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Validity of Outpatient ICD-10 Codes to Identify Respiratory Synctial Virus (RSV)

- Estimating Sensitivity and Specificity of Health Administrative Claims Data

Steinmann M, Schmidt J*, Greiner W

Department for Health Economics and Health Care Management, Bielefeld University, Bielefeld, Germany

Background and objectives

- . Respiratory Synctial Virus (RSV) is one of the leading causes of acute lower respiratory tract infections, bronchiolitis and pneumonia in infants, young children and elderly [1]. Due to insufficient surveillance (in Germany) reliable incidence or prevalence estimates are not available.
- . Health administrative (claims data) are increasingly being used for epidemiological and health economic studies [2]. However, due to similarity to other respiratory viruses, such as influenza, RSV often is not considered as diagnosis in patients with flu-like symptoms [3].

Results

Table 1: Disease status according to inpatient and outpatient data

		Inpatient data D (Gold standard)		
		Infected D = 1 RSV ⁺	Not infected D = 0 RSV ⁻	
	Coded W = 1	True positive	False positive	Σ = 34
Outpatient	RSV ⁺ <u>and</u> ARI ⁺	T _p = 8	F _p = 26	
	Not Coded W = 0			
data	RSV^+ and ARI^-	False negative	True negative	Σ = 99,966
W	RSV^{-} and ARI^{+}	F _n = 18	T _n = 99,948	
	RSV [−] and ARI [−]			
				Total
		Σ = 26	Σ = 99,974	(Σ = 100,000)
er the co	ondition of bei	ing coded witl	h any ICD-10 F	RSV code an

- . Thus, epidemiological studies based on claims data are susceptible to misclassification bias and underestimation of the 'true' disease burden, especially for respiratory infectious diseases like RSV [4].
- . Prior research shows low sensitivity (6 %, 95 %-CI: 3 % 12 %) of outpatient claims data concerning RSV and high specificity (99,8 %, 95 %-CI: 99,6 % - 99,9 %) [4]. However, inpatient claims data show high specificity (99 %) and high positive predictive value (91 %) [5].
 - \rightarrow Less misclassification bias in inpatient claims data can be assumed.

Primary objective of this study is estimating **sensitivity and specificity** of outpatient ICD-10-GM coded RSV infections based on claims-data.

Methods

Study sample

Health administrative claims data from a large German statutory health insurance are available over a time frame of ten years (2010-2019). For each year a random sample of n = 10,000 patients was drawn. Resulting in

ICD-10 actute respiratory infection (ARI) codes, true positive cases can be identified.

Figure 1: Sensitivities according to ICD-10 code combinations



N = 100,000 patients for the analysis.

Retrieval of patients with at least one of the following characteristics:

Risk patient for RSV:	Examples: P07 low birth weight, J45 asthma, J44 chronic obstructive pulmonary disease
OPS– Codes that hint at RSV therapy:	Example: Complex intensive care treatments 8-980, 8-98d, 8-98f
ARI-specific ICD-10 diagnosis as primary or secondary diagnosis:	Examples: J11 influenca, viruses not detected, J20 acute bronchitis

Disease definition

Inpatient diagnosis data are assumed to be the gold standard:

- D = 1 infected
- D = 0 not infected
- Outpatient diagnosis data are defined as potentially misclassified:
- . W = 1 coded
- W = 0 not coded

Analysis

- . By increasing the number of ICD-10 codes for the definition of outpatient RSV infections higher sensitivity can be achieved.
- . The estimates for sensitivity each show large 95 %-Cl.
- . Specificity of the different ICD-10 code combinations ranges from 99.98 % to 100 % (95 %- CI: 100 % - 100 % each).

Conclusion

- . The results demonstrate differences in sensitivity and specificity of outpatient data according to the choice of ICD-10 combination for RSV estimation.
- . Outpatient claims data are useful to detect patients without RSV infections (high specificty), however cannot fully identify patients with RSV infections (low sensitivity).
- . Further analyses of sensitivity and specificity should take seasonal effects in RSV infections into consideration.



. Using information in claims data to account for misclassification could reduce underestimation of RSV [6]. Thus, comparisons of different statistical methods are needed to provide reseachers with recommendations for future research.

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*For questions regarding this poster, please contact the corresponding author: juliana.schmidt@uni-bielefeld.de