Assignment of Pregnant Women to Midwives

Based on the due date of a pregnant woman, Danish Health Authority guidelines prescribe time windows for when the woman should have midwife consultations. A principle of continuity of care means that each woman should preferably see the same midwife at every consultation. For the first consultation, pregnant women are assigned an arbitrary free time slot belonging to a specific midwife. In turn, this midwife is expected to have consultations with this woman in specific weeks according to authority guidelines. This random assignment of pregnant women to midwives means that each midwife has a very unbalanced workload and that there is an imbalance between the workloads of different midwives within each week.

The aim of this work is to devise a method for assigning and scheduling midwife consultations that results in a balanced workload for each midwife and among the midwives while making sure consultation guidelines are respected. We present a mathematical model for this problem and through simulation of the historical flow of pregnant women show that using this model would have significantly reduced workload imbalances, even when including a further restriction not currently adhered to. The model is too demanding to be implemented at the hospital. Therefore, we develop an assignment tool based on full enumeration for one pregnant woman at a time. Simulations show that this approach can still reduce workload imbalances considerably. The tool, which has now been implemented at the hospital, is also used to test the workload impact of continuity of care.

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