STREPT.
PROPOSAL
4 KHC

YUKON-KUSKOKWIM HEALTH CORPORATION
AFFILIATE OF THE ALASKA FEDERATION OF NATIVES
P. O. Box 528
Bethel, Alaska 99559
(907) 543-2506
(907) 543-2508

September 5, 1974

ATTACHMENT #1

Donald Freedman, M.D., M.P.H.
Division of Public Health
State of Alaska
Department of Health
Pouch H
Juneau, Alaska 99801

Dear Dr. Freedman:

Yukon-Kuskokwim Health Corporation has been developing two important projects which you should become familiar with.

The first project has been the development of a maternal and child health program. We have developed a position for a M.C.H. co-ordinator who helps identify and track high risk pregnancy and co-ordiantes the prenatal, post natal, and well baby care with the Health Aide, Public Health Nurse's, and the Physicians. The M.C.H. program has been a collaborative effort between Yukon-Kuskokwim Health Corporation, Public Health Nurse's, and Indian Health Service. A more detailed program description is attached for your information.

The second project consists of a streptococcal surveillance program for the children attending high school in Bethel and for Bethel children in the Primary and Middle Schools.

I am sure you are aware that Alaska Natives particularly those in South Western Alaska have some of the highest rates for streptococcus infection and rheumatic heart fever in the U.S. Alaskan Natives in 1968 had a streptococcal infection rate of 4,026/100,000. The rate is eighteen times higher than the U.S. rate. The rheumatic heart fever rate is three to ten times higher than other places in the U.S.

The center for disease control in Alaska has proven the efficacy of a streptococcal surveillance program in reducing the incidence and prevalence of streptococcus infections in a village situation. Other research activities have proven the success of a streptococcal surveillance program in reducing and eradicating rheumatic heart fever.

Because of the high streptococcal infection rate in the Bethel Service Unit the Yukon-Kuskokwim Health Corporation board has funded a surveillance program for Bethel. The program will be expanded in the future to other villages. The board wants to seek alternate resources for this program and invision's Y.K.H.C.'s financial participation decreasing due to other needs. Additional information is attached on the streptococcal program.

These two projects are winthin the scope and responsibility of the State of Alaska as expressed in Title 18: Health and Safety of the Alaska statutes. The

code stresses emphasis on maternal and child health and on communicable disease control. Specifically we would like our M.C.H. program to be incorporated into the state plan which is manditory if the state is to receive federal M.C.H. programs. We will expand the program statement indicating how our program pulls together most of the services related to maternal and child health.

In the near future we will request a meeting with you to discuss a contract with the state to provide these two services. Please call if you have any questions.

Cordially,

Alvin S. Ivanoff
Executive
Director

ASI/aj

cc: William Marshman, Regional Planning Director
M.C.H., H.E.W.
Dr. Brenneman, A.N.H.S., Bethel
Frank Estes, A.N.H.S., Bethel
Dr. Towers, Regional Health Officer, Anchorage
Jeanette Pitcherella, P.H.N. Supervisor, Bethel
Senator George Hoffman, Bethel
Representative Phillip Guy, Kwethluk

YUKON-KUSKOKWIM HEALTH CORPORATION

AFFILIATE OF THE ALASKA FEDERATION OF NATIVES

P. O. Box ~~556~~ 528
Bethel, Alaska 99559
(907) 543-2506
(907) 543-2508

MEMORANDUM

TO: Frank Pauls

DATE: September 26, 1974

FROM: Dan Rounds, Technical Assistant DR/aj

SUBJECT: Strept. Surveillance Program

Enclosed is a budget and program description for your 1976 budget.

DR/aj

cc: George Hohman
Phillip Guy
Dr. Elizabeth Towers
Ms. Jeanette Pitcherella
Dr. Donald Freedman

YUKON-KUSKOKWIM HEALTH CORPORATION

AFFILIATE OF THE ALASKA FEDERATION OF NATIVES

P. O. Box 536
Bethel, Alaska 99559
(907) 543-2506
(907) 543-2508

October 22, 1974

Frank Pauls
Chief Public Health Labs
Pouch H
Juneau, Alaska

Dear Mr. Pauls:

This is a reminder of the need to put the Strept Surviellance Program in Bethel into your 1976 Budget.

As microbiologist in charge of the program, I would be pleased to have you come up and see what we are doing and to answer any questions you may have regarding the program.

This is an exciting opportunity to put preventive medicine to work in an area where the results can easily be seen and evaluated. Because of the high incidence of Rheumatic Heart Disease and Streptococcal diseases in the Bethel area this type of preventative medicine can really be a benefit to area resident who might otherwise become victims of those diseases caused by untreated strept infections.

I hope to hear from you soon with confirmation of the inclusion of the Strept Program in you 1976 Budget.

Sincerely,

Patricia Porter

Patricia Porter
MT (ASCP)

PP/ep

STATE OF ALASKA

Jay S. Hammond, Governor

DEPT. OF HEALTH AND SOCIAL SERVICES

DIVISION OF PUBLIC HEALTH

Pouch H 06-D, Juneau, Alaska 99811

December 5, 1974

Mr. Dan Rounds
Technical Assistant
Yukon-Kuskokwim Health Corporation
P.O. Box 528
Bethel, Alaska 99559

Dear Mr. Rounds:

Attached is our reply to Mrs. Porter regarding the inclusion of the Bethel Streptococcus Surveillance Program in the FY '76 budget for the Section of Laboratories. This also answers your earlier letter which furnished a program description and budget.

I had high hopes of working this into the budget but the advanced deadlines did not permit any revision or exceeding the limits established by the Governor. Unfortunately, I do not have any excess funds and therefore can not make up the requested funds.

The project is important and would have our support if funds were available The most appropriate course of action at this time appears to be through your local legislators. As I pointed out to Mrs. Porter, the additional funding would have to be by legislative action and appropriation of specific funds earmarked for your project.

We regret that we could not be of more assistance at this time but will do all we can to be of assistance to your local legislators.

Sincerely,

Frank P. Pauls

Frank P. Pauls, Dr. P.H.
Chief, Section of Laboratories

FPP:ah

Attachment

cc: Dr. Freedman
Lois M. Jund

STATE OF ALASKA

Jay S. Hammond, Governor

DEPT. OF HEALTH AND SOCIAL SERVICES

DIVISION OF PUBLIC HEALTH

Pouch H06, Juneau 99811

December 4, 1974

Mrs. Patricia Porter, M.T. (ASCP)
Yukon-Kuskokwim Health Corporation
P. O. Box 536
Bethel, Alaska 99559

Dear Mrs. Porter:

We appreciated the opportunity to review the material submitted on the Bethel Streptococcus Surveillance Program.

We had hoped to include the requested funds in our budget proposal for FY 76 as indicated in our earlier discussions but, due to the advanced deadlines, it was not possible. Under the present budgetary system we need to be aware of new programs in April in order to incorporate them into our preliminary requests for the following fiscal year. Sometimes late changes can be made after budget submission but it was not possible in this instance.

The project has merit and to assure continuation of the work in FY 76 with State support, legislative approval would be required with specific funds appropriated for this purpose. The most effective way of doing this is through the efforts of local legislators.

We regret that we could not secure the funds for you but if we can be of any assistance during the legislative session, please advise.

Sincerely,

Frank P. Pauls

Frank P. Pauls, Dr. PH
Chief, Section of Laboratories

FPP:ms
CC: Dr. Donald K. Freedman
Miss Lois Jund

STREPTOCOCCAL SURVEILLANCE PROGRAM

Streptococcal Surveillance Program

Problem:

The Rheumatic Heart Fever rate for Alaskan Natives in the Bethel area has been highest in Alaska. The Bethel area has had incidence rates of 20 to 157 cases per 100,000 persons 5-19 years old between 1968 and 1973. The average rate in the Bethel area between 1968 and 1973 was 82 cases per 100,000 persons 5-19 years old compared to the Statewide Alaskan Native rate of 44 per 100,000. The national rate for the same age group is around 26 cases per 100,000. Because of the nature of Rheumatic Heart Disease, the average life time cost per person with Rheumatic Heart Fever is around $40,000. These costs do not include the loss of work time or school time resulting from the treatment services and sickness.

The streptococcal infection rate, the precussor to Rheumatic Heart Fever is also extremely high in the Bethel area. A research project operated by the Communicable Disease Control Laboratory (C.D.C.) has shown that streptococcal disease in Alaskan Natives is eighteen times higher than in the U.S. population. Streptococcal infections also contribute to school absenteeism, resulting in the secondary problem of inhibiting a child's learning process.

Objectives:

The objectives of a streptococcal surveillance program are to reduce the Rheumatic Heart Fever rate and reduce the morbidity resulting from streptococcal infections in children ages 5-19. According to C.D.C. findings it is possible to almost eliminate new cases of Rheumatic Heart Diseases and to reduce the streptococcal infection rate by half through a program of monthly surveillance and early treatment of persons with streptococcal infections. The surveillance program will be on Bethel School children.

Resources:

The start up funds in 1975 have come from Yukon-Kuskokwim Health Corporation. It is now proposed that the State contract with Y.K.H.C. to maintain the program in 1976. A preliminary budget is attached; (See Attachment I).

Action Plan:

The method being employed to achieve the objectives is to culture the entire school age population in Bethel each month with treatment provided to those with positive cultures. If the treatment is completed within ten days it is 80 to 90% probable that the streptococcal infection will not develop into Rheumatic Heart Fever. The procedure used in Bethel is outlined in Attachment II, "Surveillance Procedure." The procedure in Attachment II has been based upon the work of C.D.C. in its streptococcal surveillance research project.

Attachment I
Budget for 12,000 Cultures

Personnel	
Lab. Tech. (1)	16,880
Secretary (1)	9,450
School Aide (9 months 1/2 time)	3,937
Fringe 13%	3,935
Sub-total	34,202
Supplies	
Lab supplies for 12,000 cultures @ 5¢/cultures.	$6,000
Forms and records.	488
Office	300
Sub-total	$6,788
Equipment	
Laboratory	600
Sub-total	$600
Space Costs	
Lab. Utilities	$3,900
Fire Insurance	750
	$4,650
Travel	
Training	$630
	$630
Other	
Malpractice Insurance	$650
Postage	160
Sub-total	$810
Administration	
Accounting/Supply	$1,000
Administration	1,500
Xerox	100
Janitorial Service	562
	$3,162
Total	
	$50,842

PROJECT DESIGN

1. Approval - The streptococcal surveillance program involves the routine screening of children in the Elementry, Middle, and High Schools. Children who have streptococcus will require medication. Because the program involves treatment we will require the approval of not only the YKHC Board but the School Board and parents of each child. After the School Board has approved the project a unified permission slip authorizing a child to participate in the strept. surveillance, dental care, and other health care activities will be developed and approved by the School Boards and Health Professionals. The approved permission slips will be given to each teacher to hand out to the children. Returned permission slips will be given to the microbiologist who will compare class registration to permissions lips received to determine the children without permission slips. The microbiologist would then direct the Community Health Representatives to make Home Visits to families who do not want to participate or have not responded. The C.H.R's would discuss the Streptococcal Program with each family as well as the Dental Program and other programs requiring parental consent. If families cannot be contacted the School Boards will have to determine if we should continue with the project. Only children with parental approval will be in the streptococcal program.

2. Surveillance Procedure - Based on a profile of children in each classroom the Elementry, Middle, and High School children would be divided into four groupings of classrooms. Each child in a group would be assigned a code number to be used through out the year. Each week one of the four groups would be tested by C.H.R.'s and a Public Health Nurse to determine if they have a streptococcal infection. Children not tested in their assigned group because they are absence could be added to the following weeks group. Any children already exhibiting signs of streptococcus infection as determined by teachers and/or the school nurse would also be tested. After four weeks the entire school population in Bethel would have been surveyed.

   When the prevalence of streptococcal isolates rise to a predetermined level, for example 20 or 30 percent, more than one group could be surveyed and treated or the entire school population could be treated prophylacticly. Other criteria such as 50% or more "M" types appearing in the positive cases would also be used to determine if an epidemic has started and whether it warrants a concentrated effort to treat or screens the school population. This decision will be made by the project director Dr. Hurwitz, the microbiologist and C.D.C. officials.

3. Laboratory - After the C.H.R.'s take the throat swabs they will be given to the laboratory for analysis. The swabs are received in metal foil packets containing silica gel, each with the cultured child's identifying code number. The desiccated swabs are incubated 4-6 hours at 37°C in Todd-Hewit broth. A loopful of the broth is added to 15 cc of melted neopeptone agar with 5% sheep blood and pour plates made. After incubation at 37°C for 18 hours, Betahemolytic colonies are picked and subcultured on quartered neopeptonesheep blood agar plates with bacitracin discs. After 24 hours incubation at 37°C, presuptive group A determination is made. Total time through the laboratory should not exceed three days.

   Positive cultures would be transmitted to the C.D.C. laboratory in Anchorage for "M" and "T" typing to determine if an epidemic is begining. The number of positives transferred to C.D.C. in Anchorage would be determined by C.D.C. and the project director.

4. Treatment - Individuals that respond positively to the streptoccal tests would be treated whether or not they are symptomatic. The test and treatment must be completed within 10 days to assure that a child does not develop rheumatic heart disease. The laboratory results would be given to the school nurse who would administer the treatment to each positive child. If a child cannot be located or is absent at school the treatment would be given by the Public

Health Nurse with assistance from C.H.R.'s. Treatment would conform to current American Heart Association Recommendations:

a. Children over age 10.	1.2 million units LA bicillin TM (Benzathine Penicillin G.).
b. Children age 10 and younger.	600,000 units LA bicillin IM. (Benzathine Penicillin).

Allergic children would be given 250 mg erythromycin four times daily for 10 days.

Every child treated would have a card or record of treatment which would be returned to the laboratory for cross checking to make sure that all positive children actually were treated.

During an epidemic the treatment would have to be accelerated. Backup personnel consisting of Itinerate Public Health Nurses and available hospital staff would be called to assist the school nurses. The state may also be able to bring in other nurses to help stem an epidemic. During an epidemic all activities would be co-ordinated by the project director Dr. Hurwitz.

