

The Effect of Message Type on Physician Compliance with Disease Reporting Requirements

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SYNOPSIS

Objective. Despite the existence of mandatory reporting laws, the under-reporting of disease conditions to public health authorities is widespread. This article describes an evaluation of the effects of using different appeals to promote complete and timely reporting to the New York State Occupational Lung Disease Registry (NYS OLDR).

Methods. Three-hundred sixty-eight physicians who had not reported patients were randomly assigned to receive correspondence emphasizing either the legal obligation to report, the public health benefits of reporting, or both. Chi-square tests were used to determine if the proportion of physicians who subsequently reported patients differed by message group. Chi-square tests and the Kruskal Wallis rank sum test were used to test for differences in the completeness and timeliness of reports received from physicians in the three message groups.

Results. Physicians receiving correspondence describing the legal obligation to report were more likely to report patients than those receiving only the benefit message, while those receiving correspondence describing the public health benefits of reporting submitted more complete reports than those receiving only the obligation message.

Conclusions. To maximize physician reporting, it is important for public health agencies to emphasize both the legal and public health basis for reporting conditions in correspondence to physicians.

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Reporting is an essential component of a successful physician-based public health surveillance system. However, getting physicians to report to appropriate public health agencies remains a challenge.^{1,2} Lack of awareness of reporting requirements is cited as the primary reason physicians do not report specific health conditions to public health agencies,^{3,4} but other factors can also influence reporting.^{1,5,6} For example, although physicians may be aware of reporting requirements, they may not know the procedures for reporting, the criteria for determining whether a specific patient is reportable, or have the time to report. Public health professionals continuously develop materials and persuasive communication campaigns to increase and sustain reporting,⁷⁻⁹ and although anecdotal evidence suggests that campaigns and materials have been successful, few studies have evaluated the impact of the specific types of messages used to promote physician reporting.

Physicians have two primary motives for reporting instances of a condition to a public health surveillance program.¹⁰ One is to comply with reporting laws and regulations. Physicians are accustomed to completing forms to satisfy hospital and insurance regulations and may treat disease-reporting requirements as an extension of the general obligation to complete and submit necessary paperwork. The second motive is to benefit the health of their patients and the public. Physicians are responsible for the care of their patients and accustomed to acting in their interests;¹¹ therefore, they may perceive reporting to a public health surveillance program as a way to benefit their patients and promote overall public health.

Since 1982, the New York State Sanitary Code has required physicians, health facilities, and clinical laboratories to report suspected cases of occupationally related lung diseases to the New York State Occupational Lung Disease Registry (NYS OLDR) within 10 days of diagnosis.¹² However, underreporting has been well documented and a study using hospitalization data found that hospital discharges for pneumoconiosis during 1985 in New York State exceeded the number of reports to the NYS OLDR by almost fivefold. (Unpublished internal report, New York State Department of Health, 1986.)

As a result of recent outreach efforts, health care facilities have been reporting patients identified through ambulatory surgery, emergency department, and hospitalization medical records with suspected occupational lung disease to the NYS OLDR. Although health care facilities are an important reporting source, their reports have disadvantages. First, relative to physician reports, health care facility reports are less timely

and therefore less useful for identifying intervention opportunities. Second, because they often lack information about a patient's diagnoses, potential exposures, and diagnostic tests received, it is necessary to follow up with the identified attending physician. The follow-up correspondence sent to these attending physicians provides an opportunity to improve physician reporting as well as to evaluate the effects of messages emphasizing either the legal obligation to report, the public health benefit of reporting, or both.

METHODS

From September 2003 to the first week of March 2004, letters and materials were mailed to 368 physicians identified through hospital medical records as having provided care to patients ($n=424$) with lung conditions reportable to the NYS OLDR who had not reported these cases. None of the physicians contacted had previously reported any cases to the OLDR. Physicians were randomly assigned to one of three message groups: One group received messages and materials emphasizing the legal obligation to report to the OLDR (i.e., obligation message group). A second group received messages and materials emphasizing the benefits of reporting to the OLDR (i.e., benefit message group) and the third received messages and materials conveying both the obligation to report plus the benefits of reporting (i.e., obligation plus benefit message group). Eighteen letters were returned because an appropriate address could not be identified (17 letters) or the physician had retired (1 letter). Forty-four physicians attended to two or more reportable cases and therefore received multiple letters with reporting requests. These 44 physicians were distributed equally across the three message groups and received letters consistent with the message group to which they were initially randomized. The figure lists the materials sent to physicians in each message group. The message group to which physicians were assigned and the dates on which the reporting requests were sent were recorded in a database.

