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RELATIONS BETWEEN HEALTH LEVELS, SERVICES AND DEMAND IN FRENCH POLYNESIA

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Abstract—During the course of the last 30 years, the pathological landscape of French Polynesia has undergone major changes. All health indicators attest to the fact that the overall level of health has improved. A sickness regime typical of a developed country now coexists with a pathology of a less developed country. The latter remains a matter of concern.

There is a general health over-servicing in French Polynesia, but especially Tahiti itself contrasts with the modest means of the surrounding islands. For example 91% of private doctors in French Polynesia practice in Tahiti's city area. Medical utilization has risen with the level of services offered more than *pro rata* to population increase. This is a consequence of the sudden development of a modern lifestyle in a marginal territory.

Examples make clear that medical facility coverage is widespread and that a system of free public health care has been developed both among the population of Tahiti and also of the surrounding islands.

Key words—health services, changing expenditure, population boom, infant mortality

INTRODUCTION

During the last 30 years French Polynesia has witnessed major social changes. The population has greatly increased and urbanized and the standard of living has improved as a consequence of the opening of the territory to the outside world and the installation of the nuclear testing centre in the early 1960s. The 118 islands of the five archipelagoes of French Polynesia are often tiny, and frequently remain very isolated and sparsely populated as are many of the other islands of the states and territories of the South Pacific area. Consequently French Polynesia provides a good example of accelerated transition in the field of health levels and its health care system and making allowance for demographic and economic conditions.

PRELIMINARY DEMOGRAPHIC AND ECONOMIC DATA

Population change

In the last 40 years the population of French Polynesia has more than trebled from 58,200 inhabitants in 1946 to 180,700 in 1986, and it has doubled between 1966 and 1986. This is equivalent to an average annual increase of 4% in the last 40 years and of 3% in the last 10 years.

This spectacular increase has emphasized the unequal population distribution in the territory which occurred during the colonial period. The population of the peripheral archipelagoes (Marquesas, Tuamotu, Gambier, Austral) is static, whereas in the Society Archipelago and particularly in Tahiti itself population is continually on the increase. In 1956, the population of Tahiti was 50% of the total of French Polynesia. By 1983, it was more than 70%. The most noteworthy fact is the development of an urban area in the northwest of Tahiti to 25% of the French Polynesian total in the early 1960s. In Table 1 and Figs 1, 2 and 3, three major features are

shown: the demographic boom, the population concentration in urban areas, and the accelerated rate of urbanization.

Mortality and infant mortality

The population multiplication by 2.5 in the last 30 years is basically due to natural growth. The role of migration is secondary. The birth rate was higher than 40 per 1000 until 1960 and stabilized at 30 per 1000 about 10 years ago. There is no evidence of a decline being likely in the near future in spite of the fall in the fecundity rate.

Consequently population increase is mostly due to mortality decrease. The mortality rate was high at the end of World War II and remained above 10 per 1000 until the end of the 1960s. It has steadily decreased since the early 1970s and is at present 5.3 per 1000. This general decrease in mortality is attributable to the spectacular fall of infant mortality. The infant mortality rate was over 100 per 1000 until the end of the 1950s, around 70 per 1000 during the 1960s and 50 per 1000 during the 1970s. The infant mortality rate is currently under 20 per 1000. Table 1 and Figs 4, 5 and 6 illustrate these improvements and changes in French Polynesia's demographic characteristics from an under-developed country's situation to one more like developed countries.

Figure 5 shows the favourable evolution of all the infant mortality parameters even if they are still higher than in most developed countries. Their different rates of change reveal the level of the epidemiological transition: the very favourable change in the perinatal mortality rate (stillborn babies and deaths during the first week of life) currently 14 per 1000 and of early neonatal mortality (deaths during the first month) at 7.6 per 1000. These result from good quality antenatal training and care of newborn children in hospital. But the maintenance at 11.6 per 1000 in 1986 of the post-neonatal mortality (deaths



