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Measurement of the Use of Curative Health Services: Health Interview Survey versus National Registers

by

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Abstract

Introduction: *Information on the use of curative services is essential to establish an efficient health policy and may be obtained both by registrations and health interview surveys. A comparison between data from these two sources has been performed in order to assess the validity of the information on the use of curative services in a health survey.*

Methods: *Information on the number of contacts with medical practitioners and on hospital admissions based on data from the 1997 Belgian Health Interview Survey (HIS) was compared with results from respectively the National Institute for Sickness and Invalidity Insurance and the Hospital Discharge Registration.*

Results: *General estimates of the average annual number of medical contacts per person in the health interview survey are in line with the results from the registration systems. For more specific information on contacts with medical practitioners, the estimates of a health interview survey are less accurate. A health interview survey provides quite reliable information on the annual number of hospitalisations for young and*

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middle-aged persons, but underestimates the hospital admission rates for the elderly.

Conclusions: *A health interview survey is a useful instrument to measure the use of curative health services because it allows relating the use of health services to a large number of other health and health related information. In general, health interview survey estimates are quite reliable. Information from a health survey may however underestimate the actual use in some population groups due to underreporting or a selection bias towards persons with a lower medical consumption profile.*

Keywords: health interview survey, use of health care, curative medical services, validation

Introduction

The use of curative medical services represents - definitely in terms of budgetary implications – an important part of medical consumption. Valid information on the use of curative services is essential to establish an efficient health policy. Currently, this information is obtained by either medical registrations and/or health interview surveys (1). Both measurement tools have advantages and disadvantages.

First of all the information gathered by means of registrations is usually more accurate and more reliable than results from a health interview survey. Memory effects and lack of medical knowledge by respondents and interviewers may indeed affect the validity of information on medical consumption obtained from a health interview survey. Health interview surveys are also subject to sampling and non-response errors, whereas medical registrations often provide complete information. The complete coverage of registrations is especially relevant when phenomena with low prevalence rates are studied or detailed information is required.

Health interview surveys have, however, also a number of important advantages. Because of the integrated way in which the data are collected, it is possible to link the information on the use of different services. Furthermore, it is possible to relate the use of medical services to a large number of (demographic and socio-economic) background characteristics of the patients. This is usually not possible with medical registrations, in which only a limited number of background characteristics are included. Record linkage between registrations may be a solution to this problem, but is often not possible because of major practical and ethical constraints. A final advantage of health interview surveys is that

users and non-users of health services can be compared with respect to a number of relevant characteristics, such as socio-economic status and health status. By studying the use of health services in relation to need it is possible to identify groups in society that are in need of health care and do not use it, but also groups that make less appropriate use of existing medical facilities.

Although a health interview survey is thus not primarily aimed at measuring the overall use of health services, it is still worthwhile to investigate to what extent estimates from a health interview survey correspond to data obtained from registrations. In effect, this information gives an indication about the validity of the results obtained from the health interview surveys and allows exploring some of the biases that possibly affect the data.

The comparison was made using results of the Belgian HIS organised in 1997 (2). In this survey, information on the health status, the life style and the medical consumption of a representative sample of about 10,000 people of the population in Belgium was obtained. The part on medical consumption included questions on contacts with the general practitioner (GP), the medical specialist and hospital admission.

The main aim of this paper is to compare information on the contacts with the general practitioner, the contacts with the medical specialist and information on admissions to hospital in the HIS with data from two important registration systems in Belgium. The first data source consists of data from the National Institute for Sickness and Invalidity Insurance (NISII, INAMI or RIZIV). The NISII is responsible for the administrative and financial management of the public health insurance. In Belgium, GPs and specialists are paid fees for their services. The fee structure is regulated at national level by the NISII, as a result of negotiations between syndicates of medical doctors, sickness funds and the government. The majority of doctors accept the negotiated fees and patients making use of their services are reimbursed according to the agreed fees.

97% of the Belgian population is covered by the NISII (3). The modalities of this insurance are different for people with an independent profession and their families (independent regime) than for those who are employed or receiving an allowance (general regime). People belonging to the first category (10% of the total population) are less often insured for small risks, such as a GP consultation, than the latter category.

