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# Notification of STI test results by text messaging: Why do patients refuse? Cross-sectional study in a Parisian sexual health centre

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## Abstract

Text messaging has been used to notify patients of results after sexually transmitted infection (STI) testing. This study aimed to characterise the population who refused notification of results by short message services (SMS) and to explore their reasons for refusing. From January to August 2018, 1180 patients coming for STI testing in a Parisian sexual health centre were offered SMS notification of their results, completed a self-administered questionnaire and were included in the study. Factors associated with refusal of SMS notification were explored using logistic regression models. Reasons for refusal were analysed following a qualitative content analysis methodology. In the study population, 7.3% [95% CI 5.8–8.8] of patients refused SMS notification. In the multivariate logistic regression model, male gender and older age were associated with refusal, as were non-French nationality, having forgone health care for economic reasons and being unemployed. Qualitative analysis showed that preferring face-to-face medical contact (32%) and anxiety about the test result (29%) were the main reasons given by patients for refusal. Socially disadvantaged patients may have more limited access to technology and be less at ease using it in a health context. Preference for face-to-face medical contact may reflect the need for human support in vulnerable populations.

## Keywords

Sexual health, testing, notification of communicable diseases, communication technologies, genitourinary medicine services

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## Strength and limitations of this study

- To the best of our knowledge, this study is the first to explore not only the factors associated with refusal of SMS notification but also the reasons for refusal.
- This study provides valuable insight into the strategy needed to develop communication with patients as SMS notification of STI test results appears to be an interesting option for medical teams but is not suited to all patients.
- The main limitation of this study is selection bias as 878 persons refused to complete the questionnaire and were not included. Patients who did not complete the questionnaire were more likely to refuse SMS notification. Considering this selection bias, the impact of low socioeconomic status on refusal of SMS notification by participants is probably underestimated.

## Key messages

- Short message services notification refusal was not associated with sexual behaviour but with socioeconomic characteristics reflecting social vulnerability.

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- Preferring face-to-face medical contact and anxiety about the STI test result were the two main reasons for refusing SMS notification.
- Preference for face-to-face medical contact may reflect the need for human support in vulnerable and anxious populations.

## Introduction

In 2018, 37.9 million people worldwide were living with HIV and 1.7 million contracted the infection. In Western Europe, despite reduced AIDS mortality, the HIV infection rate has not significantly decreased and early diagnosis and treatment of sexually transmitted infections (STIs) remain public health priorities.<sup>1</sup> In France, around 6000 new HIV infections occur every year and 25,000 persons are living unaware of their HIV infection.<sup>2</sup> In addition, *Chlamydia trachomatis* and gonorrhoea infection rates have increased from 2012 to 2016, in particular among the 15–24 year age group.<sup>3</sup> French sexual health centres aim to prevent STI, and testing is free and anonymous. After their blood or genital samples have been taken, patients have to come back to the centre a few days later for their results. However, some patients do not return. According to the literature, the failure-to-return rate after STI screening ranges from 7% to 22%.<sup>4–7</sup> Some studies suggest that the rate could be even higher among people tested positive for HIV infection.<sup>2–4</sup>

A large proportion of the population owns a mobile telephone and uses short message services (SMS) daily. The cost of SMS is low and text messaging has proved its usefulness in various health contexts<sup>8</sup> such as health promotion, smoking cessation and diabetes management. In sexual health, text messaging has been used with various objectives<sup>9–12</sup>: sexual health, appointment reminders, partner notification, anti-retroviral treatment reminders or result notification after STI testing. SMS result notification after STI testing has enabled earlier treatment and also saving in healthcare workers' time.<sup>13</sup> It could also address the issue of the patient's failure to return.

Acceptability and preference for SMS results notification in sexual health has been evaluated in a few studies.<sup>14–18</sup> In some studies, notification by SMS was found to be acceptable,<sup>14,15</sup> whereas other authors reported that talking face-to-face with doctors/nurses or mobile phone calls were preferred options.<sup>16,17,19</sup> In order to improve the system, it is important to understand the profile and the motivations of patients who refuse notification of their results by SMS. However, only one study has examined the characteristics of patients who refuse SMS notification.<sup>18</sup> It suggested that refusal of SMS was associated with older age, less favourable social conditions and declining to answer sexual behaviour questions. Some other studies also observed an association with patients' characteristics,<sup>14,15,18,20</sup> but they were not specifically designed to explore this issue. Therefore, reasons for refusing notification of test results by

text messaging are still unclear and more evidence is needed.

