

Using Evidence for Prenatal Case Management Structure (R40MC05472)
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I. Introduction

I. A. Nature of the research problem

Prenatal case management (PCM) is a community-based, health-related service provided to medically or socially high risk pregnant women for the purpose of improving birth and early infancy outcomes (Issel, Anderson, & Kane, 2003), and typically includes home visitation, referrals to needed services, and follow-up visits. Systematic literature reviews reveal that PCM is effective in lowering rates of caesarean births, infant birth weights less than 1500 grams and antenatal hospital admissions (Hodnett & Fredericks, 2003). Various researchers (Hodnett & Roberts, 2003; Kendrick et al., 2000) noted the variation in types of home visitors, ranging from RNs to lay employees, and on the inconsistency of what constitutes interventions provided during prenatal and early post-partum home visiting. Although evaluations of individual PCM programs have been done (Issel, Slaughter & Forrestal, in press), no information exists on how PCM is delivered across the nation. In addition, PCM programs in many states may receive Medicaid reimbursement as a targeted case management program. It is important to understand how PCM programs are implemented as a first step toward a national assessment of their effectiveness.

I. B. Purpose, scope, and methods of the investigation

This study sought to understand the role that the organizational environment of the PCM program plays in shaping the internal work environment of the program, the program model in terms of staff mix, and the types of interventions used by case managers. The study aims focused on: characterizing the types of existing PCM program models based on staff mix, and extent to which the model is a professional nursing PCM program model; identifying relationships of organizational and program internal environment variables to the PCM program model used; identifying the relationship of organizational, program internal environment, and program model variables to individual case manager use of different types of interventions; and, identifying the relationship of PCM program model variables and intervention use to program outcomes, given organizational, and program internal environment variables

PCM programs in 29 of the 33 states that reimburse through Medicaid for PCM were surveyed. Data were collected from PCM program managers and their case managers. A census of PCM programs was conducted, identifying all potential programs in 29 states. Program directors in eligible programs were invited to participate. Following the participation of the program director, case managers were then invited to participate. [Note: The term case manager is used to encompass all employees directly involved in providing PCM.]

I. C. Nature of the findings

The descriptive results provide an overview of how PCM is implemented across the United States in terms of staff mix, client characteristics, managerial processes, and interventions used by case managers. PCM programs are moderately formalized with policies and procedures, are moderately based on evidence, and tend use health professionals with at least a baccalaureate degree. Correlational analyses suggest that a few program and organizational factors influence the interventions used by case managers or client birth outcomes.

II. Review of the Literature

Prenatal case management is designed to increase appropriate utilization of health and social services by pregnant women through simultaneous attention to their multiple medical and social problems and is provided in the community setting, rather than in a clinic or hospital, and within the family context. PCM serves a vulnerable population, namely pregnant women who are at high risk for adverse pregnancy outcomes such as low birth weight or premature births. In a review of seven randomized trials of home visiting programs for pregnant women, Olds and Kitzman (1993) concluded that home visiting was not consistently effective in improving birth outcomes, and that there was no clear pattern of relationship between the program focus and the modest outcomes achieved. Several subsequent studies have identified positive effects of comprehensive case management for pregnant women and infants. Despite the similarity of client characteristics across programs, the percent of core case manager activities performed according to program guidelines can vary significantly among programs (Duggan et al., 2000). Such variations in PCM implementation can help explain the inconsistent results.

One key program characteristic that is likely to vary is the staffing mix model. In community mental health, considerable work has been done to identify important aspects of case management models. Johnsen et al. (1999) found that although programs professed to be following the standardized model, programs varied significantly with regard to staff mix, client/staff ratio, and type of services provided to clients. Dewa et al. (2003), in a study of the time inputs of mental health case managers, found that even for a well researched and established mental health case management model, fidelity to the model guidelines ranged from 69 to 89%.

Ramey and Ramey (1993) proposed that to arrive at a typology of home visitation programs for pregnant women, the domains of health and intervention, plus program characteristics need to be studied. They identified the following as key program characteristics: program philosophy, strategy, timing of visits, intensity of services, coordination of activities within the program, and sensitivity to social and family context. Since their report in 1993, attention has focused only on the structural characteristic of staff mix, specifically, the use of RNs vs para-professionals for PCM delivery (Korfmacher et al, 1999). Gomby et al. (1999), in a review of PCM and prenatal home visitation programs, considered program goals, schedules for client contact, target population served, and background and training of the home visitors. Their typology incorporates program goal, a feature of clinical programs and health care organizations.