Table 1. Some demographic data for French Polynesia, 1945-1987

Year	Births	Deaths	Natural increase	Average population ('000)	Crude birth rate*	Crude mortality rate†	Natural increase rate per 1000	Infant mortality rate‡
1945	2025	843	1182	56.9	35.6	14.8	20.8	
1946	2288	1081	1207	58.2	39.3	18.6	20.7	117
1947	2210	1201	1009	59.1	37.4	20.3	17.1	180
1948	2378	1068	1310	60.1	39.6	17.8	21.8	155
1949	2457	978	1479	61.1	40.2	16.0	24.2	146
1950	2489	1131	1358	62.1	40.1	18.2	21.9	112
1951	2295	1626	669	63.0	36.4	25.8	10.6	217
1952	2902	948	1954	64.5	45.0	14.7	30.3	99
1953	2892	945	1947	66.8	43.2	14.1	29.1	132
1954	3019	838	2181	69.2	43.6	12.1	31.5	101
1955	3217	841	2376	71.9	44.7	11.7	33.0	98
1956	3403	837	2566	75.2	45.2	11.1	34.1	80
1957	3296	901	2395	76.6	42.7	11.8	30.9	100
1958	3081	920	2161	78.1	39.2	11.8	27.4	102
1959	3486	832	2654	79.6	43.6	10.5	33.1	75
1960	3626	936	2690	81.1	44.6	11.5	33.1	92
1961	3502	1041	2461	82.6	42.3	12.6	29.7	126
1962	3797	787	3010	84.2	45.1	9.3	35.8	65
1963	3912	884	3028	86.3	45.3	10.2	35.1	76
1964	4177	912	3265	89.1	46.9	10.2	36.7	71
1965	4266	1030	3236	92.0	46.4	11.2	35.2	72
1966	4071	1090	2981	95.0	42.9	11.5	31.4	79
1967	4819	973	3846	98.1	49.1	9.9	39.2	57
1968	4567	968	3599	101.9	44.8	9.5	35.3	55
1969	4597	977	3620	106.8	43.0	9.1	33.9	73
1970	4390	1065	3325	112.0	39.2	9.5	29.7	67
1971	4366	1018	3348	117.3	37.2	8.7	28.5	64
1972	4334	958	3376	123.0	35.2	7.8	27.4	34
1973	4202	940	3262	125.9	33.4	7.5	25.9	42
1974	4306	896	3410	128.8	33.4	7.0	26.5	50
1975	4404	953	3451	131.8	33.4	7.2	26.2	43
1976	4252	1047	3205	134.7	31.6	7.8	23.8	68
1977	4393	983	3410	138.1	31.8	7.1	24.7	57
1978	4272	1120	3152	142.2	30.0	7.9	22.2	64
1979	4331	1020	3311	146.5	29.6	7.0	22.6	49
1980	4544	1005	3539	150.9	30.1	6.7	23.5	41
1981	4771	966	3805	155.5	30.7	6.2	24.5	41
1982	4818	1008	3810	160.3	30.1	6.3	23.8	35
1983	4997	930	4067	165.3	30.2	5.6	24.6	23
1984	5171	879	4292	170.3	30.4	5.2	25.2	20
1985	5402	984	4418	175.4	30.8	5.6	25.2	23
1986	5378	964	4414	180.7	29.6	5.3	24.3	18
1987	5370	1008	4362	186	28.9	5.4	23.4	19

*Number of live births per 1000 mean population.

†Number of deaths per 1000 mean population.

‡Number of deaths of live born children within one year of birth per 1000 live births.

Source: Institut Territorial de la Statistique, 1988.

between one month and one year) emphasizes the need for infant surveillance during the whole of the first year of life. Contrasted with the situation in most industrialized countries, 60% of infant mortality in French Polynesia is due to post-neonatal mortality.

Age structure

In 1986 the territory population still had a young profile. Fifty percent of the people were less than 20 years old. Due to demographic momentum, following the recent drop of natality and fecundity, the French Polynesian population will remain young for a long time, with less than one quarter of the people older than 40 years.

Economic boom and social change

In the 25 years following the establishment of the nuclear testing centre in 1963 there has been a tremendous economic boom quite as remarkable as the demographic changes (Fig. 6). This exceptional economic growth is artificial, being related solely to

the nuclear testing centre. Consequently this implies aggravated dependence upon overseas sources even for food, and increasing ethnic, geographic and economic income disparities. This modernization and economic boom particularly affects the urban area. According to a 1979 survey of the Institut Territorial de la Statistique, the average income of an Asiatic family was 4.8 times higher than the income of a Polynesian family and 2.5 times higher than the income of a European or a half caste family. The average income of employers was 10 times higher than the incomes of wage-earners.

