Multimethod Evaluation of Health Policy Change: An Application to Medicaid Managed Care in a Rural State

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Objective. To answer questions about the impacts of Medicaid managed care (MMC) at the individual, organizational/community, and population levels of analysis.

Data Sources/Study Setting. Multimethod approach to study MMC in New Mexico, a rural state with challenging access barriers.

Study Design. Individual level: surveys to assess barriers to care, access, utilization, and satisfaction. Organizational/community level: ethnography to determine changes experienced by safety net institutions and local communities. Population level: analysis of secondary databases to examine trends in preventable adverse sentinel events.

Data Collection/Extraction Methods. Survey: multivariate statistical methods, including factor analysis and logistic regression. Ethnography: iterative coding and triangulation to assess documents, field observations, and in-depth interviews. Secondary databases: plots of sentinel events over time.

Principal Findings. The survey component revealed no consistent changes after MMC, relatively favorable experiences for Medicaid patients, and persisting access barriers for the uninsured. In the ethnographic component, safety net institutions experienced increased workload and financial stress; mental health services declined sharply. Immunization rate, as an important sentinel event, deteriorated.

Conclusions. MMC exerted greater effects on safety net providers than on individuals and did not address problems of the uninsured. A multimethod approach can facilitate evaluation of change in health policy.

Key Words. Medicaid managed care, safety net, multimethod research, access, ethnography

In health services research, the problem of how to evaluate the results of policy change has remained challenging (Evaluation Gap Working Group 2006). While the Centers for Medicare and Medicaid Services mandates that state governments evaluate changes in their Medicaid programs, these evaluations have proven limited, typically confirming budget neutrality and finding no adverse effects (Chang et al. 2003). More comprehensive evaluations of policy

changes in Medicaid, which address in more depth issues such as utilization, costs, quality, access, or satisfaction, have occurred rarely (e.g., Freund et al. 1989).

We report here a multimethod assessment of Medicaid reform within a rural state. The study addressed research questions at three levels of analysis. (a) Sequential surveys answered questions about the impacts of Medicaid managed care (MMC) for individuals. (b) Ethnographic methods assessed what effects occurred for safety net institutions and local communities. (c) Analysis of publicly available secondary databases determined how sentinel events changed as population-level indicators.

BACKGROUND ON MMC

By the end of the 1990s, most states required some or all Medicaid recipients to enroll in managed care. Regarding our interest in questions about *individual-level* impacts, some MMC programs led to improved or unchanged access for Medicaid recipients, while other programs manifested enduring access barriers (Baker and Afendulis 2005; Berman, Armon, and Todd 2005; Fairbrother et al. 2005; Sommers 2005; Seligman et al. 2007); MMC exerted no consistent effects on access for the uninsured (Haberer, Garrett, and Baker 2005). Utilization under MMC proved inconsistent, even involving services targeted for reduction such as emergency department visits (Alessandrini et al. 2001b; Garrett, Davidoff, and Yemane 2003; Davidoff et al. 2007).

Research has generated contradictory findings about other individual-level outcomes (Waitzkin 2001). Some MMC programs generated wide satisfaction among users (Roohan et al. 2003). Others showed dissatisfaction, especially for minorities and/or those with language barriers (Weech-Maltonado et al. 2003; Valet et al. 2004). Regarding quality of care, national data revealed shortcomings under MMC provided by commercial health plans (Thompson et al. 2003), while studies of specific MMC medical and/or mental

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health programs produced either favorable (Bouchery and Harwood 2003), adverse (Busch, Frank, and Lehman 2004), or neutral (Ridgely and Maglione 2006) findings. Although most studies showed moderating effects of MMC on costs (Shireman et al. 2002; Long, Coughlin, and King 2005), others revealed little change in costs for specific subgroups (Domino and Salkever 2003).

Regarding our concern about research questions at the *organizational/community level*, while some safety net institutions survived and even flourished under MMC, others encountered major crises (Sparer et al. 2002; Bindman, Yoon, and Grumbach 2003; Felland et al. 2003; Jacobson et al. 2005; Zuvekas 2005). Some but not all states included rural areas in MMC (Slifkin et al. 1998). In rural areas, the theoretical advantages of market competition did not necessarily apply (Kronick et al. 1993).

Surveillance of *population-level* sentinel events under MMC has occurred rarely. Some prior studies have assessed interventions to improve immunizations under Medicaid (Vivier et al. 2000; Alessandrini et al. 2001a; Kirschke et al. 2004). Other sentinel events pertinent to population-level research questions have received little attention.

SETTING

New Mexico manifests high levels of poverty, uninsurance, minority ethnicity, and limited physician capacity (U.S. Census Bureau 2004, 2005; Morgan 2005; U.S. Health Resources and Services Administration 2006). The state recently ranked 47th among the 50 states in personal income per capita (\$24,291), third in persons below the poverty level (18.4 percent), second in lack of health insurance (22.1. percent), and first to 11th in unemployment. Drug- and alcohol-induced death rates per capita ranked first and second highest, respectively; suicide death rate ranked fifth; and homicide death rate ranked sixth. In a population of 1.8 million, approximately 21 percent held Medicaid coverage. Hispanics and American Indians comprised 51.6 percent of the state's population. Of 33 counties, 32 contained federally designated Health Professional Shortage Areas and/or Medically Underserved Areas.

Until 1997, New Mexico maintained a Medicaid system based on fee-for-service. Public and private providers received specified fees for Medicaid patients. The Medicaid program did not require selection of a primary care practitioner (PCP). Safety net providers, especially community health centers (CHCs) and public hospitals, could use Medicaid

revenues to subsidize services for uninsured patients. The state government provided preventive services such as immunizations through its Department of Health.

During July 1997, New Mexico initiated mandatory MMC (named “Salud!”) for nearly all Medicaid recipients. At 3-month intervals, the state government implemented MMC first in urban counties, next in suburban counties, then in rural counties, and finally in “frontier” counties. The state approved three private, for-profit managed care organizations (MCOs) to provide MMC services. These MCOs either offered services directly or subcontracted with other providers, including CHCs, public hospitals, and private practitioners’ offices. The new system required a PCP for each Medicaid patient. Because MCOs were to provide preventive services, the state reduced services previously provided by the Department of Health (for instance, immunizations). To deliver mental health services, the MCOs introduced new administrative layers: MCOs contracted with behavioral health organizations (BHOs), which subcontracted with regional care coordinators (RCCs), which in turn subcontracted with service providers.

OVERVIEW, CONCEPTUAL MODEL, AND RESEARCH QUESTIONS

Before New Mexico’s MMC program began, leaders of safety net organizations asked our research team to study the reform. We received transitional funding from the state government and the state’s largest public hospital to support the work. Later, we obtained federal funding to expand the research throughout the state. By planning the study so that we could detect favorable, neutral, and unfavorable impacts of MMC, we hoped our evaluation would provide information that program managers could use to improve the MMC program.

Conceptually, we considered specific research questions about the effects of policy change at three levels of analysis. At the *individual* level, our research question was: *What were the effects of MMC on barriers to care, access, utilization, and satisfaction?* As a result of gate-keeping and administrative review, we expected that individual utilization of services might change. Because of the bureaucratic procedures, we expected that MMC might adversely affect patients’ satisfaction; alternatively, satisfaction might improve with an assigned PCP who could serve as a “medical home.” Because enrollment in Medicaid shifted frequently (for instance, as people became

employed or unemployed), we decided to study not only the population covered by Medicaid but also those with other types of insurance and the uninsured.

At the *organizational/community* level, we asked: *What changes took place in workload, processes of supervision, visions of service ethics, financial stress, and provider accountability at safety net institutions and in the communities that the institutions served?* As control over Medicaid procedures reverted to a small number of MCOs, safety net institutions might experience reduced revenues and difficulties in maintaining services for the uninsured. Alternatively, systematic scrutiny by MCOs might improve accountability and quality.

At the level of the *population*, we asked: *What trends occurred in patterns of sentinel health events, linked to MMC reform.* For instance, changing access might affect rates of prenatal care, hospitalizations sensitive to outpatient care, cancers subject to early detection, immunizations, and diseases preventable by vaccines.

RESEARCH METHODS

We implemented three methods to address the research questions. Figure 1 summarizes the study's components. Several approaches in each component reduced the likelihood of bias: highly structured, validated instruments, and standardized, quantitative data analysis (survey); a variety of data sources, data collection and analysis involving multiple observers, and an iterative coding and interpretation process (ethnography); and application of standardized statistical methodology to databases whose public accessibility permitted reassessment by other analysts (sentinel events).

Survey Component

Survey Waves, Respondents, Sample Size, and Response Rates. We conducted telephone surveys of randomly sampled low-income households. The surveys were sequential and cross-sectional; each wave involved a separate sampling of the target population (we did not follow a cohort of subjects mainly due to frequent changes in insurance status). Although the state government did not initiate a baseline study before MMC and we could not accomplish such a study due to resource limitations, we conducted surveys shortly after implementation (at 9 months in two representative counties and at 18 and 27 months statewide), when we asked respondents to rate their experiences before and after MMC. To obtain information about children

Figure 1: Conceptual and Methodological Model of the Effects of Medicaid Managed Care Reform.

