1046-92-1940 **J. S. Kimbell*** (kimbell@thehamner.org), The Hamner Institutes for Health Sciences, P.O. Box 12137, Res. Triangle Park, NC 27709, and **J. D. Schroeter** and **G. J. M. Garcia**. *Mathematical Modeling in Nasal Drug Delivery and Surgery.* Preliminary report.

Millions of people are affected each year in the US by nasal symptoms that require therapeutic drugs or surgical intervention. The nasal passages, due to their rich vascularization, also represent an opportunity for the systemic delivery of pharmaceuticals. Innovative approaches are needed to optimize nasal drug delivery by maximizing drug deposition at sites of interest, minimizing side effects, and reducing waste of expensive compounds. Recently, three-dimensional (3D) mathematical models of the nasal passages have been used to study nasal deposition of sprayed and nebulized drug particles as well as the potential effects of surgery on nasal function. A preliminary study was conducted to estimate a particle size range for optimal nebulized particle deposition in four normal people and one surgery patient. Preliminary results indicate that nebulized particles between 7 and 15 microns in aerodynamic diameter are likely to optimize nasal drug delivery for systemic action. The 3D models are also being explored as a strategy to improve the outcome of nasal surgery through virtual surgical planning. These studies demonstrate the significant value that mathematical modeling can have in the real world of innovation in medicine. (Received September 16, 2008)