This study aimed to characterise the population that refused notification of STI test results by SMS and to explore their reasons for refusing.

## Material and methods

### Setting

The study was conducted between January and August 2018 in the Fernand Widal sexual health centre, which is one of the largest in Paris, France. This is a walk-in centre that offers screening for HIV, HBV, HCV, syphilis, chlamydia and gonorrhoea. During pre-test counselling, the physician evaluates the patient's risk-taking behaviour and prescribes appropriate individualised screening tests. Since August 2016, SMS results notification is proposed to all French-speaking patients coming for STI testing who own a mobile phone.<sup>18</sup> In accordance with medical guidelines, if one of the screening tests performed is positive, results are not directly given in the text message. Patients are invited to return to the centre to obtain their results and receive appropriate guidance from a physician. Patients can come to collect a paper copy of their results whether or not they accept SMS notification. In the centre, a self-administered anonymous questionnaire available only in French is offered to all French-speaking patients coming for STI testing. While patients are waiting for their medical consultation, they are invited to complete the questionnaire using two computers freely available in the waiting room. Median time to complete the questionnaire is approximately 12 min.

### Study population

The study population included all patients coming for STI testing who were offered SMS results notification (whether they accepted or refused) and who completed the self-administered questionnaire. From January to August 2018, 2080 patients attended Fernand Widal sexual health centre for STI testing and were offered SMS results notification. The French self-administered questionnaire was not offered to 22 non-French-speaking patients and 878 patients declined to complete it. A total of 1180 patients completed the questionnaire and were included.

### Data

The self-administered questionnaire included questions on sociodemographic characteristics, health, HIV knowledge, sexual behaviours and sexual partners. The patient was also asked whether he/she was willing to be notified of their results by text messaging. Respondents who declined were asked to enter their reasons for refusal in a free-form text box. Using open-ended questions has been shown to yield

detailed responses and to avoid suggesting a range of responses to participants, unlike closed questions.<sup>21</sup>

Having multiple sex partners was defined as at least two sexual partners during the last 12 months. Patients who stated they were consulting for STI symptoms, who had a sexual partner with an STI or who had blood contact were considered as having a high risk of STI.

## Analysis

**Factors associated with SMS notification refusal.** Factors associated with SMS notification refusal were explored using univariate and multivariate logistic regression models. For multivariate analyses, variables were selected by a backward stepwise selection method with a 0.2 significance level for removal from the model. Statistical analyses were performed using STATA/IC 11 (Stata Corporation, College Station, TX, USA).

## Reasons for refusing SMS notification

Free-text answers were analysed to explore reasons for refusing SMS results notification following a qualitative content analysis methodology. Each answer was coded independently by two researchers (JC and PP). In the event of disagreement, a third researcher was consulted (PT).

## Ethical and legal requirements

The study was registered with the AP-HP (Paris Hospitals) Data Protection Office (Registration number 20181119172904) and received approval from an institutional review board (IRB 00006477).

## Results

The characteristics of the study population are presented in [Table 1](#). Two-thirds were men and the majority were less than 34 years old (77.8%). After testing, 9.7% had at least one positive result. Of the 1180 patients, 7.3% refused SMS results notification ( $n = 86$ ).

Univariate and multivariate analyses of factors associated with refusing SMS results notification are presented in [Table 2](#). With the exception of having multiple sex partners and at least one positive test result, all other factors studied were associated with refusing SMS notification in univariate analyses. The backward selection method retained seven variables into the multivariate model including five that remained significantly associated with refusing SMS results notification. Male gender (OR 1.84, 95% CI 1.03–3.29) and age over 34 years (OR 1.71, 95% CI 1.05–2.78) were associated with refusing SMS results notification, as were non-French nationality (OR 1.88, 95% CI 1.08–3.26) and having forgone health care for economic reasons (OR 1.82, 95% CI 1.07–3.11). Being unemployed was also associated

with a greater likelihood of refusing SMS results notification (OR 1.85, 95% CI 1.09–3.16) compared with being employed or in training.

