

Research article

GENERAL PRACTITIONERS' ROLE IN THE NOTIFICATION OF COMMUNICABLE DISEASES – STUDY IN MALTA

C Gauci (charmaine.gauci@gov.mt)^{1,4}, H Gilles², S O'Brien³, J Mamo⁴, N Calleja^{4,5}

1. Health Promotion and Disease Prevention Directorate, Msida, Malta

2. University of Liverpool, Liverpool, UK

3. University of Manchester, Manchester, UK

4. University of Malta, Msida, Malta

5. Health Information and Research Directorate, Msida, Malta

General practitioners (GPs) have an essential role in notification of communicable diseases. The main aim of the study described here was to assess the GPs' awareness of and attitudes towards the notification system in Malta, with special focus on infectious intestinal disease (IID). A questionnaire collecting demographic data, information on reporting practices, opinions on the existing notification system and suggestions for improvement was sent to 256 GPs working in either private or public health sector. In all, 150 GPs took part in the survey (response rate 58.6%). The responses revealed that Maltese GPs were aware of their obligations to notify communicable diseases but often did not report them, relying on the hospitals or laboratories to do so. The Disease Surveillance Unit (DSU) website and medical school training were the main sources of information on notification. Notification forms were obtained from health centres and usually kept at the place of work. Most GPs reported filling in the forms during the patients' visits. Private GPs tended to notify earlier than GPs working in public health centers. Among IID, food-borne illness was reported more frequently than person-to-person transmitted gastroenteritis and was considered to be of a higher priority with regard to public health importance ($p < 0.001$). The survey highlighted also some areas for improvement, including need of feedback especially by direct communication or a newsletter.

Introduction

Routine surveillance of communicable diseases is fundamental to public health policy and practice [1]. Passive surveillance systems which are the most common depend on statutory reporting of communicable diseases by general practitioners (GPs), hospital doctors and laboratories. In Malta, 67 specified communicable diseases are statutorily notifiable. Notification is mandatory by law for all doctors in both public and private sectors [2] whereby doctors report cases on the basis of symptoms only, not necessarily waiting for lab-confirmation. In addition, a supplementary system is in place which obliges all public and private medical diagnostic laboratories to report laboratory-confirmed cases [3].

In order to evaluate the role of GPs in the notification system and identify areas of improvement, a study was conducted in December 2005. The specific objectives were:

- ▶ To assess GPs' current reporting practices.
- ▶ To describe GPs' attitudes towards the notification system.

- ▶ To collect GPs' views on the notification of communicable diseases, particularly with regard to infectious intestinal disease (IID).

- ▶ To ask GPs' opinions on proposed changes in the notification system.

The special focus of the study was on infectious intestinal disease (IID) since it is known that surveillance systems capture only a tiny fraction of the infectious intestinal disease that is actually occurring in the community [4]. This indicates that there must be significant lacunae in information describing the magnitude of infectious intestinal disease, especially at the population level including food-borne illness and infectious gastroenteritis. The study described in this paper formed part of a series of studies to evaluate the surveillance system and to find ways to improve the under-reporting.

Methods

The study employed both quantitative and qualitative research methods, and comprised two phases:

- ▶ Phase 1: Survey (postal and hand-delivered)
- ▶ Phase 2: Focus group discussion

Phase 1: Survey Study population

The study population comprised GPs working in the private sector and in publicly funded health centres in Malta. Both types of GPs provide health care service at primary level but patients who consult private GPs have to pay for the service whilst the ones frequenting the health centres do not. To date there has been no official register of all GPs in Malta. For the purpose of this study, a list of private GPs registered with pharmaceutical wholesale dealers (175 GPs) was used. Even though it did not cover all private GPs in Malta, it was considered to be representative of the whole group. The list of health centre doctors (81 GPs), on the other hand, was comprehensive since it was obtained from the Primary Health Care Department which employs them.

Questionnaire

The questionnaire used for this study was prepared on the basis of issues raised during earlier meetings with GPs and on questionnaires used in studies with similar objectives performed

previously in Malta [5], Canada [6], United States [7] and Germany [8], with appropriate permissions obtained.

