center
for health
information
and analysis

Non-Government Application for Massachusetts All-Payer Claims Data [Exhibit A]

I. INSTRUCTIONS

This form is required for all Applicants, except Government Agencies as defined in 957 CMR 5.02, requesting protected health information*. All Applicants must also complete the Data Management Plan, attached to this Application. The Application and the Data Management Plan must be signed by an authorized signatory of the Organization. This Application and the Data Management Plan will be used by CHIA to determine whether the request meets the criteria for data release, pursuant to* 957 CMR 5.00*. Please complete the Application documents fully and accurately. Prior to receiving CHIA Data, the Organization must execute CHIA's Data Use Agreement. Applicants may wish to review that document prior to submitting this Application.*

Before completing this Application, please review the data request information on CHIA's website:

- Data Availability
- Fee Schedule
- Data Request Process

After reviewing the information on the website and this Application, please contact CHIA at apcd.data@state.ma.us if you have additional questions about how to complete this form.

All attachments must be uploaded to IRBNet with your Application. All Application documents can be found on the CHIA website in Word and in PDF format or on IRBNet in Word format. If you submit a PDF document, please also include a Word version in order to facilitate edits that may be needed.

Applications will not be reviewed until the Application and all supporting documents are complete and the required application fee is submitted. A Fee Remittance Form with instructions for submitting the application fee is available on the CHIA website and IRBNet. If you are requesting a fee waiver, a copy of the Fee Remittance Form and any supporting documentation must be uploaded to IRBNet.

II. FEE INFORMATION

1. Consult the most current Fee Schedule for All-Payer Claims Database data.

2. After reviewing the Fee Schedule, if you have any questions about the application or data fees, contact apcd.data@state.ma.us.

3. If you believe that you qualify for a fee waiver, complete and submit the Fee Remittance Form and attach it and all required supporting documentation with your application. Refer to the Fee Schedule (effective Feb 1, 2017) for fee waiver criteria.

4. Applications will not be reviewed until the application fee is received.

5. Data for approved Applications will not be released until the payment for the Data is received.

III. ORGANIZATION & INVESTIGATOR INFORMATION

Project Title:	**Medicaid Payment Policy and Access to Care for Dual Eligible Beneficiaries**
IRBNet Number:	1336202-1
Organization Requesting Data (Recipient):	The General Hospital Corporation d/b/a Massachusetts
Organization Website:	General Hospital
Authorized Signatory for Organization:	Erinn Crane, J.D., LL.M.
Title:	Senior Agreement Advisor & Contracts Team Lead
E-Mail Address:	ecrane@partners.org
Address, City/Town, State, Zip Code:	399 Revolution Drive, Somerville, MA 02145
Data Custodian: **(individual responsible for organizing, storing, and archiving Data)**	**Catherine Myong**
Title:	Research Assistant
E-Mail Address:	cmyong@mgh.harvard.edu
Telephone Number:	617-724-9530
Address, City/Town, State, Zip Code:	100 Cambridge Street, Suite 1600, Boston, MA 02114
Primary Investigator (Applicant): **(individual responsible for the research team using the Data)**	**Vicki Fung, Ph.D.**
Title:	Assistant Professor
E-Mail Address:	vfung@mgh.harvard.edu
Telephone Number:	617-726-5212
Names of Co-Investigators:	John Hsu, MD, MBA, MSCE
E-Mail Addresses of Co-Investigators:	John.Hsu@mgh.harvard.edu

IV. PROJECT INFORMATION

1. What will be the use of the CHIA Data requested? [Check all that apply]

☐ Epidemiological
☐ Health planning/resource allocation
☐ Cost trends
☐ Longitudinal Research
☐ Quality of care assessment
☐ Rate setting
☐ Reference tool
☒ Research studies
☐ Severity index tool
☐ Surveillance
☐ Student research
☐ Utilization review of resources
☐ Inclusion in a product
☐ Other (describe in box below)

2. Provide an abstract or brief summary of the specific purpose and objectives of your Project. This description should include the research questions and/or hypotheses the project will attempt to address, or describe the intended product or report that will be derived from the requested data and how this product will be used. Include a brief summary of the pertinent literature with citations, if applicable.

Summary of project:
This project will assess the impact of primary care provider (PCP) payment policy on medical care, clinical events, and medical spending. This project is funded by the Agency for Healthcare Research and Quality (AHRQ) and proposes to use Medicare claims data from CMS on dual-eligibles, as well as Massachusetts All Payer Claims data on Medicaid-

only enrollees to assess the impact of recent policy changes that could impact provider supply and availability for low-income individuals, with a focus on changes in provider payments (e.g., the Affordable Care Act (ACA) PCP payment bump). **Please note: It is the latter focus on Medicaid enrollees in Massachusetts (not dual-eligibles) that is relevant for this application for APCD data [we retained the title of our original AHRQ proposal that focuses on dual-eligibles because it is tied to the project funding and IRB approval].** This project will account for other concurrent policy changes that could impact provider supply for low-income populations, such as changes in federal funding for Federally Qualified Health Centers associated with the Affordable Care Act and subsequent legislation.

