

The Nationwide Evaluation of Fetal and Infant Mortality Review (FIMR) Programs: Development and Implementation of Recommendations and Conduct of Essential Maternal and Child Health Services by FIMR Programs

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Objective: An evaluation of fetal and infant mortality review (FIMR) programs nationwide was conducted to characterize their unique role in improving the system of perinatal health care. The aim of this paper is to examine intermediate outcomes of the FIMR, in particular the development and implementation of recommendations produced by the FIMRs and the conduct of essential MCH services by the FIMRs. *Methods:* We report on 74 FIMRs whose communities were selected for the nationwide evaluation and for whom we had data from the FIMR director or comparable respondent. We focus on the recommendations of the FIMRs and the essential maternal and child health (MCH) services conducted by the FIMRs as intermediate outcomes (or outputs) and then examine how selected characteristics of the FIMR may influence these. *Results:* FIMRs developed recommendations on a broad range of topics but there were some areas for which nearly all programs had developed recommendations. The FIMRs relied primarily on strategies related to programs and practices, with few FIMRs reporting attention to policy-oriented approaches. Implementation of recommendations was high. Factors that influenced likelihood of implementing recommendations and conduct of essential MCH services included structure of the FIMR and training received by FIMR directors and staff. *Conclusions:* The focus of FIMR recommendations and the likelihood of implementation vary across FIMRs as does the conduct of essential MCH services. FIMR team structure and training of the director and staff are important areas to consider in efforts to maximize the impact of FIMR.

KEY WORDS: fetal and infant mortality review program; essential maternal and child health services; evaluation; local health department; recommendations.

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INTRODUCTION

A key component of fetal and infant mortality review (FIMR) is the development of recommendations based on review of fetal and infant deaths. Few

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studies have examined recommendations produced by this process (1, 2). The recommendations generated by FIMR, however, are not necessarily the only product of potential interest. Viewing FIMR broadly as one of many perinatal systems initiatives leads to a consideration of intermediate “process” outcomes, or outputs, that may be carried out by the FIMR but are not specific to the FIMR methodology. The Institute of Medicine public health functions framework has been operationalized in the area of maternal and child health [MCH (3)], and the derived essential MCH services (EMCHS) also may be conceptualized as outputs of FIMR (4). In this paper, we will focus on the activities of the FIMRs, in particular the development and implementation of recommendations and the performance of essential MCH services.

FIMR programs bring together community members to review information from individual cases of fetal and infant death, in order to examine the social, economic, cultural, safety, and health systems factors that are associated with them (5–10). On the basis of reviews of fetal and infant deaths, FIMRs make recommendations for interventions and policies that address these factors, participate in or facilitate the implementation of the recommended strategies and policies, and assess their progress (9). The recommendations are a tangible “product” of the FIMR process. In the “cycle of improvement” espoused by FIMRs using the National FIMR (NFIMR) Program model (9, 10), this “product” would be identified as an important process output in achieving progress toward the goal of reducing fetal and infant mortality. However, the development of the recommendations is not the point at which the FIMR cycle concludes. The cycle of improvement explicitly calls for implementation of new policies, practices, and/or programs to effect change in the community systems (9). Recommendations of FIMRs have previously been examined and discussed but implementation has not been systematically assessed in prior studies (1, 2, 5–7, 11–13). Based on the Johns Hopkins University (JHU) national FIMR evaluation, this study provides insight into the nature of the recommendations developed by FIMRs and their implementation, as well as identifying characteristics of the FIMR programs that may influence implementation.

The extent to which FIMR programs directly carry out public health functions, operationalized as essential MCH services, has not been explored in previous studies of FIMR. FIMR program activities are likely to reflect public health functions, as the FIMR process involves a number of these, including data as-

essment and analysis, policy development, and providing information and education for the public. In the current study, this output also is examined, and variation in FIMR performance of essential MCH services is studied.

The analysis of the FIMR programs for this paper complements the approaches taken in the accompanying papers by Strobino *et al.* (14) and McDonnell *et al.* (15). Unlike those analyses, however, this paper uses a within-group analysis to study the impact of FIMR. The variation in public health functions measured as essential MCH services can be compared across programs [FIMR vs. other perinatal systems initiatives) (15)] or by community according to the presence of the programs (14). However, the development and implementation of recommendations of the FIMR program do not have valid parallels in other perinatal systems initiatives and therefore cannot be compared between programs. In addition, using a within-group analysis of FIMR programs enabled us to examine whether outputs differed by factors measured specifically for the FIMRs. If the sum of the evidence from the nationwide evaluation points to FIMR as a useful strategy for improving perinatal health, such an analysis may suggest predictors of effectiveness.

