The Economic Burden of CVD in Women with a History of Preterm Delivery

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PRETERM DELIVERY (PTD) is a global burden with detrimental consequences leading to maternal and fetal mortality and morbidity; and economic burdens that seem so extraordinary they appear immeasurable.^{1,2} Despite attempts to reduce PTD, little has been accomplished to prevent PTD in developed countries worldwide. Part of this reason may be because of the heterogeneity in presentation of PTD. Women who experience PTD have diverse pathophysiological mechanisms; those at highest risk have a medical indication to deliver prematurely secondary to pre-eclampsia with severe features.^{3,4} More is known about the mortality and morbidity of mothers who deliver secondary to medically indicated PTD. These women have a fourfold risk of developing heart failure and a twofold risk of myocardial infarction later in life.³ Spontaneous PTD traditionally has not been thought to be associated with future maternal cardiovascular disease (CVD) risk; however, these women are now known to have up to a twofold risk.⁵ Therefore, despite the underlying mechanism resulting in PTD, there is likely future maternal CVD risk associated with it and most likely an opportunity to alter the future maternal CVD lifecourse with early CVD prevention measures.⁶

In this issue of the *Journal of Women's Health*, Gao et al.⁷ present important data that aim to quantify the future economic burden of CVD in women with a history of PTD in Australia. The authors utilized a Markov microsimulation model in women with PTD from 2017 to 2066 using the Australian health care system perspective. The model was run two ways: (1) static, where the premenopausal women with PTD age 30–54 in 2017 were modeled over a 50-year time horizon and (2) dynamic model where in addition to the static model women who turned 30 each year were added to the model. Both first-ever and recurrent CVD events were accounted for in the model. Populations with a history of PTD were sourced from the Australian Bureau of Statistics, and costs of acute hospitalization and long-term management from government websites. Nonmonetary burden as years of life lost (YLL) were compared between women with and without PTD history.

Women with PTD in the dynamic model demonstrated a total CVD burden of AUD 11 billion for the next 50 years, and the YLL as 0.34/capita, whereas the static model generated a cost of AUD 4.5 billion and a YLL 0.52/capita. Over the lifetime of each individual woman, 66% would have at

least one CVD event by age 69, with nearly 25% of these women having more than one reoccurrence of CVD later in life. Despite the large economic burden of acute hospitalization (AUD 2 billion) provided to these women, long-term management costs (AUD 9.4 billion) exceedingly contributed to the overarching economic CVD burden.

This study has several strengths. First, it utilizes a novel modeling technique called microsimulation that allows for subsequent recurrent CVD events to be captured over a lifetime. This is currently not being captured in the frequently used health economic model for primary prevention of CVD in Australia. Appropriately quantifying disease burden is very important for health policy decision-making such as resource allocation, public awareness, and increasing CVD health care priorities. By utilizing this novel microsimulation model and identifying subsequent recurrent events (most notable was the 4-year reoccurrence rate of stroke at 19.8%) it provides opportunity to identify gaps in care to improve secondary prevention (in this case repeat stroke).

Considering the substantial economic burden eloquently described by Gao et al.,⁷ future prevention strategies for women who experience PTD is imperative. As is currently the case for pre-eclampsia and hypertensive disorders of pregnancy, recognizing PTD as a potential CVD risk factor/enhancer is important. By utilizing improved economic modeling as evidenced by the authors, future steps can be made to improve health policy. With improved health policy reform three primary goals can be identified: (1) improve public health strategies to heighten a women's perception of personal CVD risk, including PTD history, (2) invest in the future by increasing funding for CVD prevention research, and (3) increase access and the number of CVD prevention programs. Primary CVD prevention programs provide many benefits to help women improve their health care lifecourse. Some examples include atherosclerotic CVD risk screening and counseling, screening for familial hyperlipidemia, providing early hypertension diagnosis and management, and lifestyle counseling (in nutrition, exercise, and smoking cessation). Together, we can alter a woman's future CVD trajectory for the better.

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