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Health and economic burden of preeclampsia: no time for complacency

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Preeclampsia is a common and severe pregnancy complication and a leading cause of maternal and infant illness and death.^{1–3} The incidence of preeclampsia increased in the United States during the past 3 decades,^{4,5} and substantial evidence suggests that a history of preeclampsia is a significant risk factor for heart disease in the future years following pregnancy.⁶ In addition to adverse health consequences, preeclampsia is costly because of the medical services needed to treat pregnant and postpartum women and their infants, who are often born preterm.^{1,7}

In this issue, Stevens et al⁸ documented the short-term medical costs associated with preeclampsia. The authors combined state hospital discharge data with birth certificate data, commercial insurance claims data, and nationally representative Healthcare Cost and Utilization Project (HCUP) data to derive nationally representative estimates of the additional cost of medical treatment for women with preeclampsia and their newborns vs women without preeclampsia. This aggregated incremental cost was found to be \$2.18 billion to the US health care system, including \$1.03 billion in maternal health care costs and \$1.15 billion for infants born to mothers with preeclampsia (in 2012 US dollars), which is about one third of the total \$6.4 billion short-term estimated health care costs for preeclampsia pregnancies. This study is the first to quantify the medical costs associated with preeclampsia in the United States up to 1-year postdelivery. Previous studies estimated only the cost of hypertension during pregnancy in a Medicaid population in a single state,⁹ the per-person cost associated with pregnancies complicated by hypertension,¹⁰ or the cost of prematurity, regardless of the cause.⁷

Administrative data, including both hospital discharge data and insurance claims data, have the advantage of including large numbers of observations and information on diagnoses, services received, and payments. However, because claims data are collected primarily for billing and reimbursement, they are limited by potential inaccuracies in the coding

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of diagnoses. Studies have shown that relatively severe and costly conditions are more likely to be coded than milder conditions¹¹ and that gestational age, an important mediator for the cost of preeclampsia, is often captured inaccurately in claims data.¹² We applaud the authors' recognition of the limitations of administrative data and their effort to link hospital discharge data from California Office of Statewide Health Planning and Development (OSHPD) with vital statistics records to obtain more accurate gestational age estimates. However, because preeclampsia and its complications were still identified through administrative data, cases of mild preeclampsia could have been missed because of inaccurate coding or misdiagnosis. Although mild cases may not generate additional medical services that affect the aggregated incremental cost associated with preeclampsia, the per-person cost of preeclampsia might be overestimated because of their exclusion.

Stevens et al⁸ applied novel approaches to impute cost estimates for each maternal and infant hospitalization in the California OSHPD data based on a cost algorithm developed from a commercial claims database. They further adjusted these costs by using correction factors derived from the HCUP database. However, novel approaches must be validated because imputed costs might be different from the real costs. Another way that costs can be estimated for the California OSHPD data is by applying a cost-charge ratio to the total charge,^{13,14} and this approach is commonly used in analyses that use HCUP data.

Linking claims data with birth certificate data is an established technique.^{15,16} It has been used to estimate the total cost of preterm birth in the United States.⁷ Linking allows researchers to directly estimate the cost of preeclampsia by gestational age. Although most database links involve claims for a single type of payer, linking all-payer claims databases with birth certificate databases could further overcome the limitations of administrative data. Moving forward, such links, as well as links to databases with electronic health records, hold promise for more accurate cost estimates.

Quantifying the total cost of a health problem helps to show the public, payers, and health care administrators the magnitude of the problem on a population level. Preeclampsia, in particular, has been underrecognized and underresearched relative to its prevalence as a leading cause of maternal-fetal complications in pregnancy. Quality improvement initiatives for preeclampsia have only recently been implemented by state hospital programs, but these initiatives have not been adopted in every hospital and state in the country.¹⁷ By underscoring the economic burden of preeclampsia, Stevens et al⁸ provided important information about the high costs of this condition.

However, we need to go beyond health burden and cost-of-illness studies when considering the value of interventions to prevent and better manage preeclampsia and its adverse outcomes. Cost of the intervention and the cost savings associated with preventing 1 case of the condition are important parameters that can be used to calculate the potential savings of interventions. In fact, if the lifetime costs of caring for children with adverse outcomes of preeclampsia are included, the potential cost savings from effective interventions may be even greater. The future costs (beyond 1 year) of preeclampsia-associated health problems for women should also be considered.

