



The Management and Use of Data on Maternal and Child Health and Crippled Children: a Survey

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Synopsis.....

With the advent of the Maternal and Child Health Services Block Grant, both maternal and child health programs and crippled children's (CC)

programs at the State level have assumed greater responsibility for identifying populations in need, planning appropriate services for them, and monitoring progress toward program objectives. To determine the capabilities of eight Southeastern States to produce and apply the data necessary to accomplish those tasks, a survey of data systems available to, and used by, perinatal and CC programs in the Southeast was undertaken.

Findings of the survey suggested that the data available to perinatal programs were more useful for planning and evaluation than those available to CC programs, primarily due to the vital statistics data systems in each State. The major data management needs of the region include (a) measuring the health status of populations served by public perinatal programs, (b) measuring services received by population groups considered in need of public perinatal care, (c) estimating the incidence and prevalence of handicapping conditions among children, and (d) measuring the outcomes of CC programs.

If these shortcomings are addressed, the programs will be in better positions for effective planning and evaluation. To improve data management and utilization capabilities, the programs may need to engage technical assistance and consultation from sources outside their service-oriented agencies.

IN THE PAST FEW YEARS, INCREASING importance has been attached to data requirements in the area of maternal and child health (MCH). A variety of data items and systems are needed at many jurisdictional levels for long- and short-term policy debates and to encourage informed management of MCH and crippled children's (CC) programs (1,2). Investigators have repeatedly found, however, that many necessary data items are not routinely available or accessible and that existing data systems are fraught with a variety of problems related to data quality, linkage capabilities, and consistency across geographic areas (3-6).

Several new efforts to generate appropriate data for policy decisions have been implemented in recent years (1). Relatively little emphasis has been given to the needs of State MCH and CC programs to generate the data required to plan, manage, and evaluate services. Yet these needs have become particularly critical since enactment of the Maternal and Child Health Services Block Grant (7), which assigned greater fiscal and managerial responsibilities to the States while greatly diminishing Federal reporting requirements.

State programs are required, however, to submit an annual report of intended expenditures and an

annual progress report. To comply with these requirements and make informed management decisions, State MCH and CC program directors should be able to respond to four fundamental questions:

- Which populations are in need of services?
- What services are available to those target groups?
- Are the populations at risk receiving the services they require?
- Are the services effective in improving the health status of the target groups?

To date, no systematic assessments of the capabilities of MCH and CC programs to generate the necessary data and to process the data in order to respond to these questions have been reported. To explore selected aspects of data management in eight Southeastern States (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee), a detailed survey of perinatal (that is, prenatal, intrapartum, postpartum, and neonatal), CC, and related data systems and data applications was undertaken. This survey was part of a larger project, the Region IV Network for Data Management and Utilization, which is supported by the Division of Maternal and Child Health, Bureau of Health Care Delivery and Assistance, Health Resources and Services Administration; the project exists to improve program planning and evaluation capabilities in the MCH and CC programs in Region IV, U.S. Department of Health and Human Services. The purpose of this paper is to report the major findings of the survey and discuss important implications for future data management and use in those programs.

Methods

Survey questionnaires were developed to assess

- the major characteristics of data systems available to perinatal and CC programs (for example, availability, computerization, quality, linkage capabilities, and mode and frequency of dissemination),
- capabilities for producing specific indicators of perinatal health status, perinatal health services, health status of CC program recipients, and health services delivered by CC programs,
- availability and use of incidence and prevalence data for conditions covered by CC programs, and

- planning and evaluation processes used by perinatal and CC programs.

To complete the questionnaires, appropriate statistical reports, program plans, and program descriptions were reviewed, and then key informants in each State were interviewed during 2 1/2-day site visits. On-site meetings were arranged with representatives of vital statistics agencies; health resource data systems; MCH, CC, and Women, Infants, and Children (WIC) Programs; genetics programs; Medicaid programs; special education services; and others, as appropriate.

After the inventories of the eight States were completed, a two-stage verification process was begun. First, telephone contacts were made to clarify specific points. Second, the completed questionnaires and a narrative summary were returned to each State for review and correction.

Findings

Perinatal and related data. With regard to perinatal and related data, the survey focused on the States' capabilities for producing selected indicators of perinatal health status and perinatal health services. To assess fully the States' capabilities for producing these indicators, certain characteristics of perinatal and related data systems were also examined.

