Yale SCHOOL OF MEDICINE
Physician Associate Program

Appendix I – Thesis Research Plan Form

Class of 2018 Thesis Research Plan & Electronic Signature Form

Type the information below to describe your thesis idea and email this *single Word document* to alison.garb@yale.edu and Rosana.gonzalez-colaso@yale.edu **no later than 8/7/2017 at 5 pm. Your advisor must be copied on your thesis research plan submission to be considered complete. Plans will be reviewed in the order of submission. Please do not copy and paste into this form but type the data into the appropriate fields.**

I, Ben Artin have discussed with my advisor the PA Thesis Guidelines and also the deadlines I will be subject to during my thesis project. My thesis advisor has reviewed the thesis idea described below.

Tentative Title: Regional variation of respiratory syncytial virus season duration among infants in Connecticut

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Thesis Advisor Name: Daniel Weinberger
Academic Title (*check one*)**:** Professor Associate Professor √ Assistant Professor
Yale School (check all that apply: **YSM** √ **YSPH** **YSN**
Clinical Department: _____
Preferred Email Address: daniel.weinberger@yale.edu **Phone** 203-737-6004

Research Plan Due: 8/7/17 at 5pm **Thesis Month I:** 12/4/17-12/21/17 **Progress Report Due:** 1/8/18 at 5pm

Pre-Thesis Meeting:_____ **Thesis Month II:** ☐ 4/23/18-5/18/18 ☐ 5/21/18-6/15/18
(fill in the blank) (*select one*) ☐ 6/18/18-7/13/18 ■ 7/16/18-8/10/18
☐ 8/13/18-9/07/18

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1. Rationale for your study. You must describe the previous evidence that justifies the need, novelty and feasibility of the proposed study in less than 2000 words. Must include citations (not counted on word limit)

Respiratory syncytial virus (RSV) causes seasonal respiratory illness of varying severity. RSV infection in infants is often associated with more severe illness (including bronchiolitis and pneumonia), sometimes requiring hospitalization. Several groups of infants are at higher risk of severe illness, hospitalization, and complications; these groups include premature and young infants, infants with lung and heart disease, and immunosuppressed children. [1]

While no targeted treatment exists for RSV infection, preventative monoclonal antibody medication (palivizumab) is available. Due to its high cost (in thousands of USD per patient per year) and its inconvenience (requiring monthly healthcare visits during RSV season), palivizumab immunoprophylaxis is recommended only for high-risk infants, and only during RSV season. [2, 3]

With exception of Florida, these guidelines are based on analysis of RSV seasonality on state and national level. [3] However, recent research has revealed regional variation in RSV season patterns within Connecticut. [4] This variation is potentially large enough to guide recommendations regarding administration of palivizumab, and therefore lower healthcare burden of RSV immunoprophylaxis.

I propose to analyze existing data about RSV infections among infants hospitalized in Connecticut between 1997 and 2013, with the goal of establishing an association between geographic subdivisions (by ZIP code) and RSV season onset and duration. Based on the results of that analysis, I intend to propose a refinement to the guidelines for RSV immunoprophylaxis within Connecticut, aimed at optimizing the use of RSV immunoprophylaxis without adversely affecting RSV infection outcomes.

Need: Since healthcare burden of RSV immunoprophylaxis is primarily tied to the number of doses administered, which is substantially determined by the duration and onset of RSV season, analysis of RSV season duration and onset is needed to optimize use of RSV immunopropylaxis in Connecticut.

Novelty: Prior analysis of regional variation in RSV seasonality within Connecticut established geographic variability in timing of peak RSV incidence, but did not consider duration or onset of RSV season. [4] The analysis I propose is a novel analysis of the existing data.

Feasibility: The data necessary for the study have already been collected. The study would be performed as part of existing research at YSPH, which has already received IRB approval. I have taken classes at YSPH covering the methods and techniques needed for this

study; one of those classes was taught by my thesis advisor. My thesis advisor is experienced in this type of analysis, and is available to mentor me as needed. He agrees that this project is viable within the scheduling constraints of a PA/MPH thesis.

[1] Centers for Disease Control and Prevention (2017) "Respiratory Syncytial Virus Infection (RSV): For Healthcare Professionals" https://www.cdc.gov/rsv/clinical/index.html
[2] American Academy of Pediatrics Committee on Infectious Diseases. (2003). Revised indications for the use of palivizumab and respiratory syncytial virus immune globulin intravenous for the prevention of respiratory syncytial virus infections. Pediatrics, 112(6 Pt 1), 1442.
[3] Committee on Infectious Diseases. (2014). Updated guidance for palivizumab prophylaxis among infants and young children at increased risk of hospitalization for respiratory syncytial virus infection. Pediatrics, 134(2), e620-e638.
[4] Noveroske, Douglas Brian. (2016) Respiratory Syncytial Virus In Connecticut: Predictors Of Seasonal Epidemic Timing. Public Health Theses. 1213. http://elischolar.library.yale.edu/ysphtdl/1213

Complete section 2-13 with as much detail for faculty to evaluate the proposed plan

2. Research Question: If you are an infant residing in Connecticut, is the ZIP code of your residence associated with the number of doses and timing of RSV immunoprophylaxis you need?

3. Type of Study Design: Cross-sectional study

4. Study Population: Children less than 2 years old infected with RSV between 1997 and 2013 in Connecticut

5. Study Setting: Acute care hospitals in Connecticut reporting inpatient admission data to the State of Connecticut Office of Health Care Access between 1997 and 2013

6. Sampling Method: Hospital admission sample using database consisting of 100% of hospitalizations in Connecticut between 1997 and 2013

7. Predictor or Independent Variable/s: ZIP code (of patient residence)

8. Main Outcome or Dependent Variable: Number of doses of RSV immunoprophylaxis needed

9. Other Variables: Calendar year

10. Estimated period of recruitment and data collection (including follow up time, if applicable): N/A; data already collected

11. Statistical hypothesis to be tested: RSV season onset changepoint in ZIP code A ≠ RSV season onset changepoint in ZIP code B, for any ZIP codes A and B (A ≠ B) in Connecticut; similarly for season offset changepoint

12. Statistical method for testing hypothesis: Changepoint analysis

13. Estimated sample size: 10000 (Hospitalizations due to RSV among children <2 in Connecticut between 1997 and 2013)