Commonwealth of Massachusetts Center for Health Information & Analysis (CHIA) Non-Government Agency Application for Data

This application is to be used by all applicants, except Government Agencies, as defined in 957 CMR 5.02.

<u>NOTE</u>: *In order for your application to be processed, you must submit the required application fee. Please consult the fee schedules for APCD and Case Mix data for the appropriate fee amount. A remittance form with instructions for submitting the application fee is available on the CHIA website.*

I. GENERAL INFORMATION

APPLICANT INFORMATION	
Applicant Name:	<u>Principal Investigators:</u> Bruce E. Landon, MD, MBA, MSc Asaf Bitton, MD, MPH <u>Co-Investigators:</u> Michael E. Chernew, PhD Michael L. Barnett, MD Zirui Song, PhD
Title:	Professor of Health Care Policy, Harvard Medical School; Professor of Medicine, Beth Israel Deaconess Medical Center (Landon) Instructor of Health Care Policy, Harvard Medical School; Instructor of Medicine, Brigham and Women's Hospital (Bitton)
Organization:	Harvard Medical School
Project Title:	The Impact of Payment Reform on Physician Referrals, Patient Flows, and Health Care Costs
Date of Application:	January 10, 2014
Project Objectives (240 character limit)	(1) To describe the epidemiology of physician referral patterns across Massachusetts. (2) To explore changes in referral patterns and medical spending and utilization associated with physician organizations moving from fee-for-service to global payment contracts. (3) To rigorously simulate the effect of payment system (degree of risk: fee-for-service, global risk contract, shared risk) and provider labor mix (physicians and non-physician personnel) on practice-level referral rates for a typical primary care practice in Massachusetts.
Project Research Questions (if applicable)	**Aim 1A**. What is the basic epidemiology of physician referrals in Massachusetts (referral rates in outpatient care, consultation rates in hospital care, and variations in referral rates, specialty of referral physician, and receiving physician) among physicians and physician organizations in Massachusetts?

	Aim 1B. What is the association between changes in payment systems (moving from fee-for-service to global payment for physician organizations) and changes in referrals rates and types of referring/receiving physicians?
	Aim 2A. What is the association between changes in referral patterns and changes in health care spending (total spending, inpatient spending, outpatient spending, and spending by types of care according to Berenson-Eggers type of service categories)?
	Aim 2B. What is the association between changes in referral patterns and changes in health care utilization (total, inpatient, outpatient, and utilization by types of care)?
	Aim 3. Using microsimulation, what is the effect of payment system (fee-for-service, global risk contract, shared risk) and provider labor mix in a typical primary care practice on practice-level referral rates?

Please indicate if you are a Researcher, Payer, Provider, Provider Organization or Other entity and whether you are seeking data pursuant to 957 CMR 5.04 (De-Identified Data), 957 CMR 5.05 (Direct Patient Identifiers for Treatment or Coordination of Care), or 957 CMR 5.06 (Discretionary Release).

X Researcher ○ Payer ○ Provider / Provider Organization	⦿ 957 CMR 5.04 (De-identified Data) ○ 957 CMR 5.05 (Direct Patient Identifiers)

II. PROJECT SUMMARY

Briefly describe the purpose of your project and how you will use the requested CHIA data to accomplish your purpose.

> **INTRODUCTION**
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> Physicians and hospitals are increasingly forming accountable care organizations to enter contracts that specify a spending target or budget with financial risk. In this environment, improved care coordination among providers has become a leading strategy slow the growth of health care spending by reducing waste and improving efficiency through team-based care. Central to care coordination is the referral of patients from one physician to another. Little is known, however, about the basic epidemiology of referrals or the extent to which payment incentives affect referrals.
>
> In this project, using the Massachusetts All Payer Claims Dataset (APCD) we will describe the basic epidemiology of referrals, examining the referral patterns of primary care physicians across Massachusetts as well as their association with physician organizational characteristics. We will also explore the extent to which referral behaviors change under global payment contracts taking advantage

of the broad implementation of the Alternative Quality Contract bundled payment model initiated in 2009 by Blue Cross Blue Shield of Massachusetts.