5. Records - Records will consist of:

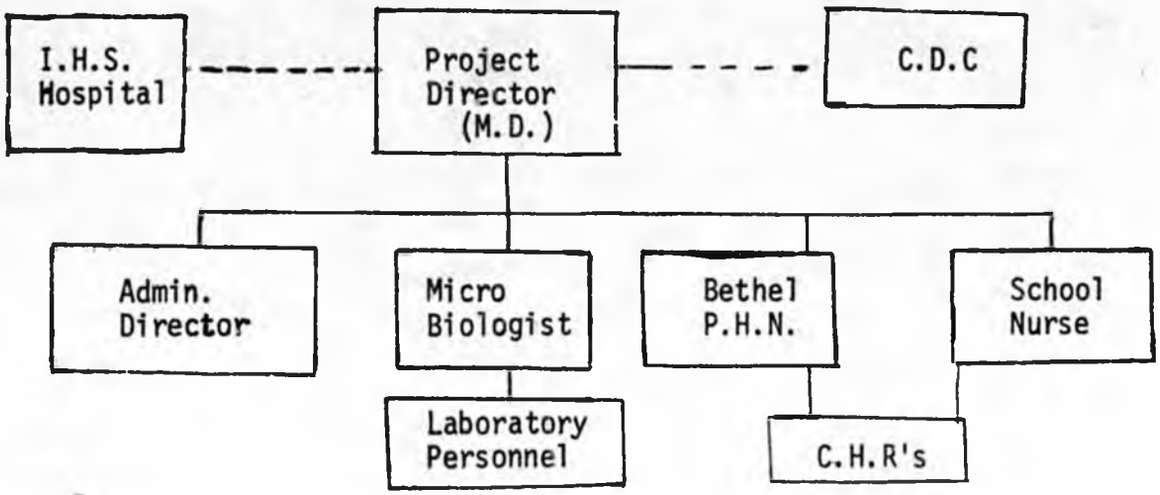
   a. Permission slips on each child.

   b. List of individuals in each group. The list would be developed initially by C.D.C., the microbiologist, school nurses and school administration. After initial set up of each group the C.H.R.'s would be given a roster and stick'um labels coded by number and group. Any revisions would be co-ordinated by the project director. The list would also include information on whether a child is allergic to penicillin.

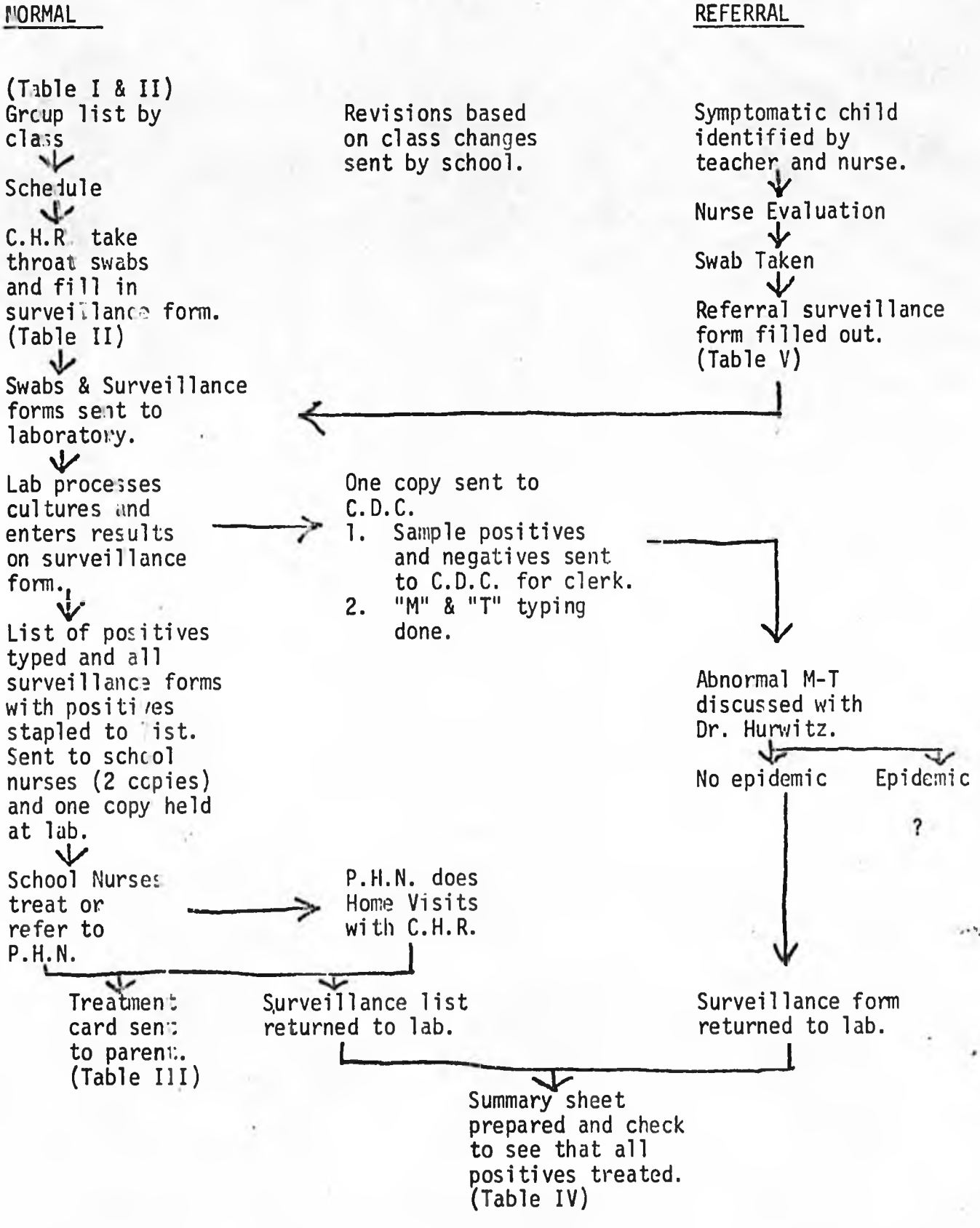
   c. Treatment card and/or test card. - The results of the tests would be entered on a card or roster. All positive cards or a roster would be given to the school nurses who would do the follow-up treatment. The cards or roster would be returned to the lab.

Each week the culture results would be tabulated so that point prevalence of Group A strep can be calculated.

6. Organization - The project will be headed by the Indian Health Service Project Director, Dr. Robert Hurwitz. A microbiologist and clerk would operate the laboratory and maintain records. The School Nurses would co-ordinate the surveillance activities of the C.H.R.'s and would administer the treatment for any positives. The C.H.R.'s would collect throat swabs, assist the Public Health Nurse in Home Visits to treat absent children and would help obtain permission slips. The Center for Disease Control will act as technical consultants and will evaluate the program. An organizational chart appears on the next page.


I.H.S. Hospital
Project Director (M.D.)
C.D.C
Admin. Director
Micro Biologist
Bethel P.H.N.
School Nurse
Laboratory Personnel
C.H.R's

SURVEILLANCE PROCEDURE



STREPTOCOCCAL SURVEILLANCE PROGRAM
BETHEL SUMMARY SHEETS
NOV. 11 - DEC. 16, 1974

WK	GROUPS CULTURED	STARTED WITH	FINISHED WITH	TOTAL CULTURED	TOTAL POSITIVE	%	TOTAL TREATED	%	PRIMARY SCHOOL POSITIVE	%	MIDDLE SCHOOL POSITIVE	%	HIGH SCHOOL POSITIVE	%
11-11	A & B	1	461	Sx: 17 445	Sx: 7 101	22	Sx: 7 101	100	cultured: 152 48	33	cultured: 158 37	23	cultured: 155 16	10
11-18	C & D	462	919	Sx: 25 433	Sx: 2 77	13	Sx: 2 77	100	cultured: 110 26	23	cultured: 139 31	24	cultured: 186 20	10
11-25	D & Abs.	920	1089	Sx: 37 133	Sx: 9 31	23	Sx: 9 31	100	cultured: 43 9	20	cultured: 69 21	30	cultured: 22 1	4
	Totals			Sx: 79 1011	Sx: 18 209	18	Sx: 18 209	100	T. cultured: 315 83	29	T. cultured: 363 89	24	T. cultured: 30 37	10
12-2	A	1	265	Sx: 40 227	Sx: 7 32	13	30		cultured: 67 10	15	cultured: 82 12	15	cultured: 78 8	10
12-9	B	266		245	29	11.8								
12-16	C-D			451	48	10.6								

STREPTOCOCCAL SURVEILLANCE IN REMOTE ARCTIC POPULATIONS

The Development of a System for Detection of Group A Pharyngitis and the Prevention of Nonsuppurative Sequelae

THE ACV CDC COLLABORATIVE PROJECT

CAN PREVENT JUST CULTURE TO SYMPTOMATIC

VIABLE POSSIBLE

Thomas R. Bender, M.D., M.P.H.
Chief, Alaska Activities
Center for Disease Control
325 Eagle Street
Anchorage, Alaska 99501

DIST U. CENTERS.

