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SUWANNA TAWONRUNGROJN : A STUDY ON THE VENTILATOR PERFORMANCE EVALUATION USED IN SIRIRAJ HOSPITAL. THESIS ADVISOR : PUTTIPANNEE VORAKITPOKATORN, M.D., PRACHA SIWAWETKUL, M.Sc., CHUSAK VEJBAESYA, M.D., Ph.D. 61 p.
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By standard checking and maintenance of the ventilators, users can detect errors early and prevent patients from being exposed to serious harm. This study was intended to evaluate performance of the 26 ventilators used for more than two years in 6 intensive care units at Siriraj Hospital. Most of the ventilators were 6 years of age (16 ventilators); only three ventilators were more than 6 years old and six ventilators were less than 6 years of age. Data wanted was mostly from ventilators that were six years old.

The samples were 26 third-generation ventilators from five different kinds; CPU-1, Hamilton Veolar, Puritan Bennett 7200a, Adult Star, Servo 900C and Servo 900E. The study was conducted in six surgical intensive care units, Department of Surgery at Siriraj Hospital during April 1997 to September 1997. The instruments used to measure the ventilators were ventilator tester VT-2 (Bio-Tek) and oxygen analyzer No.5577 (Hudson RCI). The evaluation was performed by varying five parameters.They are tidal volume, flow rate, PEEP, respiratory rate and oxygen concentration of the inspired gas. The measured values were evaluated according to the ANSI Z79.7-1976 standard (American National Standard Breathing Machines for medical use). Measured data were analyzed with percentage and correlation between the number of hours the machines have been in use and the error rate. There were 15 ventilators which were error in reading flow rate. The measured flow rate in these ventilators was about 18.6% less than the set value. All of them were not accepted in ANSI's criteria. (Flow should be ±10% of the set value). Six ventilators were error in PEEP. The measured PEEP was 13.6% higher than the set PEEP. These ventilators were not accepted in ANSI standard (PEEP should be ±10% of the set value). Only one ventilator was error in tidal volume. Its measured tidal volume was 18.05% less than the set volume. This ventilator was not accepted, as well (Tidal volume should be within ±15% of the set value). All ventilators were accurate in respiratory rate and oxygen concentration.

The error in each parameter was not correlated with the hours in use ($P>0.05$). That is the more errors could be found in every range of hours in use.