

COMMUNICATION BETWEEN GENERAL PRACTITIONERS AND RADIOLOGISTS: OPINIONS, EXPERIENCE, PROMISES, PITFALLS

J.M.L. Bosmans^{1,2}, D. Schrans³, D. Avonts³, J.M. De Maeseneer³

Purpose: Studies encompassing the views and aspirations of general practitioners (GPs) concerning the radiology report are rare. We present the results of a large-scale survey among GPs in Flanders, Belgium, and examine its implications for the communication between radiologists and GPs.

Materials and methods: GPs were invited by e-mail to participate in a survey on the radiology report. Respondents could state their degree of agreement with 46 statements. Besides that, they could freely make suggestions to improve the report. Quantitative results were examined to determine majority convictions. Free text suggestions were searched for motives and convictions.

Results: Of 1323 GPs invited, 282 completed forms were prepared for analysis. 96.8% considered the report an indispensable tool. 85.5% were satisfied with it. Itemized reporting of complex examinations was favoured by a very large majority.

83 GPs (29.4%) made suggestions for improvement. Much emphasis was put upon the clinical role of the radiologist. The need to mark key images, to mention meaningful normal findings, to structure the report and to facilitate communication was also frequently mentioned.

Conclusion: GPs expect the radiologist to think as a clinician and offer clinical answers. An automated electronic information chain may contribute to realize this objective but direct communication should always remain possible.

Keywords: Radiology and radiologists.

Background

This paper aims to explore the communication needs between the radiologists and GPs. Do GPs need a radiology report? Are they convinced that the quality of the report will improve if they provide the radiologist with adequate clinical information and a clear clinical question? Are radiology reports clear enough? What would GPs suggest as a means to improve the quality of the communication with the radiologist?

COVER-GP is a substudy of the COVER internet survey, published earlier in *Radiology* (1) and *Insights into Imaging* (2), which explored the views and expectations of referring clinicians concerning the radiology report. In the present paper, we focus on the views and expectations of general practitioners (GPs). We present our results, elaborate on the underlying convictions and motivations of the responders, examine the information interchange between GPs and radiologists and discuss the potential impact of present and future developments.

Methods

In the course of 2008-2009, we organized an internet survey among

radiologists and referring clinicians in Flanders, the Dutch speaking part of Belgium (1, 2). Permission for the surveys was obtained from the Institutional Review Board (IRB) of Antwerp University Hospital. Since no patient health data were used, informed consent, HIPAA compliance and the need to attribute a study number were waived by the IRB.

The COVER-GP project (*survey on Clinicians' Opinions, Views and Expectations concerning the radiology Report among General Practitioners*) was a substudy of the survey among referring clinicians. A three section questionnaire was developed. In the first section, responders were asked to enter demographic data. The second part consisted of 46 statements on the radiology report, for which respondents could state their level of agreement according to a 5-tiered Likert scale. In the third, GPs could enter free text suggestions for improving the report.

For data collection, we used SurveyMonkey, a web-based survey tool. The surveys were launched according to a two-wave scenario. All GPs in the province of Antwerp, Flanders, Belgium, whose e-mail address was mentioned in the 2008 edition of the member list of the Order of Physicians of the Province of Antwerp

were invited by e-mail to participate. Two weeks later, all non-responders received a reminder. Again two weeks later, the survey was closed.

In the analysis of COVER-GP, the overall results on the 5-tiered Likert scale were complemented by columns in which 'entire' and 'partial' (dis)agreement were combined into single (dis)agreement. A total of 50% or more in such a column was considered threshold value for a 'true' or 'false' expression on the statement, while 50% or more in the 'neutral' column was considered a 'neutral' expression. If none of these options obtained 50%, the matter was considered 'undecided'.

Suggestions and comments in free text were subjected to open coding, grouped and used to elucidate the quantitative results.

Results

Study population

COVER-GP was performed in April-May 2009. Of 1,323 GPs invited by e-mail, 314 (23.7%) accepted the invitation to participate. Incoming forms were screened for incompleteness, errors and jokes. Of incomplete ones, only rated statements were retained. In total, 282 forms were prepared for analysis (21.3% of the invited GPs). Of these, 83 provided suggestions for improvement. Table I shows the demographics of the responders.

Tables IIa to IIe summarize the results. Statements pertaining to local situations and irrelevant to an international readership were not

From: 1. Department of Radiology, Ghent University Hospital, Ghent, 2. Department of Radiology, Antwerp University Hospital, Antwerp, 3. Department of General Practice and Primary Health Care, Ghent University, Ghent, Belgium.