STREPT RELATED TO
- IMPET. GO
- OTITIS MEDIA

GROUP A LEADS TO RHEUMATIC

Action
1. COOPER.
2. Y-K.
3. HOSP. PUBLIC.

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	11.0	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	87	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	10.2	29	15.0	106	10.6
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	6.0	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	26.3
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	181	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.

ALASKA NATIVE HEALTH SERVICE
TEN LEADING NOTIFIABLE DISEASES
(RANKED IN ORDER OF INCIDENCE)
1972 - 1971

Disease	Cases 1972 Number	1972 Rank	Cases 1971 Number	1971 Rank	Percent Change '72/'71
Total Reported Notifiable Diseases	20,630 1/	-	13,909	-	48.3
Total Ten Leading Notifiable Diseases	19,474	-	13,241	-	-
Upper Respiratory Infect., C/Cold	7600	1	3672 2/	2	107.0
Acute Otitis Media	4297	2	4195	1	2.4
Strep Throat	2156	3	1686	3	27.9
Gonococcal Infections	1378	4	1288	4	7.0
Gastroenteritis, Diarrhea	1335	5	380	8	251.3
Impetigo	907	6	532	7	70.5
Influenza	900	7	597	6	50.8
Pneumonia (excl. NB)	655	8	727	5	-9.9
Chickenpox	127	9	115	10	10.4
Bacillary Dysentery	119	10	49	15	142.9

1/ Increase partially due to a change in disease coding.
2/ Does not include "common cold" diagnosis.

SOURCE: Office of Systems Development, Alaska Native Health Service
Community Health and Epidemiology Branch, Alaska Native Health Service
IHS Inpatient/Outpatient Reporting System

TOTAL RHEUMATIC FEVER INCIDENCE BY SERVICE UNIT OF RESIDENCE
ALASKA NATIVES AGED 5-19 YEARS
Case Rate Per 100,000 Population

S.U.	Anch.	Bar.	Beth.	Kan.	Kotz.	Mt.E.	Tan.	Total
Pop.	4761	1042	5089	1331	3781	3418	2307	21,733
1968	0	0	157	150	79	79	0	64
1969	0	0	20	0	26	29	43	18
1970	42	0	39	75	0	0	0	23
1971	42	0	118	225	53	88	0	74
1972	84	96	118	0	0	29	0	55
1973	63	0	39	0	0	29	0	28
Mean Inci.	39	16	82	75	26	34	7	44

Only cases meeting the revised Jones criteria were used in determining these rates.

REVIEW CHARTS for PROPER DIAGNOSIS.

PREVALENCE OF RHEUMATIC HEART DISEASE IN ALASKA NATIVES
HOSPITALIZED CASES, ALL AGES
1968-73

Service Unit	Cases	Rate/10,000
Total	316*	60.7
Anchorage	48	38.0
Barrow	13	55.8
Bethel	103	88.3
Kanakanak	27	86.1
Kotzebue	55	65.5
Mt. Edgecumbe	57	67.5
Tanana	13	23.9

*158 definite RHD
42 probable RHD
116 possible RHD

Table 12

RHEUMATIC HEART DISEASE PREVALENCE AMONG DIFFERENT POPULATIONS

YEAR	LOCATION	AGE OF SAMPLE	PREVALENCE (per 1,000)
1962-64	Denver (Morton)	5-18	1.7
1965	San Luis Valley Colorado (Morton)	grades 5-8	3.7
1968	Tokyo (Shiokawa)	primary and secondary students	.30
1965	Karachi (Abbasi)	8-14	1.8
1969	Iran (Garagozloo)	4-15	22
1973	Alaska	5-19	3.8
	Yukon-Kuskokwim Delta		5.9
	Alaska	all ages	6.1
	Yukon-Kuskokwim Delta		8.8

STREPTOCOCCAL SURVEILLANCE AND CONTROL AMONG ALASKA NATIVES

A REPORT OF WORK COMPLETED UNDER IHS CONTRACT

HSA 76-74-177

Alaska Federation of Natives, Inc.

Health Affairs Division

In Cooperation with

Center for Disease Control

Bureau of Epidemiology

Alaska Activities

October 15, 1974

INTRODUCTION

Streptococcal sore throat ranks third in the list of notifiable diseases for Alaska Natives. Rheumatic fever, one of the nonsuppurative sequelae of strep infection, is a major public health problem among the more than 55,000 Natives. As of 1972, an average of thirty cases of rheumatic fever had been discharged from hospitals each year over the previous 15 years.[1,2] Especially notable are high rates in three coastal service units, Kotzebue, Bethel, and Kanakanak. These three high risk service units, comprising 44 percent of Alaska's Native population, are inhabited primarily by Eskimos living in numerous, small, remote villages.

Because of the high rates of rheumatic fever, a cooperative study was begun in January, 1971, to study the epidemiology of streptococcal disease and to develop a control program for this population. Longitudinal surveillance techniques, similar to those used in the successful projects in Natrona County, Wyoming[3] and the San Luis Valley, Colorado[4], were modified for use in Alaska. Results of the pilot study conducted in schools of two Alaskan villages for one semester have been published.[5] The progress of the program has been presented at six state, national, and international meetings (Appendix I). Results of the first three years of operation just completed in nine, and then 12 villages, are presented in this paper, the third annual summary.

MATERIAL AND METHODS

Nine villages were initially chosen for the project, three in each high risk service units. Each had experienced previous cases of rheumatic fever. The villages range in size from 70 to 470 persons. The approximately 900 school age children in the villages were enrolled in the program. Throat cultures and sera were obtained from these children at the beginning and end of each school year.

In each village, the children were randomly divided into four groups which were stratified by grade in school and sex. Family members were distributed as widely as possible among the random groups. One of the four groups was cultured on rotation each week by village health aides without regard to symptoms. Thus, every school child had a throat culture taken every four weeks. During the 1973-74 school year the number of villages under routine surveillance was increased to 12. Six of these continued to be cultured weekly following the original design, while the other half had their 25 percent sample of children cultured every two weeks. In every village, the health aides cultured any children or adults who complained of sore throat, and recorded their signs and symptoms.

