1067-92-771 **Carson C Chow*** (carsonc@niddk.nih.gov), NIH/NIDDK/LBM, Bldg 12A, Rm 4007, Bethesda, MD 20892, and **Michael A Buice** (buicem@niddk.nih.gov), NIH/NIDDK/LBM, Bldg 12A, Room 4007, Bethesda, MD 20892. *Finite-size effects in globally coupled neural networks.*

We investigate the population statistics and dynamics of a recurrent network of globally coupled quadratic integrate and fire neurons and present a formalism for computing the statistics in a finite size expansion. The small parameter for the expansion is the inverse number of neurons. The potentials in the network are reduced to phase oscillators. The evolution of the population density of these coupled oscillators is then inferred from the network dynamics, which is in turn used to construct an expression for the population statistics of the network in terms of a probability distribution of population densities. A steepest descent evaluation of the moments of this probability distribution yields the expansion. We derive both the mean field equation (the lowest order approximation) as well as coupled equations for the mean and correlation function for this network, and demonstrate how higher moments and corrections can be calculated. (Received September 14, 2010)