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An Innovative Manpower Research: A Prediction Model for Manpower Resources in a Sterile Services Department
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Introduction
Sterile Services Departments (SSD) have faced a tremendous change in its services from processing simple surgical instruments and utensils to sophisticated medical devices due to advancement in surgery. Medical devices have to go through cleaning, disinfection, inspection and packaging, and sterilization before they are safe for patient use. With increasing complexity of the devices, SSD staff members spend more time to inspect and check their function. As a result, there is a need to review the manpower of SSD to cope with increased complexity of work. However, limited data is available for the purpose.

Objectives
To create a predictive model for manpower resources for inspection and packaging of surgical instruments in a SSD

Methodology
A pilot, observational study was conducted in a SSD of an acute hospital in Hong Kong. The dependent variable was time for inspection and packaging surgical instruments used in operations. The predictor variables were years of experience of the SSD staff, the number and complexity of instruments. Surgical instruments were categorized into four groups including 'open', 'closed', 'lumen' and 'miscellaneous' according to their complexity. Instruments for general, orthopedic and obstetrics surgery were included in the study. However, laparoscopic instruments were excluded.
SPSS version 22 was used for data analysis. A multiple linear regression model was used to study the relationship between the dependent and predictor variables.

Result
Data was collected from 16 October 2017 to 5 November 2017. Total 101 instrument sets were included. The regression model for estimating time for inspection and packaging of instruments was: $\ln(T) = 0.008X_o + 0.019X_c + 0.017X_l + 0.01X_m$

-0.062Xe + 6.177 Where T = Time for inspection and packaging of surgical instruments; Xo = Number of open instruments; Xc = Number of closed instruments; Xl = Number of lumen instruments; Xm = Number of miscellaneous instruments; Xe = Years of staff experience. The regression coefficients showed the relative contribution of the instrument types and staff experience to Time for inspection and packaging (T). Particularly, open and closed instrument types, and staff experience were found to be the significant predictors of Time (T) with $p < 0.05$.

The model can be used to estimate time spent for inspection and packaging of surgical instruments. Therefore, it is a valuable tool for manpower planning in SSD.