CHIA.
center for health information and analysis

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

I. INSTRUCTIONS

This form is required for all Applicants, Agencies, or Organizations, hereinafter referred to as "Organization", except Government Agencies as defined in 957 CMR 5.02, requesting protected health information. All Organizations must also complete the Data Management Plan, and attach it to this Application. The Application and the Data Management Plan must be signed by an authorized signatory. 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. Organizations 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@chiamass.gov if you have additional questions about how to complete this form.

The Appliciaton and all attachments must be uploaded to IRBNet. All Application documents can be found on the CHIA website.

Information submitted as part of the Application may be subject to verification during the review process or during any audit review conducted at CHIA's discretion.

Applications will not be reviewed until the Application and all supporting documents are complete and the required application fee is received.

A Fee Remittance Form with instructions for submitting the application fee is available on the CHIA website. If you are requesting a fee waiver, a copy of the Fee Remittance Form and any supporting documentation must be uploaded to IRBNet. Please be aware that if your research is funded and under that funding you are required to release raw data to the funding source, you may not receive CHIA Data.

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@chiamass.gov.

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:	*Impact of Variations in Healthcare Quality, Enrollment Behavior and Policy Reforms on Maternal Health Outcomes among Medicaid Enrollees in Massachusetts*
IRBNet Number:	*STUDY2024-0781*
Organization Requesting Data (Recipient):	*University of Illinois, Chicago- School of public health*
Organization Website:	*https://publichealth.uic.edu*
Authorized Signatory for Organization:	*Paul Ellinger*
Title:	*Comptroller*
E-Mail Address:	*awards@uic.edu*
Telephone Number:	*3129962862*
Address, City/Town, State, Zip Code:	*1737 W. Polk Street, 304AOB* *Chicago Illinois 60612-7227*
Data Custodian: **(individual responsible for organizing, storing, and archiving Data)**	*Lisa Powell*
Title:	*Distinguished Professor and Director* *Health Policy and Administration*
E-Mail Address:	*powelll@uic.edu*
Telephone Number:	*(312) 413-3544*
Address, City/Town, State, Zip Code:	*1603 W. Taylor St., 777 SPHPI, Chicago, IL-60612*
Primary Investigator (Applicant): **(individual responsible for the research team using the Data)**	*Lisa Powell*
Title:	*Distinguished Professor and Director* *Health Policy and Administration*
E-Mail Address:	*powelll@uic.edu*
Telephone Number:	*(312) 413-3544*
Address, City/Town, State, Zip Code:	*1603 W. Taylor St., 777 SPHPI, Chicago, IL-60612*
Names of Co-Investigators:	*Devoja Ganguli*
E-Mail Addresses of Co-Investigators:	*dgangu4@uic.edu*

IV. PROJECT INFORMATION

IMPORTANT NOTE: Organization represents that the statements made below as well as in any study or research protocol or project plan, or other documents submitted to CHIA in support of the Data Application are complete and accurate and represent the total use of the CHIA Data requested. Any and all CHIA Data released to the Organization under an approved application may ONLY be used for the express purposes identified in this section by the Organization, and for no other purposes. Use of CHIA Data for other purposes requires a separate Data Application to CHIA **or** written request to CHIA, with approval being subject to CHIA's regulatory restrictions and approval process. Unauthorized use is a material violation of your Organizations's Data Use Agreement with CHIA.

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 (or other derived input)

☐ Surveillance ☒ Student research ☐ Utilization review of resources
☐ Inclusion in a product ☐ Other (describe in box below)

The data requested will be used for my Doctoral Dissertation to partially fulfill all requirements of the PhD program at University of Illinois – School of Public Health, Department of Health Policy and Administration.

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.

The overarching goal of this research study is to examine the impact of Medicaid policies on maternal (and infant) health outcomes in Massachusetts. We focus on (i) quality and variations in care received among Medicaid enrolled expectant mothers, (i.e., the extent to which similar patients receive different levels or types of care), and (ii) adverse selection in Medicaid (i.e. expectant mothers who are likely to have complicated and more expensive births, switch into Medicaid from commercial plans or into specific Medicaid plans).

This research study is a retrospective investigation of secondary data using claims data between 2018 to 2023 from the Massachusetts All Payer Claims Database (MA-APCD). Our primary sample will comprise of all adult women(ages 18-54) who had at least one pregnancy related claim at a Massachusetts state hospital or facility and were Massachusetts state residents between 2018 and 2023. We will observe both Medicaid as well as commercially insured patients as a part of our study sample. Analysis performed for this study will be on STATA using standard statistical and geographical analysis techniques.