Of the 86 patients who refused SMS results notification, 38 gave their reasons in the free-form text box. Five main reasons for refusal were identified ([Table 3](#)). More than half of patients ( $n = 23$ ) refused SMS notification because they preferred face-to-face medical contact ( $n = 12$ ) or because they were anxious about the result ( $n = 11$ ). Other reasons were preferring to receive a paper copy of their results ( $n = 5$ ), unwillingness to communicate a personal phone number to the sexual health centre in order to stay anonymous ( $n = 4$ ), various practical reasons ( $n = 3$ ) and not having a telephone or a French telephone number ( $n = 3$ ).

## Discussion

Of the 1180 patients who came for STI testing and were included in our study, only 7.3% refused SMS notification of their results. Refusing notification of results by SMS was associated with sociodemographic characteristics reflecting social vulnerability, such as non-French nationality, having forgone health care for economic reasons or being unemployed. Conversely, sexual behaviour was not significantly associated with refusal. Regarding reasons for refusing, privacy concerns were only reported by a few patients, whereas preferring face-to-face medical contact was one of the main reasons given.

One of the principal strengths of this study is that it explores not only the factors associated with refusal of SMS notification but also the reasons for refusal, whereas the few previous studies only focused on the factors associated with refusal.<sup>14–18</sup> The reasons for refusal of SMS notification were collected through a free-form box in a self-administered questionnaire, allowing detailed and sincere responses.<sup>21</sup> However, we cannot rule out selection bias as 878 persons refused to complete the questionnaire and were not included in the study. Patients were not asked about their reasons for refusal. Possibly, some may simply not have wished to spend time to complete the questionnaire, even though they had quite a long period in the waiting room as no appointments are given for medical consultations. Moreover, patients who did not complete the questionnaire differed from those who agreed to respond and who were included in the study (see [Supplementary Electronic Material](#)). Patients who did not complete the questionnaire were more likely to refuse SMS notification (37.6% vs 7.3%,  $p$ -value <0.001). This gap between participants and non-participants may be explained by less familiarity with use of technology in a health context and with a written form of language.<sup>22</sup> Illiteracy has been shown to have an impact on the use of SMS, and this would limit the use of SMS to convey health information.<sup>23,24</sup> Health literacy is also associated with participation in research studies.<sup>25</sup> Considering this selection bias, the strong

**Table 1.** Characteristics of patients coming for STI testing in a Parisian sexual health centre ( $n = 1180$ ).

Variables	Study population ( $n = 1180$ )	%
Gender		
Female	397	34
Male	783	66
Age, years		
$\leq 34$	918	78
$> 34$	262	22
French nationality		
Yes	1030	87
No	150	13
Sexual intercourse with persons of the same sex or trans, during the last 12 months		
No	880	75
Yes	300	25
Work status		
Employed or in training	1019	86
Unemployed <sup>a</sup>	161	14
Healthcare forgone for economic reasons in last 12 months		
No	1015	86
Yes	165	14
High risk level associated with reason(s) for coming to the sexual centre <sup>b</sup>		
No	962	81
Yes	218	19
Previous HIV testing		
No	267	23
Yes	913	77
Multiple sex partners ( $\geq 2$ during the last 12 months)		
No	216	18
Yes	891	76
Prefer not to answer	73	6
At least one positive result		
No	1066	90
Yes	114	10

STI: sexually transmitted infection

<sup>a</sup> Including retired people ( $n = 3$ ) and people describing themselves as 'at home' ( $n = 7$ ).

<sup>b</sup> Patient's risk of STI contamination was defined as high if he/she reported STI symptoms, a sexual partner with an STI or blood contact.

impact of low socioeconomic status on refusal of SMS notification by participants is probably underestimated. To enhance participation in future studies, particularly by people with limited literacy, patients should be helped by one-on-one counselling and support as suggested by Kripalani et al., for instance, verbal instructions and verbal completion of the questionnaire.<sup>25</sup> Moreover, translation of the self-administered questionnaire into other languages should be considered to allow participation by non-French-speaking patients.