The questionnaire included:

Demographic Information

- Number of years in practice
- Type of practice
- Access to internet

Sources of information on notification

Reporting practices

- Sources of certificates
- Where notification forms are kept
- When notification forms are filled in
- Reliance on laboratory/hospital for notification

Actions taken by Disease Surveillance Unit in response to notification

- Frequency of notification of selected diseases
- Criteria used for notification
- Ranking of diseases according to public health importance

Attitudes towards notification

- Reasons causing physicians not to notify
- Proposed suggestions to improve physicians' notification
- Feedback expected on reportable diseases

Type of feedback to GPs

- Regularity of feedback
- Medium to send feedback
- Identified subjects for feedback

Participation in sentinel surveillance systems

Infectious Intestinal Disease Cases

- Number of patients with IID seen in practice during one month preceding the survey
- Symptoms of IID
- Stool culture ordering practice for cases
- Factors affecting stool culture requests

The questionnaire was sent out by post to all listed private GPs along with self-addressed stamped envelopes to complete and return. In publicly funded health centres the questionnaires were distributed among doctors by their superiors and then collected by hand upon completion. On returning a completed questionnaire, the GPs were included in a prize lottery.

Case definitions

A case of IID was defined as an individual who reported having at least three episodes of diarrhoea (defined as loose stools) within 24 hours or vomiting at least three times in 24 hours, or who suffered diarrhoea or vomiting with two or more additional symptoms. A case of food-borne illness was defined as a case of IID suspected or confirmed to be related to a food source; whereas gastroenteritis was defined as a case of IID in which person to person transmission was suspected.

Phase 2: Focus group discussion

The focus group discussion was conducted after the analysis of the postal survey had been completed, to discuss the main findings of the study and to elaborate on specific areas. For this purpose topic guidelines were developed based on the review of literature and the results of the postal survey.

The focus group consisted of the first author as coordinator, two GPs (one private and one public affiliated), a hospital physician,

and a GP with work experience at the Disease Surveillance Unit (DSU).

The ethical approval for the study, including the lottery incentive, was obtained from the Research Ethics Committee of the University of Malta. The data obtained from the postal questionnaire was analysed using SPSS Version 14. Focus group session was audiotaped with the interviewees consent. All tapes were fully transcribed and the information was analysed according to the themes of interest of the study.

Results

Phase 1: Survey

The questionnaire was sent to 175 private general practitioners, of whom 113 replied (a response rate of 64.6%) and 81 health centre doctors of whom 37 returned the questionnaire (a response rate of 45.7%), giving an overall response rate of 58.6% (150 out of 256). The majority of doctors (25.5%) had been practicing for about 16 to 20 years. Access to the internet was available for 66.9% (n=97) of GPs. A further 2.14% (n=30) stated that they planned to have access soon. The major source of information about the responsibility of doctors to notify infectious diseases was the website of DSU, the national centre for surveillance in Malta (31.5%; n=147) while medical school training was the next commonest source (Table 1).

TABLE 1

Sources of information about the responsibility to notify (more than one response option was available per doctor). Survey of general practitioners, Malta, 2005

Source of information	Total number of responses (n= 467)	% of total responses
Disease Surveillance Unit (DSU) website	147	31.5
Medical School training	120	25.7
Department of Health circulars	91	19.5
Infectious Disease notification form	42	8.9
Post-graduate training	22	4.7
DSU newsletter	22	4.7
DSU annual reports	13	2.8
Lectures by DSU staff	8	1.7
Never learned about the responsibility to notify	2	0.4

The GPs who had 11-30 years of practice (62.1% of participants) knew about notification mainly from the following sources: DSU website (31.8%, p<0.0001); Department of Health circulars (19.9%, p<0.0001); medical school training (24.3%, p<0.0001); post graduate training (5.8%, p=0.004); DSU lectures (2.1%, p=0.023) and DSU annual reports (2.7%, p=0.4441).

