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The STD – HIV Connection: Deficiencies in Knowledge and Practice Patterns among Family Physicians and Gynecologists

The STD – HIV Connection: Deficiencies in Knowledge and Practice Patterns among Family Physicians and Gynecologists

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ABSTRACT

Previous studies have shown suboptimal compliance with the Centers for Disease Control and Prevention recommendations for HIV testing in patients with sexually-transmitted disease (STDs). However, the literature is especially sparse with respect to family physicians and gynecologists in private practice. Further, there are no data regarding knowledge among these physicians of the causative relationship between STDs and HIV. All family physicians (238) and gynecologists (131) in private practice in Broward County, Florida were anonymously surveyed for their knowledge of the connection between STDs and HIV and to determine if they translated this into practice. Responses from 57 family physicians and 21 gynecologists were analyzed. Overall, gynecologists showed a greater awareness of the STD-HIV connection (81% vs. 54%, P=0.03), but not in their frequency of testing for HIV. Among physicians in both groups who stated that they "always test" for HIV in patients with STDs, a strong correlation was found between awareness of the STD-HIV connection and testing for HIV (P<0.001). Physicians that only "sometimes test" showed a lesser degree of awareness of this connection and tested less frequently for HIV in patients with seven specific STDs. However, even physicians who claimed to "always test" did not consistently test for HIV with all of these seven STDs. This lack of consistency was especially true for family physicians. Many family physicians and gynecologists in private practice are unaware that STDs facilitate the transmission of HIV and/or do not translate this knowledge into practice.
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Introduction

Despite great efforts to reduce the scourge of HIV/AIDS in the United States, approximately 40,000 persons become infected with HIV each year (Centers for Disease Control and Prevention [CDC], 1999). Similarly, non-HIV sexually transmitted diseases (hereafter simply referred to as STDs) remain a major public health problem with approximately 19 million new infections occurring each year (CDC, 2006a). Several studies have documented a high rate of co-infection of HIV and other STDs (Quinn et al., 1988; Wasserheit, 1992; Laga et al., 1993; Royce, Seña, Cates & Cohen, 1997; Brown et al., 2007). This is not solely due to the fact that patients with these two diseases engage in the same risky behaviors. Importantly, a direct causal relationship has been identified between STDs and HIV. Through multiple mechanisms, both ulcerative and non-ulcerative STDs can increase the risk of acquisition and transmission of HIV (Fleming & Wasserheit, 1999; LeGoff et al., 2007; Kaul et al., 2008; Levine et al., 1998; Lingappa & Celum, 2007). Information regarding this knowledge among primary care physicians in private practice is lacking. We could find no study that measured this knowledge.

There is evidence of a deficiency in compliance with CDC recommendations regarding HIV testing in patients with other STDs. However, most of this research was conducted in emergency departments (CDC, 2001; Weinstock, Dale, Linley & Gwinn, 2002; Burke et al., 2007; Gift & Hogben, 2006; Fincher-Mergi et al., 2002; Wilson, Mitchell, Bradbury & Chavez, 1999; Seña et al., 2005; Montaño, Phillips, Kasprzyk & Greek, 2008). Only one study compared the attitudes and practices of family physicians with those of gynecologists with respect to HIV testing (Montaño et al., 2008). Since among primary care physicians, family physicians and gynecologists see the largest number of STD patients, it is critical that they be aware of the STD-HIV connection and that they implement this knowledge by consistently testing STD patients for HIV.

Because Broward County, Florida, with 761cases/100,000, has the second highest prevalence of HIV/AIDS in the state (Florida Department of Health [FDH], 2002), and also has very high prevalence rates of other STDs (FDH, 2008), it provides a fertile testing ground in which to assess physician awareness of the STD-HIV connection and the translation of that knowledge into practice. We

104

1

selected family physicians and gynecologists for our survey because of the paucity of published information regarding their HIV testing knowledge and practice patterns and also because of the frequency with which these physicians see patients with STDs. We were especially interested in determining whether gynecologists, with their more focused training and more frequent contact with STD patients, would demonstrate a greater awareness of the biological connection between STDs and HIV and more consistently implement CDC recommendations for HIV testing.