A NEW PATHOLOGICAL LANDSCAPE

The consequences for demographic, economic and social evolution are as numerous in the health field in French Polynesia as we have seen in changes of mortality and infant mortality. The health care scene directly affects the pathological landscape. Until the end of the 1950s morbidity had been chiefly due to infectious and parasitic diseases. From the 1960s to

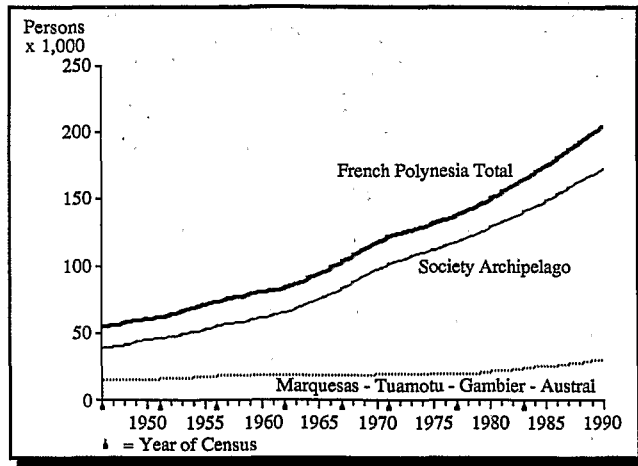


Fig. 1. Population change in French Polynesia from 1946 to 1990.

date a new pattern of morbidity has been established with increases in degenerative and chronic diseases particularly those of the metabolism, the heart and blood vessels, poisoning and trauma. The latter increase is particularly related to road traffic accidents rising from 54 in 1959 to 715 in 1964.

GROWTH AND IMBALANCES OF THE HEALTH SERVICES

In all health sectors the development of health services has been significant. Until 1963-64 health services were essentially public and also limited in scope. Nowadays health services are very diversified in both the public and private spheres. However the geographic distribution of health services is still very unequal.

The global evolution of medical and hospital equipment

The total of private and public sector physicians in French Polynesia was 255 in 1986, that is 1.4 per 1000 of population or one doctor per 698 inhabitants. In 1964 the rate was 0.4 per 1000 or one physician for 2308 inhabitants. This growth was quite slow until

the end of the 1970s. Since then growth has been sharp: in 1987 physicians in the public health service numbered 140 against only 56 in 1980. In 10 years, numbers in the private sector have increased from 34 in 1978 to 115 in 1986; overall that is a seven-fold increase in 20 years (Table 2).

Unlike medical services, dental care has long been dominated by the private sector. In 1964 there were 17 private dental surgeons compared to 1 in the public health service with a ratio of 0.2 per 1000 inhabitants. The rise has been rapid; in 1986 there were 25 public service dental surgeons and 60 in the private sector. Now the rate for French Polynesia, 0.5 per 1000, is close to the rate in France, 0.6 per 1000.

The number of pharmaceutical outlets has been limited for a long time. In 1972 there were only five private chemists and three working for public health. Increasing numbers of chemist shops date to the early 1980s, rising from 13 private chemist shops in 1979 to 26 in 1986. During the same period, public health chemists strength has also doubled from four in 1979 to eight in 1986. With 0.7 chemists per 1000 inhabitants French Polynesia is now close to France's rate of 0.8 per 1000.

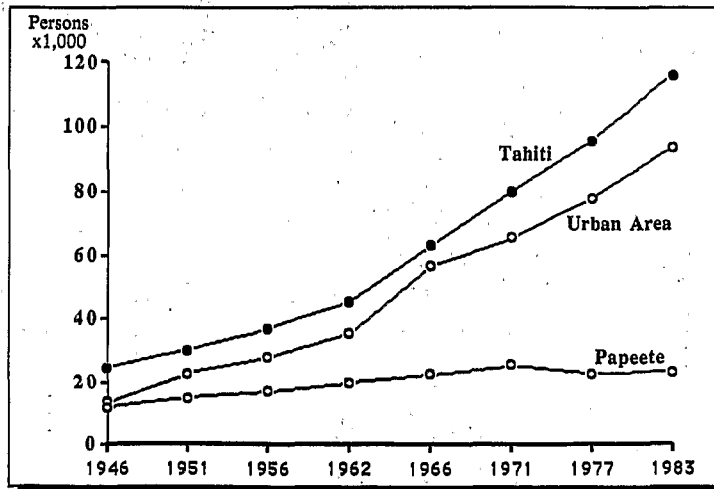


Fig. 2. Urban growth in French Polynesia.