We used three dependent measures to evaluate the effect of message type on physicians' responses: (1) *response rate*—the proportion of physicians in a message group who returned an OLDR reporting form by fax or mail, (2) *timeliness*—the number of days from when the report request was mailed to when a physician responded to the request, and (3) *completeness*—physicians were asked to indicate whether a patient's condition was confirmed or suspected and to provide the date of diagnosis and names, dates, and locations of any diagnostic tests performed. We also tracked *unprompted physician reports to the OLDR*—

Figure. Materials included in correspondence to physicians in the three message groups**Obligation message group**

- Letter to physician emphasizing legal requirement to report to the OLDR
- Excerpt of public health law mandating the reporting of occupational lung diseases to NYSDOH
- One-page flyer with bold, 24-point font reading, "Public health law requires that physicians report patients with occupational lung disease to the Occupational Lung Disease Registry. To comply with this requirement, please report this and future patients to the Registry by completing and returning the accompanying form."
- Brochure describing how to report to the OLDR and listing the OLDR reportable conditions
- Reporting form with patient information from the previous hospital report
- Additional reporting form

Benefit message group

- Letter to physician emphasizing benefits of reporting to the OLDR
- One-page flyer with bold, 24-point font reading, "Patients with occupational lung disease are reportable to the Occupational Lung Disease Registry. Physician reports are essential to public health prevention and surveillance efforts. To report this and future patients, please complete and return the accompanying form."
- Brochure describing New York State Occupational Health Clinic Network
- Reporting form with patient information from the previous hospital report
- Additional reporting form

Obligation plus benefit message group

- Letter to physician emphasizing legal requirement to report and benefits of reporting to the OLDR
- Excerpt of public health law mandating the reporting of occupational lung diseases to NYSDOH
- One-page flyer with bold, 24-point font reading, "To assist the state's prevention and surveillance efforts, Public Health Law requires physicians to report patients with occupational lung disease to the Occupational Lung Disease Registry. To report this and future patients, please complete and return the accompanying form."
- Brochure describing how to report to the OLDR and listing the OLDR reportable conditions
- Brochure describing New York State Occupational Health Clinic Network
- Reporting form with patient information from the previous hospital report
- Additional reporting form

physician reports from doctors who were contacted previously but who did not receive a prompt for the patient identified in the report. The measures were meant to serve as proxies for complete reporting and were selected because they correspond with attributes commonly used in evaluating public health surveillance systems.¹³ Individuals who were unaware of the message groups to which physicians were assigned tracked the dependent measures.

The chi-square test for contingency tables was used to determine if there were statistically significant differences in our categorical dependent measures (i.e., response rate, completeness, and unprompted physician reports) among physicians in the three message groups. Because the continuous timeliness variable had a skewed distribution, the non-parametric Kruskal-Wallis rank sum test was used to determine if timeliness differed among the three message groups. For all analyses, statistical significance was set at $p < 0.05$.

RESULTS**Response rate**

Fifty-three percent (184 of 350) of the physicians returned the reporting forms by mail or fax. As indi-

cated in Table 1, the physician response rate (44%) in the benefit-only message group was significantly lower than the physician response rate in the obligation message group (54%) or obligation plus benefit message group (60%). There was no significant difference between the response rate of physicians in the obligation message group and obligation plus benefit message group.

Of the 44 physicians who received multiple letters with reporting requests, thirty (68%) subsequently reported at least one of the patients. This 68% return rate was significantly greater than the 51% return rate from physicians who received only a single prompt, ($\chi^2[1] = 4.03$; $p < 0.05$).

Forty-four (21%) of the attending physicians indicated that they had not treated the patient for their lung condition and could not provide the requested information. In these instances, the physician was considered misidentified. The misidentified physicians were distributed equally over the three message conditions. Sixteen (36%) of the 44 physicians provided the name and/or address of the proper attending physician for follow-up and eight (18%) forwarded the reporting request to a colleague who subsequently reported the case to the OLDR. The rate at which misidentified

Table 1. Number of physicians responding to reporting requests by message group

	Message group			Total
	Obligation n (percent)	Benefit n (percent)	Obligation plus benefit n (percent)	
Responses	57 (54)	54 (44) ^a	73 (60)	184 (53)
Non-response	48 (46)	70 (56)	48 (40)	166 (47)
Total	105	124	121	350

NOTES: Although 15 physicians reported more than one patient to the NYS OLDR, for the purpose of these analyses, the column totals reflect the number of physicians who were contacted in a given message group and not the number of response requests sent. Overall chi-square ($\chi^2[1]=6.75$; $p<0.05$) for response vs. no response between message groups.