This research seeks to provide a comprehensive understanding of how Medicaid policies shape maternal health, and identify potential areas for improvement going forward.

Specific Aims and Hypotheses:

Aim 1: *Measure the extent and conditions under which similar Medicaid patients receive different levels or types of care (i.e., variations in quality of care received), and experience different outcomes, as a result of receiving care from different facilities. Additionally, we also identify which facility characteristics are associated with providing desired types of care and outcomes, respectively.*

> ***Hypothesis 1:*** *Similar Medicaid patients receive different levels of care and experience different outcomes depending on the facility (hospital) they visit. Facility characteristics that will be considered include for-profit status, rural versus urban, hospital network size, staff to patient ratio, academic teaching status.*

Aim 2: *Identify patterns of adverse selection (i.e. those who are expected to have complicated and more expensive births, switch into Medicaid or into specific Medicaid plans) among enrollees.*

> ***Hypothesis 2:***
>
> *(A) Pregnant women who newly select into Medicaid are more likely to have higher expected costs and greater health care utilization than women who were already enrolled in the program.*
>
> *(B) Certain Medicaid plans (e.g. plans that contract with higher rated hospitals or have broader networks) attract women with higher expected costs of care for pregnancy related claims than others.*

Study Background:

Aim 1: *Health care utilization varies considerably across the U.S. Drivers of this variation include both demand and supply side factors (Finkelstein et al., 2016). Demand side drivers include patients' severity of illness and the consequent need for more or less intensive treatment, insurance type, health literacy, and the opportunity cost of receiving care (Chandra et al., 2011; Rosenstock, 2005). Supply side factors include characteristics of the health care provider which reflects in their*

practice styles, financial incentives and peer effects (Clemens & Gottlieb, 2023; Cutler et al., 2024; Gawande, 2009; Gowrisankaran & Town, 1999). However, there is another contributor to supply side variations in health outcomes and that is from facilities, which is addressed in this part of the study. We focus on a population of expectant mothers and their journey to giving birth as they make up a relatively homogenous population with measurable risk factors. While much research has been done in the past in this regard, most of it has focused on Medicare and the commercially insured. However, results from Medicare and commercially insured do not often translate to the experience of those on Medicaid. Different hospitals and providers often face binding constraints in terms of capacity and reimbursement rates which has been known to exacerbate variations in care to Medicaid patients (Gowrisankaran et al., 2023). This makes it crucial to identify the hospital characteristics that contribute to differential treatment received by the patients.

Aim 2: *Enrollment in Medicaid is conventionally based on income eligibility. The program makes special provisions for Pregnant and expectant mothers to select into the program based off of a higher-income cut off. We compare expectant mothers who were already enrolled in Medicaid (control group) versus those who selected into the program using the special provisions to compare average health care expenditures and utilization patterns as a result of the pregnancy between the two groups. This will allow us to identify potential adverse selection into Medicaid if those who opt into the program as a result of pregnancy have on average, poorer health or a higher number of risk factors leading to complications in childbirth and use more expensive care than the control group. Past studies in this field have found conflicting evidence on the presence of adverse selection among enrollees. One paper in particular looked at post-partum care utilization among pregnancy-only Medicaid enrollees versus those with continuous enrollment and have found that the control group was more likely to receive post-partum care as opposed to pregnancy only enrollees(DeSisto et al., 2020). However another study in Massachusetts found evidence of income manipulation at the threshold for Medicaid eligibility for all enrollees (not just expectant mothers) especially among wage-workers and those who are self-employed (Shi, 2016).*

In a subsequent analysis we will look at Medicaid Plan Choice and plan switching among expectant mothers. Massachusetts allows for enrollees to switch from an existing plan into a new one during the annual 90-day Plan Selection Period. These Medicaid Managed Care Organization (MCO) plans typically vary in terms of service areas and network sizes. We analyse ther plans offered during our study period to identify instances of plan switching among expectant mothers and characterize health conditions that may encourage certain plan choices. We expect to see plans with wider networks or those contracting with higher-rated hospitals to see an influx of expectant mothers who may experience clinically riskier pregnancies (thereby needing more expensive care). This finding would also point towards adverse selection in Medicaid among expectant mothers. A study in Kentucky used randomized Medicaid plan allotment and switching behavior to test for adverse selection and inertia to find significant switching from high cost to low cost plans (Marton et al., 2017). Another study, based in New York, found evidence of churning (i.e., temporary loss of coverage) among cancer patients who temporarily selected into Medicaid MCO plans that contracted with specialized cancer centers (Shepard, 2022) .