Nine villages similar to the original study villages were selected for comparison, and health aides were trained in a similar manner. Throat cultures were obtained from children in these villages at certain points in time: March and December 1972, April and October 1973, and March 1974. Those with positive cultures were treated. During the 1973-74 year, eight new villages were provided with materials so that health aides could collect cultures from patients with sore throats seen in the clinic. Thus a total of 30 villages have participated in the program in some manner. (Appendix II)

Throat Cultures

Throat swabs were placed in silica gel and mailed to the Center for Disease Control laboratory in Anchorage or Bethel for processing. Beta hemolytic streptococci grown on pour plates were grouped using bacitracin sensitivity and the Lancefield precipitation methods. Group A isolates were typed using T-agglutination and M-precipitation methods.[6]

Each week, as soon as bacitracin sensitivity results were available, the laboratory notified the village aide by telephone, radio, or teletype. Persons with Group A streptococci were treated with benzathine penicillin as recommended by the American Heart Association.[7] Symptomatic persons were sometimes treated at the time they were first seen, depending on clinical findings. When epidemic trends occur, previously established criteria[8] have been used to define situations that require mass prophylaxis of school children with penicillin. The three criteria, which must exist simultaneously, are: (1) Group A prevalence is found to be 30 percent or more, (2) at least half of these organisms are M-typeable, and (3) a single strain accounts for at least one-third of those typeable.

Blood Specimens

Ten or 15 cc of blood was collected periodically in most villages. Both Group A and type-specific antibodies were determined on a sample of these specimens.[9,10]

Surveillance and Secondary Prevention or Rheumatic Fever

A number of techniques have been used in an attempt to monitor the incidence of acute rheumatic fever, and to identify those at risk of suffering a recurrence. Clinicians at the PHS Alaska Native Hospitals have been surveyed by mail twice monthly regarding the occurrence of new cases in their area, hospital discharge diagnosis were tallied for 1968-73, and medical records of all Alaska Natives with the diagnosis of acute rheumatic fever or rheumatic heart disease in this six year period were reviewed. Cardiac screening of school children in the project villages and Bethel has been conducted. A registry of persons with rheumatic heart disease or a history of acute rheumatic fever was begun.

RESULTS

Throat Cultures

The population under surveillance and the number of Group A isolates are shown in Table 1. In the three years, 62.4, 48.9, and 57.1 percent of the children had at least one Group A streptococcal isolate. For each year the number of isolates per positive child averaged 1.7, 1.5, and 1.7 isolates. In the first and last years, over one third of the isolates were M-typeable.

Nearly 22,500 cultures were processed from villages observed routinely in the three years. While the prevalence was highest among children

with symptoms (34.4, 24.8, and 31.2 percent), these children accounted for only 9.5, 8.8, and 11.0 percent of the total Group A isolates (Table 2).

Figure 1 summarizes the average streptococcal prevalence rates among the weekly samples of school children for the first two years of the project. The rates for the first two months of each year reflect the staggered start of culturing in the villages. Group A prevalence initially ranged from 11 to 41 percent, with a mean of 26 percent. Thereafter, mean weekly prevalence rates declined to about ten percent and remained near that level. After four months of summer vacation when the program was reinstituted, 15 percent of the children were positive. With treatment of positives, rates again dropped to ten percent and remained below that level. The three mean Group A point-prevalence rates in the nine comparison villages were 15, 25 and 17 percent, as indicated in Figure 1 by the letter A.

Figure 2 summarizes the average Group A prevalence rates for the past year in villages with cultures taken biweekly in contrast with those cultured weekly. The initial prevalence in all villages averaged 31.0 percent. Again the rates declined shortly after the introduction of the program with rates near 10 percent maintained best in those villages cultured weekly. Mean Group A prevalence in the nine villages cultured at two points for comparison was 20.5 percent in October and 18.2 percent in March.

An analysis of the symptoms of 1,542 episodes of pharyngitis among persons of all ages cultured because of illness during three years confirmed the well recognized impossibility of making a clinical diagnosis of streptococcal sore throat (Table 3). When the decision to give antibiotics was based on clinical impression, the health aides gave treatment to 56.0 percent of those with subsequently positive cultures and 35.5 percent of those with negative cultures. The clinical diagnosis agreed with the subsequent culture result 62.5 percent of the time. If the culture had not been available, 160 patients infected with streptococca. organisms would have gone untreated.

Table 4 shows the mean delay in days between culture and treatment of positives. The worst delays were encountered for villages of the Bethel Service Unit. For the three years, the average delays attributable to mailing in this Service Unit were 4.8, 5.4, and 8.8 days.

In spite of the treatment of positives within an average of 10-11 days after culturing, the appearance of a new M-typeable strain in a village was frequently followed by an increase of Group A prevalence, occasionally to epidemic levels. Figure 3 shows the weekly Group A prevalence for St. Michael, a village where this was observed in the first year of the program. Initially, M-type 6 organisms were isolated from 20 percent of the children. Following the collection of school-wide cultures and treatment of positives, this prevalence declined and the M-type 6 serotype disappeared a few months later. In December, M-type 1 organisms appeared

in this same village and nine weeks later this strain reached a prevalence of 30 percent. Epidemic criteria were fulfilled and penicillin prophylaxis was given to all school children. Prevalence rates declined.

Figure 4 shows the year's experience in Stebbins, a nearby village. M-type 6 organisms were also present here at high levels in October, and penicillin mass prophylaxis was given. In February, M-type 1 organisms were first cultured in Stebbins during the time this organism was causing an epidemic in St. Michael. Within eight weeks prevalence reached epidemic levels. The fluorescent antibody technique for identification of Group A streptococci was set up in the school, prompt treatment followed, and the epidemic was terminated.

Because of these experiences, during the second and third study years an additional 25 to 50 percent sample of children were cultured whenever Group A prevalence rates exceeded 20 percent particularly whenever new M-types were noted.

Serologic Studies

Sera from a random 30 percent sample of bloods drawn during the first year from school children in both study and comparison villages were examined for precipitating antibody to Group A polysaccharide, a non-protective antibody which is thought to reflect accumulated Group A streptococcal experience. Of the children tested in the 18 villages, 75 percent had detectable levels of this antibody. Both this prevalence, and the mean antibody titers obtained, were similar to Colorado school populations studied after epidemics and were higher than any other populations of similar age thus far studied under endemic circumstances. The lowest titers and prevalence of this antibody have been found in children in Casper, Wyoming, where a primary streptococcal prevention program has been operating for more than ten years.

Titers of type-specific antibody against M-protein from Group A serotypes 1, 2, and 12 were determined in randomly selected sera taken during the first year. The geometric mean titers (GMT) against types 1 and 2 were very low and showed little rise during the study year in spite of the predominance of these strains in several villages. The high prevalence of antibodies against M-type 12 is probably an indication of past experience with this serotype. Only two M-type 12 isolates were obtained during the year.

CONCLUSIONS

In any population, prevention of recurrence in rheumatic subjects is thought to be of highest priority. In addition, the ability to detect streptococcal infection in symptomatic persons by bacteriologic means should be made available to all practitioners and auxiliaries. Longitudinal surveillance projects require intensive efforts in streptococcal control but are useful in select populations with a high rate of sequelae.

The ability of such a program to reduce streptococcal prevalence in Alaska has now been demonstrated, but it will take a number of years of accumulated experience to evaluate the effect of such a program on the rate of acute rheumatic fever and rheumatic heart disease.

During each year of the program, at least 50 to 60 percent of the children had at least one Group A infection. Persons seeking medical attention for a sore throat accounted for only ten percent of the total annual Group A isolates obtained in the population. By itself, treatment of children with pharyngitis may have little impact on the reduction of streptococcal prevalence. Introduction of new M-types into a village often lead to epidemics. The surveillance program allows detection of these epidemics so that appropriate control measures can be undertaken.

Serological studies show that this population has previously had considerable experience with Group A streptococci. The presence or absence of type-specific antibodies in the population correlated inversely with the isolation rates of their respective streptococcal serotypes. This finding supports the idea that this particular antibody is protective. Serologic studies of this sort help predict susceptibility to a newly introduced serotype.

