**Project Description**

**Aim 1.** **Tobacco treatment use**, including use of tobacco cessation counseling; nicotine replacement therapy and prescription drug use; and calls to the state quitline.

***Hypothesis 1.*** *PHA resident tobacco treatment use will increase with the implementation of smoke-free policies in PHAs.*

**Aim 2.** **Signal adverse clinical events**, including emergency department visits and hospitalizations(overall admissions; admissions for acute myocardial infarction, acute ischemic stroke, acute COPD exacerbations, acute asthma attack) as well as care to treat otitis media

***Hypothesis 2.*** *Risk of tobacco-associated adverse clinical outcomes will decrease for PHA residents following the introduction of smoke-free housing policies.*

**Aim 3.** **Health care expenditures**, including total and component direct medical spending.

***Hypothesis 3.*** *PHA residents’ health expenditures will decrease after smoke-free housing policies are implemented.*

1. **Study design**
2. **Overview**

We propose a study examining how public (and potentially other low-income) housing residents’ health changes with the introduction of comprehensive smoke-free housing policies in public housing authorities (PHAs). **Figure 1** provides a framework illustrating how smoke-free policies are expected to improve residents’ health. Smoke-free housing policies will most directly affect smokers because they are not allowed to smoke in their apartments or buildings. Just as has been observed in response to other types of clean indoor air laws, smoking will be less convenient; smokers will likely cut down on the number of cigarettes that they smoke, and some will choose to quit.28,29 Among those attempting to quit, some will do so with the assistance of first-line tobacco treatments provided through the public health and health care sectors (Aim 1). Quitting smoking, and to a far lesser extent, reducing cigarette consumption, will result in improved health for smokers, reduced health care use (Aim 2), and lower health care costs (Aim 3). Non-smokers, especially those living with smokers, will benefit from smokers’ behavior change by virtue of the reduction in tobacco smoke pollution in their buildings and their units. Non-smokers’ health will then improve, and their health care use (Aim 2) and health care costs will decrease (Aim 3).

The current study will focus on public housing residents (and other residents known to be in smoke-free buildings) in Arkansas and other states. PHA residents will be identified in the all payer claims database (APCD) using their addresses. Health will be measured in the APCD using adverse clinical events known to be affected by tobacco exposure. Our results will provide a detailed assessment across multiple housing authorities of how smoke-free housing policies affect resident health and utilization of health care resources.

**Figure 1. Model for impact of smoke-free housing policy on health**



1. **Data sources**
	1. ***Address data***

PHA residents in our analyses will be identified based on their home addresses. Address data for all Massachusetts PHA residents will be acquired from two sources, corresponding to the two major funding streams that support public housing in the state. Data on residents living in federally subsidized public housing will come directly from the U.S. Department of Housing and Urban Development (HUD). For state-subsidized public housing, addresses will be obtained from the Massachusetts Department of Housing and Community Development. The lists will indicate the specific PHA associated with a particular address. Address lists from both the federal and state agencies may be obtained by researchers completing standard data use agreements.

* 1. ***Data on PHAs’ Smoke-free Policies***

Our principal independent variable of interest is the presence and strength of smoke-free policies in place at PHAs. In year 1 of the project, our research assistants will conduct an online/telephone survey of all Arkansas PHAs to determine if and when a smoke-free policy has been implemented. For each PHA with a smoke-free policy, we will determine the first known date the smoke-free policy was discussed publicly, the date the policy was enacted by the PHA, and the date the policy was implemented. We will also determine if there are any exceptions to the policy, for example if the policy only applied to new leases or to certain buildings. We will only designate an address as smoke-free if it is in a building with a comprehensive smoke-free policy that applies to all units; others will be considered control sites. Furthermore, our survey will assess a checklist of implementation strategies to gauge the strength of the policies in place. The checklist will document the presence and timing of each of the following: 1) a stated process for communicating the smoke-free policy to all residents; 2) comprehensive no-smoking signage; 3) dedicated places for residents to smoke; 4) dedicated mechanisms for soliciting complaints about smoke (e.g., hotline, email); 5) mechanism for tracking and adjudicating complaints; 6) dedicated staff responsible for following-up on complaints; and 7) availability and promotion of tobacco cessation resources. Survey data will be supplemented by searching PHA websites for meeting minutes and policy statements, searching other public records files, and searching local news sites. Executive Directors who choose to participate in the survey may choose to be entered into a raffle to win a $50 gift card for use at a staff or resident event at their housing authority. The results of the survey will be summed to provide a score measuring the strength of smoke-free rule implementation at any given time, though alternate summary methods will be considered in our analyses.

