Comparing the methodologies used to estimate foodborne disease in the UK to those used in other countries

Research programme Foodborne diseases B14

FSA EXPLAINS

Rick Mumford, Head of Science, Evidence & Research Directorate, has provided an analysis of the report and what it means for comparing international food standards.

Background

Estimates of foodborne Infectious Intestinal Disease (IID) are needed due to under-reporting of cases as not everyone who gets ill will seek medical help. Those who do will not always get a confirmed diagnosis. These estimates are produced to inform within-country food policy and prioritisation of resources.

The FSA uses estimates of foodborne IID based on research undertaken by two previous studies: The second study of infectious intestinal disease in the community (IID2 Study) and Extension to the IID2 study: identifying the proportion of foodborne disease in the UK (IID2 extension).

This new study reviews the estimation approaches used in different countries. It examines the pros and cons of each and assesses whether the estimates obtained from these different estimates can be fairly compared. The benefit of this is to both inform how the FSA estimates UK cases in the future and to highlight any issues when estimates from different studies are compared.

Research approach

Literature searches were performed in three databases (Ovid Medline, Scopus and Web of Science) and grey literature, spanning the years 1990 to 2018. For study eligibility, the indicator was the burden and estimation of foodborne IID in each country. The outcome was the incidence and prevalence of IID measured using population level surveys. The studies were reviewed independently by two reviewers to ensure that they conformed to the inclusion and exclusion criteria. Data were extracted and grouped into three subgroups based on study design (cross-sectional, cohort and surveillance pyramid). Meta-analyses were conducted on cross-sectional and surveillance pyramid studies.

Results

The review found:

- Studies used to estimate Infectious Intestinal Disease (IID) and Foodborne Disease (FBD) fall within three main categories: **retrospective cross-sectional studies**, **prospective cohort studies** and **surveillance pyramid studies**. The range of study methodologies vary among and within countries. This makes any comparison and interpretation of differences challenging.
- Cross-sectional retrospective studies are the most commonly conducted study. These are studies where a representative sample of the population are contacted and asked about their symptoms in the recent past. Rates of self-reported illness ranged from 0.31 to 1.4 episodes of IID person year. However, differences in study design such as case definitions, recall periods and representativeness of population samples can affect the incidence rates. Therefore comparing rates across studies can be difficult.
- Prospective cohort studies involve recruiting a sample population in advance of the study. Study participants are then required to report on a weekly basis on whether they had experienced symptoms of diarrhoea and vomiting. For most such studies, those reporting symptoms submit stool samples for microbiological examination so that the specific case of illness can be determined. Few prospective cohort studies have been conducted because they can be expensive to implement. However, they are the most accurate way of estimating IID rates (compared to surveillance pyramid and cross sectional studies) because samples from symptomatic patients are obtained to confirm aetiology.
- The UK's IID1 and IID2 studies are the only prospective cohort studies using the same methodology repeated at different points in time in the same country. They are therefore the only two studies where the pathogen specific estimates can be compared over time.
- The surveillance pyramid studies estimate the extent of under-ascertainment and under-reporting to calculate the overall burden of foodborne illness. However, the models (e.g. multipliers) are country specific. Their application to other countries needs to be made with caution as the disease burden of specific pathogens may not be the same in another country. The quality and representativeness of the surveillance systems within countries must also be taken into account as the calculations to estimate foodborne IID are extrapolated from laboratory confirmed cases derived from the surveillance systems.

Research report

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