• PREVALENCE

• PROPHYLAXIS

Rheumatic Fever and Rheumatic Heart Disease Among U.S. College Freshmen, 1956–65

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IN 1956 the Heart Disease Control Branch of the Public Health Service and the American College Health Association began a cooperative study to determine the prevalence of a history of rheumatic fever or rheumatic heart disease, or both, among college freshmen. Data have been published for the first 5 years of the study, 1956–60 (*1*). The data presented here concern 767,600 participants during the first 10 years of the study, 1956–65, and they supplement the earlier report.

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Methodology

The survey. A specially designed questionnaire is completed for each freshman student (average age 18 years) entering the participating colleges. The questionnaire, previously described in detail (*1*), consists of two parts; the first part is completed by the student and the second by the physician.

The student is asked whether he has had frequent sore throats, scarlet fever, St. Vitus dance, joint pains and swelling, leakage of heart valves (heart murmur), or frequent nosebleeds. He is also asked specifically whether he has been told by a physician that he has had rheumatic fever or rheumatic heart disease; if so, he is asked the date of the attack or attacks, whether he has been given prophylactic medication, the

Table 1. Number of students examined, by sex and State of residence at time of survey, 1956–65

State of residence	Total	Male	Female	Sex not stated	Percent male
Total	767, 600	458, 633	306, 830	2, 137	59. 7
Alabama	2, 918	2, 085	828	5	71. 5
Alaska	270	154	114	2	57. 0
Arizona	4, 377	2, 648	1, 704	25	60. 5
Arkansas	1, 398	886	503	9	63. 4
California	35, 484	18, 626	16, 780	78	52. 5
Colorado	13, 667	7, 245	6, 388	34	53. 0
Connecticut	8, 611	5, 420	3, 172	19	62. 9
Delaware	4, 587	2, 614	1, 971	2	57. 0
District of Columbia	7, 759	4, 368	3, 366	25	56. 3
Florida	7, 910	5, 792	2, 087	31	73. 2
Georgia	6, 026	3, 733	2, 272	21	61. 9
Hawaii	829	471	355	3	56. 8
Idaho	4, 830	3, 277	1, 545	8	67. 8
Illinois	23, 202	13, 000	10, 171	31	56. 0
Indiana	1, 967	1, 260	701	6	64. 1
Iowa	17, 960	10, 254	7, 665	41	57. 1
Kansas	22, 638	13, 911	8, 648	79	61. 4
Kentucky	10, 222	6, 032	4, 160	30	59. 0
Louisiana	5, 624	3, 391	2, 209	24	60. 3
Maine	2, 686	1, 804	880	2	67. 2
Maryland	5, 604	4, 109	1, 487	8	73. 3
Massachusetts	41, 773	26, 412	15, 025	336	63. 2
Michigan	69, 778	38, 658	31, 072	48	55. 4
Minnesota	32, 062	20, 391	11, 598	73	63. 6
Mississippi	8, 830	5, 986	2, 602	242	67. 8
Missouri	19, 728	11, 829	7, 790	109	60. 0
Montana	14, 571	8, 856	5, 632	83	60. 8
Nebraska	20, 820	13, 358	7, 442	20	64. 2
Nevada	1, 038	636	401	1	61. 3
New Hampshire	7, 167	5, 503	1, 657	7	76. 8
New Jersey	16, 763	8, 660	8, 062	41	51. 7
New Mexico	2, 348	1, 382	960	6	58. 9
New York	53, 274	26, 808	26, 391	75	50. 3
North Carolina	8, 342	1, 937	6, 385	20	23. 2
North Dakota	5, 022	3, 611	1, 406	5	71. 9
Ohio	97, 271	58, 998	38, 171	102	60. 7
Oklahoma	20, 650	12, 429	8, 146	75	60. 2
Oregon	2, 884	1, 585	1, 297	2	55. 0
Pennsylvania	37, 938	25, 472	12, 414	52	67. 1
Rhode Island	2, 506	1, 578	923	5	63. 0
South Carolina	5, 881	4, 781	1, 096	4	81. 3
South Dakota	7, 684	4, 923	2, 743	18	64. 1
Tennessee	4, 397	2, 106	2, 279	12	47. 9
Texas	10, 468	6, 219	4, 239	10	59. 4
Utah	13, 003	7, 442	5, 535	26	57. 2
Vermont	701	434	265	2	61. 9
Virginia	22, 384	15, 248	7, 125	11	68. 1
Washington	11, 556	7, 111	4, 378	67	61. 5
West Virginia	9, 473	6, 163	3, 289	21	65. 1
Wisconsin	14, 921	8, 572	6, 308	41	57. 4
Wyoming	9, 665	5, 931	3, 692	42	61. 4
Puerto Rico	210	159	49	2	75. 7
Virgin Islands	75	55	19	1	73. 3
Foreign group	5, 848	4, 320	1, 433	95	73. 9

type of medication prescribed, and whether he is still on the medication or how long he took it.

In completing the second portion of the questionnaire the examining physician, who is either the private physician of the student or the school physician, establishes the validity of the student's history of rheumatic fever or rheumatic heart disease, or both, or indicates that the history is questionable or inconsistent with rheumatic fever. Then, based on his physical examination of the student, the physician states that there is definite rheumatic heart disease, probable rheumatic heart disease, other heart disease, or no heart disease with or without innocent murmur.

The analysis. An early element in the design of the study was the assignment of a system of numerical weights to each affirmative answer of both student and physician. This system was tested for reliability and reproducibility and has made possible, despite the inevitable changes in staff personnel, a consistency in defining and grouping the students according to the positive answers on the questionnaires (*1*). Personnel of the heart disease control program directed the analysis of the completed questionnaires using the data processing facilities of the National Center for Chronic Disease Control.

With this system, the students who have had rheumatic fever or rheumatic heart disease, or both, are identified. Students classified as probably having had rheumatic fever have either a history of rheumatic fever with validation by the examining physician or questionable rheumatic heart disease together with a history of rheumatic fever symptoms or of rheumatic heart disease. The definite group consists of those with definite clinical evidence of, or prior diagnoses of, rheumatic fever or rheumatic heart disease validated by both history and physical examination. This group includes students with a history of definite signs and symptoms of rheumatic fever, which are confirmed in a second interview despite the absence of evidence of rheumatic heart disease.

The study population. During the first 10 years of the study, 148 colleges participated voluntarily (see p. 926). Only the University of California at Santa Barbara, Occidental College, and Harvard University participated continuously for the entire 10 years.

College freshmen were chosen for this study because they represent an age group which has relatively recently passed through the period of highest incidence of rheumatic fever. Furthermore, it was thought that the high educational level of this group would tend to minimize inaccuracies due to poor recall or to poor communication between physician and parent or physician and patient.

The original designers of the study were aware that this group may not be the ideal one from which to obtain epidemiologic data. The college freshmen may not be representative of the population at large, particularly in that they generally represent a higher than average socioeconomic stratum. However, studying college freshmen was considered a suitable and economical alternative to a prospective study of a nationwide random sample of the population (*1*).

Prevalence

Results

A total of 767,600 students completed the questionnaire and were interviewed and examined by physicians. The study population represented about 7.8 percent of the total freshmen enrollment in the United States during the decade of the study and consisted of students from the 50 States, the District of Columbia,

Table 2. Number of cases of rheumatic fever and rheumatic heart disease identified among 767,600 college students, by methods of identification, 1956–65

Method	Number of cases	Rate per per 1,000 examinations
Scoring system:		
Rheumatic fever and rheumatic heart disease	12, 134	15. 8
Definite	9, 787	12. 8
Probable	2, 347	3. 0
History reported by student:		
Rheumatic fever and rheumatic heart disease	15, 447	20. 1
Physician validation of history by interview:		
Rheumatic fever and rheumatic heart disease	10, 079	13. 1
Physical examination by physician:		
Rheumatic heart disease	3, 743	4. 9

Table 3. Prevalence of probable or definite rheumatic fever or rheumatic heart disease, or both, per 1,000 students surveyed, by sex and State of residence at time of survey, 1956–65