REFERENCES

1. Goorman, J.R. - A Brief Look at the Incidence of Rheumatic Fever among Alaska Natives. Alaska Area Native Health Service, Area Office, Anchorage, Alaska. 1968.

2. Edelen, John S., Thomas R. Bender, and Robert A. Zimmerman, Streptococcal Surveillance in Western Alaska. Presented at Twenty-third Alaska Science Conference, Fairbanks, Alaska. August, 1972.

3. Phibbs, B., Taylor, J., Zimmerman, R.A.: A community-wide streptococcal control project: The Natrona County primary prevention program, Casper, Wyoming. JAMA 214:2018-2024, 1970.

4. Zimmerman, R.A., Biggs, B.A., Bolin, R.A., et al: An effective program for reducing group A streptococcal prevalence. PEDIATRICS 48:566-572, 1971.

5. Bender, T.R., R.A. Zimmerman, J.D. Knostman, S.A. Sherman, A. Price, and J. Kenneth Fleshman. Streptococcal Surveillance in Remote Arctic Populations: The Development of a System for Detection of Group A Pharyngitis and the Prevention of Nonsuppurative Sequelae. ACTA SOCIO-MED. SCAND., Suppl. 6, 1972.

6. Wilson, E., Zimmerman, R.A., Moody, M.D.: Value of T-agglutination typing of group A streptococci in epidemiologic investigations. HEALTH LAB SCI 5:199-207, 1968.

7. Committee Report on Prevention of Rheumatic Fever and Bacterial Endocarditis, Council on Rheumatic Fever and Congenital Heart Disease of the American Heart Association. New York, N.Y., 1968.

8. Zimmerman, R.A., Cross, W.M., Miller, D.R. et al: A streptococcal epidemic in an isolated civilian population with institution of mass prophylaxis. J PEDIAT 69:30-45, 1966.

9. Zimmerman, R.A., Auernheimer, A.H., Taranta, A: Precipitating antibody to group A streptococcal polysaccharide in humans. J IMMUN 107:832-841, 1971.

10. Zimmerman, R.A., Mathews, J., Wilson, E.: Microtiter indirect hemagglutination procedure for identification of streptococcal M-protein antibodies. APPL MICROBIAL 16:1640-1945, 1968.

TABLE 1

STREPTOCOCCAL SURVEILLANCE

Alaska Native Villages

	School Year		
	1971-72	1972-73	1973-74
Population Under Surveillance			
Children	848	919	1,154
Families	282	287	376
Number with Group A Isolates (%)			
Children	529(62.4)	449(48.9)	659(57.1)
Families	236	217	295
Total Group A Isolates	917	673	1,087
Isolates Per Positive Child	1.7	1.5	1.7
No. Isolates M-Typeable (%)	330(36.0)	25(3.7)	380(35.0)

TABLE 2

STREPTOCOCCAL CULTURES FROM ALASKA NATIVE VILLAGES

	School Year		
	1971-72	1972-73	1973-74
Total Cultures Processed	6,963	7,315	8,140
Symptomatic Patients	250	238	385
No. Positive (%)	87(34.4)	59(24.8)	120(31.2)
Percent of Total Positives	9.5	8.8	11.0
Asymptomatic Children	6,713	7,077	7,755
No. Positive (%)	830(12.4)	614(8.7)	967(12.5)
Percent of Total Positives	90.5	91.2	89.0

FIGURE 1

STREPTOCOCCAL PREVALENCE AMONG ALASKA NATIVE SCHOOLCHILDREN

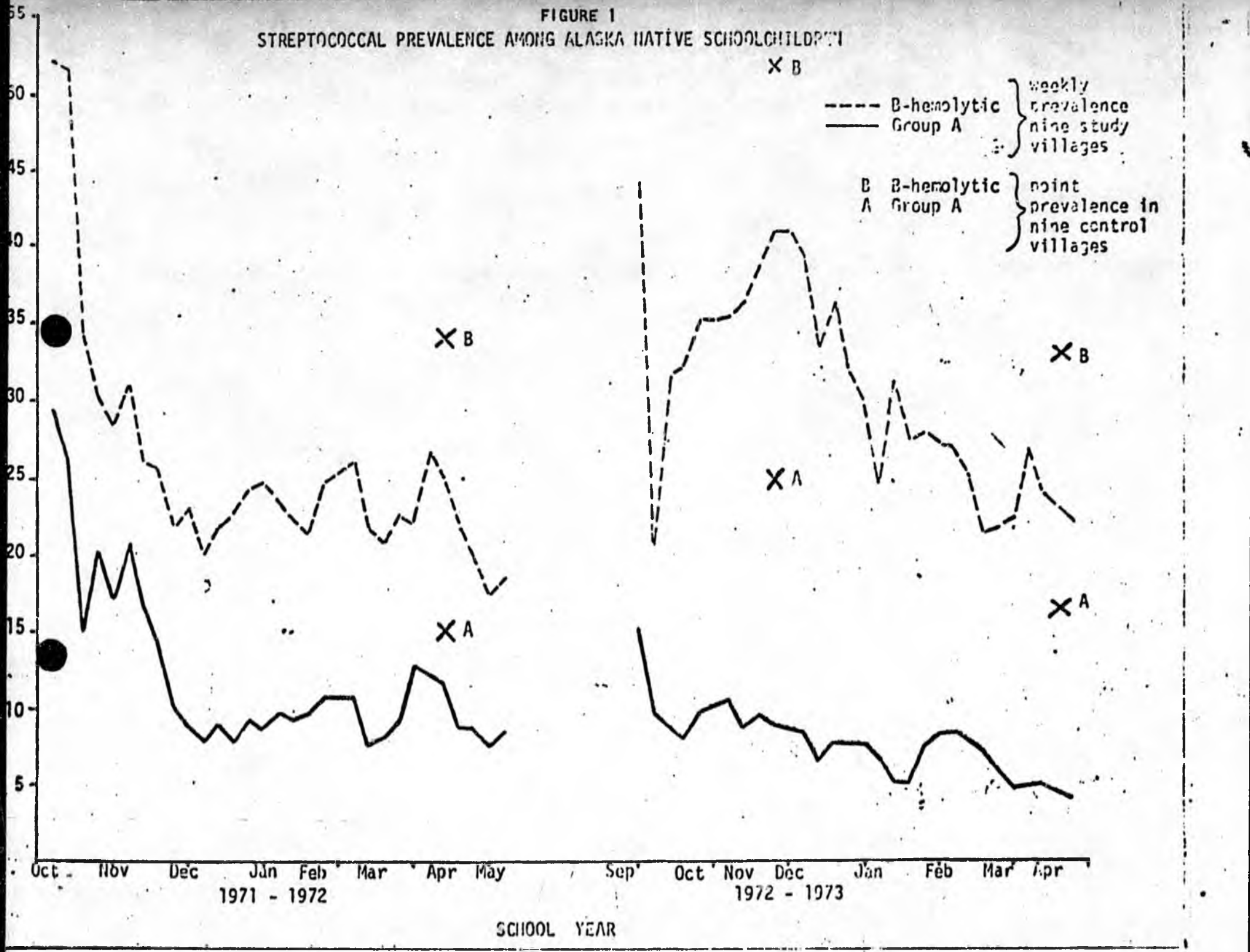
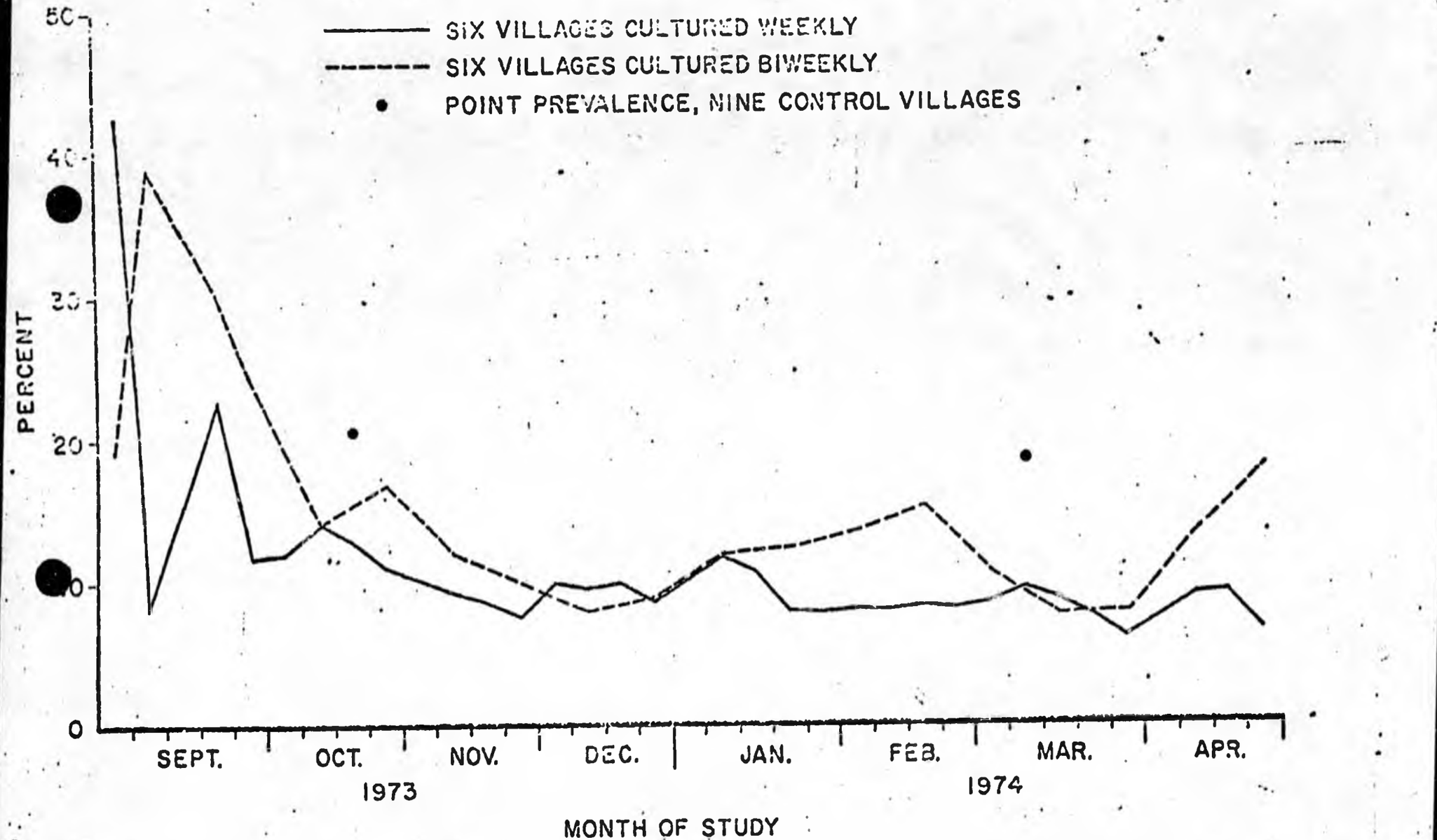