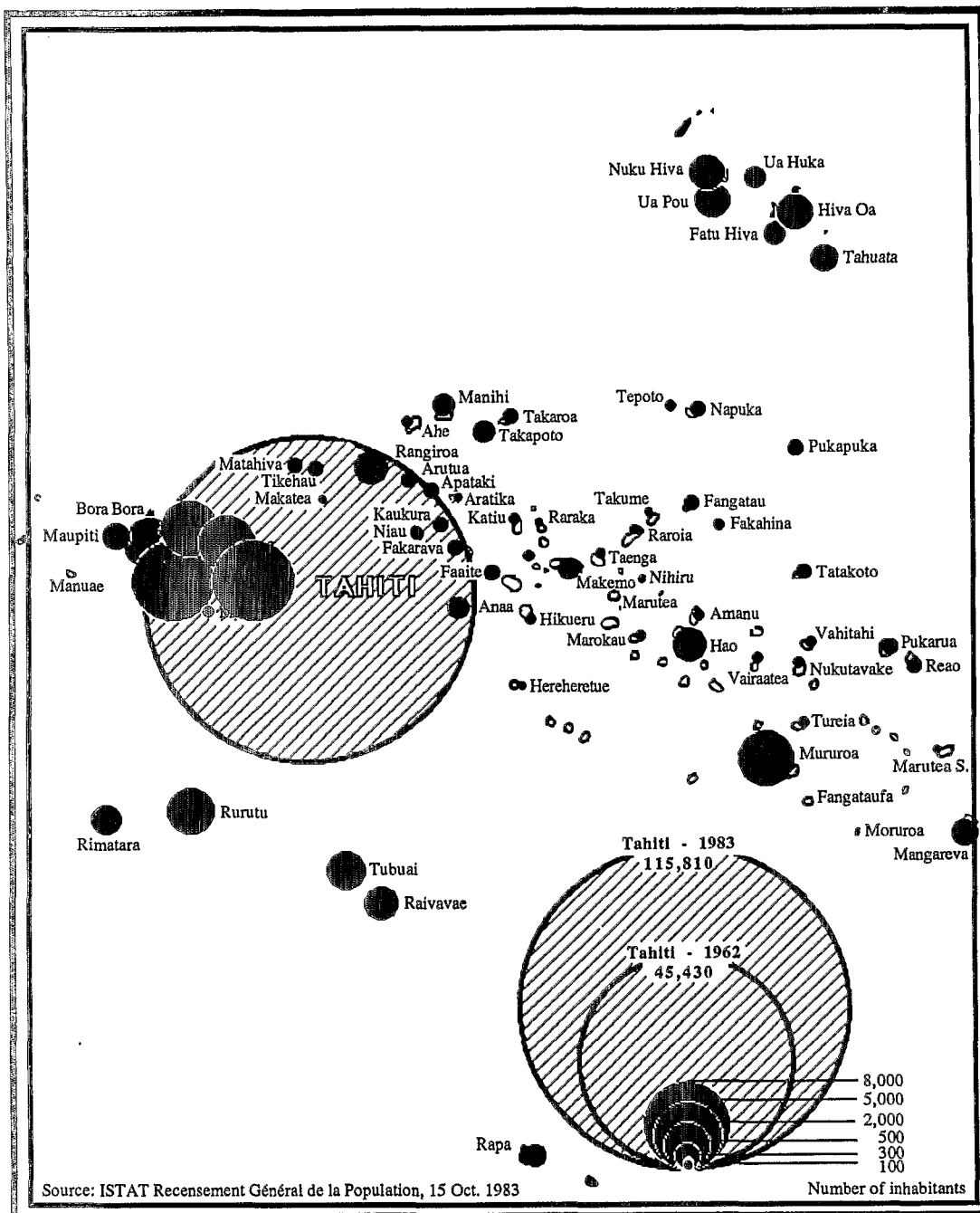


Fig. 3. Population distribution in French Polynesia, 1983.

The other categories of health personnel are in the public sector to an overwhelming extent. From 157 nurses (1.7 per 1000 inhabitants) in 1964 they have risen to 260 in 1979 and to 460 in 1986 (2.2 per 1000). This represents a near trebling in 20 years. Increasing numbers of public health assistants (a qualification lower than for nurses) has also been spectacular. From 20 in 1968 they rose to 120 10 years later and to 180 in 1986. They act as nurses in charge of a great part of the public health system, particularly in the more remote islands where there are no medical doctors.

Lastly, the number of hospital beds has doubled in 20 years from 500 in 1964 to 1000 in 1984. The rate has remained stable for the last 30 years at 5.4 beds per 1000. The innovation has been in the marked increase of quality, with more and more specialized beds, and the opening of three private clinics. One opened in 1965 and currently offers 76 beds, another in 1982 with 105 beds and a third for cosmetic surgery. These private clinics are all located in Papeete and treat mostly urban people as indeed 90% of all private medical services do.

