

Analysis of Idaho Case Registry for Rheumatic Fever

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THE IDAHO rheumatic fever control program, established in 1955 through the cooperative efforts of the Idaho Department of Health and the Idaho Heart Association, represents one of many such programs, both state-wide and local, jointly sponsored by government and voluntary agencies. The goal of these cooperative efforts is to find and register persons with rheumatic fever and rheumatic heart disease and to prevent recurrent attacks through prophylactic treatment.

Thus the Idaho program was designed primarily to provide service to the State's rheumatic fever victims under age 21. However, the case register system, through which this goal is accomplished, serves other valuable purposes. As a centralized information bank, it provides:

1. Basic data reflecting the trends in rheumatic fever and rheumatic heart disease in the State of Idaho.

2. A current record of statistical data relating to the effects of prophylaxis on the course of the disease.

3. Data for critical evaluation of program effectiveness and ways in which it may be improved.

This paper describes such an evaluation of the Idaho program made through tabulation and analysis of data in the Idaho case registry during 1961.

Scope of Program and Method of Analysis

Under the Idaho rheumatic fever control program, benzathine penicillin G, either oral or injectable, is supplied without charge to medically indigent patients under 21 years of age

with a history of rheumatic fever or with rheumatic heart disease. The decision as to whether a patient is medically indigent is made solely by the attending physician. A modification of the Jones Criteria is used to determine medical eligibility for the program. To be eligible, a child must have exhibited two major or one major and two minor manifestations of rheumatic fever within the past 5 years, or he must have definite evidence of rheumatic heart disease.

To obtain penicillin from the program, the physician completes an application card, giving name, address, birth date, sex, and race of the patient, dates of first and most recent attacks of rheumatic fever, number of attacks, diagnostic symptoms, type of murmur in rheumatic heart disease, previous therapy, and type of penicillin desired. All this information is contained on two sides of a card about 7½ by 3½ inches. On receipt of the application card the program staff mails the physician enough penicillin to provide one 200,000-unit tablet a day or one injection of 1,200,000 units a month for 4 months. Three weeks before the end of the 4-month period, the physician is sent a renewal form which he must complete and return before additional penicillin is supplied. This form asks about reactions to the drug and recurrence of rheumatic fever, in addition to whether the physician desires more penicillin.

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Physicians are encouraged to report to the registry cases of rheumatic fever in patients who do not require penicillin from the program, and provision is made for reporting these cases on the application cards. At present, however, the registry lists only patients receiving penicillin from the program.

Machine punchcards were prepared to include the information from the application and renewal forms. Since some murmurs were listed as "apical" or "basal" and others as "mitral" or "aortic," for this analysis apical murmurs were interpreted as being mitral in origin and basal murmurs as being aortic in origin.

