

NURSING HOME BED PLANNING WITH MEDICAID BED-HOLD PAYMENT POLICIES

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We focus on a profit-optimal bed need analysis by using a queueing model to approximate the number of beds requested for the duration of a multi-year planning period. Assuming that the potential residents are willing to remain on a wait-list, our analysis is based on a multi-server queueing model with abandonment, where the residual time to abandon equals its service time. Using a cost function based on certificate of need regulations, we optimize the number of beds over the transient behavior of the system. We model the demand by a non-homogeneous Poisson process and the customer service times by identically distributed and mutually independent, positive random variables that need not be exponentially distributed.

With these assumptions, we can give explicit formulas for the transient mean number of beds in use and a regulated profit function. We then develop an initial algorithm that uses our queueing model to address statistical issues related to the nursing home problem. Finally, we apply our stochastic analysis to estimate the optimal number of beds needed for long term planning. This estimation is based on a given projected increase in the demand for skilled nursing home care and the regulated revenue structure.