(if any), the interviewee answered questions about one designated child with the most recent birthday.

With α of 0.05 and 80 percent power, the sample size to detect a 5 percent difference from a baseline prevalence of 0.40 was 1,612. For lower baseline prevalences, or larger differences, the sample sizes were smaller. Six hundred fifty-seven persons participated in the smaller, 9-month survey, while 1,819 completed interviews in the 18-month statewide survey. Due to larger than expected differences in the 18-month survey and unexpectedly higher survey costs, the 27-month survey included 1,216 respondents. In the three waves, respondents gave information, respectively, about 267, 926, and

603 children in their households. The three waves showed response rates of 68.0, 82.8, and 76.4 percent.

Survey Items. We employed items from commonly used surveys, such as the Behavioral Risk Factor Surveillance System, the Consumer Assessment of Health Plans Study, and SF-36 measure of health status. Spanish-speaking team members translated the instrument into Spanish, different team members back translated into English, and the team resolved discrepancies through discussion.

Data Analysis. Bivariate analyses compared respondents by insurance category, demographic characteristics, and experiences before and after MMC. In each wave, pertinent dependent variables were entered into principal components factor analysis. The item loading highest on each factor was used as the dependent variable in logistic regression analysis. We conducted most analyses with *SAS* software (Cary, NC). *SUDAAN* software (Research Triangle Park, NC) provided weights to adjust findings as appropriate to population characteristics.

Ethnographic Component

Field Observations and Interviews. Ethnography is a qualitative method, usually involving intensive field observations and in-depth interviews. In health services research, ethnography can help document intended and unintended effects of government policies on institutions and communities (Rylko-Bauer and Farmer 2002; Singer and Castro 2004).

Graduate students conducted interviews at Income Support Division (ISD)—“welfare”—offices, CHCs, emergency departments, private PCPs’ offices, and mental health institutions. Observations also took place at community meetings and public forums. At each of 11 health care sites, ethnographers conducted field observations, performed structured interviews, and collected pertinent documents, at baseline and again at 9, 18, and 27 months after MMC implementation. Postdoctoral fellows monitored numbers of interviews, interview response forms, and field notes to enhance quality control. The anthropology professor who directed this component met with the team every 2 weeks to oversee data collection and assure quality. Ethnographers completed 15–20 interviews at each site during each phase with approximately equal numbers of administrators,

professionals, non-professional workers, and clients. Over the course of the 4-year study, the ethnographers conducted approximately 900 interviews.

Data Analysis. Ethnographic data were analyzed through iterative codings, which included terms such as PCP, referrals, workload, and financial impact. Through joint discussions, the ethnographic team then developed a coded index of topics (Emerson, Fretz, and Shaw 1996). A software package, *ATLAS.ti*, facilitated data analysis. Triangulation (i.e., comparing observations, interviews, and documents) helped clarify themes, concerns, and meanings that emerged repeatedly. Separate articles provides a more complete description of our ethnographic data collection, analysis, and interpretation process (Horton 2004; Lamphere 2005; Willging, Waitzkin, and Wagner 2005).

Sentinel Events Component

Data Sources. We employed data sets available at no or minimal cost in the public sphere. Adverse sentinel events included rates of hospitalization for conditions preventable by outpatient care (Bindman et al. 2005; Basu, Friedman, and Burstin 2006), mortality from cancers subject to early detection, prenatal care, immunization coverage levels, and incidence of vaccine-preventable diseases. We used several databases: (1) birth and death certificates, (2) hospital inpatient discharge data, (3) the New Mexico Tumor Registry, (4) the National Immunization Survey, and (5) data on reportable diseases from the State Department of Health.

Data Analysis. We generated bivariate plots of sentinel events over time. Formal statistical comparisons of data before and after MMC used Fisher's Exact Test for differences or ratios of rates and the Cochran–Armitage test for trend. We examined, when feasible, differences among geographical areas with larger versus smaller proportions of low-income households; we anticipated that MMC might impact these areas differently. Post hoc analyses of statistical power for nonsignificant findings determined that lack of significance did not reflect insufficient sample sizes. Partly through ethnographic observations, we examined causality to assess whether concurrent trends due to causes other than MMC might have contributed to findings.

RESULTS

Survey Component

This component addressed the first research question, concerning *effects on barriers to care, access, utilization, and satisfaction*.

*9-Month Survey.*⁷ Most respondents reported little change after MMC, which did not significantly affect barriers to access. Uninsured respondents experienced major access barriers. A substantial proportion of Medicaid adults reported transportation as a barrier to care. Adult Medicaid and Medicare recipients enjoyed the most favorable access. Medicaid recipients were more likely to utilize an emergency department than other groups. No differences emerged by insurance category in satisfaction. In logistic regression analyses, uninsured adults and children showed greater barriers and less access than those in other insurance categories; no significant changes occurred after MMC.

