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The Contributions of Managed Care Plans to Public Health Practice: Evidence from the Nation's Largest Local Health Departments

S Y N O P S I S

Objective. The authors examine the extent and nature of managed care plans participating in local public health activities.

Methods. In 1998, the authors surveyed the directors of all US local health departments serving jurisdictions of at least 100,000 residents to collect information about public health activities performed in their jurisdictions and about organizations participating in the activities. Multivariate logistic and linear regression models were used to examine organizational and market characteristics associated with managed care plan participation in public health activities.

Results. Managed care plans were reported to participate in public health activities in 164 (46%) of the jurisdictions surveyed, and to contribute to 13% of the public health activities performed in the average jurisdiction. Plans appeared most likely to participate in public health activities involving the delivery or management of personal health services and the exchange of health-related information. Managed care participation was more likely to occur in jurisdictions with higher HMO penetration, fewer competing plans, and larger proportions of plans enrolling Medicaid recipients. Participation was positively associated with the overall scope and perceived effectiveness of local public health activities.

Conclusions. Although plans participate in a narrow range of activities, these contributions may complement the work of public health agencies.

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The rapid growth of managed care over the past decade has motivated widespread speculation about how these evolving health care delivery and financing systems affect the administration and practice of public health.¹⁻⁷ Some observers have suggested that managed care plans and public health agencies face compelling reasons to cooperate in carrying out activities such as community based health promotion and disease prevention interventions, community health surveillance activities, and outreach efforts for vulnerable and high-risk populations.^{1,2,6,8-10} Because plans manage the health care needs of defined populations of subscribers, they may have an interest in contributing to public health activities that improve population health status and reduce the need for medical care.¹¹ In turn, public health agencies may benefit from these contributions. Contributions by managed care plans may assist agencies in expanding the scope and scale of public health activities available in the community.^{8,12-14} Moreover, plans may provide public health agencies with access to specialized managed care resources that facilitate the conduct of public health surveillance and education efforts—large clinical and administrative databases, for example, and mechanisms for communicating with large numbers of plan members and affiliated providers.⁴

Others argue that an overriding concern with short-term financial performance and competitive market position precludes most plans from meaningful involvement in public health activities.^{5,15} From this perspective, managed care plans may decline to invest in public health activities because the returns (such as population health improvements) often require relatively long periods of time to accrue. Moreover, any returns from public health activities are likely to accrue to all plans in the market, regardless of whether they contribute to the activities. Concerns about adverse selection may also lead managed care plans to eschew involvement in public health activities, under the assumption that such involvement could encourage less healthy populations to enroll in the plans.

Managed care plans participating in governmental health insurance programs such as Medicaid and the State Children's Health Insurance Program (CHIP) potentially face strong incentives for contributing to public health activities. These plans serve low-income populations that often confront higher risks for preventable disease and injury and greater needs for outreach and support services. Nonetheless, Medicaid and CHIP plans may choose to address the health risks and service needs of their members through contracts with private health

care providers rather than through contributions to public health activities. By re-directing patients from public health agencies and other safety-net providers to private providers, these plans potentially reduce the clinical revenue that some public health agencies use to support population based public health activities.^{16,17} Others, however, argue that public health agencies face opportunities for enhancing population based public health activities—including surveillance, environmental health protection, and community health planning—when they transition responsibilities in clinical services delivery to managed care plans and private providers.¹⁸

These possibilities raise the important question of how managed care affects the scope of public health activities performed within communities. To address this question, we examined the contributions made by managed care plans to core public health activities in the largest local public health jurisdictions in the United States. The objectives of our research are twofold. First, we identify the types of activities in which plans participate, and examine the organizational and market characteristics that are associated with this participation. Second, we explore how managed care plan participation may affect the overall scope and effectiveness of public health activities performed within local communities. Findings from our study provide insight on administrative and policy strategies for strengthening the nation's public health system amid continued health system change.

BACKGROUND AND CONCEPTUAL FRAMEWORK

Throughout the past decade many observers have maintained that collaboration between managed care plans and public health agencies can allow both types of organizations to improve the effectiveness and efficiency of their operations. Consequently, collaborative relationships have become widely advocated strategies for improving public health and medical practice.^{1,2,4,9,19-22} Despite this enthusiasm, very little systematic evidence exists concerning the extent to which managed care plans contribute to public health activities within the communities in which they operate. Most of the existing evidence is specific to individual plans and communities. One case study analysis of the managed care plans and local public health agencies operating in eight diverse US markets found that only about one-fifth of the 32 plans contributed to public health activities.¹³ Other studies have shown that managed care plan involvement in public health activities tends to concentrate on: the delivery

If managed care plan contributions are not coordinated sufficiently with the activities of public health agencies, duplication may erode any opportunities for public health system expansion and improvement.

of personal health services, the exchange of health data and information, and the development and implementation of community interventions and policies.^{7,8,10,12}

The body of literature documenting examples of such involvement has grown steadily and extends to activities such as: population based efforts to increase uptake of immunizations, cancer screening services, and other clinical preventive services;^{4,23,24} disease surveillance and control efforts such as those focused on sexually transmitted diseases²⁵ and tuberculosis;^{26,27} primary injury prevention efforts such as bicycle and automobile safety programs;²⁸ population based health education efforts such as anti-tobacco campaigns and breast cancer awareness programs;²⁹ and physician targeted education and training programs such as those focused on diabetes management and appropriate vaccine storage techniques.¹³ Little evidence suggests that managed care plans participate in other core public health functions such as environmental monitoring, community health planning and policy development, and food and water safety inspections.²⁹

Concepts from economic theory and organizational sociology suggest that plans may have both altruistic and economic motivations for participating in public health activities. For some not-for-profit plans, public health activities may fall within their institutional mission of expanding access to health care and improving community health.^{3,30,31} Even profit-maximizing (that is, for-profit) health plans may participate in public health activities to achieve altruistic interests, as well as to build goodwill with the communities they serve.³² Health plans may also view certain public health activities as business investments that potentially yield economic returns through diminished future health care costs or expanded market share.^{11,15} The incentives for participation may be particularly strong for plans that serve populations most likely to benefit from public health interventions, such as underserved populations and socioeconomic groups at high risk for preventable disease and disability.¹⁰