Another program characteristic that could be important is the use of evidence-based practice (EBP), which is influenced by attitudes toward research utilization (Olade, 2003) or barriers and facilitators to nurses' research utilization. McKenna et al. (2004), with data from community-public health nurses, found that 42% indicated that at least 60-79% of their practice was evidence based. The main barriers identified were organizational, specifically lack of time, high workload and prevalence of change, as were the facilitators of organizational support and the environmental factor of service purchasers expecting EBP.

III. Study Design and Methods

III. A. Study design

This descriptive, multi-level study used a survey method to collect self-report questionnaire data between June 2006 and December 2007 from the population of PCM programs in 29 states as represented by program directors and the program case managers.

III. B. Population studied

The population studied was PCM programs throughout the United States. We identified

members of the population through a national search that began at the state level, followed by state level enumeration of programs, and concluded with local verification and a final count of programs. The population enumeration was an unanticipated but important study finding (Issel et al. 2008).

National Search of States. To generate a list of states with Medicaid reimbursed PCM, we used several strategies. We sought the information from each HRSA regional office, but regional officers either did not have contact information for the Medicaid or MCH division officers within their region or had outdated lists. We then searched the websites of all 50 states for PCM and Medicaid office information. Using the publicly available information, telephone and email contact was made to verify this information regarding PCM programs. Also, we emailed all Title V directors via their listserv with a request for state-level contacts and from that were able to add six states to our list of those confirmed to have PCM programs. For the remaining states, we began by “cold calling” a state health department or Medicaid office phone number. In summary, we contacted all 50 states, of which 33 were identified as having Medicaid reimbursed PCM. The list of 33 states was remarkably similar to the older list of states obtained from the National Governors Association.

State Level Provider List Acquisition. We requested lists of PCM providers, asking for the names and contact information of only Medicaid-reimbursed PCM providers and offering to reimburse the states for time and effort involved. Provider information was accessible at web sites of 16 states. During telephone contacts, states expressed varying levels of concern about confidentiality of their providers, but shared names and addresses. After numerous follow-up telephone calls and email, we ultimately received provider lists from 31 of the 33 states that reimburse for PCM. The lists from two states were overly inclusive of all Medicaid providers, and thus were excluded, yielding usable lists of PCM providers from 29 states.

Local Provider List Cleaning and Verification. Initial review of the provider lists readily revealed two problems: duplication of addresses or telephone numbers, individual names associated with multiple addresses, and duplicated names of individual providers; and non-specificity to PCM. Some listings clearly had names that denoted behavioral health or diabetes management providers, WIC offices, public schools, and government financial or administrative offices. A visual inspection of the state lists ruled out most of the programs that were clearly not PCM providers. We then applied a set of decision rules to systematically clean and verify the remaining providers listed. For the study purposes, *PCM was defined as the provision of Medicaid reimbursed targeted case management of high-risk pregnant women*, and a *provider was defined as a program consisting of at least one prenatal case manager with an active caseload*. Thus, we excluded providers of medical care or social services.

In total, we contacted over 1300 providers via telephone or email to verify the provider contact information and eligibility. In 21 of the 29 states, we contacted all providers listed because we encountered a sufficient number of problems to warrant total validation. As a result of all our telephone calls and emails, we eliminated 418 (26%) providers from the lists, with a final count of 1180 PCM providers in 29 states.

III. C. Sample selection

A PCM program was eligible to participate if it provided community-based case management to pregnant women at high risk for adverse pregnancy outcomes. Programs were not eligible if case management was only provided in acute care facility, if only medical prenatal care was provided, or if the focus was exclusively on a specialty health or social service, such as nutrition or mental health. All 1180 eligible PCM programs in 29 states that provided a list of

PCM providers were invited to participate in the study.

The overall response rate was based on the number of program directors, representing program participation, in the study was 35%, using the American Association of Public Opinion Research (AAPOR) Response Rate 4 formula. The formula estimates response rate by applying the same eligibility rate among programs with a known eligibility status to those whose status is unknown (AAPOR, 2008). This formula was chosen as a result of discovering programs were identified as no longer being eligible since the time of the initial verification of program eligibility. At least 3664 contacts were made with the 1180 programs invited to participate, with many receiving up to six follow-up contacts to encourage participation.