Address for correspondence: Dr J.M.L. Bosmans, M.D., Dpt of Radiology and Medical Imaging, Ghent University Hospital, De Pintelaan 185, 9000 Ghent, Belgium.
E-mail: jan.bosmans@uzgent.be

Table I. — Demographics of GP responders, all and with suggestions: absolute number (percentage).

All	282 (100.0)						With suggestions	83 (29.4)							
	Gender	Male	(%)	Female	(%)	total		(%)	Gender	Male	(%)	Female	(%)	total	(%)
		176	(62.4)	106	(37.6)	282	(100.0)		49	(59.0)	34	(41.0)	83	(100.0)	
Age								Age							
Mean		52		41		48		Mean		55		42		50	
26-35		20	(11.4)	32	(30.2)	52	(18.4)	26-35		5	(10.2)	10	(29.4)	15	(18.1)
36-45		17	(9.7)	39	(36.8)	56	(19.9)	36-45		1	(2.0)	11	(32.4)	12	(14.5)
46-55		72	(40.9)	28	(26.4)	100	(35.5)	46-55		18	(36.7)	11	(32.4)	29	(34.9)
56-65		47	(26.7)	7	(6.6)	54	(19.1)	56-65		18	(36.7)	2	(5.9)	20	(24.1)
> 65		20	(11.4)	0	(0.0)	20	(7.1)	> 65		7	(14.3)	0	(0.0)	7	(8.4)
Licensed		173	(98.3)	101	(95.3)	274	(97.2)	Licensed		49	(100.0)	32	(94.1)	81	(97.6)
In training		3	(1.7)	5	(4.7)	8	(2.8)	In training		0	(0.0)	2	(5.9)	2	(2.4)
Working single		109	(61.9)	39	(36.8)	148	(52.5)	Working single		31	(63.3)	8	(32.4)	39	(47.0)
Working in group		66	(37.5)	67	(63.2)	133	(47.2)	Working in group		18	(36.7)	26	(76.5)	44	(53.0)
Unknown		1	(0.6)	0	(0.0)	1	(0.4)	Unknown		0	(0.0)	0	(0.0)	0	(0.0)

included. We will elaborate on the results and emphasize the specificity of primary care in its relationship with radiology. In total 83 questionnaires contained suggestions. We selected different quotes to illustrate the results found in the survey. Each quote is accompanied by the gender (M or F), age (years), degree (Licensed or in Training) and practice type (working Single or in a Group) of the responder.

Is the radiology report important for the GP?

In Belgium, GPs receive both the report, and the films or a CD-ROM containing the images. However, Table IIa shows that primary care physicians rely heavily on the radiologist for the interpretation of imaging studies. They cannot do their work without a report (96.8%). If they would try to interpret the images themselves, they would miss important features (84.0%). Therefore, not reading a radiology report would be unthinkable (97.8%).

Quotes:

"Always a conclusion at the end, even if it says there are no abnormal findings, so one knows at once it is worthwhile to read the whole report." (M 70 L S)

"Especially a clear, concise conclusion is important and handy for the clinician. An extensive report without a summary is too time-consuming and too much of an effort to decipher." (F 44 L S)

"If things are certain: clearly say so. Uncertain things: write they are uncertain or provide a differential diagnosis if possible." (M 76 L S)

Is there a need to provide clinical information and to formulate an unequivocal clinical question?

Would it be better to restrict the provision of clinical information to the radiologist to prevent interpretation bias? No: 81.7% disagreed. Does the radiologist have to know which clinical question the clinician wants to see answered? Nearly all responders (97.4%) agreed. Should a GP who requests an examination that is not part of any routine clearly state a clinical question? 93.4% of GPs thought so.

Quotes:

"I always ask a question in the examination request. They seldom provide an answer in the report. I suppose he has not read it then?" (M 40 L S)

"In our practice, we pay a lot of attention to referral letters with clinical information. A helping hand to the radiologist, who is a doctor too. Otherwise, the job could be done by a technician." (F 49 L G)

Is the GP satisfied with the report?

More than eight GPs out of ten (85.5%) are satisfied with the radiology report, which they understand well. Style and language are clear to 58.5%. One should be able to understand the report without great effort (85.5%). If the radiologist wants to achieve this, he better take into account the background of the referrer (94.9%).

As for completeness of the report and mentioning normal findings, opinions are mixed. Pointless details are unwanted:

"No descriptions of silly details." (M 55 L G)

"Extensive descriptions of normal things are pointless." (M 30 L G)

But so are reports which are too concise:

"All too short reports just mentioning 'normal' do not keep us up to date." (F 49 L G)

The report should mention what is relevant, including normal findings that may be important for later comparison.

