Implementation of a Linked Medical Organization Survey in the Medical Expenditure Panel Survey

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Abstract

Recent changes in the provision and organization of health care initiated by the Affordable Care Act designed to increase insurance coverage and promote the efficient delivery of care, have led to concerns about how these changes interact with the medical provider organizational characteristics to affect access, use, and expenditures for care. To examine the impact of this phenomenon on individuals' use of care and costs, linked information is needed on both the characteristics of the medical providers' organizations and the individuals receiving care. There is currently no nationally representative data source that provides this essential information. Consequently, the Medical Organizations Survey (MOS) is being added as a component of the Medical Expenditure Panel Survey (MEPS) to address this limitation. The MEPS-MOS will obtain essential data on provider organizational characteristics, policies, and treatment protocols for a nationally representative sample of physicians providing care to MEPS participants. This paper will describe the survey and sample design of the MEPS-MOS, the survey content and precision targets and its analytical focus. This addition will substantially enhance the analytic capacity of the MEPS by facilitating assessments of the extent to which provider organizational structures and policies have impacts on health care utilization and expenditures, health status, patient safety and the health outcomes of individuals. The data collection strategy has benefitted by the results of a field test to administer a draft survey instrument. Attention will also be given to describe how resultant data will be merged with the MEPS household data and estimation strategies to support enhanced MEPS person level analyses.

Key Words: Physician survey; medical organizations; MEPS

1. Introduction

Recent changes in the provision and organization of health care in the U.S. initiated by the Affordable Care Act (ACA), which are designed to increase insurance coverage and promote the efficient delivery of care, have led to concerns about how these changes interact with organizational characteristics of health care providers to affect access, use, and expenditures for care. The increasing emphasis of policy makers is on moving away from fee-for-service payment arrangements to payments based on the quality, rather than the quantity, of care. For example, Medicare and some private payers' are moving to organize care and reimbursement around Accountable Care Organizations (ACOs). This has prompted providers to respond by adjusting their organizational structures, resulting in increasing consolidation of provider networks and changes in the financial structures around hospital and physician practices. Many hospitals have acquired physician practices to enhance the extent to which they can expand their influence on all aspects of care, and physicians have created their own expanded networks toward the same end. Thus, the

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system is changing in ways that are likely to profoundly affect how individuals access and receive care, and what the costs of that care will be. One outcome could be improvements in efficiency and the quality of care, as providers become more responsible for the health outcomes of the individuals in their care. Another could be an increase in providers' monopoly power, resulting in increases in costs and perhaps even declines in quality, as the payers' ability to influence the provision of care is eroded. In order to examine the impact of such changes on individuals' use of care and associated costs, analysts need information on both the characteristics of providers and the individuals receiving care [8]. Currently, there is no nationally representative data source providing this information. The purpose of the Medical Organizations Survey (MOS) is to build upon the Medical Expenditure Panel Survey (MEPS), the country's primary source of nationally representative, comprehensive, person-level data on health care use and expenses, by collecting data on the organizational and financial characteristics of the medical providers that provided medical care to a representative sample of MEPS respondents. These data will be used to create a database that will be unique in providing an internally linked and consistent source of information on individuals' characteristics and their health care utilization and expenditures as well as the characteristics of the providers they use. It will support analyses designed to answer questions such as:

- How does the organization of physician practices affect access to care for individuals with different health characteristics and types of insurance?
- How does the provider organization affect use of different types of services?
- What is the relationship between physician practice organization and overall medical expenditures for care?
- What is the relationship between physician practice organization and individuals' out-of- pocket costs for care?
- How is provider organization related to the health status of the individuals receiving care?

This MEPS-MOS design enhancement project will build upon an established and ongoing data collection enterprise to create a unique, nationally representative data set that can be used to address these and similar questions. Given the importance of this effort to help inform health policy and practice, the MEPS-MOS is being funded through grant support provided by the Robert Wood Johnson Foundation through a major collaboration in concert with the Agency for Healthcare Research and Quality (AHRQ).

