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Evaluating community health centers' adoption of a new global capitation payment (eCHANGE) study protocol

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Abstract

Primary care patient-centered medical homes (PCMHs) are an effective healthcare delivery model. Evidence regarding the most effective payment models for increased coordination efforts is sparse. This protocol paper describes the evaluation of an Alternative Payment Methodology (APM) implemented in a subset of Oregon community health centers (CHCs), using a prospective matched observational design. The APM is a primary care payment reform intervention that changed Oregon's Medicaid payment for several CHCs from fee-for-service reimbursement to a per-member-per-month capitated payment. We will implement a difference-in-difference analytic approach to evaluate pre-post APM changes between intervention and control groups, including: 1) clinic-level outcomes, 2) patient-level clinical outcomes, and 3) patient-level econometric outcomes. Findings from the project will be of national significance, as there is a need for evidence regarding how novel payment methods might enhance PCMH capabilities and support their capacity to produce better quality and outcomes. If this capitated payment method is proven effective, study findings will inform dissemination of similar APMs nationwide.

Keywords

Medicaid; Payment methodology; Capitation; Patient-centered medical homes

1. Introduction

Primary care patient-centered medical homes (PCMHs) are effective healthcare delivery models that strengthen quality of clinical care, improve patient satisfaction, and reduce healthcare costs [1–3]. Increased healthcare coordination from PCMHs is associated with improvements in physician-patient communication, provision of guideline-based preventive services, and patient health [4–6]. However, evidence regarding the most effective payment models for increased coordination efforts is sparse, and there is no consensus about the best approach [7–10]. Existing fee-for-service (FFS) reimbursement schemes, such as the relative value units of the Centers for Medicare and Medicaid Services, provide little financial

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incentive for coordination activities because these models reward a high volume of physician face-to-face visits with increased reimbursement, rather than care quality, communication with other members of the healthcare team, or patient-centered modes of contact [11]. For example, under this system, services such as patient education delivered by a non-provider, care coordination, or quality improvement cannot be billed [12]. Alternative payment approaches could allow clinics to plan and deliver patient-centered care that best fulfills the needs of patients, rather than the needs of an antiquated billing system [12–15]. Further, there is evidence that alternative payment methods can reduce the provision of unnecessary healthcare services encouraged by FFS models. For example, when hospitals went from FFS to prospective and aggregated diagnosis-related groups, they reduced expenditures by 10.9%, with no change in length of stay or re-admission rates [16]. Previous research regarding alternative payment has been mixed: on one hand, it encouraged team-based care; on the other hand, it was associated with increased administrative burden and information technology needs [17,18]. Thus, there is a need for further investigation of the impact of alternative payment approaches and their outcomes.

This protocol paper describes the evaluation of an Alternative Payment Methodology (APM) intervention involving a subset of Oregon community health centers (CHCs) classified as Federally Qualified Health Centers (FQHCs) or Rural Health Centers (RHCs). In 2013, the Oregon Health Authority (OHA) partnered with the Oregon Primary Care Association to launch the APM demonstration project that changed Oregon's Medicaid payment for several CHCs from FFS reimbursement to a per-member-per-month (PMPM) capitated payment structure [19]. Using a prospective matched observational study, this evaluation intends to assess this 'natural experiment' and its impact on care delivered to patients.

1.1. APM background

Traditionally, CHC care has been reimbursed from Medicaid on a FFS visit-based system, which established a prospective payment rate that clinics would receive per visit based on the full cost of providing care in CHCs. This system and its implementation are complex in each state. For example, in Oregon, most Medicaid recipients are assigned to one of several Coordinated Care Organization (CCOs), which are a type of accountable care organization responsible for care quality (with an emphasis on patient-centered medical homes) in a given population [20]. For CHCs designated as FQHCs or RHCs, the visit-based prospective payments include CCO payments that are supplemented by OHA 'wraparound' payments.

For CHCs participating in the APM project, the OHA changed the payment from a FFS visit-based, prospective payment to a PMPM capitated payment, which provides a monthly payment for each Medicaid patient attributed to their health center for that month. The monthly payment replaces the FFS visit-based payment for all services except dental, mental health, and obstetric care. Participating CHCs are required to show enhanced support services and to report on quality metrics to the OHA. An annual payment reconciliation ensures that each participating CHC is paid at least what they would have received under the previous payment scheme.

