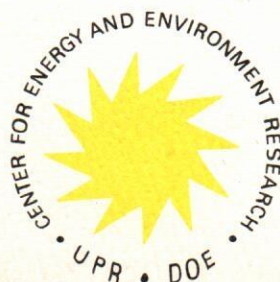


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AGE-SPECIFIC REACTIONS TO SKIN TEST  
FOR  
SCHISTOSOMIASIS IN NINE ENDEMIC  
MUNICIPALITIES OF PUERTO RICO  
1969-1976.

by  
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and  
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Abstract

Although general evaluations have shown large decreases in antigen reactivity in Puerto Ricans inside the schistosomiasis control projects, little detail has been presented in age specific rates or on individual municipalities. This report gives such additional information for surveys in 1969 and 1976 in Luquillo, Río Grande and Yabucoa, municipalities not in the original control program, and for 6 other municipalities which had been part of the control program since 1955. The age-specific curves of positivity to the antigen showed steep rises between children 6 years of age to 18 years of age, indicating significant transmission in the recent past in all areas before 1969. By 1976 the positivity rates had increased in the uncontrolled municipality of Luquillo but had decreased markedly in most of the controlled municipalities. However in Naguabo there was evidence that transmission had not decreased significantly despite many years of snail control.

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Introduction

General evaluations have been made on the island-wide changes in prevalence of schistosomiasis in Puerto Rico, but transmission patterns have not been reported in any detail (1 and 2). It was the purpose of this report to present additional information on reactivity to the skin test in the most important endemic areas of Puerto Rico. Nine municipalities were included in this report, 3 from the endemic area not part of the Health Department's Control Program in 1969 at the beginning of this study, and 6 municipalities which had been placed under control in 1955 (Aibonito, Arroyo, Guayama, Patillas, and Vieques, Figure 1).



### Methods

Adult schistosomes were used to prepare antigen by standard procedures (2). Over 15,000 schoolchildren were injected on the volar aspect of the forearm with 0.05 milliliters of antigen and their reactivity read 15 minutes later. The criteria for positivity were a reaction wheal greater than 1.0 square centimeters for all girls and for boys under 14 years of age. For boys 14 years of age and older the reaction wheal had to be 1.2 square centimeters or larger to be considered positive. The antigen batches used in 1969 and 1976 were standardized against each other (3).

All children in the public schools of the indicated municipalities were tested in the surveys of 1969 and children in all fifth grade classrooms of the same municipalities were tested in 1976. Thus an age-specific curve of positivity to the skin test was obtained for 1969 and the positively for children of ages 10 to 11 for 1976. All skin test infections were performed by the same person (HNA).

## Results

Results from the skin-test have to be interpreted with care, due to its well known limitations (4). However the repetition of the test under similar circumstances in the same population has considerable practical value in assessing large changes in distribution and level of schistosome infections.

Of the three municipalities not under control in 1969, Yabucoa was then included in the control program in 1970 using snail control by ditching, by mollusciciding and by biological control where appropriate (1). However no control effort was introduced in Luquillo or Río Grande before 1976, thus these two communities indicated the course of transmission in the absence of snail control.

The mean age-specific reactivity in these 3 communities in 1969 rose from 8% for 6 year olds to 25% for 16 year olds (Table 1 and Figures 2 and 3). The increase in positivity with age was quite uniform and continuous, indicating relatively stable transmission conditions previous to 1969.

The age-specific prevalence in the children from the controlled municipalities showed much more irregularity with many decreases of prevalence with increasing age, indicating some sporadic transmission despite control efforts (Table 1, Figures 4 and 5).