Selected data system characteristics. To produce the indicators of interest, access to three types of data—vital statistics, census data, and service statistics—is required. These types of data, with specific data sets and the number of States with each set, are shown in table 1. Vital statistics are a major source of perinatal data in all States. For perinatal programs to use them effectively, access to live birth, fetal death, and infant death files as well as to a linked live birth-infant death file is required. At the time of the survey, all eight States had computerized, statewide live birth, fetal death, and infant death files. All States could link, or were in the process of linking, live birth and infant death files at least to 1 year of age, but the accessibility of these data to perinatal programs varied greatly across States.

Census data were also maintained by all States. Each State kept copies of all census publications as well as copies of the computer tapes. Seven States did population projections by age, sex, and race for each county in the State. Six of these States did the projections by year through at least 1990.

Table 1. Types of data and data sets¹ required to produce selected perinatal indicators and the number of States with each data set

Type of data and data set	Number of States with data set
Vital statistics:	
Live births	8
Fetal deaths	8
Infant deaths	8
U.S. census data (publications and tape) ..	8
Service data:	
Prenatal	8
Intrapartum	5
Postpartum	5
Newborn hospital	6
High-risk infant tracking	5
Sudden infant death syndrome	7
Women, Infants, and Children	8

¹ A data set was defined as information collected on a specific group of individuals, type of activities, or both for a set time period.

In the seventh State, projections by year were available on request but were routinely made in 5-year intervals. Three of the States projected age by year, with the remaining four States projecting age in 5-year groupings. The practice of using 5-year groups precluded calculation of perinatal indicators that required other types of age breakdowns. In all States, special computer runs of census data could be done for a fee but, in one State, they were very difficult to obtain.

The service data of greatest importance to perinatal programs are those generated by prenatal, intrapartum, postpartum, and family planning services, as well as WIC, newborn care, and infant followup care for high-risk newborns. Most States (6) did not have service data systems with common identifiers for all public health programs, although some had greater capabilities for yielding unduplicated counts within programs and linking across

Table 2. Number of States capable of and routinely producing selected perinatal health status indicators

Indicator	Indicator could be produced	Indicator was produced	Indicator was defined as proposed
Fertility-related rates for total population			
Fertility rate (number of live births to women 15–44 years ÷ number of women 15–44 years) × 1,000	8	7	6
Adolescent fertility rate I (number of live births to adolescents less than 15 years old ÷ number of female adolescents less than 15) × 1,000	8	5	4
High-risk pregnancy ratios for total population			
Educational risk ratio II (number of live births to women with less than 12th grade education ÷ number of live births) × 100	8	2	4
Previous fetal death ratio (number of live births to women with a previous fetal death ÷ number of live births) × 100	6	2	2
High-risk pregnancy ratios for population served			
Prenatal medical risk ratio (number of women served with prenatal medical high-risk conditions ÷ number of women served) × 100	3	1	0
Pregnancy weight gain risk ratio (number of women served who gained less than 20 or more than 30 pounds ÷ number of women served) × 100	3	1	0
Birth weight to gestational age ratios for total population			
Very low birth weight ratio I (number of live births, 1,001–1,500 grams ÷ number of live births) × 100	8	6	3
Preterm birth ratio I (number of live births, less than 37 weeks ÷ number of live births) × 100	8	1	2
Perinatal-related mortality rates for total population			
Fetal mortality rate (number of fetal deaths of more than 20 weeks' gestation or more than 500 grams ÷ number of live births and fetal deaths) × 1,000	8	7	2
Neonatal mortality rate (number of infant deaths up to 28 days ÷ number of live births) × 1,000	8	8	8

programs than others. In addition, seven of the eight States did not routinely link any service data to vital statistics (for example, birth) data. Therefore, it was impossible to produce many important indicators for the population served. Moreover, the information included in service data systems varied greatly across States, from registration data only at one extreme (one State) to detailed assessments of risk and progress throughout the perinatal period for the total population served at the other (two States).

Perinatal indicators. Information about perinatal data systems is of particular interest when considered in light of the capabilities of those systems to generate indicators for planning, evaluation, and other management purposes.

To assess the States' capabilities, 30 indicators of perinatal health status were proposed as stan-

dards for comparison. Table 2 shows selected indicators, proposed definitions, production capabilities, and whether the definitions were used. Included are indicators of fertility-related rates, high-risk pregnancy ratios, birth weight to gestational age ratios, and perinatal-related mortality rates. It is clear that the eight States could produce most of the indicators on table 2 but in many cases they did not produce them routinely. Although definitions used were often not consistent with proposed ones, the differences were minor.