^aChi-square benefit vs. obligation or obligation plus benefit, $\chi^2(1)=6.27$; $p<0.05$.

physicians provided the name and/or address of a physician to contact or forwarded the request to other physicians did not vary according to message group.

Timeliness of responses

For physicians who replied to the reporting requests, the number of days from when they were sent the requests to when they replied was used as an indicator of response timeliness. The timeliness of physicians' responses did not differ significantly among physicians in the three message groups. The median response time was 14 days.

Completeness of responses

Of the 148 reports received from physicians who were not misidentified, 69 (47%) provided complete information about these five fields: the date of diagnosis; the name, date, and location of diagnostic tests; and if the patients' condition was occupational. Sixty-one (41%) provided partial information and 18 (12%) contained no information.

Table 2 lists the percentage of reports that contained

information about each of the five fields across the three message groups. There were significant differences in completeness depending on the message group to which physicians were assigned ($\chi^2[1]=5.97$; $p<0.05$). Physicians who received the obligation-only message completed significantly less information on the reporting forms than did those who received the obligation plus benefit ($\chi^2[1]=4.11$; $p<0.05$) or benefit-only ($\chi^2[1]=4.62$; $p<0.05$) messages. Completeness did not differ significantly between physicians in the obligation plus benefit or benefit only message groups.

Unprompted reports to the NYS OLDR

During the study period, four physicians in the obligation-only message group subsequently reported one or more newly diagnosed patients to the NYS OLDR without receiving a prompt to do so. Although these results suggest that it is necessary to emphasize the legal obligation to report to sustain physician reporting, the small number of physicians spontaneously submitting reports did not allow for a conventional statistical analysis.

Table 2. Percentage of physician reports containing requested diagnostic information

	Message group		
	Obligation	Benefit	Obligation plus benefit
Occupational diagnosis	73%	70%	85%
Date of diagnosis	65%	66%	70%
Date of diagnostic tests	55%	76%	67%
Location of diagnostic test	53%	69%	64%
Name of diagnostic test	55%	75%	65%
Overall	61% ^a	73%	70%

^aThe amount of information on forms returned by physicians in the Obligation group was significantly less than the amount from physicians in the Benefit or Obligation plus benefit message groups, $p<0.05$.

DISCUSSION

Activities aimed at achieving more complete reporting are an essential component of physician-based disease registries. The majority of published studies concerning efforts to improve physician reporting have evaluated the effects of multifaceted communication campaigns on physicians' reporting of specific illness and conditions. For example, one study demonstrated that a two-year campaign that included educational mailings, letters from prominent members of the practicing medical community, newsletters, presentations, and publications and advertisements in a state medical journal increased reports of adverse drug reactions in Rhode Island seventeen-fold.⁸ Rothenberg and colleagues identified five barriers to physicians' reporting gonorrhea to the Colorado State Health department: lack of saliency in the request, patient interference, violation of the physician-patient relationship, insufficient incentives, and excessive administrative obstacles. They randomly assigned a sample of physicians to receive one of five interventions created to address one of these five barriers.¹⁴ Only physicians receiving periodic phone calls meant to address excessive administrative obstacles demonstrated an increase in reporting during the study period. Finally, Weiss et al. implemented a campaign to increase the reporting of communicable diseases in Los Angeles County that included the publication of a monthly newsletter, the introduction of a stamped postcard for reporting, and routine phone calls to a network of physicians, high schools, and universities (i.e., active surveillance). Although the campaign resulted in an increased awareness of disease reporting requirements and in the detection of several disease outbreaks, it did not result in a statistically significant increase in reporting.⁹

In contrast to these previous studies, we sent physicians personalized correspondence identifying a patient or patients whom they were responsible to report. Our evaluation found that physicians who received messages emphasizing the legal obligation to report to the OLDR, both with and without an accompanying public health benefit message, were more likely to respond to requests for additional information than those who received messages describing only the public health benefits of reporting. This result suggests that it is necessary to emphasize the legal obligation to motivate some physicians to report diseases to public health authorities. Because of the demands made on their time, some physicians may report only when it is mandatory.^{11,15} This finding also provides support for legislation mandating the reporting of specified conditions to public health authorities.

Our evaluation also found that physicians who received materials describing the benefits of reporting, both with and without the obligation message, provided more information on the reports than did physicians who were told only of the legal obligation to report. One explanation for this is that solely emphasizing the obligation to report may have led physicians to focus more on fulfilling the legal requirement than on providing complete information that would be useful for public health surveillance. Although emphasizing the public health benefits did not influence the rate of reporting, it did appear to have an independent effect on the completeness of reporting.

