Minnesota Department of Health

Laboratory-Based Disease Surveillance

A Survey of State Laboratory Directors

JANICE R. GODES, M.P.H.;* WILLIAM N. HALL, M.D., M.P.H.;† ANDREW G. DEAN, M.D., M.P.H.‡ and C. DWAYNE MORSE, Dr. P.H.‡‡

Responses to a mail survey by 83% of the 262 clinical laboratories in Minnesota indicated that at least 28% of *salmonella* infections, 20% of *shigella* infections, 71% of *Haemophilus influenzae* meningitis, 58% of meningococcal meningitis cases, and 92% of pneumococcal meningitis cases are not reported through the present Minnesota Department of Health disease surveillance system.

Eighty-five percent of responding laboratory directors indicated that a laboratory-based surveillance system could be implemented without difficulty or would be only moderately difficult to implement, but practical thereafter. Laboratory directors described the principal disadvantages as related to time and cost demands. Eighty-two percent of the directors felt that patients and 60% felt that physicians would react positively or be indifferent to the reporting system, whereas 34% felt that physicians would react negatively to laboratory-based disease reporting. Most (93%) clinical laboratories responding would participate if laboratory-based surveillance were implemented. Laboratory directors preferred a voluntary to mandatory reporting system. A system of disease surveillance that allows, but does not require, reporting by laboratories or hospitals of findings suggestive of selected communicable diseases would probably be most effective.

THE ACUTE DISEASE EPIDEMIOLOGY Section of the Minnesota Department of Health (MDH) is responsible for surveillance of infectious diseases of public health importance at the state level. The primary purpose of infectious disease surveillance is to recognize and respond to situations that require public health action. Data are also gathered which provide current information on trends in infectious disease epidemiology.[1-3]

Current rules on reportable diseases in Minnesota place the primary burden of reporting solely on the attending physician.[4] The attending physician is required to report diseases of public health importance either by telephone or on a standard disease report card.

At present, 80% of the respondents in this survey send their *salmonella* and *shigella* isolates to the MDH Enteric Reference Laboratory for serotyping and confirmation. This constitutes essentially a laboratory reporting system by means of specimen referral. Also, it allows for surveillance of the distribution of specific serotypes in the state, so that clusters can easily be recognized and public health action taken if necessary.

The purpose of our survey was two-fold: (1) to determine the potential for improvement in the surveillance of diseases of public health importance by having clinical laboratories report microbiology and serology findings that suggest the diagnosis of a reportable disease and (2) to ascertain the feasibility of implementing a laboratory-based reporting system from the viewpoint of the clinical laboratory director.

Methods

Questionnaires were sent to all general hospital clinical laboratories included in the 1979 Directory of Licensed and Certified Health Care Facilities[5] in the State of Minnesota and all private clinical microbiology laboratories participating in the Clinical Laboratory Improvement Program at MDH in August 1979. A total of 178 general hospital clinical laboratories and 84 private clinical labs were surveyed.

Questionnaires were mailed in August 1979. A second mailing was sent to nonresponding laboratories in September 1979 followed by telephoning the remaining 90 nonresponding laboratories which was

*Student Intern, Graduate Student in Epidemiology, University of Minnesota, School of Public Health, Minneapolis. Currently, Epidemiologist, St. Paul Division of Public Health.

†Epidemiologist, Epidemic Intelligence Service Officer, Center for Disease Control, Atlanta, Georgia, assigned to the Minnesota Department of Health. Currently, Epidemiologist, Michigan Department of Health, Lansing.

‡Director of Disease Prevention and Control, Minnesota Department of Health.

‡‡Director of Medical Laboratories Division, Minnesota Department of Health.