TABLE 1

AGE SPECIFIC PROPORTION OF POSITIVE REACTIONS TO SCHISTOSOME SKIN TEST  
OF 15,000 CHILDREN IN NINE ENDEMIC MUNICIPALITIES OF PUERTO RICO, 1969\*

Age in Years	Municipality								
	Aibonito	Arroyo	Guayama	Luquillo	Naguabo	Patillas	Rio Grande	Vieques	Yabucoa
6				3/ 79		54/328	5/121	15/123	27/184
7				4/ 80		58/419	13/168	13/144	19/175
8				7/108		77/473	15/181	12/172	37/272
9				11/137		56/426	14/180	11/189	41/250
10	7/43	9/ 75	30/150	12/107	14/ 91	89/448	27/230	20/180	57/273
11	12/64	14/169	75/297	19/118	16/130	69/397	38/249	19/168	60/265
12	12/46	27/161	70/221	25/137	15/ 79	115/441	35/239	27/165	68/328
13	6/18	11/ 61	40/ 98	31/134	9/ 34	137/463	47/232	18/154	127/434
14	4/14	13/ 51	28/ 69	23/108	9/ 29	66/382	36/193	8/145	78/348
15				16/ 80		66/315	37/191	3/ 96	53/267
16				21/ 93		59/264	53/209	11/ 82	42/210
17				16/ 54		45/185	35/154	12/ 50	46/193
18				11/ 32		27/ 97	41/ 87	6/ 30	19/ 77
Total Tested	185	517	835	1267	363	4,638	2,434	1,698	3,276

\*DATA REPORTED AS POSITIVE REACTORS/TOTAL TESTED.



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AGE - SPECIFIC REACTIVITY TO SCHISTOSOME SKIN TEST IN  
UNCONTROLLED MUNICIPALITIES OF LUQUILLO AND RIO  
GRANDE, PUERTO RICO, 1969-1976

