

# 49

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## **A Comparison of Two Methods for Biosurveillance of Respiratory Disease in the Emergency Department Chief Complaint versus ICD9 Diagnosis Code**

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Study Objectives: ICD9 diagnosis code (ICD9) and patient's statement of chief complaint (CC) have both been advocated for surveillance of emergency department (ED) visits to detect or mitigate a bioterror attack. However, no studies exist comparing these two methods. The objective of this study was to see if selected existing ICD9 and CC methods identified the same patients and similar patterns of illness when applied to the same ED database, screening for respiratory illness. Methods: Design: Retrospective analysis of a computerized database of (ED) visits. Setting: 14 New Jersey EDs located in urban and suburban areas with annual ED volumes from 20,000 to 65,000. Participants: Consecutive patients seen by ED physicians, January 1999 - November 2002. Protocol: A CC respiratory illness algorithm was developed by the New York State Department of Health, based on previous work by the New York City Department of Health. An ICD9 respiratory illness algorithm was supplied by the ESSENCE project. Applying each method against the database, we prepared a time-series graph of respiratory illness and also calculated a Kappa statistic for agreement. We also analyzed the patient visits for which the methods disagreed. Results: There were 2,250,922 patient visits in the database. Visual inspection of the time-series graph demonstrated excellent correlation regarding seasonal variations in incidence of respiratory disease. ( $R=0.90$ ). However, the kappa statistic showed only fair agreement between the two methods ( $Kappa = 0.37$ ). Subgroup analysis revealed that many patients presenting with non-respiratory chief complaints (e.g. "fever") fell into the respiratory ICD9 group at final diagnosis. Also, the methods differed in term of diagnostic targets. Conclusion: The selected existing chief complaint and ICD9 methods identified similar seasonal variations in respiratory illness. However there was only fair agreement between the patients identified. Further work needs to be done to refine these methods.