Although primarily used as an administrative tool for reimbursement of health care costs, the information that is collected by the NISII also

allows obtaining important data on the medical consumption. The NISII provides e.g. exhaustive data on the ambulatory contacts with medical doctors for all people benefiting from the general regime (87% of the total population). It is this data that we want to compare with the information that is obtained from the HIS (4).

The second comparator that we used is the registration of Hospital Discharge Data (HDD) in hospitals (5, 6). This generalised and compulsory registration of all admissions in general hospitals in Belgium is organised by the Ministry of Public Health since 1990[1]. For each hospitalisation, data are registered on the diagnosis, the interventions carried out during hospitalisation and length of stay. The registration also includes the age, gender and place of residence of the patient, but there is no unique patient identifier. As a result it is not possible to consider hospital admissions at the level of the patient. The diagnoses of all hospital admissions are grouped in 25 Major Diagnostic Categories (MDCs) and 617 Diagnosis Related Groups (DRGs) (7). Each MDC groups one medical entity and consists of a medical and surgical subgroup. Each DRG consists of admissions with similar pathologies and similar durations of hospital admission.

Methods

Indicators that were used to compare ambulatory contacts with medical practitioners include the mean annual number of contacts with a general practitioner (consultations and home visits) and the mean number of ambulatory contacts with a medical specialist[2]. Contacts with the general practitioner were analysed globally and for consultations and home visits separately. We also looked at the average number of contacts per year for three specific medical specialities: the specialist in internal medicine, the paediatrician and the neuropsychiatrist. For those types of specialists, information on the number of contacts was directly available both in the NISII data and the HIS.

As indicated above, exhaustive information on ambulatory visits of health professionals is only available for people benefiting from the

[1] In Belgium also admissions in psychiatric hospitals are registered, but this is done within a separate system. As the number of admissions in these hospitals at population level is rather marginal compared to the admissions in general hospitals, they are not considered.

[2] Contacts with a medical specialist during hospitalisation are not considered, but ambulatory contacts in a hospital are.

general NISII-regime, not for people with an independent profession and their dependents. It is however possible to identify those people in our HIS dataset and exclude them from the analyses. As a result the two datasets that were compared pertain to the total population in Belgium, excluding people with an independent profession and their dependents. Assumingly the HIS data set also includes information on ambulatory contacts of people that are not assured by the NISII. As this involves only 3% of the population it was judged that it was not necessary to correct for this.

NISII data are only made available at an aggregated level. This means e.g. that the NISII can provide the total number of consultations and home visits that were carried out by general practitioners per year. The same applies for the total number of consultations with the specialist, in general, but also with specific (types of) specialists such as a specialist in internal medicine, a paediatrician, or a psychiatrist for which there are specific reimbursement codes. When dividing these numbers by the total number of eligible persons an average number of contacts is obtained per year per person.

The same means can be calculated from the HIS database. To limit the recall bias, estimates are based on contacts with general practitioners, respectively medical specialists, during the past 2 weeks and multiplied by 26. Although this does not give correct information at the individual level, it is assumed that at aggregated level the chances of under- and overestimation do level out, so it is possible to make a statistically reliable estimate of the number of consultations in 1 year at aggregated level (8). The NISII nomenclature makes a distinction between an advice by the GP and a consultation. In the HIS, both are considered but not separated in two categories. On the other hand the HIS also collects information on contacts with the GP by telephone. As these are not included in the NISII figures they have been withdrawn from the analysis.

The reference for the comparison of the hospital admissions is the data from the HDD registration. Admissions to psychiatric hospitals are not included in this registration. In the HIS 1997 no specification is given on the type of hospital that should be taken into account when reporting hospital admissions, but it is assumed that most hospital admissions pertain to hospitalisations in acute hospitals. The reference period that is used in the HIS for hospital admissions is one year. It is assumed that a hospital admission is a sufficiently important event to be remembered for such a relatively long period. Ongoing hospitalisations were considered for the calculation of the mean number of hospital admis-

sions per year but were excluded when calculating the average stay. The HIS data also include day hospitalisations. In the HDD registration, day hospitalisations are registered separately, hence they do not figure in the comparator data set that is used for the analysis. For this reason we did not consider the day hospitalisations in the HIS. The same applies to hospitalisations that started longer than a year ago but continued throughout the reference period of one year. A major difference between the two data sets is that in the HIS data, hospital admissions related to childbirth are not included. This has to be taken into account when comparing results from both data sets.