Our research team is well-situated to perform this research and the Massachusetts health care market provides a unique opportunity to inform this crucial topic as health reform is implemented nationally. Using the Massachusetts APCD, which includes administrative claims data on almost all insured patients residing in Massachusetts, provides a rare opportunity to examine in great depth the scope and impact of referrals in the state.

RESEARCH AIMS

Aim 1: To describe the epidemiology of referrals in Massachusetts

Using statewide data from the Massachusetts all-payer claims database (APCD), we will perform a comprehensive analysis of referrals from primary care and specialist physicians to other physicians across Massachusetts. Overall, we aim to understand the extent of variation in referral decision-making among physicians and the association of patient, physician and organizational factors with variations in referral rates. We hypothesize that after controlling for patient and physician factors, there will be greater than 2-fold variation in primary care physicians' overall referral rates as well as the referral rates for common, potentially high-cost and/or prevalent primary care diagnoses such as low back pain, headache and gastro-esophageal reflux disease. In addition, we hypothesize that characteristics of individual physician's practices (e.g., patient population, burden of specific diseases) and the characteristics of physicians' practice organizations, such as academic affiliation, size, and proximity to urban medical centers will also be significant contributor to variation in referral rates for the conditions above. Answers to these hypotheses can help guide future efforts to target referral interventions or guidelines at the individual clinician or healthcare organization level.

Aim 2: To evaluate the effect of global payment on referral patterns and spending in Massachusetts

The implementation of health reform in Massachusetts, beginning in 2006, achieved near-universal health insurance coverage but accelerated concerns about cost growth in the state. As a consequence, Massachusetts began serving as a laboratory for payment reform in 2009, when Blue Cross Blue Shield of Massachusetts implemented the Alternative Quality Contract (AQC), a risk contract involving global payment for physician organizations across the state (Chernew et al., 2011). This new wave of risk contracts differed from prior global payment efforts in the 1990s in that it includes robust quality incentives and the contracts were 5 years in length, allowing physician organizations to reap the rewards of improved care management over time. Since that time, other major private insurers in the state and the state government also have moved away from fee-for-service towards global payment (Song and Landon, 2012). Using a quasi-experimental design, we will assess the impact of payment reform on referral volume and referral patterns, including referrals to different specialties and across different organizations ("leakage"), by comparing referral volume and patterns in physician organizations that entered risk contracts with those that remained primarily in standard fee-for-service contracts.

Aim 3: Using microsimulation techniques, what is the effect of payment system (degree of risk: fee-for-service, global risk contract, shared risk) and provider labor mix (physicians and non-physician personnel) on practice-level referral rates for a typical primary care practice in Massachusetts?

In addition to descriptive and regression analyses, we will also use microsimulation techniques to approach important unanswered questions. Specifically, we will build a simulation model to examine how the payment and organization of the typical primary care practice affect referral rates. This aim is

designed to produce useful estimates for primary care practices in Massachusetts and elsewhere in the country which are facing staffing decisions and organizations facing investment decisions in primary care in the face of payment reform.

III. FILES REQUESTED

Please indicate the databases from which you seek data, the Level(s) and Year(s) of data sought.

ALL PAYER CLAIMS DATABASE	Level 1[1] or 2[2]	Single or Multiple Use	Year(s) Of Data Requested Current Yrs. Available 2009 - 2012
X Medical Claims	☐ Level 1 X Level 2	Multiple ▼	X 2009 X 2010 X 2011 X 2012
☐ Pharmacy Claims	☐ Level 1 ☐ Level 2	▼	☐ 2009 ☐ 2010 ☐ 2011 ☐ 2012
☐ Dental Claims X Member Eligibility X Provider X Product	☐ Level 2 X Level 2 X Level 2 X Level 2	Select... ▼ Multiple ▼ Multiple ▼ Multiple ▼	X 2009 X 2010 X 2011 X 2012