2. Background

The Medical Expenditure Panel Survey (MEPS) has been collecting data on health care utilization and expenditures annually since 1996. The survey is sponsored by the Agency for Healthcare Research and Quality (AHRQ). In addition to collecting nationally representative data to yield annual estimates for a variety of measures related to health care use and expenditures, the MEPS also provides estimates related to health status, demographic characteristics, employment, health insurance coverage, and access to health care. The MEPS consists of a family of three interrelated surveys: the Household Component (MEPS-HC), the Medical Provider Component (MEPS-MPC), and the Insurance Component (MEPS-IC). The MEPS-IC collects establishment-level data on insurance programs and will not be further described. Through a series of interviews with household respondents, the MEPS-HC collects detailed information at the level of the

individual respondent on demographic characteristics, health status, health insurance, employment, and medical care use and expenditures. These data support estimates both for individuals and for families in the United States. Respondents identify medical providers from whom they have received services [3-6, 9,10]. To supplement the expenditure data provided from the MEPS-HC respondents and improve the accuracy of resultant expenditure estimates, the MEPS includes a medical provider survey, the MEPS-MPC. The MEPS-MPC collects data from a sample of providers who provided medical care to MEPS- HC respondents and were identified during the MEPS-HC interviews as eligible for inclusion in the MPC sample. MPC data are collected a year after the household health care event information is collected to allow adequate time for billing transactions to be completed. The MPC collects data on dates of visits/services, use of medical care services, charges, sources of payments and amounts, and diagnoses and procedure codes for medical visits/encounters. Only providers for whom a signed permission form was obtained from the household authorizing contact are eligible for data collection in the MPC [9,10]. The categories of providers in the MPC include (1) office-based medical doctors; (2) hospital facilities providing inpatient, outpatient, and emergency room care; (3) health maintenance organizations (HMOs); (4) physicians providing care during a hospitalization; (5) home care agencies; and (6) pharmacies. For purposes of the MEPS-MOS, primary interest focuses on providers in categories 1 and 3.

3. MEPS Medical Organization Survey Objectives

The principal objectives of this MEPS design enhancement are (1) to develop procedures for identifying the medical organizations associated with the usual source of office-based ambulatory care physicians from whom a nationally representative sample of individuals receive medical care; (2) to refine a survey questionnaire designed for assessing important features of the staffing, organization, policies, and financing of office-based and related ambulatory care medical care providers; (3) to collect organizational level data associated with these providers of medical care to MEPS respondents; (4) to develop estimation weights that support nationally representative linked provider-respondent data based on the MEPS-MOS survey; and (5) to make the linked provider-respondent data set available to the research community.

The enhanced MEPS data will benefit health care policymakers and health services researchers primarily by filling a gap in the available evidence linking provider characteristics with individual behavior and outcomes. Accurate and timely information on physicians' practices medical organizations is essential to understanding the functioning of the health care system, identifying potential problems, and assessing programmatic and policy reforms. Recent health reform initiatives are attempting to stimulate health care system improvements through advancing the role of primary care physicians in care management, providing incentives to physicians for the delivery of high-quality care and facilitating delivery system transformations to improve care, with special attention to the treatment of patients with multiple chronic conditions. Physicians and their practice organizations are integral to these initiatives, so understanding the organizational context in which they practice and how they practice and respond to policy and economic incentives is a critical input for evaluating and predicting the success of such reforms. Consequently, this design modification will help advance research efforts to discern how recent changes in health care delivery and practice resulting from the Affordable Care Act's health reform efforts affect health care costs, access, health status and health care quality.

4. Medical Provider Sample for the Medical Organization Survey

Given the focus on relating provider characteristics to individual respondents' medical care use, expenditures, access, health status and quality of care, the MEPS-MOS design will focus on those providers identified as respondents' usual source of care (USC). The assumption is that the USC will have the greatest influence on service utilization. For the MOS survey, the target sample will be medical care practices in an office based setting associated with the usual sources of care for a nationally representative sample of MEPS adult (age 18 or older) participants who received health care from those USCs in 2015. Only those HC respondents that sign a permission form allowing their medical provider to be contacted are eligible for inclusion in the MEPS-MOS sample. The targeted overall sample size for the project requires completed MEPS Medical Organization Surveys for the providers associated with 6000 MEPS survey participants selected for the survey. A survey design effect of 1.4 is assumed for estimates of proportions attributable to the MEPS complex survey design. The sample size specifications are determined to achieve targeted levels of precision in survey estimates expressed as relative standard errors (standard error of estimate/estimate), for the linked person-medical organization level analyses to be undertaken. Consequently, the survey will be of sufficient total sample size to support person level analyses at the national level with relative standard errors (RSEs) of 4.5%-5% for medical expenditure related estimates and RSEs of 1.5% for survey estimates expressed as proportions (for proportions = 0.5) for the linked person-medical organization level analyses to be undertaken. A survey design effect of 1.35 is assumed for estimates of proportions attributable to the MEPS complex survey design. The design permits the option of oversampling individuals based on specific socio-economic, demographic and health related factors (e.g. individuals with multiple chronic conditions; high health care utilizers; minorities; uninsured).