Rank [1]	State of residence	Total		Male		Female	
		Number of cases	Rate per 1,000 examinations	Number of cases	Rate per 1,000 examinations	Number of cases	Rate per 1,000 examinations
	Total	[2] 12, 134	15. 8	7, 273	15. 9	4, 838	15. 8
46	Alabama	20	6. 9	14	6. 7	6	7. 2
	Alaska	24	88. 9	16	103. 9	8	70. 2
8	Arizona	112	25. 6	66	24. 9	46	27. 0
27	Arkansas	20	14. 3	12	13. 5	8	15. 9
30	California	485	13. 7	243	13. 0	240	14. 3
12	Colorado	329	24. 1	172	23. 7	154	24. 1
36	Connecticut	100	11. 6	55	10. 1	45	14. 2
33	Delaware	56	12. 2	31	11. 9	25	12. 7
	District of Columbia	72	9. 3	32	7. 3	40	11. 9
29	Florida	109	13. 8	78	13. 5	31	14. 9
34	Georgia	72	11. 9	41	11. 0	31	13. 6
	Hawaii	8	9. 7	4	8. 5	4	11. 3
10	Idaho	120	24. 8	66	20. 1	54	35. 0
23	Illinois	377	16. 2	224	17. 2	152	14. 9
6	Indiana	53	26. 9	35	27. 8	18	25. 7
15	Iowa	373	20. 8	231	22. 5	142	18. 5
19	Kansas	407	18. 0	250	18. 0	155	17. 9
21	Kentucky	178	17. 4	96	15. 9	81	19. 5
35	Louisiana	67	11. 9	49	14. 5	18	8. 1
26	Maine	39	14. 5	24	13. 3	15	17. 0
40	Maryland	63	11. 2	46	11. 2	17	11. 4
45	Massachusetts	401	9. 6	245	9. 3	156	10. 4
41	Michigan	771	11. 0	427	11. 0	344	11. 1
13	Minnesota	724	22. 6	454	22. 3	270	23. 3
32	Mississippi	109	12. 3	86	14. 4	22	8. 5
16	Missouri	405	20. 5	231	19. 5	174	22. 3
3	Montana	475	32. 6	267	30. 1	207	36. 8
20	Nebraska	372	17. 9	256	19. 2	115	15. 5
2	Nevada	40	38. 5	30	47. 2	10	24. 9
39	New Hampshire	81	11. 3	54	9. 8	26	15. 7
31	New Jersey	224	13. 4	126	14. 5	98	15. 2
9	New Mexico	59	25. 1	26	18. 8	33	34. 4
42	New York	544	10. 2	315	11. 8	229	8. 7
24	North Carolina	135	16. 2	29	15. 0	106	16. 6
22	North Dakota	85	16. 9	53	14. 7	32	22. 8
28	Ohio	1, 379	14. 2	869	14. 7	508	13. 3
38	Oklahoma	233	11. 3	136	10. 9	97	11. 9
5	Oregon	81	28. 1	46	29. 0	35	27. 0
18	Pennsylvania	731	19. 3	509	20. 0	221	17. 8
44	Rhode Island	25	10. 0	15	9. 5	10	10. 8
43	South Carolina	60	10. 2	48	10. 0	12	10. 9
7	South Dakota	201	26. 2	123	25. 0	78	28. 4
25	Tennessee	64	14. 6	32	15. 2	32	14. 0
47	Texas	71	6. 8	43	6. 9	28	6. 6
1	Utah	527	40. 5	315	42. 3	212	38. 3
37	Vermont	8	11. 4	5	11. 5	3	11. 3
48	Virginia	128	5. 7	84	5. 5	44	6. 2
11	Washington	285	24. 7	168	23. 6	116	26. 5
14	West Virginia	202	21. 3	129	20. 9	72	21. 9
17	Wisconsin	303	20. 3	159	18. 5	142	22. 5
44	Wyoming	287	29. 7	183	30. 9	102	27. 6
	Puerto Rico	2	9. 5	2	12. 6	0	. 0
	Virgin Islands	0	. 0	0	. 0	0	. 0
	Foreign group	38	6. 5	23	5. 3	14	9. 8

[1] Rank of prevalence rates for total group surveyed in each State of continental United States. Rank not assigned to Alaska, District of Columbia, Hawaii, Puerto Rico, Virgin Islands, and foreign students.

[2] Total includes 23 cases in which sex was not stated.

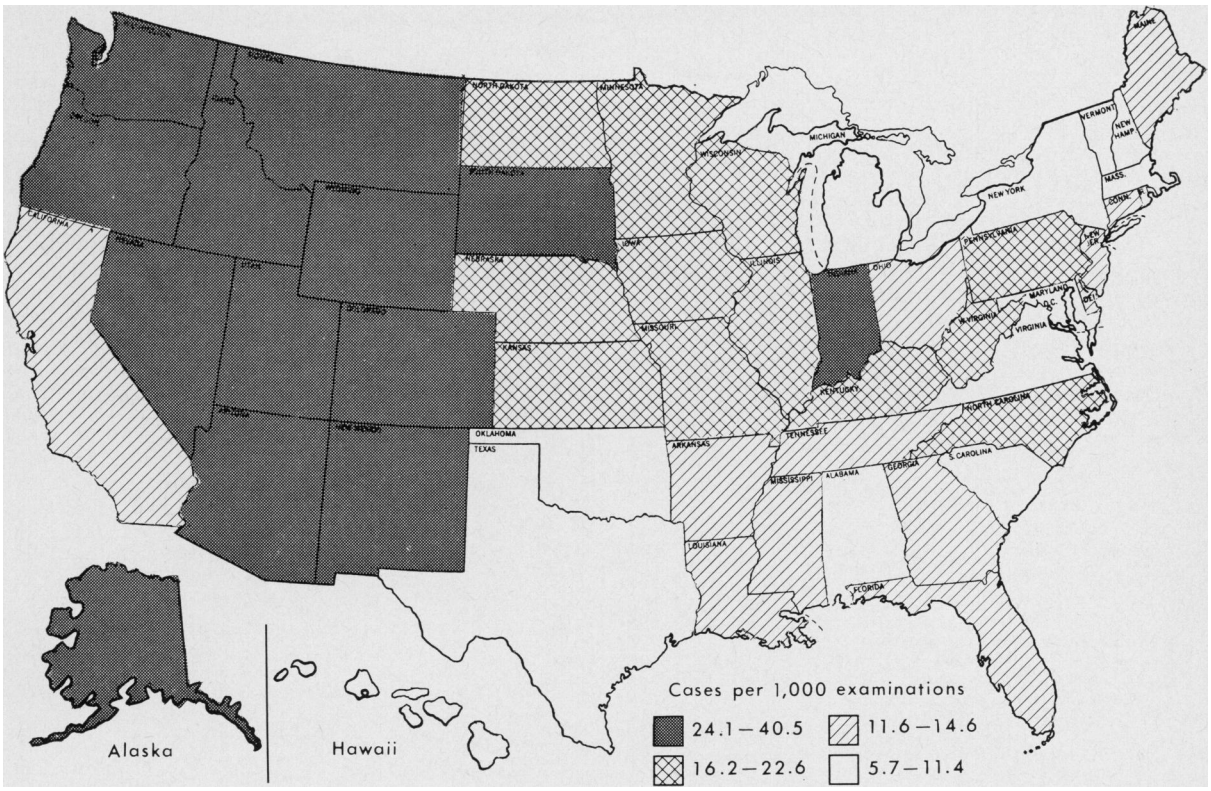

Figure 1. Prevalence rates, in quartiles, of definite and probable rheumatic fever and rheumatic heart disease among college freshmen, by State of residence at time of survey, 1956–65

Puerto Rico, and the Virgin Islands. Foreign students attending the colleges in the study were also included.

