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# General practitioners' use of ICPC diagnoses and their correspondence with patient record notes

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ORIGINAL ARTICLE

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## **BACKGROUND**

The quality of the general practitioners' setting of diagnoses using codes from the International Classification for Primary Care (ICPC) is important, because these codes are used for purposes of quality development, research and public health statistics. It is uncertain, however, to what extent these diagnoses present a correct picture of the content of and reasons for the consultations and the prevalence of illness in the population. The objective of this study was to identify the extent to which the general practitioners' use of diagnostic codes correlates with the content of the patient record notes.

## **MATERIAL AND METHOD**

A total of 23 general practitioners from five different medical centres in Agder county participated in the study. The patient record notes from all patient contacts over two working days in 2013 were reviewed by two experienced general practitioners who assessed the degree of correspondence between the content of the patient record notes and the concomitant ICPC diagnostic codes.

## **RESULTS**

A total of 1 819 patient contact were assessed, and for 1 591 of these (87.5 %) it was possible to assess the correspondence between the patient record notes and the diagnosis. We found good correspondence for 693 (85.3 %) consultations and 321 (69.9 %) simple contacts with issuance of a prescription. For simple contacts with no issuance of a prescription there was good correspondence for 213 (83.9 %), although 144 of a total of 398 (36.2 %) could not be assessed because the patient record notes were absent, too brief or imprecise.

## **INTERPRETATION**

The diagnoses made during consultations corresponded well with the patient record notes examined in this study. The results may indicate that caution should be exercised in including simple contacts in the data on diagnoses in public statistics. The findings should be followed up in larger-scale and more representative national studies.

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## Main findings

In this study, we found that the diagnoses made by the general practitioners tallied well with the patient record notes taken during consultations (85 %).

For simple contacts with issuance of a prescription there was good correspondence in 70 %, and for simple contacts without issuance of prescription in 84 % of cases. Altogether 144 of a total of 398 (36 %) simple contacts with no issuance of a prescription could not be assessed.

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The general practitioners' setting of diagnoses in their patient record notes has multiple purposes. The patient record serves as the doctor's work-tool, and it is useful to document diagnoses as part of the clinical assessments. It is also a requirement laid down in the Regulations regarding patient records (1). Moreover, the Norwegian Health Economics Administration (Helfo) requires the reimbursement cards to be marked with one or more diagnostic codes according to the International Classification of Primary Care (ICPC-2) (2). These diagnoses are entered into the KUHR (control and payment of healthcare reimbursements) database and used in statistics, research, professional development and quality control. When reporting diagnoses made by GPs and out-of-hours services in this database, the sum of all contact types is used (3). These data are used as an indicator for the prevalence of illness in the population, both in the Public Health Profiles (3) and in the database for the statistics banks KommuneHelsen (Municipal Health) (4) and Norgeshelsen (Norwegian Health) (5).

Development of the ICPC coding framework started in 1972 when the World Organisation of Family Doctors (WONCA) established an international classification committee. Today, this coding framework is used in many countries (6). In Norway, all primary doctors have been required to use at least one ICPC code for diagnoses on reimbursement cards and sickness leave certificates since 1992. The ICPC-2 version has been in use since 1998 (in electronic format since 2002). In the remainder of this article we will refer to it as ICPC.

ICPC codes consist of one letter and two digits (7). For some special diagnoses, three digits are used. The letter identifies the organ chapter (A – general, B – blood, etc. The digits 00–29 refer to symptom diagnoses, while 70–99 refer to disease diagnoses. The codes 30–69 are process codes shared by all the organ chapters.

Of the diagnoses that the doctor enters into the electronic patient records (EPJ), the first two (the main diagnosis and a secondary diagnosis, if any) are automatically copied onto the reimbursement card. In 2015, there were 29.4 million GP contacts, of which 14.2 million were simple contacts (attendances at a doctor's surgery, telephone consultations and prescription renewals) (48.2 %), 13.8 million were consultations (47.1 %), 1.1 million were administrative contacts (3.9 %), 142 558 were interdisciplinary collaboration meetings (0.5 %) and 89 362 were home visits (0.3 %) (8).