* 1. ***Arkansas All Payer Claims Database***

Key outcomes data on tobacco treatment use, adverse clinical events, and health care expenditures for residents in our sample will be drawn from the APCD (Aims 1, 2, and 3). We will use unique patient identifiers to track individuals even if they transition from one health plan to another within the state over time. The APCD’s “member eligibility” data include standardized patient addresses, age, and gender. Once a PHA resident has been identified by address, they will then be tracked in the APCD using the unique patient identifier. The address data will also allow us to track any movements in and out of PHAs in association with smoke-free policy changes. Outcomes for all three study aims will be defined based on APCD data including claims, diagnosis codes, dates, of service, cost-sharing and paid amounts, laboratory codes, and NDC codes. Note that data on tobacco treatment counseling may be underreported in the APCD because providers may not always use tobacco-specific counseling or diagnosis codes in their billing. However, counseling may be a minor component of tobacco treatment (it is less preferred than pharmacotherapy34) and the underreporting is unlikely to be associated with PHAs’ smoke-free policies.

1. **Study procedures**
2. **Data cleaning and linkage**

Address data will come from the U.S. Department of Housing and Urban Development, Arkansas public housing agencies, and private sources. We will engage the Center for Geographic Analysis (CGA) at Harvard University to clean the address data and conduct the linkages. The CGA will not receive any claims data – they will only receive addresses to conduct data cleaning and linkages. The Center provides academic consulting services to Harvard faculty, assisting with a wide range of geospatial research applications. The Center will standardize the address data from each source using techniques such as probabilistic/”fuzzy” data matching where necessary. The Center will also add in neighborhood demographic and socioeconomic data based on Census tract in the event that changes in smoke-free policies coincide with other location-based characteristics that may affect resident health. Once the addresses have been standardized and matched, the Center will create a master linkage file that will enable us to connect the policy database, the APCD, and neighborhood data.

1. **Aim 1 – Tobacco treatment use**

We will not have data on the smoking status of individuals in our study population; as a result, our analysis of tobacco treatment use will include non-smokers, though tobacco treatment use will only take place among smokers. This will reduce our statistical efficiency somewhat, but should not bias our analysis. We will focus on residents ≥15 years old assuming negligible treatment-assisted cessation will take place at younger ages.

Information on tobacco treatment use will come from the APCD. Counseling will be identified in the APCD outpatient files using the Current Procedural Terminology (CPT) codes and Healthcare Common Procedure Coding System (HCPCS) codes in use each year according to standard methods.41,42 Medications, including over-the-counter NRT, which is covered by Medicaid and ACA-compliant insurers with a prescription, will be identified in the APCD pharmacy files using generic and brand names for first-line therapies (i.e., NRT in the form of patches, gum, lozenges, inhalers, and nasal spray; bupropion; and varenicline). Note, bupropion is used to treat both depression and nicotine addiction and it is not possible to discern with certainty which use is intended based on claims alone. We will conduct sensitivity analyses varying whether particular bupropion claims are included, for example by only including claims for individuals who have no diagnosis codes for depression, by including only bupropion marketed as Zyban (the brand name used for its smoking cessation application), or by including all bupropion claims.

We will also conduct secondary analyses to better understand how treatments are used. We will examine the total number of Helpline calls attributable to the policy introduction to assess the extent to which smoke-free policies increase service demands on the Helpline. Analyses of treatment use will also assess total number of counseling calls and total months of pharmacotherapy supply acquired. Sensitivity analyses will assess the use of tobacco treatments beyond 12 months post-policy implementation.

We will not be able to observe any tobacco treatment use that was not paid for by insurance or provided by the Helpline. However, because our population consists almost entirely of individuals below the federal poverty line, we believe few will pay for treatments out of pocket and other sources of tobacco treatment are rare in this population.