Table 1 shows the distribution of the students by sex and reported State of residence at the time of the survey. There were more than 900 students in the study from each State except Alaska, Hawaii, and Vermont; 22 States had

Table 4. Race and sex distribution of the prevalence of rheumatic fever or rheumatic heart disease, or both, and rheumatic heart disease alone, 1956–65

Race and sex	Examinations		Prevalence			
			Rheumatic fever and rheumatic heart disease		Rheumatic heart disease	
	Number	Percent	Number of cases	Rate per 1,000	Number of cases	Rate per 1,000
Total	767, 600	100. 0	12, 134	15. 8	3, 743	4. 9
White	722, 312	94. 1	11, 509	15. 9	3, 498	4. 8
Male	435, 554		6, 941	15. 9	2, 170	5. 0
Female	286, 758		4, 568	15. 9	1, 328	4. 6
Nonwhite	33, 779	4. 4	442	13. 1	193	5. 7
Male	17, 261		226	13. 1	96	5. 6
Female	16, 518		216	13. 1	97	5. 9
Race not specified	11, 509	1. 5	183	15. 9	52	4. 5
Male	5, 818		106	18. 2	30	5. 2
Female	3, 554		54	15. 2	18	5. 1
Sex not specified	2, 137		23	10. 8	4	1. 9

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Table 5. Prevalence of probable or definite rheumatic heart disease per 1,000 students surveyed, by sex and State of residence at time of survey, 1956–65

Rank [1]	State of residence	Total		Male		Female	
		Number of cases	Rate per 1,000 examinations	Number of cases	Rate per 1,000 examinations	Number of cases	Rate per 1,000 examinations
	Total	[2] 3,743	4.9	2,296	5.0	1,443	4.7
48	Alabama	6	2.1	4	1.9	2	2.4
	Alaska	4	14.8	4	26.0	0	0
5	Arizona	35	8.0	22	8.3	13	7.6
28	Arkansas	6	4.3	3	3.4	3	6.0
40	California	109	3.1	59	3.2	50	3.0
8	Colorado	101	7.4	55	7.6	45	7.0
35	Connecticut	33	3.8	15	2.8	18	5.7
43	Delaware	13	2.8	10	3.8	3	1.5
	District of Columbia	30	3.9	15	3.4	15	4.5
36	Florida	30	3.8	21	3.6	9	4.3
39	Georgia	19	3.2	12	3.2	7	3.1
	Hawaii	3	3.6	2	4.2	1	2.8
9	Idaho	33	6.8	22	6.7	11	7.1
19	Illinois	127	5.5	76	5.8	51	5.0
7	Indiana	15	7.6	9	7.1	6	8.6
10	Iowa	120	6.7	79	7.7	41	5.3
22	Kansas	123	5.4	69	5.0	54	6.2
24	Kentucky	51	5.0	31	5.1	20	4.8
42	Louisiana	17	3.0	13	3.8	4	1.8
13	Maine	17	6.3	11	6.1	6	6.8
46	Maryland	14	2.5	11	2.7	3	2.0
33	Massachusetts	163	3.9	106	4.0	57	3.8
34	Michigan	263	3.8	157	4.1	106	3.4
18	Minnesota	181	5.6	121	5.9	60	5.2
26	Mississippi	39	4.4	28	4.7	11	4.2
20	Missouri	108	5.5	54	4.6	54	6.9
2	Montana	142	9.7	87	9.8	54	9.6
37	Nebraska	75	3.6	46	3.4	29	3.9
3	Nevada	9	8.7	6	9.4	3	7.5
32	New Hampshire	29	4.0	19	3.5	10	6.0
30	New Jersey	70	4.2	49	5.7	21	2.6
21	New Mexico	13	5.5	8	5.8	5	5.2
38	New York	189	3.5	97	3.6	92	3.5
14	North Carolina	51	6.1	9	4.6	42	6.6
31	North Dakota	21	4.2	13	3.6	8	5.7
15	Ohio	581	6.0	390	6.6	191	5.0
44	Oklahoma	56	2.7	27	2.2	29	3.6
6	Oregon	22	7.6	7	4.4	15	11.6
16	Pennsylvania	226	6.0	164	6.4	62	5.0
27	Rhode Island	11	4.4	6	3.8	5	5.4
45	South Carolina	16	2.7	11	2.3	5	4.6
4	South Dakota	62	8.1	37	7.5	25	9.1
17	Tennessee	25	5.7	12	5.7	13	5.7
41	Texas	31	3.0	20	3.2	11	2.6
1	Utah	134	10.3	84	11.3	50	9.0
29	Vermont	3	4.3	2	4.6	1	3.8
47	Virginia	48	2.1	27	1.8	21	2.9
12	Washington	73	6.3	42	5.9	31	7.1
25	West Virginia	43	4.5	28	4.5	15	4.6
23	Wisconsin	76	5.1	44	5.1	31	4.9
11	Wyoming	62	6.4	38	6.4	23	6.2
	Puerto Rico	0	0	0	0	0	0
	Virgin Islands	0	0	0	0	0	0
	Foreign group	15	2.6	14	3.2	1	.7

[1] Rank of prevalence rates for total group surveyed in each State of continental United States. Rank not assigned to Alaska, District of Columbia, Hawaii, Puerto Rico, Virgin Islands, and foreign students.

[2] Total includes 4 cases in which sex was not stated.

more than 10,000 participants. The greatest number of participants (97,271) were from Ohio. Almost 60 percent of the participants were males.

Of the 767,600 students, 12,134 or 15.8 per 1,000 students examined were found to have a valid history of rheumatic fever or clinical evidence of rheumatic heart disease according to the scoring system described (table 2). Of the 12,134 students with a history of rheumatic fever or rheumatic heart disease, or both, 9,787 or 80.7 percent can be considered as definitely having had the illness and 2,347 or 19.3 percent as probably having had the illness, as shown in table 2.

Table 2 also indicates that in many cases the student's history could not be substantiated by the physician's interview and physical examination. Of the 12,134 students with rheumatic fever, 3,743 or 30.8 percent had rheumatic heart disease as determined by physical examination. Rheumatic heart disease had been diagnosed previously in 1,830 or 48.9 percent of the 3,743 students; rheumatic fever had been diagnosed previously in 1,025 or 27.4 percent, but they had not been told that they also had rheumatic heart disease; and 888 or 23.7 percent had no history of rheumatic fever or previously diagnosed rheumatic heart disease. Of the 3,743 students with rheumatic heart disease, 1,126 or 30.1 percent had no previous history of an acute episode of rheumatic fever.

The overall prevalence rate of rheumatic fever and rheumatic heart disease for the 10-year period was 15.8 per 1,000 students (table 3). The prevalence rates ranged from a high of 40.5 per 1,000 students in Utah to a low of 5.7 per 1,000 students in Virginia. As shown in figure 1, between 1956 and 1965 the prevalence was generally highest in the Rocky Mountain area.

Of the total study population, 33,779 students, or 4.4 percent were nonwhite (table 4). The prevalence rate of rheumatic fever and rheumatic heart disease among nonwhite students was 13.1 per 1,000, and among the 722,312 white students it was 15.9 per 1,000. However, the prevalence rate of rheumatic heart disease alone was 5.7 per 1,000 nonwhite students in contrast to 4.8 per 1,000 white students. The prevalence of rheumatic fever and rheumatic heart disease was equal in both sexes among the students who specified both race and sex (table 4). However, the prevalence rate of rheumatic heart disease alone (table 5) was slightly greater in males (5.0 per 1,000) than in females (4.7 per 1,000) when the entire population is considered, because of the higher rate in males among the 11,509 students who did not specify their race. When stratified for race and sex, rheumatic

Table 6. Prevalence of rheumatic fever and rheumatic heart disease, by type of college ownership,[1] 1956–65

School year	Type of colleges participating			Examinations by college type			Prevalence rate per 1,000 examinations					
							Rheumatic fever and rheumatic heart disease			Rheumatic heart disease		
	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private
1956	89	46	43	86, 939	60, 261	26, 678	16. 6	18. 3	12. 8	7. 9	8. 4	6. 6
1957	86	38	48	95, 083	65, 971	29, 112	17. 5	17. 3	18. 2	7. 3	6. 2	9. 9
1958	106	61	45	113, 538	82, 136	31, 402	19. 6	20. 2	17. 9	5. 5	5. 2	6. 4
1959	110	58	52	110, 317	79, 837	30, 480	17. 0	17. 5	15. 7	4. 4	4. 3	4. 7
1960	98	57	41	111, 252	83, 913	27, 339	16. 4	16. 3	16. 8	4. 3	3. 9	5. 4
1961	19	9	10	18, 385	12, 398	5, 987	17. 0	16. 9	17. 0	5. 0	5. 3	4. 2
1962	55	27	28	51, 275	34, 086	17, 189	12. 6	12. 5	12. 7	3. 5	3. 3	3. 7
1963	65	34	31	67, 062	50, 780	16, 282	12. 7	13. 4	10. 3	3. 3	3. 2	3. 1
1964	51	27	24	62, 414	49, 904	12, 510	11. 8	12. 5	9. 0	3. 0	3. 0	2. 2
1965	38	18	20	51, 335	39, 385	11, 950	10. 6	11. 0	9. 2	2. 1	2. 2	1. 9
Total				767, 600	558, 671	208, 929	15. 8	16. 2	14. 8	4. 9	4. 7	5. 5

[1] Type of ownership according to "Opening Fall Enrollment In Higher Education," U.S. Office of Education OE-54003-66, 1966, p. 106.

