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# CORRESPONDENCE

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## Leprosy in Greece at the End of the 20th Century (1988–2000)[1]

TO THE EDITOR:

Historical data indicate that Greece belongs to the group of countries with very low leprosy endemicity. Sporadic newly detected Greek cases of active disease are mainly referred by dermatologists to our unit with a prevalence rate much lower than 1:100,000 dermatologic outpatients. The disease has therefore been eliminated as a public health problem, but not completely eradicated ([4]). For leprosy patients and their contacts, consultation, laboratory investigation, World Health Organization (WHO) recommended multi-drug treatment (MDT), hospitalization, and follow-up are free of charge.

As has occurred in other European countries, since 1990 an influx of approximately one million migrants from Eastern Europe (mainly Albania), the Middle East, Africa, the Indian Subcontinent, and South-East Asia have entered Greece (total population ten million).

A retrospective study (1988–2000) regarding 25 Greek and five foreign newly detected (incident) leprosy patients, as well as 40 relapsed Greek cases was carried out. Relapses were old cases who, years after being discharged from the hospital and with repeatedly negative clinical and smear examinations, presented with new signs and symptoms of the disease verified by histopathologic and smear examinations (bacterial index, BI). Drug sensitivities were not assessed in the relapsed cases.

Case classification across the disease spectrum was based on clinical picture, histopathology, bacterial index from skin lesions (BI), lepromin test, and epidemiologic history. Therapeutic decisions are always based on WHO treatment recommendations ([7]).

Disease type distribution, yearly relative relapse rates (relapsed leprosy cases were the numerator and yearly followed up ex-leprosy patients were the denominator), and prevailing symptom at diagnosis (progressive skin lesions or a leprosy reaction) were analyzed either alone or as related to disease duration, age, gender, and residence (rural or urban).

There was no significant difference between Greek incident and relapsed cases with regard to disease type distribution (Table 1). After 1992, no more paucibacillary (PB) cases were detected. Between incident and relapsed cases, there was no difference by gender (Table 2) nor prevailing symptom that led to diagnosis. Skin lesions were a more common presenting symptom (incident cases 70%, 21/30; relapsed cases 55%, 22/40) than leprosy reactions (incident cases 30%, 9/30; relapsed cases 45%, 18/40).

When estimating disease progression in the relapsed cases, it was observed that four remained PB (10%), seven progressed from

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TABLE 1. *Leprosy in Greece by classification 1988–2000.*

| Cases | Leprosy classification | | | | | | |
|---|---|---|---|---|---|---|---|
| | **I** | **TT** | **BT** | **BB** | **BL** | **LL** | **Total** |
| | | | | **Greek** | | | |
| Incident | 1 | 1 | 3 | 4 | 8 | 8 | 25 |
| PB vs. MB | | 5 (20%, 6.8–40.7) | | | 20 (80%, 59.3–93.2) | | |
| Relapsed | — | 1 | 3 | 5 | 9 | 22 | 40 |
| PB vs. MB | | 4 (10%, 2.8–33.6) | | | 36 (90%, 76.3–97.2) | | |
| Total | 1 | 2 | 6 | 9 | 17 | 30 | 65 |
| Percent | 1.5 | 3.1 | 9.2 | 13.8 | 26.2 | 46.2 | 100 |
| 95% CI | 0.04–8.3 | 0.4–10.7 | 3.5–19 | 6.5–24.8 | 16–38 | 33.7–58.9 | — |
| PB vs. MB | | 9 (13.8%, 6.5–24.6) | | | 56 (86.2%, 75.3–93.5) | | 65 |
| | | | | **Other Nationalities** | | | |
| Filipino | | | | | 2 | | |
| Egyptian | | | | 1 | | | |
| S. Leonian | | | | | | 1 | |
| Albanian | | | | | | 1 | |
| Total | | | | 1 | 2 | 2 | 5 |

95% CI: 95% "exact" confidence interval.

PB to multibacillary (MB) (17.5%), and the remaining 29 cases were MB from the moment of diagnosis (72.5%). Despite disease duration of the relapsed cases, which from the moment of first diagnosis was 29.4 ± 10.6 yrs, range 8 to 48 yrs, there was no difference in disease type distribution within incident cases at first diagnosis. Relapse rate and disease duration did not differ between men and women. The number of ex-leprosy patients followed up annually series presented a declining trend and a negative compound growth rate (exponential trend, $Y = 395.7\ (0.92)^t$, *t*-statistic –5.96, $p < 0.001$, compound growth rate –7.6%) (Table 2).

Regarding the age of Greek active leprosy cases, there was a significant difference between incident PB (N = 5, mean 26.6, range 6 to 56 yrs) compared with incident MB (N = 20, 55.9, range 33 to 79 yrs, $p < 0.001$), but not between incident MB and the relapsed cases (N = 40, 64.05, range 42 to 90 yrs, *Bonferroni* p-values, one way ANOVA). Only 2 children younger than 14 yrs were detected in the whole study period (diagnosed in 1989).