1. **Aim 2 – Adverse clinical events**

Tobacco smoke exposure affects health in a wide variety of ways, causing cancer, respiratory disease, and cardiovascular/cerebrovascular disease in both smokers and those exposed to secondhand smoke.2,44,45 Quitting smoking or eliminating exposure to secondhand smoke can reduce health risks, regardless of the age at which tobacco smoke exposure ceases, though some health risks are reduced more quickly than others.2 Our analysis plan focuses on signal adverse clinical events related to six (five primary, one exploratory) health conditions associated with tobacco smoke exposure where we expect a rapid reduction in risk (within 2 years).7,10,11,46,47 While such events do not measure overall health and wellbeing, most are serious and reductions in these events signal improved population health. Our primary analyses generally will focus on age ranges where the adverse clinical events are most common, but where applicable alternative analyses will examine event rates for all ages. A secondary outcome (less directly connected to tobacco use/exposure) will be all-cause hospitalization/ED visits. Absent from our outcome measures is mortality; unfortunately, the APCD does not have sufficiently accurate vital status data to support such an analysis.

Adverse clinical events will include admissions for emergency department (ED) visits and inpatient hospitalizations, overall and for tobacco-related diagnoses. For each tobacco-related adverse clinical event, we will define the ICD-9 and ICD-10 codes for the relevant diagnoses using existing literature and the Agency for Healthcare Research and Quality Healthcare Cost and Utilization Project Clinical Classifications Software.48 Our starting point will be to define these events on the basis of principal diagnoses; in sensitivity analyses we will broaden our definition to include all principal and secondary diagnoses and length of stay, where applicable. Condition-specific outcome definitions are listed below, along with relevant ICD-9-CM codes in brackets “[ ]” and citations supporting the use of claims to accurately identify cases. We will use CMS General Equivalence Mapping49 to translate ICD-9 codes to ICD-10 codes (not shown below) for later years’ data.

***Hospitalization for acute myocardial infarction and other CVD-related diagnoses***. Our primary cardiovascular measure will be hospital discharges among residents ages ≥35 years for acute myocardial infarction [410].50-52 Secondary analyses will include discharges for other ischemic heart disease [411-414], pulmonary heart disease [415-417], heart failure [428], aortic aneurysm [441] and other peripheral vascular conditions [442-445].44,53,54 In addition, we will assess any cardiovascular disease admission, regardless of age.

***Hospitalization for stroke and other cerebrovascular disease***. Our measure of cerebrovascular disease events will be admissions among residents age ≥35 for subarachnoid or intracerebral hemorrhage, occlusion/stenosis of precerebral or cerebral arteries, or acute cerebrovascular disease [430, 431, 433, 434, 436]2,7,44,55-57 Secondary analyses will include all cerebrovascular disease [430-438] and admissions, regardless of age.

***Hospitalization for acute COPD exacerbation***. Admissions for COPD will be identified among patients ≥40 years old based on diagnosis codes for chronic bronchitis [491], emphysema [492], and COPD [496] in the primary diagnosis.58-60 Secondary analyses will broaden the definition of respiratory disease to include bronchitis (unspecified acute/chronic) [490], and pneumonia [480-486].Additional analyses will focus on admission with any COPD diagnosis, regardless of age.

***Hospitalization and ED visits for acute asthma exacerbation***. Hospital and ED admissions for asthma will be identified using ICD-9-CM code 493.11,61-64 For asthma, we will also examine medication-related outcomes that indicate worsening [improving] symptom control or exacerbations including rescue medication use (i.e., number of canister-equivalents of short-acting beta agonists dispensed) and oral steroid bursts.65,66

***Treatment for otitis media***. Diagnoses of otitis media will be identified based on outpatient, inpatient, and ED visits for children ages 2 months to 17 years, though we expect that most cases will be observed in those under 12. As is standard practice in health services research, otitis media will be identified using claims for specific diagnoses of interest including nonsuppurative otitis media and Eustachian tube disorders [381], suppurative and unspecified otitis media [382], and other disorders of the tympanic membrane [384].40,67-73

***Infants born with low birth weight (exploratory).*** Infants born with low birth weight or small for gestational age will be identified in inpatient and outpatient claims among children <1 year old [656.5x, 764, 765, V21.3x]. This outcome is exploratory given its relative rarity.2,74

1. **Aim 3 – Total health care expenditures**

Our primary outcome for Aim 3 is the total of all paid amounts in claims, including expenditures paid by public and commercial insurers and individuals’ out-of-pocket expenditures. In secondary analyses, we will examine how expenditures change for specific payers. Identifying the costs that fall to specific payers will point to the stakeholders that have the greatest interest in smoke-free policies. We will also examine the proportion of any observed change driven by outpatient, inpatient/ED, and pharmaceutical costs. Expenditures across different years will be adjusted for inflation using methods recommended by the Agency for Healthcare Research and Quality.75 Separate adjustments will be made for different classes of expenditures (outpatient, inpatient/ED, pharmaceuticals) where analyses focus on these classes specifically.