To the best of our knowledge, no study has evaluated or tested specifically for adverse selection among pregnant women on Medicaid. This analysis will help inform policymakers and insurers on crafting plans that can address the healthcare needs of the population.

Study endpoints:

Aim 1: *Primary outcomes include identifying key facility characteristics that contribute to a c-section versus a vaginal delivery while controlling for hospital selection and observable patient characteristics and behaviors.*

Aim 2: *Primary outcomes for hypothesis 2A include identifying significant differences in health care utilization, and prevalence of prenatal risk factors (anemia, previous c-section, maternal cancer, cardiac disease, diabetes, gestational diabetes) between pregnancy-only enrollees versus expectant mothers who were already enrolled. Primary outcomes for hypothesis 2B include identifying significant differences in health care utilization, and prevalence of prenatal risk factors (anemia, previous c-section, maternal cancer, cardiac disease, diabetes, gestational diabetes) between enrollees that*

switched plans during an enrollment period that preceded or coincided with pregnancy versus those who continued on the same plan.

References:

- Chandra, A., Cutler, D., & Song, Z. (2011). Who Ordered That? The Economics of Treatment Choices in Medical Care. In *Handbook of Health Economics* (Vol. 2, pp. 397–432). Elsevier. https://doi.org/10.1016/B978-0-444-53592-4.00006-2
- Clemens, J., & Gottlieb, J. D. (2023). *Do Physicians' Financial Incentives Affect Medical Treatment and Patient Health?*
- Cutler, D., Skinner, J. S., Stern, A. D., & Wennberg, D. (2024). *Physician Beliefs and Patient Preferences*. *11*(1).
- Daw, J. R., Winkelman, T. N. A., Dalton, V. K., Kozhimannil, K. B., & Admon, L. K. (2020). Medicaid Expansion Improved Perinatal Insurance Continuity For Low-Income Women. *Health Affairs*, *39*(9), 1531–1539. https://doi.org/10.1377/hlthaff.2019.01835
- DeSisto, C. L., Rohan, A., Handler, A., Awadalla, S. S., Johnson, T., & Rankin, K. (2020). The Effect of Continuous Versus Pregnancy-Only Medicaid Eligibility on Routine Postpartum Care in Wisconsin, 2011–2015. *Maternal and Child Health Journal*, *24*(9), 1138–1150. https://doi.org/10.1007/s10995-020-02924-4
- Finkelstein, A., Gentzkow, M., & Williams, H. (2016). Sources of Geographic Variation in Health Care: Evidence From PatientMigration*. *The Quarterly Journal of Economics*, *131*(4), 1681–1726. https://doi.org/10.1093/qje/qjw023
- Gawande, A. (2009). *The Cost Conundrum | The New Yorker*.
- Gordon, S. H., Hoagland, A., Admon, L. K., & Daw, J. R. (2022, January). *Extended Postpartum Medicaid Eligibility Is Associated With Improved Continuity Of Coverage In The Postpartum Year | Health Affairs*. https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2021.00730?casa_token=vK5WejX3ZOIAAAAA%3AhsB7ac2_gjOXSORYgCi7jxlrhmlVCeyYGgiZGIIsiFKSH3BGzRZux8BcyFmb-sv9P8Wb8CdWILtD
- Gowrisankaran, G., Joiner, K., & Léger, P. T. (2023). Physician Practice Style and Healthcare Costs: Evidence from Emergency Departments. *Management Science*, *69*(6), 3202–3219. https://doi.org/10.1287/mnsc.2022.4544
- Gowrisankaran, G., & Town, R. J. (1999). Estimating the quality of care in hospitals using instrumental variables. *Journal of Health Economics*, *18*(6), 747–767. https://doi.org/10.1016/S0167-6296(99)00022-3
- Marton, J., Yelowitz, A., & Talbert, J. C. (2017). Medicaid program choice, inertia and adverse selection. *Journal of Health Economics*, *56*, 292–316. https://doi.org/10.1016/j.jhealeco.2017.04.006
- Rosenstock, I. M. (2005). Why People Use Health Services. *The Milbank Quarterly*, *83*(4), 10.1111/j.1468-0009.2005.00425.x. https://doi.org/10.1111/j.1468-0009.2005.00425.x
- Shepard, M. (2022). Hospital Network Competition and Adverse Selection: Evidence from the Massachusetts Health Insurance Exchange. *American Economic Review*, *112*(2), 578–615. https://doi.org/10.1257/aer.20201453
- Shi, J. (2016). Income Responses to Health Insurance Subsidies: Evidence from Massachusetts. *American Journal of Health Economics*, *2*(1), 96–124. https://doi.org/10.1162/AJHE_a_00035

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**: Applications must include 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.