1.2. Study aims

This study uses a prospective matched observational design to quantitatively examine electronic health record (EHR) and Medicaid claims data (described below) at the clinic- and patient-level to assess pre-post differences between patients seen in CHCs participating in APM (intervention) compared to patients from non-APM CHCs (control). This study has the following specific aims:

Aim 1: Assess pre-post changes in utilization of CHC internal services (services that occur within the CHC) and quality of clinical care delivered to intervention patients, as compared with control patients.

Hypothesis 1a Facilitation of non-traditional services (e.g., non-bill-able visits, phone encounters and group visits) will decrease the demand for traditional visit-based encounters; this change will increase more for intervention versus control patients.

Hypothesis 1b Utilization of non-traditional services will increase more among intervention patients from pre- to post-APM, than in control patients, while visit-based encounter rates will not increase in intervention patients relative to those of control patients.

Hypothesis 1c Intervention patients will achieve greater pre-post improvements in quality of care delivered internally (e.g., preventive care services), as compared to the rates of improvement in control patients.

Aim 2: Measure pre-post changes in utilization of external services (services that occur outside of the CHC) and overall costs to the Medicaid program among intervention patients receiving primary care, as compared to control patients.

Hypothesis 2a Utilization of external services will decrease for intervention patients, but will remain the same or increase in control patients.

Hypothesis 2b Total Medicaid expenditures will decrease for intervention patients, while expenditures for control patients will remain the same or increase.

2. Materials and methods

2.1. APM intervention time periods

The APM natural experiment was implemented in phases: phase one started on 3/1/2013; phase two start dates ranged from 7/1/2014–10/1/2014; and phase three started on 7/1/2015. The study will analyze data from 6/1/2011 through 5/30/2018 (the actual time frame analyzed will depend on the analysis). This end date gives us one year prior to study completion (5/31/2019) for analyses. EHR data are real-time; for analyses that use claims data, we will allow six months for data correction before final analyses are conducted. Study time intervals for phase one will be categorized as pre-intervention (2010–2012), implementation of intervention [time period to allow for changes (2013–2014)] and post-intervention (2015–2018). Time intervals will depend on the phase of implementation; time increments used in the analyses will depend on the outcome variables (described below).

2.2. Data sources

We will use EHR data from the OCHIN (not an acronym) practice-based research network (PBRN) [21,22]. All phase one and two, and the majority of phase three CHCs are part of the OCHIN PBRN. The EHR data is centrally hosted and managed at OCHIN; data are updated daily from the EHR, standardized across all OCHIN CHCs, and checked regularly for accuracy [21,22]. This large network with a rich EHR dataset will enable us to identify appropriate control clinics and patients.

We will also use Medicaid administrative claims data, which will provide information on healthcare services received and costs incurred by those with Medicaid coverage. Oregon's Medicaid recipients are assigned unique individual identification numbers, facilitating data linkages across multiple databases, including the OCHIN EHR data [23–25].

2.3. APM and non-APM clinics

From the OCHIN PBRN, a total of 27 APM clinics are included in phase one, two, or three of the demonstration project [see Table 1].

2.4. Statistical analyses

The analyses for this study are determined by the outcome type: 1) clinic-level outcomes, 2) patient-level clinical outcomes, and 3) patient-level econometric outcomes. All proposed analyses will implement a difference-in-difference analytic approach to evaluate pre-post APM changes between groups [26]. For all analyses, the time period used for propensity scores will depend on APM phase: we will collect inputs from data before 3/1/2013 for phase one clinics, before 7/1/14 or 10/1/2014 for phase two, and before 7/1/2015 for phase three.