1. **Public Housing Authority (PHA) Survey**

For the PHA Survey, data will be collected by interview and recorded in an electronic REDCap database. Research assistants and study staff will email or call the PHAs and ask that the survey be addressed to a person knowledgeable about the smoking policy of the PHA. Once the knowledgeable person has been identified, the subject will be asked to complete an online survey that asks specific details of the PHA’s smoke-free policy, if there is such a policy. If they cannot be reached by email, research assistants will attempt to contact subjects by phone. In addition, research assistants may call survey respondents to clarify answers to survey questions. In addition to the PHA name, the respondents’ names and job titles will be collected with the data in case there is a need to reconnect with the subject for further information on the PHA’s smoke-free policy. No additional personal characteristics will be collected. Only study staff will have access to these data.

1. **Analysis Plan**
2. **Statistical model**

For each of our Aims and outcomes, we will use the same general analytic approach of interrupted time series analysis with concurrent controls using generalized mixed effects models. These models have a variety of features that strengthen the rigor of the analysis. First, our analysis controls for secular trends in the outcomes for both PHAs with and without smoke-free policies over the study time period. Second, by measuring the effect of smoke-free policies implemented at different times in different PHAs, we protect against the possibility that a single confounding factor (e.g., an environmental change arising at the same time as the smoke-free policy and also affecting outcomes) will bias our estimates. Third, by examining within-resident and within-PHA changes, we allow each to act as a control for itself, accounting for unmeasured time-stable confounders.

Our analysis will compare the outcomes for each aim between the before and after periods based on longitudinal data from the same individuals. The analyses will be limited to the residents who live in the PHA during both time periods. We will use a three-level generalized mixed effects models to accommodate the data structure with measurement across period (level 1), nested within subjects (level 2), and nested with cluster (level 3). In general, the model is described as:

$$Y\_{ijt}=β\_{0}+β\_{1}period\_{t}+β\_{2}SFP\_{jt}+β\_{3}period\*SFP\_{jt}+β\_{4}X\_{4jt}+β\_{5}X\_{5i}+b\_{ij}^{\left(2\right)}+b\_{j}^{\left(3\right)} \left(Eq. 1\right)$$

where **Y*ijt*** is the outcome for subject *i* within cluster (PHA or building) *j* at period *t*, ***bij(2)***is a random subject effect and ***bj***(3) is a random cluster effect. To control for any secular trends in outcomes, we include a term “period” which is a continuous measure of time. The term *SFP*, our independent variable of interest, is 1 if PHA *j* has a smoke-free policy in period *t* and 0 otherwise. We will also assess models where *SFP* is the implementation score or a vector of indicators for the checklist items present at time *t*.The interaction term *period\*SFP* allows the trend to change once the smoke-free policy has been introduced. The effect of smoke-free policies on our outcomes will be captured jointly in the coefficients for changes in level and trend ( *β2* and *β3*, respectively). The interval for *period* will initially be specified as a month in order to accurately capture the timing of policy introductions. However, we will test alternate intervals, if necessary. The term $X\_{4}$ represents PHA characteristics which could be time-varying in nature, and $X\_{5} $represents resident characteristics. The model is represented in stylized form in **Figure 2** for three hypothetical PHAs, two with smoke-free policies (1 & 2), one without (3).

**Figure 2. Schematic of interrupted time series model**

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1. **Protection against selection bias**

We will use the APCD to formally assess whether there are differential transitions in/out of PHAs associated with smoke-free policies. Based on data from our prior study in Boston and Cambridge, we do not expect there to be differential moves in/out of PHAs upon adoption of smoke-free policies. If we find evidence of selection effects, we will consider a range of methods for protecting against bias. We may restrict our analyses to those residents living in their PHAs for a continuous period of time (minimum 2 years for control observations, minimum 1 year pre and 1 year post for residents during a transition to smoke-free), or we may develop weights to correct for differential transition probabilities.