First, we will perform descriptive analysis of data by aim and study sample. Second, we will perform econometric/statistical modelling for each of the aims to test the outlined hypotheses.

For Aim 1 we will design a differential distance instrumental variable estimator and conduct two stage least square estimation to evaluate our outcomes. Primary outcomes include identifying key facility characteristics that contribute to a c-section versus a vaginal delivery while controlling for hospital selection and observable patient characteristics and behaviors. We will also control for infant health characteristics and complications at birth in our specification.

- *We will calculate differential distance for each observation as follows:*

$$\text{Differential Distance} = \text{Distance to nearest C-section-heavy hospital} - \text{Distance to nearest vaginal-delivery-heavy hospital}\backslash$$

- *Our first stage model is:*

$$\text{C-section}_i = \alpha + \beta 1 * \text{Differential Distance}_i + \beta 2 * \text{Patient Characteristics}_i + \beta 3 * \text{Infant Characteristics}_i + \beta 4 * \text{Facility Characteristics}_i + \epsilon_i;$$

  where, c-section_i is a binary indicator for if patient 'i' had a c-section delivery or not. Patient characteristics include factors like Mothers age and race, risk factors that may contribute to pregnancy outcomes, insurance status, and prenatal care utilization. Infant characteristics include birth weight, gestational age, and birth complications. Facility Characteristics include size of facility (number of beds), Doctor to patient ratio, Nurse to patient ratio, NICU availability.

- *Our Second stage model:*

$$\text{Outcome}_i = \gamma 1 * \text{Predicted\_ Csection}_i + \gamma 2 * \text{Patient Controls}_i + \gamma 3 * \text{Facility Characteristics}_i + \gamma * \text{Infant Controls}_i + u_i$$

  The most important outcome that we will be testing for is probability of c-section given the above controls. However, this model can be extended to test for other health outcomes such as post-partum complications exhibited by both mother and child that resulted from the birth procedure.

For Aim 2 we will estimate logit models for each of the hypotheses (2A and 2B) outlined. Primary outcomes for hypothesis 2A include identifying significant differences in health care utilization, and prevalence of prenatal risk factors (anemia, previous C-section, Maternal cancer, cardiac disease, diabetes, gestational diabetes) between pregnancy-only enrollees versus expectant mothers who were already enrolled. Primary outcomes for hypothesis 2B include identifying significant differences in health care utilization, and prevalence of prenatal risk factors (anemia, previous C-section, Maternal cancer, cardiac disease, diabetes, gestational diabetes) between enrollees that switched plans during an enrollment period that just preceded pregnancy versus those who stayed on the same plan.

- *We use the following logit specification to test hypothesis 2A:*

$$Pr(\text{New Plan}_i = 1) = \beta 0 + \beta 1 * \text{Healthcare Utilization}_i + \beta 2 * \text{Prenatal Risk Factors}_i + \beta 3 * \text{Other Control}_i + \epsilon_i$$

Where the outcome variable is a binary indicator that is equal to 1 if individual switches into a new Medicaid plan from a commercial plan prior to pregnancy. Health care utilization will be modelled using the number of prenatal visits, hospitalizations during period of pregnancy, specialist referrals and

visits, and ER visits. Risk factors include conditions like anemia, prior c-sections, diabetes, gestational diabetes, history of cardiac disease, maternal cancer. Other controls include demographic variables such as age, race , education level, marital status and behavioral traits like alcohol use, smoker status, number of prior pregnancies. The goal here is to identify if those at the income cutoff for Medicaid, forcefully manipulate income to qualify for Medicaid when they have reason to believe that their pregnancy experience will be medically challenging.