Taken together, our findings suggest that to better ensure quality reports from physicians, it is important that they are made aware of the public health benefits of reporting these diseases. Because reporting in the obligation plus benefit message group was no more frequent than in the obligation-only group and no more complete than in the benefit-only group, it is unlikely the reporting differences observed were attributable to differences in the amount of information sent.

One advantage of requesting specific information about a specific patient is that it may generate feelings of personal responsibility in physicians toward their patients that contribute to their reporting. A potential disadvantage, however, is that sending a request about a specific patient may deter physicians from reporting future patients when not prompted by creating the impression that public health authorities will receive a report from other sources. This has been identified as a barrier to reporting in previous studies. For example, a survey of primary care physicians in Vermont found that 66% did not report instances of communicable disease to the Vermont Department of Health because they assumed a laboratory would report them.¹⁶ We received unprompted reports from four physicians. However, the limited timeframe of the study did not allow us to draw conclusions about whether the letters resulted in sustained increases in reporting. Future work should enable us to determine the long-term impact of this correspondence campaign on physician reporting.

Because a subset of the physicians in this demonstration received multiple reporting requests, albeit for different patients, we were able to gain some insight into the effects of receiving multiple prompts on physicians' reporting. Consistent with advertising research showing that moderate repetition is often necessary to prompt receivers to attend to and process a message,¹⁷ physicians receiving multiple reporting requests were more likely to report patients than those receiving a single prompt. However, because physicians may

respond negatively to being inundated with reporting requests, future work will be necessary to more fully evaluate the long-term consequences of sending multiple prompts to physicians.

Physicians in the obligation-only message group and the obligation plus benefit message group received a copy of the public health law stating that physicians are required to report patients with suspected occupational lung disease within 10 days of diagnosis. We anticipated that physicians in these message groups would submit more timely reports than those receiving only the benefit message. However, our analyses found no significant differences in timeliness across the three message groups. One possible explanation for this is that timeliness may be largely determined by factors outside of physicians' direct control, such as the size of their patient load and number of support staff. A second possibility is that physicians did not believe that the 10-day reporting period applied because all the patients identified in the hospital reports had been diagnosed a month before. However, we do not have the data to determine why we did not observe a difference in timeliness across the three message groups.

In spite of receiving personalized correspondence that identified specific patients reportable to the OLDR, only 53% of the physicians contacted responded to the reporting requests. This rate is comparable to the mean response rate found in physician mail surveys published in medical journals, 54%.¹⁸ One reason for the modest response rate is that the physician-identified report may not have evaluated or diagnosed the patient's lung condition, and therefore may not have had the requested medical information. Consistent with this possibility, 21% of the responses we received were from physicians who lacked the requested medical information because they had not treated the patients for their occupational lung condition. Since the completion of this evaluation, we have added language to our letters asking physicians to forward the reporting request to an appropriate colleague if they lack reportable information. A second reason is that there were no direct consequences or penalties for physicians who did not report. Social cognitive theories of behavior suggest that people choose behaviors when the perceived benefits of action outweigh the perceived costs.¹⁹ In the present demonstration, the legal reporting requirement and the potential public health benefits of reporting were used as justification for reporting. In the absence of any salient penalty, it is possible that some physicians did not perceive that the legal requirement and potential public health benefits justified the time and effort involved in reporting.

It will be important to identify acceptable justifica-

tions for reporting to incorporate into subsequent communication campaigns. Moreover, consideration should be given to examining whether physicians who continue to fail to comply with reporting requirements will respond to penalties. A third and final reason for not reporting is that some physicians may believe they are doing a disservice to their patients by reporting them to a public health authority for a work-related condition. For example, physicians participating in focus groups in New York State reported they would be hesitant to report patients to occupational illness and injury registries because of concerns that doing so might jeopardize their patients' jobs. (Unpublished data, Brissette, Gelberg, and Schottenfeld, New York State Department of Health, 2003.) To address this issue, future communications to physicians will describe the provisions available to protect the identity of workers and legal mandates that prevent employer retribution.

In summary, personalized correspondence to physicians reminding them to report patients for whom they provided care represents a useful way to increase physicians' reporting of work-related illnesses and injuries to public health surveillance programs. The desire to fulfill an obligation and the desire to provide a benefit are independent precursors to prosocial behavior.^{10,20} Our results suggest that to maximize complete reporting from physicians, it is important to emphasize both the legal obligation as well as the public health benefits of reporting a disease condition to public health authorities.

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