HESSP Project 1

**Title:** Racial Heterogeneity in the Association between Inflammatory Cytokines (IL-4, IL-10, IL-2, IL-6), IgG4, Interferon Gama and Childhood Asthma Severity: Quantitative Evidence Synthesis and Scientific Statement (QES)

**Professor Laurens Holmes, Jr.**

**Description:**

Asthma remains the leading cause of chronic disease among children in the U.S. While racial/ethnic disparities had been observed in incidence, treatment, outcomes and mortality, the predisposing factors to these variabilities remain unclear and not fully assessed. Despite the contributing effect of socio-economic factors, biologic determinants are equally implicated in this complex etio-pathogenesis, namely pro-inflammatory (IL-6, IL-2), and anti-inflammatory cytokines (IL-4, IL-10), IgG4, and interferon gamma. You will examine published literature for evidence on the implication of these inflammatory indicators in childhood asthma severity, as well as the racial differences in this implication. Your analysis will consist of using a random effect meta-analytic technique prior to the examination of heterogeneity. Because studies are from different settings, the fix effect method will not be used. Forrest plot will be used to illustrate the point estimates and confidence intervals. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

**HYPOTHESES:** (1) Inflammatory mediators are not associated with asthma severity (2) the role of inflammatory mediators in asthma severity does not vary by race/ethnicity.

**SPECIFIC AIMS:** (1) To examine published literature from 2000-2016 on the correlation between asthma, asthma severity and inflammatory mediators cytokines/immunoglobulin G/interferon γ. (2) To assess racial/ethnic distribution/concentration of inflammatory mediators in this association.

**METHODOLOGY:** (1) **STUDY DESIGN:** Systematic review and QES (2) Eligibility criteria and search techniques: the Pub med search engine will be used to identify studies between 2000-2016 as well as mid 2017 on the implication of inflammatory mediators in asthma and asthma severity. Studies will be eligible for inclusion of QES if published in English language sample size >10 subjects, prospective design, with reliable laboratory measures of the inflammatory mediators **STATISTICAL MODELING:** Correlation analysis: Unlike meta analysis this QES will utilize random effect meta-analytic technique prior to the examination of heterogeneity. Because studies are from different settings, the fix effect method will not be used. Forrest plot will be used to illustrate the point estimates and confidence intervals.
HESSP Project 2

Project Title: Childhood Obesity and Novel Biomarkers in Racial/Ethnic Differences in Epidemic: Quantitative Evidence Synthesis (QES) and Scientific Statement

Professor Laurens Holmes, Jr.

Description:

Inflammatory and pro inflammatory cytokines have been implicated in obesity epidemic. Additionally, novel biomarkers have been sparingly used and implicated as predisposition to adiposity as well as body mass index in adult and children populations. This study involves adiponectin, tumor necrosis factor, fibrinogen, c-reactive protein, plasminogen and adipokines. In effect, given inconclusive findings in both preclinical and clinical data, there is a need to obtain evidence in order to establish the implication of these biomarkers in obesity. This proposed project aims to utilize published literature in the implication of these novel biomarkers in obesity. This project includes statistical modeling which entails using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To obtain the summary point estimate, random effect metal analytic of dersimmonian-laid will be used. Next, a heterogeneity test will be performed to determine the variability between studies after the summary estimates have been obtained. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

HYPOTHESES: NH1) There are no implications of novel biomarkers of obesity in the obesity epidemic among children NH2) There is no racial/ethnic differences in implications in biomarkers in childhood obesity epidemic NH3) Sex differences does not occur in the association between novel biomarkers of obesity and obesity epidemic.

SPECIFIC AIMS: (1) To examine literature published from 2000 to mid 2017 on the role of novel obesity biomarkers in obesity predisposition. (2) To assess the literature for possible differences in this predisposition by race (3) To quantify findings and generate a scientific statement.

METHODOLOGY: STUDY DESIGN: Systematic Review and Quantitative Evidence Synthesis. (QES) allows for the summary point estimate of studies conducted in a given design such as prospective or retrospective but not combined using random effect mental analytic method. DATA SOURCE: Published literature in English language available in major scientific search engines PATIENT SAMPLE & SAMPLING TECHNIQUE: Data will be extracted published literature using a specific criteria for extraction namely population, sample size, outcome, independent variables, statistical methods, measure of association, bias, confounding, and follow-up period (3) STATISTICAL MODELING: Summary statistics: performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To obtain the summary point estimate, random effect metal analytic of dersimmonian-laid will be used . Next, heterogeneity test will be performed to determine the variability between studies after the summary estimates have been obtained.
HESSP Project 3

Project Title: Racial Differences in Cerebral Palsy and Co-morbidities in Children: Evidence from National Survey of Children’s Health

Professor Laurens Holmes, Jr.