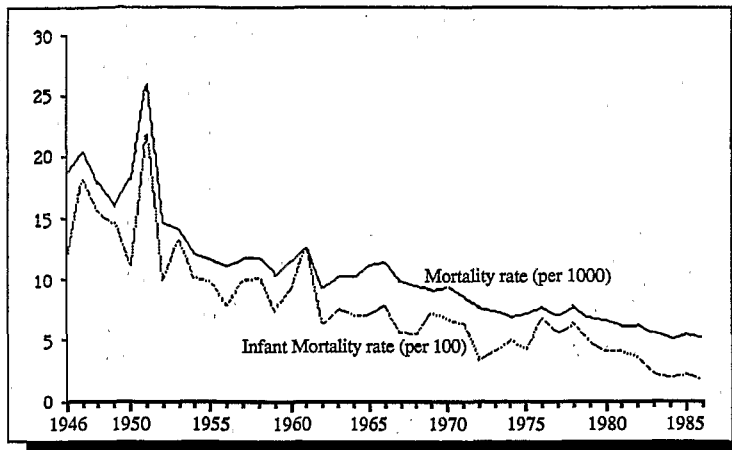


Fig. 4. Mortality and infant mortality in French Polynesia.

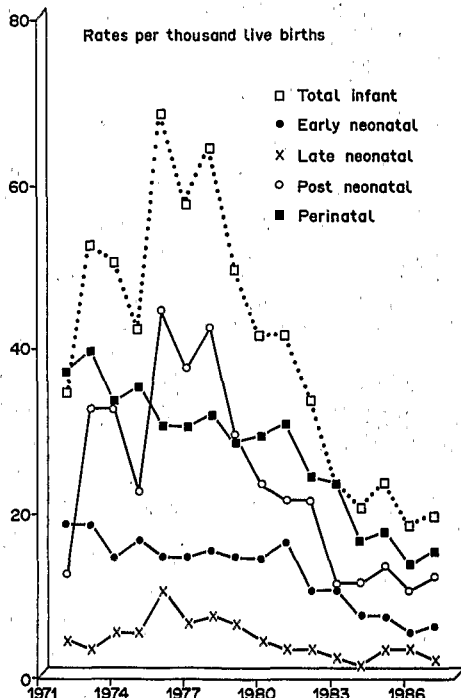


Fig. 5

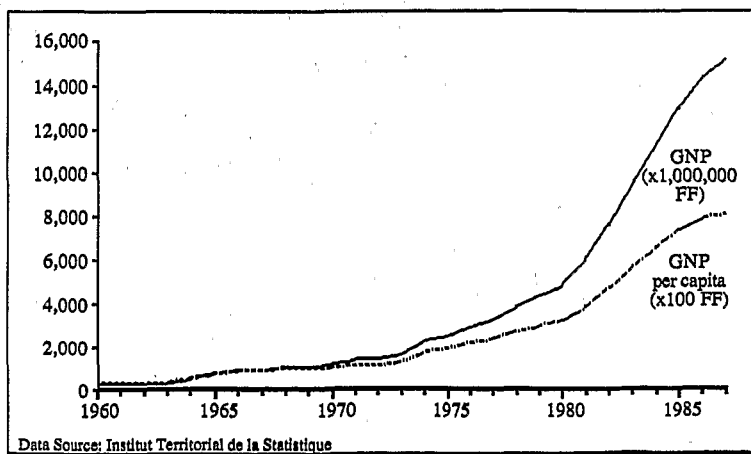
Health services organization

In terms of overall cost, more than half of health provision is by the private sector, compared to 35% 10 years ago and possibly 10% in the early 1960s. Although there is some access for civilians to Military Health Services (for example, air ambulance evacuation in case of emergency or major burns) the Military Health Services primarily treat the military forces. The private sector offers a large range of medical and para-medical services, particularly since the opening of a second private clinic in 1982 with most specialities.

The Public Health Administration is divided into several sections (Table 3). Its organization relates to its importance in territory life. Its budget of 290 million French francs was 10% of the territory budget in 1986. Its total personnel in all grades was 2002 staff in 1986. The public health organization is also proportional to the uneven geographical distribution of population.

Geographical disparity of supply

The spatial distribution of health service allocation is inequitable. With 70% of the territory population, Tahiti island has a concentration of 82% of physicians, 96% of chemists, 78% of dental surgeons and



Data Source: Institut Territorial de la Statistique

Fig. 6. Gross national product and GNP per capita in French Polynesia.