The majority of doctors obtain notification forms from health centres (41.2%, n=63) and state-owned medical equipment and supplies stores (18.9%; n=29). Other sources included the DSU website (12.4%; n=19); DSU office (9.8%; n=15); St. Luke's

Hospital (7.8%; n=12); another governmental hospital (5.2%; n=8) and local health inspector (1.3%; n=2).

Most GPs (37.3%, n=79), fill in the notification form during the patient's visit; 16.5% (n= 57) of doctors wait till the end of the day; while 15.2% (n=25) complete it immediately after the patient's visit. 10.9% of GPs (n= 18) notify cases at the end of the week, 6.1% (n=10) do so only when prompted by the DSU by means of regular reminders; whereas 14.0% (n=23) rely on laboratories or on hospital doctors to notify. There was a significant association between the group of private GPs and early notification ($p= 0.05$), indicating that private GPs tend to notify earlier than GPs employed in the public health centres.

Almost half of the GPs (46.2%; n=67) stated that they would always report food-borne illness. However, only 9% (n=13) would do so for gastroenteritis and 34.5% (n=50) admitted they never reported gastroenteritis cases. 48.8% (n= 61) claimed that they reported food-borne illness on confirmation while 75.2% (n=53) claimed to report gastroenteritis on confirmation (Figure). There was a significant relationship between frequency of notification and having confirmed cases of gastroenteritis ($p=0.001$).

Food-borne illness was rated as a high priority disease according to public health importance by more than half of the GPs surveyed (55.2%; n=80) whilst gastroenteritis was considered a high priority disease by only 15.9% of GPs (n=23). For both food-borne illness and gastroenteritis, there was a significant relationship between the frequency of reporting and the rated public health importance of the disease ($p< 0.001$) (Table 2).

TABLE 2

Priority of disease according to public health importance. Survey of general practitioners, Malta, 2005

Disease	High (%)	Moderate (%)	Low (%)
Meningitis	86.2	4.1	0.7
AIDS	83.4	7.6	2.8
HIV	78.6	9	4.8
Legionella	77.9	13.8	2.1
Hepatitis B	74.5	15.9	4.1
Hepatitis C	72.4	17.9	4.1
Acute encephalitis	71	17.2	3.4
Hepatitis A	65.5	21.4	4.8
Typhoid	55.9	26.9	6.9
Food-borne illness	55.2	26.9	6.2
Syphilis	45.5	29	15.2
Dysentery	44.8	36.6	9
Leptospirosis	42.8	39.3	9
Typhus	37.9	37.2	15.9
Pertussis	30.3	42.8	17.2
Measles	29	34.5	25.5
Leishmaniasis	28.3	44.8	18.6
Gonorrhoea	27.6	41.4	21.4
Rubella	24.8	33.8	29
Mumps	22.8	37.2	28.3
Varicella	21.4	33.1	32.4
Gastroenteritis	15.9	33.1	32.4
Chlamydia	13.8	37.2	37.2
Pneumonia	9	38.6	37.2
Erysipelas	8.3	22.8	53.1

FIGURE

Reporting disease on suspicion or upon confirmation. Survey of general practitioners, Malta, 2005