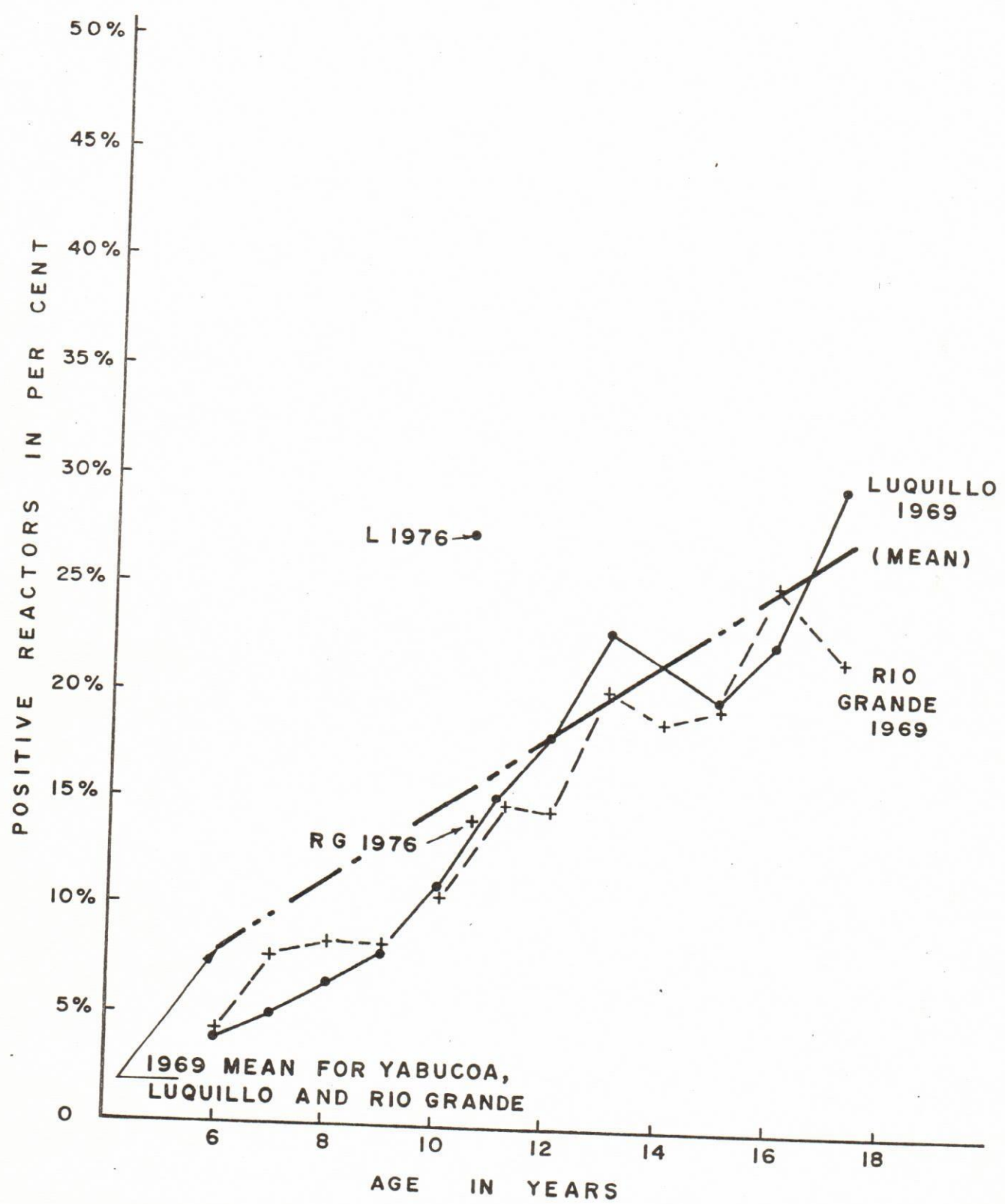


FIGURE 2

AGE-SPECIFIC REACTIVITY<sup>8</sup> TO SCHISTOSOME SKIN TEST IN  
MUNICIPALITY OF YABUCOA, PUERTO RICO, 1969-1976