When all 30 of the proposed indicators were reviewed, we found that 19 could be produced, but again, production had not been routine. Specific definitions used for the complete set of indicators again varied slightly across States. Eleven of the 30 indicators either could not be produced by the States or their definitions varied substantially from one State to the next.

Table 3. Number of States capable of and routinely producing selected perinatal health service indicators

Indicator	Indicator could be produced	Indicator was produced	Indicator was defined as proposed
Perinatal care for total population			
Percent with no prenatal care (number of live births in which mothers received no prenatal care in total population ÷ total number of live births) × 100.....	8	7	2
Percent with inadequate prenatal care (number of live births in which mothers received inadequate prenatal care according to Kessner Index (20) ÷ total number of live births) × 100	8	2	0
Percent of deliveries by cesarean-section (number of women who delivered by cesarean-section in total population ÷ total number of live births and fetal deaths) × 100	3	2	1
Percent of live births less than 1,500 grams delivered at level III hospitals ¹ (number of live births less than 1,500 grams delivered in level III hospitals ÷ total number of live births less than 1,500 grams) × 100.....	7	2	1
Percent home deliveries (number of live births and fetal deaths delivered at home ÷ total number of live births and fetal deaths) × 100	7	3	1
Perinatal care for target population			
Percent high-risk infants with appropriate care (number of high-risk infants in target population who received care at specified intervals—3, 6, 9, 12 months ÷ number of high-risk infants in target population) × 100	3	1	0
Percent with inadequate prenatal care (number of live births in target population in which mothers received inadequate prenatal care according to Kessner Index (20) ÷ number of live births in target population) × 100	0
Perinatal care for population served			
Percent screened for risk (number of pregnant women in the population served screened for high-risk conditions ÷ number live births and fetal deaths in population served) × 100	2	1	1
Percent with appropriate postnatal care (number of women in prenatal population served who received postpartum or family planning care within 2 months of delivery ÷ number of women in prenatal population served) × 100.....	4	0	...
Percent active family planning clients (number of women in prenatal population served who had a family planning visit at 1 year postpartum ÷ number of women in prenatal population served) × 100.....	5	0	...

¹ Each State in Region IV used different criteria to identify hospital levels. No effort was made to standardize these criteria across States.

Twenty-nine indicators of perinatal health services (that is, services received in pregnancy and through the first year of life) were also proposed. Table 3 shows selected indicators of perinatal care for the total population, the target population, and the population served. While most States could produce the selected indicators for the total population, they were not producing them routinely nor were the definitions completely consistent with the proposed ones. Some indicators require linkages across data sets, and in several cases, the necessary linkage capabilities did not exist. For example, the States in the Southeast tended to estimate the size of their perinatal target groups from poverty data in census reports. But income and financial data were not included on birth certificates or in most perinatal service data sets, so most indicators of the services received by target populations, such as the measure of inadequate prenatal care shown in table 3, could not be produced.

CC and related data. Emphasis in the CC sections of the inventory was given to determining the availability of (a) incidence and prevalence data for handicapping conditions covered by CC programs and (b) indicators of CC program outcomes.

Incidence and prevalence data. All CC programs had few incidence data, prevalence data, or both available, and most of the data that were available were considered unsatisfactory, partly because they were derived from dated national sources or localized studies. The majority of respondents indicated that current, State-specific and age-specific data for diagnoses under the International Classification of Diseases, Ninth Edition, would be of major assistance to the planning of CC programs.

Indicators of CC program outcomes. Our efforts to identify measures of CC program outcomes were directed at two levels: the health status of program recipients and the health services they received.

With regard to health status indicators, three questions were asked. They were designed to determine whether health status data were collected by the CC service data systems at entry to or discharge from CC programs. Those questions and a summary of responses are shown in table 4.

The table shows that seven States collected, or would soon begin to collect, indicators of client diagnosis at entry to the CC program (question 1). In two of these States, however, collection was considered sufficiently incomplete to limit the usefulness of this information.

With regard to indicators of functional status, virtually no State was collecting them at entry to or exit from the CC program for any condition. In fact, there was only one exception to a totally negative finding. In one State, Denver Developmental Screening Test results were recorded on children with cerebral palsy, and Bayley Test scores were recorded on clients with spina bifida at both entry and discharge.

