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Expectations for Feedback in Adverse Drug Reporting by Healthcare Professionals in the Netherlands

Ingrid Oosterhuis,[1] *Florence P.A.M. van Hunsel*[1,2] and *Eugène P. van Puijenbroek*[1]

1 Netherlands Pharmacovigilance Centre Lareb, 's-Hertogenbosch, the Netherlands
2 University of Groningen, Department of Pharmacy, Division of Pharmacotherapy and Pharmaceutical Care, Groningen, the Netherlands

Abstract

Background: In 2010, the Netherlands Pharmacovigilance Centre Lareb received more than 4000 reports from healthcare professionals (HCPs). All HCPs received individual personal feedback containing information about the reported drug-adverse drug reaction (ADR) association. It is unclear what type of information HCPs expect in this feedback letter.

Objective: The aim of the study was to examine the expectations of the personal feedback of HCPs who reported an ADR to the Netherlands Pharmacovigilance Centre Lareb.

Methods: A questionnaire survey was conducted among a random sample of 1200 pharmacists, general practitioners (GPs) and medical specialists who reported an ADR to the Netherlands Pharmacovigilance Centre Lareb between 1 January 2009 and 27 January 2010. Responders and non-responders were compared on the basis of profession, number of reports submitted to the pharmacovigilance since 2007 and their last report being serious or not. Questions were asked about the importance of personal feedback and the type of information reporters would like to see in their personal feedback. Both linear and logistic regression analysis were performed, with correction for possible confounding factors.

Results: The response rate to the questionnaire was 34.6% (n = 399). The type of information the respondents generally would like to see in their personal feedback is information about the time course of the ADR and information about the pharmacological mechanism. However, GPs were, in general, less interested in receiving feedback than pharmacists and medical specialists.

Most of the respondents were (very) unsatisfied if they received only a confirmation letter instead of personal feedback. Personalized feedback was considered to be (very) important for reporting an ADR in the future. Most of the respondents (80.3%) stated that the personal feedback increased their knowledge. Only 0.6% of respondents had not read the personalized feedback. No differences were found between responders and non-responders,

with the exception that responders had reported statistically more often to the Netherlands Pharmacovigilance Centre Lareb in the past 3 years.
Conclusions: Most of the respondents would like personal feedback instead of a standard confirmation letter. In general, pharmacists and medical specialists would like more information than GPs. The information in this study is useful in generating more customized personal feedback in the future, and could be useful for other pharmacovigilance centres that are interested in writing personalized feedback to make available to reporters.

Background

Spontaneous reporting of adverse drug reactions (ADRs) plays an important role in providing early signals for detecting new ADRs in the post-marketing phase. It contributes to more knowledge of the nature of ADRs in daily practice.[1,2]

In the Netherlands, the Pharmacovigilance Centre Lareb is responsible for collecting and analysing ADR reports. In 2010, the Netherlands Pharmacovigilance Centre Lareb received 9868 reports from healthcare professionals (HCPs), consumers and marketing authorization holders, of which 4015 reports were submitted by HCPs.[3]

Motives and attitudes about ADR reporting to a pharmacovigilance centre have been studied extensively.[1,2,4-10] The main reasons for HCPs to report ADRs were the seriousness[6,7,9] and severity[2,8-10] of the reaction, ADRs to a new drug,[6-10] unusual reactions[7,9,10] and the possible relationship of the reported drug-ADR association (causality).[2,4,5,8] The obligation to report,[4,5] share knowledge and contribute to drug safety was also mentioned.[1] In most studies, no significant differences for reporters in sex,[4,5,7,9] age[4,5,7,9] or specialization[4,5] were found, although one study did find differences in sex for the probability of reporting.[11] Reporting ADRs was also stimulated by sending general feedback and by a positive active relationship between the HCP and the pharmacovigilance centre.[8] HCPs report less when they think serious ADRs of new drugs are well documented, that causality must be certain when reporting and when they think the assessment of causality is nearly impossible.[11]

To increase the knowledge and awareness of ADR reporting, sending personal feedback to reporters may help. The newly obtained information from the personal feedback enables more knowledge to become available for use in daily practice.[12] Sending personal feedback occurs in only a few countries, for example Sweden,[13] New Zealand[14] and the Netherlands.[1] In addition, the provision of personalized information may well increase the relationship between the pharmacovigilance centre and the reporters, and therefore also the chances of obtaining follow-up information when required. In the UK, the introduction of targeted follow-up letters was associated with an increase in the mean annual response rate for follow-up from 36.4% in the 5 years before targeted follow-up to 60.5% in the 5 years after introducing targeted follow-up.[15]