Description:

Cerebral palsy (CP) reflects a disorder or dysfunction of the grey matter of the brain effecting cognition and movement. This condition occurs very early in life and has been associated with cognitive impairment as well as improper delivery. Clinical and population based data have observed differences in incidence/mortality by race, income, education, poverty level, sex. While co-morbidities have been shown to be higher in this population there are very little data on health disparities indicators of the perceived co-morbidities within the pediatric cerebral palsy subpopulation. We aim to examine the prevalence of co-morbidities comparing children with cerebral palsy and those without, as well as racial differences in the distribution of co-morbidities. Statistical modeling includes using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. The prevalence of CP co-mobidity will be determined using frequency and proportion (simple probability assessing the outcome of failure and success as a binomial function) as well as the statistical stability of the proportion. Next, you will examine co-mobidity by race/ethnicity using the log binomial regression model. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

HYPOTHESES: NH1) There is no difference in co-mobidity prevalence comparing children with and without cerebral palsy. NH2) There are no racial/ethnic disparities in Cerebral Palsy Co-Morbidities NH3) Racial disparities in CP co-morbidities is not explained by education, income, environment, BMI, and sex

SPECIFIC AIMS: (1) To determine the prevalence of cerebral palsy among children ages 0-17 years. (2) To examine co-morbidities in this sample comparing those with and without cerebral palsy. (3) To identify racial/ethnic disparities in CP and to determine social and environmental factors influencing such variability

METHODOLOGY: STUDY DESIGN: A retrospective Cohort Design DATA SOURCE: National Survey of Children’s Health, 2012. PATIENT SAMPLE & SAMPLING TECHNIQUE: Data will be extracted from National Survey of Children’s Health, 2012. These data includes all children surveyed from household interview using adult in the household to obtain information on children (3) STATISTICAL MODELING: Summary statistics: performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. The prevalence of CP co-mobidity will be determined using frequency and proportion (simple probability assessing the outcome of failure and success as a binomial function) as well as the statistical stability of the proportion. Next, to examine co-mobidity by race/ethnicity log binomial regression model will be used.
Project Title: Childhood Behavioral and Mental Health: Implications of Environmental and Social Factors

Professor Laurens Holmes, Jr.

Description

Mental and behavioral issues have been linked to social determinants of overall health as well as biological dysfunctions across the life course. While several data have implicated unemployment, income, race, poverty, and environment in predisposition to mental illness. Data are very rare in assessing the implication of these factors in childhood mental illness and behavioral dysfunction. Since the grassroots for health disparities is childhood early education, there is a need to understand the potential role of behavioral dysfunctions in early childhood achievement in order to further explain the nexus between education and health disparities. We seek in the proposed project to examine complex bioneurosocial factors in the predisposition of children to mental and behavioral functions as well as examine these predispositions by race/ethnicity. Statistical modeling includes using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To determine the prevalence of mental illness/behavioral dysfunction in a representative sample of U.S. children aged 0-17 years. A simple probability will be computed. To assess the crude/unadjusted relationship between mental illness/mental dysfunction and predisposing/risk factors including race and sex and univariable log binomial regression model will be utilized. Thirdly, to assess whether or not race/ethnicity is an effect modifier in the proposed relationship between childhood illness/behavioral dysfunction and bioneurolsocial determinants of health, we will use Mantal Haenzel stratification analysis Cochran –Mantal Haenzel stratification model. Finally, if race remains an effect measure modifier, a multi-variable log binomial regression model will be used for separate subpopulations (race/ethnicity) while controlling for the assessed confounding variables in the relationship between mental illness/behavioral dysfunction and race. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

HYPOTHESES: NH1) There are no relationships between childhood mental illness and 1. Parental education, poverty level, Income, Comobidity, Environment) NH2) There is no racial/ethnic heterogeneity in the nexus between childhood mental illness/behavioral dysfunction and predisposing factors (bioneurosocial determinants) NH3) the relationship between race and childhood mental illness/behavioral dysfunction is unexplained by bioneural/social determinants.

SPECIFIC AIMS: (1) To examine the prevalence of mental illness (depression, anxiety, etc) and behavioral dysfunction among children 0-17 years. (2) To determine the association between mental illness, behavioral dysfunction and education, poverty, environment, BMI, co morbidity (autism, epilepsy) cognitive impairment (brain injury).
METHODOLOGY: (1) STUDY DESIGN: Cross Sectional design that allows for the simultaneous assessment of outcome variable (mental/behavioral dysfunction) and independent variables (education, race/ethnicity, income, comorbidities, etc.)


PATIENT SAMPLE & SAMPLING TECHNIQUE: Data will be extracted from the National Survey for Children's health, 2012. With sampling based on adults from the hospital where children will be identified.