Economic theory further suggests that the structure

of local health insurance markets may influence the incentives that managed care plans face to help produce public goods such as public health activities.³³ Specifically, plans are expected to face more compelling incentives to help improve population health status in local markets where larger shares of the population are concentrated in smaller numbers of competing managed care plans.³⁴⁻³⁶ Plans operating in markets with high managed care penetration and low competition are able to capture larger shares of any economic returns that flow from efforts to improve health status and lower disease risks at the population level. Consequently, these plans are expected to be more likely to contribute to such efforts. A recent study of commercial HMOs operating in a nonrandom selection of 60 counties provides some empirical support for these potential market effects.^{37,38}

By contributing to public health activities, managed care plans potentially influence the overall scope and effectiveness of activities produced by the local public health delivery system. Such contributions should enhance the availability and quality of public health activities if managed care plans complement the work carried out by the other organizations contributing to this system—especially the work of governmental public health agencies.²⁹ From this perspective, managed care plan contributions are expected to enable public health agencies to support an expanded set of public health activities. On the other hand, if managed care plan contributions are not coordinated sufficiently with the activities of public health agencies, duplication may erode any opportunities for public health system expansion and improvement. Moreover, it is possible that the activities contributed by managed care plans function as imperfect substitutes for activities formerly performed by public health agencies. If so, then managed care contributions could diminish the local availability and effectiveness of public health activities.³⁹

Analytical model. Because the potential causes and consequences of managed care plan participation in pub-

lic health activities are varied and complex, an empirical, exploratory investigation is warranted. The underlying analytical model for this study relies on the economic and sociological concepts described above. Under this model, a managed care plan's decision to participate in public health activities is shaped by the plan's preferences for economic and non-economic (altruistic) returns, along with other characteristics that influence the expected costs and benefits of participation in public health activities. Ownership characteristics (for-profit versus non-profit status) are presumed to reflect a plan's economic preferences, whereas characteristics of the local market structure (degree of market concentration) are presumed to influence the expected benefits of participation. Other characteristics likely to affect participation costs and benefits include a plan's organizational structure, characteristics of the local public health agency, and local population and area characteristics. In addition to shaping managed care participation, most of these characteristics are expected to have direct effects on the scope and effectiveness of activities produced by the local public health delivery system as a whole. Consequently, analytical methods must be used to control for these characteristics in order to explore how managed care plan contributions may affect the overall scope and effectiveness of public health activities.

METHODS

Population and sampling frame. We surveyed the directors of all US local health departments that serve jurisdictions of at least 100,000 residents to collect information about the performance of core public health activities in their jurisdictions, and about the contributions made by managed care plans and other types of organizations. The study population was limited to large public health jurisdictions, in part, to eliminate smaller jurisdictions that were not served by managed care plans and therefore were not likely to be affected by managed care participation in public health activities. The 1997 National Profile of Local Health Departments maintained by the National Association of County and City Health Officials was used to identify the 497 health departments that reported serving jurisdictions of at least 100,000 residents during 1996–97.⁴⁰

These organizations represented approximately 17% of all local health departments but served jurisdictions that contain approximately 70% of the total US population.⁴¹ The survey was fielded from August through November of 1998.

Measures of participation and performance. The dependent variables used in this analysis measured both the extent to which managed care plans participate in core public health activities, and the overall scope and effectiveness of public health activities performed within the jurisdiction. These measures were constructed from data reported by the public health agency director in each study jurisdiction, using a previously tested self-administered survey instrument.⁴² The instrument included questions about 20 public health activities, each one linked to one of the three core public health functions identified by the Institute of Medicine.⁴³ The survey instrument was developed through two research projects sponsored by a cooperative agreement between the Centers for Disease Control and Prevention and the Association of Schools of Public Health.^{42,44} Using expert panel meetings, literature reviews, local health department surveys, and case studies, each of the projects identified activities regarded as important for maintaining and improving public health at the community level.^{42,44-50} Findings from these two projects were used to identify a set of 20 public health activities that could serve as indicators of local public health performance (Table 1). Activities were selected based on the expert opinions of public health researchers and practitioners, and based on the statistical associations between activities and other summary measures of public health performance.^{46,51-53} Researchers surveyed a nationally representative sample of 298 local health department directors in 1995 and found wide agreement with the 20 activities as indicators of local public health performance.⁵³

For each of the public health activities included on the survey instrument, a series of questions was asked of the local health department director. The director was asked first to indicate whether or not the activity is performed in the jurisdiction served by the local health department. If the activity is performed, then the director was asked to rate how well the activity is performed (perceived effectiveness) using a five-point Likert scale ranging from "Meets no community needs" to "Fully meets community needs." Finally, the director was asked to indicate the types of organizations that participate in performing the activity within the jurisdiction, using a predefined list of 11 organizational categories and an open-ended response option for other organizations.

The organizational category for managed care plans was defined to include all organizations that finance and arrange the delivery of health services for defined populations of subscribers, and included health maintenance organizations (HMOs) as well as preferred provider organizations (PPOs). Other organizational categories were

defined for physician organizations, hospitals, community health centers, federal government agencies, state government agencies, local government agencies, and other nonprofit organizations. One of the 20 public health

activities included on the survey instrument (No. 20) related specifically to public health agency responsibilities and therefore was not used in measuring participation by other organizations (see Table 1).

Table 1. List of survey questions regarding core public health activities used in surveying local public health agency directors

Assessment

1. In your jurisdiction, is there a community needs assessment process that systematically describes the prevailing health status in the community?
2. In the past three years in your jurisdiction, has the local public health agency surveyed the population for behavioral risk factors?
3. In your jurisdiction, are timely investigations of adverse health events conducted on an ongoing basis—including communicable disease outbreaks and environmental health hazards?
4. Are the necessary laboratory services available to the local public health agency to support investigations of adverse health events and meet routine diagnostic and surveillance needs?
5. In your jurisdiction, has an analysis been completed of the determinants of and contributing factors to priority health needs, the adequacy of existing health resources, and the population groups most affected?
6. In the past three years in your jurisdiction, has the local public health agency conducted an analysis of age-specific participation in preventive and screening services?

Policy Development

7. In your jurisdiction, is there a network of support and communication relationships that includes health-related organizations, the media, and the general public?
8. In the past year in your jurisdiction, has there been a formal attempt by the local public health agency to inform elected officials about the potential public health impact of decisions under their consideration?
9. In your local public health agency, has there been a prioritization of the community health needs that have been identified from a community needs assessment?
10. In the past three years in your jurisdiction, has the local public health agency implemented community health initiatives consistent with established priorities?
11. In your jurisdiction, has a community health action plan been developed with community participation to address priority community health needs?
12. In the past three years in your jurisdiction, has the local public health agency developed plans to allocate resources in a manner consistent with community health action plans?