When a reporter submits a report to the Netherlands Pharmacovigilance Centre Lareb, the report is assessed, coded and filed in a database.[16] In this process, the ADR information collected is not only focused on the detection of new signals, but also on providing feedback for the reporter. The causality is assessed on a case-by-case basis using the Naranjo algorithm.[17] After the assessment, the reporting HCP receives an individual feedback letter.[5] This letter contains information about the Summary of Product Characteristics (SmPC), literature, information about the number of reports in relevant databases and information about causality. In Sweden and New Zealand, information about causality and the number of reports in relevant databases is also given,[13,14] and New Zealand also gives additional information about risk groups and prevention issues.[14]

Because only a few countries send individual feedback, a limited number of studies have been

performed that have attempted to reveal the impact of sending feedback and the motivations behind ADR reporting to a pharmacovigilance centre.[13,18]

In the pharmacovigilance centre in Sweden, two types of feedback were compared in doctors reporting ADRs to the regional pharmacovigilance centre. The standard type of feedback was compared with a more extensive type of feedback, which also contained information about the reports of the regional pharmacovigilance centres. No differences in opinion were found on quality or overall impression of the feedback. Statistical differences were found in the perceived amount of information in the extensive type of feedback containing additional information. The authors discussed that ADR reporting rates can be increased by a more detailed, specific feedback to the reporter. The content of feedback is important and may influence the reporting rate.[13]

Previous research by the Netherlands Pharmacovigilance Centre Lareb also concluded that sending personal feedback motivates HCPs to report an ADR on future occasions;[1,18] however, sending individual feedback serves several other goals. Because of the case-by-case analysis, personalized feedback can be used as a tool for the detection of possible new ADRs (signal detection).[16] In addition, personal feedback will increase awareness of ADRs.[1,18] Moreover, sending personal feedback increases knowledge about the reported association for the reporter. A reporter can apply this newly obtained information about the risks of a drug to the treatment of the individual patient.[12]

In 2009, the Netherlands Pharmacovigilance Centre Lareb published their experiences with feedback for general practitioners (GPs).[18] This study concluded that GPs were satisfied with the feedback given and would like to see the same format and communication in the future.

Because this study focused on GPs, no conclusions could be made about the other reporting HCPs, such as medical specialists and pharmacists. The study did not give information about what specific type of information HCPs expect and how this personal feedback influences the reporting of ADRs. This information is needed to make tailor-made personal feedback that is both useful in daily practice and cost efficient.

The aim of this study was to quantify the expectations of the personal feedback of HCPs who reported an ADR to the Netherlands Pharmacovigilance Centre Lareb. In addition, a comparison was made of responders to the questionnaire versus non-responders.

Methods

A web-based questionnaire was sent to pharmacists, GPs and medical specialists who had previously reported an ADR to the Netherlands Pharmacovigilance Centre Lareb.

Study Population

The study population was defined by pharmacists, GPs and medical specialists who reported at least one ADR to the Netherlands Pharmacovigilance Centre Lareb in the period between 1 January 2009 and 27 January 2010. Patients were excluded. Using a query on the ADR database, a list of unique e-mail addresses of reporters was created, with 858 pharmacists, 822 GPs and 824 medical specialists. In each group, the 400 most recent reporters were selected at random. Another 400 reporters per group were included in a separate study that was conducted in the same period.[19]

Questionnaire

A web-based questionnaire was designed with the SurveyMonkey[20] package using the following items (table I):

1. The HCPs' satisfaction when a confirmation letter was sent instead of personalized feedback.
2. The type of information reporters would like to see in their personal feedback.
3. Action taken by the reporters after they received personal feedback.
4. The importance of the feedback for reporting an ADR in the future.