- *We use the following logit specification to test hypothesis 2B:*

$$Pr(Switched\ Plan\_i = 1) = \beta 0 + \beta 1 * Healthcare\ Utilization\_i + \beta 2 * Prenatal\ Risk\ Factors\_i + \beta 3 * Plan\ Characteristics\_i + \beta 4 * Other\ Control\_i + \epsilon\_i$$

Where the outcome variable is a binary indicator that is equal to 1 if individual switches into a new Medicaid plan from an old Medicaid plan prior to pregnancy. Health care utilization will be modelled using the number of prenatal visits, hospitalizations during period of pregnancy, specialist referrals and visits, and ER visits. Risk factors include conditions like anemia, prior c-sections, diabetes, gestational diabetes, history of cardiac disease, maternal cancer. Plan characteristics will be captured using plan network size, access to specialists, average ratings hospitals in plan network. Other controls include demographic variables such as age, education level, marital and behavioral traits like alcohol use, smoker status, number of prior pregnancies. The goal here is to identify if plan switchers switch into better plans when they expect to have costlier or more challenging pregnancy experiences.

All analysis will be performed using STATA drawing on data from 2018 to 2023.

Note: *See included IRB Protocol Document*

V. PUBLIC INTEREST

1. Briefly explain why completing this 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.

Results from studies focusing on medicare and commercially populated don't often translate to those on Medicaid. Additionally, pregnant women are classified as a vulnerable population group. Their health and well being is responsible for shaping the health of their future infant. It is thus crucial to evaluate the current policy landscape and close any gaps in maternal health care. This study will guage three specific areas: a) facility characteristics that shape maternal outcomes, b) Medicaid plan choice and its potential health maternal outcomes and c) care continuity utilization and benefits to post-partum mothers.

This research seeks to provide a comprehensive understanding of how Medicaid policies shape maternal health and identify potential areas for improvement going forward.

VI. DATASETS 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 fully-insured and self-insured plans. APCD data are refreshed and updated annually and made available to approved data users. For more information about APCD Data, including available years of data and a full list of elements in the database please refer to 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. Projects that 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 requests are subject to the Data Use Agreement, will require payment of fees for additional Data for Non-Government Entities, and subject to the limitation that the Data can be used only in support of the approved Project.

1. Please indicate below whether this is a one-time request, or if the described Project will require a subscription.
   ☒ One-Time Request **OR** ☐ Subscription
2. CHIA is currently supporting requests for claims data from 2016 to 2022. Requests made outside of these years may not be supported by CHIA and will be considered on a case-by-case basis. Please specify the years of data that are being requested: 2018-2023.

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: *This will be used to identify medical procedures performed or interventions and create control variables to help strengthen analysis in each of the above described aims.* *Medical claims will also be used to identify potential outcomes (e.g., csection was performed, specific intervention was taken) in our analysis.*
☒ **Pharmacy Claims**
Describe how your research objectives require Pharmacy Claims data: *This will be used to create control variables and create measures for health care interventions for each of the aims described.*
☐ **Dental Claims**
Describe how your research objectives require Dental Claims data:.
☒ **Member Eligibility**
Describe how your research objectives require Member Eligibility data: *Member Eligibility data is required to identify plan enrollment among the population and control for plan related characteristics.*
☒ **Provider**
Describe how your research objectives require Provider data: *Provider information will be required to control for provider characteristics and provider fixed effects in our models*
☒ **Product**
Describe how your research objectives require Product data: *Product file is essential for creating product indicators including type of insurance, market etc.*

VII. DATA ENHANCEMENTS REQUESTED

State and federal privacy laws limit the release and use of CHIA 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 Organizations 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.

a. Geographic Subdivisions

ZIP code and state geographic subdivisions are available for Massachusetts residents and providers only. Small population ZIP codes are combined with larger population ZIP codes. One ZIP Code per person (MEID) per year has been assigned based on the ZIP code/state reported in the member eligibility record's earliest submission year month. If the record does not have an MEID, assignment is based on distinct OrgID/Carrier Specific Unique Member ID.

Non-Massachusetts ZIP codes and state codes except for CT, MA, ME, NH, NY, RI, and VT are suppressed.

Select *one* of the following options.

☐ 3-Digit Zip Codes (standard)	☒ 5-Digit Zip Codes***
***If requested, provide justification for requesting 5-Digit Zip Code. Refer to specifics in your methodology:** *5 Digit zip-codes are required for constructing approximate distance measures between mother's residence and their nearest hospital/facility where delivery took place. The 5 digit zipcode will also be used for merging in zipcode level demographic information from ACS data. Additionally these zipcodes may be used to construct aggregate outcome measures as part of our final findings.*	

b. 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:** *Exact date is required to identify day of the week when delivery happened. Studies show there is correlation between day of the week baby was delivered and physician intervention decisions. This will be used as a control to suppress day of week fixed effects.*		

c. National Provider Identifier (NPI)

Select *one* of the following options.