In the total population who attended the sexual health centre for STI screening ( $n = 2058$ ), the SMS notification refusal rate was 20.3%. This rate is low but is in agreement with the 20% to 48% refusal rates reported in previous studies on STI results notification.<sup>14,15,26</sup> The important variation in the proportion of SMS refusal observed in the literature may be due to patients' perception of its usefulness

and to the explanations given.<sup>26</sup> In our centre, the receptionist explains how SMS notification works using an information leaflet and also gives the patient an explanatory card. Moreover, when results are negative, patients do not need to return to the centre, resulting in time-saving. The direct benefit perceived by the patients may thus also explain the low level of refusal in our setting.

In our study, male gender and age over 34 years were both associated with refusing SMS notification. These results are consistent with other studies.<sup>14,15,18–20,26</sup> The age effect may reflect less ease with use of new information and communication technologies (ICT) among older people, according to the innovation diffusion theory.<sup>27</sup> As shown in a previous French study,<sup>18</sup> individual factors indicating low socioeconomic status (not having French nationality, being unemployed or having forgone health care for economic reasons) were associated with refusing SMS notification.

**Table 2.** Characteristics associated with refusing SMS notification of STI test results.

Variables	Number refusing SMS results notification/number of patients	% of refusals	Univariate analysis (n = 1180)			Multivariate analysis (n = 1180)		
			OR	95% CI	p	Pseudo R2 = 0.0764		
			OR	95% CI	p	OR	95% CI	p
Gender					<0.01			0.039
Female	16/397	4.0	1			1		
Male	70/783	8.9	2.34	1.34–4.08		1.84	1.03–3.29	
Age, years					<0.001			0.031
≤34	52/918	5.7	1			1		
>34	34/262	13.0	2.48	1.57–3.92		1.71	1.05–2.78	
French nationality					<0.01			0.026
Yes	66/1030	6.4	1			1		
No	20/150	13.3	2.25	1.32–3.83		1.88	1.08–3.26	
Sexual intercourse with persons of the same sex or trans, during the last 12 months <sup>a</sup>					0.02			
No	55/880	6.3	1			—	—	
Yes	31/300	10.3	1.73	1.09–2.74		—	—	
Work status					0.001			0.024
Employed or in training	64/1019	6.3	1			1		
Unemployed <sup>b</sup>	22/161	13.7	2.36	1.41–3.96		1.85	1.09–3.16	
Healthcare forgone for economic reasons in last 12 months					<0.01			0.029
No	64/1015	6.3	1			1		
Yes	22/165	13.3	2.29	1.37–3.83		1.82	1.07–3.11	
High risk level associated with reason(s) for coming to the sexual centre <sup>c</sup>					0.002			0.079
No	59/962	6.1	1			1		
Yes	27/218	12.4	2.16	1.34–3.50		1.57	0.95–2.61	
Previous HIV testing					0.003			0.059
No	8/267	3.0	1			1		
Yes	78/913	8.5	3.02	1.44–6.34		2.09	0.97–4.51	
Multiple sex partners (≥2 during the last 12 months)					0.33			
No	11/216	5.1	0.65	1.60–5.62				
Yes	68/891	7.6	1	0.34–1.25				
Prefer not to answer	7/73	9.6	1.28	0.57–2.91				
At least one positive result					0.31			
No	75/1066	7.0	1					
Yes	11/114	9.7	1.41	0.73–2.74				

STI: sexually transmitted infection; SMS: short message services.

<sup>a</sup> This variable was included in the backward stepwise selection but was not retained in the model.

<sup>b</sup> Including retired people (n = 3) and people describing themselves as 'at home' (n = 7).

<sup>c</sup> Patient's risk of STI contamination was defined as high if he/she reported STI symptoms, a sexual partner with an STI or blood contact.

Several mechanisms could explain this result. Firstly, socially disadvantaged patients may have more limited access to ICT. Use of mobile phones and text messages in the context of health care has been reported as associated with employment and higher education.<sup>28,29</sup> Access to a cell phone is unreliable for socially disadvantaged patients and may be regularly disrupted as these patients are more likely

to have a no-contract cell phone plan requiring the continuous purchase of minutes.<sup>30,31</sup> Secondly, regardless of access to the technology, the association observed between social vulnerability factors and refusing SMS notification may be explained by differences in use of ICT according to social class, as examined in a Norwegian systematic review of innovative technologies and health inequalities.<sup>32</sup>