Comparisons regarding possible associations of active case detection with residence (rural or urban) revealed that rural residence (villages) was five times more frequent in incident cases (19 of 25, 76%, "exact" CI 54.9 to 90.6) when compared to relapsed cases, who are mainly living in cities, mostly in the Athens greater area and throughout the country (25 of 40, 62.5%, "exact" CI 45.8 to 77.3, $\chi^2$, Yates corrected, $p = 0.005$, odds ratio (OR) 5.3, "exact" CI for OR 1.5 to 19.4). In contrast, there was no association of patient residence with gender (incident, relapsed, and overall).

Foreign patients represented a small proportion of total active leprosy cases (N = 5, total N = 70, 7.1%, "exact" CI 2.4 to 15.9), coming from endemic countries (Table 1). After 1992, only one imported case (LL) was detected.

## DISCUSSION

In Greece during the second half of the 20th century, rapid socioeconomic development, rapid urbanization, substantial improvement of living standards, nuclear family pattern predominance, and a lack of differentials in the access to health care services were gradually achieved. These factors are closely associated with a disease decline, reduced exposure and transmission even in endemic areas, irrespective of leprosy control interventions ([2]). Thereafter, secondary prevention, a good dapsone

TABLE 2. *Yearly active leprosy cases (numbers, incident and relapsed) and relative relapse rates (RRR, per thousand rate) in Greece, 1988–2000.*

| Year | Incident | | Examined | | Relapsed (RRR ‰) | | Total active cases |
|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | |
| 1988 | 1 | 1 | 187 | 181 | 2 (10.7) | 4 (22.1) | 8 |
| 1989 | 5 | 5 | 177 | 223 | 4 (22.6) | 3 (13.5) | 17 |
| 1990 | — | 1 | 167 | 206 | 5 (29.9) | 2 (9.7) | 8 |
| 1991 | 1 | 1 | 129 | 145 | 2 (15.5) | 1 (6.9) | 5 |
| 1992 | — | 1 | 143 | 159 | 1 (7.0) | 1 (6.3) | 3 |
| 1993 | — | — | 81 | 84 | — | — | 0 |
| 1994 | — | 1 | 103 | 112 | — | 1 (8.9) | 2 |
| 1995 | 2 | — | 76 | 96 | 1 (13.2) | 2 (20.8) | 5 |
| 1996 | — | 2 | 102 | 100 | 4 (39.2) | — | 6 |
| 1997 | — | 1 | 85 | 87 | 1 (11.8) | — | 2 |
| 1998 | — | — | 80 | 81 | — | 1 (12.3) | 1 |
| 1999 | — | 1 | 80 | 81 | 1 (12.5) | 1 (12.3) | 3 |
| 2000 | 2 | — | 100 | 81 | 2 (20.0) | 1 (12.3) | 5 |
| Total | 11 | 14 | 1510 | 1636 | 23 (15.2) | 17 (10.4) | 65 |
| Mean/y | 0.85 | 1.1 | 116.2 | 125.8 | 1.8 | 1.3 | 5.0 |

Foreign patients are not taken into account in this table
M = males, F = females; Mean/y: mean yearly rate.

monotherapy program in conjunction with yearly clinical and BI examinations aiming a permanent smear negativity of registered cases and the significant BCG coverage of the general population have further contributed to the epidemiologic pattern of a dying out disease where the few cases that occur have a predominance of lepromatous leprosy ([1, 5]).

A constant policy of our center is that all current and former household contacts of new patients should be invited for examination. As a rule, nuclear family members do present at least once for clinical, BI and histopathologic examinations, as the only cost effective method of active case finding ([1]).

The majority of new cases and especially those seen after 1992 seem to represent a "hidden prevalence" which was not perceived before ([6]). A clear evidence for this is documented by more frequent rural residence of incident cases, the lack of difference in age between incident MB and relapsed cases, as well as by the homogeneous disease type distribution in both patient categories at first diagnosis.

In our elderly ex-leprosy patients, stigma is based on memories of compulsory segregation, isolation in leprosaria, and discriminatory lows in the past ([2, 3]). These conditions resulted in concealment which, in association with socioeconomic developments, might explain why the majority of relapsed cases lives in urban areas.

The number of yearly examined, prominently elderly, ex-leprosy patients is not constant and gradually declines as a function of mortality, life conditions influencing compliance of elderly people in general, and stigma-related fatigue. According to previous regimens, all smear negative MB cases first treated with dapsone monotherapy had to remain under lifelong treatment with dapsone. Re-treatment with MDT of all these old cases requires intense health education and is gradually obtained.

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