2.4.1. Clinic-level outcome analyses—The subjects in these analyses will be primary care clinics that are members of the OCHIN PBRN with EHR data available on or before 6/1/2011. Mental health, dental, and obstetric only clinics are excluded because these clinics predominantly offer services excluded from the APM agreement. For clinic-level analyses, we will select a subset of clinics from control CHCs that closely match the intervention CHC clinics. We will use a propensity score approach [27–29] to select this control group. Potential control clinics will be limited to those with similar federal designations to the intervention CHCs (e.g., FQHC, RHC) that also meet the EHR criteria. Propensity scores will be generated from a logistic regression of APM status (i.e., implemented APM or did not implement APM) on clinic- and patient-panel characteristics; the date of data used will depend on APM phase as described above. Clinic characteristics used to generate the propensity score will include the trend in clinic outcomes during the pre-period, as matching on pre-intervention trend has been shown to be critical to difference-in-difference analysis approaches [30]. Separate propensity matches will be run for the access and quality of care analyses, as the closest matches for pre-intervention outcomes may differ for the two types of outcomes. The defining dates for the implementation phases for these propensity-score matched control CHC sites will be assigned based on their matching intervention CHC sites.

We will use a generalized linear mixed model (GLMM) approach to adjust for serial correlation and other potential confounders. An interaction term for APM status and intervention phase will be included in the model to determine the difference-in-differences between groups. Primary adjustment for potential confounding will be achieved through the propensity matching. Clinic and patient panel characteristics that remain unbalanced between the intervention and control groups after matching will be included as covariates in the GLMM models to control for residual confounding. Longitudinal GLMM models will account for correlation within matched clinic site pairs and within CHCs through random effects.

2.4.2. Patient-level clinical outcome analyses—The subjects for the patient-level utilization and quality of care analyses will be all patients (aged 2–64) with 1 visit to any primary care clinic that was a member of the OCHIN PBRN utilizing the EHR on or before 6/1/2011. We will control for confounding due to differences in patient characteristics attending different CHCs through inverse propensity weighting (as described below). Subjects from non-intervention clinics will be randomly assigned dates for defining the implementation phases based on the distribution of APM dates in the intervention group.

Propensity score weighted GLMM methods will be used to adjust for confounding due to differences between groups in patient and clinic characteristics [29]. These propensity score derived weights will be derived from a multinomial logistic regression of the APM phase (phase one, two, three, or none) on patient and clinic characteristics; [28] the time period of data used will depend on APM phase, as described above. Any patient- or clinic-level covariates with residual imbalance after propensity weighting will be included in the models to adjust for residual confounding. The longitudinal GLMM models will account for correlations within patient and within clinic through random effects. An interaction term for APM status and intervention phase will be included in the models to determine the difference-in-differences between groups.

2.4.3. Patient-level econometric outcome analysis—Econometric analyses will be conducted with all Medicaid enrollees (aged 2–64) who were patients at a CHC that was a member of the OCHIN PBRN at any point in the study period. In any given year, many patients will have no visits or expenditures. Thus, our dependent variable will have a cluster of observations at zero. We will use a well-validated approach for modeling this phenomenon: the 2-part model [31]. Part 1 will use a logistic regression to estimate the probability of any expenditure. Part 2 will focus on individuals with non-zero expenditures. We will use recent literature to guide the appropriate estimation approach, taking into account the potentially skewed distribution of the dependent variable [32]. Propensity weighting methods will be incorporated into the 2-part models to account for differences in patient and clinic characteristics between intervention and control groups; the time period of data used will depend on APM phase, as described above. Any patient characteristics with residual imbalance between groups (after accounting for propensity weighting) will be included in the models as covariates. Because our study will focus on the “treatment-effect” of the APM, our approach will be to use clinic-level fixed effects to net out any time-invariant differences in clinic-level cost outcomes. Changes in spending after APM

implementation in the intervention clinics vs. spending changes in the control clinics will “net out” any secular changes not related to APM. Any remaining significant differences in outcome – the difference-in-differences – are attributed to the APM intervention.

In non-linear models (e.g., the 2-part model), the interpretation of the interaction effect cannot be directly calculated from its coefficient [33]. Our approach will be to estimate the 2-part model, save those co-efficients, and use empirical simulation (also known as “recycled predictions”) methods to determine the APM’s average effect using a nonparametric bootstrap method to derive 95% confidence intervals.

This study was reviewed and approved by the Oregon Health & Science University Institutional Review Board. It is registered with ClinicalTrials.gov (NCT02637869).