18-Month Survey. Both Medicaid and uninsured patients reported cost as barriers to physician services and medications (despite Medicaid's coverage for both). Medicaid recipients remained more likely to report transportation barriers and emergency department visits. All groups except Medicare reported cost as a barrier to dental services. The uninsured were significantly less likely and Medicaid recipients were as likely as other respondents to report a regular PCP or to have visited a physician (Table 1). For children, respondents' answers showed the same overall patterns.

In logistic regression analyses (Table 2A), the uninsured remained significantly more likely to report persisting barriers to care, as well as reduced access and utilization. Medicaid children experienced favorable access and utilization. Comparing their situation with the time before MMC, uninsured adults reported the quality of their care as significantly worse, while adult Medicaid recipients and Hispanics (the latter with borderline statistical significance) reported a favorable change in quality (Table 2B).

We examined changes in insurance over time. For adults with Medicaid coverage before MMC, 12.7 percent obtained private insurance by the time of the 18-month survey, while 25.4 percent became uninsured (Table 2C). Among these same respondents, 38 percent obtained full- or part-time employment. Only 22.2 percent of the latter employed respondents gained private insurance, while 37.4 percent reported lack of insurance.

Table 1: Barriers to Care, Access, Utilization, and Satisfaction for Low-Income Adults and Children, by Insurance Category, 18-Month Survey

<i>Adults</i>	<i>Private</i> (<i>n</i> = 438)	<i>Medicaid</i> (<i>n</i> = 169)	<i>Medicare</i> (<i>n</i> = 418)	<i>Other Insurance</i> [†] (<i>n</i> = 208)	<i>None</i> (<i>n</i> = 580)
Cost to see MD as barrier ^{**†}	20.6 ^{S,U}	26.6 ^{M,U}	15.3 ^{S,O,U}	27.7 ^{P,M,U}	48.9 ^{P,S,M,U}
Cost for Rx as barrier ^{**†}	22.4 ^U	29.8 ^U	25.9 ^U	25.7 ^U	40.6 ^{P,S,M,O}
Cost to see dentist as barrier ^{**†}	32.6 ^{M,O,U}	31.0 ^{M,O,U}	22.0 ^{P,S,O,U}	44.1 ^{P,S,M,U}	55.3 ^{P,S,M,O}
Language barrier ^{**†}	4.6 ^U	4.7	5.2	8.2	8.2 ^P
Transportation barrier ^{**†}	7.5 ^{S,M,O,U}	32.5 ^{P,M,O,U}	14.7 ^{P,S}	19.4 ^{P,S,U}	12.0 ^{P,S,O}
No PCP ^{**§}	18.9 ^{M,O,U}	23.1 ^{M,O,U}	12.1 ^{P,S,O,U}	44.4 ^{P,S,M,U}	51.8 ^{P,S,M,O}
No ED visits ^{**§}	75.6 ^{S,M}	57.4 ^{P,M,O,U}	68.2 ^{P,S,U}	72.3 ^S	77.8 ^{S,M}
No MD office visits ^{**§}	22.1 ^{S,M,U}	14.2 ^{P,U}	13.2 ^{P,U}	16.0 ^U	42.4 ^{P,S,M,O}
Dissatisfied with time for routine ^{*†}	12.0	12.1	8.1 ^{O,U}	17.4 ^M	15.0 ^M
Dissatisfied with time for sudden ^{*†}	17.3 ^M	14.6 ^U	10.5 ^{P,O,U}	18.5 ^M	21.7 ^{S,M}
<i>Children</i>	<i>Private</i> (<i>n</i> = 226)	<i>Medicaid</i> (<i>n</i> = 474)	<i>Medicare</i> (<i>n</i> = 0)	<i>Other insurance</i> [†] (<i>n</i> = 71)	<i>Uninsured</i> (<i>n</i> = 140)
Cost to see MD as barrier ^{**†}	7.1 ^U	6.1 ^U		7.0 ^U	23.9 ^{P,S,O}
Cost for Rx as barrier ^{*†}	7.6 ^U	7.6 ^U		9.9	16.5 ^{P,S}
Cost to see dentist as barrier ^{**†}	15.8 ^U	12.6 ^U		15.5 ^U	28.3 ^{P,S,O}
Language barrier [†]	5.8 ^S	11.8 ^P		8.5	9.3
Transportation barrier ^{**†}	8.0 ^S	15.9 ^{P,U}		15.5	7.2 ^S
No PCP ^{**§}	14.3 ^{O,U}	8.9 ^{O,U}		42.9 ^{P,S}	47.1 ^{P,S}
No ED visits ^{**§}	76.1 ^S	63.3 ^{P,U}		66.2	75.7 ^S
No MD office visits ^{**§}	18.6 ^{S,U}	9.3 ^{P,O,U}		23.9 ^{P,S,U}	39.3 ^{P,S,O}
Dissatisfied with time for routine visit [†]	14.0	11.1		14.5	10.0
Dissatisfied with time for sudden visit [†]	13.4	13.5		20.0	20.2

*Loglinear model $p < .05$.**Loglinear model $p < .01$.

