Recent Trends in Congenital Cytomegalovirus-Related Hospitalization in the United States

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OBJECTIVE
This study sought to document recent trends in cCMV-related infant hospitalizations in the US, as well as to describe attributes of these hospitalizations, including patient characteristics and economic measures.

METHODS
Study Design
Retrospective database analysis

Data Source
• Hospital discharge data from the 2004 through 2013 Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Databases (NIS)4
• NIS is the largest inpatient-care database in the US and the only national inpatient database with charge information on all patients, regardless of payer
• NIS-provided clinical and nonclinical variables for each hospitalization, including patient demographics, diagnosis codes, length of stay (LOS), total charges, admission and discharge status, and payer
• Sampling weights to allow for generating nationally representative estimates

Inclusion Criteria
• A diagnosis of cCMV (ICD-9-CM code 771.1)
• Less than 1 year of age at admission

Study Measures and Analytical Methods
• Weighted, descriptive analyses were carried out using the SAS® (Version 9.4) statistical software package
• For each of the years assessed, the following measures were calculated:
  – Weighted estimates of the rate of cCMV-related hospitalization
  – Per-discharge total costs, in 2016 US dollars (charge data converted to costs)3, and LOS for cCMV-related hospitalizations
  – Patient-level characteristics (i.e., sex, race, primary payer, mortality)

RESULTS

Rates of cCMV-Related Hospitalization (Figure 1)
While the rate of hospitalization during the study period observed has fallen since 2008, the total burden of cCMV-related hospitalizations (i.e., aggregate costs across all cCMV-related hospitalizations) increased slightly, from $73,000 in 2004 to $77,000 in 2013, but did increase to >$80 million in 2009, 2011, and 2012.

The proportion of cCMV-related hospitalizations that ended with the patient’s death peaked at 8.5% in 2008 and has fallen since then to 4% in 2013.

LOS and Total Costs (Table 2)
• Mean (standard deviation [SD]) costs increased from $93,683 ($138,604) in 2004 to $102,377 ($175,737) in 2013, peaking in 2011 at $128,052 ($202,966).
• The total burden of cCMV-related hospitalizations increased slightly, from $73,000 in 2004 to $77,000 in 2013, but did increase to >$80 million in 2009, 2011, and 2012.
• While the rate of hospitalization during the study period observed has fallen since 2008, the total burden of cCMV-related hospitalizations (i.e., aggregate costs across all cCMV-related hospitalizations) increased slightly, from $73,000 in 2004 to $77,000 in 2013, but did increase to >$80 million in 2009, 2011, and 2012.

CONCLUSIONS
• cCMV-related hospitalization rates in the US decreased during the study period observed (overall, −15%), but the total cost burden per stay increased slightly during this period (11%).
• In the US, roughly half of all births are covered by Medicaid, but our results show that nearly two-thirds of cCMV-related hospitalizations among children less than 1 year of age (of which a large proportion are births) are paid for by the program, suggesting that the economically disadvantaged are disproportionately affected by the condition.
• Further research is warranted to better understand factors that may be influencing the observed decrease in rates of cCMV-related hospitalization among the very young in the US, as well as the modest increase in the direct economic burden of infant stays for these events linked to LOS remains relatively constant.

LIMITATIONS
• Patient discharges were identified based upon diagnosis codes that, if recorded inaccurately, may cause misidentification of cCMV.