To determine whether CC programs could produce and use any indicators of health services to measure outcomes, questions about four sets of measures, each set addressed to a particular problem and age group, were asked. The four problem area or age group combinations were (a) infant metabolic diseases (phenylketonuria [PKU] and hypothyroidism), (b) infant development, (c) preschool hearing, and (d) preschool development.

The indicators and the capabilities of CC programs to produce them are shown in table 5. As the table demonstrates, each set of indicators was designed to represent a progression of health

Table 4. Number of States with selected indicators of crippled children's (CC) program outcomes

Question	Responses for all conditions covered by program were "yes"	Response scheduled to change from "no" to "yes" in near future	Most responses were "no" but some exceptions	Responses for all conditions covered by program were "no"
Are indicators of client diagnosis (for example, cerebral palsy) collected at entry to the CC program?.....	5	2	0	1
Are indicators of functional status (for example, IQ scores) collected at entry to the CC program?.....	0	0	1	7
Are indicators of functional status collected at discharge from the CC program?.....	0	0	1	7

service activities from screening, to suspected problem, to confirmed diagnosis, to treatment. Hence, the latter three indicators in each set may be considered a health service outcome of the activity mentioned in the numerator of the preceding indicator. Important findings are highlighted subsequently.

Several data sets would be required to produce the indicators. For each set of indicators, a program-specific (service) data set (for example, metabolic screening) would be necessary. Production of some indicators (for example, percent preschoolers assessed for development) would also require child health service data and census data. As indicated, census data were available in each State. Each State also had a system for collecting data on child health services and CC services,

while six States had developmental disability data systems.

While most States had the necessary data sets available, there was great variation across States in the items included and linkage capabilities. As a result, none of the indicators could be produced by all States, and most of those that could be produced were found in only four or five States. In addition, States that were capable of producing certain indicators had rarely done so. No systematic information to explain this finding was collected, but informal discussions suggested that, in some situations, data were considered so incomplete or inaccurate that it would be misleading to base indicators on them.

Table 5 also shows that some States were capable of producing selected indicators for sub-

Table 5. Number of States capable of and producing selected indicators of crippled children's and related services

Indicator	Selected subpopulations			
	Could produce indicator	Has produced indicator	Could produce indicator	Has produced indicator
Infant metabolic conditions				
Percent infants in State screened for phenylketonuria (PKU)	4	3	0	0
Percent screened infants with confirmed diagnosis of PKU	7	6	1	1
Percent infants diagnosed with PKU having treatment initiated within 3 weeks	7	5	1	1
Percent infants screened for hypothyroidism	4	3	0	0
Percent screened infants with confirmed diagnosis of hypothyroidism	6	6	1	1
Percent infants diagnosed with hypothyroidism having treatment initiated within 5 weeks	6	4	1	1
Infant development, ages 0-1				
Percent infants assessed (screened) through State health system	5	1	2	0
Percent infants in target population assessed (screened) through State health system	5	0	3	0
Percent infants assessed with identified-suspected (screened positive) problem	4	1	3	0
Percent infants with confirmed positive diagnosis	0	0	5	0
Percent infants receiving treatment	0	0	5	0
Preschool hearing, ages 1-4				
Percent preschoolers assessed (screened) through State health system	4	1	1	0
Percent preschoolers in target population assessed (screened) through State health system	4	0	2	0
Percent preschoolers assessed with identified-suspected problem (screened positive)	5	0	1	0
Percent preschoolers with diagnosis confirmed positive	0	0	5	0
Percent preschoolers receiving treatment	0	0	5	0
Preschool development, ages 1-4				
Percent preschoolers assessed (screened) through State health system	4	1	2	0
Percent preschoolers in target population assessed (screened) through State health system	4	0	3	0
Percent preschoolers assessed with identified-suspected problem (screened positive)	5	1	1	0
Percent preschoolers with diagnosis confirmed positive	0	0	5	0
Percent preschoolers receiving treatment	0	0	5	0

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groups (for example, Early and Periodic Screening, Diagnosis, and Treatment [EPSDT] recipients and children who stay within the State health system for services) but again, in most instances where this capability existed, it had not been applied.

On a more positive note, however, capabilities for producing indicators of infant metabolic screening and subsequent services were more fully developed. Three States could produce all of the metabolic indicators, and four additional States could produce two or more of them. The eighth State was in the process of developing a statewide metabolic screening program; as a result, many of the indicators could not yet be produced in that State.

Particularly striking in this analysis was the lack of ability of any State to produce the indicators involving confirmed diagnosis and treatment for developmental and hearing problems. This observation indicates that where referral-feedback systems (to and from other providers) existed, this important information was not being entered into a data system. It further suggests that referral-feedback systems may not have been in place in some States.

Program planning and evaluation. Production of useful indicators is fundamental to perinatal and CC program planning and evaluation. Neither of these important management activities, however, can be accomplished solely on the basis of good data. The models, or frameworks, that guide the process are also critical.

Program planning. The planning processes used by perinatal and CC services in the Southeastern States are constantly changing. In the 2 years before the survey, all of the States had made some changes in the planning frameworks most frequently used. The frameworks could be characterized in a variety of ways but our major interest was the extent to which a framework was

“problem-oriented” as opposed to “program-oriented.” For this study, a planning process was considered problem-oriented if it required careful analysis of health problems and development or adjustment of services to address determinants of those problems. A process was considered program-oriented if it primarily involved a matching of services with financially eligible population groups, in the absence of routine assessments of health problems. No State exercised a purely problem- or program-oriented planning strategy. In the perinatal area, there was a great deal of variation along the continuum. Four States tended to be committed to analyzing perinatal problems and adjusting services accordingly at regular intervals, and the remaining four were more likely to apply a program-oriented approach.

In the CC area, planning capabilities were much more limited, primarily because of data deficiencies. That is, State-specific incidence and prevalence data, which are essential to identifying population needs, were rarely available. Moreover, with a few minor exceptions, the States' information systems were not capable of producing indicators of health status (other than diagnosis) at entry to CC programs or at discharge from them. As a result, staff of the CC programs could not determine whether the functional status of their handicapped patients had improved.

Program evaluation. Program evaluation, in the form of monitoring the delivery of services, was conducted in all perinatal and CC programs. However, the more complicated and expensive assessments of program effects had been carried out on a very limited basis.

Comparative evaluations of the impacts of perinatal programs had been conducted in five of the eight States (8-14). When considered in light of the number of perinatal programs administered by the MCH agencies, however, these few studies reflect a modest level of evaluation.

In our assessment of the outcomes of CC services, the programs were again severely constrained by data deficiencies. Consequently, no programs had objectives that specified levels of achievements for health status indicators.

Discussion

Perinatal and CC program staff should be able to determine population needs for services, identify target groups, monitor the delivery of services to those groups, and assess changes in their health

status. The purpose of this survey was to determine the capabilities of eight perinatal and eight CC programs in the Southeast to generate and apply the data necessary for those tasks. The findings suggest strong capabilities in some areas, while others would benefit from improvement.

Overall, the data-related capabilities of perinatal programs are more developed than those of CC programs, due largely to the existence of well-organized vital statistics data systems in every State. Nevertheless, some aspects of perinatal data management could be improved. For example, actual production of most of the perinatal health status indicators was extremely limited. This finding suggests that many programs and State data units suffer from shortages of financial and human resources, inadequate (data-related) education of existing personnel, and incomplete appreciation of the potential of existing data sources, especially vital statistics, by decisionmakers.

Indicators that document the extent to which a target population has received perinatal services were not produced by any of the surveyed States. Moreover, no comprehensive indicator of need for perinatal services, analogous to the indicator of need for family planning services (15), has been developed. An approach such as that developed by Payne and Strobino (16) for measuring need for maternity care through education data on birth certificates might be useful to perinatal program managers. Prenatal care data on birth certificates could also be examined to determine how many of those in need (by virtue of educational attainment) started care early and made an adequate number of visits.

As indicated, the capabilities of perinatal service data systems varied greatly across States. While conformity among those data systems is not necessarily an appropriate goal, it would be helpful, for program management purposes, to identify certain key indicators, like some of those in table 3, for which perinatal programs now with limited capabilities could aim.

The findings of the survey suggest that the data available to CC programs are limited. But, several options for improvement are worthy of consideration.

To plan for CC services, managers need to know how many children with specific handicaps are in the State and how many are eligible for CC services. State-specific estimates of incidence and prevalence rates could be calculated from national rates or rates derived from special studies. Although estimates are fraught with the limitations

of the data sets from which they are derived (17, 18), careful consideration of those limitations can lead to adjusted rates, tailored to some of the major characteristics and eligibility criteria of each State.