Methods

Study Design

A 10-question survey of STD practice patterns, approved by the Nova Southeastern University Institutional Review Board for Research with Human Subjects, was mailed or faxed to all 238 practicing family physicians and all 131 practicing gynecologists in Broward County, Florida. Three surveys were returned because of incorrect addresses (one family medicine, two gynecology). Sixty-three surveys were received from family physicians

(response rate 26.4%) and 23 from gynecologists (response rate 16.8%). Surveys from six family physicians and one gynecologist were excluded because of incompleteness, leaving for analysis fifty-seven surveys from family physicians and twenty-one surveys from gynecologists. The questionnaires were answered anonymously and returned to the office of the Physician Assistant Program where any identifying information was removed by the department secretary before being given to the investigators for analysis.
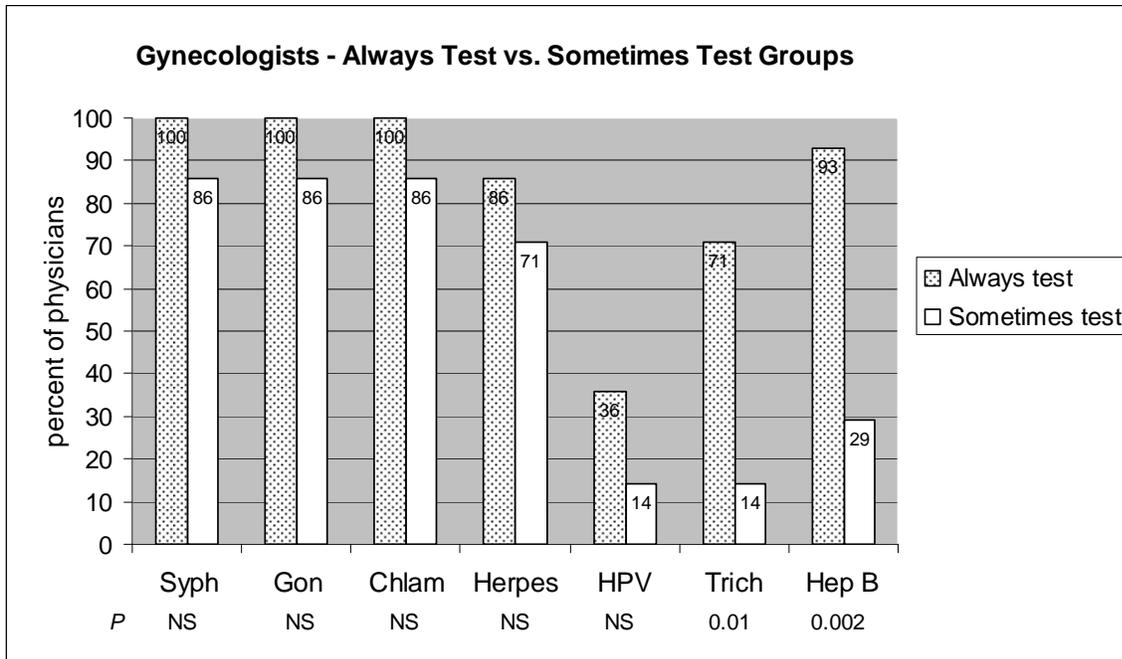
Statistical Analysis

The likelihood ratio chi-squared test (SPSS, Version 15.0) was used to assess the difference between the two specialty groups on each of the characteristics of responding physicians' practices (Table 1) and on the physicians' beliefs and testing practices (Table 2). The same test assessed the difference between the 'always testers' and the 'sometime testers' on their practice of testing for HIV in cases of seven specific STDs. This was conducted both among family physicians (Figure 1) and among gynecologists (Figure 2).

