

Information Collection on Cause-Specific Absenteeism in Schools (Pittsburgh Location)

**Request for OMB Approval of a New Information Collection
(OMB Control # 0920-XXXX)**

December 31, 2014

Statement B

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PART B. COLLECTION OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Respondent Universe and Sampling Methods

The project will be implemented in three school districts in Pittsburgh, Pennsylvania. There are 22 schools in the three participating districts in Pittsburgh: 1) Fox Chapel School District (3000 students in 7 schools covering K-12) 2) Propel Charter School District (3000 students in 9 schools covering K-12) and 3) Canon-MacMillan School District (5000 students in 11 schools covering K-12). Six of the 22 schools across the three districts in Pittsburgh will participate in the enhanced cause-specific absentee monitoring project. Information on cause-specific absenteeism will be obtained through telephone interviews. Additionally, a sentinel cohort of 360 students (and their families) will be recruited from the six schools. Families will fill out an online form weekly (for a twelve week period) to report if any respiratory illnesses have occurred in the past week among family members.

To estimate the sample size necessary to build effective predictive models, time-series models were fit to simulated data in order to explore the ability to fit models. This was done by assuming a temporal shift between the influenza dynamics in different age groups, in an age-specific model of influenza with coupling between age classes. The temporal shift in this case was created by using different seasonalities of influenza in the two populations. Information from the previously conducted study was used to parameterize a 5-age class model of influenza and initiated influenza in the youngest age class in 3 simulated influenza seasons. Study team then sampled 500, 1000, 1500, 2000, 2500, and 3000 children from the simulated population (of 100,000) in the lowest two age classes and sampled 5% of cases from the two oldest age classes (with a population of 100,000). Seasonal autoregressive models were fit with 5 time-specific seasonal factors on transmission to the two data streams and compared the performance of two individual models and a shared parameter model. This procedure was performed 1000 times. The two models were determined to be significantly different by this procedure 55%, 68%, 75%, 82%, 88% and 89% of the time given the respective samples of 500, 1000, 1500, 2000, 2500 and 3000. Based upon these results, a targeted sample size of 2000 to 2500 was chosen, roughly the expected number in the 6 schools. This study will be conducted over multiple seasons and so we expect some amount of turnover in our schools. The total sample size of individuals for which individual level data will be obtained is 4000. Also, parents of these individuals will be asked questions and thus the study team expects to contact, conservatively, 8000 parents of these children (assuming two parents per child are contacted over the course of the study).

The sample size of the household cohort (360 households) was determined by calculating the required sample size to estimate the proportion of individuals experiencing influenza virologically confirmed illness within a desired level of precision. It is estimated that 15% of individuals in this population will have an influenza virologically confirmed infection during the 12 week period. This proportion will be estimated with an absolute range of +/- 2 %. An alpha of 0.05 and power of 0.80 were assumed. To do this 1,440 individuals are required. Assuming that each household has on average 3.6 individuals, the conservative estimate is 360 households.

2. Procedures for the Collection of Information

This information collection aims to assess the role of cause-specific absentee monitoring systems to predict community-wide influenza transmission. Each proposed project will submit statistically and culturally appropriate tools for information collection (including screenshot of online data collection

form and copies of surveys) in the statement provided to OMB (see attachments to Statement A). Information collection tools have been reviewed and approved by the IRBs of Johns Hopkins University and University of Pittsburg with CDC review and deferral to Johns Hopkins IRB. Approval letters from Johns Hopkins University, University of Pittsburg and CDC's deferral approval are included with this new information collection request (see attachments to Statement A).

Collection and analysis of cause-specific absentee information

Influenza transmission among school-aged children and young adults is frequently predictive of subsequent community transmission. Therefore, early recognition of school-based transmission of influenza could contribute to the timely implementation of mitigation efforts to reduce morbidity and mortality in the wider community (1-2). This information collection aims to implement a cause-specific absentee monitoring system at kindergarten through 12th grade schools in Pittsburgh, Pennsylvania. Information collection tools will record daily absentee data, the cause of reported absences (including symptoms associated with any illness related absence), and if meeting the influenza-like-illness (ILI) definition, provide opportunities for influenza diagnostic testing (at school or during a home visit). The tools will also capture household composition (and other household demographic characteristics), travel information (related to influenza exposure), and influenza vaccination history. This information will be obtained through telephone contact, text messages, in-person interviews, and through the option of a web-based survey.

This information will allow us to generate rates of influenza-related school absenteeism that could be compared with established community influenza surveillance systems. Routine (and established) community systems used in this project will include the national ILI sentinel surveillance network, hospital pediatric influenza surveillance systems, and other local surveillance systems for ILI and/or influenza. With appropriate statistical methods, cause-specific school absenteeism data will be used to predict the course of an influenza outbreak in the school population as well as in the wider community (2). In both locations, for example, multiple methods will be applied to model the case counts of influenza (or ILI) from different routine influenza surveillance systems as a function of the total confirmed cases of influenza (or ILI) reported from participating schools. We will explore different lag periods (days and weeks) between school-based case findings and cases reported through the routine surveillance sources to improve the prediction models. These analyses will be adjusted for various covariates, including students' age, seasonality, and vaccination status of the school populations (and community).

The population universe for the information collection is based on the purposeful sample of three school districts (22 schools) in Pittsburgh, Pennsylvania. Absentee data from all schools will be collected and analyzed to establish baseline absentee levels. In six of the 22 schools in Pittsburgh (2,500 students), these routine absentee-reporting systems will be enhanced to ascertain data specifically related to this information collection. At these schools, we will collect cause-specific information on the absences, including symptoms of reported illnesses, and for absences related to ILI, we will obtain specimens for influenza diagnostic testing. Information will also be collected on the demographic characteristics of the student's household, travel history, and influenza vaccination status (see attachment in Statement A). We estimate that each student will have four absences per school year.

Additionally, a sentinel cohort of 360 students (and their families) will be recruited from these six schools in Pittsburgh. Families will be contacted weekly (for a twelve week period) to determine if any respiratory illnesses have occurred in the past week. Specimens will be collected from students reporting ILI for influenza diagnostic testing.

Estimation procedures

Outcomes will include descriptions of cause-specific absenteeism over time and the statistical association (including a lag period) between absentee data and national, local, or hospital influenza surveillance data. Corrections will be made for over/under sampling, non-response, non-standard distributions, covariates, and other unanticipated phenomenon that may skew or bias the information collection and analyses.

Degree of accuracy needed for the purpose described in the justification

DGMQ collects information in order to plan and implement health programs and activities relevant to its public health mission, primarily related to updating CDC's Pre-pandemic Guidance (as described in statement A). The use of simple but scientifically sound recruitment strategies will ensure that DGMQ and partners will collect quality data to inform the potential utility and limitations of cause-specific school absenteeism on community-wide influenza transmission.

Appropriate statistical tests were conducted to determine the sample size required for project implementation in each location, respectively, assuming variability in the circulation of influenza and other acute respiratory infections (which cannot be predicted). Sample size estimates were generated by testing time-series models to simulated data in order to explore the ability to fit the models. Two models were determined to be significantly different 88% of the time with a sample size of 2,500, roughly the expected number of students in the six participating schools.

Unusual problems requiring specialized sampling procedures

Unusual problems requiring specialized sampling are not expected with this new information collection. If situations occur during the course of the project implementation, requests for changes in the proposed methodologies will be provided to OMB.

Any use of periodic (less frequent than annual) data collection cycles to reduce burden

This information collection will minimize the requests from project participants to the extent possible. Except for the cohort of 360 students and their families participating in the 12 week follow-up survey, respondent burden will be limited to the number of reported school absences. Requesting information on multiple episodes of absences from one parent or caregiver may be possible over the course of a project. We estimate four absences per student per year in our burden estimates. The estimated burden time for each response is 3 to 10 minutes.

3. Methods to Maximize Response Rates and Deal with Non-response

The following are examples of procedures that have proven effective in previous studies and will be used when possible to obtain at least an 80% response rate:

- Using opt-out letter
- Information about the project will be provided to school boards, parent-teacher organizations, school staff, school nurses.

- Informing respondents of what the project is asking, why it is being asked, who will see the results, and how the results will be used, as well as discussing how respondents will benefit from the results and how the findings will be put into action.
- Initial contact letters will be sent home to parents to describe the study and to permit opt-out of the study. Parents and guardians in households that have not opted out will be sent a flyer to determine if they would like to participate.
- Parents and guardians of school children will be contacted through telephone, email and text methods. These systems will be integrated within the existing absence follow-up of the school systems.
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- Using web-based survey for weekly illness from the active surveillance cohort.
- A token of appreciation for a respondent's time and interest may be given to research participants.
- Addressing data security and anonymity with respondents.
- Informing respondents how much time the project will take so that they know what to expect.
- Utilizing deadlines, reminders, and follow-ups to remind respondents and encourage participation.

4. Test of Procedures or Methods to be Undertaken

The information collection tools that will be used in this project are statistically valid as well as linguistically and culturally appropriate for the targeted populations. The importance of utilizing culturally and linguistically appropriate instruments and procedures is well-documented in the literature and is an important aspect of designing and implementing DGMQ's activities and programs.

The targeted populations in Pittsburgh, Pennsylvania have participated in previous state-based influenza related research and several of the information collection tools were developed and used in these public health projects. For example, paper based and online contact surveys were completed by students from the same school districts on a daily basis in order to determine contact based risk factors for acquisition of influenza like illness and influenza in 2011-2013. The types of procedures that will be undertaken during this project are in keeping with previous similar projects.

5. Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

The following individuals, including contractors, who may be chosen to pre-test and conduct information collections, will be available to provide advice about the design of statistical and sampling procedures undertaken as part of these data collection activities:

- Clive Brown, MBBS, Associate Director for Science, Division of Global Migration and Quarantine
- Christine Prue, PhD, Health Communication Specialist, Office of the Director, National Center for Emerging and Zoonotic Infectious Diseases

- Hongjiang Gao, PhD, Statistician, Office of the Director, Division of Global Migration and Quarantine
- Jianrong Shi, Statistician, Office of the Director, Division of Global Migration and Quarantine
- Laura Kann, PhD, Program Director, Division of Adolescent and School Health

DGMQ will determine if additional consultation is required and will report any consultants, as well as any individuals collecting and/or analyzing the data in the individual packages.

REFERENCES

- 1) Kara EO, Elliot AJ, Bagnall H, Foord DG, Pnaiser R, Osman H, Smith GE, Olowokure B. Absenteeism in schools during the 2009 influenza A(H1N1) pandemic: a useful tool for early detection of influenza activity in the community? *Epidemiol Infect* 2012;140:1328-36.
- 2) Sasaki A, Hoen AG, Ozonoff A, Suzuki H, Tanabe N, Seki N, Saito R, Brownstein JS. Evidence-based tool for triggering school closures during influenza outbreaks, Japan. *Emerg Infect Dis* 2009;15:1841-3.