The ACA PCP payment bump increased payments for PCPs providing care to Medicaid enrollees in 2013-2014 to 100% of the Medicare rate (an estimated 32 percentage point payment increase for PCPs in Massachusetts). We will conduct a longitudinal analysis to compare changes for Medicaid enrollees in Massachusetts vs. concurrent comparison groups (e.g., subsidized individual market enrollees) before, during, and after the expiration of the PCP payment bump in 1) medical care (e.g., overall, to PCPs, to specialists); 2) clinical event rates (e.g., emergency department (ED) visits, hospitalizations overall and for ambulatory care sensitive conditions); and 3) total and component medical spending (e.g., outpatient, inpatient, prescription drugs).

Background and Significance:
Concerns about access to care for low-income populations were heightened with the passage of the Affordable Care Act (ACA) because of large expected increases in demand for care associated with insurance coverage expansion in 2014 through Medicaid and new insurance marketplaces. The ACA increased Medicaid PCP payment rates to Medicare levels in 2013 and 2014 to help maintain or improve access to primary care.[1] The payment increase was estimated to cost the federal government $11 billion and increased Medicaid PCP payments from an average of 59% of Medicare fees to 100%. The magnitude of the payment increase varied by states' pre-policy Medicaid-to-Medicare payment ratios; for dual-eligibles, this policy increased PCP payment rates by up to 25% because many state Medicaid programs cap provider reimbursement for Medicare cost-sharing at Medicaid rates.

In theory, increasing PCP payments should improve access; however, early findings have been mixed. One study found greater appointment availability for Medicaid patients associated with the payment increase,[2] while other qualitative reports suggest that the policy did not increase PCPs' Medicaid participation or enrollees' primary care use.[3] Despite the limited evidence, in 2015, 34 states dropped PCP payments back to pre-2013 rates after expiration of federal funding, while 16 states continued the payment increase.[4 5-12] The literature on prior Medicaid payment changes is also mixed and has several methodological limitations. Cross-sectional studies have found higher levels of provider participation in states with higher payments,[1,8,13-16] but few studies have examined longitudinal changes in payments or the effects on visit rates and patient outcomes.

The ACA payment changes occurred in the context of coverage expansion (e.g., through individual market insurance exchanges and Medicaid expansion). In Massachusetts, we have the opportunity to better isolate the impact of the payment changes in a state that previous expanded insurance prior to the policy change.

Bibliography:
1. Decker SL. In 2011 nearly one-third of physicians said they would not accept new Medicaid patients, but rising fees may help. *Health Aff (Millwood).* 2012;31(8):1673-1679.
2. Polsky D, Richards M, Basseyn S, et al. Appointment Availability after Increases in Medicaid Payments for Primary Care. *New England Journal of Medicine.* 2015;372(6):537-545.
3. Medicaid and CHIP Payment and Access Commission. *An Update on the Medicaid Primary Care Payment Increase.* Washington, DC Mar 2015.
4. Snyder L, Paradise J, Rudowitz R. *The ACA Primary Care Increase: State Plans for SFY 2015.* Kaiser Family Foundation;2014.

5. Decker S. Medicaid Physician Fees and the quality of medical care of Medicaid patients in the USA. *Review of Economics of the Household.* 2007;5:95-112.
6. Gabel JR, Rice TH. Reducing public expenditures for physician services: the price of paying less. *J Health Polit Policy Law.* 1985;9(4):595-609.
7. Fox MH, Weiner JP, Phua K. Effect of medicaid payment levels on access to obstetrical care. *Health Affairs.* 1992;11:150-161.
8. Perloff JD, Kletke P, Fossett JW. Which physicians limit their Medicaid participation, and why. *Health Serv Res.* 1995;30(1):7-26.
9. Bindman AB, Yoon J, Grumbach K. Trends in physician participation in Medicaid. The California experience. *J Ambul Care Manage.* 2003;26(4):334-343.
10. Coburn AF, Long SH, Marquis MS. Effects of changing Medicaid fees on physician participation and enrollee access. *Inquiry.* 1999;36(3):265-279.
11. Gray B. Do Medicaid physician fees for prenatal services affect birth outcomes? *Journal of Health Economics.* 2001;20:571-590.
12. Currie J, Gruber J, Fischer M. Physician Payments and Infant Mortality: Evidence from Medicaid Fee Policy. *The American Economic Review.* 1995;85(2):106-111.
13. Zuckerman S, McFeeters J, Cunningham P, Nichols L. Changes in medicaid physician fees, 1998-2003: Implications for physician participation. *Health Aff (Millwood).* 2004;23:1998-2003.
14. Berman S, Dolins J, Tang S-f, Yudkowsky B. Factors that influence the willingness of private primary care pediatricians to accept more Medicaid patients. *Pediatrics.* 2002;110:239-248.
15. Cohen JW, Cunningham PJ. Medicaid physician fee levels and children's access to care. *Health Aff (Millwood).* 1995;14(1):255-262.
16. Perloff JD, Kletke PR, Neckerman KM. Recent trends in pediatrician participation in Medicaid. *Medical care.* 1986;24:749-760.

3. Has an Institutional Review Board (IRB) reviewed your Project?

☒ Yes [*If yes, a copy of the approval letter and protocol must be included with the Application package on IRBNet.*]
☐ No, this Project is not human subject research and does not require IRB review.