Table 1: Sample Size Specifications and Precision Targets for the MEPS Medical Organization Survey

Domain	Targeted Sample Size (person level)	Relative Standard error for office based medical expenditures estimates	Relative Standard error for total medical expenditures estimates	Relative Standard error for estimates of proportions of the population with specific characteristics (e.g. fair or poor health; # of visits or medical expenditure estimates above a specified threshold; health care burdens in excess of 10% of income): Computed for proportions, p=.5
Total sample	6000	4.5%	5.0%	1.5%
Sample subgroup (e.g. usual source of care setting)	3000	6.0%	7.0%	2.1%

5. Survey Design

In 2015, a nationally representative sample of MEPS adult respondents with office based ambulatory visits to their usual source of care (USC) was selected. Among those

respondents with a signed permission form to contact their medical providers, a sample of the locations at which they receive their office based medical care will be selected. The MOS sample will be a subset of the office based providers contacted for the MEPS-MPC. Places where medical care is provided will be contacted, an appropriate respondent will be determined and a MEPS-MOS will be administered. It is anticipated that the most cost-effective design will include data collection by phone when possible. Mail and web modes of data collection will be offered when necessary or preferred. Additional mail and telephone follow up will be performed, when required. For the survey instrument, an existing Medical Organization Survey questionnaire, pilot tested by the National Center for Health Statistics, Centers for Disease Control and Prevention and funded through a contract awarded from the Agency for Healthcare Research and Quality (AHRQ) to Mathematica Policy Research, was used as a starting point for the MEPS-MOS. This questionnaire was then revised based on the pilot test results and recommendations from experts in the field in order to better obtain essential information on important features of the staffing, organization, policies, and financing that characterize the sample of office-based medical care providers. Since the MEPS survey currently does not acquire essential data on providers, practice and organizational characteristics, policies and treatment protocols, penetration of ACOs, medical homes and health information technology (HIT), this survey will fill a critical gap in content. The following areas will be addressed in the MOS survey as they potentially affect individuals' access to, use of, and affordability of health care services:

- Organizational characteristics, e.g., size, specialties covered, practice rules and procedures, patient mix and scope of care provided, membership in an ACO, certification as a primary care medical home
- Use of health information technology
- Policies and practices related to the ACA
- Financial arrangements, e.g., reimbursement methods, number and types of insurance contracts, compensation arrangements within the practice

In order to achieve completed MOS interviews for 6000 MEPS survey participants, a larger number of MEPS participants will be selected to account for (1) non-signature of the MEPS permission forms that allow information from respondents' medical providers be obtained (90% target signing rate), and (2) nonresponse associated with the completion of the MEPS- MOS (minimum of a 60% response rate conditional on a signed permission form). The sample design for the MOS will be further optimized to ensure the providers selected for this sample are a subset of the providers selected for the MEPS-MPC.

All providers fielded for the MPC are contacted via telephone by a data collection specialist (DCS). Research Triangle Institute International (RTI) is the data collection organization for the survey. In order to facilitate efficient navigation through the provider's organization, the DCS follows a scripted contact guide. Following the contact guide, the DCS identifies the appropriate respondent with release of information authority, explains the nature of the study, and attempts to gain cooperation. The current MEPS-MPC survey consists of 17,000 office- based medical provider–person pairs with a survey response rate of 88 percent. For the proposed project, an analogous script will be developed. Given the nature of the questions in the provider interview, the MOS questionnaire may require information from someone other than the respondent in the MPC, most likely an office manager, Medical Director, or Department head.

Data will be collected either through telephone interviews or through mailed surveys or web based administration for those respondents who prefer these modes.

The practices that will be asked to participate in the MEPS-MOS already provide information about payments through the MEPS-MPC. This linkage facilitates finding knowledgeable and cooperative informants within the practices. Having a brief questionnaire is generally important for gaining cooperation, and the MEPS-MOS must be especially brief, because these practices already experience burden responding to the MEPS-MPC.