STATISTICAL MODELING:
Summary statistics: performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To determine the prevalence of mental illness/behavioral dysfunction in a representative sample of U.S. children aged 0-17 years. A simple probability will be computed. To assess the crude/unadjusted relationship between mental illness/mental dysfunction and predisposing/risk factors including race and sex an univariable log binomial regression model will be utilized. Thirdly, to assess whether or not race/ethnicity is an effect modifier in the proposed relationship between childhood illness/behavioral dysfunction and bioneurol social determinants of health, we will use Mantal Haenzel stratification analysis Cochran – Mantal Haenzel stratification model. Finally, if race remains an effect measure modifier, a multi-variable log binomial regression model will be used for separate subpopulations (race/ethnicity) while controlling for the assessed confounding variables in the relationship between mental illness/behavioral dysfunction and race.
Description

Childhood Cancer remains the leading cause of disease-related-mortality among children 0-14 years. While incidence continues to increase, survival has improved due to advances in therapeutics as well as a greater understanding of cancer as somatic mutation, despite, a few cases of familial germ line mutation. Mutations are common in human cells implying a probability of $10^{10}$ mutation in the life of a cell. With pediatric cancer, etiologic factors that tend to drive the incidence are not very well understood compared to adult cancer. Additionally, incidence has been shown to be higher among white children in most malignancies and black children continue to illustrate survival disadvantage. We sought in this study to examine pediatric malignancy of all sites by age of diagnosis, sex, race, vital states, as well as geographic locale, insurance, education and poverty level. The project includes: using a mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To examine the temporal trends, age-adjusted percent change and annual percent change will be computed. The population size (denominators) will be based on the 2010 U.S. Census. To determine factors associated with racial, and sex differences in incidence in multi-variable logistic regression model will be utilized. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

HYPOTHESES: NH1) There is no difference in pediatric cancer incidence and temporal trends by race and sex. NH2) Pediatric cancer incidence mainly acute lymphocytic leukemia, chronic myeloid leukemia, lymphoma, renal cancer does not differ by race and sex NH3) Racial differences in overall pediatric cancer are not associated with poverty level, geographic local and education.

SPECIFIC AIMS: (1) To characterize all and major pediatric cancer by race, ethnicity, sex, geographic local, insurance and vital status. (2) to determine racial differences in the major pediatric cancer.

METHODOLOGY: STUDY DESIGN: A Retrospective Cohort Design DATA SOURCE: SEER Data, 1973-2013. PATIENT SAMPLE & SAMPLING TECHNIQUE: Data will be extracted from early SEER Registries implying the initial nine registries that began in 1973. These data includes all cancers among children diagnosed between 1973-2013 and followed for the disease. (3) STATISTICAL MODELING: Summary statistics: performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To examine the temporal trends, age-adjusted percent change and annual percent change will be computed. The population size (denominators) will be based on the 2010 U.S. Census. To determine factors associated with racial, and sex differences in incidence in multi-variable logistic regression model will be utilized.
HESSP Project 6

Project Title: Social Determinants in Childhood Brain/CNS Cancer Incidence and Mortality: Analysis using SEER Data

Professor Laurens Holmes, Jr.

Description

Brain/CNS tumors are not common among children. However, an excessive increase in incidence may reflect geographic clustering of the tumor as well as health disparities. Epidemiologic and clinical data have shown variances by sex, age, and social determinants in the adult population but data are lacking in pediatric settings. In the proposed study, we aim to characterize pediatric brain/CNS tumors and to determine whether or not they are racial/ethnic and sex variability in the social determinants of both incidence and mortality. Statistical modeling will be performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To examine the incidence/temporal change using age adjusted parameters the incidence, cumulative incidence, percent change, and annual percent change will be computed using SEER Stats, version 8.3.2. To examine the mortality and the social determinants for the CNS/Brain tumor, binomial regression model will be used for both univariable and multi-variable assessment. What is included upon a successful completion of this project? A potential publication in a reputable scientific journal, a publishable manuscript, and/or a poster presentation.

OBJECTIVES/HYPOTHESES: OBJ (1) Characterization of Brain/CNS tumors by social determinants OBJ (2) Examination in brain/CNS mortalities NH1) There are no racial/ethnic disparities in social determinants in Brain/CNS tumors incidence NH2) There are no racial/ethnic disparities in social determinants in Brain/CNS tumors mortality.

SPECIFIC AIMS: (1) To characterize brain CNS tumors by age of diagnosis, year of diagnosis, sex, race, race/ethnicity and geographic locale as SEER registries (2) To examine the mortality in pediatric brain and CNS tumors.(3) To assess social determinants mainly education and poverty level as well as the racial disparities therein.

METHODOLOGY: STUDY DESIGN: A retrospective Cohort Design DATA SOURCE: Surveillance Epidemiology and End Result Data (SEER), 1973-2013. PATIENT SAMPLE & SAMPLING TECHNIQUE: Data will be extracted from the SEER registries implying the nine SEER Geographic Areas that began in 1973. This data includes all children diagnosed with Brain/CNS tumor from 1973-2013. (3) STATISTICAL MODELING: Summary statistics: performed using mean/standard deviation for normally distributed data as well as median and inter-quartile range for data that violates normality assumption. To examine the incidence/temporal change using age adjusted parameters the incidence, cumulative incidence, percent change, and annual percent change will be computed using SEER Stats, version 8.3.2. To examine the mortality and the social determinants for the CNS/Brain tumor, binomial regression model will be used for both univariable and multi-variable assessment.