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Under-ascertainment of Illness due to Influenza in Administrative Databases, a Population-based Record Linkage Study

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Objective

To estimate the degree to which illness due to influenza is under-ascertained in administrative databases, to determine factors associated with influenza being coded or certified as a cause of death, and to estimate the proportion of coded influenza or certified influenza deaths that is laboratory confirmed.

Introduction

Under-ascertainment of severe outcomes of influenza infections in administrative databases has long been recognised. After reviewing registered deaths following an influenza epidemic in 1847, William Farr, of the Registrar-General's Office, London, England, commented: "…the epidemic carried off more than 5,000 souls over and above the mortality of the season… the deaths referred to that cause [influenza] are only 1,157" [1].

Even today, studies of the population epidemiology, burden and cost of influenza frequently assume that influenza's impact on severe health outcomes reaches far beyond the number of influenza cases counted in routine clinical and administrative databases.

There is little current evidence to justify the assumption that influenza is poorly identified in health databases. Using population based record linkage, we evaluated whether the assumption remains justified with modern improvements in diagnostic medicine and information systems.

Methods

Patient records from databases of laboratory notification of influenza cases, emergency department (ED) presentations, hospital admissions and death registrations were linked (Figure 1). The setting was the population (~6.9 million) of New South Wales (NSW), Australia, 2005 to 2008.

Results

Of 5,596 notifications from laboratories of serologically or virologically diagnosed influenza infection, 2,568 were virologically confirmed. Where there was an associated virological notification, influenza was certified as a cause of death in 25% of death registrations, and coded as a diagnosis in 49% of hospital admissions, and 8% of ED presentations.

Children, patients with influenza virus type A infection, and residents of major cities were more likely to have influenza correctly coded as an admission diagnosis. Persons aged 15-64 years, persons with influenza type A infection, and persons discharged home were more likely to have influenza coded as an ED diagnosis.

Among death registrations with an influenza cause recorded, 15% had a corresponding laboratory confirmed diagnosis. Among hospital admissions and ED presentations with coded influenza 28% and 1.4% respectively had a laboratory notification.

Conclusions

This large and comprehensive record linkage study found that laboratory confirmed influenza is coded in hospitalisation data less than half of the time, and even less in other databases, meaning that these routine datasets significantly underestimate the burden and incidence of influenza. The databases remain nonetheless useful for public health surveillance of time trends in influenza incidence.

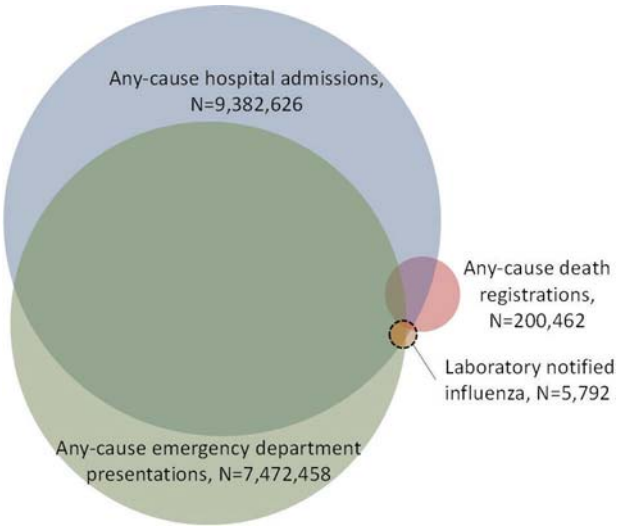

Figure 1. Venn diagram schematically showing the record linkage and resulting dataset indicated by black dashed lines (not to scale).

Keywords

influenza; record linkage; databases

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References

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