FIGURE 2

GROUP A STREPTOCOCCAL PREVALENCE AMONG ALASKA NATIVE SCHOOLCHILDREN, 1973 - 1974.



CLINICAL DIAGNOSIS IN SYMPTOMATIC PATIENTS

Adequate Antibiotic Therapy for Streptococcal Pharyngitis Compared to Throat Culture Results

Experience in Three Study Years

		TEST		
		+	-	Total
Therapy	+	204	418	622
	-	160	760	920
	Total	364	1,178	1,542

Patients with a positive culture 364/1,542 or 25.1%
Patients falsely treated 418/1,178 or 35.5%
Patients positive but not treated 160/364 or 44.0%
Ratio of false positives to false negatives 418/160 or 2.6

Correctly classified as positive 204/364 or 56.0%
Correctly classified as negative 760/1,178 or 64.5%
Agreement 964/1,542 or 62.5%

TABLE 4

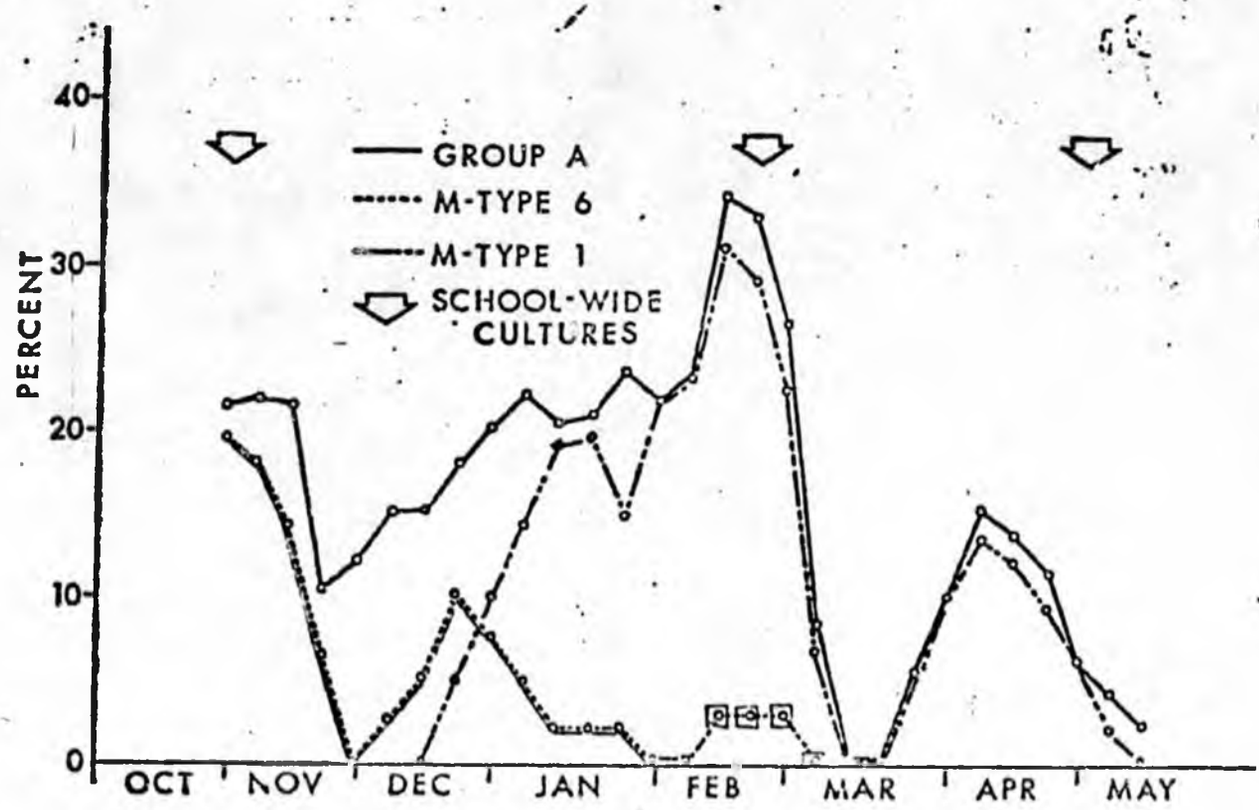
STREPTOCOCCAL SURVEILLANCE PROGRAM

Mean Delay Between Throat Culture and Treatment

Service Unit And Village	School Year 1971-72	1972-73	1973-74
Total	11.5	10.1	11.1
Bethel S.U.	13.2	12.4	15.5
Nunapitchuk	14.4	13.8	14.5
Kasigluk	11.6	12.6	17.3
Atmautluak	13.5	10.7	15.6
Napakiak	-	-	15.0
Kotzebue S.U.	11.1	9.7	10.2
Unalakleet	10.3	9.3	8.1
Stebbins	11.9	11.7	9.9
St. Michael	11.2	8.0	8.7
Koyuk	-	-	14.8
Kanakanak S.U.	10.2	8.3	7.6
Togiak	10.6	9.6	7.6
Twin Hills	9.5	7.7	6.2
Manokotak	10.6	7.7	7.9
New Stuyahok	-	-	9.2

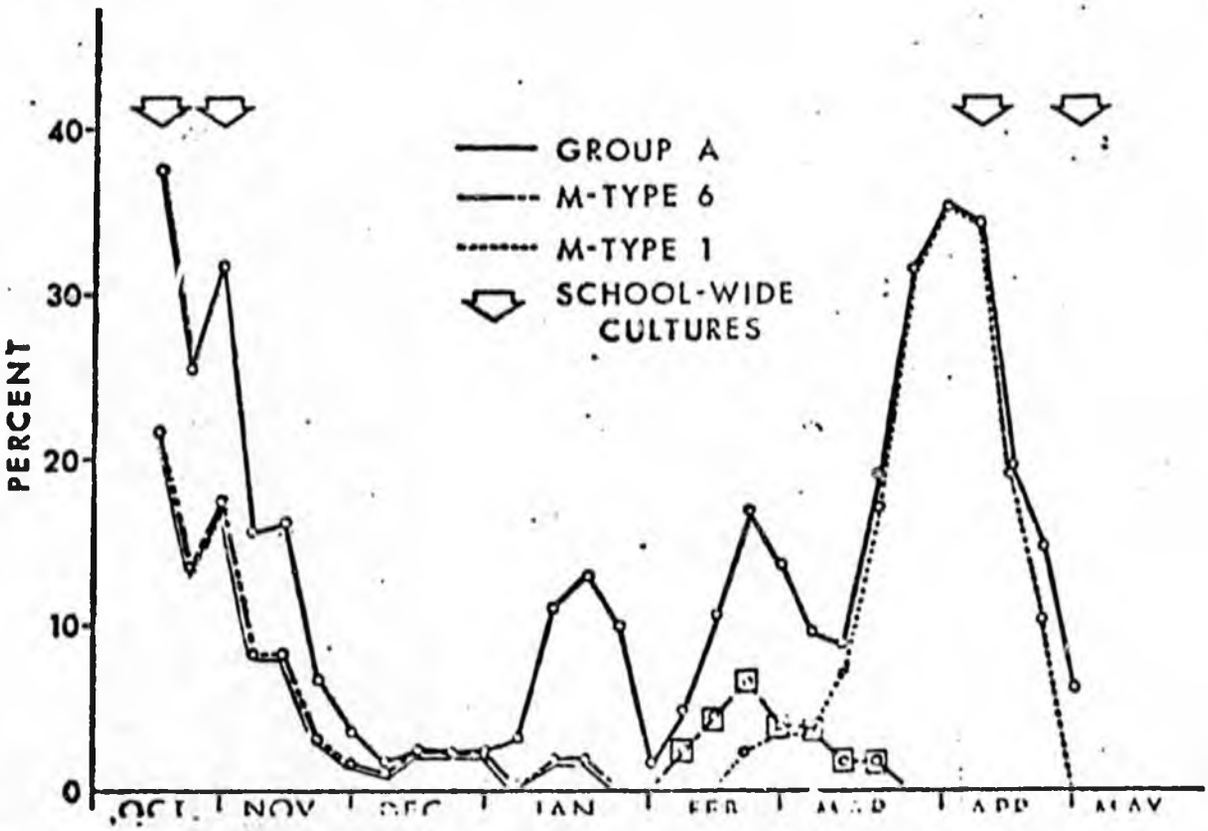
AVERAGE WEEKLY STREPTOCOCCAL PREVALENCE
ESKIMO SCHOOL CHILDREN
ST. MICHAEL, ALASKA
1971 - 1972

FIGURE 3



STEBBINS, ALASKA
1971 - 1972

FIGURE 4



APPENDIX I

1. Bender, T.R., Zimmerman, R.A., Knostman, J.D., Sherman, S.A., Price, A., Fleshman, J.K. Streptococcal Surveillance in Remote Arctic Populations. The Development of a System for Detection of Group A Pharyngitis and the Prevention of Nonsuppurative Sequelae. Presented at the Second International Symposium on Circumpolar Health, Oulu, Finland, June 21-24, 1971.