III. D. Instruments used

Both paper and Internet versions of the questionnaire were used to collect data from program directors. The paper version was mailed to each program director to be completed and returned in a postage-paid envelope. Follow-up with program directors who had not returned their survey included telephone calls, email, and fax and mail reminders. Program directors who opted for the Internet version received a URL to a secure website for responding to the survey, which used Survey Monkey as the platform.

The program director questionnaire was divided into five sections focusing on different aspects of the PCM program: client characteristics; funding sources and policy structures; personnel descriptions; staff use of evidence and barriers to EBP usage; organization type and quality of services provided; and program director background information.

A separate paper questionnaire was used with case managers. Their questionnaire was mailed to the program director for distribution to the case managers. Case managers were instructed to return their questionnaire in a postage-paid envelope. The case manager questionnaire contained items and scales regarding the following: size of caseload and workload, use of interventions, program philosophy, barriers to the use of evidence for practice, centralization, communication, formalization, teamwork, and demographics.

III. E. Statistical techniques employed

Basic descriptive statistics, both parametric and nonparametric correlational statistics, and analysis of variance were used. Scale reliabilities were assessed using Cronbach's alpha coefficient, and for newly developed scales, factor analyses were conducted to verify scale structure. In addition, several variables required special calculation, such as the funding diversity score and degree of professional staff. Hierarchical analyses are planned.

IV. Detailed Findings

Of 30 states for which we have data obtained during the program enumeration process, 17 states use a mix of private and state providers (e.g., health departments), nine states use private providers, four states are exclusively run by the state, and one state contracts with a private vendor conducting case management exclusively via telephone. The nine states with private providers had an average of 7.25 programs per state, compared to 58.3 programs per state among the states using both private and state run programs.

Data on the organizational context were obtained from the program directors of 188 PCM programs. Approximately 71% were identified as government agencies (state or local health departments), 15% were community-based organizations, and the remaining 14% were health systems types (i.e. managed care organization, health care network, hospital, school health center). On average, the PCM programs were 13.9 years old ($SD=6.0$; range=1 to 37).

Participant Sample Characteristics. Individual participants consisted of program directors and case managers. Directors from 188 programs had been in their position for about 7.6 years (SD=5.8) and were predominantly white (86.4%) females (97.6%) with RN license (68.5%). Most of the directors had a baccalaureate (47.9%) and another 25.4% had a Master's degree or higher. Data were also received from 339 PCM case managers, from 21 states and from 125 (66.5%) of the 188 programs. Their response rate, based on the number of case manager surveys sent to programs, was 47.4%. The case managers had been in their position for 6.2 years (SD=5.9) and were predominantly white (82.0%) females (99%). Most were RNs (63%), although social workers (4.9%), nutritionists (2.4%) and others were also case managers. Their education ranged from high school (4.8%) to master's (12.7%), but most had a baccalaureate degree (55.2%).

One other sample included in the study was client encounters. Each case manager who participated was asked to provide information on the nature of their client contacts. Of the 339 case managers who participated, 195 provided client encounter data. Data on client encounters are still being entered; 3050 client encounters have currently been entered for analysis, representing nearly half of the contacts recorded by case managers across multiple days of work.

Table 1 provides a list of study variables along the mean score, standard deviation, and additional information about the variables, such as Cronbach's alpha or scale range.

Table 1. Summary of Variables and Data Sources, with Mean, Standard Deviation and Notes. (Data are from the director unless otherwise noted; D=program director, CM=case manager.)