4. **Research Methodology**: Applicants must provide either the IRB protocol or a written description of the Project methodology (typically 1-2 pages), which should state the Project objectives and/or identify relevant research questions. This document must be included with the Application package on IRBNet and must provide sufficient detail to allow CHIA to understand how the Data will be used to meet objectives or address research questions.

V. PUBLIC INTEREST

1. Briefly explain why completing your Project is in the public interest. Use quantitative indicators of public health importance where possible, for example, numbers of deaths or incident cases; age-adjusted, age-specific, or crude rates; or years of potential life lost. *Uses that serve the public interest under CHIA regulations include, but are not limited to: health cost and utilization analysis to formulate public policy; studies that promote improvement in population health, health care quality or access; and health planning tied to evaluation or improvement of Massachusetts state government initiatives.*

Policies that improve access to care and outcomes and reduce spending for vulnerable, low-income populations are urgently needed. The federal government spent billions of dollars to temporarily increase payments for PCPs caring for Medicaid beneficiaries, and some states have chosen to finance a continuation of this policy, even in the absence of information on its effects. In Massachusetts, the payment bump increased Medicaid payments to PCPs by about 32 percentage points, but there is limited evidence on its effects. Other related policy approaches over this time period could also impact access to medical care for underserved populations, including changes in funding for community health centers. This study will use comprehensive datasets and rigorous quasi-experimental methods to provide timely evidence on the effects of these policies on utilization, quality and spending for Medicaid enrollees in Massachusetts to inform efforts to improve receipt of high value care for low-income populations.

VI. DATA REQUESTED

The Massachusetts All-Payer Claims Database is comprised of medical, pharmacy, and dental claims and information from the member eligibility, provider, and product files that are collected from health insurance payers licensed to operate in the Commonwealth of Massachusetts. This information encompasses public and private payers as well as data from insured and self-insured plans. APCD data are refreshed and updated annually and made available to approved data users in Release Versions that contain five calendar years of data and three months of run-out. Data requests will be fulfilled using the most current Release Version. For more information about the most current APCD Release Version, including available years of data and a full list of elements in the release please refer to release layouts, data dictionaries and similar documentation included on CHIA's website.

Data requests are typically fulfilled on a one time basis, however; certain Projects may require future years of data that will become available in a subsequent release. Applicants who anticipate a need for future years of data may request to be considered for a subscription. Approved subscriptions will receive, upon request, the same data files and data elements included in the initial Release annually or as available. Please note that approved subscription request will be subject to the Data Use Agreement, will require payment of fees for additional Data, and subject to the limitation that the Data can be used only in support of the approved Project.

1. List years of data requested (only list years available in the current Release Version): 2012-2016

2. Please indicate below whether this is a one-time request, or if the described Project will require a subscription.

☒ One-Time Request **OR** ☐ Subscription

3. Specify below the data files requested for this Project, and provide your justification for requesting *each* file.

☒ Medical Claims

Describe how your research objectives require Medical Claims data:

We will use the Medical Claims file to characterize outcomes for aims 1 and 2 (medical care and clinical event outcomes). We will use information included in the claim to identify outpatient encounters (by visit type and diagnosis)- e.g., using procedure and diagnosis codes, site of service, bill type. We will also using information on costs to examine changes in medical spending associated with the policy changes.

☒ **Pharmacy Claims**

Describe how your research objectives require Pharmacy Claims data:

We will use the Pharmacy Claims data to examine receipt of prescription drugs and drug spending. We will examine receipt of guideline-consistent medications (e.g., receipt of drugs for chronic conditions such as diabetes or hypertension) and adherence to these medications using information on the days of supply and fill patterns to calculate the proportion of days covered in relevant time periods.

☒ **Dental Claims**

Describe how your research objectives require Dental Claims data:

We will use dental claims to examine changes in receipt of dental care associated with the policy change. Although this policy did not directly impact payments for dental care, greater access to medical care could have spillover effects on oral health or health care receipt.

☒ **Member Eligibility**

Describe how your research objectives require Member Eligibility data:

We will use the Member Eligibility file to identify populations of interest (e.g., Medicaid enrollees, comparison groups of ConnectorCare enrollees or commercially insured enrollees) using coverage/enrollment information. We will also use information on individual characteristics -e.g., age, gender – as covariates in our analyses.

☒ **Provider**

Describe how your research objectives require Provider data:

We will use the provider data to classify visits to different types of providers (e.g., based on specialty or linked taxonomy codes using the NPI file). We will also examine changes at the provider-level – e.g., in Medicaid case-loads, continuity of care. We will also account for potential clustering by provider or provider organization.

☒ **Product**

Describe how your research objectives require Product data:

We will use information in the Product file to control for relevant plan characteristics that could influence receipt of medical care, such as benefit design and plan design - e.g., HMO vs. PPO.

VII. DATA ENHANCEMENTS REQUESTED

State and federal privacy laws limit the release and use of Data to the minimum amount of data needed to accomplish a specific Project objective.

All-Payer Claims Database data is released in Limited Data Sets (LDS). All applicants receive the "Core" LDS, but may also request the data enhancements listed below for inclusion in their analyses. Requests for enhancements will be reviewed by CHIA to determine whether each represents the minimum data necessary to complete the specific Project objective.