SCHOOLS PARTICIPATING IN THE COLLEGE RHEUMATIC FEVER STUDY, 1956–65

Alabama
Alabama Polytechnic Institute

Arizona
Arizona State College
Phoenix College

Arkansas
Henderson State Teachers College
Fort Smith Junior College

California
Associated Colleges of Claremont
California State Polytechnic College
Occidental College
University of California at Berkeley
University of California at Davis
University of California at Santa Barbara
University of Southern California
Loma Linda University
San Diego State College

Colorado
Colorado State University
University of Denver
Colorado College
Colorado Women's College
University of Colorado

Connecticut
Central Connecticut State College
Yale University

Delaware
University of Delaware

District of Columbia
Gallaudet College
District of Columbia Teachers College
Georgetown University
Howard University

Florida
University of Florida
University of Miami

Georgia
Georgia Institute of Technology
University of Georgia
Georgia State College for Women

Idaho
Idaho State University

Illinois
Northern Illinois University
Rockford College
Roosevelt University
University of Chicago
Wheaton College
George Williams College

Indiana
University of Notre Dame

Iowa
Drake University
Iowa State University of Science and Technology
State College of Iowa

Kansas
Fort Hays Kansas State College
Kansas State University

Kentucky
Berea College
University of Kentucky

Louisiana
Louisiana State University A&M College
Louisiana Polytechnic Institute
Tulane University
Xavier University

Maine
Bowdoin College
Colby College

Maryland
Johns Hopkins University
Washington College

Massachusetts
Amherst College
Boston University
Brandeis University
Harvard University
Springfield College
University of Massachusetts
Williams College

Michigan
Michigan State University
Eastern Michigan University
University of Michigan
Wayne State University

Minnesota
Hamline University
St. Olaf College
University of Minnesota

Mississippi
Mississippi State University
University of Mississippi
Mississippi State College for Women

Missouri
Central Missouri State College
Southwest Missouri State College
Washington University

Montana
University of Montana
Northern Montana College
Eastern Montana College
Montana State University

Nebraska
Creighton University
University of Nebraska

Nevada
University of Nevada

New Hampshire
Dartmouth College
University of New Hampshire

New Jersey
Rutgers the State University
Newark State College
Princeton University

New Mexico
New Mexico Highlands University
Western New Mexico University

New York
Adelphi University
Barnard College
Brooklyn College
Columbia University
Vassar College
Cooper Union University
St. John's University
Skidmore College
State University College at Brockport
Syracuse University
Union College
Cornell University
State University of New York at Buffalo

North Carolina
University of North Carolina at Greensboro
Wake Forest College

North Dakota
North Dakota State University

Ohio
Kent State University
Miami University
Muskingum College
Oberlin College
Ohio State University
Ohio Wesleyan University
Ohio University
Otterbein College
University of Toledo
University of Cincinnati
Cleveland State University
Wilberforce University

Oklahoma
University of Oklahoma
Oklahoma State University of Agriculture and Applied Science

Oregon
Eastern Oregon College

Pennsylvania
Bryn Mawr College
Pennsylvania State University
Carnegie Institute of Technology
Bucknell University

Rhode Island
Brown University

South Carolina
Clemson University
South Carolina State College

South Dakota
Northern State College
South Dakota State University
South Dakota School of Mines and Technology
University of South Dakota

Tennessee
George Peabody College for Teachers
Tennessee Agricultural and Industrial State University

Texas
Southwest Texas State College
University of Texas
University of Texas—Medical Branch

Utah
University of Utah
Brigham Young University

Vermont
Bennington College

Virginia
University of Richmond
Virginia State College
University of Virginia

Washington
University of Washington
Seattle Pacific College

West Virginia
West Virginia University

Wisconsin
Wisconsin State University at La Crosse
Beloit College
University of Wisconsin

Wyoming
University of Wyoming

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heart disease was slightly more prevalent among white males than white females, and among nonwhite females than among nonwhite males (table 4).

The prevalence of rheumatic fever and rheumatic heart disease was calculated according to whether the reporting college was a private or public institution. Table 6 shows the 10-year trend data. The total rheumatic fever prevalence rate in the public colleges (16.2) was 9.5 percent higher than in private colleges (14.8). The prevalence rate of rheumatic heart disease, however, was 17 percent higher (5.5 versus 4.7) in the private schools.

The yearly prevalence rates of rheumatic fever and rheumatic heart disease and of rheumatic heart disease alone are shown in figure 2. Between 1956 and 1965 there was a decline in prevalence of rheumatic fever and rheumatic heart disease of about 36 percent and of rheumatic heart disease alone of about 75 percent. As shown in table 6, this decline occurred among students of both private and public colleges. The prevalence also declined in both sexes and in both the white and the nonwhite groups.

Discussion

The size of the study population varies from year to year, depending on the number of schools which participate voluntarily and the

Table 8. Prevalence of rheumatic heart disease, results of surveys

Location and reference number	Date	Number in survey	Age range (years)	Rate per 1,000
Children, United States:				
New York City (*3*)	1920	44, 000	(?)	4. 5
Boston (*4*)	1926	119, 337	6–17	4. 5
Philadelphia (*5*)	1928	10, 333	6–16	8. 2
Detroit (*6*)	1928–31	946, 580	6–12	1. 2
San Francisco (*7*)	1929–31	91, 000	5–18(?)	1. 7
Philadelphia (*8*)	1934	33, 293	6–18	4. 8
San Francisco (*9*)	1931–34	86, 082	5–18	1. 5
San Francisco (*9*)	1935(?)	13, 338	6–18	2. 2
Cincinnati (*10*)	1936–38	50, 531	5–14	1. 7
Louisville, Ky. (*11*)	1936–39	41, 905	6–15	3. 6
Rural Iowa (*12*)	1945	5, 048(?)	5–19	2. 7
San Francisco (*13*)	1946–47	57, 768	5–18	2. 4
New York City, Lower East Side (*14*)	1949	27, 639	(1)	4. 8
Miami, Fla. (*15*)	1949–50	1, 001	10–16	5. 0
Colorado, statewide (*16*)	1949–51	11, 236	10–13	6. 6
Buffalo, N.Y. (*17*)	1949–52	71, 707	5–18(?)	2. 2
New York City, Lower East Side (*14*)	1950	29, 543	(1)	4. 3
New York City, Lower East Side (*14*)	1951	31, 259	(1)	3. 6
Pensacola, Fla. (*18*)	1951–52	2, 600	9–21	3. 8
New York City, Lower East Side (*14*)	1952	34, 663	(1)	3. 2
New York City, Lower East Side (*14*)	1953	36, 082	(1)	2. 7
New York City, Lower East Side (*14*)	1955	37, 317	(1)	2. 2
Durango, Colo. (*19*)	1956–58	2, 191	5–13	4. 1
New York City, Lower East Side (*14*)	1957	41, 955	(1)	1. 5
Grand Junction, Colo. (*20*)	1958	6, 311	5–13	1. 1
Chicago (*21*)	1959–60	27, 911	6–13	. 6
New York City, Lower East Side (*14*)	1961	40, 500	(1)	1. 4
New York City, Lower East Side (*14*)	1963	39, 400	(1)	1. 6
Children, other countries:				
New South Wales (*22*)	1925(?)	12, 000(?)	6–13	8. 3
Bristol, England (*23*)	1943–48	261, 600	4–13	. 4
Toronto (*24*)	1948–49	74, 450	5–15	1. 6
Rotterdam (*25*)	1951–54	84, 674	5–15	1. 0
Sydney, Australia (*26*)	1955	34, 863	5–16	1. 0
Toronto (*27*)	1961–62	102, 219	5–15	. 6

time period over which they participate. For instance, the State of Ohio, with a study population of 97,271, had 12 universities participating while the State of Florida, with only two universities participating, had a study population of 7,910. It must be questioned how closely the study population represents the corresponding age group in the total population. Certainly the male representation is greater than would be expected in a random sample of the population of this age. Likewise, it must be assumed that the study population generally represents the higher socioeconomic strata. One would anticipate that a similar study in the lower socioeconomic strata would yield an even higher prevalence of rheumatic fever.

