patients (table 3). These patients probably constituted the majority of those re-

quiring corrective and preventive surgery. The heat, humidity, and coral terrain take a heavy toll on the longevity of the braces and supportive abdominal devices.

Family acceptance of disability and therapy. Initially, the families expected complete, spontaneous recovery from the illness. As months elapsed, many parents began to grasp the significance of the need for therapy and commenced to learn to assist in their children's regimen.

Health professionals found it impossible to convince Marshallese parents to separate their children from the home for inhospital treatment. Therefore, one parent for each child was allowed to attend the children at the hospital, but often whole families moved into the wards.

Therapists reported that families' presence caused some inconvenience in giving therapy and in ward management. Parents sometimes felt "too sympathetic" toward their children, especially when prolonged bracing and tendon-stretching exercises were required to prevent and reduce contractures.

The involvement and training of families is crucial, however, to the rehabilitation and adjustment of patients in the community. Continued health education is mandatory to achieve maximum success from corrective surgical procedures.

Social and vocational rehabilitation. Of the patients receiving medical care, 19 required extensive vocational rehabilitation. Seventeen of these had primarily lower extremity involvement, and two had flail upper limbs. In 1965 there were 143 affected children over the age of 6 years, 20 of whom were 12 years of age or older. The urgent task of developing a program within the framework of the islands' environment and economy was increasingly apparent.

Table 1. Severity of paralytic cases of poliomyelitis, Marshall Islands, 1963

Class	Number	Percent
1	37	19
2	68	35
3	51	26
4	29	15
5	11	5
Total	196	100

Table 2. Treatment status of 185 patients who had poliomyelitis during the Marshall Islands epidemic, 1963

Status	Majuro	Ebeye	Outer islands	Total
Treatment and surveillance	39	27	0	66
Not under active care	[1] 11	[1] 3	[2] 53	56
Completely discharged	10	12	30	52
Total	60	42	84	185

[1] Pending complete discharge.
[2] Required medical examinations relative to determining surveillance or treatment programs.

Realistically, social and vocational rehabilitation must be geared to the islands' sharply inhibited economic development and to their limited resources. Communities are small and the people live communally. The close relationship between daily living and the environment determine the kind and extent of vocational rehabilitation.

In 1965 there was little evidence of planning for the education and vocational rehabilitation of the patients. As a part of the planning of services, it was recommended that case records be compiled and that each patient be helped to function at his maximum potential.

Trust Territory Rehabilitation Center

The establishment of the Trust Territory Rehabilitation Center in Majuro, Marshall Islands, offered an unprecedented opportunity for the improved care of disabled patients throughout Micronesia. Proximity of the Armer Ishoda Memorial Hospital provided an opportunity for all patients to profit from rehabilitation medicine. This is exemplified by transfer of a young traumatized paraplegic to the rehabilitation center where he was trained in the activities of daily living and returned to Palau. With the addition of the rehabilitation center, a continued program of total health care was instituted. In 1965 the addition of 60 beds to the complex was contemplated, and a 15-bed section was opened as personnel became available.

Projected major functions of this center are to provide (*a*) selected patient care in rehabilitation medicine for the inhabitants of the Territory, (*b*) referral services for patients with chronic disease or who require long-term care, (*c*) compilations of data on amputees, paraplegics, and other disabled persons so that services can be given at the district hospitals, and (*d*) training of health personnel in the latest rehabilitative techniques.

It was recommended that, as the need for hospitalization of the poliomyelitis patients diminishes, the facility be used to rehabilitate the victims of other crippling diseases, such as strokes, and persons with injuries to the spinal cord or orthopedic problems. According to health authorities in the Marshalls, this expansion of services has begun.

Further recommendations were that the rehabilitation center be maintained as a dynamic center for active rehabilitation and that it not be allowed to settle into a custodial institution as it accumulated patients for whom no ready discharge seemed possible.

Pending the completion of the Rehabilitation Center, therapy was carried on at improvised structures at Majuro. In 1965 three old quonset huts were used to house patients and their families from the outer islands, while a fourth hut was used for therapy. At Ebeye a small, inadequate building was in use and therapy was carried on in an adjacent hospital.

Table 3. Patients using braces and corsets, Marshall Islands, 1965

Type of appliances	Majuro	Ebeye	Outer islands	Total
Bilateral long leg braces	10	3	0	13
Unilateral long leg brace	1	7	2	10
Bilateral short leg braces	0	0	1	1
Unilateral short leg brace	5	1	4	10
Unilateral long leg brace and unilateral short leg brace	1	0	0	1
Upper extremity bracing	[1] 1	1	0	2
Corset [2]	9	4	2	15
Total	27	16	9	52

[1] Patient had severe bilateral upper extremity involvement.

[2] Patients requiring corsets may also have required any of the other appliances.

