Use of an administrative database to estimate the economic burden of febrile neutropenia in France

Durand-Zaleski I, Vainchtock A, Tochin V, Bogiliot O
WHF J. le D. l'Erable Hospital, Châlons, France 14 , Villejuif, France 15 , Vincennes, France 16 , Leuilly-sur-Orge, France

Background and objective:
• The incidence of neutropaenia-related hospitalisation in the USA has been estimated at 8 events per 1,000 patients with cancer undergoing chemotherapy (2).
• In a study of patients hospitalised during treatment for non-Hodgkin lymphomas, 10% had at least one neutropaenia-related hospitalisation (3).
• Currently, there are no studies conducted in France that allow isolation of the cost of managing febrile neutropenia (FN) in private and public hospital settings.
• Our objective was to estimate the hospital cost, as well as the national health insurance coverage cost of FN, public and private hospital admissions associated with chemotherapy-induced FN in France during the year 2005.

Methods:
• In France, public and private hospital admissions are recorded in exhaustive administrative databases, the native PMSI (Programme de Medication des Systemes d’Information), that generate Diagnosis Related Groups (DRG). ICD10 diagnosis and procedure codes. These national databases were used to identify the total number of hospital admissions during which chemotherapy-induced FN occurred (4).
• The analysis unit was the hospital admission and not the patient.
• Localization and Data Retrieval of Hospital Stays
• Two ICD10 codes were identified to build our relevancy algorithm: drug-induced aplasia (D61.1), and agranulocytosis (D70). This approach was validated by physicians from various public and private French hospitals.
• To confirm the presence of a concurrent neutropaenia or a malignant infection, we retrieved the hospital admissions that were assigned to one of the two previously mentioned codes in conjunction with a cancer code.
• Some tumour codes were excluded because neutropaenia may have been a symptom of the disease rather than an indicator of chemotherapy resistance (e.g., chronic leukemia). These exclusions were validated by hematologists.

Results:
Global Results
• Of 21,214 hospital admissions in 2005 related to FN:
  - 48% (n=10,416) were principal diagnosis of FN (Figure 1).
  - 52% (n=10,832) were procedures postponed due to FN (Figure 1).
• In public hospitals, the mean estimated cost based on the ENC and the mean charge appear to be consistent (1,930–3,636) (n=1,517) (Figure 2).
• In public hospitals, 68% (n=13,936) of the hospital admissions were complete admissions (defined as LOS ≥ 48 hours) with a mean charge of €3,636 per admission.
• In private hospitals, 14 admissions of this type were identified at a mean charge of €391 (n=1,517) (Figure 2).
Hospital admissions with principal diagnosis of FN
• In public hospitals, the mean charge per admission due to FN was €3,635 (n=13,932).
• In public hospitals, complete hospitalisations represented 85% (n=12,277) of admissions for FN, with a mean charge of €3,624.
Hospital admissions where FN was a complication
• A total of 13,706 admissions of this type were identified in public hospitals and 2,445 admissions for FN in private hospitals.
• Chemotherapy administration admissions and outpatient visits represented 35.4% of these admissions in the public sector and 35% in the private sector.
• The mean for type of admission, FN was managed without apparent complication and did not produce an extension in the LOS.
• With regard to complete hospitalisations (i.e. hospital stays for more than 48 hours), FN events associated to a longer length of stay. In fact, the mean LOS for the most frequent DRG (17M06V and 17M06W) was numerically longer compared with the hospital stay for similar patients with no FN (Figure 3). Longer LOS has potential to increase costs further, but this was not assessed in the present study.

Discussion:
• In public hospitals, the mean estimated cost based on the ENC and the mean charge appear to be consistent (€3,635–€3,636).
• Mean charges for private and public hospital care are very different (€3,635 vs. €391).
• The costs of admissions to public hospitals are obtained from an annual study of a sample group of 1,000 patients with cancer undergoing chemotherapy in France.
• The identified hospital admissions were then categorized as follows:
  - Those with a principal diagnosis of FN
  - FN as a complication during hospital stay
  - Those where planned treatments were cancelled due to FN.

Economic Assessment
Costs were calculated from the healthcare payer perspective.
• Analyses such as this could be a relevant tool for studying the potential cost-savings derived from prophylactic use of G-CSFs.

Conclusion:
• In France, exhaustive administrative databases native PMSI can be used to estimate the economic burden of FN, a frequent complication of myelosuppressive chemotherapy.

References
[3] Vainchtock A

<Figure 1>
- Category of hospital admissions associated with FN (n=13,936).

<Figure 2>
- Mean charge (cost to the payer) per hospital admission with principal diagnosis of FN, in public and private hospitals.

<Figure 3>
- Impact of FN events on the length of hospital stay.
- Analyses of the mean length of stay (LOS) for complete hospitalisation related to the presence or absence of neutropaenia. The two most frequently observed DRG were chemotherapy for other tumours with or without Complications or Associated Morbidity (CAML), and other tumours with or without Complications or Associated Morbidity (CAML). (n=6,000 for private and public hospitals).