1. **Model specification**

A likely specification of the generalized mixed effects model will be Poisson regression. We will examine the goodness-of-fit of the model to determine whether there is any problem with over-dispersion and whether alternative, possibly more complex, models are needed. The statistical distribution of health care utilization and expenditures tends to have a large density at $0 as well as a high degree of skewness. When building our statistical models, we will follow the extensive literature for dealing with these specialized outcomes76-82 and further consider more complex models such as negative binomial and/or zero-inflation models. Zero-inflated models are two part models assessing the probability of positive health care expenditures and mean health expenditures conditional on having positive expenditures simultaneously. Dr. Levy has experience with these econometric methods83,84 and will work closely with Dr. Chang to develop optimal functional forms for each analysis.

1. **Timing of events**

For Aim 1 (tobacco treatment use), we will limit the follow-up period to the first year after the smoke-free policy is in place. We believe changes in treatment use beyond this initial period are less likely to be directly attributable to the smoke-free policies. For Aims 2 and 3 (adverse clinical events, health care expenditures), we will model outcomes over the entire period that a resident is observed to be living in public housing.

With respect to the independent variable, we will primarily define the date a smoke-free rule is in place as the date the rule is *implemented* (i.e., goes into effect). However, it is possible that some changes in outcomes may occur in *anticipation* of a smoke-free rule. In most cases, there is a public period of discussion when a smoke-free policy is being considered, followed by a period between when the policy is enacted (formally announced to go into effect on a specific date) and when the policy is actually implemented. Tobacco treatment in particular may increase in anticipation of smoke-free policy implementation, in part due to efforts by PHAs and partners to support smoking cessation. We will conduct sensitivity analyses using the date of *announcement* or *enactment* as the point delineating our pre-post periods. For models using the smoke-free policy checklist, the score may change based on when specific checklist elements were introduced. Beyond the issue of when to mark policy initiation, there is the possibility, particularly for Aims 2 and 3, that the *effect* of the policy may arise sometime after the policy is initially implemented. We will visually inspect outcome trends for all Aims to identify possible policy-driven inflection points and test the sensitivity of our estimates to different lag specifications relative to the smoke-free policy. In our exploratory analysis of low birth weight, births in the 9 months before and after smoke-free policy implementation (or lagged implementation) will be excluded to avoid biases due to censoring or pregnancies partially exposed to the policies.

1. **Covariates**

We will include a number of covariates to further isolate the effect of smoke-free policies in PHAs on resident health. We will control for resident sex and age, and if data are sufficient, race/ethnicity. All PHA residents will, by definition, be matched on socioeconomic status. We will control for insurance type (e.g., Medicaid, Medicare, other), insurance model (fee for service, prospective payment, or mixed), and provider supply in PHA market areas to adjust for the differences in quality and access to care, as well as differences in payment policies across insurers. We will consider controlling for pre-policy health status using standard risk adjustment measures (e.g., Chronic Illness & Disability Payment System,85 Hierarchical Condition Categories86). Neighborhood socioeconomic status and demographic information will be included using census tract data specific to residents’ addresses. Though strong smoke-free policies have existed in workplaces, bars, and restaurants since 2004, we will further control for state and federal changes in tobacco policy, such as increases in tobacco taxes as well as local ordinances affecting tobacco use (e.g., restricting sales to ages ≥21, tobacco-free pharmacy rules). We will also consider adjustments for time periods when major tobacco control efforts were in force which are known to increase treatment use (e.g., the CDC “Tips From Former Smokers” campaigns87,88). Lastly, for Aim 1 we will control for calendar month as tobacco treatment use is known to vary throughout the year. For Aims 2 and 3, we will explore whether seasonality should be included as a covariate. Though rates of illness vary throughout the year,89-92 levels of secondhand smoke in housing do as well,21 and we do not want to include as a covariate a measure that could be in the causal pathway between smoke-free policies and our outcomes.

1. **Additional sensitivity and subgroup analyses**

For outcomes that are observed at all ages (asthma exacerbations, health care expenditures), we will conduct exploratory subgroup analyses by age (0-17, 18-39, 40-64, ≥65). We will also conduct analyses by sex, race/ethnicity (if data are sufficient), disability (identified in claims),93,94 and residence in elderly/disabled versus family housing. We will consider tracking treatment for non-tobacco-related conditions (e.g., appendicitis) to verify the specificity of the smoke-free policy effects. Lastly, we will assess whether there are differences in policy effects for those with evidence of preexisting disease (atherosclerosis, hypertension, asthma/COPD) in the two years prior to policy implementation versus without.