Reprint requests to: Janice R. Godes, Epidemiologist, St. Paul Division of Public Health, 555 Cedar Street, St. Paul, Minnesota 55101.

completed in October 1979. The first and second mailings were accompanied by a cover letter explaining the study and requesting participation in the survey; a copy of the current rules for reporting communicable diseases in the State of Minnesota was included.[4]

The questionnaire included three sections. Section I asked the Laboratory Director's opinion regarding a possible regulation that laboratories report findings suggestive of communicable disease to MDH. The system as proposed suggested the reporting of age, sex, race, locality (city or counties), date of onset, diagnosis (or positive laboratory findings) and the name of the physician for each suspected case. The patient's name would not be reported initially to maintain the confidentiality of the patient-physician relationship. If follow-up by MDH was indicated, the attending physician would be contacted first for permission to follow up the patient. Section II pertained to computer facilities available for laboratory reporting. Section III concerned the microbiology and serology activities of the laboratory and included a question requesting the number of patients from whom specified pathogens had been cultured from cerebrospinal fluid, as well as the number of patients positive for *salmonella* or *shigella* in the six-month period January 1, 1979, through June 30, 1979. The number of patients positive within each diagnostic category was compared with the number of cases reported in the same time period through the present Minnesota surveillance system, to obtain an estimate of the potential improvement in the surveillance of these diseases if laboratory-based reporting was implemented and complete.

Results

The overall response rate was 83% (216/262); 84% of the hospital clinical labs and 79% of the private clinical labs completed questionnaires. There was no statistical significance in response rates between different geographic areas or among laboratories of large and small hospitals. Sixty-six percent of the total state clinical laboratories completed Section III of the questionnaire and therefore represents a conservative estimate of potential reporting impact (Table).

Currently, computer technology is not widely used by clinical laboratories in Minnesota. Only 11% (22) of the laboratories that responded to the survey enter laboratory results into a computer system now or proposed to do so within a year. Where computers are utilized, they are generally not programmed to provide epidemiologic data with specific laboratory results.

Although 62% (103) of the directors recognized little or no benefit to their laboratory from the proposed supplementary laboratory-based surveillance system, 49% (103) indicated that the system would not be difficult to implement in terms of resources and logistics. Fifteen percent (31) indicated that the system would be difficult or impossible to implement. When all respondents were asked to specify the principal drawbacks of the system from the laboratory point of view, 62% indicated time, "paperwork", or cost demands; 21% indicated there would be few or no drawbacks.

Eighty-two percent (150) of the 182 laboratory directors who responded to a question regarding the anticipated view of the patients they served indicated that they felt patients would feel positive or indifferent towards laboratory-based surveillance. Ten percent (18) felt patients would react negatively to the reporting system. Sixty percent (108) felt the physicians they served would feel positive or indifferent about the reporting system, whereas 34% (61) felt that physicians would react negatively to laboratory-based surveillance of reportable diseases.

Forty-two percent (87) of 206 respondents were in favor of a voluntary reporting system. The proposed

TABLE

Comparison of Number of Patients With Positive Cultures Reported by 173 Responding Laboratories With Cases Reported to the Minnesota Department of Health (MDH) January 1-June 30, 1979

Etiologic Agent	Number Identified by MDH Surveillance	Number of Patients Positive Reported By Responding Laboratories	Percent Not Reported
Salmonella spp.	181	250	28
Shigella spp.	66	82	20
Meningitides:	55	213	74
Haemophilus influenzae	41	141	71
Neisseria meningitidis	10	24	58
Streptococcus pneumoniae	4	48	92

mandatory reporting system was favored by 30% (62), whereas 21% (43) stated they would comply if a health department rule were enacted. Only 4% (8) would strongly oppose any involvement.

Discussion and Conclusion

The ability of state and local health departments to identify outbreaks of infectious disease and take action on a timely basis depends upon good surveillance. The data suggested a modest increase in reported cases of salmonellosis (38%) and shigellosis (24%) would be possible if a clinical laboratory surveillance system were implemented and reporting were complete.

