

Defining the Standard of the Terminology of the Mechanical Ventilation Data in Japan

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Abstract. To effectively use data from intensive care unit patient information systems at multiple hospitals, it is necessary to standardize the data into a well-ordered form. However, terms often vary between devices. We designed a mechanical ventilation concept model and applied data to that model using existing tools and expert opinions. The JSICM glossary was revised based on this study.

Keywords. Standardization, intensive care, concept models

1. Introduction

The Japanese Society of Intensive Care Medicine (JSICM) aims to construct clinical decision support systems using big data from multiple intensive care units (ICUs) in Japan. Electronic medical record systems and clinical devices vary between hospital ICUs, so data formation is also different. Hence, we standardized the ICU data and introduced a mechanical ventilation model.

The names of the ventilation modes differ between ventilator models (manufacturing companies). The terminology in this field has been established but it lacks some essential parts and is missing a model. We connected the ventilation data including the differences using existing tools.

2. Methods

We figured our concept model about mechanical ventilation as a mindmap (XMind 8®) [1] and compared with openEHR Clinical Knowledge Manager (CKM) [2]. Then we improved our model to make it more suitable for developing AI models. We also referred to the glossary, which was published by JSICM, however that did not have enough information. We accepted the advice from intensivists and sorted out the most general

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terms and values in intensive care field. We also referred to ISO 1922 [3]: Lung ventilators and related equipment. This resource explains about the detailed vocabulary and semantics, and thus we unified the terminology which was different between manufacturing companies based on this. After the unification of the concept, we associated terms which had same meanings with Logical Observation Identifiers, Names, and Codes [4] (LOINC®). LOINC code didn't cover everything we have but organized information systematically, so we accepted the shortcomings.

3. Results

Table 1 shows the templates and example of major terminology of ventilator values from ICU patient information systems. Some of terms were unique to devices but these original terms were thought not to be important for constructing the AI models and then we decided to ignore. However, most of information which was in the JSICM glossary was covered by our terminology.

Table 1. Example of major terms of ventilator values.

Term (description)	Company A	Company B	LOINC Code
Inspiration/Expiration time Ratio	IE	IE	75931-6
Plateau Pressure Respiratory system	Pplat	Pplateau	76259-1
Mean Airway Pressure	MnAwP	Pmean	76530-5
Inspiratory breath (Time)	IE_I	TI	33435-9
Breath rate (spontaneous)	RRspont	none	19839-0

4. Conclusions

We constructed the mechanical ventilation terminology by using existing tools. Instead of newly creating our own standard, fitting into an existing mold can avoid making the "locked in" standard and keep the versatility. We've already proposed the glossary correction and it was accepted. We expect the spread of this standardized terminology and then the utilization and application of the ICU data will be achieved.

References

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