



Defining incident cases of epilepsy in administrative data

Paul M. Bakaki^a, Siran M. Koroukian^a, Leila W. Jackson^a,
Jeffrey M. Albert^a, Kitti Kaiboriboon^{b,*}

^a Department of Epidemiology & Biostatistics, Case Western Reserve University, Cleveland, OH, United States

^b Epilepsy Center, Department of Neurology, University Hospitals Case Medical Center, Cleveland, OH, United States

Received 23 August 2012 ; received in revised form 7 April 2013; accepted 13 May 2013

Available online 20 June 2013

KEYWORDS

Incidence;
Administrative data;
Epilepsy

Summary

Purpose: To determine the minimum enrollment duration for identifying incident cases of epilepsy in administrative data.

Methods: We performed a retrospective dynamic cohort study using Ohio Medicaid data from 1992 to 2006 to identify a total of 5037 incident epilepsy cases who had at least 1 year of follow-up prior to epilepsy diagnosis (epilepsy-free interval). The incidence for epilepsy-free intervals from 1 to 8 years, overall and stratified by pre-existing disability status, was examined. The graphical approach between the slopes of incidence estimates and the epilepsy-free intervals was used to identify the minimum epilepsy-free interval that minimized misclassification of prevalent as incident epilepsy cases.

Results: As the length of epilepsy-free interval increased, the incidence rates decreased. A graphical plot showed that the decline in incidence of epilepsy became nearly flat beyond the third epilepsy-free interval.

Conclusion: The minimum of 3-year epilepsy-free interval is needed to differentiate incident from prevalent cases in administrative data. Shorter or longer epilepsy-free intervals could result in over- or under-estimation of epilepsy incidence.

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Introduction

There is increasing interest in the analysis of administrative claims data to assess health resource utilization, health outcomes, and cost in several disease entities including epilepsy (Kurth et al., 2010; Thurman et al., 2011; St Germaine-Smith et al., 2011). Several algorithms to identify epilepsy cases using claims data have been developed and validated (Holden et al., 2005a, 2005b; Pugh et al., 2008). These

* Corresponding author at: 11100 Euclid Avenue, Lakeside 3200, Cleveland, OH 44106, United States. Tel.: +1 216 844 8799; fax: +1 216 844 3160.

E-mail address: Kitti.Kaiboriboon@UHhospitals.org (K. Kaiboriboon).

studies have shown that the use of a combination of diagnosis (e.g., epilepsy or seizure diagnosis) and pharmacy claims (e.g., antiepileptic drugs (AEDs)) can correctly classify 90% of epilepsy cases (Holden et al., 2005a, 2005b; Pugh et al., 2008). In addition, inclusion of both inpatient and outpatients claims will enhance the validity of epilepsy case ascertainment (Reid et al., 2012). However, algorithms to identify incident cases of epilepsy using claims data have never been investigated. The first occurrence of an epilepsy claim in the data is not necessarily indicative of an incident case because some people with established epilepsy could have been doing well and sought medical care very infrequently. In addition, some people might have received health care services through a different payer, and therefore not captured in the dataset.

Accurate identification of incident epilepsy cases in administrative data is dependent upon the amount of time an individual has contributed prior to epilepsy diagnosis. In the case of claims data, including Medicare, Medicaid, and commercial insurance, this duration extends from the time of enrollment to the time of first appearance of epilepsy claim, or "epilepsy-free interval". A very short epilepsy-free interval will likely include prevalent cases, and a very long interval will likely exclude some incident cases with a disease-free interval occurring in between. Currently, the minimum duration of epilepsy-free interval to accurately identify incident cases of epilepsy in administrative database is unknown. The commonly used 1 or 2 years of epilepsy-free intervals are probably inadequate to distinguish between prevalent and incident cases (Thurman et al., 2011).

In this study, we assessed the minimum epilepsy-free interval by estimating and comparing incidence rates of epilepsy obtained from different lengths of epilepsy-free interval using the Ohio Medicaid claims data.

Materials and methods

Data source

We used the Ohio Medicaid enrollment and claims data between January 1, 1992 and December 31, 2006, which contained approximately 2 million participants each year (Kaiser Commission on Medicaid and the Uninsured, 2009). Medicaid is a state and federally funded health insurance program for low-income and medically vulnerable groups of people in the U.S. including children, pregnant women, adults with dependent children, people with severe disabilities, and the elderly. The Medicaid program has extensive rules for determining eligibility with considerable variation across the states (Schneider and Elias, 2002). In general, a person must belong to one of the Medicaid's categorically eligible groups and also meet financial criteria to qualify for Medicaid.

To identify persons with disabilities for categorical eligibility under Medicaid, states are required to use the definition of disability defined under the Supplemental Security Income (SSI) program (Schneider et al., 2000). However, not every person with physical and mental impairment, regardless of the severity, qualifies for SSI benefits on the basis of disability. Furthermore, some states including Ohio

have the option to use a more restrictive definition of disability (Meyer and Zeller, 1999). Consequently, Medicaid individuals with disability are a diverse group of people with a wide variety of conditions that cause physical and/or psychological impairments and limitations (Schneider and Elias, 2002). Some of these conditions such as autism, and mental retardation are closely related to epilepsy (Fisher et al., 2012). Moreover, many of the disabled Medicaid individuals have several forms of disabilities (Meyer and Zeller, 1999). Ultimately, Medicaid serves a disproportionate share of the most vulnerable and severely limited group of persons with disabilities.

Medicaid claims data consists of enrollment and claims files. The enrollment files contained data on periods of enrollment, eligibility category, dates of enrollment, and demographic characteristics of each enrollee. The claims files contained data on office visits, emergency room visits, hospital admissions, procedures performed, date of service, and filled prescriptions including drug name, dose, and number of days supplied. The diagnoses were coded using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) while the procedures performed were coded using the Current Procedural Terminology, 4th Edition (CPT-4).

The research protocol was approved by the Institutional Review Board at Case Western Reserve University and by the Ohio Department of Job and Family Services.

Identification of study cohort

Subjects entered our retrospective dynamic cohort if they enrolled in Medicaid for at least 12 months, and were at least 18 years of age at the time of enrollment. Individuals who had enrollment gaps between the first and the last date of enrollment of more than 20%, who enrolled in managed care program, Medicare program, or spend-down program were excluded from analyses as essential data might be missing.

Epilepsy case ascertainment

We used standard criteria for epilepsy case ascertainment consistent with previous studies using claims data (Thurman et al., 2011; Paradis et al., 2010; Manjunath et al., 2011). Individuals were identified as having epilepsy if they met all of the following criteria:

- (1) At least 1 visit with an epilepsy diagnosis (ICD-9-CM: 345.xx); or at least 2 visits, on different dates, with a diagnosis of non-febrile convulsions (ICD-9-CM: 780.3 or 780.39). The epilepsy onset or epilepsy index date was determined as the date of the first diagnosis of epilepsy or the second diagnosis of non-febrile convulsion.
- (2) At a minimum of 30 days after epilepsy index date, there was at least 1 more visits related to epilepsy or non-febrile convulsions (ICD-9-CM: 345.xx, 780.3, or 780.39).
- (3) A minimum of 2 pharmacy dispensing claims, at least 30 days apart subsequent to the epilepsy index date, for any of the following AEDs: carbamazepine, ethosuximide, felbamate, gabapentin, lamotrigine, lev-
etiracetam, oxcarbazepine, phenobarbital, phenytoin,

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