VECTOR CONTROL BY DISTRICTS

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I recently had the opportunity to serve on the AD HOC Committee that has developed the report to the legislature on vector control funding and delivery. The report is being authored by the Vector Biology and Control Section of the Department of Health Services and is in a nearly completed form. I can say it adequately describes the vector problems in the State of California. And, in the face of Proposition 13, it also correctly recommends that a mechanism for funding vector control be established to assist local health agencies, university research and mosquito and pest abatement districts. However, I believe the report may not emphasize some important aspects of the delivery of vector control in California and may be compounding the problems by establishing a tortuous conduit for vector control funding.

As background, I would like to talk a little about some generalities of vector control programs. Vector control programs, for the most part, begin in crises. Either the prevalence of a vector borne disease, or highly pestiferous vectors result in governmental action to control them. Because the program begins in crises, public demand is usually high for immediate results. A vector program in its early developmental stages necessarily depends heavily upon chemical methodologies to obtain the desired results. As the program evolves, it moves along a continuum from the short-term control methodologies to long-term control provided by physical and biological control methodologies. The result, after perhaps many years and significant capital investment, is a cost/effective program. The program is no longer primarily responding to crises caused by the vectors, but through implementation of effective long-term control aimed at the sources, the program has reached a preventive configuration. It is at these latter stages of vector control programs that the public receives the maximum for the least cost. Ironically, it is also precisely at this time in its development that a vector control program is most vulnerable.

If the legislators are going to develop a realistic mechanism for adequately funding vector control in California they should be aware of at least three truisms concerning vector control programs. The first truism is that vector control programs cannot be turned off and on like tap water. Interruption of the programs by inconsistent funding arrests the development of the program condemning it to crises orientation and low cost/effectiveness. The public is not receiving maximum benefit for its money under these circumstances.

The second truism concerning vector control programs is that the more effective it becomes, the less likely it will receive continued and consistent public and political support for funding. For example, in a recenlty published book on malaria control, Gordon Harrison reported that the funding for malaria control in Sri-Lanka was cut in 1954 by a government yielding to the temptation to save money. The result was the resurgence of malaria in 1956. In India, according to Harrison, the need to continue the attack against malaria even after apparent successes could not be translated into practicable political criteria. The resurgence of malaria in India was even more disastrous from a low of less than 100,000 cases in 1960 through 1963 to an estimated 30-50 million cases in 1977. Harrison explains that the key to the malaria resurgence in India was the programs "near success in an environment with an excess of problems clamoring for attention. As malaria receded to a low level other pressing health and social problems exerted irresistible demands for available resources."

The legislators should also be made aware of a third truism about vector control programs. Vector control programs do not compete well for funds in a tight fiscal environment. For example, a report by California's Legislative Analyst in October, of 1979 indicates that local environmental health and sanitation agencies received a 5.3% increase of funds in the fiscal year following passage of Proposition 13. Yet the findings of the AD HOC Committee suggest that vector control programs have lost resources to the other environmental health programs. Quite frankly, my observations are that vector control programs do not do well over the long-term under the aegis of boards of supervisors or within the matrix of general sanitation. The reasons are not pernicious, but it is nearly impossible for vector control programs to obtain adequate funding when competing for limited funds in a highly competitive environment. This, as pointed out earlier, is especially true if the control program is effective.

Another indication that vector control programs do not compete well for funding has been evidenced by state aid allocations to Special Districts following Proposition 13. The county boards of supervisors were charged with the responsibility of distributing the funds to districts within their boundaries. Comparing the 1978/79 distribution to that of 1979/80, mosquito abatement districts received an 18.3% decrease in funding. The mosquito and pest abatement districts, in open competition with library, fire and recreation districts, had lost.