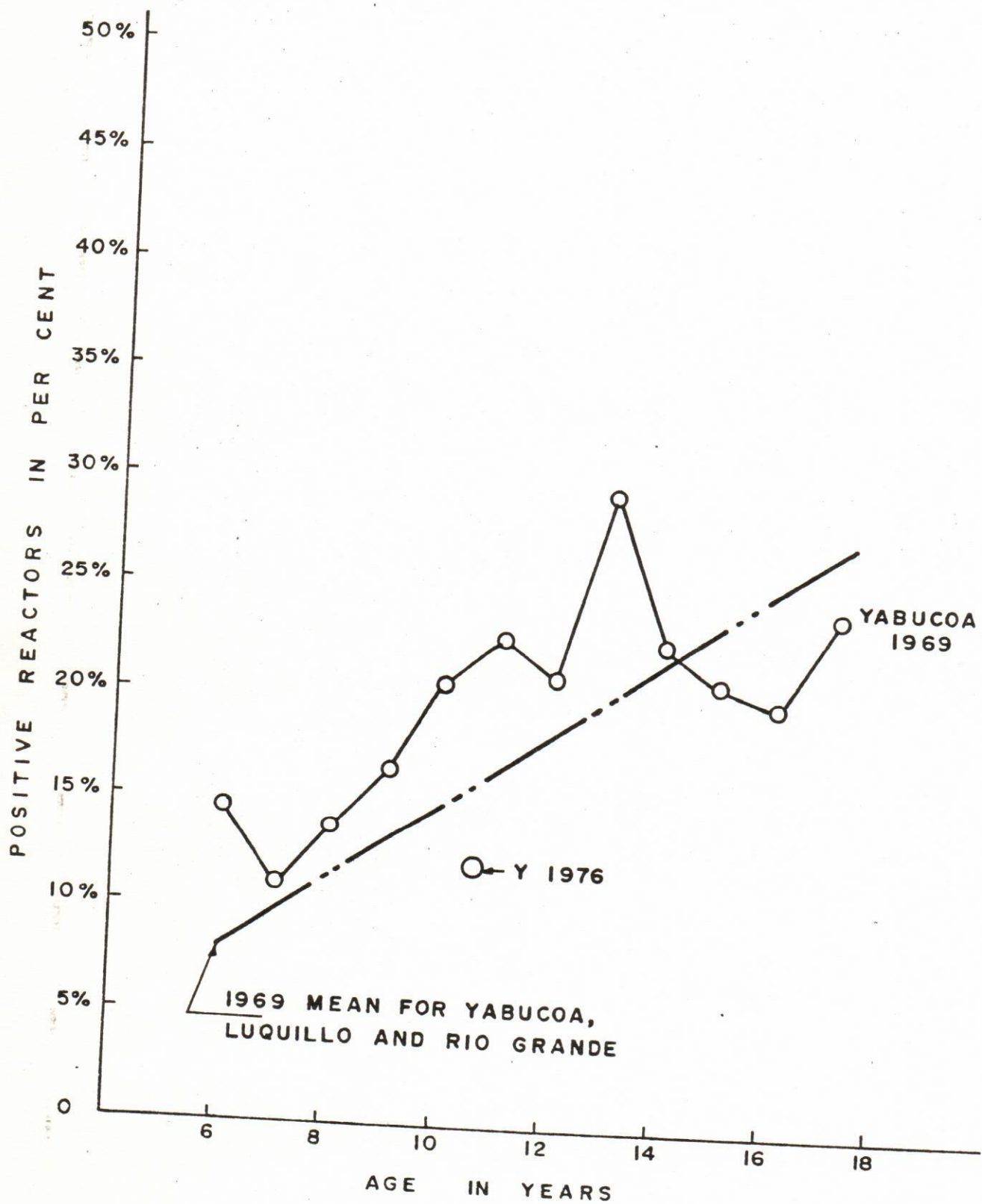


FIGURE 3

AGE SPECIFIC REACTIONS TO SCHISTOSOME SKIN TEST  
 IN CONTROLLED MUNICIPALITIES OF AIBONITO, ARROYO,  
 GUAYAMA AND PATILLAS, PUERTO RICO  
 1969 - 1976