METHODS

The information provided within this article is primarily derived from data gathered in telephone interviews of FIMR program directors, one component of the national evaluation (4). The FIMR questionnaire was designed to obtain information about the features and outputs of FIMR programs. It was developed with input from federal and state MCH staff, NFIMR representatives, and other consultants, including research colleagues and local FIMR directors/coordinators. The time frame for the questions was the previous 4 years. Qualitative as well as quantitative data were collected and analyzed. The FIMR director or a knowledgeable informant was contacted for each of the 88 eligible FIMR programs over a 6-month period (March to August 2000). Hereafter, the respondents are generically referred to as the “FIMR directors.” Telephone interviews with FIMR program directors were completed with 84% ($n = 74$) of eligible programs.

Roles and attributes identified by the JHU FIMR evaluation’s Technical Advisory Group as representative of FIMR were nearly universally espoused by

the FIMRs in our sample (data not shown). The high degree of concordance with these roles and attributes for our sample increases the generalizability of our findings. Although we refer to the reviews generically as FIMRs, 35% of the respondents identified their reviews as infant mortality reviews, while the remainder (65%) considered their review to be a fetal and infant mortality review. More than half of all FIMRs investigated over 90% of their cases of fetal and infant mortality. For programs that did not review all fetal/infant deaths, cases were chosen based on a restricted (such as by geographic area) or random sample of cases.

Nearly half of the FIMR programs (45%) concurrently participated in child fatality reviews, 15% additionally participated in maternal mortality reviews, and 30% in combined reviews (most of which were combined child fatality and infant mortality reviews). The FIMR was frequently the entity responsible for implementing the other reviews in which it participated.

Methods are presented in five sections: characteristics of the FIMR programs in our sample; outputs (development of recommendations, implementation of recommendations, performance of essential MCH services); and assessment of the variation in outputs by FIMR characteristics.

FIMR Characteristics

We collected extensive data on the characteristics of the FIMR programs in our sample, including their structure and processes. We identified the potential relevance of these factors on the basis of both the expertise of public health professionals having substantial experience with FIMR [i.e., TAG, NFIMR staff, and directors of Healthy Start FIMRs (2)], and the published literature specific to collaborative community partnership interventions (16, 17). Factors hypothesized a priori to be related to the outcomes of interest include organization of the FIMR structure and training of the FIMR director and staff.

To investigate the FIMR structure, respondents were asked to categorize each of their FIMR teams as case review, community action, joint, or other. FIMRs with separate case review and community action teams are referred to as two-tier programs, while FIMRs with a single team are referred to as one-tier programs. In two-tier programs, the review of cases and development of recommendations is accomplished by one team [case review team (CRT)], while the development of strategies for implement-

ing the recommendations is the responsibility of the other team [community action team (CAT)] (9).

Training was examined separately for the FIMR director and FIMR staff. Three specific areas of training were queried: 1) perinatal health and/or infant mortality; 2) using case review findings; 3) implementing recommendations.

Development of the Recommendations

The approach to the assessment of FIMR recommendations was based on experience studying the FIMRs implemented through Healthy Start programs (2). FIMR directors were asked to describe the four most important FIMR recommendations developed within the 4 years prior to the time of the interview. In addition to assessing the four “most important” recommendations, FIMR directors were also asked about 10 specific content areas: multiple pregnancies; infections during pregnancy; domestic violence; monitoring of maternal complications; prenatal care; family planning; SIDS; very low birth weight; smoking; and substance abuse. We selected these factors for inquiry based on expert opinions (1, 2) as well as substantial research establishing them as important in fetal and infant mortality.

Implementation of the Recommendations

FIMRs might achieve improvements in perinatal health without implementation of their recommendations, such as through changes that individual FIMR members might undertake as a result of their experience with FIMR. However, the most direct and frequently cited mechanism for achieving systems changes through FIMR is through the development and implementation of recommendations. Although implementation is a critical outcome, it is difficult to study with no well-established measurement scales (16–22). However, in a previous evaluation of Healthy Start FIMRs (2), elements upon which an assessment of implementation could be based were identified. In the national evaluation of FIMR programs reported on here, we included open-ended questions about implementation as well as directed questions about key components of implementation, to enable us to determine the extent of implementation.

For each of the four “most important” recommendations, FIMR directors were asked to provide information about their strategies for implementation,

including a description of the strategies, who was responsible for taking action, and who was targeted to be affected by the strategies. Taking a systems perspective, these strategies were analyzed according to whether they focused on programs, practices, or policies as characterized here:

Program: Focuses on a group or subpopulation and/or on a set of activities. Includes the development and implementation of services.

Practice: Focuses on interventions directed at individuals. Examples would be standards for clinical care, protocols, and new treatments.

Policy: Focuses on groups/populations. Includes legislation, regulation, financing/budget initiatives, and/or governmental guidelines.

For each recommendation, we also gathered information about what happened as a result of the strategies and which strategies seemed to be effective. We categorized a recommendation as “implemented” if identified action strategies had been initiated. Implementation was considered to be “in process” if efforts to initiate identified strategies were underway. Recommendations were denoted as “not implemented” where the strategies were never initiated or were unsuccessful.