Table 2. Physicians in the private sector, 1987

Specialty	Number
General medical practitioners	90
Gynaecologists	8
Anaesthetists	6
Dermatologists	5
Ophthalmologists	5
Ear, nose and throat specialists	4
Radiologists	4
General surgeons	3
Paediatricians	3
Cardiologists	2
Cosmetic surgeons	2
Biologists	1
Orthopaedic surgeons	1
Stomatologists	1
Chest and allergy specialists	1
Psychiatrists and neurologists	1
Rheumatologists	1
Urologists	1

Source: Council of Physicians, Papeete.

85% of hospital beds. In contrast, the Tuamotu-Gambier Archipelagoes with 7% of French Polynesia's inhabitants have only 2% of physicians, dental surgeons and nurses and no chemist and no hospital beds.

In terms of rates (cf. Table 4) there is flagrant inequality between the Windward Islands (Tahiti and Moorea) where rates are close to or even higher than those in industrialized countries and the surrounding Leeward Islands, Marquesas and especially the Austral, Tuamotu and Gambier archipelagoes, where rates are close to those of developing countries.

Maps of medical personnel in 1987 compared with maps of population distribution explain this inequality. They also indicate that distance is a major factor.

Medical evacuations from the surrounding islands to centralized establishments in Tahiti are the solution chosen in spite of the high cost. These air ambulance journeys can be extremely urgent but more often they are routine links. The slight drop in these evacuations in 1987 results from a better definition of the criteria for air ambulance evacuation on a real-cost basis (Table 5).

HEALTH CONSUMPTION: BEHAVIOURAL PATTERNS AND COSTS

Growth and diversification of medical consumption

As health service opportunities have grown and diversified, overall consumption has risen and changed in the last 30 years. The growth of public health expenditure annually and per capita is a prime indication of this change (Fig. 7).

As well as private and public medical care, Polynesians still ask for traditional health care. Although it is always difficult to quantify its role, it is a fact that in the early 1960s this type of care represented a large part of health consumption. It has been brought back into fashion by a neo-traditional cultural movement and may possibly not be really significant in either the urban area or in the rural areas. A similar picture holds for Oriental and Chinese drugs used by people of Chinese origin, which account for only 1.6% of the total imports of medicines in 1986. The spectacular growth of industrial drugs (Fig. 8) has led to a new Polynesian behavioural pattern with regard to medical choices. The spectacular growth of air ambulance evacuations to foreign countries (predominantly to France) which are always voluntary is also significant. They evidence a Polynesian trust in modern hospital care, even for such serious

Table 3. Organization of public health administration in 1987

Division	Section	Medical personnel	Total personnel
Management administration planification	General management	12	56
	Pharmacy	2	37
	Health training	0	12
Formation	Nursing colleges	0	12
Specialized main health care and prevention services	Hygiene and public health	3	52
	Maternity and paediatric	10	31
	School health	6	29
	Dental health	8	37
	Sports medicine	1	2
	Mental health and toxicology	1	2
	Centre for rheumatism and arthritis	2	4
	Handicapped persons	1	2
Main health care specialized establishments	Blood Transfusion Centre	3	13
	Maternity Health Clinic	1	7
	Public service medicine	1	5
	Anti-Leprosy Centre	1	9
	Tuberculosis sanitaria	3	90
	Centre for the Elderly	1	32
	Territorial Hospital	85	960
Decentralized health care and prevention establishments (clinics)	Tahiti East and Tahiti West	10	45
	Tahiti North and Tahiti South	8	86
	Moorea-Maiao	4	43
	Leeward Islands	19	125
	South Marquesas Islands	3	68
	North Marquesas Islands	6	46
	Austral Islands	6	35
	Tuamotu-Gambier Islands	5	60
	Research	Louis Malarde Institute	8

Source: Public Health Administration, Papeete.

Table 4. Geographical disparity of health supply in 1986 (rate per 1000 persons)

Archipelagoes	Hospital beds	Physicians	Dentists	Pharmacists	Nurses	Health assistants
Windward Islands	6.9	1.5	0.5	1.0	2.6	1.1
Tahiti	7.0	1.6	0.5	1.0	2.7	1.1
Leeward Islands	3.3	1.0	0.4	0.1	1.2	0.8
Marquesas Islands	6.5	1.3	0.4	0.1	2.3	1.3
Austral Islands	2.1	0.9	0.3	0.0	0.9	0.9
Tuamotu/Gambier	0	0.4	0.2	0.0	0.6	0.3
Total	5.9	1.4	0.5	0.7	2.2	1.0
	5.9	1.4	0.5	0.2	2.6	1

Table 5. Local air ambulance evacuations

Year	Urgent	Urgent (with medical assistance)	Planned	Total
1984	1089	247	1125	2214
1985	1733	293	1495	3228
1986	1993	405	1781	3774
1987	1895	—	1495	3390

conditions as heart operations following rheumatic fever (Fig. 9).