The distribution of diagnoses made by general practitioners is an important source of continuous information about the health of the population, made relevant after the introduction of the municipal patient and user registry (KPR) in 2017 (9). However, we do not know to what extent the diagnoses used in the reimbursement cards that the doctors send to Helfo provide a correct picture of the reasons for contact and the prevalence of illness in the population. Some electronic records systems have shortcuts for automatic setting of a diagnosis, for example by proposing 'last used diagnosis'. This will often be the correct diagnosis, but not always. In our experience, there is widespread use of 'general diagnoses' in prescription renewals and telephone consultations (e.g. A29: General symptoms/complaints and A97: Administrative contact/examination).

In its hearing statement to the proposal from the Ministry of Health and Care Services regarding a municipal patient and user registry, the Norwegian Medical Association pointed out that the diagnoses on the reimbursement cards often fail to reflect the content of the consultations, especially the so-called simple contacts (10). There is also a risk of systematic underreporting of data from multimorbid patients, since the KUHR database only imports the first two diagnoses from the reimbursement cards.

If the information from health registries based on this reporting is to be useful, the quality of the diagnostic coding is crucial. This has been investigated using different methods, and the results diverge. A Danish study on inter- and intra-observer variations in the setting of ICPC diagnoses showed 71 % correspondence for individual diagnoses and 94 % when the diagnoses had been grouped by ICPC chapter (11). A study of 400 patient records from a total of 20 general practitioners in Stockholm showed the correct ICD-10 code in 97 % of cases (12). A large-scale study undertaken in Tromsø in the years 1992–2008 investigated the setting of diagnoses using the problem-oriented electronic patient record system PROMED (13). It found a lack of correspondence between the description of the problem in the records and the standard ICPC-2 text in 53.8 % of cases.

This study investigates the degree of correspondence between the use of ICPC diagnostic codes and the content of the patient record notes from a non-random sample of general practitioners.

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## Material and method

In 2014, the quality of diagnoses in the patient records of general practitioners was the subject of discussion in a research group in which the authors participate. To take a closer look at this, we chose to study the quality of diagnoses retrospectively for the year 2013. Five medical centres recruited by the research group participated in the study, one in Kristiansand and four in Arendal. Four of these centres were also the workplaces of the recruiting doctors, and one was a neighbouring centre with colleagues that were known to us. All the doctors who had been practising in 2013 were willing to participate. The doctors' average age was 51 years (range 28–67). Eighteen of the 23 doctors were specialists in general practice, and five were women. The centres used the Winmed2 (16 doctors) and Infodoc Plenario (7 doctors) records systems.

We assessed all patient contacts made in the course of two working days for all the doctors, one full office day in spring and one in the autumn. Each doctor compiled a list of names for all patient contacts for these two days and retrieved the patient record notes in question. Notes with diagnoses were copied to a text file and printed out in anonymised form (year of birth and sex were kept). Two of the authors (BB and GM) undertook the analyses, making a review, registration and assessment of the quality of the diagnoses. The following variables were registered: Doctor ID, the patient's sex and year of birth, type of contact, main diagnosis and any secondary diagnoses with ICPC codes, plus prescription and sickness leave certificate, if any. The contacts were registered as: consultation, simple contact with prescription, simple contact without prescription, collaboration meeting, home visit or 'other'. The degree of correspondence between the patient record notes and the ICPC diagnosis was divided into six categories (Box 1).

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### Box 1 Categorisation of the degree of correspondence in the study

Category 1 was 'good and complete correspondence', where the main diagnosis and any secondary diagnoses gave a correct impression of what was registered in the patient records.

Category 2 was 'correct diagnosis, but imprecise'. Example: New prescription for insulin. Diagnosis: Contact/examination for administrative purposes A97.

Category 3 was 'correct main diagnosis, but absent or incorrect secondary diagnosis'.  
Example: Standard diabetes check-up. In addition, difficulty swallowing in recent weeks.  
Diagnosis: Diabetes mellitus T90.

Category 4 was 'the main diagnosis describes part of the contact, but not the main cause'.  
Example: Comes in for a check-up to verify blood tests after pneumonia. The wound on the knee has healed. Diagnosis: Laceration/cut S18.

Category 5 was 'no correspondence'. Here, the diagnosis was in no way related to the content of the patient record note. Example: Note on an acute attack of gout. Diagnosis: Diabetes mellitus T90.