☐ Encrypted National Provider Identifiers (standard)	☒ Decrypted National Provider Identifiers***
*** **If requested, provide justification for requesting decrypted National Provider Identifier(s). Refer to specifics in your methodology:** *Decrypted NPI will be used to merge in provider characteristics and will also be used to control for provider fixed effects and to track continuity of care across time for the patient.*	

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 identifiable 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.

Researchers must provide the following information for MassHealth to determire how the disclosure of indentifiable MassHeath claims data is directly related to the administration of the MassHealth program:

- How does the project relate directly to the administration of the Medicaid program?
  This project can relate directly to the administration of the Medicaid program in the following ways:
  - *Help identify facility characteristics that impact and promote better maternal health outcomes. This can in turn be used to guide efforts to create better standards of care across all facilities in Massachussetts.*
  - *Studying variations in care received can help administrators address disparities in health care access and create standards for equitable care among enrollees*
  - *Studying patterns of adverse selection among plan enrollees can help insurers mitigate risks and improve plan design and budgetary decisions that promote optimal enrollment in the furture. This will help ensure plans are adequetly compensated for catering to high-risk patients. Further plans can be designed to target specific populations within the Medicaid program to inhibit future 'bad behaviour' among enrollees*

- What specific Medicaid program, policy, rule or law will be affected or changed based on the outcome of this project?
  This study can affect various aspects of the Medicaid program in Massachussetts. First and foremost it can help evolve hospital regulations to develop uniform and efficient standards of care for similar Medicaid patients (Aim1). Next, it can affect eligibility and plan selection criteria to minimize losses incurred as a result of enrollees' "bad behavior" (Aim 2).

- How will MassHealth's objectives be helped or impaired by approving this project?
  Approving this project will help positively impact MassHealth's objectives by enhancing quality of care, improving cost management, and promoting equitable care for enrollees. There may be potential short term negative impacts such as: disruptions to resource allocation or increased strain on current resources, and possible increase in administrative burden due to additional staffing requirements to help implement policy changes. However the potential benefits of this study are expected to outweigh any short term disruptions.

- Will the results of the research have the potential for:
  - reducing cost of the Medicaid program,
  - improving access for recipients, and/or
  - increasing quality of care to recipients?

  Yes, this research will have potential for reducing costs of the Medicaid program, improving access for recciepients, as well as increasing quality of care to recipients.

All aims will directly contribute to lowering costs of the Medicaid Program. Aim 1 identifies hospital characteristics that help achieve better outcomes for pregnant women and their infants. Identifying and implementing these characteristics at the hospital level will help curb costs incurred due to future hospitalizations that may occur. Aim 2 identifies potential patterns of misuse of Medicaids generous benefits among individuals who forcefully qualify for the program (adverse selection). Studying these patterns can help insusrers mitigate risks and improve plan design and budgetary decisions that promote optimal enrollment in the furture. This will help ensure plans are adequetly compensated for catering to high-risk patients thereby reducing costs incurred by the program.

All aims will indirectly help improve access for recipients. Identification of hospital characteristics that influence better outcomes will help set standards of care across hospitals. Once adopted, hospitals will be able to deliver standard, optimal and equitable levels of care thereby improving access to resources for recipients. Aim 2 will identify adverse selection into Medicaid, which will help policy makers understand and make decsions about program expansion and recipient inclusion criterias. This will help set realistic expectations regarding the health care needs of the population Medicaid serves – which will consequently help improve access for recipients.

Aim 1 will directly help improve quality of care by identifying the key hospital characteristics that are associated with better health outcomes. Aim 2 will indirectly help improve quality of care among recipients by ensuring resources are appropriately used among recipients.

- Please describe the project deliverables the researchers will provide to MassHealth
  Final outcomes, results and other findings from each of the aims described above will be shared with MassHealth upon completion.

- Please describe how MassHealth can use the project deliverables in administration of the MassHealth program.
  The findings from this study can help MassHealth in its goal to help reduce coverage gaps in health care while reducing cost of care, improving access for beneficiaries and improving quality of care received by beneficiaries.