ORGANIZATIONAL ENVIRONMENT	Mean	SD	Notes
History with QI scale	3.9	.64	Alpha .92, scale 1 (low) to 5 (high)
Program covers entire county	--	--	88% said yes
PROGRAM INTERNAL ENVIRONMENT			
Age of program (years)	13.9	6	Range 1970 to 2006
Years approved for Medicaid reimbursement	13.1	6	Range 1966 to 2006
Funding diversity (lower is less diverse)	537	414	Median=338, range=35 to 1111
Budget size	\$259,125	\$467,605	Median=\$124,900
Number of full-time equivalent staff	4.4	6.2	Range 0 to 49, median=2.8
Influences on director scale	--	--	5 subscales, alphas .70 to .85
Levels from director to top administrator	1.2	.96	Range 0 to 4
Teamwork scale [CM]	41.6	4.3	Alpha .80, range 29 to 50
Communication scales [CM]	--	--	Alpha .71 to .84 across subscales
Centralization scale [CM]	10.5	3.8	Alpha .94, scale 5 (low) to 20 (high)
Perceived barriers to EPP scale [D]	--	--	Alphas .66 to .87 across subscales
Perceived barriers to EBP scale [CM]	--	--	Alphas .64 to .87 across subscales
Percent of practice evidence based [D]	69.2%	22.2%	Median=75%
Percent of practice evidence based [CM]	74.9%	20.5%	Median=80%
Number of information sources [D]	5.8	2.3	Range 0 to 12
Number of information sources [CM]	5.9	2.1	Range 0 to 12
Percent clients-white	64.6%	32.3%	
Percent clients- Medicaid	90.9%	24.5%	
Percent clients-adolescents	17.5%	20.7%	
Percent clients-prima gravida	47.4%	27.8%	
Client risk level	1.9	.74	Scale 1=low to 4=extreme
PROGRAM MODEL			

Program Philosophy/Priority Scale [D]	8.3	.99	Alpha .87, 5=low to 10=high
Program Philosophy/Priority Scale [CM]	7.9	1.1	Alpha .90, 5=low to 10=high
Formalized policies and procedures [D]	5.6	2.2	Range 0 to 10
Formalized policies and procedures [CM]	5.9	2.5	Range 0 to 10
Formalization scale [CM]	18.6	14.0	Alpha .81, scale 5 (low) to 25 (high)
CM years in current position	7.0	5.9	Median 5.5 years
CM caseload-pregnant women [D]	27.7	36.0	Range 0 to 300 clients
CM caseload-pregnant women [CM]	26.9	29.8	Range 0 to 230 clients
Staff mix-Health discipline degree	87%	24%	Range 0% to 100%
Staff mix-BA/BS or higher degree	62%	37%	Range 0% to 100%
Hours staff work per week	34.9	8.0	Range 0 to 50 hours
Hours work per week as case manager	21.5	13.9	Range 0 to 40 hours
PRACTICE PATTERN-[CM] Percent of work time spent delivering each of the following interventions			
Educating or informing clients	24.9%	14.0%	Mode 20%
Assessing client needs	20.3%	12.9%	Mode 20%
Monitoring client status	14.0%	8.4%	Mode 10%
Coordinating services, referring clients	12.9%	8.3%	Mode 10%
Counseling, providing support	11.9%	7.8%	Mode 10%
Giving tangible items	5.3%	5.0%	Mode 5%
Giving medications or treatments	2.4%	4.9%	Mode 0%
PROGRAM OUTCOMES			
Annual staff turnover rate	16.5%	31.1%	Range 0% to 200%
Number of clients per month	104	225	Range 0 to 1835, median=40
Number of client contacts billed to Medicaid last year	1076	5309	Range 0 to 60,000, median=119
Number of clients per FTE	362	839	Range 0 to 9840, median=210
Percent cesarean birth	8.4%	9.9%	
Percent LBW	4.1%	6.2%	

IV. A. Program Internal environment

PCM Budget. The number of case managers per program ranged from 1 to 27, with an average of 4.8 case managers (SD=4.0) but a median of 3.5 case managers per program. As expected, programs serving more clients pre month have larger operating budgets ($r^2=.66$; $p < .000$) and more client contacts billed to Medicaid ($r^2=.43$; $p < .000$). The average annual PCM budget was \$279,125 (SD=\$476,605), with a median of \$125,900. However, 25% of programs had a budget of \$124,000 or less. Across the programs, from 1 to 5 different sources of funding were used to support the PCM program, with 56.8% of programs using either one or two sources (mean=1.9 sources; SD=1.2).

Communication, Teamwork, Centralization. These three variables characterize the internal work environment of the PCM program, and therefore case managers' perceptions of these key program characteristics were obtained. These scales all had good internal consistency as reflected in the Cronbach's alpha scores (Table 1). Overall, there were fairly high scores for the quality of communication (accuracy, openness, timeliness) both within the program and with others outside of the program. Teamwork score was also relatively high. The centralization scale score was moderate, indicating that the staff had some discretion and autonomy.