The first and fourth questions were rated using the 5-point Likert scale.[21] The other two questions had several possible responses, from which more than one response could be chosen. When

Table I. Overview of the questions in the questionnaire

General questions
How satisfied will you be when receiving only a confirmation letter without feedback?[a] (very unsatisfied, not satisfied, neutral, satisfied, very satisfied)
Which information would you like to see in the personal feedback? (time course of the ADR, mechanism, literature, Netherlands Pharmacovigilance Centre Lareb/WHO databases, other)
What did you do with the information you received for your last report? (I stored the information, the information increased my knowledge, the information influenced the treatment of the patient, I didn't read the information, I didn't receive any information, other)
How important is the personal feedback for reporting the next time?[a] (not important, less important, neutral, important, very important)
Case-related questions
How relevant is the information for you from:[a]
the SmPC
Literature (Micromedex® and MEDLINE®)
Pharmacological mechanism
Netherlands Pharmacovigilance Centre Lareb and WHO databases
Dechallenge and rechallenge
Information about the ADR in general or publications with a URL to the Netherlands Pharmacovigilance Centre Lareb website
Do you still miss any information (Y/N). If Y, please specify your answer (text field)

a Questions using the 5-point Likert scale as answer (not relevant, slightly relevant, neutral, quite relevant, relevant).

ADR = adverse drug reaction; **N** = no; **SmPC** = Summary of Product Characteristics; **Y** = yes.

the option 'other' was chosen, a text field appeared where the responder could explain their choice.

Additional (case-related) questions concerning the appreciation of the various components of the feedback were studied through three practical examples of drug-ADR associations. Questions concerning the following were asked:

1. Relevance to the reporter of information from the SmPC.
2. Relevance to the reporter of data from the literature, both for the literature database MEDLINE® and from a literature database that also contains information from US package inserts (Micromedex®).[22]
3. Relevance to the reporter of a possible pharmacological mechanism.
4. Relevance to the reporter of information about the number of reports that were reported to the Netherlands Pharmacovigilance Centre Lareb and WHO databases.
5. Information about the ADR in general, or publications with a URL link to the Netherlands Pharmacovigilance Centre Lareb website.

All case-related questions were rated using the 5-point Likert scale ('not relevant' to 'relevant'). The middle position represented the neutral position.[21] At the end of each case the reporter was asked if he or she missed any information that was not mentioned in the case above. When the option 'yes' was chosen, a text field appeared where the responder could explain his choice in free text.

The questionnaire consisted of 39 questions and took a minimum of 15 minutes to complete.

Sending the Questionnaire

The questionnaire was field-tested among a small group of HCPs, which consisted of three pharmacists, one GP and two medical specialists, before sending the questionnaire to the study group.

The survey was sent on 16 February 2010. Two weeks later, a reminder was sent to all non-responders. Collection of responses was finished 3 weeks after sending the first invitation. The link in the invitation e-mail was unique for each respondent; therefore, only one response per e-mail address was possible.

Data Analysis

Responders vs Non-Responders

To see if responders and non-responders of the questionnaire differed, they were compared on the basis of their profession (GP, pharmacist or medical specialist), the number of reports sent to the Netherlands Pharmacovigilance Centre Lareb in the period 1 January 2007 to 27 January 2010 and the seriousness of their latest report according to the CIOMs criteria.[23] Differences between responders and non-responders based on profession and seriousness of their latest report were statistically compared with a Chi-square test. Significance was based on $p < 0.05$.

The difference in number of reports between responders and non-responders was studied with a non-parametric Mann-Whitney test. Significance was based on $p < 0.05$.

Questionnaire

General Questions

For questions that were measured on the 5-point Likert scale, a linear regression analysis was performed. The profession of the HCPs was included as a dummy variable, with GPs as the initial reference category.

The outcome of the regression analysis was the HCPs' score on the 5-point Likert scale (with 95% confidence interval [CI]), corrected for possible confounding from the factors 'number of reports between 1 January 2007 and 27 January 2010' and 'last report before the questionnaire is serious'. Likewise, Likert scale scores using the other professions as the reference category were calculated. Statistical differences between the professions were calculated, with significance based on $p < 0.05$.

The question about what HCPs would like to receive in the feedback was measured as dichotomous variables; a logistic regression analysis was used for the analysis. Odds ratios (with 95% CI) for the separate professions were calculated, corrected for possible confounding from the same factors and significance mentioned above.

The question about what the reporter did with the information received for the last report was presented in percentages.

Case-Related Questions

The 5-point Likert scale score regarding the relevance of personal feedback for the cases was compared with a linear regression analysis corrected for possible confounders, in a similar manner to the analysis for the general questions.

SPSS (IBM SPSS Statistics Microsite), version 18.0 (South Wacker Drive, Chigago, IL, USA), was used for all analyses.

Answers to the open questions were categorized by two of the authors (IO and FvH) independently. Differences were discussed until the authors reached agreement.

Results

Response

A link to the questionnaire was sent by e-mail to a total of 1200 pharmacists, GPs and medical specialists. Thirty-eight e-mails were undeliverable and eight respondents turned out to be non-HCPs who erroneously filled in the reporting form for health professionals instead of the consumer reporting form. These respondents were excluded from the data analysis. Of the remaining 1154 invitations, 399 (34.6%) respondents filled in the questionnaire. Of these respondents, 321 (80.5%) completed the questionnaire. The respondents were equally divided over the groups, with 132 (34.2%) pharmacists, 131 (34.7%) GPs and 136 (34.9%) medical specialists (figure 1).

Responders vs Non-Responders

There was no statistical difference between responders and non-responders based on profession or the HCPs' last report being serious (see table II).

The number of reports varied per reporter from 1 to 53 reports. The mean number of reports for responders was 3.36 reports (SD 4.53). The mean number of reports for non-responders was 2.55 reports (SD 5.97). Responders to the questionnaire had reported statistically more often than non-responders (Mann-Whitney test; $p < 0.001$).

General Questions

The type of information respondents generally would like to see in their personal feedback is information about the time course of the ADR and information about the pharmacological mechanism. Crude and corrected odds ratios and p-values for the differences between groups are shown in tables III and IV. The need for information about the time course of the ADR was highest for pharmacists and lowest for medical specialists ($p < 0.05$). Pharmacists are also the group most interested in the pharmacological mechanism, a subject that was statistically less interesting for GPs ($p = 0.02$). Pharmacists and medical specialists are also statistically more interested in information about the national and WHO database than GPs ($p < 0.001$ for GPs vs pharmacists, and $p = 0.01$ for GPs vs medical specialists).

Most of the pharmacists, GPs and medical specialists were (very) unsatisfied if they received a standard confirmation letter instead of personal feedback containing information about the re-

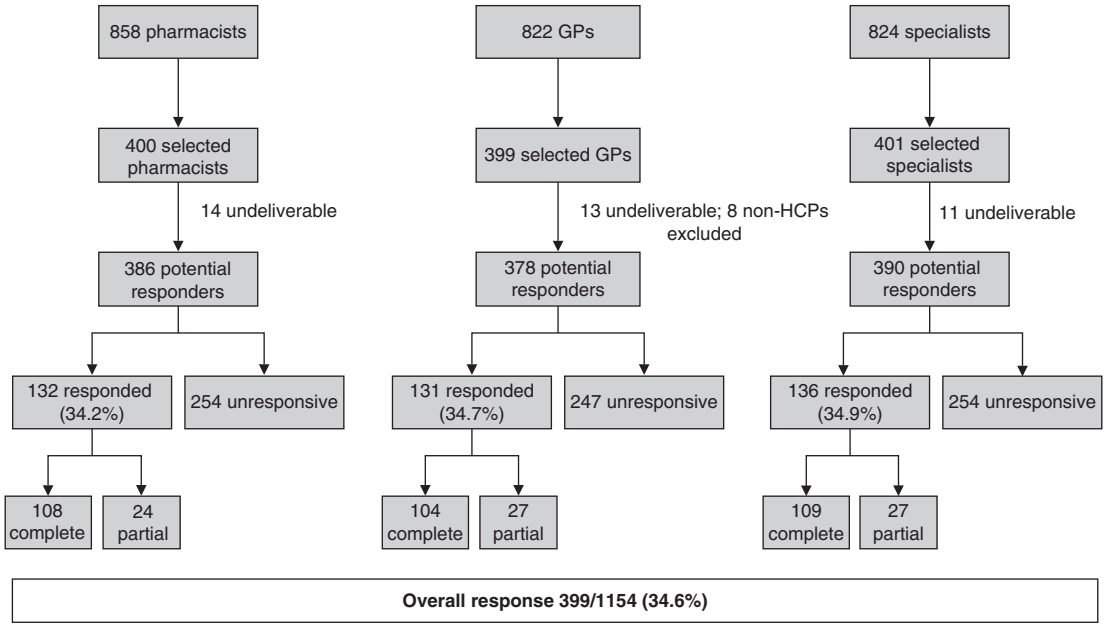

Fig. 1. Flowchart of the respondents of the questionnaire. **GPs** = general practitioners. **HCPs** = healthcare professionals.

ported drug-ADR association. Scores on the Likert scale were 2.46 for GPs, 2.05 for pharmacists and 2.53 for medical specialists. Satisfaction with receiving only a confirmation letter was statistically significantly different between pharmacists and GPs ($p < 0.001$), and between pharmacists and medical specialists ($p < 0.001$).

Personal feedback was considered to be (very) important for reporting an ADR the next time. Scores on the Likert scale varied from 4.17 for medical specialists to 4.31 for GPs. There was no statistical difference between professions.

Table II. Comparison responders vs non-responders

	Responder	Non-responder	p-Value (Chi-square test)
Profession			
Pharmacist	132	254	0.98
General practitioner	130	246	
Medical specialist	136	254	
Seriousness of latest report			
Serious	124	244	0.69
Non-serious	274	519	

After the respondents received their personal feedback, most of the respondents (80.3%) stated that the personal feedback helped to increase their knowledge. In total, 36.4% of the respondents archived the information they received. Only 0.6% of respondents had not read the personalized feedback. In the 'other' free-text field category, many respondents stated that they discussed the content of the personal feedback with their patient, and that the information influenced the treatment options of the patient.

Case-Related Questions on the Relevance of the Information

An overview of the responses of the case-related questions, with p-values for the differences between groups, is given in table V. There were no items that scored lower than 3.31 (Likert score between 'neutral' and 'mostly relevant'). In the personal feedback, information from the Netherlands Pharmacovigilance Centre Lareb database and SmPC was considered as the most relevant information for respondents. Scores on the Likert scale for relevance of information from

Table III. Outcomes between professions of the general questions regarding the personal feedback: Likert scale answers

General questions	Crude outcome linear regression analysis: Likert scale (95% CI)			Adjusted outcome linear regression analysis: Likert scale (95% CI)			Statistical differences between groups[a] (p-value <0.05 shown in bold)		
	GP	P	MS	GP	P	MS	GP vs P	GP vs MS	P vs MS
Satisfaction when a confirmation letter would be sent instead of personalized feedback (score 1–5 on the Likert scale)	2.50 (2.35, 2.65)	2.07 (1.93, 2.22)	2.56 (2.41, 2.71)	2.46 (2.08, 2.84)	2.05 (1.67, 2.44)	2.53 (2.19, 2.87)	<**0.001**	0.51	<**0.001**
The importance of the feedback for reporting an ADR next time (score 1–5 on the Likert scale)	4.34 (4.20, 4.48)	4.25 (4.11, 4.38)	4.18 (3.98, 4.37)	4.31 (3.96, 4.66)	4.21 (3.85, 4.56)	4.17 (4.04, 4.31)	0.31	0.10	0.54

a Based on the regression analysis corrected for confounding factors.

ADR = adverse drug reaction; **GP** = general practitioner; **MS** = medical specialist; **P** = pharmacist.

the Netherlands Pharmacovigilance Centre Lareb database varied from 4.23 for medical specialists to 4.43 for pharmacists. This difference was statistically significant (p = 0.04). There was no statistical difference in relevance of the SmPC between the groups. Scores varied from 4.14 for medical specialists to 4.36 for GPs.

Information from the WHO database was significantly more interesting for pharmacists than for GPs (p = 0.02) and medical specialists (p = 0.03).

Medical specialists and pharmacists also scored high on the relevance of information from a literature system (scores 4.27 and 4.22, respectively). This information was statistically significantly more relevant for both groups compared with GPs (p = 0.001). Literature found through a MEDLINE® search was seen as less relevant, with medical specialists appreciating this information more than GPs and pharmacists. GPs were least interested in this information. This was statistically significant between all three professions.

GPs were also less interested in the pharmacological mechanism of an ADR than pharma-

Table IV. Outcomes between professions of the general questions regarding the personal feedback: multiple selection answers

General questions	Crude odds ratio logistic regression analysis (95% CI)			Adjusted odds ratio logistic regression analysis (95% CI)			Statistical differences between groups[a] (p-value <0.05 shown in bold)		
	GP	P	MS	GP	P	MS	GP vs P	GP vs MS	P vs MS
What information would you like to receive in the personalized feedback?									
Course of the ADR	2.74 (1.86, 4.04)	4.28 (2.77, 6.61)	2.40 (1.66, 3.47)	5.62 (1.92, 16.46)	8.33 (2.66, 26.12)	4.54 (1.72, 11.91)	0.20	0.44	**0.05**
Literature	0.21 (0.52, 0.13)	0.47 (0.32, 0.67)	0.62 (0.44, 0.87)	0.17 (0.06, 0.48)	0.34 (0.12, 0.93)	0.50 (0.21, 1.21)	0.03	<**0.001**	0.14
Pharmacological mechanism	1.11 (0.79, 1.57)	2.30 (1.59, 3.33)	1.52 (1.08, 2.14)	2.91 (1.13, 7.51)	5.40 (1.96, 14.99)	3.49 (1.47, 8.28)	**0.02**	0.48	0.11
Netherlands Pharmacovigilance Centre Lareb and WHO databases	0.49 (0.34, 0.70)	1.36 (0.96, 1.92)	0.97 (0.69, 1.36)	0.68 (0.28, 1.68)	1.79 (0.70, 4.58)	1.35 (0.59, 2.95)	<**0.001**	0.01	0.24

a Based on the regression analysis corrected for confounding factors.

ADR = adverse drug reaction; **GP** = general practitioner; **MS** = medical specialist; **P** = pharmacist.

Table V. Outcomes between professions regarding the relevance of personal feedback for the cases

Case-related questions	Crude outcome linear regression analysis: Likert scale (95% CI)			Adjusted outcome linear regression analysis: Likert scale (95% CI)			Statistical differences between groups[a] (p-value <0.05 shown in bold)		
	GP	P	MS	GP	P	MS	GP vs P	GP vs MS	P vs MS
How relevant is the type of information written below? (score 1–5 on the Likert scale)									
SmPC	4.21 (4.05, 4.37)	4.12 (3.98, 4.26)	4.02 (3.86, 4.17)	4.36 (3.98, 4.74)	4.27 (3.88, 4.64)	4.14 (3.79, 4.49)	0.37	0.07	0.29
Literature system (Micromedex®)	3.81 (3.63, 4.00)	4.26 (4.09, 4.43)	4.29 (4.11, 4.46)	3.79 (3.33, 4.24)	4.22 (3.76, 4.68)	4.27 (3.86, 4.68)	**0.001**	**0.001**	0.72
Literature retrieved through MEDLINE®	3.12 (2.94, 3.31)	3.47 (3.31, 3.62)	3.79 (3.62, 3.97)	3.31 (2.88, 3.74)	3.60 (3.17, 4.03)	3.95 (3.55, 4.34)	**0.02**	**<0.001**	**0.01**
Pharmacological mechanism	3.43 (3.27, 3.58)	3.84 (3.70, 3.98)	3.71 (3.56, 3.86)	3.72 (3.34, 4.10)	4.12 (3.74, 4.50)	3.97 (3.63, 4.32)	**<0.001**	**0.03**	0.17
Netherlands Pharmacovigilance Centre Lareb database	4.16 (4.02, 4.30)	4.34 (4.22, 4.46)	4.14 (4.00, 4.28)	4.26 (3.93, 4.60)	4.43 (4.09, 4.77)	4.23 (3.92, 4.54)	0.09	0.74	**0.04**
WHO database	3.57 (3.38, 3.76)	3.92 (3.75, 4.08)	3.64 (3.46, 3.82)	3.97 (3.52, 4.41)	4.27 (3.81, 4.73)	3.99 (3.58, 4.40)	**0.02**	0.87	**0.03**
Dechallenge and rechallenge	4.03 (3.75, 4.16)	3.99 (3.82, 4.16)	3.70 (3.50, 3.89)	4.15 (3.66, 4.63)	4.17 (3.68, 4.66)	3.67 (3.42, 4.31)	0.86	0.06	**0.03**
Information about the ADR in general or publications with a URL to the Netherlands Pharmacovigilance Centre Lareb website	3.57 (3.34, 3.80)	3.73 (3.54, 3.93)	3.37 (3.16, 3.59)	3.71 (3.16, 4.27)	3.88 (3.31, 4.44)	3.50 (3.00, 4.00)	0.32	0.20	**0.02**

a Based on the regression analysis corrected for confounding factors.

ADR = adverse drug reaction; **GP** = general practitioner; **MS** = medical specialist; **P** = pharmacist; **SmPC** = Summary of Product Characteristics.

cists ($p < 0.001$) and medical specialists ($p = 0.03$). Medical specialists were the least interested in information about dechallenge and rechallenge, and general information about the ADR, which can be found on the website of the pharmacovigilance centre or links to other websites. For both items there was a statistical difference with pharmacists ($p = 0.03$ and $p = 0.02$, respectively).

When asked whether the respondents still missed any information, medical specialists missed information more often than GPs and pharmacists (10.2%, 8.2% and 3.6%, respectively). The open-text fields in the questionnaire revealed that, in general, practical information (advice on treatment, how to inform the patient, prevention of the ADR; n = 25), information about the time course of the ADR (n = 8) and pharmacological information (information about group effects, dose-response relationships, cross-sensitivity and interactions; n = 10) was missed most often in the personal feedback.

Discussion

Responders vs Non-Responders

The response rate in the study was limited, which may have influenced the generalizability of the whole population of reporters. To determine if there was a selection bias in the response to the questionnaire, we compared responders versus non-responders. The only statistically significant difference found was that the responders reported more ADR reports to the Netherlands Pharmacovigilance Centre Lareb than the non-responders. Therefore, selection bias cannot be excluded completely, which could have influenced the outcome of this study. Responders might have been more interested in pharmacotherapy, and thus more interested in receiving personal feedback. However, no statistical differences were found on the basis of the profession and seriousness of the latest report.

General and Case-Related Questions

In the general questions, information about the time course of the ADR and pharmacological mechanism was considered as the most important information given in the personal feedback. With respect to the case-related questions, respondents were most interested in information from the SmPC and information about the number of reports in the Netherlands Pharmacovigilance Centre Lareb database. Information from the SmPC was not mentioned as a specific option in the general questions, whereas it was specifically mentioned as a source of information in the case-related questions.

The pharmacological mechanism was rated as relevant in the general question, but rated as less relevant in the case-related questions. Possibly not all reporters could relate to the practical examples provided in the case-related questions and thus found the information about the pharmacological mechanism less relevant.

Information from the reports of the Netherlands Pharmacovigilance Centre Lareb database was considered more important than the WHO database. In daily practice, information provided about the Netherlands Pharmacovigilance Centre Lareb database is more elaborate than information about the WHO database; for example, information is given about the time course of the ADRs from the Netherlands Pharmacovigilance Centre Lareb database. In contrast, for the WHO database, only the number of reports and information about disproportionality is given to reporters. This is probably the reason why respondents rated the Netherlands Pharmacovigilance Centre Lareb database as more relevant than the WHO database in the case-related questions.

In general, differences in answers between general and case-related questions may also be caused by the fact that the case-related questions were asked after presenting practical examples of personal feedback. Perhaps the examples provided are not representative of the ADRs seen in daily practice by all professions; however, the examples were representative of the feedback provided by our pharmacovigilance centre.

Differences between Professions

In general, pharmacists and medical specialists are more interested in the information provided in the personal feedback than GPs. Based on the case-related questions, GPs were statistically less interested in information concerning literature (Micromedex® and MEDLINE®), pharmacological mechanism and reports from the WHO database. An explanation may be that GPs are seeking more practical information that can be used in the direct treatment of patients. However, GPs rated the importance of personal feedback for reporting the next time as 4.31 (Likert scale between 'important' and 'very important'). Because GPs reported the lowest number of ADRs in 2010[3] compared with medical specialists and pharmacists, there is much to gain in this group when providing more tailor-made feedback.

Medical specialists and pharmacists were highly interested in information from the literature system (Micromedex®). This could be explained by the fact that this system requires a subscription and is not accessible for most of the respondents. Articles found through MEDLINE® were seen as less relevant, but were considered most relevant by medical specialists. This group is less interested in general information about dechallenge and rechallenge, and general information about the ADR, which can be found on websites. Medical specialists also missed more information in the personal feedback than pharmacists and GPs. Information concerning the treatment and advice given to the patient was felt to be lacking most frequently. This might be because medical specialists have more complex patients to treat than GPs and pharmacists.

For the last 10 years, pharmacists have been the HCPs with the highest reporting rate in the Netherlands.[3] Pharmacists were more satisfied with most information in the personal feedback than other professions. Information that was statistically more relevant for them than for (one of) the other professions was information about the pharmacological mechanism, reports from the Netherlands Pharmacovigilance Centre Lareb and WHO databases, dechallenge and rechallenge, and general information about the

ADR. Only 3.5% of pharmacists felt that there was information lacking in the personal feedback. Pharmacists were also most unsatisfied when they received only a confirmation letter instead of personal feedback.

Comparison with Other Studies

Because only a few countries send individual feedback, to our knowledge there are only a few published studies that have attempted to reveal the impact of sending feedback and the motivations behind ADR reporting to a pharmacovigilance centre.[13,18] Wallerstedt et al.[13] compared two types of feedback. This feedback was sent after reporting an ADR to the Swedish Pharmacovigilance Centre. Another study by the Netherlands Pharmacovigilance Centre Lareb[18] gained insight into expectations after reporting an ADR. In both studies, only GPs and medical specialists were included. There was no stratification by profession.

The web-based SurveyMonkey[20] package was used for sending the questionnaire. This method was chosen because survey development in this way is much cheaper and more efficient for contacting a large group of reporters.

Terwee et al.[24] developed quality criteria, like content validity and interpretability, to detect shortcomings and gaps in knowledge of measurement properties. Our questionnaire used these concepts through pilot testing, using drug-ADR associations previously reported to the Netherlands Pharmacovigilance Centre Lareb and through the use of three practical examples.

A major disadvantage of electronic questionnaires is uncertainty about the expected response rate. Furthermore, some people will not take the time to complete longer surveys.[25] In our questionnaire, 19.5% of the respondents did not complete the entire questionnaire, probably because our questionnaire was relatively long.

There are several different methods for increasing participation in questionnaires. Of these methods, sending a reminder to non-responders, lottery incentive (with immediate notification of the results), shorter questionnaires, personal headings, using a white background and the use of a simple header are mentioned.[25]

In our questionnaire, we used all of these methods with the exception of a short questionnaire and personal heading. Because the number of questions included were needed to obtain accurate data, a shorter questionnaire was not possible. Selection of the study population was based on the reporter's e-mail address, through which a more personal approach was not possible.

Strengths and Limitations

The overall response rate to the questionnaire was 34.6%. Several other questionnaires about similar subjects have had higher response rates.[1,4,5,13] Our questionnaire took a minimum of 15 minutes to complete, which may have influenced the response rate. The response rate makes it more difficult to generalize the answers from the questionnaire to all HCPs who report an ADR to the pharmacovigilance centre, although it might be likely that those reporters who were most interested in ADR reporting were more likely to have answered the questionnaire. However, the number of respondents per profession was nearly equal, through which the professions can be compared with each other. With regard to the generalizability of the results, it should also be noted that informational requirements may vary between different countries.

Because the respondents were divided into pharmacists, GPs and medical specialists, conclusions per profession can be drawn. In the statistical analysis (linear regression and logistic regression) profession was analysed by using different professions as the reference category. The selected respondents all reported an ADR in the last year before sending the questionnaire; therefore, recall bias will be limited.

In the statistical analysis we tried to correct for possible confounding. By linking the responders' e-mail addresses to the Netherlands Pharmacovigilance Centre Lareb database we were able to correct for the number of reports the HCP had sent to Netherlands Pharmacovigilance Centre Lareb since 2007 and whether their latest report was serious. Reporters who generally report more ADRs to the pharmacovigilance centre, or who have recently reported a severe reaction in a patient, might differ

in their answers from other respondents. Both crude results and results corrected for these confounders are presented in this report.

For the analysis of the responses given on the Likert scales, we used multiple regression analysis. Although Likert scales are ordinal variables in nature, this statistical approach, which assumes interval level data, was used since multiple categories were involved.[26]

We did not take into account other possible confounders such as sex and age of the reporter.[11] There is no reason to presume that there will be a misclassification when correcting for sex and education. Only HCPs were selected for this study. Previous studies have not found any statistical difference with regard to sex, age and time since specialization.[7] Any misclassification will be random and will therefore not influence the height of the point estimates.

Using the results of this questionnaire, we implemented new accents on the customized feedback for each of the professions. Because pharmacists were satisfied with all the information, their feedback remained the same. Information for GPs and medical specialists contained less extensive literature information. Feedback for GPs was also shortened and is now more compact.

Conclusions

The results of this study indicate that personal feedback is considered to be important for reporting an ADR in the future. Most of the respondents would like detailed personal feedback, instead of only a confirmation letter. In general, pharmacists and medical specialists would like more information than GPs. The information gathered in this study is useful in generating more customized personal feedback for HCPs and could be useful for other pharmacovigilance centres that are interested in writing personalized feedback to reporters.

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Correspondence: Drs *Ingrid Oosterhuis*, PharmD, Netherlands Pharmacovigilance Centre Lareb, Goudsbloemvallei 7, 5237 MH 's-Hertogenbosch, the Netherlands.
E-mail: i.oosterhuis@lareb.nl