As noted earlier in the section *Development of Recommendations*, all FIMR directors were also asked about 10 specific content areas in which they may have developed recommendations. If the topic was reported to have been discussed by the FIMR, the FIMR director was then asked whether the FIMR had developed recommendations about the topic and, explicitly, if those recommendations had been implemented. As all FIMRs answered questions about these 10 areas, this provides an opportunity to examine implementation in a consistent manner across all sites in contrast with the questions relating to the four recommendations each FIMR deemed as “most important.”

On the basis of these data, we created two distinct “implementation of recommendations” variables. First, the percentage of the four “most important” recommendations coded as fully implemented was computed (see earlier in this article for definitions). This was available for 67 (91%) of the 74 FIMRs. The advantage of this outcome measure is that it inherently takes account of the variability in FIMRs and their focus.

We also created a variable representing implementation that would be consistent across all FIMRs

by using the responses to questions about the 10 specific content areas (listed earlier). Of the 74 FIMRs for which we have interview data on the variables studied here, 65 (87.8%) reported developing recommendations in at least one of the 10 areas. The specific outcome variable created was defined as the percentage of the 10 topic areas in which recommendations were developed for which implementation was reported (10 topics variable).⁶

Essential MCH Services

Finally, in addition to examining implementation of recommendations, we explored the degree to which FIMR programs engaged in performance of public health functions, operationalized as essential MCH services in five areas as reported by the FIMR director. These five essential MCH services were data assessment and analysis; community partnerships and mobilization; quality assurance and improvement; policy development; and informing and educating the public. These data were available for 69 of the 74 FIMRs for whom we had interview data (93%). We selected these five essential services making the assumption that they were the most germane to the factors examined. Activities identified within each essential MCH service were summed for the comparisons.

Variation in Outcomes by FIMR Characteristics

We examined the distribution of FIMRs with regard to the implementation and essential MCH services outcomes, and then determined whether selected characteristics of the FIMR may influence these outcomes. Quantitative variables were generally analyzed using basic descriptive statistical methods. Where we sought to determine differences in continuous outcomes (e.g., proportion of recommendations implemented; mean number of essential MCH services activities conducted) by FIMR structure or training, we used a *t* statistic (23). Comparisons of differences in dichotomous outcomes were tested for statistical significance using a chi square statistic (24).

⁶For example, a FIMR might report developing recommendations in 8 of the 10 areas and implementation in 6 of these 8. Therefore, 75% of the areas in which recommendations were developed also had implemented recommendations in those areas.

RESULTS

Results are presented in five sections: characteristics of the FIMR programs in our sample; outputs (development of recommendations; implementation of recommendations; essential MCH services); and variation in outputs (i.e., recommendations, and essential MCH services) by FIMR characteristics.

FIMR Characteristics

Table I describes characteristics of the communities, respondents (FIMR directors), and programs. The most common administrative home for the FIMRs in our sample was within the local health department. A wide array of funding sources for FIMR was cited and funding start dates ranged from 1978 to 1999, with most FIMRs (85%, *n* = 63) reporting that their funding started in the 1990s. More than three quarters of FIMR directors reported that funds were sufficient for case review more than half of the time (data not shown). This contrasts sharply with perceived sufficiency of funds for promoting implementation (36%) or monitoring (31%) of recommendations.

Table II describes the FIMR program characteristics that were hypothesized to influence either implementation of recommendations or conduct of essential MCH services by the FIMR. The most common team structure was separate CRTs and CATs (two-tier FIMRs). FIMRs with “other” structures were excluded from further analyses of team structure. With regard to training, most FIMR directors reported having obtained training in perinatal health and/or infant mortality and were likely to report that their staff had as well. Most FIMR directors also reported having obtained training in “how to use case review findings” but far fewer respondents reported that their staff had done so. Finally, while many directors and staff reportedly obtained training in “strategies for implementing recommendations or action agendas,” percentages were lower than for the other two areas of training.

Development of Recommendations

Of the 296 potential recommendations (four requested per respondent), 231 were reported for all respondents combined. Five perinatal health concerns were most frequently the topic of recommen-

Table I. FIMR Characteristics: Community, Respondent, and Program Characteristics (*n* = 74)