Figure 1. HIV Testing Rates for 7 STDs. Comparison of Family Physicians Who State They Always Test for HIV in Patients with STDs vs. Those Who State They Only Sometimes Test
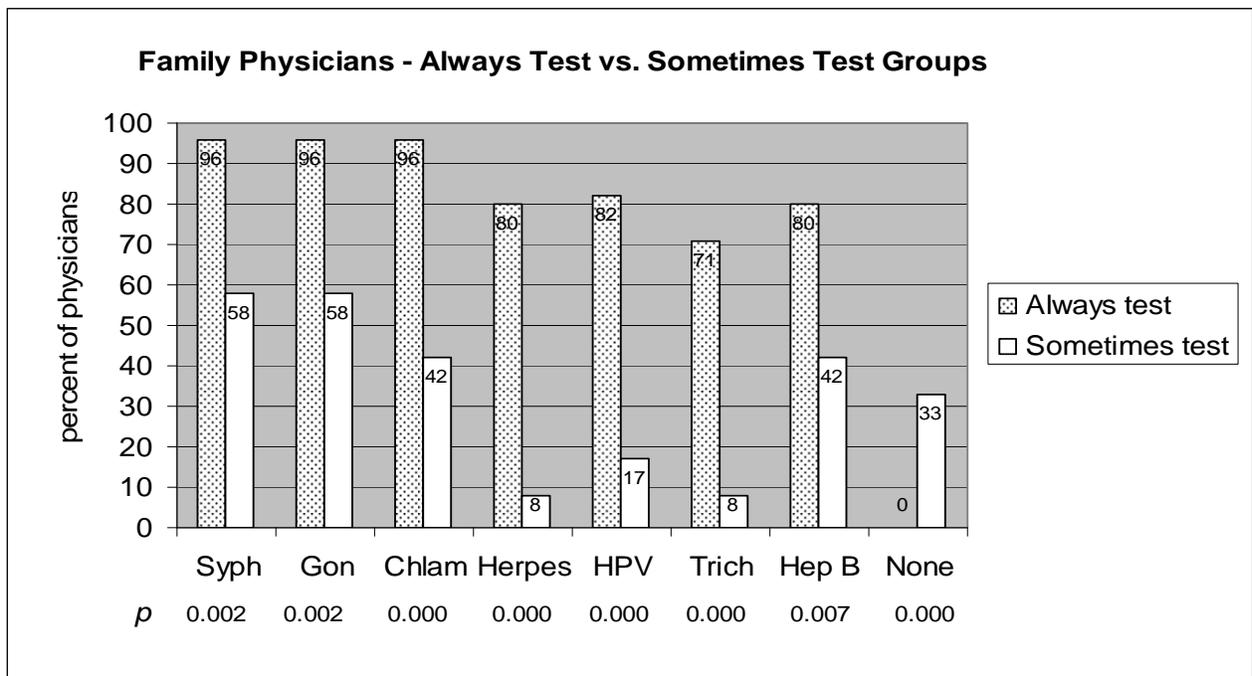
Syph=syphilis; Gon=gonorrhea; Chlam=Chlamydia; HPV=human papilloma virus; Trich=trichomonas; Hep=hepatitis B

Figure 2. HIV Testing Rates for Seven STDs. Comparison of Gynecologists Who State They Always Test for HIV in Patients with STDs vs. Those Who State They Only Sometimes Test.

NS=not statistically significant; Syph=syphilis; Gon=gonorrhea; Chlam=Chlamydia; HPV=human papilloma virus; Trich=trichomonas; Hep=hepatitis B.

Results

Whole Group Analysis

Four survey questions assessed demographic characteristics of the practices of family physicians vs. gynecologists. A higher percentage of gynecologists worked long hours in direct patient care and more saw large numbers of STDs than family physicians did (Table 1). However, the prevalence of HIV in the practices of both groups was low (mostly less than 1%) and not significantly different between specialties (p=0.059). The significantly different distribution of positive HIV tests in STD patients among gynecologists than among family physicians is largely explained by the much higher prevalence of uncertainty (the "unknown" response) among family physicians rather than by a true difference in frequency of HIV exposure.

The remaining six questions assessed physicians' knowledge of the link between STDs and HIV transmission and compared it with their HIV testing practices (Table 2). Gynecologists more commonly than family physicians expressed the belief that STDs facilitate HIV transmission (81.0% vs. 54.5%; p=0.028). This greater awareness among

gynecologists remained after controlling for number of hours spent in patient care (p=0.02) but disappeared after controlling for number of STDs diagnosed by each physician. Despite this difference in awareness of an STD-HIV connection, gynecologists and family practitioners did not differ from one another in the frequency of testing for HIV in patients with non-HIV STDs (p=0.272). In addition, a sizeable proportion of physicians in both groups (33.3% of the gynecologists and 21.1% of the family physicians) do not always test for HIV in patients with other STDs. Moreover, in both groups, there was surprisingly no correlation between the belief that STDs facilitate HIV transmission and the frequency of testing for HIV in patients with STDs, indicating a gap between knowledge and practice patterns. Finally, there were no significant differences between gynecologists and family practitioners in the frequencies of testing for HIV with respect to six of seven specific STDs. The exception was with HPV, with family physicians testing for HIV much more frequently than gynecologists (66.7% vs. 28.6%; p = 0.002; Table 2).