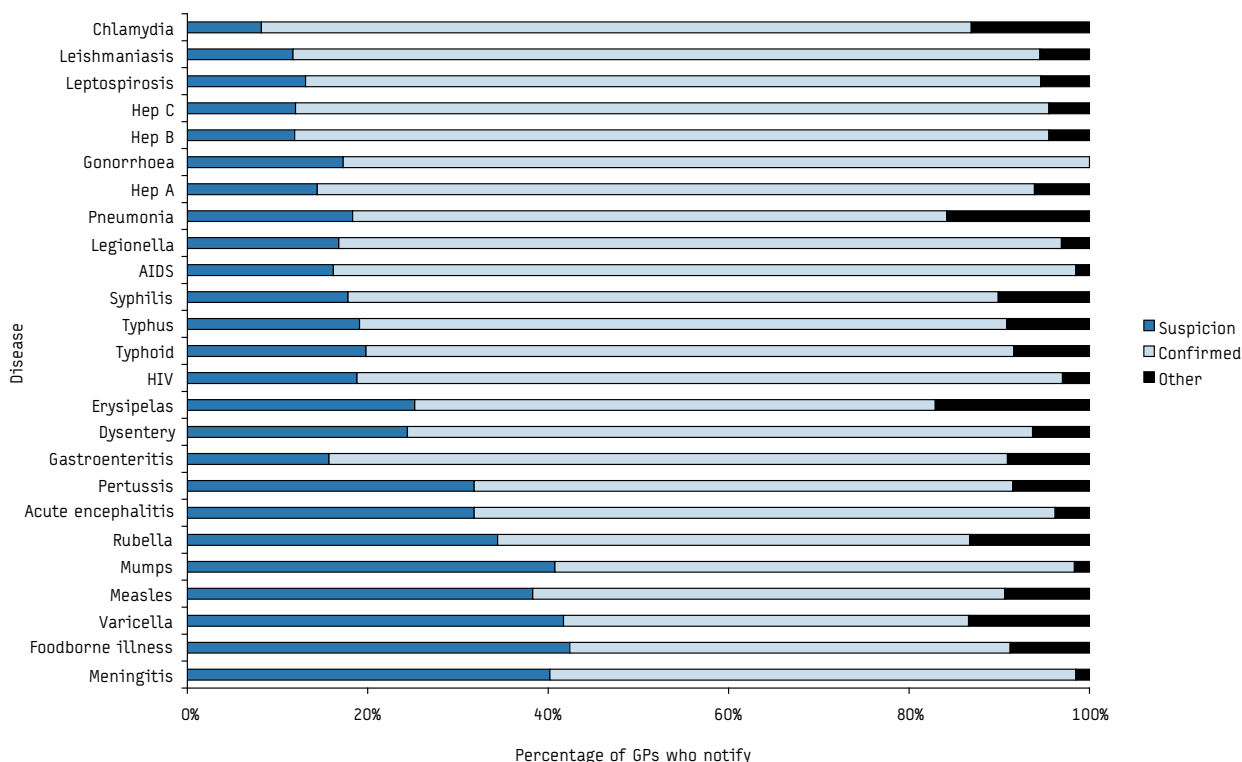


TABLE 3

Reasons for under-notification. Survey of general practitioners, Malta, 2005

Reason for under-notification	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Expect hospital to notify referred patients	40.7	33.8	13.1	8.3	4.1
Expect laboratory to report	26.2	35.2	13.8	21.4	3.4
No feedback from DSU	15.2	31	14.5	27.6	11.7
No penalty for non-notifiers	11.7	22.8	17.9	24.8	22.8
Violation of patient confidentiality	10.3	29.7	15.9	29	15.2
Expose patient to embarrassment and harassment	9.7	35.9	17.9	23.4	13.1
No remuneration for notification	9	19.3	13.1	25.5	33.1
Pressure from patients not to expose them	7.6	26.9	20.7	33.1	11
No relevance in reporting	4.1	15.9	13.8	35.2	31.0

The commonest reason for under- or non-notification by GPs was the reliance on the hospital or the laboratory to report. Also, GPs felt that notification may expose patients to embarrassment and harassment by public health officers (Table 3).

When asked for views on possible improvements in the notification system, 70.3% of the GPs (n=102) strongly agreed that it would be useful to have diseases that necessitated laboratory confirmation notified only by the laboratories. Emphasising notification responsibilities and practices in undergraduate medical education (69%; n=100 strongly agreed) was also considered to be beneficial (Table 4).

Most GPs considered it important to have some form of feedback on notified cases, with half of the GPs preferring direct communication by the DSU regarding cases investigated (50.00%, n=85), whilst 18.8% (n=32) chose the DSU newsletter. Quarterly feedback was the preferred frequency (60.7%; n= 88), only 6.9% of GPs (n=10) recommended feedback in exceptional cases only. Feedback via the internet (36.2%; n=63) followed by a letter by post (25.3%; n= 44) were the recommended media.

