1051-92-213   **Janet A Best*** (`jbest@math.ohio-state.edu`), Department of Mathematics, 100 Mathematics Tower, Columbus, OH 43210, and **Badal S Joshi** and **Mark S Blumberg**. *Mathematical Analysis of Sleep-Wake Distributions.*

We have been studying the distribution of the lengths of wake bouts by experimentation and by mathematical models. The distribution is exponential for infants but gradually changes to a power law in the adult. Our model consists of three interacting cell populations whose firing times are given by Poisson processes with firing rates that are themselves stochastic processes. We study this doubly stochastic process by analyzing the bifurcation diagram for the system of ODES given by the expectations of the rates conditioned on the past, and show that its qualitative behavior explains the transition from infant to adultbout distributions. (Received August 25, 2009)