CASE REPORT

Practising evidence-based occupational health in workers’ groups: how to prevent sickness absence caused by influenza

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**Background**
Influenza remains a major cause of disease and death. In addition to its recognized health effects, influenza has socio-economic consequences, in particular sickness absence. Managing influenza in working populations remains a relevant topic.

**Methods**
This paper reports a case study dealing with the problem of sickness absence due to *influenza-like illness* epidemics in health care workers (HCWs) in a health care setting. The case was investigated and the solution was provided according to the evidence-based medicine (EBM) paradigm using the PICO model.

**Results**
The investigation was carried out by using firstly the Cochrane Library and secondly Medline. Nine papers were considered to find appropriate solutions. Two main types of interventions were suggested: (i) influenza vaccination or (ii) antiviral M2 protein inhibitors and neuraminidase inhibitors. As the latter intervention is not yet completely validated, the immunization intervention was considered. The evidence obtained was reported to the general manager and it was proposed to undertake an annual programme of vaccination for all the health care professionals.

**Conclusion**
The case study shows that, as for other clinicians, the occupational physician can use the EBM paradigm according to the PICO model as a tool for providing appropriate solutions for the group of workers.

**Key words**
Cost of illness; evidence based medicine; evidence based occupational health; health personnel; immunization; influenza; intervention; professional competence; sickness absence; vaccination.

Introduction
Influenza remains a major cause of disease and death. The young, the elderly and those with chronic diseases are at highest risk [1]. In addition to its recognized health effects, influenza has socio-economic consequences, in particular sickness absence. It may account for 10–12% of all sickness absence from work [2]. Another relevant problem within the health and social care settings is the transmission of infection from the worker to the patient with potential serious consequences. Outbreaks not only occur typically in elderly patients with chronic conditions, but have also been reported in renal, transplant and oncology units, neonatal intensive care and paediatrics [3].

Managing influenza in working populations remains a provocative topic [1]. Most researches have assessed the impact of interventions, usually influenza immunization [2]. Relevant benefits seem to exist for employers in vaccinating healthy working adults in order to prevent sickness absence and related production losses. Furthermore, it is relevant to consider whether social benefits of vaccination for healthy working adults is worthwhile given the cost of vaccination for the community [4].

Case study
The general manager of a university hospital asked the occupational health unit (OHU) to study the problem of sickness absence due to *influenza-like illness* epidemics in health care workers (HCWs) in the health care setting. A resident of the OHU was asked to review the problem and
Formulating the question

The resident carried out the investigation according to an evidence-based approach that consisted of converting information into questions to be answered. She identified the following relevant information: HCWs; working in a health care setting; exposure to influenza virus; and prevention of sickness absence to create a question including the four components of the PICO model [5] (Table 1).

Searching for evidence

The search for evidence was carried out using Medline and the Cochrane Library. Some details of the search are reported elsewhere [6].

The Cochrane Library was searched using the terms influenza, vaccination and health personnel separately yielding 1480, 3064 and 868 results, respectively. The terms were then combined with the Boolean operator AND resulting in seven hits (two complete systematic reviews and five controlled trials). The terms influenza and vaccination were combined in the same way, resulting in 617 hits, among which the most valuable was a systematic review about influenza immunization in healthy adults published in 2002 [7]. This review was used as a framework for the Medline search. The search on the Cochrane Library took about 5 min.

The resident searched Medline with the following limits: publication date from 2001 to 2004, human and items with abstracts. The search was restricted to the last 4 years because of the recent publication date of the systematic review. She began the search using the MeSH term influenza and found 1109 hits. A further search was made using the MeSH term vaccination, resulting in 2178 hits. Since the resident was interested in parenteral vaccination only, to exclude all hits regarding intranasal vaccination, she combined the MeSH term vaccination with the text word intranasal, using the Boolean operator NOT, and 2128 hits were found. The third term used for the search was the MeSH term health personnel, resulting in 13 520 hits. The last MeSH term used was cost of illness resulting in 1822 hits. Finally the resident combined all these terms using the Boolean operator AND. Eight hits resulted, combining the following terms: influenza (MeSH) AND [vaccination (MeSH) NOT intranasal (text word)] AND health personnel (MeSH). The MeSH term cost of illness was not used in this search because when combined with the previous terms zero results were returned. The search on Medline took about 20 min.