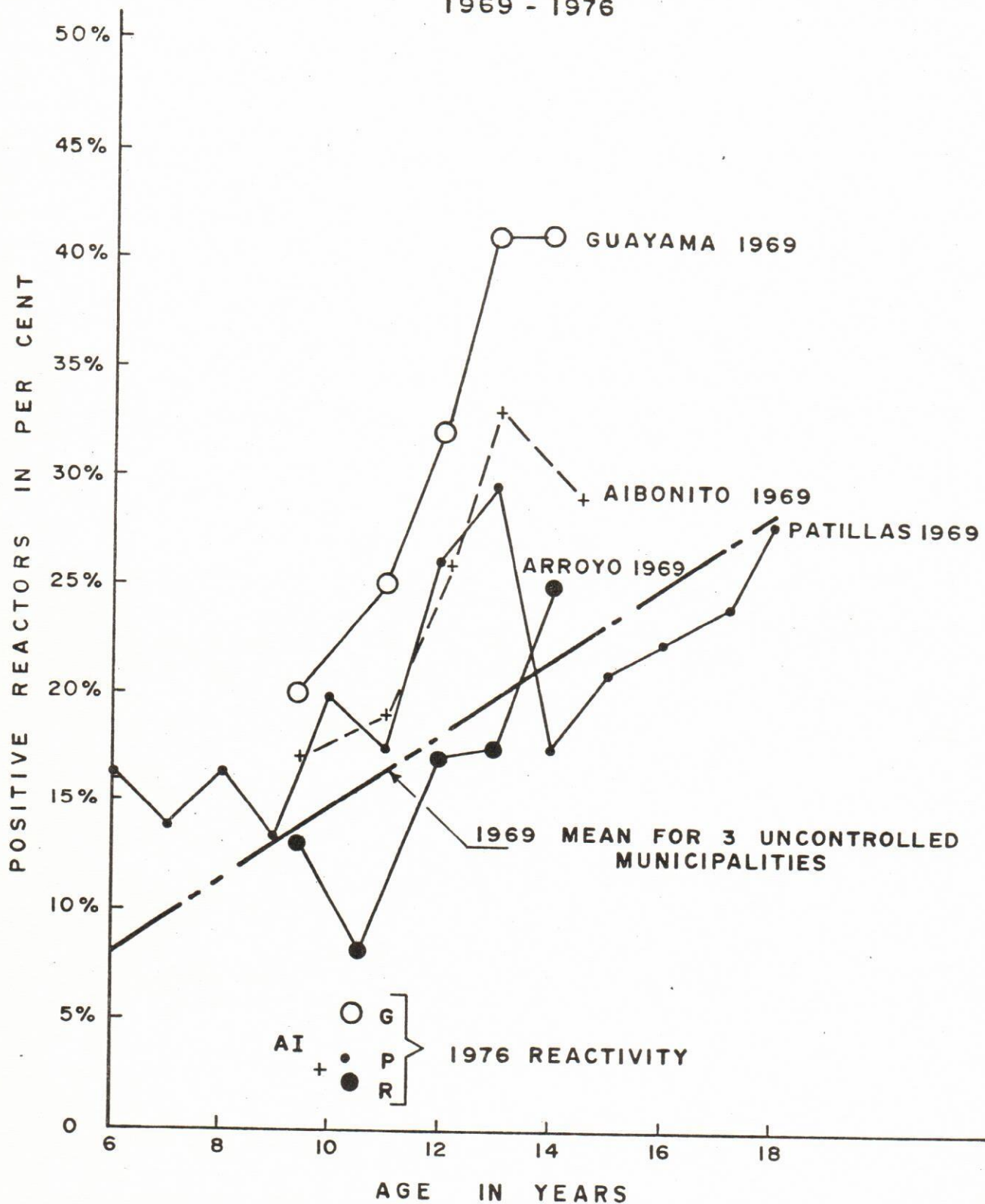


FIGURE 4

AGE-SPECIFIC REACTIVITY TO SCHISTOSOME SKIN TEST  
IN CONTROLLED MUNICIPALITIES OF NAGUABO AND VIEQUES,  
PUERTO RICO, 1969-1976