"Not too many descriptions but to the point: suspect, not suspect, pneumonia, no pneumonia, or no further examination needed." (F 42 L G)

"Systematic description of normal structures according to a fixed protocol makes sense to me as proof that the radiologist has effectively looked at them." (M 32 L S)

"Mentioning normal findings can be useful later on when other complaints show up." (F 39 L G)

What about the structure and style of the radiology report?

On the question if a report of a simple examination like a chest X-ray can be limited to a mere: "No abnormal findings", the responders did not come to a decisive answer. Complex examinations cannot be reported so, according to most (67.0%). The conclusion is an essential part of the report but GPs do not limit themselves to reading just the conclusion: 85.1% felt the descriptive part should also be read. Reports in prose are only popular in a small minority (16.0%) of the GPs. Most favour itemized reports (83.9%) and the use of a standard lexicon (72.4%).

Table II. — Overall results of COVER-SP (referring general practitioners). Absolute numbers and percentages.

a. Is the radiology report important for the clinician?	total nr. of responders	result (%)
The radiology report is an indispensable tool in my medical work.	281	TRUE (96.8)
I am better able to interpret an imaging study from my own specialty than the radiologist.	282	FALSE (89.4)
The radiology report often mentions important issues I would not have noticed myself on the images.	275	TRUE (84.0)
I read a radiology report as soon as it is available.	282	TRUE (96.8)
I often do not read the radiology report.	282	FALSE (98.6)
The content of a radiology report is not important, since it is hardly read by anyone.	276	FALSE (97.8)

b. Is there a need to provide clinical information and to formulate an unequivocal clinical question?	total nr. of responders	result (%)
In order to make a good report, the radiologist has to know the medical condition of the patient.	276	TRUE (87.0)
In order to make a good report, the radiologist has to know what the clinical question is.	274	TRUE (97.4)
It is better that the radiologist does not know much about the patient, in order to avoid bias.	273	FALSE (81.7)
Any physician who requests a radiological examination that is not part of any routine, should state a clear clinical question.	273	TRUE (93.4)

c. Satisfaction with the report.	total nr. of responders	result (%)
Generally, I am satisfied with the reports I receive.	282	TRUE (85.5)
Not taking into account radiological slang, I often have trouble understanding what the radiologist means.	276	FALSE (75.0)
The language and style of radiology reports are mostly clear.	282	TRUE (58.5)
A radiology report can be read more easily if the radiologist uses common words and expressions instead of medical slang.	275	UNDECIDED
In a radiology report simple things are often said in a complicated way.	276	UNDECIDED
One should be able to understand a radiology report without great effort.	275	TRUE (85.5)
Radiologists proofread their reports thoroughly before they are being sent.	274	NEUTRAL (63.9)
It is the responsibility of the radiologist to adapt his style and choice of words to the level of the clinician.	274	TRUE (94.9)

More structure in a report and the use of a standard lexicon would be a nice thing, according to some.

"Layout, clear subdivision in paragraphs, e.g. per organ, so something can be found easily." (F 33 L G)

"Standardization of notions like 'bulging', 'hernia' etc. Not every radiologist uses the same terminology for the same affection." (F 50 L G)

"The report could be improved if the examination would be recog-

nized by the computer and put into the right place in the electronic patient record." (M 48 L G)

Should radiologists receive instruction on how to make a good report?

Although they do not seem totally convinced, a small majority of GPs (52.8%) reject the idea that the ability to make a good report is an inborn quality. Most (91.7%) do agree that learning to report should be an

integral part of the training of future radiologists. Whether the abilities of staff radiologists make them the ideal people to teach their future colleagues to report remained undecided (73.6%).

Summary of the main findings

GPs heavily rely on the radiology report for clinical decision making. They see the radiologist as a clinical colleague, and highly value his