FIMR characteristics	Percent	(<i>n</i>)
Community characteristics		
Geographic region		
Northeast	24	(18)
Southeast	35	(26)
Midwest	11	(8)
West	30	(22)
Population size city/county area		
1 million or more	18	(13)
250,000–999,999	32	(24)
20,000–249,999	27	(20)
<20,000	9	(7)
District or region		
Other	12	(9)
Other	1	(1)
Community’s perinatal systems initiatives (PSI)		
FIMR only	49	(36)
FIMR and another PSI	51	(38)
<i>FIMR director (respondent)</i>		
Highest educational degree		
Associates or Bachelor	38	(28)
Masters degree	46	(34)
Doctoral degree	16	(12)
Public health training		
Advanced training in public health	34	(25)
<i>FIMR program characteristics</i>		
Duration of FIMR program		
1–3 years	31	(23)
4–6 years	31	(23)
7 or more years	38	(28)
FIMR operational ^a when data collected		
Yes	84	(62)
No	16	(12)
Source of funding (as many as apply)		
Federal	32	(24)
State	59	(44)
Local	18	(13)
Foundation	5	(4)
Other	4	(3)
FIMR Cases Reviewed per Year		
Range	4–200	
Mean	39	
Median	28	
Time Between Death and Review of Case		
Median	4 months	
Administrative Home of FIMR		
Local health department	65	(48)
Local community organization	12	(9)
Healthy Start	8	(6)
Other	8	(6)
Hospital	7	(5)

^aSurvey question “Is it still in operation?”

dations developed by the sample of FIMRs: SIDS (16%); prenatal screening and care (13%); bereavement support (10%); high-risk women (8%); and preterm labor (8%). Combined, these five topic areas were the subject of 55% of the total number of

Table II. FIMR Program Characteristics Hypothesized to Influence Outcomes

FIMR program characteristics	Percent	(n)
Organization of FIMR programs (n = 74)		
Separate CRT and CAT	49	(36)
CRT only	23	(17)
Joint CRT and CAT	22	(16)
Other	7	(5)
Participated in training in perinatal health and/or infant mortality (n = 69)		
Director	86	(59)
Staff (most) ^a	80	(55)
Participated in training in “how to use case review findings” (n = 69)		
Director	83	(57)
Staff (most) ^a	58	(40)
Participated in training in “strategies for implementing recommendations or ‘action agendas” (n = 69)		
Director	72	(50)
Staff (most) ^a	54	(37)

^aQuery asked about “most of the staff” as number of staff varied considerably.

reported recommendations. These same five topic areas were also those for which the highest proportion of respondents developed at least one recommendation. Recommendations related to adolescent pregnancy, domestic violence, genetic risks, preconceptional/interconceptional care, and nutrition also were reported, but less often.

We next determined the focus of each recommendation: program, practice, or policy change (Table III). While nearly all respondents reported at least one strategy that was “program” oriented (n = 64, 96%) and more than half reported at least one strategy that was “practice” oriented (n = 41, 61%), relatively few reported at least one policy-oriented strategy (n = 9, 13%) among their top four recommendations. For most topics, the main strategy was program oriented, particularly for the most frequently reported topics. For several topics, such as recommendations related to medical records or genetic risks, the most common strategy was practice oriented.

FIMR directors were also asked about discussion, development of recommendations, and implementation of recommendations as related to the 10 specific content areas. Table IV describes these results with the topics listed in descending order of frequency. The vast majority of the FIMR directors indicated that their teams had discussed all 10 topics listed, with prenatal care, substance abuse, SIDS, and smoking discussed by more than 90% of the FIMRs in our sample. Aside from multiple pregnancies, most of the topics that had been discussed led to the formulation of recommendations. Family planning, SIDS, and prenatal care were the leading topics for recommendations when these topics were reported to have been discussed in FIMR team meetings (Table IV).

Table III. FIMR Recommendations by Focus of Strategy (Policy, Program, ractice)

Topic	Recommendations	Practice % (n)	Program % (n)	Policy % (n)	None % (n)
SIDS	37	10.8 (4)	86.5 (32)		2.7 (1)
Prenatal screening and care	30	43.3 (13)	53.3 (16)	3.3 (1)	
Bereavement support	23	21.7 (5)	69.6 (16)		8.7 (2)
High risk women	19	26.3 (5)	63.2 (12)	5.3 (1)	5.3 (1)
Preterm labor	18	16.7 (3)	83.3 (15)		
Multiple issues of infant mortality	12	8.3 (1)	91.7 (11)		
Service coordination	8	62.5 (5)	37.5 (3)		
Fetal movement monitoring	7		85.7 (6)		14.3 (1)
Smoking	7	28.6 (2)	57.1 (4)	14.3 (1)	
Substance abuse	7	71.4 (5)	14.3 (1)		
Family planning	7	42.9 (3)	42.9 (3)		14.3 (1)
Insurance coverage	7	42.9 (3)	28.6 (2)	28.6 (2)	
Infections	5	20.0 (1)	60.0 (3)	20.0 (1)	
Medical records/vital records	5	80.0 (4)	20.0 (1)		
Fetal/infant safety	4	25.0 (1)	75.0 (3)		
Nutrition	4	50.0 (2)	25.0 (1)	25.0 (1)	
Fimr functions	4	25.0 (1)	50.0 (2)	25.0 (1)	
Genetic risks	2	100.0 (2)			
Preconception/interconceptional care	2		50.0 (1)		50.0 (1)
Other	23	9.5 (2)	71.4 (17)	4.8 (1)	14.3 (3)
Total	231	26.8 (62)	64.5 (149)	3.9 (9)	4.8 (11)