**Table 3.** Main reasons for refusing SMS results notification from text box answers analysis ( $n = 38$ ).

Coding	Verbatim
Preference for face-to-face medical contact ( $n = 12$ )	'I much prefer to have my results given to me orally, rather than through technology that has no heart and no empathy. Thanks' 'Nothing 'll ever replace human contact'
Anxiety about the result ( $n = 11$ )	'I prefer to be accompanied by a medical doctor for my results' 'It would be too stressful to know that one of my results was positive without knowing which' 'I am already stressed enough about the results, I don't want to worry all on my own!'
Preference for obtaining test results on paper ( $n = 5$ )	'I prefer to get my results on paper, printed paper lasts, whereas text messages... I might lose my number or my phone. Thanks' 'I want to get my results on paper to show them as proof to my boyfriend. That way, I can ask him to do the same'.
Unwillingness to communicate one's phone number to the sexual health centre to keep anonymity ( $n = 4$ )	'To stay anonymous by not giving my phone number' 'I prefer to pick up my results in person to keep my STI testing confidential'
Various practical reasons ( $n = 3$ )	'I'll be on holiday'
Not having a telephone or not having a French telephone number ( $n = 3$ )	'I'm in transit and my foreign telephone is not active'

STI: sexually transmitted infection; SMS: short message services.

Differences in use of these technologies could be related to health literacy disparities or to the digital divide and could be a consequence of socially differentiated strategies in using innovative technologies.<sup>23,24,33</sup>

Regarding the reason for refusing SMS, we hypothesised that the wish to avoid accidental breach of confidentiality to friends or partners was a reason for refusing SMS<sup>34,35</sup> However, this reason was not explicitly mentioned in the free-form text box answers, although some patients stated that in order to keep anonymity, they were unwilling to give their phone number to the sexual health centre. In our study, preferring face-to-face medical contact was one of the main reasons reported by patients for refusing SMS notification. Direct healthcare provider contact allows patients to ask their questions and be reassured. The importance of human contact and of being able to put a question directly to a healthcare provider has also been reported in previous studies.<sup>16,19</sup> The opportunity to ask a direct question may be important for patients with low socioeconomic status and limited access to external sources of information (written information or information obtained through a personal social network in particular). The resources an individual may expect from his or her social network depend on its composition. As social networks are characterised by homophily, that is, the tendency of individuals to associate and bond with similar others, patients with low socioeconomic status are less likely to find reliable sources of information about health in their social network than patients of higher status. Anxiety about the test result was the second most frequent reason reported by patients. This finding is in line with the association found in univariate analysis between the patient's perception of his/her risk of STI infection and

refusing SMS notification and with previous studies.<sup>20</sup> Several patients gave preferring to receive a paper copy of the results as their reason for refusing SMS, thus showing that a proportion of patients did not clearly and fully understand the SMS notification system. In fact, in our centre, patients accepting SMS notification also have the possibility of obtaining a paper copy of their results (in addition to the SMS). When implementing a new communication system, it is very important to consider the views of patients and in particular those who are socially less advantaged.

## Conclusion

Preferring face-to-face medical contact was one of the main reasons that patients gave for refusing SMS notification, showing the need for human support. This finding provides valuable insight into the strategy needed to develop communication with patients as SMS notification of STI test results appears as an interesting option for medical teams but is not suited to all patients. To take into account the need of a number of patients for human support as well as the need to reduce the time spent by doctors on delivering negative STI results, new communication strategies such as delivering results by a nurse or a health mediator should be explored.

## Contributorship

J.C., P.P. and P.T. contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. E.R. contributed to the analysis of the results and to the writing of the manuscript. C.S. supervised the findings of this

work. All authors discussed the results and contributed to the final manuscript.

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### Supplemental material

Supplementary material for this article is available online.

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## SUPPLEMENTARY MATERIAL

**Table.** Characteristics of the whole population coming to the sexual health centre for an STI screening test ( $n = 2058$ )

	Study population ( $n = 1180$ )	%	Refusal to complete the questionnaire ( $n = 878$ )	%	<i>p</i> -value
Mean age, years	29.1		35.4		0.0000
Gender					0.846
Female	397	34	299	34	
Male	783	66	579	66	
Accepted SMS notification					0.000
Yes	1092	93	548	62	
No	86	7	330	38	
At least one positive result					0.014
No	1066	90	763	87	
Yes	114	10	115	13	