Category 6 was 'no note or the content cannot be assessed against the diagnosis'. Example: Telephone from the home nursing services with no further description.

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For simple contacts involving no more than the issuance of a prescription, the correspondence was deemed to be good if at least one of the drugs corresponded with the main or secondary diagnosis. If the notes were very brief or missing, patient record information could be stored in a referral or letter that were unavailable to us. These were registered in category 6, i.e. cannot be assessed. The two doctors assessed the correspondence between the diagnoses and patient record notes independently of each other. In 85 % of the cases they were in complete agreement. In the remaining 15 % of the cases they reached a consensus by discussion.

In the following presentation of results we have simplified the designations of correspondence into three groups: 1 – good correspondence (categories 1 and 2), 2 – incomplete correspondence (categories 3 and 4) and 3 – no correspondence (category 5). Category 6 was excluded.

The Regional Committees of Medical and Health Research Ethics (REK) found that the study fell outside the scope of the Health Research Act, cf. Section 2 (ref. no. 2016/669). The Norwegian Centre for Research Data (NSD) found that the project was not subject to the duty of notification or licence pursuant to Sections 31 and 33 of the Personal Data Act (ref. no. 49101/3). The results were processed with the aid of the NSDstat 1.3 statistics program.

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## Results

The 23 doctors registered a total of 1 819 patient contacts in two working days. On average, each doctor had 79 contacts (range 46–124). The median value for the number of contacts per doctor per working day was 42. The patients' average age was 48.8 years (range 0–98 years). Altogether 1 026 of the contacts (56.4 %) involved women.

A total of 839 of the contacts (46.1 %) were consultations, 461 (25.3 %) were simple contacts with prescription, 398 (21.9 %) were simple contacts without prescription, 68 (3.7 %) were collaboration meetings and 6 (0.3 %) were home visits, while 47 (2.6 %) were categorised as other/unknown.

In this study altogether 346 different ICPC diagnoses were used as the main diagnosis. For all registrations a single diagnosis was used in 1 622 (89.2 %) of the cases, two diagnoses in 169 (9.3 %), three diagnoses in 24 (1.3 %) and four diagnoses in 4 (0.2 %) of the cases. For consultations, a single diagnosis was registered in 705 (84.0 %) of the cases, two diagnoses in 114 (13.6 %), three diagnoses in 17 (2.0 %) and four diagnoses in 3 (0.4 %) of the cases. There was 1.2 diagnoses on average per consultation. Altogether 1 175 (64.6 %) of the main diagnoses were disease diagnoses (code numbers 70–99), 641 (35.2 %) were symptom diagnoses (code numbers 1–29) and three (0.2 %) were process codes (code numbers 30–69).

For 228 of the contacts (12.5 %) there was no note, or the notes were too brief to be assessed against the diagnostic codes. These were excluded from further assessment. Altogether 1 591 of a total of 1 819 notes were therefore assessed with a view to correspondence (Table 1).

**Table 1**

Number of notes and degree of correspondence between the ICPC diagnoses and the patient record notes for 1 819 contacts with 23 doctors at five medical centres in Agder county over two working days in 2013. The proportions in the various correspondence categories are calculated on the basis of notes that could be assessed.

Contact type	Notes, total, n	Notes that could not be assessed <sup>1</sup> , n (%)	Notes that could be assessed, n	Good correspondence, n (%)	Incomplete correspondence, n (%)	No correspondence, n (%)
Consultations	839	27 (3.2)	812	693 (85.3)	68 (8.4)	51 (6.3)
Simple contacts with prescription	461	2 (0.4)	459	321 (69.9)	5 (1.1)	133 (29.0)
Simple contacts without prescription	398	144 (36.2)	254	213 (83.9)	5 (2.0)	36 (14.2)
Other <sup>2</sup>	121	55 (45.5)	66	58 (87.9)	1 (1.5)	7 (10.6)
Total	1 819	228 (12.5)	1 591	1 285 (80.8)	79 (5.0)	227 (14.3)

<sup>1</sup>Notes that were missing or so brief that they could not be assessed against the diagnostic code

<sup>2</sup>Collaboration meetings, home visits or other contacts

Each individual doctor's consultation notes had a proportion of 'good correspondence' that varied from 53.6 % to 97.6 % (median value 87.8 %) and 'no correspondence' that varied from 0.0 % to 35.7 % (median value 3.1 %).