Table IV. Discussion of Selected Perinatal Health Issues by FIMR Programs and the Subsequent Development and Implementation of Related Recommendations

Topic	Discussion of selected topic % (n)	Developed related recommendations ^a % (n)	Implemented recommendations ^b % (n)
Prenatal care	98.6 (68)	83.8 (57)	82.5 (47)
Substance abuse	94.2 (65)	81.5 (53)	75.5 (40)
SIDS	92.8 (64)	89.1 (57)	86.0 (49)
Smoking	92.8 (64)	78.1 (50)	72.0 (36)
Infections during pregnancy	87.0 (60)	73.3 (44)	72.7 (32)
Domestic violence	81.2 (56)	80.4 (45)	75.5 (34)
Monitoring of maternal complications	79.7 (55)	76.4 (42)	66.7 (28)
Family planning	79.7 (55)	89.1 (49)	69.4 (34)
Very low birth weight	79.7 (55)	78.2 (43)	83.7 (36)
Multiple pregnancies	76.8 (53)	52.8 (28)	64.3 (18)

^aIncludes only FIMRs that discussed the topic.

^bIncludes only FIMRs that developed recommendations related to the topic.

Implementation of Recommendations

Of the 74 participating FIMR directors, 67 (91%) provided information on implementation of at least one of the identified four “most important” recommendations. Approximately 75% of the 231 reported that the recommendations had been implemented, and an additional 22% were “in the process” of being implemented. Very few recommendations (approximately 4%) had not been implemented to any visible extent. Over 90% of the recommendations relating to the following areas were implemented: SIDS, preterm labor, family planning, fetal and infant safety, and genetic risks (data not shown). For most topics, implementation rates were equal to the overall rate, or even higher. For a few topics, however, implementation was less likely. These included recommendations related to high-risk women, vital or medical records issues, and FIMR functions.

We also examined implementation of the recommendations developed for the 10 prelisted content areas (Table IV).⁷ When a topic was reportedly discussed, recommendations and implementation often followed. In comparison to other content areas, the proportion of recommendations implemented was relatively low (<70%) for family planning, monitoring of maternal complications, and multiple pregnancies.

⁷The percentages for those content areas that appear in both the list of 10 and the top four noted by each FIMR are not always exactly the same since they are based on slightly different questions and sample sizes.

Essential MCH Services

There was considerable heterogeneity with regard to the conduct of essential MCH services. For most of the essential MCH services examined here, half or more of the FIMRs reported conducting such activities but this effort was not universal. The highest proportion of FIMRs reporting a particular activity was 67% and the lowest proportion was 12% (Table V).

Variation in Outcomes by FIMR Characteristics

FIMRs in our sample varied on a number of characteristics that may be associated with the outcomes (i.e., implementation of recommendations, performance of essential MCH services). In analyses not reported here, none of the factors in Table I were found to be related to the outcomes under study and therefore were not assessed as potential confounders of those factors hypothesized to exert an effect on the outcomes. Therefore, only bivariate analyses were conducted to determine the relationships of the outcomes with FIMR structure and training, hypothesized predictors of the outcomes.

FIMR Structure

The organization of the FIMR was not shown to be correlated with the implementation of the four most important recommendations (data not shown), but it did make a difference with regard to implementation of recommendations in the 10 specific content

Table V. Percentage and Number of FIMRs ($n = 69$) Reporting MCH Essential Services

MCH essential services	FIMR % (n)
<i>Data assessment and analysis</i>	
Data collected on the health needs of	
Pregnant women	51 (35)
Infants	54 (37)
Data analyzed on the health needs of	
Pregnant women	52 (36)
Infants	58 (40)
Focus groups on	
Pregnant women	33 (23)
Infants	28 (19)
Needs assessment for	
Pregnant women	26 (18)
Infants	32 (22)
<i>Community partnerships and mobilization</i>	
Presented data to local political leaders about	
Pregnant women	48 (33)
Infants	54 (37)
Disseminate fact sheets on health needs of	
Pregnant women	42 (29)
Infants	39 (27)
Participated in coalitions for	
Pregnant women	59 (41)
Infants	52 (36)
Worked with	
American College of Obstetricians and Gynecologists	16 (11)
American Academy of Pediatrics	12 (8)
<i>Quality assurance and improvement</i>	
Initiated change in local regulations for	
Pregnant women	39 (27)
Infants	33 (23)
Initiated change in state regulations for	
Pregnant women	28 (19)
Infants	29 (20)
Provided expertise to local legislative bodies on	
Pregnant women	41 (28)
Infants	41 (28)
Provided expertise to state legislative bodies on	
Pregnant women	36 (25)
Infants	38 (26)
Developed population-based standards of care for	
Pregnant women	32 (22)
Infants	26 (18)
<i>Policy development</i>	
Involved elected officials, consumers, and agencies on health plans for	
Pregnant women	67 (46)
Infants	58 (40)
Determine appropriate strategies based on	
Population needs	61 (42)
Local priorities	62 (43)
Feasibility	58 (40)
Effectiveness	57 (39)
Social/political acceptability	52 (36)
Developed plan to address priority health needs of	
Pregnant women	46 (32)
Infants	42 (29)
Disseminate progress report on health goals for	
Pregnant women	55 (38)
Infants	54 (37)