Assurance

13. In your jurisdiction, have resources been deployed as necessary to address the priority health needs identified through a community health needs assessment?
14. In the past three years in your jurisdiction, has the local public health agency conducted an organizational self-assessment?
15. In your jurisdiction, are age-specific priority health needs effectively addressed through appropriate service provision or service linkage?
16. In your jurisdiction, have there been regular evaluations of the effects of public health services on community health status?
17. In the past three years in your jurisdiction, has the local public health agency used professionally recognized process and outcome measures to monitor programs and to redirect resources as appropriate?
18. In your jurisdiction, is the public regularly provided with information about current health status, health care needs, positive health behaviors, and health care policy issues?
19. In the past year in your jurisdiction, has the local public health agency provided reports to the media on a regular basis?
20. In the past three years in your jurisdiction, has there been an instance in which the local public health agency has failed to implement a mandated program or service?

SOURCE: Reference 53

No evidence of systematic over-reporting or under-reporting of activities was found for any of the questions during extensive in-person site visits conducted in the jurisdictions of eight departments that responded to an earlier version of the survey in 1995.⁵⁴ More specifically, interviews with administrators of managed care plans in these jurisdictions revealed a high correspondence between the reports of managed care plan participation given by local health directors and those given by plan administrators themselves.⁵⁵

We constructed two summary measures of managed care plan participation in public health activities from survey responses. First, a dichotomous measure indicated whether or not managed care plans are reported to participate in any of the public health activities included on the survey. Second, the scope of managed care participation was measured as the number of activities in which plans are reported to participate, expressed as a proportion of the total number of activities performed within the jurisdiction. For comparison, similar measures of participation were constructed for the other organizational categories.

We also used survey responses to construct summary measures of the scope and perceived effectiveness of public health activities performed within each jurisdiction. The scope of performance was calculated as the number of activities performed within the jurisdiction, expressed as a proportion of the 20 activities included on the survey. The perceived effectiveness of performance was calculated for each jurisdiction by summing the Likert ratings of effectiveness across all the public health activities, and then expressing this sum as a proportion of the highest possible score. For example, a score of 100% would result if all 20 activities were rated as "Fully meets community needs." The perceived effectiveness measure therefore represented a weighted average of the activity-specific dichotomous indicators of public health performance, where the Likert scale effectiveness ratings were used as weights.

Market, organizational, population characteristics.

The independent variables of interest in this study included measures of the structure of the local health insurance market as well as characteristics of managed care plans operating in the jurisdiction. One variable measured the proportion of residents who are enrolled in HMOs (HMO penetration), while a second variable measured the number of competing HMOs that operate within the jurisdiction (HMO competition). Based on the analytic model described above, we expected managed

care participation in public health activities to rise with HMO penetration, but decline with HMO competition.^{34,36} The analytic model also suggested that if managed care growth adversely affected local public health agencies and other safety net providers by redirecting health care revenues, then HMO penetration and competition should have negative effects on the overall scope and effectiveness of public health activities performed within the jurisdiction. Due to data limitations, this study did not include measures of PPO enrollment and competition as additional independent variables. If PPOs are responsible for much of the managed care participation observed in this study, then the omission of PPO variables could compromise the study's ability to measure the effects of market structure on this participation. Evidence from an earlier case study analysis in 60 public health jurisdictions, however, found that most of the managed care plans participating in public health activities were organized as HMOs.³⁷

Several other variables measured specific plan characteristics that were expected to influence participation in public health activities, including the proportion of HMOs in the market that were for-profit corporations; the proportion of HMOs that were owned by national corporations rather than local plans; the proportion of HMOs that served Medicaid recipients; and the proportion of HMOs organized as group- and staff-model plans as opposed to independent practice association and network-model plans. Unlike the HMO penetration and competition variables, these detailed plan characteristics were assumed to influence the overall scope and effectiveness of public health activities only indirectly through their influence on managed care participation. Specification tests based on results from the multivariate models confirmed that these four variables were not directly associated with the scope and effectiveness measures, after controlling for other variables in the models (joint significant tests $P > 0.10$).⁵⁶ Therefore, the four variables describing plan characteristics were included in models of managed care participation but excluded from models of the overall scope and perceived effectiveness of public health activities.

Additional measures were used to control for other factors likely to influence managed care plan participation in public health activities, and the overall scope and effectiveness of public health activities. Several variables were used to control for differences in the administrative and decision-making structures of public health agencies, because these structures potentially affect the types of public health activities performed and the types of relationships formed with other organizations. First, a set of

dichotomous variables was used to indicate the type of government agency that serves each jurisdiction, including: (a) a city or township agency; (b) a county agency or combined city-county agency; or (c) a multi-county agency or other special district agency. A second set of variables indicated the type of administrative relationship that exists between each agency and its state health department, including: a centralized relationship in which the agency operates as an administrative unit of the state department; a decentralized relationship in which the agency operates under local governmental authority; and a shared relationship in which some agency functions are carried out under state authority while other functions remain under local authority.⁵⁷ Third, the public health agency's internal governance and decision-making structure was measured with a variable indicating whether or not the agency operates under the authority of a local board of health that exercises policy-making powers. A fourth variable reflected the aggregate resources allocated to the local public health agency, measured as the agency's most recent annual expenditures per resident in the jurisdiction.

Several measures were used to control for population characteristics that potentially reflect the aggregate need and demand for public health services within each jurisdiction. One variable indicated the population size of the agency's jurisdiction, which may influence the volume and scope of health needs that exist within the jurisdiction, as well as the economies of scale that exist in addressing population health needs. This study used a logarithmic transformation of population size in order to reduce skewness and the influence of outliers in the untransformed variable, and to account for possible diminishing returns to scale in performing public health activities. A second variable indicated the proportion of residents who are nonwhite. To the extent that racial and ethnic minority groups experience disparities in health and socioeconomic status, this variable served as a proxy for health and socioeconomic need within the jurisdiction. The proportion of the population that subsisted below the poverty level in 1989 was used as an indicator of socioeconomic need within the population, under the assumption that the unobservable 1998 poverty rates were significantly correlated with the 1989 rates. Similarly, a measure of population density was constructed using 1997 county population estimates and land area data. Differences in population density potentially reflected population-level differences in disease risk, access to health care, and the cost of implementing public health interventions. Two other control variables mea-

sured the local availability of medical care services within each jurisdiction: the number of community hospital beds per 100,000 population, and the number of active nonfederal physicians per 100,000 population.