[†]Other insurance includes. Veterans Administration, military (CHAMPUS), and additional small public insurance categories. The following superscripts denote the results of a multiple comparison analysis to determine differences between groups. "P" denotes that the group was different from those with private insurance at the 0.05 level of significance, "S" denotes a significant difference from those with Medicaid, "M" denotes a significant difference from those with Medicare, "O" denotes a significant difference from those with other types of insurance, and "U" denotes a significant difference from those with no insurance. No footnote was used when there was no difference between the group in question and any other group.

[†]Table entries represent percentage answering "1" or "2" on a five-point Likert-type scale, where response "1" indicated "very dissatisfied" and "5" very satisfied.

[§]Table entries represent percentage having no PCP, no ED visits, and no routine medical appointments.

ED, emergency department; PCP, primary care practitioner; MD, medical doctor; Rx, prescription.

Table 2A: Relationship of Respondent Characteristics to Key Measures of Health Services, 18-Month Survey (Logistic Regression Model)

	<i>Barriers to Care</i>	<i>Access/Utilization</i>	<i>Communication/ Satisfaction</i>
<i>Adults (n = 1,819)</i>			
Age over 55	0.47 (0.36, 0.62)**	0.72 (0.55, 0.95)*	0.51 (0.36, 0.71)**
Male	0.67 (0.52, 0.86)**	1.60 (1.25, 2.04)**	1.10 (0.81, 1.48)
Hispanic	1.18 (0.95, 1.48)	1.05 (0.84, 1.33)	0.69 (0.52, 0.90)**
Urban	0.71 (0.54, 0.93)*	0.86 (0.65, 1.13)	0.69 (0.49, 0.96)*
High school completed	0.88 (0.68, 1.14)	0.96 (0.73, 1.26)	0.65 (0.47, 0.88)**
Medicaid recipient	1.09 (0.74, 1.60)	0.74 (0.46, 1.18)	1.07 (0.68, 1.68)
Uninsured	3.13 (2.48, 3.94)**	3.15 (2.48, 4.01)**	1.25 (0.92, 1.68)
<i>Children (n = 926)</i>			
Hispanic	1.16 (0.71, 1.90)	1.36 (0.93, 1.99)	0.78 (0.51, 1.21)
Urban	0.66 (0.34, 1.26)	1.21 (0.78, 1.88)	0.93 (0.55, 1.59)
Medicaid recipient	0.82 (0.45, 1.47)	0.39 (0.25, 0.59)**	1.02 (0.63, 1.63)
Uninsured	4.03 (2.23, 7.29)**	2.57 (1.64, 4.00)**	1.22 (0.62, 2.42)

Notes: Table entries present odds ratio (95% confidence intervals) for respondents with listed characteristic having a positive response. Larger odds ratios in the first column indicate more barriers to care, in the second column indicate less access/utilization, and in the third column lower levels of communication/satisfaction.

* $p < .05$.

** $p < .01$.

27-Month Survey. In this survey, we performed more detailed analyses of respondents' current cost and transportation barriers.² About 25 percent of respondents with Medicaid reported a cost barrier. Forty-nine percent of uninsured adults and 32 percent of uninsured children were unable to see a doctor during the prior year due to cost. About one-quarter of adults and 10 percent of children with Medicaid experienced cost barriers to seeing a physician or dentist and to obtaining a prescription. One-third of Medicaid adults and 15 percent of Medicaid children reported transportation barriers.

We examined current direct medical costs (out-of-pocket payments) and indirect medical costs (waiting and travel times). Most adults and children (57 and 72 percent) on Medicaid reported no out-of-pocket expenditures; by comparison, most adults (80 percent) and children (60 percent) with private insurance incurred such expenditures. On average, respondents with some type of insurance coverage including Medicaid experienced shorter wait times (31–35 minutes) than those without insurance (42–45 minutes). Despite perceived transportation barriers, adults and children with Medicaid reported the shortest travel time to a physician's office, about 20 minutes on average; uninsured adults reported the longest average travel time, 43 minutes.

