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## Healthcare-associated infections studies project: An American Journal of Infection Control and National Healthcare Safety Network data quality collaboration—Ventilator-associated event 1, 2013

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### Abstract

This is the second case study published in a series in AJIC since the Centers for Disease Control and Prevention/National Healthcare Safety Network (NHSN) surveillance definition update of 2013. These cases reflect some of the complex patient scenarios Infection Preventionists (IP) have encountered in their daily surveillance of health care-associated infections (HAI) using NHSN definitions. This is the first case utilizing the new NHSN Ventilator-associated Events (VAE) module and criteria.

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The link to an online survey is provided below, where you may answer the questions posed and receive immediate feedback in the form of answers and explanations. All individual participant answers will remain confidential, although it is the authors' hope to share a summary of the findings at a later date. Cases, answers, and explanations have been reviewed and approved by NHSN staff.

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Conflicts of interest: None to report.

We hope that you will take advantage of this offering, and we look forward to your active participation: <http://www.surveymonkey.com/s/NHSNVAE2013>.

Helpful hint: Organizing the clinical data into a table (Table 1), will help you make your Ventilator-Associated Event (VAE) determinations. The calendar dates, mechanical ventilation day, daily minimum positive end expiratory pressure (PEEP) data and daily minimum fraction of inspired oxygen (FiO<sub>2</sub>) data have been pre-filled in the table for your use. Complete the table as you work through the entire exercise and identify the VAE Window Period.

Note: In this example, we have chosen to present FiO<sub>2</sub> values as their corresponding oxygen concentration values (percentages). For example, a FiO<sub>2</sub> of 1.0 is represented by 100%, a FiO<sub>2</sub> of 0.45 by 45%, etc.

1/15/13: Patient admitted to hospital with drug-induced pneumonitis.

1/24/13: Patient intubated (mechanical ventilation began). Central line inserted.

1/24–1/29/13: Minimum daily PEEP improves from 10 cm H<sub>2</sub>O on the first day of mechanical ventilation to a range from 5 to 7.5 cm H<sub>2</sub>O. Minimum daily FiO<sub>2</sub> improves from 1.0 (oxygen concentration 100%) to 0.45 (oxygen concentration 45%).

1/30/13: The patient is febrile. Two sets of blood cultures are collected. One bottle from each is reported positive for *Klebsiella pneumoniae*. Patient started on ampicillin/sulbactam. Minimum PEEP: 5 cm H<sub>2</sub>O; Minimum FiO<sub>2</sub>: 45%.

1/31/13–2/3/13: Minimum daily PEEP: 5–7.5 cm H<sub>2</sub>O. Minimum daily FiO<sub>2</sub>: 45%–60%.

2/4/13: Minimum PEEP 7.5 cm H<sub>2</sub>O; FiO<sub>2</sub> 60%. Patient becomes febrile: maximum temperature: 39°C. White blood cell count (WBC) 11,670 cells/mm<sup>3</sup>. Antibiotics are changed from ampicillin/ sulbactam to meropenem and tobramycin.

2/5/13: Endotracheal aspirate collected for culture. Maximum temperature: 38.4°C. Patient remains on meropenem and tobramycin. Minimum PEEP remains at 7.5 cm H<sub>2</sub>O; FiO<sub>2</sub> remains at 60%.

2/6–2/7/13: Patient remains on meropenem and tobramycin. Minimum daily PEEP remains 7.5 cm H<sub>2</sub>O. Minimum daily FiO<sub>2</sub> increases to 65%. Afebrile. Endotracheal culture from 2/5 finalized on 2/7 as “Heavy *Klebsiella pneumoniae*.”

2/8/13: Minimum daily PEEP 5 cm H<sub>2</sub>O. Minimum daily FiO<sub>2</sub> 50%, Meropenem and tobramycin continued.

We have prefilled the first 4 columns of the table below for your use.

Q1: Does this patient meet criteria for a Ventilator-associated Event (VAE), and if so, what type?

1. No. This patient does not have a VAE.

2. Yes, this patient has a Ventilator-associated Complication (VAC).
3. Yes, this patient has an Infection-related Ventilator-associated Complication (IVAC).
4. Yes, this patient has a Possible Ventilator-associated Pneumonia (Possible VAP).

Let's say the patient's daily minimum FiO<sub>2</sub> on 2/4–2/5 (MV days 12 and 13) was 65% instead of 60%, but all other findings were the same.

Q2: Does this patient now meet criteria for a Ventilator-associated Event (VAE), and if so, what specific event should be reported?

1. No. This patient does not have a VAE.
2. Yes, report as a Ventilator-associated Condition (VAC).
3. Yes, report as an Infection-related Ventilator-associated Complication (IVAC).
4. Yes, report as a Possible Ventilator-associated Pneumonia (Possible VAP).

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The findings and conclusions in this case study are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

## Reference

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**Table 1**

Organizing clinical data

Date	MV Day	Daily minimum PEEP (cmH <sub>2</sub> O)	Daily minimum FIO <sub>2</sub> (oxygen concentration, %)	Temp <sub>min</sub>	Temp <sub>max</sub>	WBC <sub>min</sub>	WBC <sub>max</sub>	Abx	Specimen	Polys/Epis	Organism	VAE
1/24	1	10	100									--
1/25	2	7.5	80									
1/26	3	5	60									
1/27	4	7.5	60									
1/28	5	5	50									
1/29	6	5	45									
1/30	7	5	45									
1/31	8	5	55									
2/1	9	7.5	60									
2/2	10	5	45									
2/3	11	5	45									
2/4	12	7.5	60									
2/5	13	7.5	60									
2/6	14	7.5	65									
2/7	15	7.5	65									
2/8	16	5	50									