EBP Characteristics. Using a Guttman scale of 0% to 100%, program directors reported

that an average of 69.2% (SD=22.1%) of their practice is evidence based, whereas case managers reported that 74.4% (SD=20.2%) of their practice is evidence based. Both groups were asked to what extent their program is based on theory or the work of a researcher, using a 6 point Likert scale. Again case manager scored higher than program directors (4.4 vs 3.9). More interestingly, between those two variables there was a highly significant correlation of 1.7 ($p=.007$) among case managers, but not for program directors.

The EBP barriers scale has 27 items asking about the degree to which organizational and individual factors are perceived be barriers to the use of evidence in practice (McKenna, Aston, & Keeney, 2004). The scale had good alpha reliability with both program directors and case managers (Table 1), including across the four subscales: nurses' beliefs, skills, awareness, and values; the influence of the workplace setting; research rigor and appropriateness; and presentation and accessibility of the research. Workplace setting was rated the highest barrier to implementing EBP, followed by nurses' attitudes.

In programs with a higher percent of staff with health professions degrees, the program director perceived lower barriers to EBP. Programs with a higher percent staff with health professions degrees perceived fewer barriers due to nurses' perceptions and skills ($r^2=-.18$; $p<.05$), fewer workplace factors ($r^2=-.17$; $p<.05$), fewer barriers related to research rigor and appropriateness ($r^2=-.17$; $p<.05$), and overall fewer barriers ($r^2=-.23$; $p<.01$). Interestingly, PCM programs with more experience with quality improvement and change had lower perceived barriers to the use of evidence due to nurses' perceptions and skills ($r^2=-.38$; $p<.000$), research presentation and accessibility ($r^2=-.27$; $p=.001$), and overall barriers ($r^2=-.36$; $p<.000$). Across all four EBP barriers subscales, there were highly significant, negative correlations with all communication subscales of openness, timeliness and accuracy both within the PCM program as well as with others outside of the PCM program.

Client Characteristics. Program directors were asked to estimate the monthly number of clients served and their race/ethnicity, age, birth outcomes and insurance status. On average, programs served 104 clients per month (range=0 to 1836). Of the clients served each month, 17.5% were 17 years old or younger, 64.6% were White, 16% Hispanic, 18.9% Black and the remaining were a combination of Asian, Native American and mixed ethnicity. About half of the clients (47.4%) were preparing to become first time mothers. Nearly all of the clients had Medicaid coverage (90.9%). Interestingly, there was a significant correlation between programs having higher percent of staff with health professions degree in programs and having a larger percent of white clients ($r^2=.50$; $p<.000$) and a smaller percent of black clients ($r^2=-.40$; $p<.000$).

Client encounter information gathered from case managers is estimated to include over 5000 encounters. Based on preliminary data for 3040 encounters, approximately 20% of the client contacts were with adolescents. Between 37% to 43% of client encounters were home visits and approximately 40% occurred in an office/clinic.

IV B. Program model

Formalization. Program formalization was conceptualized as having written policies and procedures that must be followed. There were two measures of formalization; one was a count of written policies and procedures, the other was a standardized formalization scale score. On both measures formalization was moderate. Program directors and case managers reported the same number of written polices and procedures. Among both program directors and case managers, 25% reported having 4 or fewer written policies, out of 10 polices presented to them.

Staffing Mix Characteristics. PCM programs in our study employed an average of 4.7 persons (range 0 to 26) into an average of 4.4 FTEs (range = 0 to 49), of which 88% were

allocated to health professionals. Across the PCM programs 83.1% have at least one nurse as PCM staff, 42.2% have a social worker, and 9.7% have a nutritionist. Newer programs had a higher portion of staff with higher degrees, in other words, a more professional staff.

Caseload Size. Caseload size was assessed using data from the program director and separate data from the case managers. There was remarkable agreement on the caseload size. On average, case managers carried a caseload of 27 clients, with a range of 0 to 300. The average case risk level was high (mean=1.9, SD=.80), using a scale of 1 for moderate, 2 for high, 3 for very high, and 4 for extreme risk level.

IV C. Practice patterns

Intervention Use. When asked to indicate the percent of their case management time spent providing each of eight interventions, case managers reported spending 24.9% of their time educating and informing clients (Table 1). This was followed by assessing client needs (20.3%). Length of time employed as a case managers was correlated with the percent of time spent assessing client needs ($r^2=.16$, $p<.01$), and the length of time employed by the organization was correlated with the amount of time spent coordinating services or referring clients to services ($r^2=.13$, $p=.05$). Interestingly, program philosophy and priorities was significantly correlated to the time spent in five of the eight interventions: specifically, counseling ($r^2=.23$, $p=.000$), coaching ($r^2=.21$, $p=.002$), giving tangibles ($r^2=.19$, $p=.005$), and to a lesser degree with coordinating ($r^2=.13$, $p=.05$). However, having a stronger program philosophy was associated with spending less time doing assessment ($r^2=-.23$, $p=.001$). No significant bivariate correlations were found between the percent time spent in each of the eight interventions and the percent of program that is evidence based, any of the subscales of barriers to the use of evidence, any of the communication subscales, nor their caseload size.

IV D. Program outcomes

The outcomes (Table 1) reflect both managerial and long-term client outcomes. According to program directors, 4.1% (SD=6.2%) of clients had a low birth weight infant (less than 2500 grams) and 8.7% gave birth by cesarean delivery, both of which seem unusually low. Surprisingly, an estimated 61% of programs had 0% turnover of staff in the previous year.

V. Discussion and interpretation of the findings

V. A. Conclusions to be drawn from findings (with reference to data supporting each)

PCM is predominantly provided by state or local health departments (70.5%) using health professionals who spend less than 20 hours per week providing PCM, with an average caseload of 28 pregnant women. Recipients of PCM are mostly white (64.6%), with Medicaid coverage (90.9%), having at least their second child (53%), and have a high level of risk.

PCM programs tend to be only moderately formalized, with an average of 5 of 10 written policy or procedures for key program processes. Although program directors and case managers perceive their programs to be mostly evidence based, few used a theory or evidence based model for staffing or interventions. Decreased barriers to the use of evidence for practice was related to having better communication and experience with quality improvement.

The distribution of time across eight types of interventions used by case managers seems to be related only to the extent to which the PCM program is guided by strategic program priorities and a distinct program philosophy. This finding, while tentative, suggests that strategic decisions can influence the delivery of PCM interventions.

Program outcomes of staff turnover and program efficiency seem to vary by

organizational type, but not internal program characteristics, as reflected in the lack of correlations. Client outcomes, while suspiciously good, were not related to any of the organizational or program characteristics.

V. B. Explanation of study limitations

One limitation is the limited generalizability of the findings stemming from the relatively low response rate from programs, despite various and concerted efforts to increase participation. We were not able to test for non-response bias. In addition, no data were collected from four states (HI, CA, WV and WY), which further decreases the generalizability of the findings. However, given that our sample of PCM programs ranged from small rural to large urban, we have some confidence that the sample may be similar to the population of programs. Investigating non-response bias is the focus of a planned analysis and potential manuscript.

The difficulties encountered in enumerating the programs in each state could lead to unintentional but systematic bias in the sample. Although we made every reasonable effort to assure that we obtained complete list of programs from states with Medicaid reimbursed PCM, the low specificity of the lists could easily have lead us to over exclude providers who actually provided PCM. This may add to the problem of generalizability.

States vary in terms of Medicaid policy, workforce capacity, and population demographics and health status. Those natural variations were not captured in this study but might have affected participation as well as program implementation. Because of the small number of programs participating from some states, we were not able to test for state differences in the study variables. The natural small sample of PCM programs in states with smaller populations also precluded statistical analyses of state differences. Thus, we can not speculate as to the relationship of state policy to our findings about PCM program characteristics.

Both program directors and case manager provided self-report data. Although there was remarkable consistency between program directors and case manager reports on variables which were included in the questionnaire for both groups, self-report data are nonetheless susceptible to response biases and recall errors.

V. C. Comparison with findings of other studies

There are no other studies of PCM programs that have been conducted on a national scale. The only comparable study of PCM programs was conducted in one state (Issel, et al., 2001; Issel, et al, 2003).