d. What about structure and style of the radiology report?	total nr. of responders	result (%)
When a simple examination (e.g. a chest X-ray) does not show anything abnormal, the report can be limited to a mere: "No abnormal findings".	282	UNDECIDED
When a complex examination (e.g. an ultrasonography of the abdomen) does not show anything abnormal, the report can be limited to a mere: "No abnormal findings".	276	FALSE (67.0)
A radiology report that is longer than a few lines should end with a conclusion.	275	TRUE (94.5)
I usually only read the conclusion of a radiology report.	275	FALSE (66.5)
The descriptive part of a report should also be read, not only the conclusion.	275	TRUE (85.1)
If a radiologist does not mention a particular organ or body part, he will not have looked at it closely.	275	UNDECIDED
Even if the report is short, I assume the radiologist will have looked at the examination thoroughly.	274	TRUE (84.3)
A report should consist of a fixed list of short descriptions of the findings.	276	UNDECIDED
A report should consist of prose, like a composition.	275	FALSE (54.2)
When reporting complex examinations (CT, MRI, US...) it is better to work with separate headings for each organ system.	274	TRUE (86.9)
The simpler the style and vocabulary of a radiology report, the better the message will be understood.	275	TRUE (73.5)
The style of radiology reports is mostly pleasant.	275	UNDECIDED
In CT and MRI reports the technical details of the examination should be mentioned explicitly.	274	TRUE (65.7)
Clinical information, the clinical question, the descriptive part of the report, the conclusion and remarks should be put into separate paragraphs.	274	TRUE (83.9)
In some countries a standard lexicon of radiological terms is being prepared. If such a system would exist in my language, I would want our radiologists to use it.	275	TRUE (72.4)

e. Should radiologists receive instruction on how to make a good report?	total nr. of responders	result (%)
Making a good report is a matter of talent: either you are able to make one or you are not.	282	FALSE (52.8)
Learning to report should be an obligatory and well-structured part of the training of radiologists.	276	TRUE (91.7)
Not taking into account their knowledge of radiology, staff radiologists make better reports than residents-in-training.	276	NEUTRAL (73.6)
Writing in the broadest sense of the word is something I like very much.	26	FALSE (54.0)

Remarks

Numbers have been rounded off to the nearest decimal.

Statements pertaining to local situations or otherwise irrelevant to an international readership have not been included in these tables.

opinion. They realize that providing adequate clinical information with a clear clinical question is necessary to receive the information they need. Although most reports meet their expectations, GPs are displeased with radiologists who do not assume their clinical role, either by not paying attention to the information and questions provided by the GP, or by

producing vague or ambiguous reports. As part of a relationship among peers, GPs highly value personal contact with the radiologist.

Discussion

GPs work in a different diagnostic landscape than specialists do. Radiologists, who have trained in a hospi-

tal environment, may not always be aware of this situation. GPs' are often faced with complex, vague problems in uncertain situations, which have to be solved in a short period of time. The knowledge-based model of GPs' diagnostic reasoning combines analytical and non-analytical cognitive processes. 'Sense of alarm' or 'gut feeling' emerge as a consequence of

Table III. — Themes from suggestions by GPs, coded and ordered according to frequency.

Conclusion or impression of the report	20	Appreciation for the work of the radiologist	2
Clinical information and the clinical question	18	Diagnosis or differential diagnosis	2
Referring to images (inc. arrows)	13	Findings beyond the remit of the clinical question	2
Suggestions for further examinations	11	Measurements	2
Abbreviations (avoiding)	10	Slang	2
Concise reporting	9	Style	2
Normal findings	8	Type of examination	2
Structured reporting	8	CD-ROM	1
Communicating directly with the clinician	7	Comparative imaging studies	1
Descriptive part of the report	7	Electronic patient record (EPR)	1
Complete reports	5	Eponyms	1
Probability or uncertainty	5	Feedback from radiologist to GP	1
Technical problems	5	GP looks at the images himself	1
Competence of the radiologist	4	Online access to EPR	1
Lexicon	4	Printing the report	1
Handing the images to the patient	3	Quality control and improvement	1
Report as a training update for clinicians	3	Quick availability of results	1
Transmission of results	3	Standard text reports	1
Vague reports / the hedge	3	Training GPs	1
Total			172

this process. They can work in both directions, either reassuring GPs or alerting them to take action (3, 4). Ordering medical imaging can be one of those actions, for which the exclusion of illness is often the main reason.

Former studies

Medical imaging is among the most important diagnostic tools available to physicians, including GPs. Paradoxically, the number of papers on the collaboration between radiologists and primary care physicians is extremely low. In 1981, concise guidelines were published by the *Joint Working Party on Radiological Services for General Practitioners* (5). One year later, Nick L. Bishop stated that, before ordering an examination, GPs should be aware of how the result could influence the diagnostic and therapeutic management. He also emphasized that radiology is not a substitute for a good clinical examination. And third: to obtain maximum benefit from radiology, GPs must communicate their clinical findings to the radiologist (6).

In a 1986 letter to the *Journal of the Royal College of General Practitioners*, Robert F. Bury reported the results of a survey among 75 GPs to assess how well they were informed on well-established as well as newer imaging techniques. The conclusion was that radiologists should provide more education to their clients (7).