Appraising the evidence

Of all hits found, the resident decided that on Medline six out of eight were consistent with the aim of the study (two were excluded as they were off topic). Three controlled trials out of seven found in the Cochrane Library were consistent with the aim of the study (four were excluded because they were not relevant). Three papers were available as full text on-line at the library of the School of Medicine, whereas the others were abstracts. The reading of these hits took about 2 h and 30 min.

Two interventions were reported in these studies:

1. Vaccination: influenza vaccination was found to be effective in preventing infection and symptoms by influenza A and B viruses in HCWs and in reducing reported days of work absence [8–12]. Furthermore, vaccination programmes for HCWs who have contact with elderly people were demonstrated to be effective in reducing death from influenza in the latter [13].

2. Antiviral M2 protein inhibitors and neuraminidase inhibitors: the antiviral M2 protein inhibitors (amantadine, rimantadine) and neuraminidase inhibitors (zanamivir, oseltamivir) have proven efficacy in preventing influenza illness and in controlling influenza outbreaks in long-term facilities [12,14]. However, their role in the prevention and control of

Table 1. The four-component question according to the PICO model

| P | population problem | In occupational health P indicates a single worker’s or a group of workers’ problem. Using the case indicated above the question starts from HCWs working in a health care setting. The first component could be as follows: ‘For HCWs working in a health care setting…?‘ |
| I | intervention | I includes the intervention or the practice adopted (diagnostic test or screening tests, information to workers). In this case the intervention is influenza vaccination. Therefore the 1st and 2nd components of the questions can be arranged as follows: ‘For HCWs working in a health care setting will influenza vaccination…?‘ |
| C | condition | C means the exposure (e.g. exposure to chemicals, ergonomic factors or individual lifestyle). In this case the exposure to be considered is the exposure to influenza virus. After including this component the question can be built as follows: ‘For HCWs working in a health care setting will influenza vaccination, for exposure to influenza virus…?‘ |
| O | outcome | O represents the outcome (e.g. blood lead reduction or accidents reduction in the population following the intervention). In this case the expected outcome is the prevention of sickness absence. The final question is: ‘For HCWs working in a health care setting will influenza vaccination, for exposure to influenza virus, prevent sickness absence?‘ |
Applying the evidence

The next step consisted of determining how these findings could be applied to this case. The evidence obtained was discussed within the OHU and reported to the general manager. The two possible hypotheses of preventive interventions were explained: (i) influenza vaccination or (ii) antiviral M2 protein inhibitors and neuraminidase inhibitors. Because of a lack of definite evidence supporting the effectiveness of the latter, the chosen intervention was influenza vaccination. A programme of annual vaccination of the whole health care professional population was thus proposed to health personnel and workers’ representatives on the basis of the reported evidence. Consent was required for each individual, who was informed of the benefits and risks of vaccination, according to basic ethical principles.

Evaluating the process

The resident who considered the problem was aware of the need for further information to be used in addition to her internal evidence (solving the problem on the basis of previous experience and knowledge). Following discussion within the OHU resulting in a useful output, she was able to formulate correctly the problem using the PICO model and then carry out the search using the Cochrane Library and Medline. Several relevant papers were retrieved and the resident was able to synthesize the results according to a framework, thereby suggesting two different solutions. Although the 2 h and 30 min spent may be considered too time consuming, it is worth noting that the case involved sickness absence due to influenza representing a costly problem for the general manager. The case study represented an opportunity to address the ethical aspects of interventions and to debate them with different stakeholders within the framework of the School of Occupational Medicine and the School of Nursing. Furthermore, the provided search and appraisal have a value from the educational point of view.

Conclusion

In addition to solving individual problems like other clinicians, the occupational physician can use the evidence based medicine paradigm according to the PICO model to look for appropriate solutions in groups of workers. Practising the PICO model, which is widely used in clinical medicine, provides a more focused question, which is a crucial early stage in the search process. Searching updated and reliable databases, finding information, appraising and applying the evidence could provide a useful tool for improving practices in the community.

References