

## PREECLAMPSIA

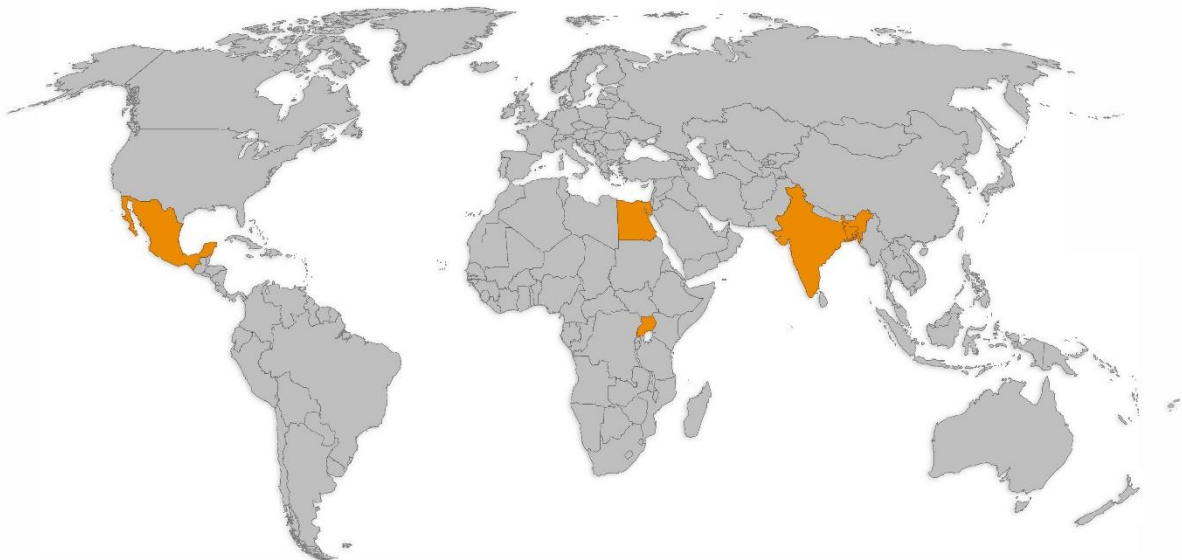
Preeclampsia and eclampsia are serious conditions unique to pregnancy and the postpartum period, most often characterized by a rapid rise in blood pressure. Affecting 5-8% of pregnancies, preeclampsia is a leading cause of maternal and fetal death, resulting in approximately 60,000 maternal deaths worldwide each year<sup>1</sup>. Fetal deaths are three times more frequent in women with preeclampsia and four times more frequent in women with eclampsia<sup>2</sup>.



Gynuity's goal is to increase access to evidence-based screening, prevention, and treatment for preeclampsia and eclampsia, especially in low-resource settings, and, in so doing, reduce maternal and infant mortality and improve the quality of care available to all women.

### LOCATIONS

The map below highlights the countries where we have conducted preeclampsia research.



## RESEARCH

### *Screening for Preeclampsia*

The diagnosis of preeclampsia has traditionally relied on the presence of hypertension and proteinuria. Unfortunately, the equipment to diagnose hypertension and proteinuria is often unreliable or there is a lack of trained personnel to use the standard diagnostics. Researchers have recently discovered that women with severe forms of preeclampsia excrete unfolded or misfolded proteins in their urine. This phenomenon classifies preeclampsia as a protein conformational disorder. (Creutzfeldt–Jakob disease, Alzheimer’s disease, and Parkinson’s disease are also characterized by such proteins.) Misfolded proteins in preeclampsia urine exhibit “congophilia” or affinity for Congo Red dye, originally developed for the textile industry in the 1800s. Based on the information that Congo Red was found to stain selectively misfolded protein in brains of Alzheimer’s patients, colleagues at Nationwide Children’s Hospital in Ohio developed a simple urine diagnostic test [Congo Red Dot (CRD) Test]. With the CRD developers and hospitals in Mexico and Bangladesh, Gynuity tested the clinical utility and usability of the CRD for the diagnosis and prediction of preeclampsia during pregnancy and in the postpartum period. Results from this prospective, case-control trial (n=204 preeclampsia; n=205 uncomplicated pregnancies) suggest that urine congophilia can be rapidly identified and that a point-of-care diagnostic for detection of urine congophilia has the potential to improve the triage and diagnosis of patients with preeclampsia. Read the full article [here](#).