Data collection. In August 1998, the self-administered survey instrument was mailed to the director of each public health agency in the study population. One additional mailing, two post card reminders, and two telephone reminders were made to non-responding departments during a four-month data collection period between August and November 1998. A total of 356 usable questionnaires were returned, yielding an overall response rate of 72%. No statistically significant differences were noted between responding and non-responding departments with respect to population size of jurisdiction, departmental expenditures, departmental staffing, type of agency, and types of services offered.

To construct control variables for use in the multivariate models, survey data were linked with secondary data indicating organizational, market, and population characteristics. Data on public health agency characteristics were obtained from the 1997 Profile of Local Health Departments collected by NACCHO.⁴⁰ Data on HMO organizational and market characteristics were obtained from Interstudy's 1998 HMO Census.⁵⁸ Finally, data on population and areas characteristics were obtained from US Census data and other secondary data sources included on the Area Resource File.⁵⁹

Measures obtained from sources other than the NACCHO data file were measured at the county level. For 79% of the local public health agencies in this study, county-level measures corresponded perfectly to the geographic extent of the agency's jurisdiction, because the jurisdictions were defined by county boundaries or multi-county aggregations. The remaining 21% of agencies served cities, towns, or special districts not defined by county boundaries. For these agencies, we expected county-level measures to be correlated with jurisdictional characteristics. To examine whether mis-specification of jurisdictional boundaries affected the results of this study, all multivariate models were estimated both with and without the 21% of observations from agencies that serve non-county based jurisdictions. Specification tests indicated that estimates were not significantly different when the 21% of observations were excluded from the models. Consequently, the results reported here were based on the full sample of observations. Variable definitions and descriptive statistics for all explanatory variables in all models are given in Table 2.

Table 2. Variables used in multivariate models of managed care participation and public health performance in large health department jurisdictions, US, 1998 (N = 356)

Variable (scale)	Mean	Standard deviation	Model 1	Models 2, 3
<i>Public health performance measures</i>				
Scope of public health activities performed (percent)	63.8	± 19.3	NI	Dependant variable
Perceived effectiveness of public health activities (percent) . .	35.4	± 13.5	NI	Dependant variable
<i>Managed care participation measures</i>				
Managed care plans participate in public health activities (0,1)	0.458	± 0.499	Dependent variable	Positive
Scope of activities in which managed care plans participate (percent)	12.7	± 19.8	Dependent variable	Positive
<i>Other public health participation measures</i>				
Hospital participation (0,1)	0.966	± 0.181	NI	Positive
Private physician participation (0,1)	0.853	± 0.354	NI	Positive
Nonprofit organization participation (0,1)	0.951	± 0.214	NI	Positive
Federal agency participation (0,1)	0.444	± 0.498	NI	Positive
State agency participation (0,1)	0.977	± 0.149	NI	Positive
Local agency participation (0,1)	0.918	± 0.275	NI	Positive
Other organization participation (0,1)	0.975	± 0.158	NI	Positive
<i>Public health jurisdiction characteristics</i>				
Population size of jurisdiction (log)	12.449	± 0.799	Positive	Positive
Population per square mile	973	± 3244	Positive	Positive
Proportion of population white (percent)	81.2	± 16.3	Negative	Positive
Proportion of population below poverty (percent)	12.28	± 5.71	Positive	Negative
Population per community hospital bed	1808	± 16055	Positive	Negative
Population per active nonfederal physician	614	± 630	Positive	Negative
<i>Local public health agency characteristics</i>				
City or township agency (0,1) ^a	0.0963	± 0.295	Negative	Negative
District or multicounty agency (0,1) ^a	0.184	± 0.388	Positive	Positive
Centralized state-local authority (0,1) ^b	0.212	± 0.409	Positive	Positive
Shared state-local authority (0,1) ^b	0.251	± 0.434	Positive	Positive
Per-capita annual agency expenditures (log)	3.28	± 1.12	Negative	Positive
Policy-making board of health exists (0,1)	0.405	± 0.492	Positive	Positive
<i>Managed care market characteristics</i>				
Proportion of population enrolled in HMOs [HMO penetration] (percent)	25.0	± 13.6	Positive	Negative
Number of competing HMOs [HMO competition]	10.39	± 5.14	Negative	Positive
HMOs, for-profit (percent)	76.0	± 26.3	Negative	NI
HMOs owned by national corporation (percent)	66.5	± 20.4	Negative	NI
HMOs enrolling Medicaid recipients (percent)	42.3	± 23.5	Positive	NI
HMOs organized as IPA/network model (percent)	52.7	± 24.3	Negative	NI

NOTES: Model 1 is a two-part model of managed care participation (logit/OLS). Models 2 and 3 are linear regression models of the scope and perceived effectiveness of public health activities.

^aOmitted category includes county and joint city-county agencies

^bOmitted category includes decentralized local authority

NI = variable not included in model

Positive = expected effect on dependent variable is positive

Negative = expected effect on dependent variable is negative

(0,1) = dichotomous variable: 0 if no, 1 if yes

(log) = variable transformed to natural log scale

Statistical analysis. The unit of analysis for this study was the local public health agency jurisdiction. Our analytical approach consisted of three components. First, we used descriptive statistics to identify the types of public health activities in which managed care plans participated, based on the reports of local public health directors. Participation measures for managed care plans were compared with measures for each of the other organizational categories using bivariate equality-of-proportions tests with multiple comparisons adjustments.⁶⁰ Second, we examined the organizational and market characteristics associated with managed care plan participation in public health activities, using a two-part multivariate model.⁶¹ In the first part of the model, a logistic regression equation modeled the likelihood that managed care plans participated in any of the 19 public health activities studied. In the second part of the model, a linear regression equation modeled the scope (proportion) of activities in which managed care plans participated, for those jurisdictions in which some participation was noted. We also estimated the second-step equation using poisson regression, with the dependent variable specified as a count rather than a proportion. Results were qualitatively equivalent to the results using linear regression; therefore we reported only linear regression results for ease of interpretation.