Table V. Continued

MCH essential services	FIMR % (n)
<i>Informing and educating the public</i>	
Presented materials to media about	
Pregnant women	58 (40)
Infants	61 (42)
Education to consumers about	
Pregnant women	52 (36)
Infants	52 (36)

areas. On average, FIMRs with a two-tier system (separate case review and community action teams) were more likely to report implementation of the 10 topic areas than those with a one-tier system (88.12% vs. 56.19%, $p < 0.001$).

FIMR organization was also related to FIMR conduct of activities associated with all five essential MCH services with an increased average number of activities reported to be conducted by two-tier FIMRs as compared with one-tier programs. Table VI compares the mean number of activities undertaken for each essential MCH service by FIMR characteristic (i.e., structure, training). Differences were largest in the domains of quality assurance and policy development.

Training

We hypothesized that training might relate to FIMR outputs. Surprisingly, training of the FIMR director and/or staff had no significant association with

the implementation of the four “most important” recommendations (data not shown). However, the implementation of recommendations in the 10 selected topic areas was related to the training reported for the director and/or staff but the association depended on the substantive area of the training (Table VII). Effects were significant for both the director and staff with regard to training in “how to use case review findings.” Training in “implementing recommendations” was associated with more implementation if obtained by the staff but there was no effect if obtained by the FIMR director.

With regard to the essential MCH services, training of FIMR directors was strongly and significantly related ($p < 0.05$) to an increase in the average number of activities (Table VI), but the particular essential MCH services for which effects were significant varied across the substantive areas of training (e.g., training in “how to use case review findings”). Training of the FIMR director in “perinatal health and/or infant mortality” was associated with a higher number

Table VI. The Relationship of FIMR Characteristics to the Performance of the Essential MCH Services (mean # of activities performed, $n = 69$)

	Mean number of activities performed in five essential mch services				
	Data assessment and analysis (0–8)	Partnerships and mobilization (0–8)	Quality assurance and improvement (0–10)	Policy development (0–11)	Public information and education (0–4)
FIMR structure					
Two-tier ($n = 33$)	2.79**	3.84*	4.70***	7.82***	2.79**
One-tier ($n = 36\%$)	1.56	2.64	2.25	4.56	1.56
Director training in Perinatal health and/or infant mortality					
Yes ($n = 59$)	2.45***	3.56***	3.85***	6.66**	2.36
No ($n = 10$)	0.30	1.20	0.90	2.90	1.50
How to use case review findings					
Yes ($n = 57$)	2.26	3.54*	3.68	6.58*	2.33
No ($n = 12$)	1.58	1.67	2.17	3.92	1.75
Strategies for implementation of recommendations					
Yes ($n = 50$)	2.30	3.58*	3.76	6.56	2.34
No ($n = 19$)	1.74	2.26	2.53	4.95	1.95

Note. FIMR: Fetal and Infant Mortality Review.

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Table VII. The Relationship of FIMR Director/Staff Training to the Implementation of FIMR Recommendations ($n = 65$)

Training area	Mean percentage of recommendations developed in the 10 specific content areas subsequently implemented			
	Training		No training	
	%	(<i>n</i>)	%	(<i>n</i>)
Perinatal health/ infant mortality				
FIMR director	75.3	(56)	50.6	(9)
FIMR staff	74.3	(54)	60.4	(11)
How to use case review findings				
FIMR director ^a	77.5	(54)	44.5	(11)
FIMR staff ^a	82.4	(38)	57.1	(27)
Strategies for implementation of recommendations				
FIMR director	76.2	(47)	60.6	(18)
FIMR staff ^b	81.2	(36)	60.4	(29)

^a $p \leq 0.01$; ^b $p \leq 0.05$.

of activities conducted for all five essential MCH services. These effects were also the strongest of all the comparisons. For the essential MCH service of community partnerships and mobilization specifically, effects of director training were statistically significant for each of the three types of training. Across all essential MCH services, staff training (not including the director) in any of the areas (e.g., perinatal and/or infant mortality) was not significantly associated with an increased number of essential MCH service activities conducted by the FIMR (data not shown). This is in contrast to the positive effects of staff training for implementation of recommendations.