**Evaluation Criteria**

*1. Is the request consistent with the Transparency Initiative's goals and purpose?*

The goal of the request is to obtain data that will help inform efforts to understand the impact of smoke-free housing rules on resident health, health care use, and health care expenditures. Our focus on public housing in particular will provide essential information on policies to improve the health of socioeconomically vulnerable residents and will help guide the efficient use of public resources. In pursuing these goals, the proposed project is consistent with the Initiative’s emphasis on identifying actions that may meaningfully improve health, enhance quality, and lower costs. Further, our efforts allow us to monitor the success and efficiency of efforts to improve health care and population health, integrate and provide information for research, and study the evolving landscape of the state's health and healthcare system.

*2. Are there real or potential conflicts of interest or anti-competitive concerns?*

We are academic researchers and have no conflicts of interest or anti-competitive interests with respect to these data.

*3. If IRB approval is required, has the approval been granted?*

Our IRB, the Partners HealthCare IRB (supervises research at Massachusetts General Hospital) has not reviewed this specific project, but has deemed an identical project using the Massachusetts APCD exempt from review. (See attached letter.)

*4. Does the data request contain the minimum information required?*

While we are requesting comprehensive data from the AR APCD, it is indeed the minimum required to a) link individuals with residences that have known smoke-free policies at particular times and places, and b) adequately establish contextual information (physical environment, economic, sociodemographic, and market data). We look forward to working with ACHI on identifying the optimal strategy for obtaining data with the minimum detail while still achieving the study’s aims.

*5. Does the request minimize the risk of re-identification of individuals?*

We propose research that will identify individuals based on their addresses and a unique id number. Ultimately, the data use agreement will prohibit attempts to re-identify individuals and we will design our data cleaning and analysis procedures to honor that agreement.

**Qualifications and Experience**

***Key personnel***

***Douglas Levy, PhD – Principal Investigator***

Dr. Levy is an Associate Professor of Medicine at Harvard Medical School, Associate Investigator at the Mongan Institute Health Policy Center at Massachusetts General Hospital, and a researcher with nearly 20 years of experience conducting health policy and health services research. Dr. Levy has published studies using health care claims data to assess utilization of genetic tests in the context of cancer care, the impact of a workplace wellness program on health care spending, and studies assessing the impact of health systems innovations on the cost of care in the context of comorbid psychiatric and cardiovascular disease, diabetes, and palliative care. He is an expert in tobacco policy and has been a leader in the field of smoke-free public housing research. He has received multiple grants from the National Institutes of Health to study the impact of smoke-free public housing policies, including a current grant (NIH R01-HL112212) where he and his team are using the Massachusetts All Payer Claims Database from 2008-2018 to investigate the effect of residential smoke-free policies on health, health care use, and health care expenditures.

***Vicki Fung, PhD – Investigator, health services researcher***

Dr. Fung is an Assistant Professor of Medicine at Harvard Medical School and Senior Scientist at the Mongan Institute Health Policy Center at Massachusetts General Hospital. She has extensive experience conducting health policy and services research using administrative claims data, including the Massachusetts APCD and Medicare and commercial claims. Her work focuses on the impact of health policy and medical care use, quality, adverse clinical events, and medical spending, particularly for vulnerable populations. She is a co-investigator on Dr. Levy’s current NIH-funded study of smoke-free housing in Massachusetts.

***Yuchiao Chang, PhD – Statistician***

Dr. Chang is a statistician who has worked extensively with sensitive health care data for over 20 years on a wide range of research projects. She is a co-investigator on Dr. Levy’s current NIH-funded study of smoke-free housing in Massachusetts.

***Nancy Rigotti, MD – Investigator, primary care physician***

Dr. Rigotti is a Professor of Medicine at Harvard Medical School and a primary care physician and tobacco researcher at Massachusetts General Hospital. She is a co-investigator on Dr. Levy’s current NIH-funded study of smoke-free housing in Massachusetts.

***Jonathan Winickoff, MD MPH – Investigator, pediatrician***

Dr. Winickoff is a Professor of Pediatrics at Harvard Medical School and a pediatrician and tobacco researcher at Massachusetts General Hospital. He is a co-investigator on Dr. Levy’s current NIH-funded study of smoke-free housing in Massachusetts.

Other Project Participants

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| --- | --- | --- |
| Name | Role | Organization |
| Vicki Fung, PhD | Investigator | Massachusetts General Hospital |
| Yuchiao Chang, PhD | Statistician | Massachusetts General Hospital |
| TBN | Programmer Analyst | Massachusetts General Hospital |