2. Edelen, J.S., Bender, T.R., Zimmerman, R.A. Streptococcal Surveillance in Western Alaska. Presented at the 23rd Alaska Science Conference, Fairbanks, Alaska, August 15-17, 1972.

3. Zimmerman, R.A., Bender, T.R., Edelen, J.S., et al. "Streptococcal Surveillance and Control in Alaska Natives" Amsterdam, August, 1972.

4. Edelen, J.S. Streptococcal Surveillance in Western Alaska. Presented at the EIS Conference, Atlanta, Georgia, April, 1973.

5. Bender, T.R., Zimmerman, R.A., Edelen, J.S., Burks, J.M. Streptococcal Surveillance in Remote Arctic Populations. Presented during the symposium, Epidemiological Studies in Northern Populations, The Society for Epidemiologic Research, Sixth Annual Meeting, Winnipeg, Manitoba, June 21, 1973.

6. Bender, T.R., Edelen, J.S., Burks, J.M. Streptococcal Surveillance and Control in Remote Arctic Populations. Presented at the Third International Symposium on Circumpolar Health, Yellowknife, N.W.T., July 8-11, 1974.

7. Edelen, J.S., Burks, J.M., Barrett, D.H., Steer, P. Rheumatic Fever and Rheumatic Heart Disease Among Alaska Natives, 1968-72. Presented at the Third International Symposium on Circumpolar Health, Yellowknife, N.W.T., July 8-11, 1974.

VILLAGES PARTICIPATING IN RHEUMATIC FEVER PREVENTION PROGRAM

September, 1974

Surveillance Villages

Cultures taken routinely and from those with symptoms

01	Nunapitchuk	07	Twin Hills
02	Stebbins	08	Atmautluak
03	Unalakleet	09	Kasigluk
04	St. Michael	20	Napakiak
05	Manokotak	21	Koyuk
06	Togiak	22	New Stuyahok

Cultures taken only from those with symptoms

23	Tununak	27	Goodnews Bay
24	Kotlik	28	Nulato
25	Naknek	29	Emmonak
26	Chevak	30	Tooksook Bay

Comparison Villages

Cultures taken on occasion

10	Shaktoolik	15	Quinhagak
11	Kaltag	16	Kwigillingok
12	Akiak	17	Kongiganak
13	Akiachak	18	Hooper Bay
14	Kwethluk		