106

Subgroup Analysis

All physicians were asked the global question: "When a patient is diagnosed with an STD, do you recommend testing for HIV?" Possible response choices were never, sometimes or always. They were then also asked to identify specific STDs for which they perform HIV testing (Table 2). Striking differences emerged when responses to these two questions were compared. Family physicians who stated that they always test for HIV were much more likely to test for all seven specific STDs than were those who only sometimes test for HIV. Interestingly, however, in no instance was the testing rate 100% even among those who claimed to "always test" for HIV in patients with STDs (Figure 1). Fewer differences were seen between the always testers and sometimes testers among gynecologists with respect to testing for specific STDs. In addition, those gynecologists who stated that they "always test" for HIV actually did so 100% of the time for syphilis, gonorrhea and Chlamydia (Figure 2). Moreover, whereas one-third of family physicians who stated that they sometimes test for HIV actually did not test for HIV with any of the seven specified STDs, none of the gynecologists failed to select any of the specific STDs (Figures 1 cf. 2) (p=0.04). Also, even gynecologists who only sometimes test for HIV do so much more often than their family physician counterparts for two STDs strongly linked to HIV acquisition and transmission: herpes (71% vs. 8%, p=0.02) and Chlamydia (86% vs. 42%, p=0.05).

For physicians who say they always test, the most common reason given is that any STD implies social behavior that confers high HIV risk (86.7% for family physicians, 85.7% for gynecologists). A statistically similar percentage of family physicians (57.8%) and gynecologists (71.4%) who say they always test do so because they feel that HIV testing increases awareness of HIV risks. Among physicians who state they always test for HIV, a strong correlation was found between the belief that STDs directly facilitate HIV transmission and the application of that belief. This was evidenced by their citing this as a reason for testing for HIV in patients with STDs (p<0.001). This correlation held true for both family physicians and gynecologists. However, almost twice as many gynecologists as family physicians always test because of the belief that STDs directly facilitate transmission of HIV (64.3% vs. 37.8%), a trend that does not reach statistical significance (p=0.08).

Among physicians who only sometimes test STD patients for HIV, gynecologists tend more than family physicians to believe that STDs facilitate HIV transmission (85.7% vs. 41.7%; p=0.05). However,

when asked for reasons for not always testing for HIV, a substantial percentage of both family physicians and gynecologists respond that the specific STD being considered has a low risk for HIV (41.7% and 57.1%, respectively) and/or that the patient has no other risk factors for HIV (75.0% and 42.9%, respectively). This indicates a failure to recognize that a STD, in itself, is a risk factor for HIV. This is in contrast to the previously noted strong correlation between belief and testing practice among physicians who say they always test. Few physicians who only sometimes test cited concern over inducing unnecessary anxiety, lack of time to discuss HIV test results, laborious administrative work, or governmental privacy regulations as reasons for not always testing their STD patients for HIV.

Discussion

In the past three decades, numerous epidemiologic studies have clearly demonstrated that both ulcerative and non-ulcerative STDs facilitate acquisition and transmission of HIV-1 independently of sexual behavior (Quinn et al., 1988; Wasserheit, 1992; Laga et al., 1993; Royce et al., 1997; Brown et al., 2007). Six of the seven STDs evaluated in our study have specifically been shown to be risk factors for HIV-1 infection including herpes simplex type 2 (HSV-2) (Kapiga et al., 2007; Freeman et al., 2006; Lama et al., 2006), syphilis (Lama et al., 2006; Stamm et al., 1988; Kreiss et al., 1989), gonorrhea (Laga et al., 1993; Levine et al., 1998; Moss et al., 1995), chlamydia (Laga et al., 1993; Levine et al., 1998), trichomoniasis (McClelland et al., 2007; Price et al., 2006), and HPV (Quinn et al., 1988; Kiviat et al., 1990). Various biological mechanisms by which STDs increase acquisition and transmission of HIV have been described (Fleming et al., 1999). These include disruption of the mucosal barrier to HIV infection, entry and exit of the HIV virus through genital ulcers which often bleed during intercourse, genital shedding of HIV by infected cells and recruitment of HIV-susceptible inflammatory cells to the genital tract (Fleming et al., 1999; LeGoff et al., 2007; Kaul et al., 2008; Levine et al., 1998; McClelland et al., 1995; Schacker et al., 1998). Gonorrheal infection has been shown to decrease the immune response to HIV both in vitro and in vivo (Kaul et al., 2008). The STD with the strongest causal linkage with HIV is HSV-2. HSV-2 immediate early genes cause stimulation of HIV transcription, and cytokines released by HSV-infected cells stimulate HIV replication (Lingappa et al., 1998). In addition, HSV-2 suppressive treatment given to patients co-infected with both HIV and HSV-2 has been shown to

107

4

significantly decrease both genital and plasma HIV-1 levels (Nagot et al., 2007).