Key considerations that were taken into account when deciding on the topic areas/domains of interest to be covered in the MEPS-MOS include (a) the potential for the organization characteristic to affect access, service use, expenditures, quality or experiences measured in the MEPS-HC, (b) the likely variation in the practice characteristic in the MEPS-MOS sample, (c) the ease of accessing and reporting the requested information, (d) whether a variety of potential respondents, especially non-physicians, can report the information, and (e) coordination with information collected in the MEPS-HC or otherwise available. In developing the MEPS-MOS questionnaire, feedback was sought and received from several external and internal AHRQ experts with expertise in the topic areas/research domains of interest and others with expertise in provider and establishment surveys. Moreover, questions were simplified and adapted from several surveys including the National Ambulatory Medical Care Survey Medical Organizations Survey, the National Ambulatory Medical Care Survey Physician Survey [13], the National Ambulatory Medical Care Survey National EHR Survey [14], the National Ambulatory Medical Care Survey physician induction interview [14], the National Ambulatory Medical Care Survey Physician Workflow Supplement [14], the National Study of Provider Organizations 2 [11], and the Community Tracking Survey of Physicians [12].

The MOS questions cover 10 broad research topics/domains of interest including (1) Physician group demographics, (2) Practice size, (3) Provider mix, (4) Practice inputs and resources, (5) Financial incentives, (6) Patient mix, (7) Access, (8) Quality, (9) Coordination of care, and (10) Electronic health records (EHRs). Most questions in the MOS cover multiple topic areas. Table 2 includes the current version of the draft instrument questions and the research topic/domain of interest each question covers. Most questions cover multiple topics. The distribution of questions by most relevant topic is shown in Table 2.

The 2015 MEPS-MOS will be fielded in 2016 in concert with the MEPS-MPC. The resulting data will be merged with the MEPS household data and estimation weights and analytic files will be developed in 2017 to support enhanced MEPS person level analyses. The long standing practice of the MEPS project is to release as much data as possible to the research community through public use files. Data that cannot be publically released will be made available in a data center environment. In addition, AHRQ staff will conduct several analyses of associations between specific provider characteristics and respondents' outcomes.

Table 2: MEPS Medical Organization Survey Research Topic/Domains of Interest

Topics	Question Number
Group demographics	1, 2
Practice size	3

Provider mix	4, 5, 6
Practice inputs and resources	7
Financial incentives	9, 10, 11
Patient mix	8
Access	12, 13, 14
Quality	15
Coordination of care	16, 17
Electronic health records (EHRs)	18, 19, 20
Survey administration	21

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6. Analysis of Office Based Physician Visits

The purpose of the MEPS Medical Organization Survey is to support analyses of the impact of provider characteristics on patterns of service use and expenditures in the U.S. healthcare system, as well as the impact those characteristics may have on the health outcomes of individuals. To illustrate the types of analyses the additional information collected in the MEPS-MOS can enhance, we modeled the association between individual characteristics, locational factors and characteristics of individuals' office-based usual sources of care on the number of office visits received by a segment of the MEPS population which mirrors the population included in the new survey. While this example is not a fully specified causal analysis, it serves to illustrate areas the MEPS-MOS will help to inform.

6.1 Data and Methods

The MEPS 2013 population characteristics file (MEPS HC – 157) was used for this analysis in order to select a sample of individuals who were age 18 or older, had an office-based usual source of care, and had at least one visit to an office-based provider during the year. The sample includes 9,764 individuals representing 110.9 million people in the U.S. civilian noninstitutionalized population. When the MEPS-MOS data become available, analysts will have the ability to examine the impact of specific organizational characteristics of the physician practices used by individuals as their usual source of care on healthcare use and expenditures. Alternatively, few indicators of practice characteristics of providers are currently available in the MEPS. They consist of a small number of provider-specific access to care measures. These indicators include whether the practice has night and weekend hours, whether or not traveling to the office is difficult, and whether or not it is difficult to contact the provider outside of regular office hours.

The dependent variable in this analysis is the total number of office visits made by the persons in the subpopulation described above. The control variables account for

characteristics of individuals that are associated with use of medical care services and cover factors related to the predisposition to obtain care, characteristics that enable individuals to obtain care, and individuals need for medical services. This conceptualization follows the classic behavioral model postulated by Ron Andersen [1-2]. Predisposing factors include variables associated with family composition, such as age, sex, and family size; social structure, such as employment status and education; and race and ethnicity. F actors related to medical need include variables such as medical conditions, diagnoses, and one's general state of health. Several of the general health status variables used in this analysis were derived from the 12-Item Short Form Health Survey (SF-12) developed for the Medical Outcomes Study (SF-12), which is a widely used self-reported questionnaire designed to measure physical and mental health status and has been shown to be associated with medical care resource use [7].

