Long term staff scheduling of physicians with different experience levels in hospitals using column generation.

We present a strategic model to solve the long-term staffing problem of physicians in hospitals using flexible shifts. The objective is to minimize the total number of staff subject to several labor agreements. A wide range of legal restrictions and facility-specific staffing policies are considered. In general, the model is capable to incorporate different experience levels. In the simplest version the model decides about the number of staff for two experience levels, i.e. the number of residents (low experience) versus specialists (high experience). Shifts are constructed implicitly by the model and may have different starting times and several lengths. This allows more flexibility in the scheduling process. We formulate the problem as a mixed-integer program and solve it applying a column generation based heuristic. Using data provided by an anesthesia department of an 1100-bed hospital, computational results demonstrate the usage of the model as decision supporting tool when staffing decision are made by hospital management.

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