CASEMIX	Level 1 - 6	Fiscal Years Requested
Inpatient Discharge	☐ Level 1 – No Identifiable Data Elements ☐ Level 2 – Unique Physician Number (UPN) ☐ Level 3 – Unique Health Information Number (UHIN) ☐ Level 4 – UHIN and UPN ☐ Level 5 – Date(s) of Admission; Discharge; Significant Procedures ☐ Level 6 – Date of Birth; Medical Record Number; Billing Number	<u>1998-2012 Available</u> (limited data 1989-1997)
Outpatient Observation	☐ Level 1 – No Identifiable Data Elements ☐ Level 2 – Unique Physician Number (UPN) ☐ Level 3 – Unique Health Information Number (UHIN) ☐ Level 4 – UHIN and UPN ☐ Level 5 – Date(s) of Admission; Discharge; Significant Procedures	<u>2002-2012 Available</u>

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[1] Level 1 Data: De-identified data containing information that does not identify an individual patient and with respect to which there is no reasonable basis to believe the data can be used to identify an individual patient. This data is de-identified using standards and methods required by HIPAA.

[2] Level 2 (and above) Data: Includes those data elements that pose a risk of re-identification of an individual patient.

	☐ Level 6 – Date of Birth; Medical Record Number; Billing Number	
Emergency Department	☐ Level 1 – No Identifiable Data Elements ☐ Level 2 – Unique Physician Number (UPN) ☐ Level 3 – Unique Health Information Number (UHIN) ☐ Level 4 – UHIN and UPN; Stated Reason for Visit ☐ Level 5 – Date(s) of Admission; Discharge; Significant Procedures ☐ Level 6 – Date of Birth; Medical Record Number; Billing Number	<u>2000-2012 Available</u>

IV. FEE INFORMATION

Please consult the fee schedules for APCD (Administrative Bulletin 13-11) and Case Mix data (Administrative Bulletin 13-09) and select from the following options:

APCD Applicants Only
☐**X**   Academic Researcher
☐   Others (Single Use)
☐   Others (Multiple Use)

Case Mix Applicants Only
☐   Single Use
☐   Limited Multiple Use
☐   Multiple Use

Are you requesting a fee waiver?
☐   Yes
☐   No

If yes, please submit a letter stating the basis for your request.

V. REQUESTED DATA ELEMENTS [APCD Only]

State and federal privacy laws limit the use of individually identifiable data to the minimum amount of data needed to accomplish a specific project objective. Please use the APCD Data Specification Workbook to identify which data elements you would like to request and attach this document to your application.

See attached workbook.

VI. MEDICAID DATA [APCD Only]

Please indicate here whether you are seeking Medicaid Data:
☐**X**   Yes
☐   No

Federal law (42 USC 1396a(a)7) restricts the use of individually identifiable data of Medicaid recipients to uses that are directly connected with the administration of the Medicaid program. If you are requesting Medicaid data from Level 2 or above, please describe in detail why your use of the data meets this requirement. Applications requesting Medicaid

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 Medicaid program. MassHealth may impose additional requirements on applicants for Medicaid data as necessary to ensure compliance with federal laws and regulations regarding Medicaid.

> Understanding referral patterns and how they change under different payment systems, particularly global payment models, is fundamental to delivering efficient care for the Medicaid population. Specialist care is responsible for a large proportion of health care costs for Medicaid patients, yet little is known about the prevalence of overutilization or underutilization of referrals to specialists. The Medicaid program will benefit from a greater understanding of how primary care physicians use specialist resources in Massachussets, and how that behavior changes with different payment models. The answers from this project can help guide future payment reform efforts as well as providing guidance to Medicaid In addressing specialist overuse.

