

## A Quantitative Model for Replacement of Medical Equipment Based on Technical and Environmental Factors

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**Abstract :** Medical equipment operation state is a valid reflection of health care organizations' performance, where such equipment highly contributes to the quality of healthcare services on several levels in which quality improvement has become an intrinsic part of the discourse and activities of health care services. In healthcare organizations, clinical and biomedical engineering departments play an essential role in maintaining the safety and efficiency of such equipment. One of the most challenging topics when it comes to such sophisticated equipment is the lifespan of medical equipment, where many factors will impact such characteristics of medical equipment through its life cycle. So far, many attempts have been made in order to address this issue where most of the approaches are kind of arbitrary approaches and one of the criticisms of existing approaches trying to estimate and understand the lifetime of a medical equipment lies under the inquiry of what are the environmental factors that can play into such a critical characteristic of a medical equipment. In an attempt to address this shortcoming, the purpose of our study rises where in addition to the standard technical factors taken into consideration through the decision-making process by a clinical engineer in case of medical equipment failure, the dimension of environmental factors shall be added. The investigations, researches and studies applied for the purpose of supporting the decision making process by a clinical engineers and assessing the lifespan of healthcare equipment's in the Lebanese society was highly dependent on the identification of technical criteria's that impacts the lifespan of a medical equipment where the affecting environmental factors didn't receive the proper attention. The objective of our study is based on the need for introducing a new well-designed plan for evaluating medical equipment depending on two dimensions. According to this approach, the equipment that should be replaced or repaired will be classified based on a systematic method taking into account two essential criteria; the standard identified technical criteria and the added environmental criteria.

**Keywords :** technical, environmental, healthcare, characteristic of medical equipment

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