The explanatory variables used in each part of the model reflected characteristics that are expected to influence the decisions of plans to participate in performing public health activities, including the attributes of local managed care plans, the local public health agency, and the local population (see Table 2). Because observations on public health agencies from the same state might be correlated due to their common policy and administrative environment, all multivariate estimates were adjusted for possible state-level correlation using the Huber/White robust standard error method.⁶²⁻⁶⁴

The third analytical component of this study examined the relationship between managed care participation and the overall scope and perceived effectiveness of public health activities performed within the study jurisdictions. A multivariate linear regression equation was used to estimate the affect of managed care participation on the scope of activities performed within the average jurisdiction, while controlling for participation by other types of organizations and for other organizational and market characteristics.⁶⁴ We also estimated this model using poisson regression, with the dependent variable specified as a count rather than a proportion. Results were qualitatively equivalent; therefore, we report only the linear regression results for ease of interpretation.

We used a dichotomous measure of managed care participation as the primary explanatory variable of interest, along with similar participation measures for each of the following types of organizations: hospitals, physician organizations, government agencies, and other types of organizations. In addition to the participation measures, the set of explanatory variables used in this model was limited to exogenous characteristics of the local public health agency and its jurisdiction that are expected to influence the overall demand for public health activities and the resources required to perform these activities (see Table 2). Consequently, this model served as a reduced-form approximation of the processes used in producing public health activities at the local level. A similar linear regression equation was used to estimate the effect of managed care participation on the perceived effectiveness of public health activities performed within the jurisdiction. This reduced-form model used the same set of explanatory variables included in the scope-of-performance model. Both models employed the Huber/White method of computing standard errors in order to account for the potential state-level correlation among observations.

The multivariate regression models used in this analysis presented a potential limitation because managed care participation may be determined in part by unobserved characteristics that also influence the overall scope and effectiveness of public health activities performed within a jurisdiction. For example, in communities facing significant communicable disease threats, public health agencies might have chosen to expand their surveillance and disease control activities while also forming partnerships with managed care plans to educate physicians and consumers. If so, then regression estimates of the relationship between managed care participation and public health performance would be positively biased because unobserved community health status has a positive effect on both variables. Alternatively, it is possible that regression estimates were not affected significantly by this type of endogeneity bias, particularly if managed care participation was determined largely by the exogenous decisions of managed care plans rather than by the decisions of public health agencies.

To test for the presence of endogeneity bias in the regression models, we used instrumental-variables regression methods and associated specification tests suggested by Hausman.^{56,65} The results obtained from instrumental-variables methods that control for endogeneity were qualitatively similar to those obtained from standard regression models, and did not provide evidence of significant

Table 3. Percent of jurisdictions in which specific types of organizations participate in public health activities, US, 1998 (N = 356)

Public health activity	Type of organization							Percent	
	Managed care plans	Hospitals	Private physicians	Health centers	Federal agencies	State agencies	Local agencies		Non-profit organizations
Service provision/linkage for health needs (15)	20.4	57.8	44.0	25.6 ^a	8.3	44.5	47.1	59.8	17.8 ^a
Support and communication networks (7)	18.3	66.5	37.8	24.4 ^a	10.6	47.6	62.2	64.2	29.8
Information dissemination to public (18)	14.6	48.9	23.7	14.0 ^a	10.0 ^a	47.4	34.6	46.6	21.4
Assessment of community health needs (1)	14.5	58.2	23.3	19.9 ^a	6.8	42.6	49.1	55.4	30.1
Implementation of public health initiatives (10)	14.0	60.7	35.5	21.5	9.7 ^a	46.7	51.0	63.9	25.8
Prioritization of public health needs (9)	11.4	49.6	25.6	15.1 ^a	5.7	33.3	45.9	47.9	25.4
Analysis of health determinants (5)	11.2	46.7	21.2	13.8 ^a	5.2	36.7	38.1	45.0	24.1
Community intervention planning (11)	9.5	34.7	19.8	10.3 ^a	4.6	20.6	31.2	33.8	16.0
Resource deployment for priority needs (13)	7.5	35.3	15.8	8.9 ^a	5.7 ^a	27.9	32.2	33.6	12.6
Adverse health events investigation (3)	7.1	56.3	40.8	11.4 ^a	21.9	82.1	43.8	13.1	12.5
Information dissemination to media (19)	6.3	33.0	12.0	5.7 ^a	5.4 ^a	37.6	27.9	25.9	8.8 ^a
Behavioral risk factor surveillance (2)	5.8	22.1	5.8 ^a	5.2 ^a	4.6 ^a	24.5	17.9	19.8	15.6
Support for laboratory services (4)	5.1	49.0	25.4	4.3 ^a	15.7	79.5	17.9	4.3 ^a	9.7
Analysis of preventive services use (6)	4.6	13.5	7.2 ^a	4.6 ^a	2.6 ^a	15.5	10.0	11.7	7.2 ^a
Informing elected officials (8)	4.0	26.8	14.8	8.0	3.4 ^a	31.9	32.2	32.5	10.5
Evaluation of public health services (16)	2.9	13.8	4.9 ^a	3.4 ^a	4.3 ^a	21.5	14.3	14.0	7.4
Resource allocation planning (12)	2.8	16.2	8.0	6.0 ^a	2.3 ^a	14.0	17.4	14.5	6.6
Monitoring programs and resources (17)	2.3	11.5	6.1	4.0 ^a	4.0 ^a	27.4	17.0	15.0	5.5
Organizational assessment of local agency (14)	1.7	3.4 ^a	1.4 ^a	1.1 ^a	0.6 ^a	12.6	12.1	4.3 ^a	4.9
Participation in at least 1 of the above activities	45.8	96.6	85.3	46.7 ^a	44.4 ^a	97.7	91.8	95.1	65.5
Mean percent of activities in which organization participated	12.6	57.3	31.5	17.2	11.0 ^a	58.5	48.5	48.4	23.7

NOTES: Public health activities in column 1 are listed in descending order of frequency in which they occur in managed care plans. Numbers that follow in parentheses correspond to question numbers shown in Table 1.

^aNot statistically different from managed care plan value (column 2), based on equality-of-proportions test using 95% threshold with multiple comparisons adjustment.

Plans participated in 13% of the activities performed within the local public health jurisdiction, significantly less than hospitals, state and local government agencies, nonprofit organizations, and private physicians

endogeneity bias. We focus here on estimates from the standard regression models only, but a detailed description of the specification tests and instrumental-variables results are available from the authors upon request.

