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Parul Verma* (verma38@purdue.edu), **Reshma Kalyan Sundaram** and **Doraiswami Ramkrishna**. *A population balance model to optimize chemotherapy infusion rate.*

Vincristine (VCR) is a core chemotherapeutic drug administered to pediatric Acute Lymphoblastic Leukemia (ALL) patients. It is administered via an IV bolus injection or via a minibag for approximately 10 minutes. In a subgroup of population, it leads to Vincristine Induced Peripheral Neuropathy (VIPN), which is the dose-limiting toxicity. Even though VCR has been used as a chemotherapeutic drug for more than 50 years now, predictors and mechanism of VIPN induction are unclear. VIPN incidence seems to be associated with VCR cumulative dosage. Hence, we are interested in finding an optimal infusion time that would lead to a reduction in VCR dosage. A population balance model, which is a set of partial differential equations, is developed to describe the mechanism of VCR in cells in different phases. The model is a function of time and cell age. Infusion time was optimized to maximize number of cancer cells being killed and minimize bone marrow toxicity by the end of induction phase, with VCR being administered weekly. Model was solved using method of characteristics and successive generations. Analysis showed that an infusion time of 60 minutes produced a better efficacy than the usual 10 minutes. Lesser amount of drug with same efficacy as before may reduce the chances of VIPN. (Received September 25, 2017)