Information on outbreaks was the preferred topic for feedback among 27.4% of GPs (n=132 responses) with other information on trends of communicable diseases (17.4%, n=84 responses),

TABLE 4

Views on proposed interventions to notification system. Survey of general practitioners, Malta, 2005

Proposal	Strongly agree	Slightly agree	Not at all	Do not know
Have laboratory-confirmed cases notifiable by laboratories only	70.3	18.6	8.3	2.8
Emphasise notification responsibilities in undergraduate curricula	69	26.2	4.1	0.7
Telephone confirmation of the outcome of investigations to notifiers	53.1	31	11.7	4.1
Use anonymous reporting for socially stigmatised diseases	52.4	21.4	17.9	8.3
Use set of standard diagnostic criteria	51	29	14.5	5.5
Discretion by DSU in investigations	49	33.1	13.1	4.8
Shorten the list of notifiable diseases	44.8	35.2	15.9	4.1
Award accreditation points to notifiers	44.1	27.6	20.7	7.6
Use telephone/voice mail answering machine reporting	41.4	33.8	19.3	5.5
Link remuneration with notifications	38.6	22.1	28.3	11
Notification on suspicion only	35.2	37.2	19.3	8.3
Send feedback to GPs on national rates to compare with their own data	34.5	46.9	14.5	4.1
Use legal obligation and notification requirements in assessments/exams	30.3	45.5	19.3	4.8
Send reminders to those with low notifications	28.3	41.4	24.8	5.5
Enforce criminal penalties for non-notifiers	20	20	47.6	12.4

vaccination activities (18.5%; n=89 responses), detection of imported diseases (17.2%; n=83 responses) and recommendations on prevention proposed by (18.3%; n=88 responses) of GPs. The majority of respondents (52.4%; n=76) were not satisfied with the present type of feedback while 18.6% (n=27) could not voice an opinion about it.

GPs are often invited to participate in voluntary sentinel surveillance schemes. In this survey, 40.7% (n=59) of GPs stated that the most important incentive to participate is the easy handling of the system, 33.10% (n=48) indicated reimbursement, and 26.2% (n=38) mentioned feedback of data.

A high percentage of GPs, (90.3%; n=131) had seen a patient with IID in the month preceding the survey. The total number of estimated IID seen in this period by the 131 participating GPs was 2,747. The mean number of cases of IID seen by GPs in the month preceding the survey was 20.9 (95% CI 9.58-32.36). The distribution was skewed however, with a median of eight cases and a mode of 10 cases.

GPs ordered a stool culture in 12.22% (n=16) of cases. The most important reason that influenced the GPs to order a stool culture was the duration of symptoms (37.5%, n=6).

Phase 2: Focus group discussion

The focus group highlighted the importance of hospitals as main sources of information on notification. Although the DSU website was the preferred source indicated by GPs in the survey, yet the focus group pointed out that there are situations where hospital doctors do not use this source since many do not know that they can access the DSU website from the hospital computers. The focus group participants also agreed that notification forms should be at hand: "I will notify if I have a notification form in my hand". The members of the focus group stressed that the perceived public health importance of a disease is a significant factor influencing whether to notify or not, which is in agreement with the findings of the GP survey. The focus group also urged for caution by the public health authority personnel in dealing with patients.

Regarding incentives to notify, the focus group recommended reward in the form of continuing medical education points for those who diligently notify as a way to encourage notifications. They also suggested a free phone for notification whereby the doctors could just call to notify without sending in a formal notification.

In addition to the incentives to participate in the sentinel surveillance systems that were mentioned in the GPs' survey, the focus group brought up co-authorship in papers published in scientific journals.

This qualitative part of the study confirmed the reluctance of GPs to ask for stool cultures: "We are not interested in the aetiology!" According to the focus group, the GPs main interest is that of clinically treating the patient. Moreover, GPs usually experience difficulties in both getting a patient to submit a sample and submitting it to a laboratory via the health centre, so that they ask for a sample only in severe cases.

Discussion

The study described in this paper used a combination of qualitative and quantitative methods. The questionnaire used in

its first phase was prepared on the basis of issues raised during various meetings held with general practitioners hence it was felt that there was no need to repeat a focus group prior to the initial quantitative study. Instead a focus group discussion was performed to discuss and elaborate the results of the survey.