Those States with statewide surveys and hospital discharge data sets may be able to derive more accurate State-specific rates. Relevant questions could be added to survey forms to estimate the prevalence of certain conditions. In the States with access to hospital discharge data, estimates of newborn anomalies could be calculated with far greater accuracy than from birth certificates alone.

With regard to measuring outcomes of CC programs, opportunities for improvement are also apparent. A marker of recent progress is the finding that seven States include an entry for diagnosis in their CC service data. This information, new to some States, is invaluable to program management and can contribute to the development of measurable objectives. For assessing outcomes, however, diagnostic categories are less useful because many of the services provided by CC programs cannot cure handicaps. Rather, interventions are designed to improve or prevent deterioration of functional capabilities. Clearly, the development of indicators of functional status of the child and family that are based on accurate, easily applied, and relatively inexpensive clinical assessments is essential for evaluations of the effectiveness of intervention strategies for chronically ill children. Without this kind of information, progress in the development of effective CC services will continue to be undocumented and delayed. In fact, we have discovered that States are eager to identify methods that will yield such information.

But the development of indicators of functional status will require a great deal of time and effort. Although every effort should be made to move with haste to develop and apply them, a short-term approach to assessing outcomes indirectly may be found in the construction of indicators that reflect client progress through the appropriate sequence of services, such as those shown in table 5. This approach is more immediately attainable for the States that participated in this survey. In most of those States, a successful effort to produce these types of indicators would require improving data collection and verification efforts. Since the metabolic indicators seem to be better developed than other indicators but still in need of improvement in some States, perhaps they might be a useful starting point.

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Improvements in the data management capabilities of perinatal and CC programs can contribute substantially to program planning and evaluation. However, unless the data are applied within frameworks that are problem-oriented (for planning) and comparative (for at least some evaluations), the degree of improvement in planning and evaluation capabilities will fall short of the potential.

The program-oriented end of the planning continuum permits some problems to remain unnoticed, or unaddressed, or both, and it can also allow recognized problems to be inadequately addressed by interventions that are no longer relevant. In general, the perinatal programs have, or can access, the data necessary to support problem-oriented approaches. With regard to CC programs, immediate needs for more and better data must be met before any major effort to improve CC planning processes can be undertaken.

The conduct of several comparative evaluations suggests that the technology is available, albeit not optimal (12), for carrying out controlled assessments of perinatal programs. Applying this technology to all perinatal programs may not be an appropriate use of resources. But since information regarding program effects is so useful for decisionmaking, perinatal programs could be selected for controlled evaluations on periodic bases and according to specified criteria (for example, size of program, "evaluability" [19]) appropriate to each State.

This survey has demonstrated some specific capabilities of perinatal and CC programs in eight States to collect, analyze, and use data. For these programs to exercise their responsibilities for ongoing management and Federal accountability, their data management capabilities should be developed more fully, and the data-related problem areas need to be addressed. In view of the

financial constraints and service orientations of the programs, it is unlikely that individual States will be able to address these issues internally. They may find it necessary to explore outside opportunities for financial support, expert consultation, and continuing education.

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Premarital Rubella Screening Program: from Identification to Vaccination of Susceptible Women in the State of Hawaii

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Synopsis

Premarital rubella screening programs are effective in identifying women of childbearing age who are susceptible to rubella. There is concern, however, that once identified, susceptible women may not be subsequently vaccinated. Therefore, a study was conducted to test the effectiveness of a motivational letter mailed at the time of serologic testing. Rubella-susceptible women identified by a premarital screening program were randomly divided into two groups: one group of 134 received a motivational letter and one group of 143 did not.

Three months later, 52 percent of the women in the motivational group had been vaccinated, compared with only 24 percent ($P < 0.05$) of the women in the control group. In this study, a motivational letter was found to lead to a significant increase in rubella vaccination rates among susceptible women. With the increasing emphasis on rubella vaccination programs for adult women, active approaches are necessary to identify and vaccinate susceptible women.

UNTIL RECENTLY, RUBELLA VACCINATION in the United States has been aimed primarily at children. Vaccination of the most critical target group—women of childbearing age—has had only secondary emphasis. This has been largely due to the

concern about inadvertent vaccination of pregnant women and possible untoward effects of the vaccine virus on the developing fetus. Although vaccination of children has resulted in reduced transmission among school children and has fore-