**Assignment HSOM**

**Case: analyzing unit and process performances in an Orthopedic Department**

**Introduction**

A hospital wants to analyse and improve the operations management for the Orthopedic Department. They ask you as Operations Management expert (to be) to help them. The hospital has several specialties. For this project they chose a patient group of orthopedic patients referred by their GP to the hospital, and having an inpatient stay in their care process. After a first visit to the outpatient clinic of Orthopedics, some examinations are planned. In a second visit, the diagnosis is provided and a decision is made about the kind of surgery. Patients who do not need surgery are excluded in this analysis. After finishing the diagnostic trajectory in ambulatory care, patients are placed on a waiting list for surgery, which is the start of the treatment trajectory. Before surgery, patients are admitted on the ward. After surgery, they stay on the ward for a few days to recover. When not enough beds are available at the ward, patients are transferred temporarily to another ward. However, from the viewpoint of quality of care, this is not an optimal situation. Patients are transferred to the orthopedic ward as soon as a bed is available. On the discharge day, some follow-up checks are performed, and therefore discharge is always at the end of the day. Some patients need home care and this has to be arranged before discharge can take place. The treatment trajectory ends when patients are discharged to their home.

The hospital gathered data for patients that have had their surgery in the period starting on 1 July 2015 and ending on 30 June 2017. For these patients they recorded the dates of the referral by the GP, ambulatory visits, admission and discharge at the ward and whether home care is needed or not.

In the Excel file, you will find data about all patients that are included in the measurement. You are asked to analyze this data from an operations management perspective.

**Part A Unit analysis**

For the unit analysis, we focus on the hospital ward. The ward management wants to get insight in the demand for beds and in their performance. In your data file, you can find the admission dates in the sheet ‘patient data’, column G and discharge dates in column K.

For the analysis of the ward, we limit the analysis period to the days in 2016 (1 Jan 2016 - 31 Dec 2016). To start, we already calculated the demand for beds per day in 2016 in sheet ‘Ward analysis’ (Column B).

The hospital has 38 beds available for this patient group.

1. Basic calculations
   1. Calculate the minimum, maximum, average and total number of beds used in 2016.  
      Use cells B1:B5 for your calculations
   2. Calculate the number of calendar days having a shortage of beds[[1]](#footnote-2).   
      Use column C for your calculations.  
      Hint: use a reference to cell I1 (the amount of available beds) instead of using the number ‘38’ directly in your calculations. This will help you in a later stage to vary the amount of beds and re-calculate the analyses.
   3. Calculate the total number of bed days that is used in other wards.  
      Notice that a patient uses a bed during his stay in the ward, including the admission day and discharge day. Use column D for your calculations.
   4. Calculate the bed utilization (as a percentage) for the ward in 2016. Take into account that a bed cannot be used by more than 1 patient on the same day. If patients are admitted on another ward due to a shortage of beds, they are not counted as ‘utilized capacity’ for your ward.  
      Use column E for your calculations.
   5. Make a frequency table of the number of beds used.  
      Use column M for your calculations.
   6. Make a frequency diagram of the number of beds used.
2. What-if analyses. Use your model to find out the number of beds needed if
   1. a shortage is never allowed
   2. the maximum number of days with a shortage is 5%
   3. the utilization must be at least 90%

Reflect on the results. How many beds would you advice for this ward?

1. Improvement.
   1. There are at least two relevant options to improve the performance of this ward. Which?
   2. Copy the complete sheet ‘Ward analysis’ and use this sheet ‘Ward analysis (2)’ to analyse one of the solutions.   
      Hint: change the numbers of beds used by changing the formula in column B, and answer question 2 again for the new situation.

**Part B: Process analysis**

1. Make a process model. It is possible to do this in Excel, but e.g. Visio is more appropriate. We divide the groups in two.
2. Make a process flow model (half of the groups).
3. Make a Blueprinting model (half of the groups).
4. Reflect on your modelling technique: what are the merits, what are the drawbacks. When is this method useful?

All groups perform a quantitative analysis. For the quantitative process analysis, you may use all patient data, not restricted to 2016.

You may use the ‘patient data’-sheet or create a new sheet.

1. Calculate with the data in Excel some relevant process parameters for your model. Calculate at least:
   1. The average access time for the first visit in the hospital.
   2. The average throughput time of the diagnostic trajectory.
   3. The average waiting time for the admission.
   4. The percentage of patients that needs home care.
   5. The average length of stay in the ward.
2. Reflect on your process model and quantitative parameters. What would you like to improve? Do you have suggestions for improvement?

1. There are several ways to do this. You can create a formula in cell C5 counting the days with demand > amount of beds, or you can do it for each day and then sum up the amount of days. [↑](#footnote-ref-2)