DISCUSSION

In addition to providing a mechanism for developing and implementing interventions to address fetal and infant mortality, the FIMR process provides a forum for identifying factors impacting the health and well-being of women and infants that may not be evident from population-based data. The high percentage of FIMR programs that discussed each of the issues listed in Tables III and IV and developed and implemented related recommendations suggests an awareness of pertinent perinatal health issues among FIMR members.

Beyond the FIMR process itself, other factors may influence the development of recommendations, including the availability of evidence-based intervention strategies; the feasibility of intervention within a given community; and the current focus of local and national initiatives addressing perinatal health issues. For example, recommendations on SIDS may have

been more prevalent as a result of the pervasiveness of the national “Back to Sleep” SIDS campaign and consequent availability of funding and information resources.

The extent to which a community can, on its own, access needed resources for systems changes may determine the likelihood of implementation of the FIMR recommendations. Communities that themselves lack the resources but can leverage external resources will likely be less constrained in developing and implementing their recommendations. Sufficiency of resources may also relate to the scope and mix of the recommendations developed. “Comprehensiveness,” which includes identification of concurrent strategies (e.g., behavior of individuals, program practices, population-wide policies, etc.) to effect change at multiple systems levels, was noted by Kegler and colleagues to be positively correlated with plan/coalition effectiveness (20). Developing broad policy-oriented strategies (e.g., enhanced Medicaid coverage) frequently involves more human resources in the form of organizational links and political will as well as money (25, 26). Interventions for population-level behavior change (e.g., smoking cessation for pregnant women) need to be maintained over a long period and are costly as well.

With regard to the functional orientation of the recommendations, relatively few FIMRs reported at least one policy-oriented strategy among their top four recommendations. Thus, the FIMRs appeared to share the documented tendency of community coalitions to focus on problems and action directly within their span of control (27). Case study interviews with FIMR staff and team members confirmed that this approach was indeed prevalent, in part in order to

instill a sense of contribution, progress, and enthusiasm among team members. However, by focusing exclusively or primarily on “quick wins,” a FIMR might sacrifice comprehensiveness, and ultimately, compromise effectiveness.

The National Fetal and Infant Mortality Review (NFIMR) guidance outlines a review process involving two separate committees. Our hypothesis that FIMR structure (one-tier vs. two-tier) would influence the scope and nature of both types of outcomes (recommendations, and essential MCH services) also was informed by the work of a number of researchers who have examined community-based programs (20, 27, 28). Recognizing Kegler’s (20) finding that “structures facilitate action,” and assuming that two-tier FIMRs would denote broader representation, including “political elites” and others with orientation and experience in community change (e.g., community advocacy organizations), we anticipated higher levels of implementation and more engagement in essential MCH services. Having two teams makes explicit the dual intents of analysis and action, thereby increasing the likelihood of sustained attention to all aspects of FIMR programming. This division of FIMR activity, paralleling the FIMR cycle (9, 10), further allows participants to best apply their specific expertise, and thus be more actively engaged in the process.

Our results provide some degree of support for this approach. A two-tier structure for the FIMR appears to enhance its effectiveness as measured in this evaluation. In addition to addressing a higher number of issues, FIMR programs with a separate CRT and CAT (two-tier) implemented a higher mean percentage of reported recommendations compared to programs with either a joint/combined CRT and CAT (one-tier) or a CRT only (one-tier). Two-tier FIMRs also implemented more activities in all five of the essential MCH services examined in this analysis (Table VI).

While NFIMR promotes a two-tier structure for FIMRs, some communities find it more efficient to combine these teams. FIMRs continuing with a one-tier approach may need to change their team composition or processes in order to maximize outcomes. Future research further informing FIMR practice might include a specific focus on the other relevant factors (e.g., team composition, participants’ understanding of FIMR goals, etc.) that potentially influence the effectiveness of a FIMR.

The areas of training examined in the study were selected because they parallel the FIMR process (9). Knowledge of perinatal and/or infant mortality is im-

portant in organizing and conducting case reviews, the starting point in the FIMR cycle. The use of case review findings is the next step, directed toward the development of recommendations. Finally, training in implementing recommendations clearly relates to the latter part of the FIMR cycle that stresses implementation of FIMR recommendations and ongoing monitoring.

As expected, compared to programs without relevant training, a higher percentage of reported recommendations were implemented among FIMR programs where the director and/or staff received training related to perinatal health issues and developing and implementing systems strategies. Training in all three areas for the director was also strongly related to engagement in the essential MCH services, particularly with respect to the essential MCH service of community partnerships and mobilization. FIMR director training in perinatal health and/or infant mortality was correlated with marked increases in the number of activities engaged in across all essential MCH services.

