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# Correlation Between Laboratory Services and Reporting Requirements for Selected Zoonoses

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THE REPORTING OF SELECTED ZOOSES is required by all State departments of health and of agriculture in the United States (1). (We define zoonoses as "those infectious diseases common to man and other animals." Therefore some noncommunicable diseases are included.) Since distinctive clinical syndromes are uncommon in the infections selected for study, laboratory assistance is extremely valuable in arriving at an accurate diagnosis. If medical practitioners (both veterinarians and physicians) are to adequately fulfill their legal reporting obligations, laboratory diagnostic assistance should be available for the reportable conditions. It also seems reasonable that the agency requiring the reports should bear the responsibility for providing this diagnostic assistance.

## Materials and Methods

Questionnaires were sent to the laboratory directors of all State departments of public health and of agriculture in August and September 1977, requesting information on the diagnostic services available for the specific zoonoses listed, including whether clearance was

required before submitting specimens, charges were made for the services, and nonhuman specimens were tested. Questionnaires also were sent to the chief State livestock health official and the epidemiologist of each State. These questionnaires listed selected zoonoses and requested information on which of these diseases were reportable in the State. The purpose of this data collection, as stated on the questionnaires, was to compile information for a reference text on the zoonoses (2).

Some of the diseases listed on the questionnaires sent to the State health departments were omitted from the questionnaires sent to the State agricultural departments because they are rarely diagnosed in nonhuman species. Also, because some agents that were listed separately on the reporting questionnaires (for example, salmonella, shigella) were grouped on the laboratory questionnaires (for example, enterobacteria), direct comparisons were not always possible.

If replies to the questionnaires were not received within 3 months, a followup letter was sent. After all States had replied, master tables showing the reportable diseases and the diagnostic services offered by each laboratory were sent to each State agency with a request that any errors be corrected. These master tables, which have been published (2), plus the reporting requirements of the various States (1), provide the data for this paper. The kinds of services (isolation, serology, skin tests, and so forth) provided varied markedly from State to State, but to permit tabulation we consider here only whether at least one service was available.

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**Results**

**Public health agencies.** Questionnaires were completed and returned by all the State public health and agricultural departments to which they were sent. The number of diseases for which State public health agencies offered diagnostic assistance varied from 8 to 51 of the 52 conditions listed on the questionnaire, with a mean of 40.1 and a mode of 44. Only 6 States offered diagnostic assistance for sarcosporidiosis, whereas diagnostic services for brucellosis and tularemia were available in all 50 States.

For 48 conditions, a direct comparison could be made between the availability of laboratory services in the State and reporting requirements. For 17 of these conditions, every State that required reporting also offered laboratory diagnostic assistance (see table). In contrast, for six conditions, less than half of the States that required reporting offered assistance. For 32 of these conditions, at least as high a proportion of the States that required reporting offered services as of the States that did not require reporting.

Fifteen States offered diagnostic services for all their reportable diseases, whereas only one State provided diagnostic services for as few as one-half of the diseases. This State indicated that it required reporting on 20 zoonoses, but that it offered laboratory assistance for only 10 of the 20. In 44 of the 50 States, laboratory assistance was available for at least as great a proportion of the reportable diseases as for the nonreportable.

Thirty States requested that they be contacted before specimens were submitted, although one of these required prior contact only for virological specimens. Only 12 States accepted specimens collected from non-human animals. The seven States that charged for at least some of their services provided assistance for a mean of 40.6 diseases, with a variation from 32 to 46.

**Agricultural agencies.** The number of diseases for which State agricultural agencies offered laboratory diagnostic assistance varied from 1 to all of the 44 conditions listed on the questionnaire, with a mean of 24.8 and a mode of 35. Only 3 States offered assistance on candidiasis, in contrast to brucellosis, for which assistance was available in 47 States.

Of the 31 conditions for which a direct comparison could be made between the availability of laboratory assistance and reporting requirements, there were only 2 for which every State that required reporting also provided laboratory services (see table). There were 12 diseases, however, for which half or less of the States that required reporting also offered assistance. For 17 of the 31 conditions, at least as high a proportion of

the States that required reporting offered services as those that did not require reporting.

Eleven States provided services for all diseases for which they required reporting, whereas 16 States provided assistance for half or less of such diseases. In 36 of the 50 States, laboratory assistance was provided for at least as great a proportion of the reportable diseases as for the nonreportable.

The agricultural agencies in 18 States requested that they be contacted before specimens were submitted. The 24 States that charged for at least a portion of their agriculture laboratory services offered assistance for a mean of 27.4 diseases, with a variation from 2 to 41.

**Interagency comparison.** Forty-four diseases were common to both the questionnaires sent the State departments of public health and of agriculture, or a total of 2,200 State-disease combinations. For 968 of these combinations, services were duplicated in the public health and agricultural agencies within the given State, as the following table shows.