The distribution of the study population is compared with the distribution of the estimated 15- to 19-year-old population during the decade of the study in table 7. While a slightly greater percentage of the study population came from States with a higher prevalence of rheumatic fever than the percentage of the total population of the same age residing in the correspond-

Table 7. Comparison of study population with the total population of corresponding age

States with rheumatic fever prevalence rates per 1,000 examinations of—	Percent of study population from these States	Percent of total 15- to 19-year-old population in these States [1]
24.1–40.5	11. 4	9. 6
16.2–22.6	29. 0	27. 0
11.6–14.6	26. 0	31. 2
5.7–11.4	31. 7	31. 4

[1] According to U.S. Bureau of the Census, *Current Population Reports*, Series P–25, No. 321, "Estimates of the population of the United States, by age, color, and sex: July 1, 1960 to 1965," U.S. Government Printing Office, Washington, D.C., 1965.

Table 8. Prevalence of rheumatic heart disease, results of surveys—Continued

Location and reference number	Date	Number in survey	Age range (years)	Rate per 1,000
Younger adults, United States:				
Harvard University (*28*)	1915	662	Average, 18	15. 0
Yale University (*28*)	1932	7, 914	17–24	8. 0
Yale University (*28*)	1932	4, 455	19–30	11. 0
University of Pennsylvania (*28*)	1932	3, 086	----------	10. 0
86 universities (*28*)	1938	104, 163	----------	12. 0
14 universities (*28*)	1938	46, 098	----------	6. 0
U.S. military (*29*)	1941	2, 000, 000	21–36	24. 0
University of Wisconsin (*28*)	1941	28, 139	----------	8. 0
Harvard freshmen (*28*)	1943	2, 856	----------	3. 0
University of Colorado (*28*)	1952	3, 645	----------	7. 0
University of California (*28*)	1952	11, 096	----------	3. 0
U.S. military (*30*)	1950–53	3, 685, 000	18–26	5. 9
U.S. military (*31*)	1953–58	2, 354, 000	18–26	4. 3
College freshmen [2]	1956	86, 939	18–21	7. 9
College freshman [2]	1957	95, 083	18–21	7. 3
College freshmen [2]	1958	113, 538	18–21	5. 5
College freshmen [2]	1959	110, 317	18–21	4. 4
College freshmen [2]	1960	111, 252	18–21	4. 3
U.S. military (*29*)	1961	20, 597	17–26	8. 8
College freshmen [2]	1961	18, 385	18–21	5. 0
College freshman [2]	1962	51, 275	18–21	3. 5
College freshmen [2]	1963	67, 062	18–21	3. 3
College freshmen [2]	1964	62, 414	18–21	3. 0
College freshmen [2]	1965	51, 335	18–21	2. 1
Other adults, United States:				
Framingham, Mass. (*32*)	1954	1, 612	30–39	24. 0
Framingham, Mass. (*32*)	1954	1, 496	40–49	28. 0
Framingham, Mass. (*32*)	1954	1, 386	50–59	29. 0
National Health Survey (*33*)	1960–62	[3] 23, 697	35–44	11. 0
National Health Survey (*33*)	1960–62	[3] 20, 576	45–54	15. 0
National Health Survey (*33*)	1960–62	[3] 15, 638	55–64	13. 0

[1] Elementary and junior high school.
[2] Present study.
[3] Number of adults in thousands. Estimated U.S. noninstitutional population. Prevalence estimated from a probability sample of 3,537 adults for the ages indicated.

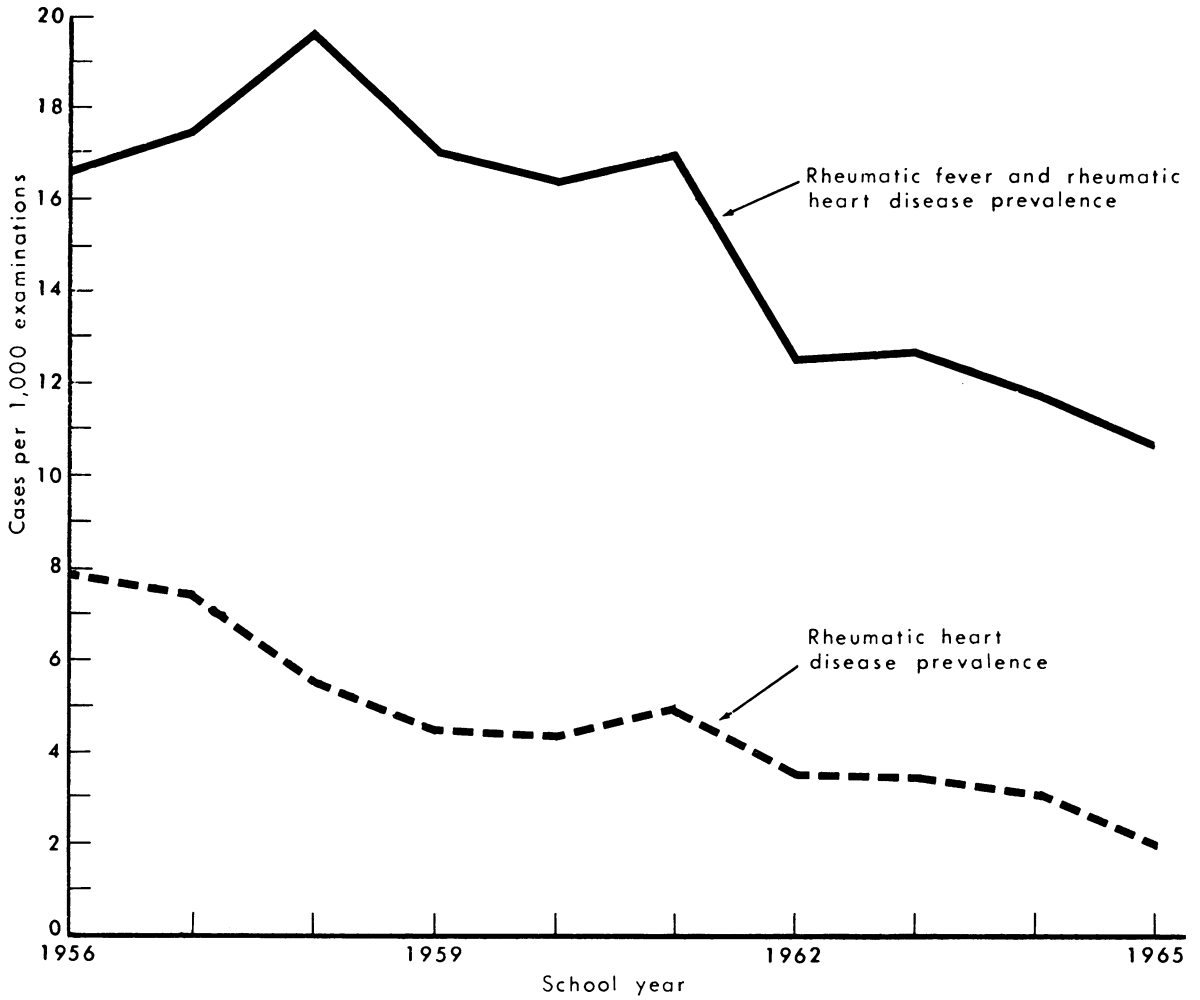
ing States, these differences would not seem to be of such magnitude as to invalidate the general conclusions of the study.

It also must be questioned whether there was an overdiagnosis of rheumatic fever in this study, since the physician-examiners generally were not trained cardiologists. While overdiagnosis of rheumatic fever by the physicians may have occurred, the conservative nature of the scoring system probably eliminated several cases of rheumatic fever. These factors can be assumed to have been relatively constant across the country and hopefully were balanced during the 10 years. An attempt was made to follow up the students to determine the final diagnosis. This was found to be impossible since, as a rule, about 48 percent of college freshmen fail to complete their studies in the school at which they originally matriculate (*2*).

The data relating to rheumatic heart disease from this study are compared with prevalence data from the literature (*3–33*) in table 8. While different methodologies make the studies not completely comparable in all respects, the data suggest a general decline in the prevalence of rheumatic heart disease. The generally lower prevalence figures for children confirm the rationale for conducting the current study among young adults. The markedly higher prevalence in older adults may be true or may be related to the small sample size in the reported studies, to the diagnostic techniques employed, or to the fact that the sample group may not be representative of the population at large.