Three indicators on hospitalisation were calculated for each of the two data sets: the mean number of hospitalisations per person per year, the mean number of hospitalisation days per person per year and the distribution of the reasons for being admitted to hospital. In order to create the latter indicator, reasons for admission were regrouped into a simplified version of the MDC classification. The 25 groups of the MDC classification are presented in table 1. However, some categories have been withdrawn from the analysis: hospital admissions related to childbirth, use of alcohol and drugs, factors that influence health and HIV infection. Either these hospi-

TABLE 1
MDC groups of diseases

1. Disorders of the nervous system
2. Eye disorders
3. Disorders of ears, nose and throat
4. Disorders of respiratory system
5. Disorders of cardiovascular system
6. Disorders of digestive system
7. Disorders of hepatobiliar system and pancreas
8. Disorders of locomotion system
9. Disorders of skin, soft tissue and breast
10. Disorders of endocrinological system, nutritional and metabolic disorders
11. Disorders of kidney and urinary tract
12. Disorders of male genitals
13. Disorders of female genitals
14. Pregnancy, delivery, post delivery
15. Neonates and perinatal affections
16. Disorders of blood, bone marrow and immunological disorders
17. Myeloproliferative disorders
18. Infection diseases and parasitological disease
19. Mental disorders
20. Problems related to use of alcohol and drugs
21. Accidents, poisoning, toxic effects of drugs
22. Burns
23. Factors that influence health
24. HIV infection
25. Multiple trauma

talisations are not supposed to be reported in the HIS (delivery), either they are too vague (factors that influence health) or considered to be underreported in a HIS (use of alcohol and drugs, HIV infection). Some other categories were grouped together. Illnesses of blood, immunological disorders and myeloproliferative disorders were chosen to figure in one category. The same applies for accidents, poisoning, toxic effects of drugs, burns and multiple traumata. The modified MDC classification consists of 17 categories of disorders. The 1997 report of the HDD registration gives an overview of all hospital admissions according to the MDC groups. It is possible to regroup this information into our simplified version of the MDC classification. In the HIS the reasons for admission are classified according to the International Classification of Primary Care (9). In order to compare the reasons for admission across the two data sets the ICPC codes were regrouped into the 17 categories of the modified MDC classification.

The NISII and HDD data are exhaustive registrations and reflect the indicator for the total target population. Hence no confidence intervals are considered. For the indicators based on the HIS data, confidence intervals are computed taking into account the multistage sampling design of the HIS.

Results

1. Contacts with the general practitioner

In 1997 there were 8,867,907 persons insured in the general regime of the NISII in Belgium (3), good for 87% of the total population (10,170,226). The total number of consultations and home visits registered for this group was 48,607,155, which brings the average number of consultations per person per year in this subgroup to 5.48. The numbers per type of contact are presented in Table 2.

TABLE 2
Number of contacts with the GP for the year 1997 *

	Total number
Advice	507,827
Consultations	25,852,882
Home visits	16,209,335
Special home visits	6,037,111
Total	48,607,155

* Source: NISII. Contacts of people in the independent regime are not considered.

TABLE 3
*Mean annual number of contacts with the GP for the year 1997 **

	NISII	HIS
	Mean number	Mean number (+ 95% CI)
All GP contacts	5.48	5.62 (5.20-6.05)
Consultations	2.97	3.53 (3.18-3.89)
Home visits	2.51	2.09 (1.81-2.36)

* Source: NISII. Contacts of independents and their dependents not considered

Out of the 10,221 persons that were included in the HIS, 968 (9.7%) were excluded because they were identified as having an independent profession (or being dependent from such a person). This is quite similar to the NISII figures that indicate that 10% of the total population fall under the independent regime. From the 9,253 remaining persons 9,193 (99.3%) had valid information on contacts with the GP. These persons reported in total 1,962 contacts with the GP over the past 2 weeks, which resulted in a mean annual number of contacts of 5.62. The number of reported consultations and home visits was respectively 1,180 and 782.