3. Organizations approved to receive Medicaid Data will be required to execute a Medicaid Acknowlegment of Conditions. MassHealth may impose additional requirements on applicants for Medicaid Data as necessary to ensure compliance with federal laws and regulations regarding Medicaid.

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)

☐ Individual Provider Level Data (e.g., American Medical Association Physician Masterfile)

☐ Individual Facility Level Data (e.g., American Hospital Association data)

☒ 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 aggregate level demographic indicators from the Ammerican Community Survey (ACS) files as well as hospital characteristics from publicly available online sources.

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.

All data linkage will be deterministic.

1. *Data from community ACS will be linked with APCD based on zipcode. ACS data will be used to supplement zipcode level demographic information.*
2. *I also plan to link the NPI in the APCD to the National Plan and Provider Enumeration System (NPPES), to identify first the hospital name and then merge Hospital characteristics data from public sources to control for specific hospital level characteristics (Hospital teaching status, NICU availability, private vs non-profit status, overall staff to patient ratio).*

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.

1. *American Community Survey – population density, race and ethnicity, median household income, median family size*
2. *Hospital Characteristics from individual hospital websites - Hospital teaching status, NICU availability, private vs non-profit status, overall staff to patient ratio*

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

None of the above mentioned linkages will be enough to uniqely identify patients as personal identifiers like race, gender, zip code and age are not enough to identify the patient uniquely. Additionally the researcher will ensure that any analysis, presentation and publication of results will strictly adhere to the rule of aggregates. Subgroups analysis with less 11 individuals will not be published.

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.

We are hopeful that our findings will be published in peer reviewed academic journals, presented as posters at seminars and/or conferences. However care will be taken to ensure that all publications and presentations of our findings comply with CHIA's cell size suppression policy, as set forth in the Data Use Agreement. All results will always be in aggregate form. In the unlikely scenario that the aggregate result displays a population with less than 11 entities, the statistic will either be dropped (suppressed) from our analysis or merged in with its nearest group.

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.

Findings and results will always be presented and published in aggregate form abiding by CHIA'S DUA policies. No CHIA data will be disclosed to the public. Data derived or extracted from CHIA data will also not be disclosed to the public.

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?

The lowest level of analysis will be facility level for Aim 1. For Aims 2 and 3 the lowest level will be zipcode level.

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?

N/A

9. If you have answered "yes" to questions 5, 6, 7 or 8, please provide the name and a description of the products, software, services, or tools.

N/A

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?

N/A

XI. 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.

I have used CMS data in the past for a number of projects where I served as research assistant and research data analyst during my time at Johns Hopkins University. I have also used claims data (Medicaid enrollees only) from the Illinois Department of Public Health for their TRANSFORM Phase 2 Project that was done in partnership with Office of Medicaid Innovation and UIC-SPH.

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.)

XII. USE OF AGENTS AND/OR CONTRACTORS

Section not Applicable

By signing this Application, the Organization assumes all responsibility for the use, security and maintenance of the CHIA Data by its agents, including but not limited to contractors. The Organization 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:	*Click here to enter text.*
Company Website	*Click here to enter text.*
Contact Person:	*Click here to enter text.*
Title:	*Click here to enter text.*
E-mail Address:	*Click here to enter text.*
Address, City/Town, State, Zip Code:	*Click here to enter text.*
Telephone Number:	*Click here to enter text.*
Term of Contract:	*Click here to enter text.*

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

Click here to enter text.

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.

Click here to enter text.

3. Will the agent or contractor have access to and 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 #1 INFORMATION	
Company Name:	*Click here to enter text.*
Company Website	*Click here to enter text.*
Contact Person:	*Click here to enter text.*
Title:	*Click here to enter text.*
E-mail Address:	*Click here to enter text.*
Address, City/Town, State, Zip Code:	*Click here to enter text.*
Telephone Number:	*Click here to enter text.*
Term of Contract:	*Click here to enter text.*

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

Click here to enter text.

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.

Click here to enter text.

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]

XIII. 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.

Organizations 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) this research is not funded by a source requiring the release of raw data to that source; (3) that the requested Data is the minimum necessary to accomplish the purposes described herein; (4) 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 (5) to my authority to bind the Organization.

Signature: (Authorized Signatory for Organization)	*Drag signature image here or delete and physically sign*
Printed Name:	
Title:	*Click here to enter text.*
Date:	*Click here to enter text.*

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 ATTACHMENT