VII.   MEDICARE DATA

Please indicate here whether you are seeking Medicare Data:
☐   Yes
☐**X**   No

Medicare data may only be disseminated to state agencies and/or entities conducting research projects that are directed and partially funded by the state if such research projects would allow for a Privacy Board or an IRB to make the findings listed at 45 CFR 164.512(i)(2)(ii) if the anticipated data recipient were to apply for the data from CMS directly. If you are requesting Medicare data, please explain how your research project is directed and partially funded by the state and describe in detail why your proposed project meets the criteria set forth in 45 CFR 164.512(i)(2)(ii).   Applicants must describe how they will use the data and inform CHIA where the data will be housed. CHIA must be informed if the data has been physically moved, transmitted, or disclosed.

Applicants seeking Medicare data must complete a Medicare Request Form.

Applicants approved to receive Medicare data will be required to execute an Addendum to CHIA's standard data use agreement, containing terms and conditions required by CHIA's data use agreement with CMS.

> We are not requesting Medicare data for this application cycle due to the requirements above, but are in discussion with CMS about relaxing the restrictions above to enable researchers like us to have greater access to these important data. If this requirement is relaxed in the near future, we will submit a addendum to request this additional data.

VIII.   DIRECT PATIENT IDENTIFIERS[3]

State and federal privacy laws may require the consent of Data Subjects prior to the release of any Direct Patient Identifiers. If you are requesting data that includes Direct Patient Identifiers, please provide documentation of patient consent or your basis for asserting that patient consent is not required.

> We are not requesting any direct patient identifiers.

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[3] Direct Patient Identifiers. Personal information, such as name, social security number, and date of birth, that uniquely identifies an individual or that can be combined with other readily available information to uniquely identify an individual.

IX. REQUESTS PURSUANT TO 957 CMR 5.04

Payers, providers, provider organizations and researchers seeking access to Level 1 (de-identified) data are required to describe how they will use such data for the purposes of lowering total medical expenses, coordinating care, benchmarking, quality analysis or other administrative research purposes. Please provide this information below.

> We are not requesting Level 1 data.

X. FILTERS

If you are requesting APCD elements from Level 2 or above, describe any filters you are requesting to use in order to limit your request to the minimum set of records necessary to complete your project. (For example, you may only need individuals whose age is less than 21, claims for hospital services only, or only claims from small group projects.)

APCD FILE	DATA ELEMENT(S) FOR WHICH FILTERS ARE REQUESTED	RANGE OF VALUES REQUESTED
Medical Claims	See requested data elements attachment	No extra filters
Pharmacy Claims	None	None
Dental Claims	None	None
Membership Eligibility	See requested data elements attachment	No extra filters
Provider	See requested data elements attachment	No extra filters
Product	See requested data elements attachment	No extra filters

XI. PURPOSE AND INTENDED USE

1. Please explain why completing your project is in the public interest.

> Physician referrals are a fundamental and ubiquitous medical decision in health care, yet we have little high quality research describing how referrals vary across a population or their association with different payments models. Our project will being to lay the foundation to understand how referral decisions are made in Massachussets, opening the field for further study in other national and state databases. The public will benefit through the ability of health systems and providers to use our findings to create referral systems that better reflect patient and population needs, rather than idiosyncratic, potentially wasteful decision making.

2. **Attach** a brief (1-2 pages) description of your research methodology. (This description will not be posted on the internet.)

3. Has your project received approval from your organization's Institutional Review Board (IRB)?

   ☐   Yes, and a copy of the approval letter is attached to this application.

   X No, the IRB will review the project on __IRB application in process, will be submitted in February, 2014__.

   ☐   No, this project is not subject to IRB review.

☐   No, my organization does not have an IRB.

XII.   APPLICANT QUALIFICATIONS

1. Describe your qualifications to perform the research described or accomplish the intended use of CHIA data.

Bruce Landon, M.D., M.B.A., M.Sc. is Professor of Health Care Policy and Medicine at Harvard Medical School and a practicing general internist at Beth Israel Deaconess Medical Center and will serve as overall Principal Investigator. Landon's primary research interest has been assessing the impact of different characteristics of physicians and health care organizations, ranging from health plans to physician group practices, on the provision of health care services. Landon has extensive experience analyzing claims data from both the Medicare program and commercial databases. Along with Dr. Barnett and Dr. Song, he recently studied national patterns in referral rates for office visits. They found that referrals rates doubled over the last ten years. Along with Drs. Song and Chernew, he also was an integral member of the evaluation team for the Alternative Quality Contract (led by Dr. Chernew), and thus has ample experience studying physician organizations in Massachusetts.