The data on the prevalence of rheumatic heart disease raise important questions. During the decade of this study the prevalence

Figure 2. Yearly prevalence rates of rheumatic fever and rheumatic heart disease and of rheumatic heart disease alone among college freshmen, 1956–65



rate of rheumatic heart disease in college freshmen decreased by 75 percent from 7.9 to 2.1 per 1,000 students. The prevalence rate of rheumatic heart disease in the adult population aged 40–50 years was considerably higher, 28 per 1,000 in one study in 1954 (*32*). Since the adults in the Framingham study (*32*) have lived primarily in an era without antibiotics and prophylactic medications, one would question whether the higher prevalence observed in that study is related to the absence of these medications or to other factors. It will be interesting to note the prevalence of rheumatic heart disease when the cohorts of college freshmen in the present decade reach the age group of 40–50 years.

The data suggest that rheumatic fever and rheumatic heart disease, although declining in prevalence among college freshmen, remain important public health problems. Certainly, knowledge gained from experience with rheumatic fever control in the higher socioeconomic strata must be applied to the less fortunate to help eradicate this disease.

Summary

Between 1956 and 1965, a total of 148 colleges and universities participated in a nationwide survey to determine the prevalence of rheumatic fever and rheumatic heart disease among freshmen students. Of 767,600 participating students,

12,134 or 15.8 per 1,000 students examined had a valid history of rheumatic fever or rheumatic heart disease, or both. The prevalence of rheumatic fever was generally highest in the Rocky Mountain States. Among the students with rheumatic fever, 30.8 percent had rheumatic heart disease. Among the students with rheumatic heart disease, 30.1 percent had no previous history of an acute episode of rheumatic fever.

During the decade of the study, the prevalence of rheumatic fever and rheumatic heart disease decreased by approximately 36 percent, and the prevalence of rheumatic heart disease alone dropped approximately 75 percent. This decrease occurred in both the white and nonwhite students and in both public and private colleges in all areas of the United States.

Prophylaxis

Results

During the decade of this study, 55.1 percent of the 12,134 students with rheumatic fever or rheumatic heart disease, or both, stated that prophylactic medication had been prescribed (table 9). Penicillin, oral and parental, was the most commonly prescribed medication.

The percentage of students ever on prophylaxis varied from 67.2 of those in Wyoming to 30.0 of those in Vermont (table 10). At the time of the study, 1,871 or 15.4 percent were on prophylaxis. The geographic distribution of these 1,871 students is shown in figure 3. Generally, the compliance of students to the recommended prophylactic regimen against rheumatic fever was highest in New England, the Midwest, and some of the Rocky Mountain States; however, compliance was not greater than 28 percent in any State.

A steady increase in the percentage of students who had ever received prophylaxis against rheumatic fever is shown in table 11. Only 28.6 percent of those with an initial attack of rheumatic fever before 1935 had ever received prophylactic medication. Of those who experienced an attack in 1961, 81.4 percent reported that they had received some prophylactic medication.

Although a small number of students experienced their first attack between 1962 and 1964, the percentages of those for whom prophylactic medications were prescribed increased. None of the participating students experienced a first attack in 1965; this points up the fact that the greatest incidence of the disease is in the age group 5–15 years.

Of the 12,134 students who had rheumatic fever, 6,685 or 55.1 percent were given prophylactic medication at some period, as mentioned. Of these 6,685 students ever on prophylaxis, only 1,871 or 28 percent were on prophylaxis at the time of the study. The percentage of those currently on prophylaxis, expressed as a percentage of those ever on prophylaxis, generally rose (table 11), but even in recent years compliance with recommended regimens seldom exceeded 60 percent. Some of the lower compliance percentages may be related to the fact that physicians in some cases recommended discontinuation of prophylaxis. It was not possible to determine the reason for noncompliance.

Table 12 shows the students who were receiving prophylactic medication at the time of the survey according to the number of reported attacks of rheumatic fever. Of the 10,107 students who could recall the number of attacks they had experienced, 60.9 percent had received some prophylactic medication and 17.0 percent were still receiving it. The percentages of those ever on and currently on prophylaxis increased with the number of recurrences. However, only 37.0 percent of those with four or more attacks

Table 9. Prophylactic medication prescribed for 12,134 students with history of rheumatic fever or rheumatic heart disease, or both, 1956–65

Use of prophylaxis	Number	Percent of total
Total cases	12, 134	100. 0
Agent given	6, 685	55. 1
Penicillin tablets	2, 156	----------
Penicillin injections	1, 356	----------
Penicillin, type unspecified	132	----------
Penicillin and sulfa drugs	987	----------
Sulfa drugs alone	1, 054	----------
Type not specified	1, 000	----------
Agent not given	2, 375	19. 6
Unknown [1]	3, 074	25. 3

[1] Student either did not know whether he had received prophylactic medication or did not answer the question.

Table 10. Use of prophylactic medication by students with rheumatic fever or rheumatic heart disease, or both, by State of residence at time of attack, 1956–65

State of residence	Total	Ever on prophylaxis			Currently on prophylaxis		
		Cases	Percent	Rank [1]	Cases	Percent	Rank [1]
Total	12, 134	6, 685	55. 1	----	1, 871	15. 4	----
Alabama	22	14	63. 6	6	1	4. 5	46
Alaska	37	19	51. 4	----	5	13. 5	----
Arizona	75	39	52. 0	34	13	17. 3	11
Arkansas	33	21	63. 6	5	1	3. 0	47
California	430	238	55. 3	27	56	13. 0	30
Colorado	327	203	62. 1	8	64	19. 6	7
Connecticut	104	62	59. 6	11	29	27. 9	1
Delaware	47	16	34. 0	47	8	17. 0	13
District of Columbia	52	32	61. 5	----	12	23. 1	----
Florida	75	37	49. 3	38	8	10. 7	39
Georgia	71	41	57. 7	17	9	12. 7	33
Hawaii	7	3	42. 9	----	1	14. 3	----
Idaho	154	68	44. 2	45	11	7. 1	44
Illinois	421	236	56. 1	26	72	17. 1	12
Indiana	86	41	47. 7	41	12	14. 0	22
Iowa	387	202	52. 2	33	52	13. 4	26
Kansas	402	214	53. 2	30	42	10. 4	40
Kentucky	176	101	57. 4	19	31	17. 6	10
Louisiana	66	43	65. 2	2	3	4. 5	45
Maine	40	20	50. 0	37	11	27. 5	2
Maryland	77	45	58. 4	15	20	26. 0	3
Massachusetts	378	181	47. 9	40	84	22. 2	6
Michigan	755	431	57. 1	23	126	16. 7	14
Minnesota	692	395	57. 1	24	107	15. 5	18
Mississippi	111	66	59. 5	12	13	11. 7	35
Missouri	399	227	56. 9	25	54	13. 5	24
Montana	466	267	57. 3	20	66	14. 2	21
Nebraska	351	201	57. 3	21	46	13. 1	29
Nevada	35	16	45. 7	42	4	11. 4	37
New Hampshire	63	33	52. 4	32	10	15. 9	17
New Jersey	236	136	57. 6	18	39	16. 5	15
New Mexico	68	42	61. 8	9	9	13. 2	28
New York	630	360	57. 1	22	151	24. 0	5
North Carolina	143	85	59. 4	13	23	16. 1	16
North Dakota	96	56	58. 3	16	10	10. 4	41
Ohio	1, 314	638	48. 6	39	169	12. 9	31
Oklahoma	224	140	62. 5	7	22	9. 8	42
Oregon	86	56	65. 1	3	13	15. 1	20
Pennsylvania	754	411	54. 5	28	117	15. 5	19
Rhode Island	26	10	38. 5	46	3	30. 8	36
South Carolina	59	31	52. 5	31	8	13. 6	23
South Dakota	205	123	60. 0	10	37	18. 0	9
Tennessee	70	41	58. 6	14	9	12. 9	32
Texas	82	37	45. 1	43	9	11. 0	38
Utah	510	262	51. 4	36	68	13. 3	27
Vermont	10	3	30. 0	48	----	----	----
Virginia	136	61	44. 9	44	11	8. 1	43
Washington	260	141	54. 2	29	35	13. 5	25
West Virginia	207	107	51. 7	35	25	12. 1	34
Wisconsin	316	202	63. 9	4	57	18. 0	8
Wyoming	259	174	67. 2	1	64	24. 7	4
Puerto Rico	3	1	33. 0	----	1	33. 0	----
Virgin Islands							
Foreign group	101	56	55. 4	----	20	19. 8	----

[1] Rank of percentages ever on and currently on prophylaxis assigned to 48 States.