The questionnaires were distributed mostly by post, which is a cheaper and less time-consuming alternative to face-to-face interviews. This type of study also reduces the observer bias. However, non-response and incomplete response are important biases which should be taken into consideration when interpreting the data [9]. In a study assessing physicians' response to surveys in the United Kingdom it was found that pre-notification of survey recipients, personalising the survey mail-out package and non-monetary incentives were not associated with increased response rates [10]. Yet, monetary incentives, the use of stamps on both outgoing and return envelopes and short questionnaires increased the response rates. It is generally accepted that non-response bias may be of less concern in physician surveys than in surveys of the general public [10]. At any rate, in the study described here a very good response rate was obtained, especially from private GPs.

The demographics of the study population including age, gender and years in practice were not compared to those of the general GP population in Malta since the latter data were not available. However, previous studies have shown that demographic differences have minimal influences on attitudes toward reporting [11].

Taking into consideration the results of the survey and the focus group discussion, a few issues merit some more attention. Lack of awareness of the legal obligation and especially of the notification procedures is a problem which leads to under-notification in many countries [8,12-18]. However, the present survey, as well as a previous study done in Malta [6], show that knowledge of the responsibilities and the procedures of notification is not a problem in our country. Regarding the reporting practices, the survey showed that most GPs tend to fill in the notification forms in the presence of their patients. This is understandable since many GPs do not keep records of patients' visits. It is understandable that the time the GP has available for the patient is limited, hence if they were to invest in electronic record keeping, this would enhance the reporting system. However, a validation system is required if this system is to be introduced [18].

As shown in the survey, the readiness to report and timeliness of notification depend on the perceived severity of the disease and its public health implications. In Malta, although there is a legal requirement for notification, no reporting deadline is mentioned in the legislation. Yet there is general awareness that diseases important from the public health point of view (like meningococcal disease) and/or causing outbreaks are to be reported immediately. For the latter, timeliness of reporting is especially important, otherwise notifications would not be of any use in outbreak identification [19].

A study in the Netherlands has shown that internet-based reporting improves timeliness and completeness of notification [20]. General web-based reporting has been feasible in Sweden using SmiNet-2 since most clinicians in Sweden have access to the internet [21]. It would be useful to encourage such a mode of notification also in Malta and other countries, albeit keeping in mind that at the moment only two thirds of Maltese GPs have access to internet (present survey).

One area of concern highlighted by the survey results is the reliance of general practitioners on hospital physicians to notify when a case is referred to hospital. This issue needs clarification as to who should report such cases. Should it be the referral doctor who is in a position to report earlier, or the hospital physician who can confirm the case at a later stage? Similarly, for diseases which require laboratory confirmation, there is strong reliance by GPs on the laboratories to notify. For some diseases, there is reluctance to notify without laboratory confirmation [22-24]. Medical diagnostic laboratories in Malta are obliged by law [3] to report notifiable diseases upon confirmation. This laboratory-based notification system would be sufficient for certain diseases such as HIV, Hepatitis B, Hepatitis C and other sexually transmitted diseases. However, in cases of food-borne illness, such system could lead to a delay in notification and hence hinder actions to be taken by public health authorities [25].

Among areas for improvement the study emphasized the role of showing practical examples of action taken by the DSU in response to timely notifications. The mainstay of a good surveillance system depends on a strong relationship between the surveillance centre and those who are supplying the information, that is, the physicians both at GP level and at hospital level. It is an established fact that completeness of reporting is directly related to the degree of confidence in the health department [9]. As seen in this study, although many GPs showed confidence in the system and knew that positive action was taken in response to notification, only few knew what was actually done. Many physicians expressed concern over how the patients would react to the investigation being carried out by the public health authorities. This issue is very important, especially for the GPs who take years to build a relationship of trust with their patients, and would not want that trust to be shattered by anyone else. In fact the system foresees that all cases that are notified should be contacted by trained doctors working in DSU who discretely and professionally collect demographic data, clinical information, confirm cases and identify any areas where corrective control measures can be taken. Informing physicians of what is actually done and showing discretion on the part of DSU medical officers should help to overcome these barriers for the benefit of all.

