

A SURVEY OF THE PUBLIC HEALTH IMPORTANCE OF PEST MOSQUITOES IN THE MILK RIVER VALLEY, MONTANA *

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INTRODUCTION. It is recognized that mosquitoes create public health hazards in addition to the transmission of diseases, but there is very little specific information available on this subject. The present report summarizes an initial survey to evaluate the impact of pest mosquitoes upon the health and welfare of a community in the Milk River Valley of northern Montana, where a severe mosquito problem has existed for a number of years.

The town of Chinook was selected for the survey because investigations by a field unit of the Logan Field Station located there during the past four years had defined the nature and extent of the mosquito problem. The mosquito problem in the Chinook area is representative for the Valley as a whole, being intermediate between the least and the most severe. Human biting records indicate that the most important mosquito species involved are: *Aedes vexans*, *A. idahoensis*, *A. dorsalis*, *A. nigromaculis*, *A. trivittatus*, and *Culex tarsalis* (the common encephalitis mosquito).

The survey was conducted during the period September 7-10, which is well beyond the peak of mosquito activity, frost occurring during the last two days of the survey. Although this decreased the opportunity for observing certain signs of reaction to mosquito bites, it probably minimized the chances of obtaining exaggerated histories such as might occur during the period of most severe annoyance.

PROCEDURES. The data were obtained by a house-to-house survey in an area two blocks wide around the perimeter of Chinook, a town of approximately 2,400 population. The area surveyed constituted about one-fourth of the town and the residences were representative of both the lower and middle income groups with a scattering of higher. Eight rural premises in the general area were surveyed for comparative purposes.

The data were obtained by verbal questions usually answered by the mother and/or father of each family. Three types of information were obtained with regard to the 1955 mosquito season (May to September): (1) the householders' evaluation of the overall effects of mosquitoes upon their families; (2) an estimate of the direct effects of mosquito bites upon indi-

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viduals from histories given to the questioning physician and from signs he observed on examination of faces, extremities, and other exposed areas of children and housewives; and (3) the nature and extent of treatments for mosquito bites as reported by householders.

Additional data on medical treatment of mosquito bites and human cases of encephalitis were obtained through contacts with local physicians and hospitals.

RESULTS. The results of the survey are summarized in table 1. With regard to the effects upon the family, three-fourths reported severe annoyance from mosquitoes, about half of them said that mosquitoes prevented children from playing

out of doors for 2 to 4 months during the summer, and three-fourths of them stated that mosquitoes interfered with outdoor activities such as gardening. Outdoor cooking and barbecuing, which is so popular over most of the country, is practically non-existent in Chinook, only one unused barbecue pit having been observed during the survey. There was very little evidence of any outdoor community activities, and a number of individuals commented that mosquitoes made such activities impossible. It was reported that in one church without screens it was most difficult to hold successful meetings during the mosquito season.

The survey indicated that most of the

TABLE 1.—Results from House-to-House Survey of Public Health Importance of Mosquitoes, Chinook, Montana, September 7-10, 1955

	Class of Residence		Totals
	Lower Income	Middle and Upper Income	
Effects of mosquitoes upon families			
Number of families interviewed	33	100	133
Percent of families reporting the following:			
Annoyance by mosquitoes: Light	9	5	6
Moderate	24	19	20
Severe	67	72	73
Children prevented from playing out-of-doors for 2-4 months in summer	42	48	47
Interference with gardening and other outdoor activities of adults	64	77	74
Effects of mosquito bites upon individuals			
Number of individuals in interviewed families	156	426	582
Percent for which following symptoms reported:			
Irritation and itching	81	80	84
Swelling and redness	68	83	83
Welts	17	20	22
Abrasions from scratching	19	23	22
Infected bites	10	4	6
Number of individuals examined by physician	30	53	83
Percent with following signs:			
Edema and erythema	40	43	42
Wheals	0	4	2
Abrasions	67	49	55
Infections	40	6	18
Treatment for mosquito bites			
Percent of families which:			
Used home treatments	42	64	59
Used repellents	33	62	55
Used ointments, lotions, etc.	30	29	29
Took children to physician	6	2	3

individuals in the area reacted to mosquito bites with irritation, itching, swelling, and redness; more than one-fifth developed welts and suffered abrasions from scratching (especially the children); and 10 percent of the lower income group and 4 percent of the higher group reported infected mosquito bites. The percentage of individuals observed by the physician with equivalent signs was much lower in the case of edema, erythema, and wheals; this was to be expected since the survey was made sometime after the peak of mosquito annoyance and these signs are those which would disappear within a short time after the bites were inflicted. On the other hand, the amount of abrasions and infections observed by the physician was much greater than reported from the histories, particularly for families in the poorer dwellings. It was noted that individuals would frequently report that their families had not had any infected mosquito bites when a casual glance at their children standing beside them would reveal infected bites. One severe case was observed in which the ankles of an infant were covered with impetiginous abscesses which were secondarily infected mosquito bites.

Over half of the families reported using some sort of home treatment for mosquito bites, and the use of repellents was particularly prevalent. Among the home remedies used were rubbing alcohol, ammonia, witch hazel, calomine lotion, mercurochrome, merthiolate, Lysol, salt, baking soda, Vicks Vapo-Rub, Mentholatum, Camphophenique, and various salves and ointments including sulfa, penicillin, and cortisone. Four histories were obtained of children who had to be taken to a physician because of mosquito bites. Contacts with local physicians revealed a total of eight cases of mosquito bite infection or allergic reaction, two of which required hospitalization. The eye of one child swelled shut from the allergic edema caused by many mosquito bites on the face.

The survey also revealed four cases of human encephalitis which occurred during 1954, one of which was fatal. One of these was confirmed as Western equine encephalitis through serologic test, and the other three were based on clinical diagnosis alone.

The survey results from the 8 rural premises were quite similar to those obtained from the town. They provided some incidental evidence of the economic importance of mosquitoes in causing cattle to mill around, remain in barns, etc., and thus be prevented from feeding. Four farmers estimated that mosquitoes were directly responsible for an annual weight loss per calf of 75 to 150 pounds, with greater losses in older cattle.

Other evidence of the socio-economic importance of mosquitoes was observed within the town. For example, the operator of an outdoor ice cream and dairy products store reported that his profits were reduced by 25 percent during the summer months because customers would leave rather than tolerate the intense annoyance of mosquitoes; the operator of a diesel service station reported that mosquitoes caused many of his customers to be diverted to a mosquito-free station. Additional information is needed on the socio-economic importance of mosquitoes.

CONCLUSIONS. The results of the survey indicate that in the Chinook area of the Milk River Valley mosquitoes create a serious public health problem in addition to the transmission of specific diseases. This is evidenced by the fact that: (1) healthful outdoor activities of a majority of the families are greatly inhibited by mosquito annoyance; (2) most of the inhabitants endure deleterious reactions from mosquito bites; and (3) over one-fifth of the population suffer from scratching and secondary infections or allergic reactions, some of which even lead to hospitalization. It appears quite likely that in many other areas of the country so-called "pest mosquitoes" create similar health hazards.