In Table 3 the mean annual number of contacts with the GP is calculated from both data sources. The overall figure is quite comparable. We notice however that in the HIS there seems to be an overestimation of consultations and an underestimation of home visits.

2. Contacts with the specialist

In the same way we calculated the ambulatory contacts with the medical specialist. Table 4 lists all ambulatory contacts with 3 specific medical specialists and all specialists taken together.

In the HIS data, information on contacts with the specialist was available for 9,194 persons.

TABLE 4
*Number of ambulatory consultations with the medical specialist for the year 1997 **

	Total number
Consultations with a specialist in internal medicine	2,261,406
Consultations with a paediatrician	1,726,404
Consultations with a (neuro)psychiatrist	913,437
All consultations with medical specialists	19,046,184

* Source: NISII. Contacts of people in the independent regime are not considered.

These persons reported 966 contacts with a specialist during the past 2 weeks in total. The number of reported contacts during the past 2 weeks with the specialist in internal medicine, paediatrician and psychiatrist was respectively 194, 87 and 46.

In Table 5 the mean annual number of contacts with the specialist is presented based on data from the NISII and data from the HIS.

TABLE 5
*Mean number of annual contacts with the specialist for the year 1997 **

	NISII	HIS
	Mean number	Mean number (+95% CI)
Consultations with specialist in internal medicine	0.26	0.40 (0.31-0.51)
Consultations with paediatrician	0.19	0.16 (0.11-0.22)
Consultations with (neuro)psychiatrist	0.10	0.12 (0.06-0.17)
All consultations with medical specialists	2.15	2.40 (2.14-2.65)

* Source: NISII. Contacts of independents and their dependents not considered

3. Admission to hospital

It appears from the HDD registration that in 1997 1,702,425 admissions were reported in acute hospitals (16.7 admissions per 100 people).

In the HIS, people are asked to report on their hospitalisations of the past year. Out of the 10,221 people participating in the survey, information on hospitalisation was available for 10,114 persons (99%). These people reported a total of 1,600 hospital admissions. The average number of hospital admissions per 100 persons per year based on the HIS data was 16.3.

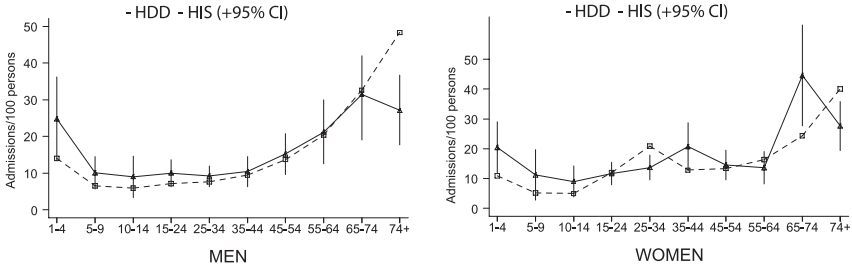
In table 6 the figures obtained by the two data sources are compared, both for the general population and for men and women separately. It is

TABLE 6
Number of hospital admissions per 100 persons per year (1997)

	HDD	HIS*
	Number	Number (+95% CI)
Men	15.5	14.6 (12.6-16.6)
Women	17.9	18.1 (15.6-20.6)
Total	16.7	16.3 (14.7-18.0)

* Hospital admissions related to childbirth not included

Fig. 1: Hospital admissions per 100 persons per year (1997) by age group and sex*. Comparison between HDD registration and HIS.



* Hospital admissions of persons < 1 year old are not included

important to emphasize that hospital admissions related to childbirth are not included in the HIS dataset.

In figure 1 a comparison by age and sex is made between the figures obtained from the HDD registration and the HIS.

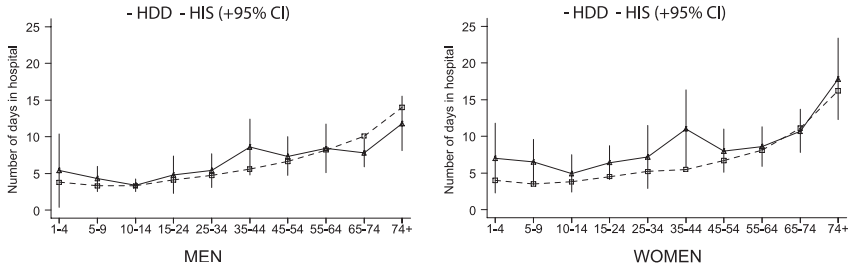
Next we looked at the average duration of the admission. The HDD data indicate an average hospital stay of 8.1 days. In the HIS this number is 8.5. In table 7 and figure 2 results are presented for the two data