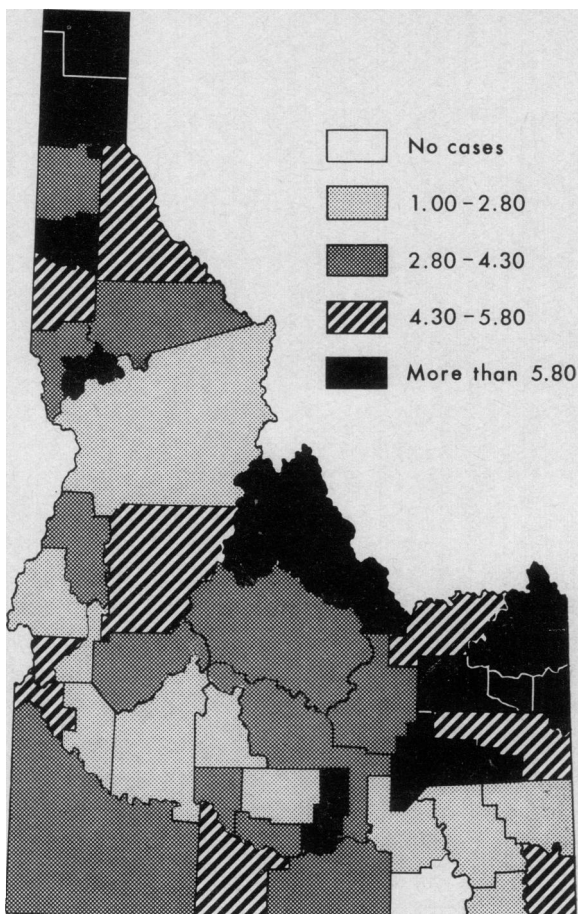
Results

At the close of 1961, 1,244 cases were on the active file (table 1). Of these patients, 658 have rheumatic heart disease. Four hundred and ninety-six patients had had at least one recurrence of rheumatic fever before coming on the program, 328 of them having had more than one recurrence. Only 29 experienced a recurrent attack in 1961 while on the program, a rate of 2.3 percent. In all respects there was very little difference by sex.

Table 1. Cases on Idaho rheumatic fever registry, 1961

	Total	Male	Female
Total cases.....	1,379	708	671
Cases active January 1, 1961.....	1,077	567	510
Cases added in 1961.....	302	141	161
Acute rheumatic fever (initial attack in 1961).....	119	49	70
Initial attack prior to 1961.....	183	92	91
On prophylaxis previously.....	78		
Rheumatic heart disease present.....	158	75	83
On prophylaxis previously.....	45		
Cases closed during 1961.....	135	70	65
Cases active December 31, 1961.....	1,244	638	606
Recurrence of rheumatic fever.....	496	240	256
One recurrence.....	168	84	84
Two or more recurrences.....	328	156	172
Rheumatic heart disease present.....	658	334	324
On oral penicillin.....	1,197	612	585
On injectable penicillin.....	47	26	21
Recurrent attack in 1961 while on program.....	29	16	13
On oral penicillin.....	27		
On injectable penicillin.....	2		

Distribution of cases on Idaho rheumatic fever registry per 1,000 population under 21 years of age, by county, 1961



During 1961, 302 new cases were added to the program. Of these patients, 119 experienced their initial attack of rheumatic fever that year and 158 have rheumatic heart disease. Only 78 of the 183 patients who experienced their initial attack prior to 1961 had been on prophylaxis previously.

The 1961 registry load was 4.29 cases per 1,000 population under 21 years of age. Distribution of cases by county suggests some clustering of the higher rates along the northern boundary (see figure).

Prophylaxis was discontinued for 135 patients in 1961 (table 2). Although the services of a public health nurse are available on request by the attending physician for those patients who fail to keep appointments, "moved away and unable to locate" and "did not return to physician and unable to locate" accounted for

the largest number of dropouts. Included in this group are those patients for whom followup was not requested by the physicians and those who moved out of State. Reactions to penicillin was the reason for discontinuing the drug in only two cases.

Of the 763 patients with heart disease on the registry at some time during 1961, 52 percent had only a mitral or apical systolic murmur (table 3). The mitral diastolic murmur was the second most common murmur noted. There

Table 2. Number of cases on Idaho rheumatic fever registry closed during 1961, by reason for closing

Reason for closing	Total
Total.....	135
Moved away and unable to locate.....	46
Did not return to physician and unable to locate.....	26
Discontinued by physician.....	34
Discontinued by parents or patient.....	13
Reaction to drug.....	2
Diagnosis changed.....	1
Over age.....	7
Patient died.....	3
Other.....	3

Table 3. Description of murmur in rheumatic heart disease cases on Idaho rheumatic fever registry, 1961

Type of murmur	Total	Male	Female
Total ¹	763	400	363
Systolic murmur only.....	447	236	211
Aortic.....	35	17	18
Mitral.....	393	211	182
Not specified.....	19	8	11
Diastolic murmur only.....	160	76	84
Aortic.....	9	4	5
Mitral.....	134	62	72
Not specified.....	17	10	7
Multiple murmurs.....	156	88	68
Mitral systolic and aortic systolic.....	11	6	5
Mitral diastolic and aortic diastolic.....	10	6	4
Mitral systolic and diastolic.....	86	43	43
Aortic systolic and diastolic.....	14	9	5
Mitral systolic and aortic diastolic.....	10	6	4
Aortic systolic and mitral diastolic.....	17	12	5
All other combinations.....	8	6	2

¹ Includes all cases on registry at any time during 1961.

Table 4. Physician participation in the Idaho rheumatic fever control program, 1961¹

	General practitioners	Pediatricians	Internists
Total number in State.....	342	22	41
Number participating in program.....	184	16	20
Percent of total participating in program.....	54	73	49
More than 25 patients enrolled.....	2	0	0
20-25 patients enrolled.....	1	1	0
15-20 patients enrolled.....	8	1	1
10-15 patients enrolled.....	21	2	0
5-10 patients enrolled.....	60	3	3
Fewer than 5 patients enrolled.....	96	9	16
Number of patients on program.....	1,010	119	69

¹ Does not include out-of-State physicians, who carry 181 of the patients on the registry.

seems to be remarkable agreement by sex in the distribution of cases by types of heart murmur.

The number of physicians who participate and the number of patients they have on the program are summarized in table 4. Fifty-four percent of the general practitioners and 73 percent of the pediatricians in the State participated in 1961. Two general practitioners each have more than 25 patients, one with 44 and the other with 28 patients.

Discussion

The low recurrence rate of 2.3 percent is evidence that the Idaho rheumatic fever control program is accomplishing its prime objective, that is, the prevention of recurrent attacks of rheumatic fever. Recognizing the need for further clarification of this figure, we attempted to gather additional information on the recurrences reported during the first 6 months of 1962. We sought particularly to determine whether prophylaxis was being faithfully maintained in these cases. As shown in table 5, of the 15 reported recurrences, the physicians attributed two to failure to take penicillin regularly, but they felt that six occurred despite regular prophylaxis. The physicians did not give an opinion as to the patients' faithfulness in taking penicillin in seven cases. It might be questioned whether some of these represent

bona fide recurrences, particularly cases 12-15, all reported by the same physician. Therefore, it may well be that the true recurrence rate in 1961 was lower than 2.3 percent.

Feinstein and co-workers (1), in a well-controlled study, found a recurrence rate of 5 percent for their group on oral penicillin. It could be argued that our low recurrence rate is due to a large number of cases in which the diagnosis of rheumatic fever is in error. If this is true, then other programs (2, 3) which have reported an even lower rate could be experiencing the same problem. However, because of many undefined variables, any conclusion on this question is unjustified.

The placing on prophylaxis of 105 patients who had their initial attack prior to 1961 but who were not on prophylaxis before entering the program is a valuable accomplishment. The size of this group indicates that efforts toward finding rheumatic fever patients and educating them in the value of prophylaxis should be continued.

Because the registry contains only cases occurring in medically indigent patients, it cannot definitely be established that the northern and northeastern areas of the State have a higher incidence of rheumatic fever. However, it is unlikely that a greater proportion of medically indigent patients in these areas accounts for the higher incidence, since per capita income does not follow a similar pattern.

The reasons for discontinuing prophylaxis are remarkably similar to those noted by Dean in the Michigan program (4). It should be pointed out, however, that a number of the patients who moved away moved out of State. Interstate referrals have been made for these patients, but no replies have been received regarding continuation of prophylaxis.

The rate of penicillin reactions is lower than is generally reported and might be explained by the physician's decision not to place on the program those patients with a known history of penicillin sensitivity.