RESULTS

Extent of managed care participation. Managed care plans participated in public health activities in 46% of the nation's largest local public health jurisdictions, according to public health officials in these jurisdictions (Table 3). Based on these reports, plans appeared significantly less likely to participate in public health activities compared with hospitals, state and local government agencies, nonprofit organizations, universities, and private physicians ($P < 0.05$). Managed care plans also participated in a smaller scope of activities compared with most other types of organizations. On average, plans participated in 13% of the activities performed within the local public health jurisdiction, significantly less than hospitals, state and local government agencies, nonprofit organizations, and private physicians ($P < 0.05$). As hypothesized, managed care plans appeared most likely to participate in public health activities involving the delivery or management of personal health services and the exchange of health-related information. The two activities most frequently reported to include managed care participation involved efforts to address priority health needs through appropriate service provision and service linkage, and efforts to form support and communication networks among health-related organizations (see Table 3). Other medical care organizations also appeared to be frequent participants in these activities, particularly hospitals, private physicians, and community health centers.

Activities involving the management and evaluation of public health resources appeared least likely to include participation from managed care plans. The two activities least frequently reported to include such participation involved participating in community coalitions or committees that conduct organizational assessments of the

local public health agency, and monitoring public health programs and resources. Most other nongovernmental organizations also appeared to be infrequent participants in these activities. Unlike other types of medical care organizations, managed care plans appeared not to be regularly involved in efforts to investigate adverse health events, nor to ensure the adequacy of laboratory services in supporting local surveillance and diagnostic needs.

Market and organizational correlates. Bivariate tests of association highlighted important differences between jurisdictions where managed care participation occurred and jurisdictions where it did not. Jurisdictions with managed care participation were characterized by higher HMO penetration levels, larger population sizes and population densities, and more physicians relative to population size (Table 4). Bivariate tests also revealed that managed care participation was positively correlated with participation from several other types of organizations, including private physicians and government agencies. Moreover, measures of the scope and perceived effectiveness of public health activities appeared significantly higher in jurisdictions where managed care plans participated in these activities.

Results from a two-part multivariate model showed that elements of managed care market structure were associated with the likelihood of plan participation in public health activities, but not with the scope of activities in which plans participated (Table 5). As hypothesized, managed care participation was more likely to occur in markets with higher levels of HMO penetration (odds ratio = 239, $P < 0.01$) and less HMO competition (odds ratio = 0.885, $P = 0.01$). The likelihood of managed care participation also appeared to increase with the proportion of HMOs that serve Medicaid recipients (odds ratio = 4.90, $P < 0.01$). None of these market characteristics were significantly associated with the scope of activities in which managed care plans participate.

Characteristics of the local public health agency and its jurisdiction also appeared to be associated with man-

Table 4. Characteristics of public health jurisdictions with and without managed care participation, US, 1998

Variable	Jurisdictions without managed care participation (n = 192)		Jurisdictions with managed care participation (n = 162)		P
	Mean	Standard error	Mean	Standard error	
<i>Public health performance measures</i>					
Scope of public health activities performed (percent)	59.66	± 1.48	68.75	± 1.31	<0.01
Perceived effectiveness of public health activities (percent)	32.81	± 1.01	38.42	± 0.97	<0.01
<i>Public health jurisdiction characteristics</i>					
Population size of jurisdiction (log)	12.214	± 0.0459	12.725	± 0.0693	<0.01
Population per square mile	596.8	± 84.9	1417.0	± 360.0	<0.05
Population white (percent)	81.31	± 1.14	81.06	± 1.32	
Population below poverty (percent)	12.545	± 0.467	11.965	± 0.367	
Population per community hospital bed	2262	± 1414	1278	± 831	
Population per active nonfederal physician	674.2	± 42.2	542.9	± 53.1	
<i>Local public health agency characteristics</i>					
City or township agency (0,1) ^a	0.0838	± 0.0201	0.1111	± 0.0247	
District or multi-county agency (0,1) ^a	0.2461	± 0.0312	0.1111	± 0.0247	<0.01
Centralized state-local authority (0,1) ^b	0.2708	± 0.0321	0.1420	± 0.0274	<0.01
Shared state-local authority (0,1) ^b	0.2500	± 0.0313	0.2531	± 0.0342	
Per-capita annual agency expenditures (log)	3.3509	± 0.0826	3.1929	± 0.0857	
Policy-making board of health exists (0,1)	0.3874	± 0.0353	0.426	± 0.0389	
<i>Managed care market characteristics</i>					
Population enrolled in HMOs [HMO penetration] (percent)	20.85	± 0.861	29.95	± 1.09	<0.01
Number of competing HMOs [HMO competition]	10.099	± 0.378	10.728	± 0.396	
<i>Public health participation measures</i>					
Hospitals (0,1)	0.9531	± 0.0153	0.9815	± 0.0106	
Private physicians (0,1)	0.7810	± 0.0298	0.9383	± 0.0189	<0.01
Federal agencies (0,1)	0.3542	± 0.0345	0.5494	± 0.0391	<0.01
State agencies (0,1)	0.9635	± 0.0135	0.9938	± 0.0062	<0.1
Local agencies (0,1)	0.8802	± 0.0234	0.9630	± 0.0148	<0.01
Nonprofit organizations (0,1)	0.9115	± 0.0206	1.0	0.0	<0.01
All other organizations (0,1)	0.9531	± 0.0153	1.0	0.0	<0.01

NOTES: Differences are assessed using t-tests for continuous variables and chi-square tests for dichotomous variables. P-values are added to table where a threshold for statistical significance was met.