Asaf Bitton, M.D., M.P.H. is Instructor in Medicine at the Division of General Medicine at Brigham and Women's Hospital and Instructor in Health Care Policy at the Department of Health Care Policy at Harvard Medical School. He is also a faculty member of the Harvard Medical School Center for Primary Care, where he serves as Core Faculty Lead for Transformation Strategy and Design. He leads the Academic Innovations Collaborative, a collaborative of 19 Harvard-affiliated clinics transforming Boston primary care teaching practices serving nearly 300,000 patients and developing new models of academic and community-based primary care. He is currently serving as a Senior Advisor to the Comprehensive Primary Care initiative at the Center for Medicare and Medicaid Innovation. His main academic interests are in primary care delivery, policy, and innovation. To that end, he both implements and evaluates the patient centered medical home model, a revamped mode of primary care delivery that is being rapidly disseminated across the US. Specifically, he is evaluating the scope and quality improvement possibilities of various regional and national patient-centered medical home demonstration pilots, with a particular focus on devising quality metrics for the medical home. He chairs the Clinical Quality work group for the Commonwealth Fund PCMH evaluators' collaborative, and serves as an executive council member of the Association of Chiefs and Leaders of General Internal Medicine.

Michael E. Chernew, PhD is the Leonard D. Schaeffer Professor of Health Care Policy at Harvard Medical School. Dr. Chernew's research examines several areas related to controlling health care spending growth while maintaining or improving quality of care. His work on consumer incentives focuses on Value-Based Insurance Design (VBID), which aligns patient cost sharing with clinical value. Several large companies have adopted these approaches and Dr. Chernew's ongoing work includes evaluations and design of such programs. His work on payment reform involves the evaluation of bundled payment initiatives, including global payment models that include pay-for-performance components. Related research examines the effects of changes in Medicare Advantage payment rates. Additional research explores the causes and consequences of rising health care spending, and geographic variation in spending, spending growth and quality. Dr. Chernew is the PI of a study that has analyzed the AQC working along with Dr. Song and Dr. Landon.

Michael L. Barnett, M.D. received his M.D. at Harvard Medical School (HMS) and received training in health services research through a Doris Duke Charitable Foundation research fellowship during medical school working with Bruce Landon and others in the HMS Department of Health Care Policy. His published work explores physician referrals as well as the relationship between physician social networks and health care costs. He is currently an internal medicine resident at Brigham and Women's Hospital and will begin a fellowship in general internal medicine at Brigham and Women's in July 2014.

Zirui Song, Ph.D. received his Ph.D. in Health Policy (Economics) from the PhD Program in Health Policy at Harvard University. He has collaborated with the other investigators on analyses of the Massachusetts Alternative Quality Contract and related research. He is currently a 4th year medical student at Harvard Medical School and a fellow in Aging and Health Economics at the National Bureau of Economic Research.

2. Attach résumés or curriculum vitae of the applicant/principal investigator, key contributors, and of all individuals who will have access to the data.   (These attachments will not be posted on the internet.)

XIII.   DATA LINKAGE AND FURTHER DATA ABSTRACTION

1. Does your project require linking the CHIA Data to another dataset?
    ☐**X**   Yes
    ☐ No

2. If yes, will the CHIA Data be linked to other patient level data or with aggregate data (e.g. Census data)?
    ☐ **X**   Patient Level Data
    ☐ **X** Aggregate Data

3. If yes, please identify all linkages proposed and explain the reasons(s) that the linkage is necessary to accomplish the purpose of the project.

For patient level data, we anticipate linking previously obtained Medicare outpatient + inpatient data files for the Boston hospital referral region from 2009-2010. This linkage is necessary because Medicare patients constitute a substantial proportion of the patients receiving care in Massachusetts. For a complete understanding of referral patterns and the spillover effects of payment reform into this very important patient population, Medicare data is crucial. We will also write a data use agreement addendum to CMS to request linkage to the APCD. Our preference would be to obtain these data directly from CHIA through the APCD application process, but because of CMS regulations, we are unable to accomplish this at this time.

For aggregate data, we anticipate linking the data to Census-level variables. This will allow us to include variables such as median income and education by geography in the analysis. These variables are not included in the APCD and will help improve our aggregate analytic models.

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

For the aggregate data, we will introduce Census variables at the zip code level, which will prevent the identification of patients in the APCD. We will certainly not attempt to identify any patients directly or indirectly in our analyses.

XIV.   PUBLICATION / DISSEMINATION / RE-RELEASE

1. Describe your plans to publish or otherwise disclose CHIA Data, or any data derived or extracted from such data, in any paper, report, website, statistical tabulation, seminar, conference, or other setting.

> We anticipate producing several manuscripts for peer-reviewed journals, at least one from each of the major aims. We will submit to clinical, health policy, and economics outlets such as the New England Journal of Medicine, Journal of the American Medical Association, Health Affairs, Annals of Internal Medicine, Healthcare, JAMA Internal Medicine, and the Journal of Health Economics. We will also disseminate our findings with policy leaders, payers, provider networks, and academic leaders within Massachusetts and at professional meetings such as AcademyHealth and the Society of General Internal Medicine. From Aim 3, our simulation model will be "open sourced" and distributed free of charge via the web to enable future academic research on how emerging primary care financing strategies may affect primary care access, cost and quality.

2. Will the results of your analysis be publicly available to any interested party? Please describe how an interested party will obtain your analysis and, if applicable, the amount of the fee.

> We anticipate disseminating our findings in the peer-review literature. We also anticipate presenting our findings at national research conferences such as the Society of General Internal Medicine (SGIM) meeting and the AcademyHealth Annual Research Meeting. These are the primary avenues for public dissemination of the research.

3. Will you use the data for consulting purposes?
☐   Yes
☐   **X** No

4. Will you be selling standard report products using the data?
☐   Yes
☐   **X** No

5. Will you be selling a software product using the data?
☐   Yes
☐   **X** No

6. If you have answered "yes" to questions 3, 4 or 5, please describe the types of products, services or studies.

XV. USE OF AGENTS AND/OR CONTRACTORS

Third-Party Vendors. Provide the following information for all agents and contractors who will work with the CHIA Data.

Company Name:	Stanford University School of Medicine
Contact Person:	Sanjay Basu, MD, PhD
Title:	Assistant Professor of Medicine
Address:	Stanford Internal Medicine 900 Blake Wilbur Dr MC 5320 W2080 Palo Alto, CA 94304
Telephone Number:	(650) 723-6028

| E-mail Address: | basus@stanford.edu |
| Organization Website: | http://med.stanford.edu/profiles/Sanjay_Basu/ |

7. Will the agent/contractor have access to the data at a location other than your location or in an off-site server and/or database?

    ☐Yes
    ☐**X** No

8. Describe the tasks and products assigned to this agent or contractor for this project.

    Dr. Basu will help work on the microsimulation analysis (Aim 3). He will be responsible for building the simulation model based on prior collaborative work with the investigators on this project.

9. Describe the qualifications of this agent or contractor to perform such tasks or deliver such products.

    Please see attached Biosketch for Dr. Basu, who is an extensively cited researcher in mathematical modeling of public health issues.

10. Describe your oversight and monitoring of the activity and actions of this agent or subcontractor.

    The principal investigators will provide oversight and monitoring of Dr. Basu's work through weekly research updates and periodic team meetings with the co-investigators. Dr. Basu has worked as a colleague of the investigators here previously and is an effective collaborator. He will also provide the team with updates on the simulation model as we work together.