### *Increasing Access to Magnesium Sulfate*

Magnesium sulfate, an inexpensive drug, is an effective treatment for preeclampsia and eclampsia, but it is used sub-optimally in many settings. In general, a loading dose of magnesium sulfate is administered intravenously and intramuscularly followed by an intramuscular (IM) injection every four hours or by a continuous intravenous (IV) infusion. Although the IV regimen has been shown to be effective, it requires the use of an infusion pump for safe delivery and, when administered manually, has a greater potential for inadvertent overdose and missed or delayed administration. The IM dosing regimen, while potentially safer, requires painful injections and is often initiated only when delivery is imminent. These limitations in administration may result in delayed or inadequate treatment of preeclamptic women.

The Springfuser® pump offers an alternative to intramuscular administration of magnesium sulfate where electronic pumps for IV administration are not available. Introduction of the Springfuser® has the potential to improve the quality of preeclampsia care by making drug administration easier and more acceptable to women and providers. The Springfuser® may help avoid the barriers associated with IM administration and the dangers of “free running” IV magnesium sulfate. Gynuity has studied the use of the Springfuser®, hypothesizing that it could offer a treatment approach that is superior to the current standard of care in terms of accurate delivery of treatment, ease of use, cost-effectiveness, demands on staff time, reduction of pain and side effects in women receiving the treatment, and increased acceptability to patients. Our recent research conducted with colleagues in Egypt concluded that serial IV boluses achieve serum magnesium concentrations statistically significantly higher but clinically comparable to those achieved with a continuous infusion and offer a third option for the administration of MgSO<sub>4</sub> to women with preeclampsia that may reduce barriers to utilization. Read the full article [here](#).

### *Improving Management of Hypertension in Pregnancy*

Treatment of elevated blood pressure—one of the primary signs of preeclampsia—reduces the risk for maternal complications.

Historically, regimens for the acute treatment of high blood pressure used medications administered intravenously, which require venous access and monitoring of the fetus. Oral anti-hypertensives are characterized by ease of use, greater availability, low cost, and ability to be used in a wider range of settings. Gynuity, in collaboration with the University of British Columbia, the University of Washington, Government Medical College (GMC), and Daga Memorial Women's Hospital in Nagpur, India, conducted a randomized trial to



compare the efficacy of oral labetalol, nifedipine, and methyldopa for management of severe hypertension in pregnant women. The study found that oral anti-hypertensives are effective in controlling severe hypertension in pregnancy without serious maternal or fetal complications. Use of oral anti-hypertensive drugs for treatment of severe hypertension in pregnancy thus represents an innovative treatment approach with the potential to increase access to life-saving care at the lowest levels of the health system. Read the full article [here](#).

With funding from the Innovation Fund of the Reproductive Health Supplies Coalition, Gynuity also conducted a landscape assessment of access to essential supplies for treatment of hypertensive disorders of pregnancy in India, Mexico and Uganda. The results of the assessment are found [here](#).

### *Improving Care at Delivery for Women with Preeclampsia*

While magnesium sulfate and various anti-hypertensive therapies can reduce the morbidity associated with preeclampsia, the only cure comes with delivery. Prompt delivery, preferably by vaginal route, is vital in order to achieve good maternal and neonatal outcomes. Inducing labor promptly and safely is a critical component of care for women with preeclampsia. Together with colleagues from the University of Liverpool and GMC Nagpur, Gynuity studied the relative risks and benefits of low-cost methods for labor induction (Foley catheter and misoprostol) and augmentation (misoprostol and oxytocin) in women with preeclampsia. The results of the study shows that Oral misoprostol was more effective than transcervical Foley catheterisation for induction of labour in women with pre-eclampsia or hypertension. Future studies are required to assess whether oxytocin augmentation following misoprostol can be replaced by regular doses of oral misoprostol tablets. Read the full article [here](#).

<sup>1</sup>Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, Gülmezoglu AM, Temmerman M, Alkema L. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health*. 2014 Jun;2(6):e323-33.

<sup>2</sup>Abalos E, Cuesta C, Carroli G, Qureshi Z, Widmer M, Vogel JP, Souza JP; WHO Multicountry Survey on Maternal and Newborn Health Research Network. Pre-eclampsia, eclampsia and adverse maternal and perinatal outcomes: a secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG*. 2014 Mar;121 Suppl 1:14-24.

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