For a full list of elements in the release (i.e., the core elements and additional elements), please refer to release layouts, data dictionaries and similar documentation included on CHIA's website.

1. Specify below which enhancements you are requesting in addition to the "Core" LDS, provide your justification for requesting each enhancement.

Geographic Subdivisions

The geographic subdivisions listed below are available for Massachusetts residents and providers only. Select *one* of the following options.

☐ 3-Digit Zip Code (standard)	☒ 5-Digit Zip Code***

*****If requested, provide justification for requesting 5-Digit Zip Code. Refer to specifics in your methodology:**

5-digit ZIP code will greatly enhance our ability to identify comparison groups of commercially insured enrollees living in lower-income ZIP codes with better precision than 3-digit ZIP. Improving the comparability of our control group is necessary for meeting critical assumptions of our difference-in-difference analytic approach (e.g., parallel trends assumption). We will also use 5-digit ZIP codes to identify service areas and provider availability within service areas (again with much better precision than 3-digit ZIP).

Date Resolution

Select *one* option from the following options.

☐ Year (YYYY) (Standard)	☐ Month (YYYYMM) ***	☒ Day (YYYYMMDD) *** [for selected data elements only]

***** If requested, provide justification for requesting Month or Day. Refer to specifics in your methodology:**

We are requesting Day for the Date Resolution. Our study aims to understand the impact of recent changes in policies on medical care use, including patterns and episodes of care, and quality of care process measures (e.g., outpatient follow-up within 14 days of hospitalization) for which exact dates are needed to accurately capture these outcomes. In addition, in Aim 2 of the study we will assess the impact of changes in medical care use (e.g., outpatient care, prescription drug use) on downstream clinical event outcomes. Detailed information on the dates of service are needed in order to determining the timing of changes in medical care use and potential subsequent changes in clinical event rates (vs. clinical events that could have occurred prior to changes in medical care use). In addition, one methodology for analyzing changes in clinical event rates uses Cox proportional hazards models to examine changes in time to events, in which exact dates are needed for more precise estimation.

National Provider Identifier (NPI)

Select *one* of the following options.

☐ Encrypted National Provider Identifier(s) (standard)	☒ Decrypted National Provider Identifier(s)***

***** If requested, provide justification for requesting decrypted National Provider Identifier(s). Refer to specifics in your methodology:**

We will link the decrypted NPIs to the CMS NPI file to obtain information on taxonomy codes to identify provider specialties -e.g., to determine eligibility for the ACA PCP payment bump based on specialty. We will also classify outpatient visits by provider type, define service areas and associated provider availability using address information available in the NPI file, and identify federally

qualified health centers to link with publicly available data from HRSA on FQHC funding to control for other area-level changes in provider availability.

We will also link providers with publicly available CMS data on Part D prescribing (e.g., Part D Prescriber Public Use Files). These data will provide information on the number of Part D claims by NPI and drug, and the number of Medicare beneficiaries who received prescriptions by NPI. These data will be used to provide information on the potential number of Medicare beneficiaries seen by providers to aid in assessment of the patient/payer composition of provider panels to supplement our provider analyses in the absence of individual-level Medicare data through the APCD.

We will also link providers with publicly available on providers from the Commonwealth of Massachusetts Board of Registration in Medicine. This website includes supplemental information on physicians, including their license status, address, affiliations, insurance accepted, Medicaid status, whether they are accepting new patients, and education and training. We will use these data to supplement and compare with the other sources of provider information.

VIII. MEDICAID (MASSHEALTH) DATA

1. Please indicate whether you are seeking Medicaid Data:

☒ Yes
☐ No

2. Federal law (42 USC 1396a(a)7) restricts the use of individually identifiable data of Medicaid recipients to uses that are ***directly connected to the administration of the Medicaid program***. If you are requesting MassHealth Data, please describe, in the space below, why your use of the Data meets this requirement. *Your description should focus on how the results of your project could be used by the Executive Office of Health and Human Services in connection with the administering the MassHealth program*. Requests for MassHealth Data will be forwarded to MassHealth for a determination as to whether the proposed use of the Data is directly connected to the administration of the MassHealth program. CHIA cannot release MassHealth Data without approval from MassHealth. This may introduce significant delays in the receipt of MassHealth Data.

Questions regarding access to providers and the effects of policy approaches to improve access to providers are directly relevant for the administration of the Medicaid program in Massachusetts. We will examine primary and specialty provider participation in MassHealth using empirical claims data and changes in participation associated with the policy change, and associated changes in receipt of medical care (including high value preventive care) for Medicaid enrollees who experienced changes in Medicaid payments to providers in 2013-2014. We will also investigate potential downstream effects on clinical event rates (e.g., potentially preventable hospitalizations) and medical spending, which will provide evidence to Executive Office of Health and Human Services on the comprehensive effects of these policy changes on Medicaid enrollees utilization and spending.

IX. DATA LINKAGE

Data linkage involves combining CHIA Data with other data to create a more extensive database for analysis. Data linkage is typically used to link multiple events or characteristics within one database that refer to a single person within CHIA Data.