May I conclude by saying that if, as the AD HOC Committee Report has stated, vector borne diseases are a threat to the citizens of California, the State Legislature should be made aware that their actions should establish a funding mechanism that insures sufficient and consistent funding. Such a mechanism is the key to providing effective and efficient vector control programs to the citizens of California. The major failure of the report could be that it does not point out that we already have delivery systems in California that avoid the common pitfalls of other vector control programs. Mosquito and pest abatement districts have been the primary delivery systems for vector control in California since 1915 and have been extremely effective, avoiding these common pitfalls. There are currently 54 of these districts operating in the state. A key element to their success has been the separate funding method inherent in the Special District system. Other important factors are the stewardship of the programs provided by the trustees, the unique operational capabilities of the districts, the close coordination with other agencies, and

the flexibility of the enabling statutes, that, among other things allows boundaries to be established to realistically encompass the problem area.

A realistic and practical solution to the problems of vector control funding in California should begin with the recognition that vector control in California has been delivered, for the most part, by Special Districts and that the districts are uniquely suited to effectively provide vector control for the citizens of California.

UTILIZATION OF A MICROCOMPUTER IN A VECTOR CONTROL PROGRAM – ALAMEDA COUNTY MOSQUITO ABATEMENT DISTRICT

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Information is required in order to accomplish vector control. It is routinely collected, processed and interpreted to provide guidance to vector control programs. It follows logically, that to process the information more efficiently is to increase the efficiency of the programs. It can provide savings in money, and result in increased effectiveness of vector control.

In recent years the costs of automatic data processing have been declining rapidly. A recent article in Science magazine, called "Information - the New Frontier", pointed out that if costs of computers continued to decline at the current rate, a computer would cost 3/10 of a cent 100 years from now. The projection is absured of course, but was intended to indicate the rate of which computer costs are now crashing.

The Alameda County Mosquito Abatement District is currently processing data automatically by means of a TRS-80 microcomputer system. A comparison of the automatic data processing system to the previous punch card system has indicated that we should expect a long-term savings of about $2,400 per year in paper and labor costs. One time costs of hardware and software were not included in the analysis, but the savings should pay for the system in about two years.

The installation of automatic data processing in the District required that we look at the flow of information in the District from the point of view of a computer scientist. The approach is called systems analysis. When the systems analysis is accomplished in the broadest perspective, it provides a logical and practical frameworks for vector management programs. It is relatively easy to accomplish a systems analysis in vector control for a couple of reasons. First, the basic concepts of integrated pest management are compatible with the systems approach. Secondly, vector ecologists have published information in the past that is usable in the systems analysis. Both published and unpublished articles by Richard Husbands, formerly of the California State Vector Biology and Control Section, were quite useful in accomplishing the analysis.

A valuable by-product of the analysis was that before the data processing system could be designed the goals and objectives of the District's programs had to be clearly defined. The analysis also provided rather startling information about the amount of time utilized to gather and process information prior to the installation of the computer system.

The data processing system has been designed to measure the mosquito problem and to determine the impact the control program has on the problem. The basic input data are the same data used in most all vector programs - - light trap data, biting counts, larval sampling data, service request data. The output data are also the same kinds of familiar information - - lineal feet of ditches excavated, number of fish plants, pounds of insecticide per source, pounds of insecticide per species, etc.

Objectives of The System.--The specific objectives to be accomplished by the automatic data processing in the District are the following:

1. To efficiently process data that will measure the effectiveness of the program.
2. To efficiently generate required reports.
3. To develop and utilize models to predict levels of mosquitoes and thereby assist in making treatment decisions.
4. To quantify the work performed by the District.
5. To define "high priority" sources through cost-evaluation and set appropriate work schedules for the physical control program.
6. To measure the insecticide pressure on any given species and avoid resistance problems.
7. To determine the costs of specific program elements and enhance program budgeting.
8. To check current inspection and treatment schedules with those of the past and modify the schedule as required.

The District has already gone a long ways toward meeting the objectives. The "core" program currently in use processes data from the employees' daily reports and generates the monthly reports of the District. The program includes one relatively simple yet informative model that predicts levels of adult *Culex pipiens*. The program can easily be upgraded as the "pipiens" model is elaborated upon and as additional models are developed for other species.

The use of the computer in the District should also provide benefits beyond that of our current stated objectives. The flexibility of the system enables data to be retrieved in a variety of combinations by simple program additions. Other programs could be developed to increase the efficiency of the bookkeeping systems. Existing programs can also be utilized to do statistical analysis if required. In truth, as we gain knowledge of