In 1988 Lafortune and Clinger, were the first radiologists to publish

systematic surveys on the imaging needs of medical specialists (8, 9). Papers on the communication between radiologists and GPs however remained extremely scarce. In 2009, Grieve et al published the results of a survey among 100 GPs. They found GPs were generally satisfied with the content and clarity of reports, liked detailed reports and valued the radiologist's opinion outside the remit of imaging when suggesting further patient management (10).

Hospital specialists see the radiologist mainly as an 'imaging specialist' and have more confidence in their own ability to interpret imaging results (1, 11). In contrast, to GPs the radiologist is a 'clinical specialist'. GPs look for arguments to reject clinical hypotheses. Not surprisingly, they highly appreciate any support by the radiologist in this decision-making process. In a recent survey among primary care physicians in the United States, 94% of the respondents even felt medico-legally obligated by recommendations made by the radiologists within their report (12).

Promises and pitfalls

The results of former surveys are very consistent, regardless of the period and the country in which they were performed. COVER-GP confirms GPs know very well that adequate clinical information can help the radiologist to optimize his conclusions. In exchange, in the interest of patient safety, we believe referring GP should also provide information

on medication that might interfere with the imaging study, as well as on former allergic or contrast reactions, thyroid function and renal clearance where appropriate. Mentioning that the patient is visually, hearing, mentally or otherwise impaired, or does not speak the language can also help. The tools to extract and transmit this data from the electronic patient record already exist.

In many countries, systems for medical information interchange among institutions and healthcare providers are under development or have already been firmly established. In Belgium, the government has created the *eHealth* platform as a means to promote and support this interchange. Today, more than 1.000 GPs already have access to the electronic patient record of their patients in collaborating hospitals.

We believe that the means are there to enable two-way communication between the GP and the radiologist, or in a stricter sense, to link the EHR (*electronic health record*) of the GP and the radiologist's PACS (*picture archival and retrieval system*) containing the images and RIS (*radiology information system*) containing the reports. Such a link would make it possible to prepare and transmit electronic request forms in which the patient's personal and basic medical data would be integrated automatically; the GP would only add the current clinical situation and the specific question. An appointment for the study could be generated automatically.

Associations such as the *Radiological Society of North America* (RSNA) are committed to provide radiology departments, information technologists and the industry with the means to integrate structured reporting into their systems. The development of a comprehensive radiology lexicon (RadLex) and of a set of numerous reporting templates testifies of this commitment (13, 14). The *European Society of Radiology* (ESR) in return is setting up a collaborative initiative between scientific subspecialist societies as well as European national radiology associations to translate and adapt the RSNA structured reporting templates.

In a structured report, the clinical information, the clinical question and patient identification can be copied from the GP's electronic request form, as is already the case in most hospitals for their inpatients. As the radiological diagnosis in a structured report will be coded, the information will find its way to the place where it belongs in the EHR at the GP's office. Either directly or through automatic translation to SNOMED-CT, ICD-10, ICPC-2 or any other coding system, the coded results will be ready for research and other forms of electronic data processing by the GP. All this is no longer science fiction, as both the will and the means are there to implement such a system.

However, while the possible assets are overwhelming, we must all keep in mind the results of COVER-GP. Comments made by the respondents suggest that today's GPs still greatly appreciate the possibility to discuss a patient with the radiologist. It seems unlikely that electronic communication will ever be able to totally substitute personal contacts between the referring GP and the radiologist. Moreover, the educational aspect of direct contact on the ability of the GP to correctly refer his patients to the radiology department cannot be overestimated. All stakeholders should bear this in mind and scrutinize each potential new step

toward automation to know if it will facilitate, allow, hamper or even impede direct consultation.

Strength and limitations of this study

The number of studies on the relationship between radiologists and primary care physicians is extremely low. With 282 responders, COVER-GP is, to our knowledge, the largest study on the subject to be reported to date. Our quantitative results are in line with those of former studies, but we have covered a much larger region of interest, including issues on education, structured reporting and standardization of terminology.

Any survey based on voluntary participation carries the risk that responders and non-responders belong to different groups. However, as the demographic data show, our responders nicely reflected the age and gender distribution of the GPs in the region.

The rather low response rate of 21.3% can be attributed to the fact that a number of the e-mail addresses we found were outdated, and that the survey was not preceded by an informative campaign to avoid bias. Several authors have shown that the accuracy of surveys with a response rate of 20 to 25% is not worse than that of surveys with a larger response rate (15, 16). Taking into account the concordance of our results with those of Grieve et al, we are convinced they do reflect the current opinions and expectations of GPs.

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