V. D. Possible application of findings to actual MCH health care delivery situations (including recommendations when appropriate)

Two key findings point toward the importance of leadership and management. One finding is that lower perceived barrier to use of evidence for practice is related to both more experience with quality improvement in the organization and to higher communication accuracy, openness and timeliness. Thus, program directors ought to seek out opportunities to be engaged in quality improvement and change efforts in their organizations, at the same time take steps to improve communication. The other finding is the strong relationship of program philosophy and priorities to the distribution of time across intervention types. This result underscores the effect that a program vision and strategy can have on intervention delivery. Both communication and vision fall within the domain of the program manager, and can be influenced through education and support of program managers.

V. E. Policy implications

Our experience with enumerating PCM programs leads us to recommend that both states and Medicaid offices develop a real-time database of PCM providers. It would seem that without such a list, reimbursement, monitoring for quality and regulatory compliance would be difficult. Additionally, having a real-time list would be especially important to the states that posted to their websites information for potential clients on how to access PCM services.

The major reasons given for not participating were lack of time and turnover. A substantial portion of the written comments from both program directors and case managers was about the perceived lack of support from their state for the program. Given the fiscal problems many states are having, their concerns are likely to be well founded. PCM programs are intended to help the most vulnerable, and an investment in PCM programs is likely to have substantial long-term savings for the state and Medicaid. Thus, adequate funding to maintain or expand PCM programs needs to remain a priority.

V. F. Suggestions for further research

The findings from this study lead naturally to the following three main research topics.

State variations. States seem to vary in how they administer and oversee PCM programs. The variations are primarily in terms of the health system of the state, the level of involvement in providing guidance and basic policy guidelines, and the fiscal support. It is unclear to what extent those variations affect the program managerial variables related to more use of evidence for practice or the client outcomes. Thus it is unclear which state models ought to be discouraged or emulated. For this reason, state variations deserve investigation.

Cost effectiveness. The PCM programs billed Medicaid for client contacts and relied heavily on Medicaid for program funding. Although the client outcomes reported seem unusually good, if they are any indication of the improvements in birth outcomes, it will be important to have a better sense of the actual cost saving to Medicaid from the investment in PCM programs.

Intervention effectiveness. The current descriptive study did not attempt to link interventions used by case managers with client outcomes. This relationship remains unexplored, particularly as that relationship is moderated by program philosophy. Given that intervention use was found to be related to program philosophy, the role of this key program factor in having effective programs is a critical avenue of research.

VI. List of products

Peer reviewed articles:

Issel, L.M., Forrestal, S.G., Wheatley, R.R., Slaughter, J., & Schultz, A. (2008, Feb. 5).

Surveying hard-to-reach programs: Identifying the population of Medicaid prenatal case management programs. *Maternal and Child Health Journal*, Epub ahead of print.

Conference presentations:

Issel, L.M., Wheatley, R.R., Forrestal, S.G., & Schultz, A. (2006). Getting a sampling frame for a Medicaid program: Lessons for national Medicaid evaluations. Oral presentation at the American Public Health Association annual meeting, Boston, MA, November 2006.

Issel, L.M., Forrestal, S.G., Slaughter, J., Khan, J., & Schultz, A.A. (2007). A national look at existing Medicaid reimbursed prenatal case management programs. Poster presentation at the AcademyHealth annual research meeting, Orlando, FL, June 2007.

Forrestal, S.G., Rourke, A.K., & Issel, L.M. (2007). Use of evidence-based models and

standardization of prenatal case management programs: What is the practice? Oral presentation at the American Public Health Association annual meeting, Washington, DC, November 2007.

- Rourke, A., Slaughter, J., & Issel, L.M. (2007). Serving vulnerable populations: Does organizational type, ownership, and funding diversity matter in prenatal case management programs? Oral presentation at the American Public Health Association annual meeting, Washington, DC, November 2007.
- Khan, J., Slaughter, J., Issel, L.M., & Forrestal, S.G. (2007). Use of evidence-based models and factors influencing program directors of prenatal case management programs. Oral presentation at the American Public Health Association annual meeting, Washington, DC, November 2007.
- Rourke, A.K., Forrestal, S.G., & Issel, L.M. (2007). Staff mix of prenatal case management programs: Who is really doing the work? Poster presentation at the American Public Health Association annual meeting, Washington, DC, November 2007.
- Issel, L.M., Forrestal, S.G., Slaughter, J., & Rourke, A.K. (2008). The black box of Medicaid-reimbursed targeted case management for high risk pregnant women. Poster presentation at the AcademyHealth annual research meeting, Washington, DC, June 2008.
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