To improve the quality of maternity care, the Council on Patient Safety in Women's Health Care has produced patient safety bundles, including one for severe hypertension in pregnancy.¹⁷ Although prevention of preeclampsia remains elusive, the severe hypertension bundle is designed to standardize best practices and reduce variation in the management of this condition. The effort by Stevens et al⁸ to estimate the short-term economic effect of preeclampsia, along with the long-documented effects of preeclampsia on women, infants, and families, serves as a stark reminder that we must continue our research efforts to understand the etiology, prediction, and treatment of a condition that is among the biggest challenges in maternity care. ■

REFERENCES

1. American College of Obstetricians and Gynecologists. Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstet Gynecol* 2013;122:1122–31. [PubMed: 24150027]
2. Ghulmiyyah L, Sibai B. Maternal mortality from preeclampsia/eclampsia. *Semin Perinatol* 2012;36:56–9. [PubMed: 22280867]
3. Kuklina EV, Ayala C, Callaghan WM. Hypertensive disorders and severe obstetric morbidity in the United States. *Obstet Gynecol* 2009;113:1299–306. [PubMed: 19461426]
4. Ananth CV, Keyes KM, Wapner RJ. Pre-eclampsia rates in the United States, 1980–2010: age-period-cohort analysis. *BMJ* 2013;347:f6564. [PubMed: 24201165]
5. Wallis AB, Saftlas AF, Hsia J, Atrash HK. Secular trends in the rates of preeclampsia, eclampsia, and gestational hypertension, United States, 1987–2004. *Am J Hypertens* 2008;21:521–6. [PubMed: 18437143]
6. Wu P, Haththotuwa R, Kwok CS, et al. Preeclampsia and future cardiovascular health: a systematic review and meta-analysis. *Cir Cardiovasc Qual Outcomes* 2017;10:e003497.
7. Institute of Medicine. Preterm birth: causes, consequences, and prevention. Washington (DC): National Academies Press; 2007.
8. Stevens W, Shih T, Incerti D, et al. Short-term costs of preeclampsia to the United States health care system. *Am J Obstet Gynecol* 2017;217:237–48.e1–16. [PubMed: 28708975]
9. UCLA Center for Health Policy Research. Costs of gestational hypertensive disorders in California: hypertension, preeclampsia, and eclampsia. Los Angeles (CA): UCLA Center for Health Policy Research; 2013.
10. Law A, McCoy M, Lynen R, et al. The prevalence of complications and healthcare costs during pregnancy. *J Med Econ* 2015;18: 533–41. [PubMed: 25714263]
11. Ford JB, Roberts CL, Algert CS, Bowen JR, Bajuk B, Henderson-Smart DJ. Using hospital discharge data for determining neonatal morbidity and mortality: a validation study. *BMC Health Serv Res* 2007;7: 188. [PubMed: 18021458]
12. Eworuke E, Hampp C, Saidi A, Winterstein AG. An algorithm to identify preterm infants in administrative claims data. *Pharmacoepidemiol Drug Saf* 2012;21:640–50. [PubMed: 22504840]
13. Office of Statewide Health Planning and Development. Patient discharge data (PDD) data dictionary. Available at: https://www.oshpd.ca.gov/HID/Data_Request_Center/documents/puf/DataDictionary_Public_PDD.pdf. Accessed May 23, 2017.
14. Levit KR, Friedman B, Wong HS. Estimating inpatient hospital prices from state administrative data and hospital financial reports. *Health Serv Res* 2013;48:1779–97. [PubMed: 23662642]
15. Gyllstrom ME, Jensen JL, Vaughan JN, Castellano SE, Oswald JW. Linking birth certificates with Medicaid data to enhance population health assessment: methodological issues addressed. *J Public Health Manag Prac* 2002;8:38–44.
16. Bird TM, Bronstein JM, Hall RW, Lowery CL, Nugent R, Mays GP. Late preterm infants: birth outcomes and health care utilization in the first year. *Pediatrics* 2010;126:e311–9. [PubMed: 20603259]

17. Council on Patient Safety in Women's Health Care. Severe hypertension in pregnancy (+AIM). Available at: <http://safehealthcareforeverywoman.org/patient-safety-bundles/severe-hypertension-in-pregnancy/>. Accessed May 22, 2017.

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