^aOmitted category includes county and joint city-county agencies

^bOmitted category includes decentralized local authority

(log) = variable transformed to natural log scale

(0,1) = dichotomous variable: 0 if no, 1 if yes

Table 5. Estimates from a two-part multivariate model of managed care participation in public health activities, US, 1998

Variable	Probability of participation (logistic regression)			Conditional scope of participation (linear regression)		
	Odds ratio	95% CI	P	Coefficient	Standard error	P
<i>Public health jurisdiction characteristics</i>						
Population size of jurisdiction (log)	2.75	1.75, 4.32	<0.01	0.0436	0.0234	<0.10
Population per square mile (in thousands)	1.00	1.00, 1.00		0.00151	0.00251	
Population white (percent)	1.00	0.98, 1.02		-0.00050	0.00111	
Population below poverty (percent)	1.00	0.99, 1.01		0.00007	0.00482	
Population per community hospital bed (in thousands)	1.00	1.00, 1.00		-0.000652	0.000408	
Population per active nonfederal physician (in thousands)	1.00	1.00, 1.00		0.0199	0.0106	<0.10
<i>Local public health agency characteristics</i>						
City or township agency (0,1) ^a	1.18	0.49, 2.83		-0.1145	0.0429	<0.01
District or multi-county agency (0,1) ^a	0.508	0.276, 0.935	<0.05	-0.0275	0.0556	
Centralized state-local authority (0,1) ^b	1.25	0.53, 2.90		0.0625	0.0486	
Shared state-local authority (0,1) ^b	1.65	0.75, 3.65		-0.0153	0.0508	
Per-capita annual agency expenditures (log)	0.814	0.617, 1.073		-0.0470	0.0222	<0.05
Policy-making board of health exists (0,1)	1.69	0.94, 3.04	<0.10	0.0072	0.0417	
<i>Managed care market characteristics</i>						
Population enrolled in HMOs [HMO penetration] (percent)	239	7, 7300	<0.01	0.172	0.197	
Number of competing HMOs [HMO competition]	0.885	0.803, 0.976	<0.01	-0.00653	0.00505	
HMOs for-profit (percent)	1.43	0.47, 4.34		-0.0232	0.0944	
HMOs owned by national corporation (percent)	1.54	0.38, 6.15		0.059	0.116	
HMOs enrolling Medicaid recipients (percent)	4.90	1.54, 15.60	<0.01	0.176	0.119	
HMOs organized as IPA/network model (percent)	0.595	0.177, 2.001		-0.159	0.103	
Constant	—	—		-0.100	0.447	

NOTES: Logistic regression was used to model the probability that managed care plans participate in public health activities. 354 observations were used to estimate the model (2 observations dropped due to missing values). The model generated a log likelihood value of -194.6. Linear regression was used to model the scope (percent) of activities in which managed care plans participate, conditional on having some participation. This model excludes jurisdictions where no managed care participation was noted. 160 observations were used to estimate the model (194 observations were dropped due to no participation, two were dropped due to missing values). The model generated an adjusted R² statistic of 0.178, indicating that the model explains 17.8% of the variation in the dependent variable. P-values are added to table where a threshold for statistical significance was met.

^aOmitted category includes county and joint city-county agencies

^bOmitted category includes decentralized local authority

CI = confidence interval

(log) = variable transformed to natural log scale

(0,1) = dichotomous variable: 0 if no, 1 if yes

Table 6. Estimates from linear regression models of the scope and perceived effectiveness of public health activities performed within public health jurisdictions

Variable	Public health activities performed					
	Scope			Perceived effectiveness		
	Coefficient	Standard error	P	Coefficient	Standard error	P
<i>Public health jurisdiction characteristics</i>						
Population size of jurisdiction (log)	0.88	1.47		-0.340	0.995	
Population per square mile (in thousands)	-0.220	0.363		-0.106	0.202	
Population white (percent)	0.0681	0.0674		0.0956	0.0430	<0.05
Population below poverty (percent)	-0.521	0.192	<0.01	-0.260	0.184	
Population per community hospital bed (in thousands)	-0.1100	0.0274	<0.01	-0.0481	0.0104	<0.01
Population per active nonfederal physician (in thousands)	-2.100	0.979	<0.05	-1.037	0.860	
<i>Local public health agency characteristics</i>						
City or township agency (0,1) ^a	6.16	3.82		4.28	2.86	
District or multicounty agency (0,1) ^a	-1.15	3.19		-1.09	2.02	
Centralized state-local authority (0,1) ^b	-3.51	3.15		-1.99	2.42	
Shared state-local authority (0,1) ^b	-0.40	3.32		-0.80	2.17	
Per-capita annual agency expenditures (log)	2.81	1.08	<0.01	1.573	0.828	<0.10
Policy-making board of health exists (0,1)	3.73	2.59		2.84	1.67	<0.10
<i>Managed care market characteristics</i>						
Population enrolled in HMOs [HMO penetration] (percent)	-14.8	11.5		-13.83	7.36	<0.10
Number of competing HMOs [HMO competition]	0.218	0.298		0.261	0.190	
<i>Public health participation measures</i>						
Managed care plans (0,1)	5.70	2.58	<0.05	4.49	1.56	<0.01
Hospitals (0,1)	12.64	5.81	<0.05	5.28	3.41	
Private physicians (0,1)	5.36	3.02	<0.10	3.65	1.87	<0.10
Federal agencies (0,1)	1.61	1.92		0.634	1.13	
State agencies (0,1)	-10.95	7.15		-7.25	5.43	
Local agencies (0,1)	13.24	3.50	<0.01	8.40	1.95	<0.01
Nonprofit organizations (0,1)	14.08	6.34	<0.05	4.02	5.58	
All other organizations (0,1)	-4.30	10.22		2.28	6.65	
Constant	15.7	23.4		13.5	12.9	

NOTES: The dependent variable for the linear regression model of scope was the percent of public health activities performed within the jurisdiction. For estimations of both models, 354 observations were used (2 observations were dropped due to missing values). The model of scope generated an adjusted R² statistic of 0.265, indicating that 26.5% of the variance in the dependent variable was explained by the model. The dependent variable for the linear regression model of effectiveness was the summary measure of perceived effectiveness ratings for public health activities performed within the jurisdiction. The model generated an adjusted R² statistic of 0.195, indicating that 19.5% of the variance in the dependent variable was explained by the model. P-values are added to table where a threshold for statistical significance was met.

^aOmitted category includes county and joint city-county agencies.

^bOmitted category includes decentralized local authority

(log) = variable transformed to natural log scale

(0,1) = dichotomous variable: 0 if no, 1 if yes

Our findings underscore the need for federal and state policy makers to consider the potential effects of Medicaid policy decisions on local public health practice.

aged care participation based on estimates from the two-part model (see Table 5). County public health agencies were more likely than district or multi-county agencies to report managed care participation, and the scope of participation was higher in jurisdictions served by county agencies than in those of city and township agencies. The likelihood of managed care participation did not appear to vary significantly with public health agency resources, but the scope of participation was significantly lower in jurisdictions with higher per person public health agency expenditures ($P < 0.05$). Finally, both the likelihood of plan participation and the scope of participation appeared higher in jurisdictions with larger population sizes, although the differences in scope merely approached statistical significance ($P < 0.10$).