TABLE 7
Average duration of a hospital stay (in days) (1997)

	HDD	HIS*
	Number of days	Number of days (+95% CI)
Men	7.8	7.1 (6.0-8.2)
Women	8.5	9.6 (8.1-11.2)
Total	8.1	8.5 (7.5-9.5)

* Hospital admissions related to childbirth not included

Fig. 2: Average duration of a hospital stay in days (1997) by age group and sex*. Comparison between HDD registration and HIS.

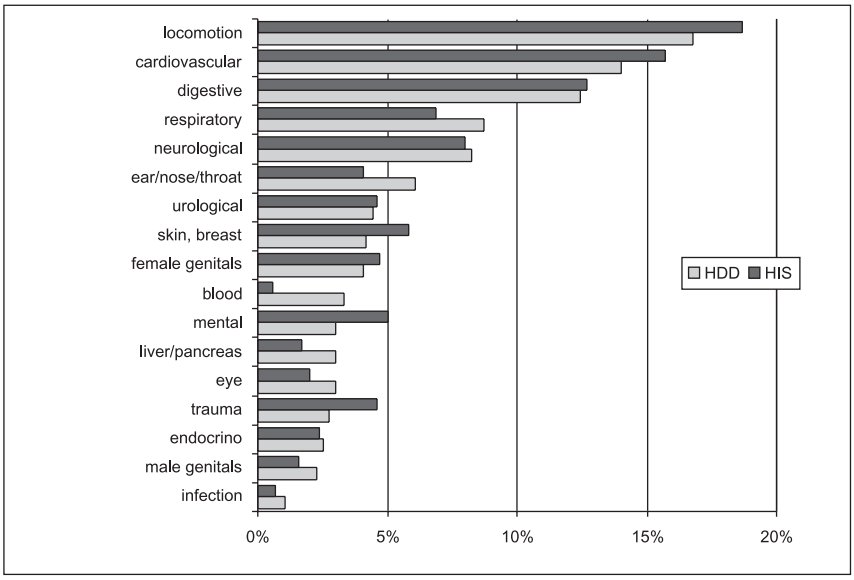


* Hospital admissions of persons < 1 year old are not included

sources, both for the general population and for men and women separately.

Finally we investigated the reason for the hospital admission. As explained above we considered the distribution of the reasons for admission, regrouped into 17 categories. The results are presented in figure 3.

Fig. 3: Relative distribution of reasons for admission to hospital (1997). Comparison between HDD registration and HIS



The graph indicates that in the HIS there is an underrepresentation of blood related diseases, diseases of liver and pancreas, eye diseases and ear nose throat diseases and an overrepresentation of mental diseases and traumata.

Discussion

In this paper we explored to what extent estimates on the medical consumption in a HIS give similar results as the information based on exhaustive medical registrations. Generally speaking we can conclude that – at least for the indicators that were studied – the results are positive. Most of the estimates from the HIS are in line with the observations from the registrations. Some differences can be observed however.

When considering the mean number of contacts with the GP and the specialist, the HIS tends to overestimate this number slightly. Yet, for both

indicators the figures obtained from the NISII registration fall within the 95% confidence interval that is calculated for the indicators in the HIS. As far as the contacts with the GP are concerned, we notice that the HIS data do not give a correct reflection of the ratio consultations/home visits. The number of consultations is overestimated; the number of home visits is underestimated. This may be due to the methodology that is used. The mean annual number of contacts (all contacts together, but also consultations and home visits) in the HIS is based on the contacts of the last 2 weeks and then multiplied by 26. One shortcoming of this method is that it underestimates the number of repeat visits. Repeat visits usually occur more often with people who suffer from a chronic disease or with people who are less mobile, such as the elderly, and are assumingly more often home visits than first consultations. Probably this could explain at least to a certain extent the underestimation of home visits in the HIS.