Table 2B: Perception of Change in Health Care Quality since MMC Began (Logistic Regression Model), 18-Month Survey

	<i>Positive Change</i>	<i>Negative Change</i>
<i>Adults (n = 1,819)</i>		
Age over 55	0.85 (0.64, 1.13)	0.65 (0.45, 0.94)*
Male	0.93 (0.69, 1.25)	0.98 (0.68, 1.41)
Hispanic	1.30 (1.00, 1.68)*	0.92 (0.67, 1.27)
Urban resident	0.92 (0.68, 1.25)	1.12 (0.78, 1.62)
High school completed	0.84 (0.62, 1.14)	0.91 (0.62, 1.33)
Medicaid recipient	1.66 (1.13, 2.44)*	1.00 (0.60, 1.69)
Uninsured	0.57 (0.39, 0.82)*	1.96 (1.36, 2.83)**
<i>Children (n = 926)</i>		
Hispanic	1.16 (0.78, 1.73)	1.00 (0.52, 1.92)
Urban	1.53 (0.97, 2.43)	1.12 (0.52, 2.42)
Medicaid recipient	1.39 (0.92, 2.09)	0.67 (0.33, 1.34)
Uninsured	0.99 (0.53, 1.86)	1.78 (0.77, 4.09)

Notes: Table entries present odds ratio (95% confidence intervals) of respondents with listed characteristic reporting a positive or negative response to questions concerning changes in health care since MMC was instituted.

**p* < .05,

***p* < .01.

Ethnographic Component

The ethnographic work aimed to answer the second research question, about *changes that took place in workload, processes of supervision, visions of service ethics, financial stress, and provider accountability at safety net institutions and in the communities that the institutions served.*

Table 2C: Comparison of Insurance Categories of Respondents before Implementation of MMC, and at the Time of the 18-Month Survey

	<i>Current Insurance Status (%)</i>				
	<i>Private (n = 399)</i>	<i>Medicaid (n = 154)</i>	<i>Medicare (n = 372)</i>	<i>Other (n = 161)</i>	<i>Uninsured (n = 465)</i>
<i>Insurance before MMC</i>					
Private (<i>n</i> = 431)	61.0	3.9	10.0	4.6	20.4
Medicaid (<i>n</i> = 260)	12.7	35.4	21.9	4.6	25.4
Medicare (<i>n</i> = 258)	2.7	0.8	88.8	3.1	4.7
Other (<i>n</i> = 179)	11.2	7.8	11.2	54.8	15.1
Uninsured (<i>n</i> = 423)	18.0	6.9	5.4	5.4	64.3

Notes: *p* < .0001 by χ^2 test for the table. Number in each cell represents the percentage of respondents in the insurance category.

Initial improvements occurred after MMC. According to safety net providers, advantages included the requirement of a PCP, emergency department case managers, and expansion of prenatal case management services. MCOs also sent reminders to parents to schedule well child exams. Disruptive transfers of hospitalized patients at the onset of MMC, experienced in some other states, did not occur. Most Medicaid patients expressed satisfaction with MMC, along the lines of: “without Salud!, we wouldn’t be able to afford health care,” or, “I am diabetic and would be on the street if I didn’t have Salud!”

Regarding workload, safety net personnel experienced the transition to MMC as stressful and chaotic. Rosters of patients and PCPs were unavailable. Telephone systems to inform patients and staff members about MMC often were busy or inoperable. Workload increased, due to increased administrative procedures and paperwork. MCOs’ separate contracts with medical laboratories, BHOs, pharmacies, and transportation agencies led to confusion. Over time, providers’ heavier workload persisted, although stress decreased with increased knowledge about MMC procedures.

Medicaid eligibility procedures grew more complex. About one-third of Medicaid applicants did not understand and/or did not complete the process. Clients who went to urban ISD offices to establish eligibility almost uniformly reported an inimical climate. With welfare reform and simultaneous staff cut-backs, ISD eligibility workers—who processed Medicaid applications—saw their caseloads increase from about 300 to as many as 700 clients. While arising from the larger policy environment rather than MMC, difficulties in eligibility determination contributed to access problems that uninsured people reported in the surveys.

Safety net institutions experienced heightened financial stress. Not one had prior experience with MMC, and only a few practice sites had received substantial managed care payments from MCOs for privately insured patients. The institutions encountered greater challenges in collecting Medicaid revenues and in using Medicaid to subsidize care for the uninsured. All CHCs received less income, due to delays and denials of payment. Providers lost capitation payments because MMC randomly assigned patients to new PCPs. Private practitioners experienced higher overhead costs due to MMC.