These observations have clear implications for training and recruitment. FIMR coordinators and other leaders need to be knowledgeable about both perinatal health and community action strategies. These are very different professional competencies making it difficult to recruit individuals skilled in both areas. Training is likely critical to assuring competency in both areas. This finding also might imply the need for further study of potential associations between the competencies of all FIMR participants (e.g., director, staff, and team members) and FIMR outcomes; the answer to such questions would further inform the field about FIMR program staffing requirements, professional qualifications for FIMR directors, and about needed training efforts.

Despite what appear to be positive associations between FIMR characteristics and outcomes, we cannot rule out the possibility that other unmeasured factors correlated with structure and training are the real reason that these FIMRs had higher rates of implementation. Furthermore, the cross-sectional nature of our evaluation must also be taken into account. For example, it is not known whether the training of FIMR staff occurred prior to the outcomes studied or occurred much later. There are a few additional caveats with regard to interpretation of the results. Given the constraints of the interview, some topic areas addressed by FIMR may be underrepresented because they were not identified as one of the four “most important” by the FIMR director or on our list of 10

specific content areas. We do not know how many other recommendations were formulated; the reported four recommendations may well be more likely than the others to have been implemented as these were the four that the FIMR directors reported as the “most important” recommendations. Similarly, our examination of implementation of recommendations in the 10 specific content areas may have excluded problems of greater importance in a particular FIMR. However, by using both measures, we believe we have a valid assessment of implementation of recommendations by the FIMR programs in our sample.

The examination of performance of essential MCH services by a systems initiative is a relatively new focus, and caution is warranted when interpreting results in this area. We anticipate, however, that future studies of public health programs will further refine this measurement approach. In particular, the meaningfulness of assessing any single community organization’s or program’s contribution to the performance of the essential MCH services remains to be validated. While the LHD is generally the locus of accountability for these functions, it is nonetheless increasingly recognized and documented that any number of non-governmental organizations may contribute to performance of public health functions in a jurisdiction (29–32); as such, we believe that our focus on the performance of essential MCH services by one such effort, FIMRs, provides insights about activities to improve the health of the population that are not easily measured in any other way.

CONCLUSION

FIMR programs in our sample considered a number of important perinatal health issues and developed recommendations on a broad range of topics. The FIMRs relied primarily on strategies related to programs and practices to achieve perinatal systems change, with few FIMRs reporting attention to policy-oriented approaches. Implementation of the self-identified, most important recommendations was high, as were implementation rates for the substantive areas we identified as important for FIMRs to address. In addition, FIMR programs conducted several activities in each of five essential MCH services.

Designation of responsibility to separate case review and community action teams appears to enhance the implementation of recommendations and performance of essential MCH services. The effectiveness of FIMR appears to be dependent in part on the extent

to which FIMR directors and staff have an adequate understanding of how to appropriately utilize information obtained during the case review process, and are skilled in effective strategies for facilitating system changes. Knowledge of perinatal and/or infant mortality also seems to be an important element.

These findings with regard to FIMR structure and staff training are particularly important to consider as FIMR is increasingly adopted throughout the United States as a strategy for perinatal health systems change. Our findings also suggest a need to more carefully examine the emerging research on coalition effectiveness (e.g., systems change strategies, plan development) and apply this new knowledge to inform the nature and content of training and technical assistance provided to FIMRs.

ACKNOWLEDGMENTS

The authors acknowledge the many substantial contributions to the JHU Evaluation of FIMR Programs Nationwide of an impressive array of individuals and organizations. First and foremost, we thank nearly 600 individuals who were generous in their time and expertise to provide information in study interviews and surveys. We are also grateful to the members of the Technical Assistance Group (TAG), convened to provide guidance on study design and instrument development. We thank Katherine Baldwin (Project Manager) and all of the individuals who staffed the study, and Bernard Guyer and Patricia O’Campo for providing thoughtful feedback and insightful guidance whenever asked. The Association of Maternal and Child Health Programs and City-MatCH are also thanked, for providing assistance by endorsing this national evaluation and lending their support in recruiting survey respondents. The work of Diane Burkom, Katrina Ott, and the team of interviewers at Battelle Center for Public Health Research and Evaluation was critical and is greatly appreciated. We also thank the key staff at the Maternal and Child Health Bureau, Health Resources and Services Administration—Ellen Hutchins, Ann Koontz, and Brenda Lisi, and at the American College of Obstetricians and Gynecologists—Jan Chapin and Kathy Buckley, who provided advice and assistance throughout. As always, we appreciate the comments and suggestions provided by our anonymous reviewers, as well as Lauren Zerbe’s patience and skill in preparation of the manuscript. Finally, we are greatly indebted to our colleague, Arden Handler, for her tough

questions, keen insights, skilled pen, and commitment to excellence in her role as editor of this special issue of the MCH Journal. Development of this article was supported by grants U93MC00101 and U08MC00136 from the Maternal and Child Health Bureau, Health Resources and Services Administration, Department of Health and Human Services.

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