

## Validation of mechanical ventilation coding in hospital discharge abstracts: a population data linkage study

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### Introduction

Mechanical ventilation (MV) is an important intervention used in critically ill patients. Accurately identifying MV use in Hospital Discharge Abstracts will be extremely useful in population-based research. Although Canadian Institute for Health Information collects information on MV for all hospitalization, its validity in intensive care unit (ICU) patients is unknown.

### Objectives and Approach

We validated MV use within ICU patients in Hospital Discharge Abstracts. Winnipeg Regional Health Authority (WRHA) ICU database prospectively collects use of MV by trained nurses. All patients admitted to a WRHA ICU (82 beds) between April 1, 2000 and March 31, 2012 were identified in Hospital Discharge Abstracts. MV was identified in Hospital Discharge Abstracts through International Classification of Diseases (ICD-9-CM), prior to 2004, while Canadian Classification of Health Interventions (CCI) were used 2004 onwards. Agreement between the WRHA database (gold standard) and Hospital Discharge Abstracts for invasive ventilation, non-invasive ventilation or neither was calculated at ICU encounter level.

### Results

There were 54,680 WRHA ICU admission during the study period. The linking of these two sources was highly successful with accurate identification exceeding 99%. There were 26,083 mechanical ventilations (25,387 invasive; 696 non-invasive) from the Hospital Discharge Abstracts and 30,455 (28,315 invasive; 4,554 non-invasive) from the CIC data. Hospital Discharge Abstracts had a sensitivity of 82.8%, specificity of 96.4%, Positive Predictive Value (PPV) of 96.7%, and Negative Predictive Value (NPV) of 81.7% for identifying mechanical ventilation. For invasive ventilation, Sensitivity was 85.5%, Specificity was 95.6%, PPV was 95.4% and NPV was 86.0%. Validation of non-invasive ventilation was poor in

sensitivity (9.38%) and PPV (61.35%): with specificity 99.5% and NPV 92.36%.

### Conclusion/Implications

Hospital Abstracts data are a good source to identify mechanically ventilated patients for ICU containing hospital stays especially invasive mechanical ventilations. Future research needs to explore the poor agreement with non-invasive mechanical ventilation.