The study showed that some incentives to increase doctors' participation in the notification system are controversial. Remuneration of notifiers was accepted only by one third of GPs, in contrast to other countries where such incentives had stimulated more enthusiasm [17,26]. Acknowledgment of notification in the form of awarding points of continuing medical education was better accepted with relatively more doctors agreeing to it than to monetary remuneration. Also, improving the relationship between the surveillance unit and the GPs has been shown to improve the attitudes of doctors regarding the notification system [27-28].

By including specific questions on IID in the questionnaire, the study has shown that many of the cases that are presenting at GP level remain unconfirmed since relatively few doctors ask their patients to submit stool samples. The results of the survey indicate that GPs ask for laboratory testing in order to improve clinical decisions and not for epidemiological reasons as was found in GP practices in other countries [28-30]. Our study has also demonstrated a relatively high burden of IID in Malta in the period of study [4,31-33]

Conclusion

From this study it is apparent that physicians know about their legal responsibilities to notify yet still many do not notify. Surveillance systems need to identify measures to enhance notification by encouraging physicians to report. A number of recommendations have been put forward in this study, including continuous communication on actions taken by the public health authorities in connection with surveillance data and regular feedback on communicable disease issues, including outbreaks. Many notification systems across Europe rely on notification by general practitioners and it is widely known that there is a high rate of under-notification. The results and recommendations made on the basis of this study can be useful for countries with similar surveillance systems. The methodology applied here can also be used to assess the situation in other countries. Improving notification of communicable diseases in every European country is crucial for the future harmonization of surveillance systems across Europe.

Acknowledgements

We would like to thank all the GPs and doctors who found the time to participate in the study despite their time restraints, the senior medical officers at health centres and the pharmaceutical wholesale dealers for funding this study.

Funding

This survey was funded by two local wholesale dealers in pharmaceuticals paying for postage and the lottery prizes.

References

1. Pan American Health Organization. An integrated approach to communicable disease surveillance. *Epidemiol Bull.* 2000; 21:1. Available from: http://www.paho.org/english/sha/eb_v21n1-vigil.htm
2. Public Health Act. Laws of Malta. Act No 13, 2003.
3. Medical and Kindred Professions Ordinance. Laws of Malta. Chapter 31 LN 133 of 1996 Section 10.
4. Gauci C. Surveillance of infectious intestinal disease in Malta. PhD Thesis. 2006 University of Malta.
5. Cook W. Summary of Survey Results: Physicians attitudes toward notification of Infectious Diseases – Tabib tal-Familja. December, 1995.
6. National studies on acute gastrointestinal illness. Physician study. Available from: http://www.phac-aspc.gc.ca/nsagi-enmga/phys_e.html (accessed: August 2004).
7. FoodNet Studies and Surveys - Physician Survey. Available from: http://www.cdc.gov/FoodNet/studies_pages/physician.htm (accessed: September 2004)
8. Krause, K, Rogers G, Stark K. Notifiable Disease surveillance and Practicing Physicians. *Emerg Inf Dis* 2005 11; 3: 442-445.
9. Parker CJ, Dewey ME, Total Study Group. Assessing research outcomes by postal questionnaire with telephone follow-up. *Int J Epidemiol.* 2000;29:1065-1069.
10. Kellerman SE. Physician response to surveys: a review of the literature. *Am J Prev Med* 2001; 20(1): 61-67.
11. Cleere R, Dougherty W, Fiumara N, Jenike C, Lentz J, Rose N. Physicians' attitudes toward venereal disease reporting. A survey by the National Opinion Research Centre. *JAMA* 1967. 202: 117-122.
12. Clarkon J. Delay in notification of infectious disease. *Health Trends* 1987; 19: 9-11.
13. Harvard RA. Scale of under notification of infectious diseases by general practitioners. *Lancet* 1973 April 21: 873-874.
14. Durrheim DN, Thomas J. General practice awareness of notifiable infectious diseases. *Pub Health.* 1994. 108: 273-278.
15. Bek MD, Lonie CE, Levy MH. Notification of infectious diseases by general practitioners in New South Wales. Survey before and after the introduction of the Public Health Act 1991 (NSW) *Med J Aust* 1994 Nov 7;161(9):441-443.
16. Weiss BP, Strassburg MA, Fannin SL. Improving disease reporting to Los Angeles County, trial and results. *Public Health Rep* 1988 Jul-Aug; 103(4): 415-21.
17. Allen CJ, Ferson MJ. Notification of infectious diseases by general practitioners: a quantitative and qualitative study. *Med J Aust* 2000 Apr 3;172(7):325-328.