1. Do you intend to link or merge CHIA Data to other data?

☒ Yes
☐ No linkage or merger with any other data will occur

2. If yes, please indicate below the types of data to which CHIA Data will be linked. [Check all that apply]

- ☐ Individual Patient Level Data (e.g. disease registries, death data)
- IZI Individual Provider Level Data (e.g., American Medical Association Physician Masterfile)
- IZI Individual Facility Level Data (e.g., American Hospital Association data)
- IZI Aggregate Data (e.g., Census data)
- ☐ Other (please describe):

3. If yes, describe the dataset(s) to which the CHIA Data will be linked, indicate which CHIA Data elements will be linked and the purpose for each linkage.

We will link with the publicly available CMS NPI file on providers to obtain supplemental information on providers, including provider type, name, address, and specialty. Although the APCD Provider file also includes this information, we will link to the CMS NPI file to obtain cleaner/standardized fields (e.g., name), and to compare location information from the address fields with the APCD provider file data (there are reports that the CMS NPI addresses can sometimes contain home addresses instead of office addresses).

We will also link providers with publicly available on providers from the Commonwealth of Massachusetts Board of Registration in Medicine. These data include supplemental information on physicians, including their license status, address, affiliations, insurance accepted, Medicaid status, whether they are accepting new patients, and education and training. We will use these data to supplement and compare with the other sources of provider information.

We will also link providers with publicly available CMS data on Part D prescribing (Part D Prescriber Public Use Files). These data will provide information on the number of Part D claims by NPI and drug, and the number of Medicare beneficiaries who received prescriptions by NPI. These data will be used to provide information on the potential number of Medicare beneficiaries seen by providers to aid in assessment of the patient/payer composition of provider panels to supplement our provider analyses in the absence of individual-level Medicare data through the APCD.

Lastly, we will link NAIC codes from the Product file to publicly available insurer information from the National Association of Insurance Commissioners to obtain information on the insurance carrier. These data will be used to help assess or validate benefit design characteristics and provider networks derived from our analyses at the plan level for a small sample of plans using publicly available information from plan websites.

At the area-level, we will use ZIP code to link with American Community Survey and US Census data on area characteristics, such as median household income, neighborhood income, race, and education composition, and insurance coverage mix. We will also use the Area Health Resource File (AHRF) and data from the Bureau of Labor Statistics to characterize other area-level traits including provider and facility counts, and local area unemployment levels. There are potential explanatory variables and confounders related to our analyses.

4. If yes, for each proposed linkage above, please describe your method or selected algorithm (e.g., deterministic or probabilistic) for linking each dataset. If you intend to develop a unique algorithm, please describe how it will link each dataset.

We will link our datasets using a deterministic algorithm, e.g., we will match NPI in one file to NPI in another file or ZIP code in one file to ZIP code in another file.

5. If yes, attach or provide below a complete listing of the variables from all sources to be included in the final linked analytic file.

CMS NPPES/NPI file
Owner: The Centers for Medicare and Medicaid Services
Variables: NPI, Taxonomy code, Provider practice/business address, Entity name, Entity type

CMS Part D Prescriber Public Use File (PUF)
Owner: The Centers for Medicare and Medicaid Services
Variables: Total number of beneficiaries with at least one claim (overall and <65 vs. 65+), counts of claims by drug class

Commonwealth of Massachusetts Board of Registration in Medicine
Owner: Commonwealth of Massachusetts
Variables: NPI, License Issue Date, License Status, Primary work setting, Accepting new patients, Accepts Medicaid, Translation services available, Insurance plans accepted, Hospital affiliations

NAIC
Owner: National Association of Insurance Commissioners
Variable: NAIC, Carrier name, Carrier status, Carrier network providers

Area Health Resource File
Owner: Health Resources and Services Administration
Variables: Counts of primary care providers, psychiatrists, psychologists, social workers, and other specialists; Counts of community health centers, Inpatient facilities/beds

U.S. Census Data and American Community Survey
Owner: US Census Bureau
Variables: Measures of poverty, race, income, education, insurance mix (% uninsured, Medicaid, Medicare, private, other)

Local Area Unemployment Statistics Database
Owner: Bureau of Labor Statistics
Variables: Local unemployment rate, Consumer spending data

6. If yes, please identify the specific steps you will take to prevent the identification of individual patients in the linked dataset.

We will not link, stack, merge, or otherwise combine the CHIA data with other claims data, such as the CMS Medicare claims. We will only link to provider or aggregate datasets, which will not increase the ease or likelihood of identifying individual patients as the information is provided in aggregate form. In addition, although we will link to information on providers and insurance carriers, our analyses and findings will not identify any individual providers, hospitals, or insurance carriers; i.e., we are not interested in the effects of specific providers or carriers on outcome, but rather

patterns of average outcomes across patients facing different insurance and provider supply conditions. All results will be presented as aggregate averages across patients, providers, and plans. Moreover, we will take extensive steps to ensure the confidentiality of the data as outlined in our data management plan.

