Influenza surveillance in China: a big jump, but further to go

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Understanding the burden of influenza-associated mortality is crucial for public health decision making, both nationally and internationally. In the *Lancet Public Health*, the population-based modelling study by Li Li and colleagues[1] on influenza-associated excess respiratory mortality in mainland China contributes an essential piece to the global picture of influenza-associated mortality. Previous studies have quantified the influenza-associated excess mortality in some districts of mainland China, showing large geographical differences,[2] but national estimates have not been characterised up till now. Li and colleagues' study provides the first combined national and province-level estimates and reveal notable geographical disparities in the burden of influenza. However, as with similar studies, the investigators encountered some substantial difficulties and uncertainties.

In an ideal world, researchers would have access to unbiased monitoring data on all mortality cases from influenza to estimate the full disease burden. In reality, influenza is known to be under-reported on death certificates;[2,3] moreover, the quality of vital records and influenza viral surveillance data in different districts varies across China. Modelling strategies, such as statistical or mathematical models, provide an alternative way to obtain estimates of influenza-associated excess mortality in regions where monitoring data are unreliable or incomplete.

In early 2018, a statistical modelling approach was developed[4] to estimate country-specific influenza-associated respiratory excess mortality rates for countries with no available estimates, while accounting for uncertainty in estimating influenza death risk and variability between countries. Li and colleagues[1] adopted a similar step-wise method to extrapolate influenza-associated respiratory excess mortality rates for provinces in mainland China without valid data for a direct estimation. The modelled data combined with surveillance data were used to provide an updated estimate for the whole of mainland China and at the provincial level during the 2010–11 through 2014–15 influenza seasons (however, their estimation method for excess mortality used identity-linear regression, which differed from the log-linear regression method used in the previous study).[4] Li and colleagues' study focused on the post-2009 pandemic period, when an expansion of the influenza surveillance network in China increased the stability and reliability of available surveillance data. Moreover, they describe an implementable systematic process to estimate general influenza-associated excess mortalities in mainland China, which could be transferrable to other developing or recently industrialised countries with an imbalance in the quality of influenza surveillance.

Although Li and colleagues' study represents an important start, there were limitations and areas where future research could improve. In their study, estimation of the influenza-associated excess mortality was limited to respiratory disease. However, influenza could also lead to death from other causes, such as cardiovascular disease and secondary complications. Thus, to obtain a full picture of the influenza mortality burden in China, estimation for other influenza-associated mortalities should be involved in future studies. Additionally, different methods for developing estimation models for excess mortality might lead to uncertainties about consistency, as identity-linear regression was used in Li and colleagues' study,[1] and negative binomial regression was used in a previous study[2] that investigated influenza-associated mortality in eight cities in China. Unstandardised methods might impair the comparability of results between studies.

Along with an imbalance in influenza surveillance, the quality of mortality reports varied greatly across China, as they do globally. Generally, high-income districts tend to have high-quality reporting of death records, and vice versa in low-income areas, which might lead to an underestimation of mortality burden in low-income districts. Using models to estimate the influenza-associated mortality by imputing unreported or missing data from an uneven surveillance system could produce biased estimates. Although adjustments were made in Li and colleagues' study[1] to correct the results and the sensitivity analysis showed consistency, the results should still be interpreted cautiously. For example, although influenza vaccination coverage is higher among elderly people in Beijing compared with general coverage in provincial districts of mainland China,[5] Li and colleagues showed that elderly people in Beijing had among the highest influenza-associated mortality burden.[1]

Enhancing the reporting quality of influenza-related surveillance data is important to minimise potential information bias. For vital records data, a standardised and automatic reporting mechanism based on hospital information systems could be an optimal option. For influenza viral data, launching and maintaining representative and qualified influenza sentinels and laboratories over the long term is crucial. Importantly, influenza vaccination coverage of the general population in mainland China is reportedly lower than 10%.[6] The absence of an active immunisation programme could explain why influenza-associated mortality burden in China is higher than other countries with a much higher vaccination coverage, such as the USA. Adopting a regularly subsidised or even free vaccination policy could help to promote the influenza vaccination rate in mainland China, which is especially important for individuals older than 65 years and other high-risk populations. Estimating the influenza-associated excess respiratory mortality is a step forward, but more needs to be done to control and reduce the influenza-associated burden.

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