ESTIMATING NATIONAL NON-MEDICAL COSTS ATTRIBUTABLE TO VISUAL IMPAIRMENT FROM A SURVEY DOCUMENTING HANDICAPS: SOME METHODOLOGICAL ISSUES

Author's name(s): Berdeaux, G*
Affiliation(s): Alcon Research Ltd, 4 Rue Henri Sainte-Claire Deville F-92563 Rueil Malmaison, France
Email: gilles.berdeaux@alconlabs.com
Phone: +33.1.47.10.48.60 ; Fax: +33.1.47.10.27.70
Corresponding author: Gilles Berdeaux

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Abstract

Background

In the long-term, chronic diseases often lead to handicaps, incapacity and dependency. The prevalence of chronic diseases is increasing in western developed countries as a consequence of greater longevity. The resources needed to bring new future therapeutic interventions that successfully address these problems to market will be considerable, and the global economics of handicaps will need to be considered. For example, savings could be realized both within the healthcare system, by postponing or avoiding the onset of visual impairments, and outside the system by maximizing patient and family productivity while minimizing social allowances. Some of these saved resources could be devoted to financing new technologies. It is, therefore, very important to know at a national level to identify the non-medical costs attributable to a specific handicap. The method used most often to estimate non-medical costs is the so-called ‘top-down’ approach. National financial statistics, coming from the treasury, are divided by the number of subjects receiving a specific allocation so as to give an average cost per registered subject.

There are certain limitations to this approach including: (1) only a proportion of subjects register their handicap, e.g., only half of all blind subjects receive social allowances in France; (2) because older people can suffer from several handicaps, there is often no sound way to arrive at the cost attributable to a specific handicap; (3) the absence of solid patient-level data does not
permit thorough analysis/adjustment of the findings. We used data available from two large, recent national surveys (1999 and 2000), performed by the French National Statistic and Economic Studies (INSEE – Institut National de la Statistique et des Etudes Economiques), to estimate national economic consequences of visual impairment. The aim of this abstract is to discuss some of the methodological issues we encountered. Full results have been submitted elsewhere.

**Objectives**

To estimate the national non-medical costs attributable to blindness and low vision.

**Methodology**

Two surveys were used. One was conducted in the community (low prevalence of handicap) and the other in subjects living in institutions (high prevalence of handicap). The purpose of these studies was to document handicaps, incapacity and dependency, and their economic consequences at a national level.

**The community survey**

The design of this survey followed the guidelines and principles for developing disability statistics published by the United Nations. Subjects were selected through 2 surveys (ELH: Everyday Life and Health followed by HD: Handicap and Dependency):

1. The 1999 National Census added a filtering survey called ELH which is comprised of a self-administered 18-item questionnaire that collected information on activities-of-daily-living. A total of 2,223, randomly selected, geographical areas participated. These generated 359,010 completed and returned questionnaires.

2. Subjects from the ELH survey were clustered into six handicap groups ranging from ‘no handicap’ to ‘severe handicap’, based upon a handicap severity score. Subjects in the severe handicap group had a higher probability of being detected by the HD survey than those in the ELH survey. This over-sampling method made it possible to describe the consequences of handicap in detail, since handicapped citizens were over-represented in the HD survey. Face-to-face interviews were available for 16,945 subjects.

**Institution survey**
A total of 2,075 institutions were picked at random from the French Health Ministry file and stratified according to 18 pre-defined strata. The probability of selecting a given institution was inversely proportional to the number of institutions in its stratum and proportional to its number of beds. Subjects were selected randomly from the resident lists. The analysis was based on 14,603 patients whose handicap was documented.

**Data collected**

Subjects were classified into one of the following categories, according to self-declaration, as blind (light perception at the best), low visual acuity (LV – still-form perception), or as controls (neither blind nor with low vision). Other data gathered included: activities-of-daily-living, need for assistance, use of devices, home or institution modifications, revenue, social allowances, time spent by the caregiver, and unmet needs.

**Economics analysis**

Resource utilisation was estimated by comparing LV and blind groups with the control group after adjusting for age, number of people living in the household and number of handicaps using a logistic regression. Non-stochastic unit costs were used to value item consumption. As time allocated to assistance was poorly documented in the INSEE surveys, we had to model it from assistance needs.

We used a multiple factorial analysis that identified 6 clusters of needs from the initial questionnaire. This identified 729 possible scenarios. 126 scenario were selected to allow precise estimates of quadratic contrast as second-order interaction. A total of 21 healthcare professionals were interviewed concerning the duration of assistance according to 18 scenarios, taken at random from a sub-set of all scenarios (126 of 729). Duration of assistance was modeled as a linear function of the assistance needs. Interactions and linearity were tested. This linear function was applied to all citizens participating in the INSEE survey. Duration was then estimated for 3 groups of subjects (blind, LV and control) and adjusted for age, number of people in the household and number of handicaps.
Results

National non-medical costs attributable to visual impairment were estimated to be about 15 billion Euro per year. Unmet needs, caregiver time, and loss of income were the main cost-drivers.

Discussion

The following points will be discussed:

- National inferences were based on weights calculated by INSEE. Non-response rates were rather low (<20%), and non-responder documentation was not available.

- Blindness and low vision were self-declared with no medical confirmation. Misclassification could have affected our results.

- Other handicaps were also self-declared and a variety of diseases may have been responsible for the same handicap.

- We used non-stochastic unit costs, i.e. the same cost for one specific resource utilisation. Volume to price relationship was not taken into account.

- We had some uncertainty related to double counting. Additional surveys could estimate the covariance between costs and, therefore, estimate the bias.

- We pooled two surveys together without adjustment.

- Unmet needs were self-declared and the cross-sectional experimental design of the surveys did not allow to check that some were purchased later. Very little is known about factors leading to unmet needs and a modelling approach could be used to estimate some biases.

- No variance of our estimates has yet been calculated.

- We were prescriptive in estimating consumption related to visual impairment. We decided that consumption was confounded by 3 variables: age, size of household and number of handicaps. This decision was confirmed empirically, but all our adjustments were far from optimal with regard to the data collected. Consequences on estimates need to be evaluated.

- We also used weighted, and unweighted, logistic regression to check the consistency of our results. Differences in results were not taken into account.
In conclusion, the previous factors could modify our results. Decision tree analysis techniques with Monte-Carlo simulation (a technique close to parametric bootstrap) could help at estimating biases.

References: