


BMJ Open What are the expectations of patients regarding the communication of nuclear imaging results? Insights from a French national survey of 723 patients

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ABSTRACT

Objectives There are still some controversies regarding the role of nuclear medicine practitioners in delivering imaging findings to the patients as well as content and magnitude of information to be delivered. The aim of the study was to identify the expectations of patients regarding the communication of results from a nuclear imaging examination.

Design A national survey was conducted among patients who underwent a nuclear imaging examination. In each participating centre, a questionnaire was administered to the patients.

Setting Primary care in France.

Participants The study involved 723 patients from 12 French Nuclear Medicine departments (university hospitals, general hospitals, comprehensive cancer centres and private centres).

Outcome measure The primary endpoint was to determine the proportion of patients expressing a wish to consult a nuclear medicine physician at the end of the imaging session and to assess the rationale underlying this preference.

Results Our results indicate that a significant majority (73.2%) of patients prefer to meet primarily with the nuclear medicine physician to receive an explanation of the imaging findings. Concerning the disclosure of these results, 66.1% of the patients prefer to receive an explanation from the nuclear medicine physician, either alongside or instead of the requesting physician alone. Furthermore, nearly all patients (96.1%) who wish to meet with the nuclear medicine physician also indicate their willingness to receive the examination results, even if they are unfavourable.

Conclusions This study underscores the clear preference of patients to interact with nuclear medicine specialists and benefit from their expertise, irrespective of whether the results are positive or negative. This emphasises the critical need for implementing standardised recommendations across countries and ensuring adequate training for nuclear physicians to actually meet this demand. This aspect is likely to distinguish a nuclear medicine physician from a scan interpreter.

INTRODUCTION

Nuclear medicine relies on the administration of radioactive isotopes for diagnostic or

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first large-scale study to investigate patients' expectations regarding their personal experience in nuclear medicine.
- ⇒ The findings may provide nuclear medicine physicians with evidence to support postimaging consultations with patients.
- ⇒ The study design is based on a structured questionnaire.
- ⇒ Limitations include potential selection bias due to the characteristics of participating centres, which may not reflect the broader nuclear medicine landscape, and the possibility that question design influenced participant responses.

therapeutic purposes. Like other physicians, nuclear medicine physicians are faced with the responsibility of communicating with the patients. There are still some controversies regarding the role of nuclear medicine physicians in delivering imaging findings to the patients as well as the content and magnitude of information to be delivered. In 2015, a study was conducted to investigate how nuclear medicine physicians typically communicate Positron emission tomography (PET) scan results to cancer patients as part of their daily practice.^{1,2} This study uncovered significant diversity in practices, with 63% of physicians stating they disclosed results on a case-by-case basis, 13% doing so systematically, while the remaining participants never disclosed imaging findings. The vast majority of physicians emphasised the absence of specific recommendations regarding how to inform patients in nuclear medicine, a context that could partially account for the variability in practices.

In 2017, a multidisciplinary ethics group was formed under the umbrella of the French Society of Nuclear Medicine (SFMN). Its primary founding initiative involved

the establishment of an ethical charter, which was later approved in 2019 and circulated to all French nuclear medicine departments, encouraging them to adopt and prominently exhibit it within their facilities. The ethical charter encompasses seven essential points, delineated as follows:

- ▶ Patient reception and explanation of the examination procedure must be conducted by a team member.
- ▶ Every patient undergoing imaging examination should have the opportunity to meet with a nuclear medicine physician.
- ▶ During this meeting, patients should receive clear, honest and tailored information, taking into account their level of understanding and sensitivity, while aligning with the clinical context as much as possible.
- ▶ The disclosure of examination results should occur during this meeting. Non-disclosure on patient request must be justified.
- ▶ This discussion should take place in a quiet room, preferably a designated area, to ensure the confidentiality of conversations between the physician and the patient.
- ▶ The nuclear medicine physician is responsible for ensuring postexamination care and should encourage patients to promptly consult their referring physician or general practitioner if results are unfavourable.
- ▶ Informing the patient is not about imposing information, but rather preparing them to understand it.

This ethical charter was written to fit with the anticipated expectations of patients and to meet the 2019 guidelines of the French National Cancer Institute (INCa) regarding the evolution of the cancer disclosure process. In continuation of this work, it was necessary to ensure that our charter was really aligned with the expectations of the large majority of patients. In 2022, a non-exhaustive survey (covering approximately 20% of the French nuclear medicine physicians) conducted among nuclear medicine departments revealed that 35% of the physicians had already implemented the ethical charter, with nearly 42% committing to implementing it in the near future.

The objective of our study was to gather additional insights into patient expectations to ascertain the alignment of the ethical charter with their needs. This study gathered responses from 723 French patients over a period of 3 months.

MATERIAL AND METHODS

Population

The target population comprised patients who underwent a nuclear medicine examination (PET scan or scintigraphy), irrespective of the indication and who consented to answer a questionnaire provided by the participating nuclear medicine departments. The study was conducted over a 3-month period from July to September 2022. The questionnaire was distributed to all registered French nuclear medicine physicians listed

within the SFMN and the Association of Residents in Nuclear Medicine (ANAIMEN). They were encouraged to participate in the study regardless of whether they had implemented the ethical charter in their department. Participating nuclear medicine physicians were asked to make the questionnaire available in paper format to as many patients as possible undergoing a PET scan and/or scintigraphy in their department. They were then responsible for collecting the completed anonymised paper questionnaires and returning them by mail. Physicians were encouraged to limit the duration of the study in each service to 1 week. Signed informed consent was obtained for participation. The sole exclusion criterion was patients declining to participate.

Questionnaire

The questionnaire was drafted by members of the ethics group of the SFMN, which, in 2022, comprised 19 individuals from diverse disciplines, including 12 nuclear medicine physicians, 1 oncologist, 2 psychologists, a philosopher, a patient representative, a lawyer and a communication researcher. The questionnaire consisted of 10 questions, primarily multiple-choice (online supplemental file 1). It aimed to ascertain whether patients desired to meet or had met the nuclear medicine physician who interpreted the results, as well as if they preferred an explanation of the results from the same nuclear medicine physician. To ensure the participation of a maximum number of nuclear medicine departments and patients undergoing examinations in these departments, it was decided to create a relatively short and understandable questionnaire. It was designed to fit on a single sheet for easy printing, distribution and mailing by physicians, while also making it quick and straightforward for patients to fill out. The first part of the questionnaire focused on delineating the primary sociodemographic and medical attributes of the patient, including gender, age group (in intervals of 5 years), the nature of the pathology being investigated through PET scan or scintigraphy (categorised as oncology or other, with additional details provided), and the frequency of undergoing this examination (whether it was the first instance or not). The second part of the questionnaire aimed to elucidate patients' expectations concerning their care within nuclear medicine departments. Initially, patients were queried about their wish to meet the interpreting nuclear medicine physician, with an opportunity to specify reasons if affirmative. Subsequently, they were prompted to articulate their preferences regarding the delivery of the examination report (whether directly provided, electronically transmitted or sent to the referring physician), as well as the elucidation of the examination results (by the nuclear medicine physician and/or the referring physician). For patients desiring an explanation from the nuclear medicine physician, willingness to receive unfavourable results was also explored.

Statistical analysis

Categorical data collected are expressed with their frequency and percentage (% valid, after excluding missing data for various questions) and are compared between different subgroups using a χ^2 test or Fisher's exact test depending on their applicability. The Mann-Whitney test was used to compare age groups in different subgroups. To study factors independently associated with the wish to meet the nuclear medicine physician for consultation and then the wish that the physician orally explains the results, binary logistic regression models were used, including age >60 years, pathology and previous examination as explanatory variables. Gender was not considered as it was not associated with these wishes ($p>0.5$) in univariate analysis. For all tests, two-tailed, a significance level of $p<0.05$ was considered statistically significant. All analyses were performed using R V.4.1 software (The R Foundation for Statistical Computing Platform, Vienna, Austria).

RESULTS

Population

The questionnaire was distributed to 755 French nuclear medicine physicians, comprising 682 registered by the SFMN and 73 nuclear medicine residents registered by ANAIMEN. A total of 12 nuclear medicine departments participated in the study, involving 723 patients. Among the 707 patients who responded to the question about their gender, 366 (51.8%) were female, while 341 were male (48.2%). The majority of patients were over 60 years old ($n=438$, 61.4%), followed by those aged 50–59 ($n=128$, 18%), 40–49 ($n=87$, 12.2%), 30–39 ($n=39$, 5.5%) and under 30 ($n=21$, 2.9%).

Regarding the diseases investigated by PET scan or scintigraphy, among the 684 patients who provided responses, 278 (40.6%) indicated they had cancer, while 406 (59.4%) indicated they had other diseases. Non-oncological pathologies were further categorised among the 116 patients who provided responses in the open-ended field and included osteoarticular ($n=50$), cardiac ($n=18$), endocrinological ($n=10$), uro-nephrological ($n=10$), inflammatory or infectious ($n=9$), pulmonary ($n=8$), neurological ($n=5$), digestive ($n=4$) diseases and 2 pretransplant assessments. Finally, among the 691 patients who responded, 298 (43.1%) indicated they had undergone the examination at least once before, while 393 (56.9%) indicated they had never undergone it before.

Do patients express a preference to meet with a nuclear medicine physician following an imaging examination?

The study shows that 73.2% (520 out of 710 patients) wished to meet with the nuclear medicine physician. Among them, just over half prefer this if the waiting time is reasonable (266 out of 710). Among the others, 14.2% ($n=101$) of patients expressed indifference towards

meeting the nuclear medicine physician, while 12.5% ($n=89$) stated that they did not wish to meet with them.

The primary reason cited for meeting with the nuclear medicine physician is, in 80.7% of cases (447 out of 554 responses), to have the doctor orally explain the main results of the examination. The second most common reason mentioned is to ask questions about the examination ($n=92$, 16.6%). A minority of patients ($n=15$, 2.7%) indicated wanting to see the physician for other reasons unrelated to the examination (such as anxiety or treatment follow-up).

The study also reveals that 66.1% of patients (446 out of 675) want to receive an explanation of the examination results from the nuclear medicine physician. Among them, 36.8% (164 out of 446) also wish for an additional explanation from the referring physician. Conversely, 33.9% of patients (229 out of 675) indicated that the explanation of the examination results will be solely conducted by the referring physician during a consultation designated for this purpose. Finally, for patients wishing the result to be explained by the nuclear medicine physician, a significant majority (96.1%, 419 out of 436 responses) expressed readiness to hear it even if it was unfavourable.

Do patients desire to receive their reports?

Concerning the report of their examination, 55.2% (399 out of 723) of patients expressed a preference to retrieve it directly in printed form, while 19.9% ($n=144$) favoured downloading it if a web access procedure was available. In contrast, 24.9% ($n=180$) of patients preferred the result to be transmitted to the physician (either a general practitioner or a specialist) who requested the examination. Finally, 13.4% ($n=97$) indicated that it did not matter to them how they retrieved the report as long as they were assured it would be transmitted to the referring physician.

Determinants influencing patients' preference to meet with the nuclear medicine physician for consultation and receive oral explanation of examination results

Univariate analysis

In the univariate analysis presented in [table 1](#), it is notable that a significant proportion of patients express either a wish to meet with the nuclear medicine physician or are open to this possibility. Furthermore, this inclination is particularly pronounced among patients below the age of 50, with 91.7% expressing a preference for meeting the physician compared with 86.3% among those aged 50 and above, a difference, however, not reaching statistical significance ($p=0.081$). Similarly, patients who have never undergone the examination display a higher preference for meeting the nuclear medicine physician, with 90.7% expressing this desire compared with 83.9% of those who have undergone the examination previously ($p=0.007$). Gender and nature of the disease, however, do not appear to exert a significant influence on the proportion of patients wanting to meet with nuclear medicine physicians.

**Table 1** Univariate and multivariate analyses on the factors associated with the wish to meet the nuclear physician

	Wish to meet the nuclear medicine physician		P value	Wish to meet the nuclear medicine physician		
	Yes	No		AdjOR	95% CI	P value
Sex						
Men	294 (87.5%)	42 (12.5%)	0.901*	NE†	NE†	NE†
Women	313 (87.2%)	46 (12.8%)				
Age						
<30 years	20 (95.2%)	1 (4.8%)	0.141‡	1 (ref.)	–	–
30–39 years	36 (92.3%)	3 (7.7%)				
40–49 years	77 (90.6%)	8 (9.4%)				
50–59 years	108 (86.4%)	17 (13.6%)				
>60 years	372 (86.3%)	59 (13.7%)				
			0.79	0.47 to 1.29	0.355	
Pathology						
Others	352 (88.2%)	47 (11.8%)	0.412*	1.02	0.62 to 1.67	0.935
Cancer	235 (86.1%)	38 (13.9%)				
				1 (ref.)	–	–
Examination already carried out						
No	352 (90.7%)	36 (9.3%)	0.007*	1.87	1.14 to 3.08	0.013
Yes	245 (83.9%)	47 (16.1%)				
				1 (ref.)	–	–

For each criterion (sex, age, pathology and examination already carried out or not), only patients who have provided an answer (Yes or No) at the question concerning their wish to meet the nuclear medicine physician are taken into account. The 'Yes' response covers patients who desire to meet the nuclear medicine physician or those who have no objections to meeting them (neutral).

* χ^2 test.

†NE: Variable NE in the multivariate model.

‡Mann-Whitney test.

AdjOR, adjusted OR; NE, not entered.

As shown in the univariate analysis (table 2), a significant majority of patients express a preference for the nuclear medicine physician to explain their results to them. This preference is notably higher among younger patients and those with a non-oncological pathology. Specifically, 69.4% of patients with a non-oncological disease express a desire for the nuclear medicine physician to explain their results compared with 60.5% of oncological patients, with the difference found to be statistically significant ($p=0.020$). In the subgroup analysis focusing on oncological patients, it appears that they are more inclined to seek clarification regarding the examination from the nuclear medicine physician compared with other patients (18.7% vs 12.5%, $p=0.039$), although they are less likely to wish oral explanations of their results (66.8% vs 75.3%, $p=0.025$). Patients who are developing cancer also demonstrate a preference for having their results communicated to the referring physician rather than directly to themselves (32.0% vs 20.0%, $p<0.001$). However, this preference is particularly pronounced among patients who have previously undergone a nuclear medicine examination, as opposed to those undergoing it for the first time, who tend to favour receiving written reports (60.1% vs 49.7%, $p=0.007$).

Multivariate analysis

In the multivariate analysis (table 1), the sole determinant found to significantly influence the wish to meet with the nuclear medicine physician in consultation is undergoing the examination for the first time (Adjusted OR=1.87 (95% CI 1.14 to 3.08), $p=0.013$). Similarly, in the multivariate analysis detailed in table 2, the only determinant significantly impacting the preference for the nuclear medicine physician to orally explain the results is the presence of a non-cancerous pathology (adjusted OR=1.45 (95% CI 1.01 to 2.07), $p=0.044$).

Stratified analysis

Figure 1 shows that a majority of patients, irrespective of whether they are undergoing a nuclear medicine examination for the first time or not, and regardless of their disease, express a desire to meet with the nuclear medicine physician. However, among oncology patients undergoing their first nuclear medicine examination and patients without oncological pathology, there appears to be an even stronger inclination towards meeting the nuclear medicine physician in consultation. Interestingly, among patients who have previously undergone the same examination, regardless of their pathology (oncological or non-oncological), the proportion of those not

Table 2 Univariate and multivariate analyses to explore factors influencing the preference for explanations by a nuclear medicine physician

	Wish for explanations of the results from the nuclear medicine physician		P value	Wish for explanations of the results from the nuclear medicine physician		
	Yes	No		AdjOR	95% CI	P value
Sex						
Men	207 (64.5%)	114 (35.5%)	0.502*	NE†	NE†	NE†
Women	229 (67.0%)	113 (33.0%)				
Age						
<30 years	14 (66.7%)	7 (33.3%)	0.034‡	1 (ref.)	–	–
30–39 years	28 (73.7%)	10 (26.3%)				
40–49 years	62 (73.8%)	22 (26.2%)				
50–59 years	85 (69.1%)	38 (30.9%)				
>60 years	253 (63.3%)	147 (36.7%)				
Disease						
Others	265 (69.4%)	117 (30.6%)	0.020*	1.45	1.01 to 2.07	0.044
Cancer	158 (60.5%)	103 (39.5%)				
Examination already carried out						
No	254 (68.6%)	116 (31.4%)	0.087*	1.25	0.88 to 1.79	0.217
Yes	171 (62.2%)	104 (37.8%)				

The 'Yes' response encompasses patients who seek explanations of the results solely from the nuclear medicine physician or in conjunction with the consultation with the referring physician.

* χ^2 test.

†NE: Variable not included in the multivariate model.

‡Test of Mann-Whitney.

AdjOR, adjusted OR; NE, not entered.

wishing to meet the nuclear medicine physician remains roughly equivalent, at around 16.5%. However, it is noteworthy that the number of patients expressing indifference towards this meeting is higher among oncological patients compared with those without cancer (16.6% vs 8.9%). **Figure 2** illustrates that the majority of patients prefer the involvement of the nuclear medicine physician in disclosing their examination results, either exclusively or in conjunction with the referring physician. However,

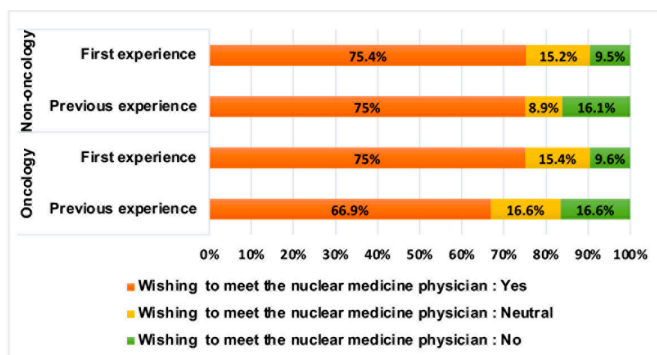


Figure 1 Representation of the distribution concerning the desire to meet the nuclear physician based on prior experiences in the nuclear medicine department.

those who exclusively prefer the nuclear medicine physician's involvement are individuals with a non-cancerous pathology or cancer patients attending for the first time. In contrast, oncological patients who have undergone the examination previously are less inclined to exclusively prefer the nuclear medicine physician for disclosure. Instead, they prefer the disclosure to be solely conducted by the referring physician (43.5%) or jointly by the

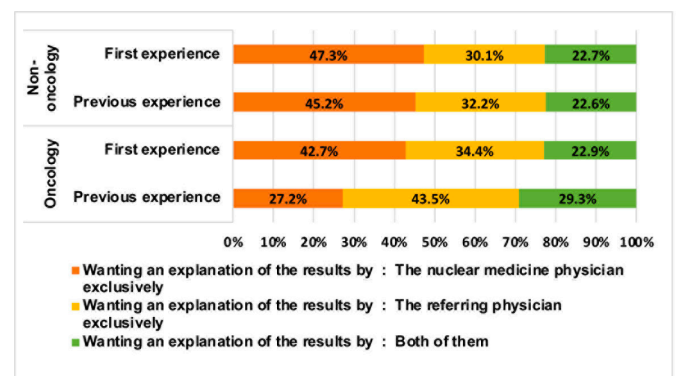


Figure 2 Representation of the distribution regarding the preference for receiving explanations of the results by either the nuclear medicine physician or the referring physician.



referring physician and the nuclear medicine physician (29.3%).

DISCUSSION

To the best of our knowledge, this study represents the first large-scale investigation into patients' expectations regarding their care in nuclear medicine.³ Apart from its high response rate, its uniqueness stems from the inclusion of patients of all ages, both men and women, with diverse pathologies, spanning across different regions of France.

The main results of our study can be summarised as follows: (1) A large proportion of patients, including oncologic and non-oncologic, wishes to meet with the nuclear medicine physician and seek explanations regarding the examination findings, (2). Almost all patients express a willingness to receive the examination results, regardless of whether they are favourable or unfavourable, (3) The primary determinant influencing patient preference for consultation with a nuclear medicine physician is the absence of prior experience in nuclear medicine and (4) Patients with a non-cancerous disease are more inclined than oncological patients to receive oral explanations of the results. Among oncology patients, those who have never undergone any nuclear medicine examination show a greater preference for receiving oral explanations exclusively from the nuclear medicine physician compared with others.

Some studies have delved into patients' expectations regarding meeting the imaging physician who interpreted their examination, but these investigations have predominantly centred on radiology settings. Remarkably, we identified only one study specifically focusing on patients undergoing nuclear medicine examinations.⁴

Our study has several methodological biases that can be discussed as follows. First, the participation rate of patients was not measured. We deliberately chose not to add this constraint to the participating departments because we were aware of the complexity of implementing the study in the department and wanted to limit the risk of having an even lower participation rate by adding this constraint. If we had had this information, it would have reinforced the representativeness of our sample of patients. Secondly, one may also wonder if the departments that agreed to participate in the study were not those already convinced of the importance of applying the ethical charter of the SFMN. However, the questionnaire was intentionally formulated in a general manner so that the responses would not be too influenced by the practices of the departments, and so that those not applying the ethical charter would not hesitate to participate in the study. Additionally, it is worth noting that we exclusively disseminated the questionnaire through SFMN and ANAIMEN channels with the aim of reaching nuclear medicine physicians. However, given the high proportion of patients in this sample who responded favourably to meeting the nuclear physician, it can be

reasonably assumed that this sample is representative of the general patient population. The participating centres may also not be representative of the nuclear medicine landscape in France. Third, the design of the questions may have influenced the responses.⁵ To avoid any yes-no question format on the question regarding their wish to meet the interpreting nuclear medicine physician, the patient could choose from four possible responses: 'Yes, I am prepared to wait as long as necessary for this'; 'Yes, if the waiting time is not too long'; 'No' and 'I don't mind'. Following this question, a follow-up question was asked exclusively to patients who expressed a desire to meet the nuclear medicine physician. This may also have steered participants towards an affirmative answer or discouraged effort-averse respondents from selecting it. We also did not perform a post hoc analysis of response patterns which could have provided a deeper understanding of potential response biases and strengthened the interpretation of our findings.

The conclusions are aligned with shifting societal attitudes, reflecting a widespread belief that information is a fundamental right for patients. The study's findings resonate with evolving social norms, prevailing legal standards and advancements in medical practices for the management of serious illnesses.⁶⁻⁸ The literature is almost limited to the radiology departments and highlighted that the vast majority of patients wished to meet with the radiologist after the examination.⁹⁻¹⁴ A single survey performed in Nuclear Medicine was conducted among 115 Belgian nuclear medicine physicians and 85 patients.⁴ The authors showed strikingly divergent results between the opinions of physicians and those of patients regarding the communication of postnuclear medicine examination results. The majority of physicians (90.5%) believed that nuclear medicine physicians and radiologists should never communicate the results to patients, except in some exceptions. In contrast, 83.5% of patients demanded at least a vague idea of the result while agreeing that referring physicians would provide further clarification and details about the complete nature of the result.

Regarding the fact that oncological patients who have already undergone the examination statistically prefer less to have the result explained exclusively by the nuclear medicine physician compared with those coming for the first time, this could be explained by several factors: (1) the fact that initially, some patients were only expecting to see the physician to receive explanations about the examination process; (2) the fact that these patients prefer their oncologist/referring physician, whom they know well, to announce the results to them and (3) the fact that they prefer the announcement to be accompanied by a therapeutic plan.

Our study demonstrates that the recommendations of the ethical charter of the SFMN are well aligned with the expectations of a majority of patients. Accordingly, there is a strong majority of patients who do not have any particular preference regarding the person delivering information about the examination process. Therefore,

the physician may delegate this task to a team member, as stipulated in the first point of the code. However, in their vast majority, patients wish to be able to meet with the nuclear medicine physician, either to have the result explained to them or to ask questions about the examination itself. The second point of the charter strongly encourages physicians to comply with this patient expectation, particularly when it is clearly expressed, regardless of their habits or preferences. The fourth point of the charter encourages the physician to orally deliver the examination result to the patient during the consultation, unless the patient explicitly opposes it and/or prefers the results to be explained by the referring physician, who may include the therapeutic aspect. This study shows that this recommendation is also in line with the expectation of a majority of patients, as they wish for the result to be explained to them by the nuclear medicine physician, exclusively or not. The other points of the code are common sense and are in accordance with the law and general recommendations already developed and not specific to nuclear medicine.

The role of the nuclear medicine physician, and more generally of the imaging practitioners, would be to prepare the patient to receive information about their health status during the announcement consultation, under the responsibility of their referring physician.¹⁵ It can be assumed that practices began to evolve following the dissemination by the SFMN of the ethical charter. Additionally, the evolution of practices will be imperative to align with the updated requirements outlined in the 2019 guidelines from the INCa. Indeed, imaging practitioners are encouraged to conduct a consultation for the announcement of suspected cancer and during other major cancer events occurring during the disease pathway (recurrence, progression...), with the aim of delivering to the patient the first elements of the potential cancer diagnosis and preparing them for the confirmation diagnosis announcement phase. In addition to legal frameworks, regulations, recommendations and patient expectations regarding their care in nuclear medicine, it is crucial for every nuclear medicine physician to consider the ethical aspect of loyalty in patient care. In this regard, it is important to recall the golden rule in ethics, which advocates treating others as one would wish to be treated in similar circumstances.¹⁶ According to our study, the practices of a majority of nuclear physicians, as described in the national study of 2015, do not comply with patients' expectations.¹ Briefly, out of the 250 physicians who responded, only 56% reported that they meet patients systematically, 35% meet them on a case-by-case basis and 9% never meet them. Regarding the oral communication of oncological PET results to patients, as mentioned earlier, nuclear physicians' practices were very heterogeneous in 2015, with nearly 81% of them not meeting the patients systematically after the PET scan, thus avoiding delivering the results to them orally.

These principles are reshaping the role of the nuclear medicine physician, and more broadly, that of imaging

practitioners, in preparing patients to receive health information during consultations dedicated to result sharing. They are also becoming more involved in the responsibility-sharing process with the referring physician.¹⁵ In this framework, imaging practitioners are encouraged to hold consultations to share diagnoses of suspected or confirmed cancer, or during other significant cancer-related events (such as recurrence or progression), with the aim of preparing patients for the next steps in their treatment. Besides the legal frameworks, regulations, recommendations and patient expectations for nuclear medicine care, it is crucial for every nuclear medicine physician to consider the ethical dimension of loyalty in patient care. In this context, it is vital to remember the golden rule in ethics, which advocates treating others as one would wish to be treated in similar circumstances.¹⁶ Acknowledged by prominent philosophers as a moral tenet, physicians should ponder whether they would prefer to remain uninformed about a medical result that could be promptly communicated to them.¹⁷ The ethical imperative of reciprocity demands the ability to see things from various perspectives. It also encourages patients to empathise with the physician's position. However, a dilemma arises as nuclear physicians may feel less equipped to meet patient expectations compared with those of the referring physician. Drawing on prudential ethics influenced by Aristotle, physicians can seek a 'middle ground' between automatically disclosing negative results and withholding information.¹⁸ By adopting an approach of openness towards the patient, the physician cannot force them to receive information but can instead prepare them to comprehend it. This preparatory approach to announcing results could help alleviate patient anxiety, which might otherwise be heightened by silence. As emphasised by the French High Authority of Health in its report on delivering distressing news, 'what is known, even if distressing, is always better than what is distressing and unknown'.¹⁹

The results of this study underscore the need to extend training on delivering examination results to as many nuclear physicians as possible. Indeed, while providing information is often easy and quick in cases of non-serious pathologies, it can be much more complex and time-consuming when the diagnosis is serious. One notably effective method is to integrate imaging specialists into management teams and actively involve them in the creation of treatment strategies. Training on managing situations involving the announcement of a serious diagnosis or prognosis appears to be an essential prerequisite before facing patients in distress and dealing with their potential reactions. However, these classroom-based trainings do not claim to replace the hands-on training of young physicians in the field, supervised by senior physicians. Traditional mentorship could be strengthened by 'simulation' type trainings to master the approach to difficult announcements. Classroom-based training has been offered by the ethics group of the SFMN since 2016 to French residents and experienced nuclear physicians.



These trainings will be even more important as they will become mandatory for continuing medical education validation from 2025 onwards in France. It would also be interesting to extend them to radiologists who share a similar practice and are subject to the same recommendations from the INCa.

CONCLUSIONS

The majority of patients express a desire to personally meet the nuclear medicine physician who interprets their examination results, regardless of whether they are positive or negative. Therefore, the recommendations of the French nuclear medicine ethical charter and societal context align with the expectations of patients regarding their relationship with the nuclear medicine physician. It is, therefore, essential to continue raising awareness among nuclear medicine physicians about the importance of meeting patients after the examination and to train them in announcing examination results, especially when unfavourable. In order to assess the effectiveness of the recommendations and training on practices, it would be advisable to replicate the study we conducted on a larger sample of participants and at consistent intervals, ideally every decade or so. This would allow for a comprehensive evaluation of the long-term impact and ensure the reliability of the findings over time.

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Patient consent for publication Consent obtained directly from patient(s).

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