## Discussion

We found that the diagnoses made by the general practitioners corresponded well with the patient record notes for consultations and simple contact without issuance of a prescription, and to a somewhat lesser extent for simple contacts with issuance of a prescription. However, a large proportion of the simple contacts that did involve a prescription could not be assessed because the note was missing or incomplete. The strength of this study is that the internal validity of the ICPC diagnoses in a large number of patient contacts was assessed by two experienced general practitioners who undertook a thorough analysis of the textual content of the notes independently of each other. We have found only a few studies that have undertaken similar analyses (11–13). A number of studies have evaluated the validity of ICPC diagnoses by investigating the degree to which patients or diagnoses are correctly identified in the EPJ system or in other medical databases, for example patients with COPD (14) or chronic diseases (15). Some studies have investigated whether the ICPC contains the diagnoses that the general practitioners deem necessary (16–18).

The weaknesses of this study include the fact that the medical centres studied were not selected at random, but were recruited among doctors who were directly or indirectly linked to our research group. Questions may thus be raised regarding the representativeness of this study. We nevertheless believe that the fact that some of the participating doctors were not members of the research group, as well as the varying size of the medical centres and their locations in different municipalities, helps strengthen the study's representativeness.

We investigated contacts during 2013, before the quality of the ICPC diagnoses became a topic in the research group in 2014. Having material of a more recent date might have been an advantage. This might have identified a greater degree of automatic setting of diagnoses, which we believe has become more common, especially for digital patient contacts (electronic prescription requests and e-consultations).

There are many possible causes for the lower degree of correspondence and more incomplete information for simple contacts. Such contacts are often of an administrative nature and involve few clinical assessments. Some patient records systems provide shortcuts to the diagnosis or diagnoses that were last used. In some medical centres, the preparation of prescription renewals is undertaken by assistant personnel, who simultaneously prepare the reimbursement card with the diagnosis.

Some cases of poor correspondence may be caused by the lack of a diagnostic code (19). When a relevant diagnostic code is lacking or fails to show up using relevant search words, the doctor may choose less relevant diagnostic codes or 'wastebasket' diagnoses. A larger ICPC search register in the doctors' patient records system could help improve the validity of diagnostic codes.

We know nothing about the doctors' opinions regarding the value of setting ICPC diagnoses in the patient records. The doctors are aware that this is a precondition for receiving a reimbursement from the Norwegian Health Economics Administration (Helfo), in which case a single diagnosis is sufficient for a reimbursement claim. When setting the diagnosis, it is uncertain whether the doctors also consider that the quality of the ICPC codes may have an impact on statistics, quality assurance and research. If the doctors do not perceive the setting of diagnoses as useful or important, the result may be that too many imprecise diagnoses are used, or that no secondary diagnoses are entered for multimorbid patients. In our study, 16 % of the consultations were coded with more than one diagnosis. This low proportion is indicative of underreporting of the actual content of the consultations in general practice. A Norwegian study from 2015 showed that an average of 2–3 problems are addressed per consultation (20).

The doctors' working routines mean that one or more diagnoses must be quickly entered on the reimbursement card once the consultation is over and the patient leaves the surgery. As a rule, the doctor subsequently completes the patient record note and may correct and add details or further diagnoses, which will not necessarily correspond to the diagnosis on the reimbursement card. In this study, we have only examined the diagnostic codes given in the patient records and not considered the reimbursement cards, thereby excluding this as a source of error in the assessment of correspondence. In research and statistics that use the ICPC diagnoses reported to the Norwegian Health Economics Administration from the reimbursement cards, this may in theory represent a weakness. However, our experience from working procedures in general practice indicates that such amendments to diagnostic codes are very rarely made.

The results from this dataset may indicate that the quality of statistics prepared on the basis of KUHR data is improved when simple contacts are omitted and only data from consultations are presented.

This study is a retrospective review of a large number of patient record notes from a limited, non-representative sample of general practitioners. Even though we found good correspondence between diagnostic codes and patient record notes, especially for

consultations, there is a need to evaluate the quality of diagnoses in Norwegian general practice in larger-scale national studies. This may also produce more reliable data on differences between doctors.

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*The article has been peer reviewed.*

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