In 1965 the physical plant of the Trust Territory Rehabilitation Center had been largely completed and the basic rehabilitation equipment (whirlpool baths, heat modalities, and other units) had been delivered. The anodized aluminum structure contains a gymnasium, therapy rooms, dining and kitchen facilities, and two 30-bed wards separated by an outdoor therapeutic swimming pool which was not yet completed. In addition to recommendations regarding ventilation and proper use of the pool and equipment, a major recommendation was that the rehabilitation center be absorbed by the nearby Armer Ishoda Hospital, and that wards be opened in 15-bed units. In 1968, 30 beds were in use.

The Situation and Recommendations in 1965

During the visit in 1965 a number of other recommendations were made. These were necessarily divided between those measures which were designed to deal with the immediate problem, and recommendations which would result in the development and improvement of permanent rehabilitation and health resources.

In the summer of 1965 the rehabilitation of patients with physical disabilities was being met on an adaptive basis using available resources and facilities. At the same time, the Trust Territory Rehabilitation Center was being organized to provide more appropriate and effective rehabilitation care.

Except during an emergency, no local medical officers were assigned to the direct management of these patients, although the physical therapists received medical instruction from the visiting orthopedist from the Shriners' Hospital in Honolulu. These physicians had been providing excellent orthopedic evaluations for the patients at 6-month intervals and, in addition to surgery performed at Majuro, occasionally patients were operated on in Honolulu. Recommendations were made for the intensification and improvement of the surgical program at Majuro, including pre- and postoperative care.

Before 1966, Majuro lacked facilities for surgery. However, after the activation of the Trust

Territory Rehabilitation Center, the program began. Approximately 30 patients received corrective surgery, and the majority of these operations were Grice procedures and peroneal tendon transfers.

Available paramedical personnel consisted of two American registered physical therapists (one at Ebeye Clinic and the other at the Majuro Clinic), two physical therapy aides at Majuro, one of whom had nurses' training, and a mechanic with the public works department who was being trained in bracing and prosthetics in Hawaii. Recommendations were made as to the more effective use of these paramedical personnel, and the assignment of an additional physical therapy aide to the Ebeye Clinic.

A skilled orthotist from Honolulu accompanied the orthopedists on their biennial visits. It was recommended that the local mechanic who was being trained be assigned maintenance responsibilities for braces. No wheelchairs were then available, although a dozen or more were needed. These would have to be modified for use on the difficult terrain, and it was recommended that the local mechanic do this.

Prospects

When the poliomyelitis epidemic occurred in 1963, there was a severe shortage of health personnel. Since then significant steps have been taken to remedy the situation. These steps were aided in part by the new eligibility for Public Health Service grants. Two young physicians as well as a physical therapist have settled in the Marshall Islands. Funds are now available for a stateside supervising clinical nurse in each district as well as one or two supervising public health nurses in each district. Salaries are such that no difficulty in recruiting nurses is anticipated. Nevertheless, the shortage of health personnel is still considered acute.

In 1965 it was recommended that for the purpose of training rehabilitation personnel, the possibilities for liaison with New York University be explored and that the training relationship with the University of Hawaii be strengthened. The long-term goal should be to include an occupational therapist, vocational counselor, and social worker on staff of the rehabilitation center.

All recommendations were geared to dealing with the ongoing need for rehabilitation while at the same time planning for the future.

The quality of health care in Micronesia, including rehabilitation, is closely bound to overall developments in the Trust Territory. The improved radio communication and rapid transportation obviously facilitate the delivery of health care. The availability of education and of professional and paraprofessional training both locally and elsewhere is clearly related to eliminating personnel shortages. The active collaboration of concerned health agencies with the appropriate Government authorities is of fundamental importance.

Basic public health laws are set forth in section 610–625 of the Trust Territory Code. As a result of the developments in health and education programs, the department of community services was separated into a department of education and a department of health, and a director of public health was appointed in June 1967. Local community planning and support for health and education programs are utilized to a considerable degree.

On the international level consultation and reporting activities are maintained with the World Health Organization (Western Pacific Region), the U.S. Public Health Service, and the University of Hawaii, among others. As a result of the Partnership for Health Act of 1967 the Trust Territory became eligible for Federal funds for comprehensive health planning.

In addition to the development of the Trust Territory Rehabilitation Center, three of the six district hospitals have been built since 1961. Three additional hospitals are scheduled for construction as well as a central training-referral hospital and three new units of a field hospital type. One hundred thirty-nine dispensaries and medical aid posts are scattered throughout the territory. The out-islanders are still physically difficult to reach. The first of a fleet of four administrative vessels to be used for health, education, and other community purposes has been acquired (*2*).

Referrals to the Crippled Children's Services have increased rapidly and many defects and deformities are now being treated. The Guam Naval Hospital continues to care for patients with complicated cases, and the Shriners'

Table 4. Persons receiving the full course for immunization against certain communicable diseases, revaccinations, and boosters for selected immunizations, July 1967–June 1968

Immunizing agent	Total
Smallpox:	
Primary	1, 994
Revaccination	4, 469
Poliomyelitis (trivalent-OPV)	4, 277
Typhoid:	
Initial series	1, 780
Boosters	[1] 15, 121
Whooping cough (pertussis):	
Initial series	786
Boosters	628
Diphtheria:	
Initial series	1, 167
Boosters	2, 705
Tetanus:	
Initial series	1, 167
Boosters	[1] 14, 337

[1] About 70 percent of the typhoid and 81 percent of the tetanus boosters were given after typhoons in Yap and the Mariana Islands.