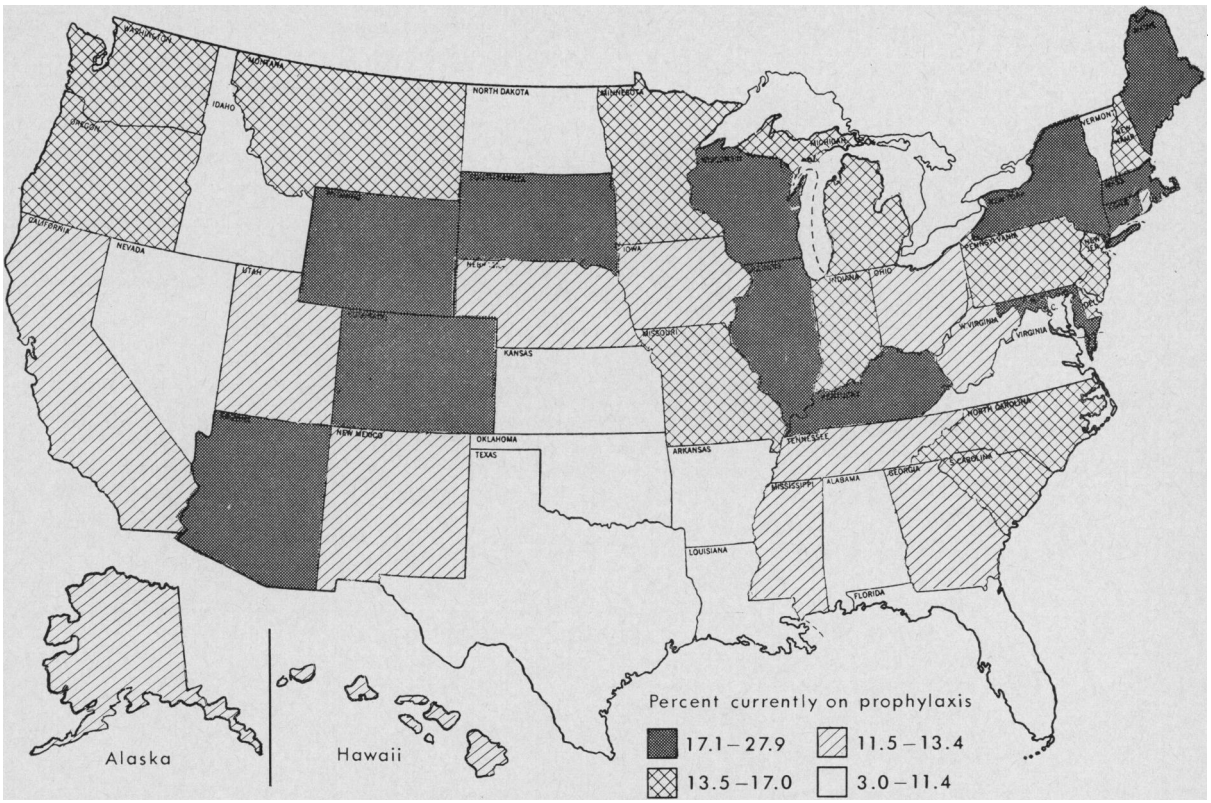


Figure 3. Use of prophylactic medication by students with rheumatic fever or rheumatic heart disease, or both, by State of residence at time of attack, 1956–65

stated that they were receiving prophylaxis at the time of the study.

Of the 1,830 students with rheumatic heart disease which had been diagnosed before the study, 1,197 or 65.4 percent reported that they had ever been on prophylaxis. Of the 1,197 students with rheumatic heart disease and ever on prophylaxis, 502 or 41.9 percent reported that they were still on prophylaxis.

Table 13 shows the compliance of students according to the type of prophylactic medications recommended. Of the students for whom oral penicillin was prescribed, 44.6 percent were on prophylaxis at the time of the survey. Of the students receiving penicillin parenterally, 24.7 percent were maintaining prophylaxis. Only 18.3 percent of those for whom sulfa drugs were prescribed were maintaining prophylaxis. Of those currently on prophylaxis, 51.4 percent were taking oral penicillin and 17.9 percent were receiving parenteral penicillin.

Table 14 reveals that almost equal percentages of white and nonwhite students received recommendations for prophylaxis and maintained prophylaxis. In both racial groups, a higher percentage of females than males received recommendations for and continued to take prescribed medications.

Table 15 reveals that a greater percentage of students attending public colleges received recommendations for prophylactic medication. However, a greater percentage of those attending private colleges maintained prophylaxis.

Discussion

The results of this study indicate that an increasingly greater percentage of students with rheumatic fever have at least received recommendations from their physicians for prophylactic medications. The data also suggest that an increasing percentage of those for whom prophylactic medication is prescribed continue to take their medications, particularly if they have rheumatic heart disease. However, there is an apparent inverse relationship between the date of original attack and compliance with the rec-

ommendations at the time of the study. The longer the time between the initial attack and the study, the fewer the students following recommendations.

The study personnel, of course, could not determine whether the students actually were taking their prophylactic medications. They could rely only on what the students said they were doing. Past studies have demonstrated reluctance of both parents and patients to complete recommended therapeutic (*34–43*) and prophylactic (*44–47*) regimens. These studies have also demonstrated a discrepancy between the patient's stated behavior in terms of taking prescribed medication and his actual behavior when urine is tested for excretion of the drug he is supposed to be taking or when the amount of medication he is supposed to have taken is counted. This suggests that our figure for compliance with recommended prophylaxis may be

Table 11. Students with rheumatic fever or rheumatic heart disease, or both, ever on prophylaxis and currently on prophylaxis at time of survey, 1956–65, by year of first attack

Year of first attack [1]	Number of cases	Ever on prophylaxis		Currently on prophylaxis	
		Number	Percent	Number	Percent of those ever on prophylaxis
Total	12, 134	6, 685	55. 1	1, 871	28. 0
Unknown	2, 032	457	22. 5	177	38. 7
Known	10, 102	6, 228	61. 7	1, 694	27. 2
Before 1935	84	24	28. 6	4	16. 7
1935–39	162	46	28. 4	10	21. 7
1935	22	6	27. 3	0	0
1936	22	5	22. 7	1	20. 0
1937	22	7	31. 8	2	28. 6
1938	32	3	9. 4	1	33. 3
1939	64	25	39. 1	6	24. 0
1940–44	1, 361	616	45. 3	89	14. 4
1940	86	33	38. 4	4	12. 1
1941	139	46	33. 1	8	17. 4
1942	199	89	44. 7	14	15. 7
1943	374	172	46. 0	29	16. 9
1944	563	276	49. 0	34	12. 3
1945–49	3, 576	1, 976	55. 3	359	18. 2
1945	698	342	49. 0	52	15. 2
1946	691	367	53. 1	51	13. 9
1947	716	394	55. 0	79	20. 1
1948	774	465	60. 1	95	20. 4
1949	697	408	58. 5	82	20. 1
1950–54	3, 305	2, 225	67. 3	603	27. 1
1950	762	477	62. 6	84	17. 6
1951	699	439	62. 8	111	25. 3
1952	666	443	66. 5	142	32. 1
1953	651	462	71. 0	130	28. 1
1954	527	404	76. 7	136	33. 7
1955–59	1, 385	1, 141	82. 4	515	45. 1
1955	429	347	80. 9	143	41. 2
1956	302	238	78. 8	91	38. 2
1957	257	216	84. 0	96	44. 4
1958	211	180	85. 3	92	51. 1
1959	186	160	86. 0	93	58. 1
1960–64	229	200	87. 3	114	57. 0
1960	114	98	86. 0	52	53. 1
1961	59	48	81. 4	25	52. 1
1962	29	27	93. 1	18	66. 7
1963	17	17	100. 0	13	76. 5
1964	10	10	100. 0	6	60. 0

[1] None of the participants experienced a first attack in 1965.