Specific variables included in the model are as follows:

- Age category; 18-44, 45-64, 65+ Sex (reference category male)
- Race/ethnicity: Hispanic, non-Hispanic white, non-Hispanic black, other
- Education: <12 years, 12 years, 13+ years (reference category 12 years) Region: Northeast, Midwest, South, West (reference category Midwest) Metropolitan Statistical Area (MSA) status (1 if MSA, 0 otherwise)
- Income: <125% poverty level, 125-199% of poverty level, 200-399% of poverty level, 400+% of poverty level (400+% reference category)
- Marital status (1 if married, 0 otherwise) Employment status (1 if employed, 0 otherwise)
- Insurance status: any private (reference), public only, all year uninsured Family size: 1 (reference), 2, more than 2
- Physical health status: fair/poor versus good/very good/excellent (1 if fair/poor, 0 otherwise) Mental health status: fair/poor versus good/very good/excellent (1 if fair/poor, 0 otherwise) Physical Health Composite Scale score (PCS) derived from the SF-12
- Mental Health Composite Scale score (MCS) derived from the SF-12
- Any chronic conditions (from the MEPS priority conditions): 1 if any chronic conditions, 0 otherwise
- Whether the provider has night or weekend hours: 1 if yes, 0 otherwise
- Whether travel to the usual source of care provider (USOC) is difficult: 1 if not difficult, 0 otherwise

Whether it is difficult to contact the provider after business hours: 1 if not difficult, 0 otherwise. We used a negative binomial model to estimate the impact of these factors on the number of office visits made by individuals during the year. The negative binomial is appropriate for modeling count variables when over dispersion is a problem. Results are presented in terms of incidence rate ratios (IRR) for ease of interpretation. The IRR reflects the relative change in the number of visits associated with a one unit increase in the variable in question. The standard errors of the survey estimates derived from the MEPS have been adjusted for the impact of clustering due to the multistage survey design, and the test statistics used to test for equivalence in estimates have also been adjusted to control for survey design complexities. Estimates in this paper are computed using the Stata software package.

6.2 Results

Regression results are presented in Table 3. Many of the individual and area characteristic variables are significantly associated with relative differences in the use of office based services over the year. For example, persons age 65 and over have 21 percent more visits than those ages 18-44, and females have about the same proportional difference relative to males. The uninsured have about 30 percent fewer visits than the privately insured, and families of 3 or more and better health status, as reflected in higher PCS and MCS scores, are also associated with relatively fewer visits.

None of the access related measures included in the model indicated the presence of significant differentials in the total number of office based medical provider visits experienced in 2013 for individuals with an office based usual source of care. Furthermore, this analysis does not permit a determination of the extent to which there are variations related to the organizational characteristics of the provider. This would include determining whether individuals whose usual source of care providers are in an HMO or a physician network owned by a hospital have differentials in their numbers of visits, or if levels of health care utilization varies by whether physicians in a practice are paid a base salary, or according to the amount of visits or charges they produce. Only when the information being collected in the MEP-MOS is available will analysts have the ability to address these types of issues, which are critical for understanding how the current financial and organizational structure of providers affects the provision and cost of care, and how recent trends in provider characteristics may affect use, costs, and the outcomes of care in the future.