The HIS gives a relatively correct estimate of the mean number of contacts with the specialist in general and the number of contacts with the paediatrician and the neuropsychiatrist. The number of consultations with the specialist in internal medicine seems to be overestimated. The estimates at the level of a specific type of specialist are based on very small numbers, which results in large confidence intervals and a great level of uncertainty. The main conclusion is that global estimates to calculate the mean number of contacts with medical practitioners such as the general practitioner and the specialist in a HIS are quite correct, but that the validity of more detailed information on the contacts is limited.

As far as the number of hospital admissions is concerned the HIS estimates appear to be remarkably similar to the results from the HDD registration, especially among men. The number of hospital admissions for women in the age group from 25 to 34 years is significantly lower in the HIS data than in the HDD data but this is in line with the fact that HIS data does not include hospital admissions related to childbirth, which are especially prevalent in this age group. The results stratified by age and sex further reveal that among people of 74 year and older the rate of hospital admissions is significantly lower in the HIS than in the HDD registration. This may be due to the fact that the HIS probably misses out admissions of elderly people in bad health (because of a higher refusal rate in this group) and does not include information on hospital admissions that resulted in the death of the patient. When taking into account this bias the results on the number of hospitalisations in the HIS are quite plausible.

Not only the number of hospital admissions, but also the average duration of a hospital stay based on the HIS estimates is very much in

line with the figures of the HDD, even for the elderly. One would expect however - especially in this age group - bigger discrepancies because of an increasing recall bias. The results from the HIS indicate that there is rather an overestimation than an underestimation of the duration of the hospital stay . This is probably due to the fact that people who are asked to report on the duration or their hospitalisation have the tendency to round this off to a higher number (e.g. 3 weeks instead of 19 days).

Finally we compared the relative distribution of the reasons for hospital admission. Some important methodological constraints should be mentioned here. HDD are based on professional diagnoses by doctors. In the HIS the information on the reason for hospital admission is provided from the viewpoint of the patient and recorded by interviewers who are not medically skilled. Despite these major differences the results from both registrations are quite similar. Problems with the locomotion system, cardiovascular problems and digestive problems, in this respective order, are the three main reasons for being admitted to hospital, both in the HDD registration and in the HIS.

The main types of diseases that are underreported are disorders of the blood and myeloproliferative disorders. Either these types of diseases are not reported or they are reported as symptoms that are classified in one of the other categories. Mental diseases seem to be relatively more frequent in the HIS. On the first sight this seems a bit strange. One would indeed rather expect that those types of problems be underreported. One possible explanation is that the HDD data that are used as comparators are about admissions in acute, general, non-psychiatric hospitals (10). It is likely that in the HIS hospitalisations in psychiatric hospitals are also reported, which may inflate the relative proportion of the hospital admission due to psychiatric problems in the HIS database, compared to the HDD data.

Some further limitations need to be mentioned. It is important to emphasize that the HDD registration, although quite complete, is not an absolute “golden standard”. Furthermore, the HDD data may have errors as a result of over- or underreporting, misclassification, a.o. Moreover some hospital admissions are in fact readmissions or concern revolving-door patients: overlooking such phenomena leads to double-count of admission.

As measurement errors or method discrepancies might have, on average, a null expectancy, it is not surprising that the estimates broadly converge. Some positive bias might be compensated by negative bias. For example, regarding hospitalisation, it is possible that the over-estimation of HDD due to revolving-door is compensated by underestimation of psychiatric hospitalisations (not registered in HDD but counted in HIS).

Finally, as estimates are averages they may be heavily influenced by the denominator for which errors are not expected to be too numerous.

Conclusions

Despite the above mentioned constraints it is found that the analyses we performed allowed us to validate to a great extent the results on the contacts with the GP, the contacts with the specialist and hospitalisations in the Belgian Health Interview Survey 1997. They also enabled us to identify some areas where estimates of a HIS appear to lead to biased or invalid results.

As mentioned in the introduction, the primary aim of the inclusion of questions on the medical consumption in a HIS remains the study of the determinants of medical consumption and the study of indicators that are not addressed in medical registrations. The fact that at least for some indicators on medical consumption estimates in a national HIS are similar to the ones obtained from registration data, indicates that a HIS remains an important instrument to gather health information on the use of health services at national level, even in countries where more or less exhaustive registration systems exist.

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