HEALTH OUTCOMES IN CONGENITAL CYTOMEGALOVIRUS: A SYSTEMATIZED AND UNBIASED APPROACH IN THE ELECTRONIC MEDICAL RECORD ERA

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Background: There is limited data on the indirect and non-medical costs associated with congenital cytomegalovirus (cCMV). Attempts to predict the economic impact of disease often rely on secondary analyses of large private databases, and may not capture the full spectrum of a disease. Fortunately, the granularity of billing codes in the Electronic Medical Record (EMR) make it possible to track health outcomes. Unfortunately, with over 70,000 unique codes in the latest version of ICD-10, selecting the appropriate codes requires specific content knowledge and can lead to bias in categorization. The Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT)® provides physicians a tool to find specific ICD-10 on the basis of semantic terms. The semantic terms outlined by the SNOMED-CT® can be used to build disease state specific clusters of ICD-10 codes to study economic impact of this potentially devastating congenital infection.

Materials/Methods: Using a series of data parsing and processing scripts written in SAS V9.4 (Cary, N.C.), we extracted the diagnosis codes for 190 patients seen in our Congenital Cytomegalovirus Clinic at Texas Children's Hospital in Houston, Texas. This data was consolidated into a relational database of clinical information. Through a second program which generalizes the SNOMED-CT® criteria, ICD-10 codes were categorized by semantic clinical terms associated with cCMV (e.g. "hearing problem", "developmental disability", etc.).

Results: Data acquisition for this cohort took 1.5 hours to complete and included 3800 ICD-10 codes, 33,000 individual laboratory values, and 800 antiviral administration records. Of the 190 patients seen in our clinic with an ICD-10 diagnosis of CMV infection, 144 of these had cCMV, and 102 of these were born after 1/1/2008 (the inception date of our EMR). 54 (53%) had hearing deficits, 17 (16%) had hearing aids, 54 (53%) had developmental abnormalities, and 18 (17%) had neurologic abnormalities. On average, central nervous system, hearing, and developmental abnormalities were noted to occur successively within the first 2 years of life.

Conclusions: The spectrum of disease of cCMV is broad and has been well studied in the past. The EMR gives us the potential to further study this disease in finer detail and identify rates of disease progression by mining the ICD-10 codes associated with these patients throughout time. These results should prove invaluable for generating cost-models for the economic impact of cCMV.