Increasingly selective consumption

According to a recent inquiry by the Institut Territorial de la Statistique, changing medical consumption shows an increasingly selective approach to

health care. Costs of out-patient care (Fig. 10) have gone up from 12% of the total expenditure in 1975 to 28% in 1985. Admissions to private clinics now represent more than a quarter of total hospitalization expenditure (Fig. 11).

Increasingly autonomous financing

The term 'autonomous' in the economic context of French Polynesia is not very meaningful since the territory is so dependent on state national assistance from France. However, major changes have occurred in behavioural patterns and health consumption. In 1984, 56% of health spending was in fact by the family itself or by different local systems of sickness benefits, the territory met 38% and the state met 6%.

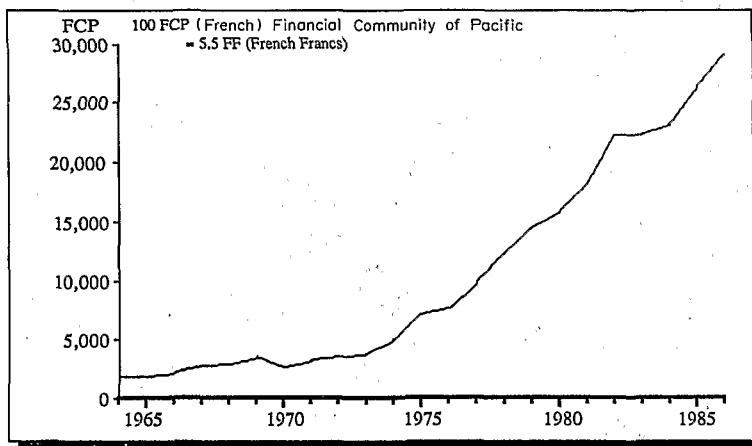


Fig. 7. Annual per capita expenditure on public health in French Polynesia.

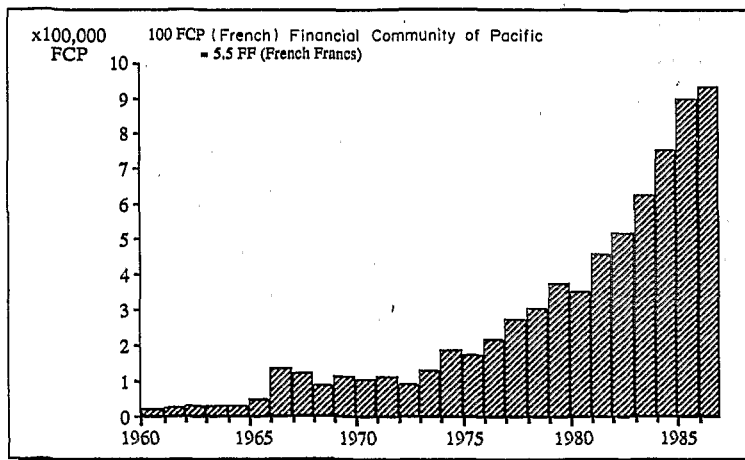


Fig. 8. Change in consumption of imported medicines in French Polynesia.

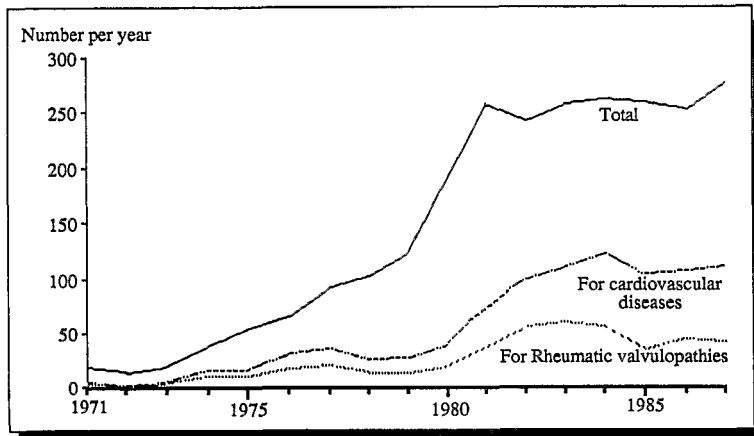


Fig. 9. Air-ambulance evacuations to foreign or mother countries.