18. Hassey A, Gerret D, Wilson A. A survey of validity and utility of electronic patient records in a general practice. *BMJ* 1991; 322:1401-1405.
19. Cowden JM. Food poisoning notification time: time for a rethink. *Health Bull* 2000; 58:328-231.
20. Ward M, Brandsema P, van Straten E, Bosman A, . Electronic reporting improves timeliness and completeness of infectious disease notification, The Netherlands, 2003. *Euro Surveill* 2005;10(1):27-30. Available from: <http://www.eurosurveillance.org/em/v10n01/1001-224.asp>
21. Rolfhamre P, Jansson A, Arneborn M, Ekdahl. SmiNet-2: Description of an internet-based surveillance system for communicable diseases in Sweden, 2006; 11(5):103-107.
22. Barret P, Lan YK. Incompleteness of statutory notification of bacterial gastro-intestinal infection. *Public Health* 1997 May; 111 (3): 183-185.
23. Schramm MM, Vogt RL, Mamolen. The surveillance of communicable disease in Vermont: who reports? *Public Health Rep* 1991:106: 95-97.
24. A report of the study of Infectious Intestinal Illness in England. 2000. Food Standards Agency, The Stationery Office, London.
25. Roush S, Birkhead G, Koo D, Cobb A, Fleming D. Mandatory reporting of diseases and conditions by health care professionals and laboratories. *JAMA* 1999; 282:164-170.
26. Schaffner W, Scott H, Rosentein B et al. Innovative Communicable Disease reporting Health Serv. *Mental Health Admin Health Re.* p 1971, 86 : 431-6.
27. Seneviratne SL, Guantilake SB, de Silva HJ. Reporting notifiable diseases: methods for improvement, attitudes and community outcome. *Trans R Soc Trop Med Hyg* 1997; 91 (2):135-7.
28. Krause G, Benzler J, Reiprich G, G6rgen R, . Improvement of a national public health surveillance system through use of a quality circle. *Euro Surveill* 2006;11(11):246-8. Available from: <http://www.eurosurveillance.org/em/v11n11/1111-224.asp>
29. Hennessy T, Townes J et al: Survey of Physician diagnostic practices for patients with acute diarrhoea: clinical and public health implications, *Clinical infect dis* 2004; 38 (supp 13):5203-5211.
30. Guerrant RL, Van Gilder T, Steiner TS et al., Practice Guidelines for the Management of Infectious Diarrhoea. *Clin Infect Dis*; 2001;32:331-350.
31. Gauci C, Gilles H, O'Brien S, et al. The magnitude and distribution of infectious intestinal disease in Malta: A population based study. *Epidemiology and Infection.* Jan 15 2007; 1-8.
32. Gauci C, Gilles H, O'Brien S et al. Estimating the burden and cost of infectious intestinal disease in the Maltese Community. *Epidemiology and Infection.* Feb 21;2007: 1-9.
33. Gauci C, Melillo Fenech T, Gilles H, O'Brien S, Stabile I, Calleja N, and al. Sentinel Surveillance: an option for surveillance of infectious intestinal disease. *Euro Surveill* 2007;12(4)[Epub ahead of print]. Available from: <http://www.eurosurveillance.org/em/v12n04/1204-227.asp>

Citation style for this article: Gauci C, Gilles H, O'Brien S, Mamo J, Calleja N, . General practitioners' role in the notification of communicable diseases – study in Malta. *Euro Surveill* 2007;12(11)[Epub ahead of print]. Available from: <http://www.eurosurveillance.org/em/v12n11/1211-223.asp>