We investigate the presence and impact of forecast errors in the arrival rate of customers to a service system. Analysis of a large data set shows that forecast errors can be large relative to the fluctuations naturally expected in a Poisson process. We show that ignoring forecast errors typically leads to over-estimates of performance, and that forecast errors of the magnitude seen in our data set can have a practically significant impact on predictions of long-run performance. We also define short-run performance as the random percentage of calls received in a particular period that are answered in a timely fashion. We prove a central limit theorem that yields a normal-mixture approximation for its distribution for Markovian queues, and sketch an argument that shows that a normal-mixture approximation should be valid in great generality. Our results provide motivation for studying staffing strategies that are more flexible than the fixed-level staffing rules traditionally studied in the literature.