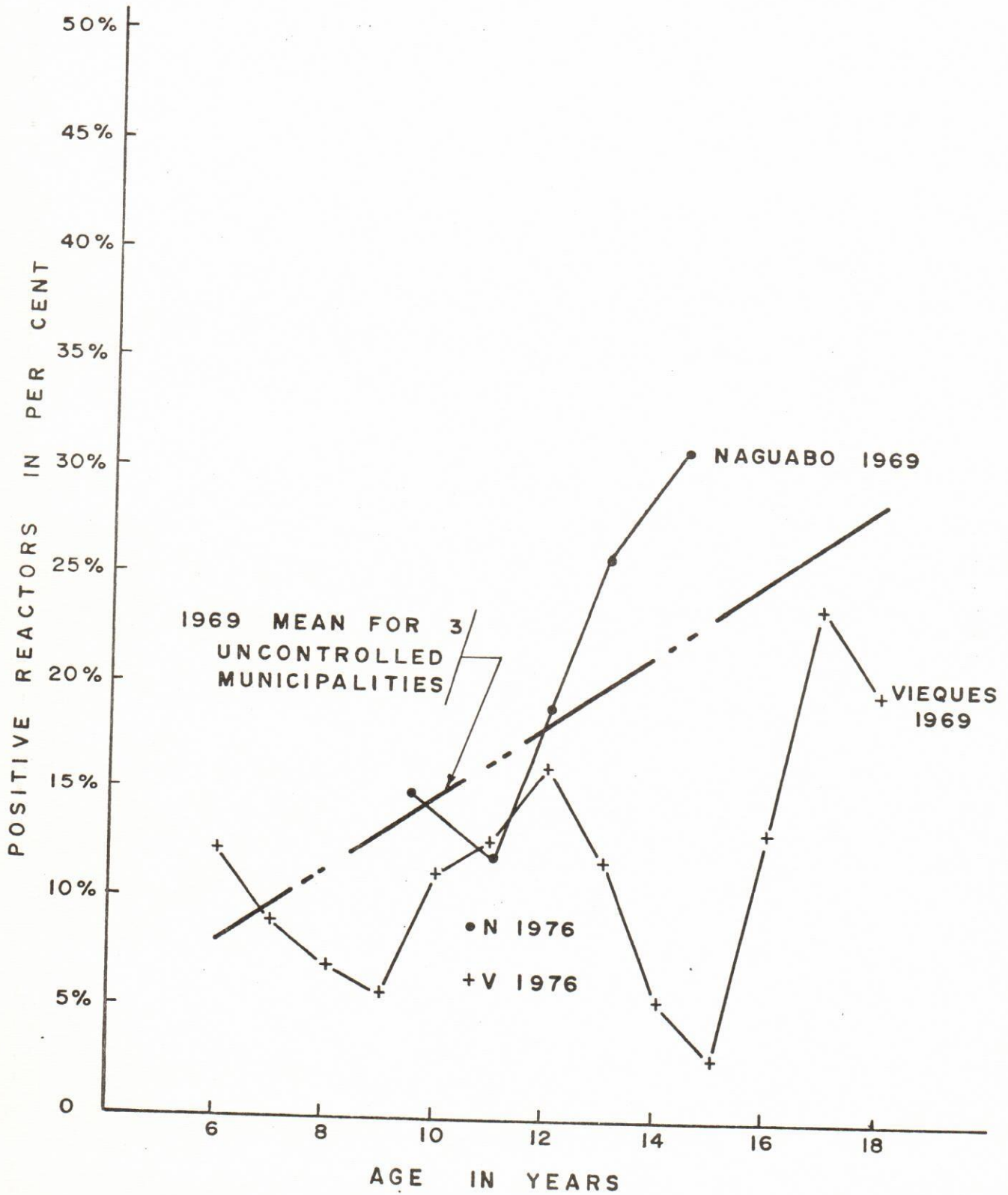


FIGURE 5

### Discussion

In fifth grade children, the only age-group tested both in 1969 and 1976, the proportion of positives in the 3 municipalities not in the original control program was slightly higher in 1969 in Yabucoa (28%) than in Río Grande and Luquillo which were 16% and 6% respectively (Table 2 and Figures 2 and 3). By 1976 the prevalence in Yabucoa decreased to 12% while it rose to 27% in Luquillo and remained about the same in Río Grande, apparently showing the effects of the control program in Yabucoa (3).

The age specific curves for four of the municipalities of the original control program showed generally higher slopes than the non-controlled communities in 1969 (Figure 4). The positivity in Guayama rose from 20% for 9-10 year olds to 40% for 13 year olds.

The positivity of fifth graders (10-11 years old) showed a marked decrease in all four of these municipalities, decreasing to less than 5% which is about the normal rate of false positives in a non-endemic community. This decrease was a clear indication of a successful control program when compared with the increase observed in Luquillo and Río Grande (Table 1).

In Naguabo and Vieques Island there also was a decrease in positivity for fifth graders, but it was not very large, indicating less effectiveness of the control operation in these two municipalities, especially Naguabo (Figure 5).

Table 2

Reactivity to skin test for schistosomes  
in fifth grade children of nine endemic municipalities  
in eastern Puerto Rico, 1969-1976

Controlled	1969	1976 (3)
Aibonito	21.6%	2.5%
Arroyo	15.6%	2.0%
Guayama	25.8%	5.2%
Naguabo	14.6%	9.0%
Patillas	10.5%	2.9%
Vieques	10.1%	6.4%
Yabucoa	28.0%	12.5%
Uncontrolled Municipalities		
Luquillo	6.2%	27.4%
Rio Grande	15.7%	13.5%

The mean age-specific slope for Vieques was much lower than that for Naguabo, indicating active transmission had occurred previous to 1969.

The previous evaluations of the control effort had shown that the proportion of skin test reactors in the control areas decreased much faster than in uncontrolled areas, as confirmed by this evaluation (1). In addition we can rank the control projects in general terms, based on this more detailed analysis.

During the period from 1969 to 1976 the projects in Aibonito, Arroyo, Guayama, Patillas and Yabucoa showed marked improvements whereas Vieques and Naguabo showed much less impact from the control efforts.

In addition there was a serious increase in reactivity in Luquillo indicating active transmission.

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