More adverse effects arose at rural sites than at urban sites. Outside urban areas, MCO penetration rates remained relatively low. Consequently, about 20 percent of rural MMC patients were assigned to PCPs more distant than nearby CHCs. Because of the financial problems, six private PCPs

decided to retire, to sell their practices, to move, or to open other practice sites for insured patients.

As a financial strategy, providers affiliated with more than one MCO, and rural providers initiated a coalition to increase their leverage in bargaining. Another strategy involved opening new part-time clinics or offices, offering new services, and reducing clinic hours. The latter cutback contributed to reduced access for uninsured people, as revealed in the survey component.

Regarding service ethics, all safety net providers decided to buffer patients from obstacles imposed by MMC. CHCs and one emergency department stopped requesting preapproval for visits. A CHC for the homeless maintained services for MMC patients but did not seek reimbursement from the MCOs. Indian Health Service facilities accepted American Indian patients with Medicaid, while the MCOs received patients' capitation payments. Providers' advocacy efforts included making phone calls for patients, helping them fill out forms, offering transportation, and assisting them in the enrollment process. Another buffering strategy involved "creative coding" in billing procedures so that MMC covered services that patients needed.

A crisis occurred in mental health services. MCOs initiated strict cost control and accountability measures in collaboration with BHOs, which authorized lower levels of care for acutely ill patients. Safety net institutions sustained financial losses as BHOs delayed or withheld service authorizations and reimbursements. Increased workload contributed to clinicians' stress, burnout, and turnover. Sixty child and adolescent mental health programs closed; agencies that remained reduced services. A net decline of 17 child psychiatrists in the state occurred after MMC. Of 47 licensed child psychiatrists, nine did not accept MMC patients. Eighty-six percent of psychologists accepted Medicaid before MMC; 34 percent did so afterward. In 2000, the state government verified that MMC recipients received lower levels of care than their conditions warranted. The federal government withdrew New Mexico's waiver to include mental health services under MMC. Later, the Bush administration reversed this decision but required extensive changes in the system (Willging et al. 2003; Willging 2005).

Ethnography clarified processes that contributed to declining immunization coverage (as observed in the sentinel events component). Reduced funding for immunizations at public health clinics resulted from the state government's decision to require immunizations by MCOs. PCPs found, however, that immunizations increased costs and reduced efficiency. Some PCPs contracting under MMC informally referred children to CHCs and public health clinics for immunizations, even though these

institutions had received reduced funding. Waiting times for immunizations increased.

Sentinel Events Component

This component aimed to answer the third research question, concerning *trends in patterns of sentinel health events*.

Birth and Death Certificates (Figure 2A). MMC did not reverse a decreasing trend in the proportion of births with a high level of prenatal care, for both high- (Cochran–Armitage $Z = -9.87$, $p < .001$) and low-income areas ($Z = -2.67$, $p = .010$). The proportion of births with a low level of prenatal care continued to rise. A previous improving trend in the mean first month of prenatal care did not continue after MMC.

Hospital Inpatient Discharge Data. Regarding age-adjusted rates of hospital admissions for conditions sensitive to outpatient care, hospitalizations for asthma decreased significantly after MMC, while those for diabetes and angina pectoris did not. An overall trend in rate or length of hospitalization for these conditions did not emerge.

New Mexico Tumor Registry. During the first 3 years after MMC, the proportion of early stage diagnoses of breast cancer increased significantly; rates of cervical and lung cancer did not change.

National Immunization Survey (Figure 2B). Immunization coverage levels decreased significantly after MMC implementation. In 1996, for the 4:3:1 vaccination series, New Mexico had achieved a coverage level of 80 percent and ranked 30th in the nation. By 2000, this level decreased to 72 percent, and New Mexico ranked 50th. The proportion of those vaccinated by public sources decreased significantly, while those by private providers, who received capitated payments for children covered by MMC, increased only marginally. (As noted above, ethnographic data suggested that reduced funding for public health clinics and MCOs' referrals of children with MMC coverage to safety net providers for immunizations contributed to the decrease in coverage levels.)

Figure 2: Changes in Key Sentinel Events. (A) Prenatal Care. (B) Immunization Coverage Level Estimates.

Note: (a) Source: New Mexico birth certificates. Results for high-income and low-income zip codes are shown. Arrow marks the date of implementation for Medicaid managed care. *Note:* (b) Source: National Immunization Survey, 1996–2000. Data for the 4:3:1 immunization series (four doses of diphtheria, tetanus, and acellular pertussis vaccines; three doses of poliovirus vaccine; and one dose of measles vaccine) are shown. Arrow marks the date of implementation for Medicaid managed care.

Data on Reportable Diseases. The incidence of vaccine-preventable diseases fluctuated considerably before and after MMC, but no temporal pattern emerged.