	<i>Agricultural agencies</i>		<i>Total</i>
	<i>Diagnostic services</i>	<i>No diagnostic services</i>	
<i>Public health agencies</i>			
Diagnostic services . . .	968	743	1,711
No diagnostic services . .	255	234	489
<b>Total . . . . .</b>	<b>1,223</b>	<b>977</b>	<b>2,200</b>

Duplications comprised 79.1 percent of the listed services offered by the agricultural agencies and 56.6 percent of those offered by the public health agencies.

We examined as a group the 12 States with public health laboratories that tested nonhuman specimens. The public health laboratories in these States offered diagnostic services for 37 to 48 diseases, with a mean of 43.6. The agricultural laboratories provided assistance for 1 to 37 diseases, with a mean of 23.8. The public health and agricultural laboratories duplicated services for from 1 to 37 diseases per State. The 256 duplications comprised 89.8 percent of the listed diagnostic services offered by the agricultural laboratories and 48.9 percent of those offered by the public health laboratories.

**Discussion**

The 100 percent response to the questionnaires, combined with the tables that were sent for verification to all laboratory directors, provides a reasonable degree of reliability to the data collected. A booklet listing the services provided by the State agricultural laboratories has been published (3), but since it does not specify diseases, verification with this source was not possible.

Availability of diagnostic laboratory services for selected zoonotic diseases in the 50 States according to the States' reporting requirements for the disease

Disease	States requiring reporting to public health agency			States not requiring reporting to public health agency			States requiring reporting to agricultural agency			States not requiring reporting to agricultural agency		
	Diagnostic services			Diagnostic services			Diagnostic services			Diagnostic services		
	Total number	Number	Percent	Total number	Number	Percent	Total number	Number	Percent	Total number	Number	Percent
Acariasis .....	4	3	75	46	22	48						
Actinomycosis .....	13	11	85	37	35	95	6	3	50	44	29	66
Amebic meningocephalitis .....	24	21	88	26	25	96						
Anthrax .....	47	34	72	3	3	100	47	33	70	3	2	67
Arboviral encephalitis .....	41	38	93	9	6	67	19	4	21	31	12	39
Arizona infection .....	6	6	100	44	43	98	4	4	100	46	35	76
Aspergillosis .....	4	3	75	46	43	93	4	3	75	46	33	72
Bacteroides infection .....	0	0	0	50	42	84						
Balantidiasis .....	2	2	100	48	38	79	0	0	0	50	20	40
Blastomycosis .....	10	10	100	40	34	85	5	2	40	45	24	53
Brucellosis .....	48	48	100	2	2	100	47	44	94	3	3	100
Campylobacteriosis .....	3	1	33	47	29	62	16	9	56	34	20	59
Cat-scratch fever .....	8	0	0	42	12	29						
Coccidioidomycosis .....	15	12	80	45	34	76	6	4	67	44	22	50
Cryptococcosis .....	7	7	100	43	39	91						
Erysipelothrix infection .....	0	0	0	50	25	50	26	14	54	24	21	88
Escherichia coli infection .....	6	6	100	44	43	98	3	3	100	47	36	77
Herpes virus simiae infection .....	5	5	100	45	42	93	0	0	0	50	23	46
Histoplasmosis .....	23	23	100	27	25	93	5	3	60	45	26	58
Leptospirosis .....	43	36	84	7	6	86	24	20	83	26	25	96
Listeriosis .....	6	6	100	44	37	84	14	13	93	36	25	69
Lymphocytic choriomeningitis .....	12	9	75	38	29	76						
Melioidosis .....	2	1	50	48	30	63						
Murine typhus .....	29	22	76	21	16	76						
Newcastle disease .....	3	0	0	47	11	23	38	22	58	12	7	58
Nocardiosis .....	3	3	100	47	43	91	4	2	50	46	25	54
Pasteurellosis .....	3	3	100	47	40	85	8	7	88	42	34	81
Plague .....	45	32	71	5	5	100	13	6	46	37	13	35
Pseudocowpox .....	8	0	0	42	8	19	4	2	50	46	8	17
Psittacosis .....	45	35	78	5	5	100	30	8	27	20	8	40
Q fever .....	25	24	96	25	20	80						
Rabies .....	47	47	100	3	0	0	45	18	40	5	3	60
Rat-bite fever .....	6	4	67	44	17	39						
Reovirus infection .....	0	0	0	50	29	58						
Rickettsialpox .....	12	8	75	38	27	71						
Ringworm .....	8	8	100	42	34	81	8	4	50	42	33	79
Rocky Mountain spotted fever .....	42	41	98	8	5	63						
Roundworm .....	6	6	100	44	37	84						
Salmonellosis .....	47	46	98	3	3	100	23	20	87	27	19	70
Sarcosporidiosis .....	0	0	0	50	6	12	0	0	0	50	25	50
Sporotrichosis .....	4	4	100	46	40	87						
Tapeworm infection .....	10	10	100	40	37	93	3	2	67	47	31	66
Tetanus .....	46	37	80	4	4	100	11	5	45	39	15	38
Toxoplasmosis .....	13	11	85	47	30	64	7	2	29	43	27	63
Trichinosis .....	47	36	77	3	2	67						
Tuberculosis .....	46	45	98	4	3	75	46	25	54	4	3	75
Tularemia .....	43	43	100	7	7	100	11	3	27	39	23	59
Yersiniosis .....	2	1	50	48	40	83						