NOTE: Cholera, typhus, and influenza vaccines are given to special groups or when required for travel, but these are not included in the general vaccination program of the Trust Territory.

Source: Reference 2.

Hospital in Honolulu, which has provided services since 1965 as a result of the poliomyelitis epidemic, is now treating orthopedic conditions.

Impact of Federal Programs

Significant advances are being made in the economic, health, and social fields. Education is developing at an accelerated pace at all levels as exemplified by school construction, higher enrollments, improvements in teaching education, and stress on vocational education. In 1968, 351 Micronesians were enrolled in schools in the United States and elsewhere. Federal programs increasingly active in the islands include Head Start, inclusion of the Territory in the Economic Opportunity Act (which provides community participation, individual development of skills, and remedial education), and broadened participation of the Public Health Service. The Peace Corps has also been making a major contribution.

As of June 1968, there were 125 nonindigenous (including 103 Peace Corps personnel) and 762 indigenous public health workers. Among them 50 were physicians, dentists, nurses, technicians, and various other health personnel (*2*).

Despite the significant advances that have been made, for the immediate future extensive rehabilitation services fully staffed with medical and paramedical personnel are not realistic. The continued delivery of effective rehabilitation care depends on the development of a pervasive rehabilitation philosophy among all health personnel, particularly those engaged in clinical care. In summary, it was recommended that the combined resources of the appropriate Government and community agencies be used in effecting rehabilitation where needed.

The National Communicable Disease Center has completed plans for a permanent epidemiologic surveillance system and is recruiting an epidemiologist. Plans for a crash immunization program have recently been approved. This plan was developed in conjunction with the National Communicable Disease Center, Public Health Service. A report of the total number of immunizations in the islands in the period July 1967–June 1968 was made in the 21st Annual Report on the Administration of the Trust Territory (table 4). Currently a comprehensive health plan which has been developed in conjunction with the University of Hawaii is being refined.

It is in the context of the overall advance in health, education, and community development that effective rehabilitation in Micronesia should continue to develop. The availability of trained indigenous personnel and the capacity to attract professionals from elsewhere to work in Micronesia is related to the developments which have already taken place and to the broad scale advances being planned.

Summary

In the summer of 1965 a rehabilitation evaluation team visited the Trust Territory of the Pacific to evaluate and advise on the rehabilitation of patients following the 1963 poliomyelitis epidemic in Micronesia. In appraising the residual disability and the available medical, surgical, and rehabilitation care, the team observed that significant progress had been made. Rehabilitative services were being delivered on an improvised basis, and the Trust Territory Rehabilitation Center was being developed. The

center had been constructed, rehabilitation equipment had been received, and a limited number of personnel was available. Recommendations were made for improving the immediate rehabilitative care and planning for long-term growth. This growth included the extension of activities to treat orthopedic and other appropriate disabilities as the rehabilitation of patients who had poliomyelitis residua was stabilized.

The outlook for effective rehabilitation in the area is inevitably related to advances in social, economic, health, and community developments. Growth in education at all levels, improved transportation and communication, and developments in local activities and in international cooperation in the health affairs contribute to the attainment of the immediate goal, as well as for long-term care. A review of the developments in the Trust Territory, particularly as reported to the United Nations in 1968, points to the creation of a favorable environment for the growth of rehabilitation services and long-term care in Micronesia.

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Tearsheet Requests

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Long-Term Care Beds Total More Than 1 Million

The number of long-term care beds in the nation's nursing homes and related facilities has passed the 1 million mark, according to the American Nursing Home Association.

A survey of State licensing agencies, made by ANHA, showed that as of January 1, 1969, there were 23,013 licensed nursing homes and related long-term facilities with 1,024,510 beds. Of these facilities, 13,047 are licensed as nursing homes (providing at least 8 hours a day of licensed nursing supervision) with a bed capacity of 762,465.

The survey results show an increase in the total bed capacity of 110,011 over figures released by State licensing agencies a year earlier, including an increase of 55,281 in licensed nursing home beds. The net growth amounted to 301 beds per day.

The growth rate for nursing home beds for the year, 7.8 percent, was down somewhat from the 10 percent rate experienced over the past several years. But the rate of growth for related facilities, such as personal care homes and homes for the aged, was more than 26 percent.

The net growths in number of nursing homes (only 135) and in number of beds (55,281) obviously indicate that many older homes have sought reclassification to meet needs for homes that offer a lesser degree of nursing service, have gone out of business, or have added to their bed capacities through expansion and modernization programs.

Under new Federal-State financing programs such as Medicaid, recognition has been given to facilities other than skilled nursing homes. Some homes, recognizing the need for the lower level of care, have chosen to be licensed under new categories such as intermediate or personal care homes, either with or without nursing supervision.

The average size nursing home, the survey showed, was 58.4 beds, compared to 54 beds in 1968, 44 in 1966, and 31 in 1961.