X. PUBLICATION / DISSEMINATION / RE-RELEASE

1. Do you anticipate that the results of your analysis will be published or made publically available? If so, how do you intend to disseminate the results of the study (e.g.; publication in professional journal, poster presentation, newsletter, web page, seminar, conference, statistical tabulation)? Any and all publication of CHIA Data must comply with CHIA's cell size suppression policy, as set forth in the Data Use Agreement. Please explain how you will ensure that any publications ***will not disclose a cell less than 11***, and percentages or other mathematical formulas that result in the display of a cell less than 11.

The results will be submitted for publication in academic, peer-reviewed journals and presented, as appropriate at academic conferences and workshops. All results will be reported as aggregate relationships and summary statistics with no cell sizes less than 11.

2. Describe your plans to use or otherwise disclose CHIA Data, or any Data derived or extracted from such Data, in any paper, report, website, statistical tabulation, seminar, or other setting that is not disseminated to the public.

We plan to publish our findings in the peer-reviewed literature. These will be available per the journal's usual policies (e.g., through subscriptions). We also anticipate presenting our findings at national research conferences.

3. What will be the lowest geographical level of analysis of data you expect to present for publication or presentation (e.g., state level, city/town level, zip code level, etc.)? Will maps be presented? If so, what methods will be used to ensure that individuals cannot be identified?

We do not anticipate publishing findings by specific geographic identifiers. We will use five-digit ZIP codes to identify patients' area-characteristics for analysis, but will not publish findings for specific geographies.

4. Will you be using CHIA Data for consulting purposes?

☐ Yes
☒ No

5. Will you be selling standard report products using CHIA Data?

☐ Yes
☒ No

6. Will you be selling a software product using CHIA Data?

☐ Yes

☒ No

7. Will you be using CHIA Data as in input to develop a product (i.e., severity index took, risk adjustment tool, reference tool, etc.)

☐ Yes
☒ No

8. Will you be reselling CHIA Data in any format not noted above?

☐ Yes
☒ No

If yes, in what format will you be reselling CHIA Data?

9. If you have answered "yes" to questions 5, 6, 7 or 8, please describe the types of products, software, services, or tools.

10. If you have answered "yes" to questions 5, 6, 7 or 8, what is the fee you will charge for such products, software, services or tools?

XII. APPLICANT QUALIFICATIONS

1. Describe your previous experience using claims data. This question should be answered by the primary investigator and any co-investigators who will be using the Data.

Vicki Fung, PhD, is an Assistant Professor of Medicine at Harvard Medical School and a Senior Scientist at the Mongan Institute for Health Policy, Massachusetts General Hospital. She received her doctoral training in Health Services and Policy Analysis at the University of California, Berkeley and post-doctoral training at the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco. She has extensive experience conducting health policy research using large claims datasets, including within the Medicare program and the Massachusetts APCD (v3) Data. John Hsu, MD, MBA, MSCE, is the Director of the Program for Clinical Economics and Policy Analysis within the Mongan Institute for Health Policy at Massachusetts General Hospital, Associate Professor of Medicine, Harvard Medical School, and an Associate Professor of Health Policy, Department of Health Care Policy, Harvard Medical School. He is the principal investigator of a number of federally funded studies examining innovations in health care financing and delivery using large datasets. He also serves on the CHIA APCD Data Release Committee.

2. **Resumes/CVs**: When submitting your Application package on IRBNet, include résumés or curricula vitae of the principal investigator and co-investigators. (These attachments will not be posted on the internet.)

XIII. USE OF AGENTS AND/OR CONTRACTORS

By signing this Application, the Agency assumes all responsibility for the use, security and maintenance of the CHIA Data by its agents, including but not limited to contractors. The Agency must have a written agreement with the agent of contractor limiting the use of CHIA Data to the use approved under this Application as well as the privacy and security standards set forth in the Data Use Agreement. CHIA Data may not be shared with any third party without prior written consent from CHIA, or an amendment to this Application. CHIA may audit any entity with access to CHIA Data.

Provide the following information for **all** agents and contractors who will have access to the CHIA Data. [*Add agents or contractors as needed.]*

AGENT/CONTRACTOR #1 INFORMATION	
Company Name:	**Biostat Data Consulting Inc.**
Company Website	NA
Contact Person:	**Mary Price, MA**
Title:	Biostatistical Consultant
E-mail Address:	mprice4@mgh.harvard.edu
Address, City/Town, State, Zip Code:	1840 Lincoln Ave, Saint Paul, MN 55105
Telephone Number:	651-690-1981
Term of Contract:	

1. Describe the tasks and products assigned to the agent or contractor for this Project and their qualifications for completing the tasks.

Mary Price will conduct the data management and analysis for this project. She is a long standing programmer/analyst with Drs. Fung and Hsu. With the study investigators, she will help advise Catherine Myong on the creation and and management of the appropriate data structures required for this project. Mary Price has worked as a senior programmer/analyst for our team for over a decade. She has extensive experience working with and conducting analysis using large claims files, including Medicare claims and large commercial claims databases and the Massachusetts APCD v3 data. She has a masters degree in biostatistics from the University of California, Berkeley.

2. Describe the Organization's oversight and monitoring of the activities and actions of the agent or contractor for this Project, including how the Organization will ensure the security of the CHIA Data to which the agent or contractor has access.