In 1975 the territory met 61%, the state met 6.5% and the family and local systems of benefit only the remaining 32.5% (Fig. 12).

Adoption of new behavioural patterns

The geography of behavioural patterns for health does not reflect the concentrated location of health services in Tahiti, particularly in the urban area. An accurate survey in Rurutu, one of the Austral Islands, in 1988 and observations made recently in some of

the Marquesas and in Tuamotu indicate that people on the remote islands are resorting more and more to modern health care. This is a direct consequence of the presence of medical staff in these islands. In Rurutu medical consultations per inhabitant per year have gone up from 4.7 in 1959 to 7.8 in 1987 and hospital patient numbers have gone up from 29 to 215 in the same period of time. These observations provide a sure mark of people's acceptance of medical treatment. The growth of air ambulance evacuations

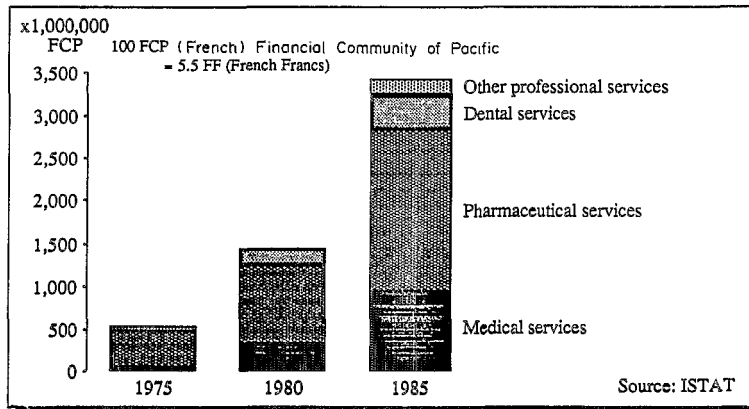


Fig. 10. Ambulatory health care spending.

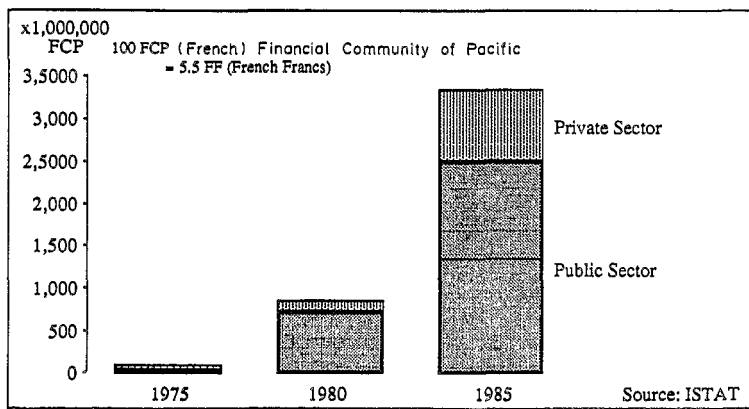


Fig. 11. Hospital care spending.

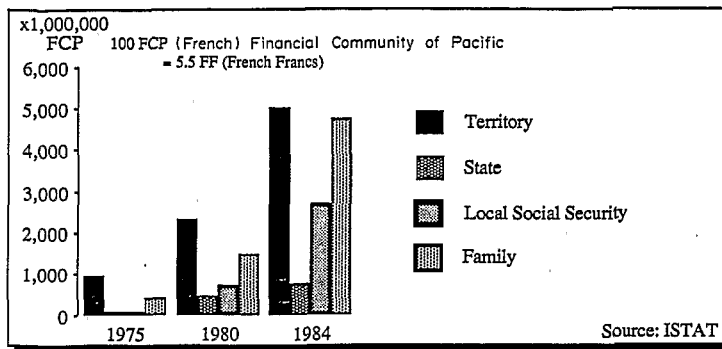


Fig. 12. Structure of health financing in French Polynesia.

from Rurutu to Tahiti is also suggestive of willing recourse to tertiary health care; they have gone up from 18 in 1959 to 129 in 1987.

CONCLUSION

Major changes in the health system in French Polynesia during the last 30 years are clearly related to demographic and economic development following the opening of the territory to the outside world and the installation of the nuclear testing centre. In the last 30 years or so growth and diversification of the modes of health supply has occurred with, especially, a spectacular growth of consumption and adoption of new behavioural patterns with regard to health.

But, due to the cost of health care in a sparsely populated and scattered island territory, allocation of

care is still unequal. There remain deep differences of situation between the urban areas, especially in Tahiti, and the remote islands.

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