2.5. Outcome variables

Access to healthcare at intervention CHCs compared to control CHCs will be assessed through the number of days between the date an appointment is made and the date of the appointment, the time to 3rd available appointment slot for providers in the CHC, and the number of overbookings. Access variables will be summarized bi-weekly and/or monthly over the study period.

Utilization and quality of care received at CHCs will include rates of face-to-face encounters, non-billable patient contacts documented in the EHR, and receipt of preventive services. Utilization rates will be summarized bi-weekly and/or monthly over the study period. Rates will be assessed prior to APM implementation, through the implementation period, and at the end of a follow-up period.

The primary outcome variables for econometric analysis will be total PMPM expenditure rates. PMPM expenditure rates for services internal and external to the patients’ clinic will be determined, and PMPM rates of specific services (e.g., primary care, sub-specialist care, emergency department visits, imaging and physical therapy) will be analyzed. We will impute a “paid” amount across all FFS and managed care organizations claims (that is, any external services for which there would be payment outside of the APM capitation rate) based on the median FFS payment for the specific encounter type [34,35]. Additional outcome variables may be added if more data becomes available. Table 2 shows the outcome variables we will use.

3. Discussion

Since the best way to pay clinics to provide coordinated healthcare through PCMHs is unknown, we will assess the APM natural experiment that changed the payment for Medicaid patients from a FFS visit-based payment to a PMPM capitated payment in several CHCs in Oregon. Potential benefits may come from being “freed” from FFS billing tied directly to provider face-to-face visits. For example, having the freedom to move away from traditional clinic visits could allow care teams to tailor care for individual patients and to more effectively meet patients’ needs. This could include more telephone or electronic contact, education and monitoring by ancillary staff, or other measures. It could also enable

and motivate providers to more effectively address population health issues and build systems to support caring for panels of patients. Alternatively, there is potential for detrimental effects resulting from changing care models. For example, moving care outside the clinic and increasing asynchronous communication might lead to poorer quality of care, or miscommunication with patients about important issues.

The econometric assessment will help to understand whether the APM intervention can reduce costs, and if so, whether the reduction comes from lower spending at the CHC-level or through reductions in potentially unnecessary or inefficient use of external specialty and hospital services. Reductions in spending for specialty services and other external services would most likely reflect improvements in internal care delivery, as CHCs are not financially at risk for external services and thus do not have incentives to act as gatekeepers to this care.

Findings from the project will be of national significance. Across the country, efforts to create PCMHs in primary care settings may be hampered by FFS payment models. There is a need for evidence regarding how novel payment methods impact PCMH capabilities and their capacity to produce better quality and outcomes. If this capitated payment method is proven effective, study findings will inform dissemination of similar APMs nationwide.

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Abbreviations

APM	Alternative Payment Methodology
CCO	coordinated care organization
CHC	community health center
EHR	electronic health record
FFS	fee-for-service
FQHC	federally-qualified health center
GLMM	generalized linear mixed model
PBRN	practice-based research network
PCMH	primary care medical home
PMPM	per-member-per-month
OHA	Oregon Health Authority
RHC	rural health center

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Table 1

Number of APM and non-APM clinics from the OCHIN PBRN.

APM phase	# of clinics starting APM	Total # of APM clinics	# of non-APM clinics
One	8	8	31
Two	13	21	18
Three	6	27	12

Clinic inclusion criteria: EHR on or before 6/1/11; federally-qualified health center or rural health center; primary care.

Clinic exclusion criteria: school-based health center; mental health, dental, or obstetric only clinic.

Table 2**Outcome variables by analysis.**

1) Clinic-level outcomes
No show rates
Time to 3rd available appointment slot for providers in the CHC
Number of overbookings
Face to face visit rates
Non-billable encounter rates
Internal service utilization
Quality measures for internal services
2) Patient-level clinical outcomes
Internal service utilization
Face to face visits
Ambulatory care: non-billable visits
Quality measures for internal services
External service utilization
External/internal services ratio
Quality measures for external services
3) Patient-level econometric outcomes
Total expenditure rates
Cost of internal vs. external services