An interesting sidelight is the increase in the reporting of rheumatic fever cases since the control program was instituted. Whereas 772 cases were reported to the State bureau of vital statistics in the 10-year period 1947-56, 759 of the 1,379 patients on the register in 1961 had

Table 5. Recurrence of rheumatic fever among patients receiving penicillin from the Idaho rheumatic fever control program, January-June 1962

Patient No.	Physician	Manifestations of recurrence	Opinion of physician as to whether patient is taking penicillin regularly
1-----	A	Rise in sedimentation rate; prolonged PR interval.	Yes.
2-----	B	Fever; new murmur	Yes.
3-----	C	Arthralgia and malaise of 3 days' duration.	Yes.
4-----	D	"Strep" throat; joint pain.	Yes.
5-----	E	Arthritis	Opinion unknown.
6-----	H	Recurrence of fever	Do.
7-----	I	Chorea	Yes.
8-----	D	Increase in joint pain	No.
9-----	J	Joint pain; fever and elevated sedimentation rate.	Opinion unknown.
10-----	K	Polyarthrits	Yes.
11-----	L	Arthralgia	No.
12-----	M	Increased sedimentation rate.	Opinion unknown.
13-----	M	-----do-----	Do.
14-----	M	-----do-----	Do.
15-----	M	-----do-----	Do.

initial attacks of rheumatic fever in the 5-year period 1957-62. We believe that this represents more complete reporting rather than an increased incidence of the disease.

This study indicates several ways in which the present program can be made more effective.

The large number of cases of rheumatic heart disease suggests the need for additional evaluation of these patients. Since the practicing physician is justifiably inclined to give a patient with a murmur of questionable significance the benefit of prophylaxis, diagnostic and consultative services should be available to assist him in making this decision. A diagnostic service has operated in Denver since 1944, and a recent review of the experience in that program (5) has shown that as many as 85 percent of the patients referred have innocent murmurs. Although this figure for a diagnostic service would not be completely comparable with a figure for the present Idaho program, it does suggest that a large percentage of the patients we are carry-

ing as having rheumatic heart disease have only functional murmurs.

Since a large number of physicians in the State have no patients enrolled in the program, efforts should be made to insure that all physicians are acquainted with the services available.

A significant number of physicians are making the diagnosis of rheumatic fever much more frequently than are other physicians. The reason for this should be determined.

Efforts at followup of patients who move and those who fail to keep physician appointments should be intensified.

An alternate drug (for example, sulfadiazine) should be available for patients with a history of penicillin sensitivity.

Physicians should be encouraged to report rheumatic fever in patients who do not require penicillin from the program.

Summary

Analysis of data from the case registry maintained by the Idaho rheumatic fever control program, which supplies penicillin to medically indigent patients on request from their physicians, illustrates potential uses of case registry data.

At the end of 1961, 1,244 cases were in the active file. Three hundred and two cases were added during the year, and 135 were discon-

tinued. Of the patients added, 119 had their first attack of rheumatic fever that year. Only 29 of the 1,244 patients had a recurrent attack in 1961, a rate of 2.3 percent.

The analysis indicates the need for diagnostic services to assist physicians in diagnosing rheumatic heart disease, better followup of patients who move or fail to keep appointments with their physicians, and increased efforts to acquaint physicians with the control program.

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- (3) Stamler, J., McDonough, J. R., and Gibson H. C.: Five years' experience of the rheumatic fever registry, heart disease control program, Chicago Board of Health [Abstract]. *Circulation* 24: 1048-1049, October 1961.
- (4) Dean, C.: Administrative phases of a rheumatic fever prophylaxis program on a state-wide basis. *Amer J Public Health* 51: 261-265, February 1961.
- (5) Colorado State Department of Public Health: Review of the Denver rheumatic fever diagnostic service. August 1960.

Examinations for Radiological Health Specialists

Examinations for the evaluation of radiological health specialists are being developed for the Public Health Service by the Professional Examination Service of the American Public Health Association. The examinations will provide Federal, State, and local agencies with standards for this professional category.

The examination service is being assisted by an advisory committee of experts in public health and radiation. The complete set of examinations will take about 2 years to develop.

Further information, including details on how agencies will be able to obtain the use of the examinations, is available from the Professional Examination Service, 1790 Broadway, New York, N.Y.