Background: Optimal care of the respiratory tract (RT) is critical to prevent ventilator-associated pneumonia in intensive care unit (ICU). Our objectives were to study the level of health care workers (HCWs)’ hand contamination during RT care and to evaluate risk factors for contamination.

Material/methods: A prospective observational study was conducted in a 34-bed adult ICU in Switzerland. Structured observations of RT care sequences were performed by trained external observers. At the beginning and the end of each RT care, imprints of the 5 fingertips of HCWs’ dominant hand were taken on blood agar plates. Bacterial colony-forming units (CFUs) were quantified after 18 hours of incubation (35°C). Mass spectrometry was performed for bacteria identification (on a maximum of 4 different CFU/plate). The primary outcome was the number of CFU/plate at the end of the care sequence. Predictors related to the type of care and the patient were assessed to explain bacterial contamination using generalized estimating equation to take into account the cluster related to the pairs of HCWs and patient.

Results: A total of 207 samples were collected during 99 observations sessions; 69 HCWs were observed and performed RT care on 49 intubated patients. Hand hygiene compliance before aseptic care was 70%. A glove contamination level >10 CFUs before care was observed in 24% of care sequences. Fixing of respiratory tube was the type of care providing the highest bacterial contamination level (median 148; interquartile range [20-269]) followed by oral care with water (126 [43-300]), nasal care with fixing of the nasogastric tube (NGT; 87 [34-257]), oral care with chlorhexidine (67 [18-179]), nasal care (36.5 [6-86]) and endo-tracheal aspiration (5.5 [1-24.5]). Similar
distribution of bacteria species was observed within each RT care. After adjustment for initial bacterial contamination and main predictor variables, the type of RT care showed a dose-response association with bacterial contamination. Bacterial contamination was independently associated with an increasing duration of care (P=0.05), a SAPS II score at 35-50 compared to <35 (P=0.003) and 2-7 days of ventilation compared to <2 days (P=0.01). Bacterial contamination significantly decreased when nursing workload increased (P=0.035).

Conclusions: Among different types of RT care in intubated patients, contamination of HCWs’ hands increased continuously from endo-tracheal aspiration, nasal care, oral care with CHX, nasal care with NGT fixation, oral care with water to fixing of respiratory tube. In the light of these results, we recommend to perform nasal care, oral care followed by fixation of the NGT and respiratory tube in the same sequence of care and to consider endo-tracheal aspiration for intubated patients as a separate sequence of care to reduce the risk of bacterial contamination. Further research is needed to establish the clinical relevance of our results.