NOTE: Leaders (...) Indicate unknown—information not requested on questionnaire.

The Center for Disease Control, Atlanta, Ga., serves as a reference laboratory and provides diagnostic support for State departments of public health; the National Animal Disease Center, Ames, Iowa, performs the same functions for the State departments of agriculture. Many localities also have private laboratories providing some services. Therefore, it cannot be assumed that if a State does not offer a service, the service is unavailable to medical practitioners within the State. Reliance on the national support laboratories, however, delays the receipt of results, and less consultative experience is available for interpreting the laboratory reports. Private laboratories are likely to provide only a limited number of the less frequently used tests and to have restricted experience with these.

Public health laboratories provide a greater variety of diagnostic services on zoonoses and services for a greater percentage of their reportable diseases than do the agricultural laboratories. Public health agencies also require the reporting of a greater number of zoonoses (1). These differences in services and reporting requirements probably reflect budgetary differences between the agencies, but we did not explore either this question or the underlying reasons for these differences in the current study. The markedly higher number of agricultural laboratories that charge for their services as compared with public health laboratories (24 versus 7) seems to support this hypothesis. Laboratories that charge for their services did not provide more services than those that did not charge. However, it is possible that these laboratories that charge would offer fewer services if they did not do so.

Prevention of most zoonoses in man depends on control in nonhuman reservoirs. Since proper medical care, including the fulfillment of diagnostic needs, is an essential element of disease control, the question of long-

term cost-effectiveness becomes an issue. The expenditure of a larger portion of resources in diagnosing zoonoses in nonhumans might be a wise investment.

It is unlikely that funds, equipment, or personnel will be diverted from one of these agencies to the other, but more public health laboratories might be encouraged to accept specimens from nonhuman sources. Although acceptance of specimens from nonhuman sources by public health laboratories has not reduced the duplication of services within a State, increased communication and collaboration between the public health and agricultural agencies within a State should result in improved health and reduced expenditures.

The data presented here suggest that a correlation exists, especially in State public health agencies, between the reporting that they require and the laboratory assistance that they provide. Whether this correlation represents a cause and effect relationship is debatable. If there is no causal relationship, perhaps greater intra-agency cooperation between the control divisions and the laboratory divisions is indicated.

The reasons that laboratories request that they be contacted before specimens are submitted are not clear, but it seems probable that the submission of unsatisfactory specimens is a common practice. If so, additional training within professional curriculums and continuing education programs are probably needed.

### References

1. Schnurrenberger, P. R., and Hubbert, W. T.: Reporting of zoonotic diseases. *Am J Epidemiol* 112: 23-31, July 1980.
2. Schnurrenberger, P. R., and Hubbert, W. T.: An outline of the zoonoses. Iowa State University Press. Ames, 1981.
3. National Animal Disease Laboratory: Directory of animal disease diagnostic laboratories, 1975. U.S. Department of Agriculture, Ames, Iowa, 1976.

## SYNOPSIS

SCHNURRENBERGER, PAUL R. (Auburn University), and HUBERT, WILLIAM T.: *Correlation between laboratory services and reporting requirements for selected zoonoses. Public Health Reports, Vol. 96, March-April, 1981, pp. 162-165.*

Questionnaires on the reporting required and the diagnostic services provided for selected zoonoses were completed by all departments of public health and all departments of agriculture in the 50 States. The

public health departments offered services for a larger number of zoonoses than did the agricultural agencies. The correlation between the required reporting of a disease and the availability of services for that disease was stronger in the case of public health laboratories.

All of the public health laboratories offered assistance with brucellosis and tularemia. The agricultural laboratories had services available for brucellosis in 47 States and for leptospirosis in 45 States. Fifteen

public health agencies and 11 agricultural agencies provided laboratory services for all the zoonoses that were reportable in their respective States. The public health laboratories in 12 States will test specimens from nonhuman patients.

Laboratory resources might be conserved by elimination of some of the duplication of services within a State that results when both the public health and agricultural agencies provide assistance for the same disease.