Table 3: Negative Binomial Regression on Number of Office Visits in 2013

	IRR	Linearized Standard Error	t	P>|t|	95% Confidence Interval	
Age						
45-64	1.0032	0.0419	0.08	0.940	0.92	1.0892
65+	1.2229	0.0692	3.56	<0.001	1.09	1.3673
Female	1.2297	0.0402	6.32	<0.001	1.15	1.3116
Race/ethnicity						
White	1.1499	0.0494	3.25	0.001	1.05	1.2516
Black	0.9283	0.0490	-1.41	0.160	0.83	1.0301
Other	0.8953	0.0593	-1.67	0.096	0.78	1.0201
Education						
Less than 12 years	0.9679	0.0500	-0.63	0.529	0.87	1.0718
13 + years	1.2610	0.0491	5.96	<0.001	1.16	1.3616
Census Region						
Northeast	1.0101	0.0596	0.17	0.865	0.89	1.1348
South	0.8220	0.0416	-3.88	<0.001	0.74	0.9082
West	0.9758	0.0564	-0.42	0.671	0.87	1.0935
MSA location	1.1147	0.0596	2.03	0.044	1.00	1.2388
Poverty status						
Less than 125%	0.8895	0.0511	-2.04	0.043	0.79	0.9962
125-199%	0.9325	0.0543	-1.20	0.232	0.83	1.0460
200-399%	0.8620	0.0378	-3.39	0.001	0.79	0.9398
Married	1.0057	0.0572	0.10	0.921	0.89	1.1249
Employed	0.8485	0.0339	-4.11	<0.001	0.78	0.9181
Insurance Status						
Public	0.9895	0.0493	-0.21	0.833	0.89	1.0918
Uninsured	0.7213	0.1009	-2.34	0.021	0.54	0.9504
Family Size						
2	1.0117	0.0611	0.19	0.847	0.89	1.1396
3 or more	0.8996	0.0577	-1.65	0.101	0.79	1.0210
Health Status						
Physical Fair or Poor	1.1216	0.0605	2.13	0.035	1.00	1.2475
Mental Fair or Poor	1.1057	0.0790	1.41	0.161	0.96	1.2730
Health Score (SF12)						
Physical Component	0.9782	0.0017	-12.56	<0.001	0.97	0.9816
Mental Component	0.9888	0.0018	-6.22	<0.001	0.98	0.9923
Any chronic condition	1.5876	0.0755	9.72	<0.001	1.44	1.7437
Usual Source of Care						
Night/weekend hours	0.9689	0.0369	-0.83	0.408	0.89	1.0446
Travel not difficult	1.0862	0.0799	1.12	0.262	0.93	1.2557
PM Access not difficult	1.0204	0.0370	0.56	0.579	0.95	1.0960

$F_{(29, 169)} = 58.13$, P-value <.001

Sample limited to individuals age 18 or over with an office-based usual source of care and at least one office visit.

Sample size = 9,764 representing 110.9 million individuals in the U.S. civilian noninstitutionalized population.

7. Summary

The MEPS Medical Organization Survey will obtain essential data on provider organizational characteristics, policies, and treatment protocols for a nationally representative sample of usual   source of care medical providers providing care to MEPS adult participants. Support for the survey implementation has been provided by the Robert Wood Johnson Foundation. This addition will substantially enhance the analytic capacity of the survey by facilitating assessments   of the extent to which provider organizational structures and policies have impacts on health care   utilization and expenditures, health status, patient safety and the health outcomes of individuals.   Given the recent changes in the provision and organization of health care initiated by the Affordable Care Act designed to promote the efficient delivery of care, the data produced from the MEPS-MOS will fill a major gap in the ability to determine how these changes influence the interaction between medical provider organizational characteristics and health care access, use, and expenditures for care. Provider-level medical organization information collected for this survey linked to a nationally representative sample of MEPS adult participants with office based medical care in 2015 will be made available to the research community in a manner similar to the procedure for other MEPS data products (e.g., downloadable from the Internet at no charge to the user; access in the secure AHRQ Data Center for non-publically available analytic files).The file will include an encrypted provider identification number, as well as the encrypted MEPS respondent identification number. This will enable provider-level information to be linked to the appropriate respondent in the MEPS. Provider-level data will be reviewed to ensure that the data cannot be manipulated to reveal the identity of providers. All MEPS data releases are subject to a thorough confidentiality review.

Planned analyses will examine associations between provider-level characteristics and person level health care utilization and expenditure patterns and health status. Initial analyses will be   descriptive in nature but will incorporate statistical adjustments for respondents' sociodemographic characteristics (e.g., age, gender, presence of chronic conditions, type of insurance coverage). These analyses will incorporate variables measuring specific provider characteristics (e.g., provider size, clinic- versus office-based location, membership in an ACO, etc.) into multivariate models predicting amount of patient-level service utilization (e.g., number of ambulatory visits, number of inpatient nights, ED visits), with the goal of identifying provider-level variables significantly related to utilization, in addition to patients characteristics. Parallel analyses will examine overall expenditures, out-of-pocket payments, and reported problems accessing care. Consideration will also be given to developing an empirical typology of providers, based on the MEPS-MOS data, using statistical techniques such as cluster or latent class analysis,

which form groups of entities based on similarity among a number of variables. Such data-based typology of providers based on organizational similarity will be useful in extracting policy-relevant conclusions from otherwise complex multidimensional provider profiles.

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