CONCLUSION

In summary, our project used a long-term, multimethod approach to study the impact of MMC. In the survey component, we found that no consistent changes occurred at the individual level after MMC implementation. Uninsured adults and children experienced worse barriers, less access, lower utilization, and less satisfaction than adults in other insurance categories; experiences of those with Medicaid proved relatively favorable, both before and after MMC. In the ethnographic component, safety net institutions experienced marked increases in workload and financial stress, especially in rural areas. Providers worked to buffer the impact of MMC for patients. Mental health services deteriorated sharply. In the sentinel events component, after MMC, immunization rates declined.

Strengths and Weaknesses of the Multimethod Approach to Assess Policy Change

To our knowledge, our research represents the first multimethod study to use complementary survey, ethnographic, and sentinel event techniques to answer questions at different levels of analysis in assessing a major health policy change. Some strengths and weaknesses of the multimethod approach became evident. Relying on statistical measures of central tendency, surveys best depict major trends in a population's experience. However, such surveys remain relatively insensitive to infrequent experiences affecting small segments of the population. Although ethnographic approaches do not lead to precise estimates about a population's experience, they can identify problems occurring infrequently and provide depth of understanding. The sentinel events component tracked changes in population-level indicators after MMC, but these indicators could not establish definitively the reform's causal impact (although the ethnographic component clarified probable causal processes). Regarding generalizability, multimethod research could assess MMC or similar policy changes elsewhere.

The survey illustrated limitations of cross-sectional, telephone-based research. Our data could have underestimated access barriers by excluding households without telephones. From our own and others' prior research, we

expect that the inclusion of people without telephones would accentuate the access barriers deriving from lack of insurance that we found in the telephone survey. In addition, survey items that asked subjects to report on experiences that occurred before and after MMC implementation raised the possibility of recall bias. Asking adults to report the experiences of one child may have led to some difficulty in accurately recalling the index child's experiences for those with more than one child. However, there is no reason to expect that errors in recall occurred differentially among insurance categories.

Arguments for multimethod research must consider costs. Our study's comprehensive design required substantial support, but similar research could proceed with less financing. To conduct a survey of this magnitude would require about \$20,000 per wave for a survey research center, plus about \$8,500 per year for a trained research assistant. Ethnographic work by two half-time research assistants would cost about \$34,000 per year. With a 25 percent research assistant, the sentinel events component would cost about \$8,500 annually. Modest expenses for local travel, supplies, and telephone calls would take an additional \$10,000 per year. Supervisory functions usually could take place within the current job definitions of faculty members at local universities or professionals based at safety net institutions. Local groups could employ a multimethod approach within existing institutional budgets combined with limited additional fund raising.

Implications for Program Monitoring and Policy Making

By contributing to program monitoring and policy making, our study established a fruitful model for evaluative health policy research. Managers and policy makers responded to our evaluation as well as other input to initiate changes in MMC. For instance, data from the population-based survey revealed that MMC caused no major changes for Medicaid recipients. Lack of insurance, however, remained the single most important predictor of barriers, access, utilization, and satisfaction, both before and after MMC. Our data proved helpful in working toward policies that moved beyond Medicaid to coverage for the uninsured.

The ethnographic component suggested problems not elicited in the surveys. Ethnographic observations helped justify additional funding for safety net institutions (Waitzkin et al. 2002). Organizing efforts based partly on the ethnographic work created such attention that the state initiated a major new mental health initiative (Willging, Waitzkin, and Wagner 2004, 2005).

After the sentinel events component clarified an unexpected deterioration in immunization coverage coinciding with MMC implementation, intense efforts to change policies and practices occurred. When our article appeared in a major primary care journal (Schillaci et al. 2004), the immunization crisis received wide coverage in newspapers and broadcast media. This information assisted in the creation of a statewide immunization task force. Funding and organizational changes led to improved practices. By 2004, New Mexico moved from 50th to 15th among the states in immunization coverage (Institute for Public Health 2006).

MMC affected safety net providers profoundly while leading to little impact on patients, partly because providers worked to buffer the adverse impacts of new policies. Despite MMC, lack of insurance continued to impede access. Future policies should address the effects of MMC on safety net providers and should recognize that such reform does not adequately address the problems of the uninsured.

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NOTES

1. An earlier publication (Waitzkin et al. 2002) presents tables that detail findings from the 9-month survey.
2. Tables that present these and other findings from the 27-month survey are available by request.

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SUPPLEMENTARY MATERIAL

The following supplementary material for this article is available online:
Appendix SA1: Author Matrix.

This material is available as part of the online article from <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1475-6773.2008.00842.x> (this link will take you to the article abstract).

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