Table 12. Students ever on or currently on prophylaxis, by number of attacks of rheumatic fever, 1956–65

Number of attacks	Number	Ever on prophylaxis		Currently on prophylaxis	
		Number	Percent	Number	Percent
Total	12, 134	6, 685	55. 1	1, 871	15. 4
Not stated [1]	1, 884	423	22. 5	122	6. 5
Uncertain	143	104	72. 7	35	24. 5
Known	10, 107	6, 158	60. 9	1, 714	17. 0
One	8, 241	4, 887	59. 3	1, 224	14. 9
Two	1, 364	899	65. 9	330	24. 2
Three	364	264	72. 5	109	29. 9
Four or more	138	108	78. 3	51	37. 0

[1] Includes students with diagnosed rheumatic heart disease but no history of rheumatic fever.

higher than would obtain if the students' responses were compared with, for example, urine tests for the excretion of the drug used for prophylaxis.

In 1953 the American Heart Association published recommendations for rheumatic fever prophylaxis (*48*). Subsequently, considerable effort has been expended in physician and lay education by the association, the Public Health Service, and State and local health authorities. The fact that only about one-third of those with two or more attacks of rheumatic fever and that only 28 percent of those with rheumatic heart disease are currently on prophylaxis suggests that there is much more work to be done. Furthermore, one would anticipate that compliance with prophylactic recommendations might be less in the population at large. Indeed, RuDusky (*29*) reported that in 1961 only 7 percent of military inductees with rheumatic heart disease were taking prophylactic medication. At that time, 17.0 percent of college freshmen with rheumatic fever were maintaining prophylaxis.

As might be expected, the greatest compliance with prophylactic routines occurred among the students with rheumatic heart disease. Almost 42 percent of the students with rheumatic heart disease for whom prophylaxis was recommended continued to take their drugs. Unfortunately, however, only 65 percent of those with rheumatic heart disease were ever placed on prophylaxis.

The data in table 13 suggest that the type and route of administration of prophylaxis might be related to compliance with recommendations. Less than 25 percent of those for whom parenteral penicillin was prescribed maintained prophylaxis, whereas about 45 percent of those receiving oral penicillin continued to maintain prophylaxis.

Table 13. Compliance according to type of prophylactic medications recommended, 1956–65

Type	Percent of those previously and currently on prophylaxis	Percent currently on prophylaxis
Penicillin tablets	44. 6	51. 4
Penicillin injections	24. 7	17. 9
Penicillin, type not specified	33. 3	2. 4
Penicillin and sulfa drugs	25. 8	13. 6
Sulfa drugs alone	18. 3	10. 3
Type not specified	8. 3	4. 4

Summary

Evaluation of 12,134 college freshmen with rheumatic fever or rheumatic heart disease, or both, revealed that between 1956 and 1965 recommendations for prophylactic medications generally were received by a greater percentage of the students who experienced their first attack of rheumatic fever in recent years. However, during the decade of the study only 55.1 percent of these students received prophylactic medication. Of the students for whom prophylactic regimens were recommended, only 28.0 percent were taking the medications at the time of the survey. The percentage of those who were maintaining prophylaxis increased according to the number of attacks they experi-

Table 14. Race and sex distribution of students ever on and currently on prophylaxis for rheumatic fever, 1956–65

Race and sex [1]	Total	Ever on prophylaxis		Currently on prophylaxis	
		Number	Percent	Number	Percent
White	11, 509	6, 353	55. 2	1, 783	15. 5
Nonwhite	442	242	54. 8	68	15. 4
Male	7, 273	3, 889	53. 5	1, 072	14. 7
Female	4, 838	2, 783	57. 5	796	16. 5

[1] Race not specified by 183 students, sex not specified by 23.

Table 15. Students with rheumatic fever or rheumatic heart disease, or both, using prophylactic medications, by type of college ownership, 1956–65

School year	Number of students			Percent ever on prophylaxis			Percent currently on prophylaxis		
	Total	Public college	Private college	Total	Public college	Private college	Total	Public college	Private college
1956	1, 444	1, 103	341	46. 5	47. 2	44. 0	8. 5	7. 8	10. 6
1957	1, 667	1, 138	529	47. 7	49. 8	43. 1	12. 4	11. 7	14. 0
1958	2, 225	1, 663	562	51. 3	53. 8	44. 1	11. 3	10. 2	14. 4
1959	1, 878	1, 399	479	52. 1	52. 3	51. 6	14. 3	13. 6	16. 3
1960	1, 830	1, 370	460	54. 5	55. 7	50. 9	13. 8	13. 3	15. 2
1961	312	210	102	55. 8	64. 3	38. 2	17. 0	12. 4	26. 5
1962	645	427	218	62. 2	61. 1	64. 2	21. 6	20. 1	24. 3
1963	851	682	169	70. 2	70. 4	69. 2	24. 4	22. 4	32. 5
1964	737	624	113	73. 1	71. 8	80. 5	29. 7	28. 0	38. 9
1965	545	435	110	71. 7	70. 3	77. 3	27. 7	24. 6	40. 0
Total	12, 134	9, 051	3, 083	55. 1	56. 4	51. 2	15. 4	14. 5	18. 2

enced, but only 37 percent of those with four or more attacks continued to maintain prophylaxis.

Only 65 percent of the students with rheumatic heart disease had ever received prophylaxis, and only about 42 percent of these continued to take prophylactic medication. A higher percentage of white and nonwhite females received and maintained prophylaxis than males of both races. A greater percentage of students for whom oral penicillin was prescribed maintained prophylaxis than did students who received other types of medication.

The results of the study point up the need for increased educational efforts toward maintaining prophylaxis among both physicians and the public.

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Program Notes

Comprehensive Air Monitoring

The State of Washington officially opened its first comprehensive air monitoring station on the roof of the Food Circus Building in the Seattle Center on May 7, 1968. The station is the first in a series planned for statewide air monitoring.

The Puget Sound Control Agency provided the space and utilities, as well as some monitoring equipment. Most of the equipment has been furnished by the State. The station will initially be staffed by State personnel.

The program will ultimately provide continuous measurement of hydrocarbons, oxides of nitrogen, sulfur dioxide, oxidants, and carbon monoxide. Suspended particulates, sulfation soiling particulates, visibility measurements, and the effects of air pollution on corrosion, fabric deterioration, and rubber cracking will also be studied.

B.S. for Physicians' Assistants

A 4-year course to train physicians' assistants has been initiated at Alderson Broaddus College in West Virginia. It leads to a bachelor of science degree in medical science.

Since the fall of 1967, when the college (which has an enrollment of less than 800 students) received a $97,100 curriculum development grant from the Commonwealth Fund of New York City, it has been mapping out the college credit program. Dr. H. C. Myers, a local physician and part-time instructor at the college, is credited with the idea for the course.

Degree candidates, Myers explained, will be given the basic surgical and medical courses now given nurses, but in addition will have courses in the history, philosophy, and ethics of medicine, in biomedical physics, and in taking patients' medical histories.

"By 1975, it has been projected that there will be 25 medical assistants for each physician," said Myers. "The question is whether we want these assistants to be well trained or not. We propose to give them good training."—(AP) *Evening Star*, Washington, D.C., July 29, 1968.

Radiation From Color TV

In recent inspections of color television sets by personnel of the Department of Health of the District of Columbia, only two of 112 sets checked were found to be emitting radiation in excess of acceptable limits, and these two were only slightly over established limits.

"Although there is little possibility that radiation from a faulty color television set will cause any harm," said Dr. Murray Grant, the health director, "it certainly can't do any good." He urged the following precautions to eliminate the need for a radiation inspection.

Everytime a repairman services a set, he should check the high-voltage circuits to make certain voltages do not exceed the manufacturer's recommended levels.

The viewing distance in front of a large-screen color set should be no less than 6 feet.

No one should sit or lie at the side of an operating color set for any long period since leakage may occur from the side or bottom.

Milestone in Tuberculosis Control

The Onondaga (N.Y.) State Chest Clinic has been discontinued. In April 1968, its functions were assumed by the health department clinics of Onondaga, Cayuga, and Cortland Counties.

The chest clinic had been under the jurisdiction of the New York State Department of Health since 1948, when it became a State tuberculosis sanatorium.

"The change represents another milestone in tuberculosis control," according to Dr. Stephen C. Mahady, assistant commissioner for the New York State Department of Health's division of medical services.—*Weekly Bulletin* (New York State Department of Health), May 6, 1968.

Items for this page: Health departments, health agencies, and others are invited to share their program successes with others by contributing items for brief mention on this page. Flag them for "Program Notes" and address as indicated in masthead.