Greater relative gains in reporting of cases would be possible for the bacterial meningitides. An estimated 158 additional cases of bacterial meningitis or an estimated 287% improvement is possible. An additional 14 cases of meningococcal meningitis and an additional 100 cases of *Haemophilus influenzae* meningitis, both of considerable public health importance, might have been reported through medical laboratory-based surveillance system (Table). The number of unreported cases is not surprising for *Haemophilus influenzae* meningitis. Prior to 1978, *Haemophilus influenzae* meningitis was regarded as largely noncommunicable. Since that time controversy has existed over efficacy of prophylactic antimicrobials for young contacts of *Haemophilus* meningitis cases.[6] Recommendations were recently published by the American Academy of Pediatrics for use of prophylactic antimicrobials for household contacts of Haemophilus meningitis cases.[7] Reporting continues to be important for meningococcal meningitis cases because antibiotic prophylaxis administered without delay to intimate contacts of a case has been demonstrated beneficial in reducing secondary cases.[8]

There are several advantages to laboratory reporting as a supplementary system for communicable disease surveillance. Since most physicians see reportable diseases infrequently, reporting is an unusual event. It requires remembering reporting procedures and searching for a telephone number or the proper report card. Because laboratories usually serve large numbers of patients and are more centralized, they encounter cases more frequently and could develop regular and systematic mechanisms for reporting those illnesses for which diagnosis is reliably confirmed in the laboratory.

Reporting by the laboratory with the physician's knowledge and agreement could save time and paperwork for the attending physician. The same convenience could be gained by assigning reporting of hospitalized patients with communicable diseases to the hospital epidemiologist. The attending physician would retain primary responsibility for reporting and continue to report diseases encountered outside the hospital, those in outbreak situations, and those for which the diagnosis is not regularly confirmed in the laboratory (e.g. measles).

A review of state health regulations revealed that twenty-five states presently have regulations requiring hospitals or laboratories to report findings suggestive of reportable communicable diseases. Four other states, including Minnesota, require laboratory reporting of only positive venereal disease tests.[9]

Improvements in the disease reporting system other than laboratory-based surveillance should be considered. Methods of increasing the frequency of reports of communicable diseases include toll-free telephone lines, prompt and effective response to reports by health departments, and various incentives such as provision of free medication or biologicals for prophylaxis of contacts. Thus, increasing the percentage of cases reported probably depends most on demonstrating to physicians that there are benefits to the physician and the patient and/or the community when a communicable disease is reported. A secondary problem — the rarity of reportable disease and the tendency to forget reporting procedures between cases could be partially overcome by supplementary reporting through hospitals and/or laboratories. If changes in reporting rules are made to facilitate such reporting, they must be viewed by the medical community as a convenience rather than an imposition. A system that allows, but does not require, laboratories or hospitals to report findings suggestive of selected communicable diseases would probably be most effective.

References

1. Brachman, P: Surveillance and the Primary Care Physician. Postgrad Med 62:2:86, 1977.
2. Center for Disease Control, Disease Surveillance, Dept. of HEW, U.S.P.H.S., Bureau of Training, Instructional Services Division, Atlanta, GA, January 1976.
3. Nahmias, AV, McCroan, J: A Community Surveillance System for Infectious Diseases in the Greater Atlanta Area, Am J Public Health, 56:3:408, 1966.
4. Minnesota Department of Health, Division of Disease Prevention and Control, Acute Disease Epidemiology Section, Minnesota Reportable Diseases, Minnesota Department of Health Regulation Number 316, 1975.
5. Directory of Licensed and Certified Health Care Facilities in the State of Minnesota, Minnesota Department of Health, 1979.
6. Ward, JI, Fraser, DW, Baroff, LJ, Plikaytis, BD: Haemophilus influenzae Meningitis: A National Study of Secondary Spread in Household Contacts. N. Engl J Med, 301:122, 1979.
7. American Academy of Pediatrics, Report of the Committee on Infectious Diseases, 19th edition, p. 106, 1982.
8. Jacobson, JA, Fraser, DW: A simplified Approach to Meningococcal Disease Prophylaxis, JAMA, 236:9:1053, August 30, 1976.
9. Minnesota Department of Health, Division of Disease Prevention and Control, Venereal Disease Unit, Reporting of Venereal Diseases, Minnesota Department of Health Regulations Number 326, 1976.

A Physician-P