Scope and effectiveness of public health activities.

Results from multivariate regression models showed that the overall scope of public health activities performed was significantly larger in jurisdictions where managed care participation occurs, even after controlling for differences in other organizational and market characteristics (Table 6). Managed care participation was associated with a 5.7 percentage point increase in the proportion of public health activities performed within the average jurisdiction, an effect size that is approximately equivalent to one additional activity being performed in the jurisdiction. After controlling for other variables in the model, the scope of public health activities performed did not appear significantly related to participation by federal agencies, state agencies, or other types of organizations.

Results from a second regression model indicated that the perceived effectiveness of public health activities was significantly higher in jurisdictions where managed care participation occurs. After controlling for other variables in the model, managed care participation was associated with a 4.5 percentage point increase in the perceived effectiveness measure. This effect size was approximately equivalent to increasing the effectiveness rating from "Meets no community needs" to "Fully meets community

needs" for one of the 19 public health activities rated in this study. After controlling for other variables in the model, perceived effectiveness did not appear to vary significantly with participation by hospitals, state agencies, nonprofit organizations, or other organizations.

DISCUSSION

Untapped opportunities. Although managed care plans have achieved a substantial market presence in the nation's most populous local public health jurisdictions, plans participate in public health activities in fewer than half of these jurisdictions, according to public health officials. The participation rate for managed care plans is substantially lower than the rate for most other types of organizations, suggesting that in most jurisdictions untapped opportunities exist for engaging health plans in local public health activities. Where they do participate, plans appear to engage in a relatively narrow range of activities compared with other types of organizations. By itself, this finding could be interpreted as evidence that managed care plans have relatively little to offer the local public health systems in which they operate.

Multivariate results, however, suggest that managed care participation, though narrow in scope, may still contribute significantly to the overall scope and perceived effectiveness of local public health activities. These findings are consistent with the proposition that managed care contributions complement rather than duplicate the work of public health agencies and other contributing organizations. By participating in one activity, plans may free up public health resources to be used for other activities. These findings imply that managed care plan participation need not encompass a broad range of public health activities to be beneficial, particularly if this participation is targeted at important public health needs and is coordinated with the efforts of other contributing organizations.^{12,29}

Detection and investigation concerns. The relatively low levels of managed care participation in two specific

areas of public health practice—investigating adverse health events and supporting public health laboratory activities—raise concerns about how managed care growth may affect the nation's systems for detecting and controlling emerging public health threats. Many managed care plans maintain administrative and/or clinical information systems that potentially could be used to facilitate public health agency efforts in detecting and investigating emerging disease patterns. Unfortunately, results from this study suggest that such uses are relatively uncommon.

Moreover, these results suggest that there are few mechanisms in place to address the possible limitations that arise when managed care plans rely on private laboratory facilities to perform the diagnostic tests that inform local disease surveillance activities. Some studies have indicated that these arrangements may introduce delays or inaccuracies for local disease reporting and investigation efforts, particularly if there are no established mechanisms for plans and public health agencies to cooperate in carrying out these efforts.^{26,66,67}

Without health plan involvement in establishing appropriate and timely disease reporting procedures, local public health efforts to detect and investigate health threats may be compromised as managed care enrollment grows. Current policy initiatives to improve the nation's defenses against emerging infectious diseases should, therefore, include efforts to expand managed care participation in laboratory surveillance and adverse health events investigation.

The need for new relationships. This study suggests that managed care plans may face heightened incentives for contributing to public health activities as managed care markets mature and become more concentrated with fewer competing plans. These findings imply that if consolidation and merger activities continue to occur among plans in local markets, then public health agencies may face expanded opportunities for engaging plans in important public health activities. Public health administrators and policy makers therefore need to anticipate and prepare for new relationships as local health care markets evolve.

Unfortunately, another market trend may present challenges to public health agencies in forming relationships with managed care plans. In recent years, a growing number of commercial plans have withdrawn their participation in state Medicaid programs due to low payment rates and difficulties in maintaining the participation of providers.⁶⁸⁻⁷⁰ Our study suggests that managed care par-

ticipation in public health activities may decline as fewer plans choose to serve Medicaid recipients. As a consequence, plan withdrawals from Medicaid may pose challenges not only for the local health care safety net but also for the local public health system. Our findings underscore the need for federal and state policy makers to consider the potential effects of Medicaid policy decisions on local public health practice. These findings may also provide a rationale for enhanced public health agency involvement in planning and implementing state Medicaid managed care programs.

We found some support for the hypothesis that managed care participation helps to enhance the availability and perceived effectiveness of public health activities in local jurisdictions. Our findings are consistent with the view that, where managed care participation occurs, this participation complements the efforts of official public health agencies and other contributing organizations rather than substituting for or compromising these efforts. The findings therefore suggest that policy and administrative strategies to encourage managed care participation could be effective in strengthening the nation's local public health systems. These strategies might include using performance measurement systems, such as HEDIS, to publicly monitor and report on managed care plan participation in public health activities, and using managed care contracting provisions in Medicaid and other governmental health programs that give preference to plans that participate in public health activities.³⁸

Limitations. These findings must be interpreted with caution, in view of the study's limitations. Results are based on self-reported data from local public health officials, who may not be fully informed about the actions of managed care plans, and who may incorporate subjective beliefs and expectations into their reports of public health performance. Moreover, because this analysis relies on a limited amount of observational data collected in a cross-sectional survey, it is impossible to rule out the possibility that the observed relationships between managed care participation and public health performance are explained by other, unobservable characteristics of the organizations and communities studied. Finally, findings from this study apply only to the nation's most populous public health jurisdictions and the agencies that serve them. Agencies that serve smaller and more rural jurisdictions may confront vastly different institutional and market forces, and they may have vastly different experiences with managed care plans. Examining the effects of managed care in these settings is an important

topic for future study, particularly where plans gain market share in rural areas.

Cautious optimism. This exploratory study provides compelling if not conclusive evidence of how managed care plans may shape local public health practice. We find reason for cautious optimism in the evidence that managed care plans and public health agencies have begun to address population health needs cooperatively. Perhaps even more reassuring, we find no evidence that managed care participation has had adverse effects on the scope and effectiveness of local public health practice as perceived by local health officials. Though only preliminary, these findings make a case for public health

practitioners to re-examine their relationships with managed care plans and to reconsider the current and potential roles of these plans within the public health system.

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