CHIA data files will be stored on the secure served maintained by Partners HealthCare using the security described in the Data Management Plan. No data will leave the site. Data will not be stored on personal computers, removable devices such as laptops, USB drives or external hard drives. Mary Price has executed a Confidentiality Agreement with Partners HealthCare that requires her to comply with these policies. Any violation is grounds for termination of her employment and/or suspension and loss of privileges. She has completed the CITI Collaborative Institutional Training Initiative's couse in the Protection of Human Research Subjects.

She will only access the data through secure VPN and behind the Partners Firewall. Her access to the data will be controlled through Partners Security and the study investigators who grant access to the secure servers via username and password authentication. As described in the data management plan, all of the research analysis and sharing is conducted within the servers through VPN. Mary Price will use a password protected and encrypted Macbook Pro to access the services through the VPN. Only Mary Price has access to the computer and knows the passwords for the computer, the VPN, and the servers. The computer is kept in her locked home office. The Macbook Pro is required to use a current, off-the-shelf anti-virus product. She is the only employee of Biostat Data Consulting, Inc.

3. Will the agent or contractor have access to or store the CHIA Data at a location other than the Organization's location, off-site server and/or database?

☐ Yes
☒ No

4. If yes, a separate Data Management Plan **must** be completed by the agent or contractor.

AGENT/CONTRACTOR #2 INFORMATION	
Company Name:	
Company Website:	
Contact Person:	
Title:	
E-mail Address:	
Address, City/Town, State, Zip Code:	
Telephone Number:	
Term of Contract:	

1. Describe the tasks and products assigned to the agent or contractor for this Project and their qualifications for completing the tasks.

2. Describe the Organization's oversight and monitoring of the activities and actions of the agent or contractor for this Project, including how the Organization will ensure the security of the CHIA Data to which the agent or contractor has access.

3. Will the agent or contractor have access to or store the CHIA Data at a location other than the Organization's location, off-site server and/or database?

☐ Yes
☐ No

4. If yes, a separate Data Management Plan **must** be completed by the agent or contractor.

[INSERT A NEW SECTION FOR ADDITIONAL AGENTS/CONTRACTORS AS NEEDED]

IVX. ATTESTATION

By submitting this Application, the Organization attests that it is aware of its data use, privacy and security obligations imposed by state and federal law *and* confirms that it is compliant with such use, privacy and security standards. The Organization further agrees and understands that it is solely responsible for any breaches or unauthorized access, disclosure or use of CHIA Data, including, but not limited to, any breach or unauthorized access, disclosure or use by any third party to which it grants access.

Applicants approved to receive CHIA Data will be provided with Data following the payment of applicable fees and upon the execution of a Data Use Agreement requiring the Organization to adhere to processes and procedures designed to prevent unauthorized access, disclosure or use of data.

By my signature below, I attest: (1) to the accuracy of the information provided herein; (2) that the requested Data is the minimum necessary to accomplish the purposes described herein; (3) that the Organization will meet the data privacy and security requirements described in this Application and supporting documents, and will ensure that any third party with access to the Data meets the data use, privacy and security requirements; and (4) to my authority to bind the Organization.

Signature: (Authorized Signatory for Organization)	Erinn Crane Digitally signed by Erinn Crane DN: cn=Erinn Crane, o=Senior Agreement Advisor & Contracts Team Lead, ou=Research Management, Partners HealthCare, email=ecrane@partners.org, c=US Date: 2018.10.11 07:54:06 -04'00'
Printed Name:	Erinn Crane, J.D., LL.M., on behalf of The General Hospital Corporation d/b/a Massachusetts General Hospital
Title:	Senior Agreement Advisor & Contracts Team Lead

Attachments

A completed Application must have the following documents attached to the Application or uploaded separately to IRBNet:

☐ 1. IRB approval letter and protocol (if applicable), or research methodology (if protocol is not attached)

☐ 2. Data Management Plan; including one for each agent or contractor that will have access to or store the CHIA Data at a location other than the Organization's location, off-site server and/or database

☐ 3. CVs of Investigators (upload to IRBnet)

APPLICATIONS WILL NOT BE REVIEWED UNTIL THEY ARE COMPLETE, INCLUDING ALL ATTACHMENTS.

[ATTACHED: research methodology, Data Management Plan]
[UPLOADED SEPARATELY: CVs, IRB approval letter]

Research Methodology

Study design overview:
This project investigates the effects of changes in Medicaid provider payments on medical care utilization, clinical event outcomes, and total and component medical spending. We will use longitudinal, quasi-experimental methods to assess the impact of changes in Medicaid provider payments on our outcomes. We will use the APCD to conduct an analysis of the effects of the Medicaid payment increase on Medicaid enrollees in Massachusetts. Our primary approach will be to compare changes in the study outcomes for Medicaid enrollees vs. a concurrent comparison group of low-income individuals without Medicaid (e.g., subsidized Massachusetts Connector enrollees) post vs. pre-policy change using a difference-in-difference study design with individual fixed-effects. We will also explore alternative comparison groups, such as those with commercial group insurance living in low-income ZIP codes (e.g., based on validated measures of SES: ≥20% of residents have incomes below the FPL and ≥25% of the residents 25+ years old have less than a high-school education.[1-3])

Study outcomes:
Outcomes:
Medical Care Use. To assess changes in outpatient medical care, we will start by examining all outpatient visits by all subjects. We will then decompose visits into visits to PCPs and to specialists (e.g., psychiatrists) and by provider type (e.g., physician vs. nurse practitioner). We will use information from the provider file as well as link the provider file with the CMS NPI file to obtain taxonomy codes.

To assess changes in outpatient medical care, we will start by examining outpatient visits. We will assess changes in all outpatient visits, all visits with PCPs, and all visits types subject to the payment increase (i.e., evaluation and management services, CPT codes 99201-99499; vaccine administration services, CPT codes 90460, 90461, and 90471-90474). We will also assess measures of care continuity, such as the Usual Provider Continuity Index that captures the proportion of visits that occur with the same provider or clinic.[4,5]

We will also examine changes in the receipt of sentinel preventive services and quality measures, such as annual diabetes screening, lipid screening, cancer screening (e.g., Pap test, mammogram), and influenza vaccinations.[6] We will define the relevant subpopulation of subjects appropriately based on US Preventive Services Task Force (USPSTF) age and gender recommendations[7] (e.g., annual diabetes screening for individuals with hypertension), and will adjust for changes over time in guidelines as necessary.[8-10] We will also account for the recommended interval between screening events (e.g., biennial mammography screening for women age 50-74).[11] We will also assess sentinel quality measures related to diabetes, cardiovascular disease (CVD), and mental illness, including screening and adherence to chronic drug therapy. We will assess adherence using a validated measure based on pharmacy dispensing data: the proportion of days covered (PDC).[12-14] The PDC measures the number of days for which the patient has available drug supply (days of supply) divided by the total number of days in a given time period, e.g., year or month. We will examine PDC as a dichotomous outcome (PDC≥80%), as well as a continuous variable.[15-18]

Clinical Events. Clinical events will include ED visits and hospitalizations, excluding or separating elective or ambulatory surgery hospitalizations and inter-hospital transfers, which are unlikely to represent adverse clinical events resulting from acute changes in disease status. We will examine all-cause ED visit and hospitalizations, as well as explore additional clinical event measures including length of stay. Since hospitalizations could reflect improved access to care as well as worse quality of care, we will also explore clinical events that are more likely to reflect the quality of outpatient care for beneficiaries, i.e., hospitalizations for ambulatory care sensitive conditions (ACSC) as defined by AHRQ as conditions for which high quality primary care could prevent hospitalization.[19] We will also examine events for specific diagnoses (e.g., cardiovascular events or mental illness diagnoses).

Spending. We will examine total and component medical spending (inpatient, outpatient, and pharmacy) using the dollar amounts captured in the APCD claims and including the patient cost-sharing amounts. We also will differentiate spending by network status. We will explore using standardized unit prices, which focus on resource use rather than pricing differences. Our starting point will be to use linear one-part FE models because these provide coefficient estimates that directly relate to partial effects of predictors on *mean absolute spending,* which are easier to interpret.

Mechanisms: To examine potential mechanisms that underlie any changes in use of medical care for Medicaid enrollees, we will also assess changes in providers' panel composition and visits with Medicaid enrollees using the medical claims linked with the provider file. We will examine providers' panel composition by payer mix and assess whether the PCP payment increase is associated with providers newly accepting Medicaid patients based on claims history (e.g., providers who change from having no claims to claims for ≥3 Medicaid patients during the year). We will also examine potential changes in the provider characteristics associated with participation (e.g., PCP demographic characteristics, subspecialty, geographic area, pre-policy panel mix by payer, race/ethnicity, SES). We will also examine potential changes in visit patterns for Medicaid patients among PCPs who were already participating in Medicaid prior to 2013, e.g., changes in total number of visits by payer (e.g., crowd-out), total visits per week, or visit intensity (e.g., based on CPT codes).

Analysis:

In multivariate analyses, most of our outcomes will be structured as repeated measures over time periods (e.g., months or quarters) and the primary unit of analysis will be the person-time period (e.g., person-month). Our primary estimation approach for the repeated outcome measures will be fixed effects (FE) estimation methods (e.g., Linear Unobserved Effects Model) that account for time stable unmeasured differences across comparison groups. The key assumption in FE analyses is that there are no unmeasured time-changing confounders that differentially affect our comparison groups. Thus, our models will include a number of time-changing covariates that could be related to care utilization, quality, clinical events, or spending, including age, comorbidities, risk scores, utilization history, and clinical history. We will also conduct sensitivity analyses to examine the potential effects of other provider- and plan-level variables such as payment and delivery mechanisms (e.g., global payments, medical homes) and incorporate these characteristics into the analyses if appropriate, as well as clustering of patients at different levels. We will include a series of potential geographic and plan-level traits, linked to individuals, including measures of area-level provider supply (e.g., from the Area Health Resource File) using the measures described above. We will examine changes for Medicaid enrollees in years with enhanced PCP payments (2013-2014) vs. baseline (2012), as well as years after the payment bump expired (2015-2016). In the analyses of clinical event rates, we will also use Cox proportional hazard models to examine changes in time to events associated with the policy changes, as we have done in prior work examining similar questions.[20]

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