In our study of family physicians and gynecologists practicing in Broward County, Florida, gynecologists were found to have a better understanding of the STD-HIV connection than family physicians as indicated by their statistically higher response to the question about this relationship, (54.5% vs. 81%, p=0.028; Table 2). Our data suggests that this difference is related to the greater exposure of gynecologists to non-HIV STDs. However, we found a greater disparity between

knowledge and the translation of that knowledge into practice among gynecologists compared to family physicians. Whereas 81% of gynecologists indicated they believe that STDS facilitate acquisition of STD, only 66.7% of them indicated that they always test patients with STDs for HIV. In contrast, only 54.5% of family physicians shared the same belief, but 78.9% would always test STD patients for HIV. In addition, both groups failed to consistently test for HIV in patients with specific STDs known to be risk factors for the acquisition and/or transmission of HIV (Table 2).

Table 1. Characteristics of Surveyed Physicians' Practices

Demographic	Family Physicians (%) (N=57)	Gynecologists (%) (N=21)	p-value[a]
Patient care (hrs/wk)			0.003
1-19	5.3	0	
20-30	12.3	15.0	
31-40	40.3	10.0	
41-60	36.8	40.0	
Over 60	5.3	35.0	
Prevalence of HIV			0.059
Less than 1%	78.9	95.2	
1% or more	21.1	4.8	
Number of STD diagnoses per year			< 0.001
1-25	61.4	9.5	
26-50	22.8	23.8	
51-100	12.3	38.1	
Over 100	3.5	28.6	
Frequency of positive HIV tests in STD patients (%)			0.019
Unknown	29.8	9.5	
Never	24.6	28.6	
Less than 1	0	14.3	
1-10	43.9	47.6	
Over 10	1.8	0	

[a]The p-value for each row shows the probability that the distribution of that characteristic does not differ between the two specialty groups.

Our subgroup analysis, which compared physicians who stated that they always test for HIV in STD patients with those who do not always test, revealed differences both between and within the two specialties that were not apparent from our whole group analysis. Whereas we were unable to find a correlation between awareness of the STD-HIV connection and testing patterns for the two specialties as a whole, this association emerged as an important predictor of testing patterns when we performed our

subgroup analysis. Both family physicians and gynecologists who stated that they always test for HIV in STD patients cited the belief that STDs directly facilitate HIV acquisition and transmission as an important reason for testing (p<0.001). This correlation was further supported by their higher HIV testing frequencies for the seven specific STDs compared to physicians who do not always test for HIV (Figures 1and 2). In fact, 33% of family physicians who stated that they sometimes test for

108

5

HIV actually did not select any of the specific STDs as an indication for HIV testing (Figure 1). Subgroup analysis also confirmed the whole group findings of a greater awareness of the STD-HIV connection among gynecologists vs. family physicians who always test for HIV. It also revealed higher testing rates for the seven STDs among gynecologists vs. family physicians who only sometimes test for HIV,

especially for Chlamydia and herpes simplex. Moreover, no gynecologist failed to select any STD as an indication for HIV testing. However, in the subgroups of sometimes testers, high percentages of both family physicians and gynecologists failed to recognize the importance of STDs as risk factors for HIV acquisition and transmission.

Table 2. Beliefs and HIV Testing Patterns of Surveyed Physicians

Question	Whole Groups		p-value[a]
	FP % (N=57)	Gyn % (N=21)	
Believe STDs facilitate HIV acquisition and transmission:			0.028
Yes	54.5	81.0	
No	45.5	19.0	
Test for HIV in patients with STDs:			0.272
Never	0.0	0.0	
Always	78.9	66.7	
Sometimes	21.1	33.3	
STDs for which HIV testing is recommended:[b]			
Syphilis	87.7	95.2	0.298
Gonorrhea	87.7	95.2	0.298
Chlamydia	84.2	95.2	0.160
Herpes simplex	64.9	76.2	0.335
Human papillomavirus (HPV)	66.7	28.6	0.002
Trichomonas	59.6	52.4	0.565
Hepatitis B	73.7	71.4	0.843
None of the above	7.0	0.0	0.108

FP = Family Physicians; Gyn = Gynecologists
a) p-values indicate the probability of no difference between the two specialty groups.
b) Respondents could make more than one selection.

A gap between knowledge and practice with regard to HIV testing has been described in other studies as well, specifically in prenatal and perinatal settings. In one study, whereas over 90% of obstetricians and family physicians indicated they believed that all pregnant women should be offered HIV testing, only 67.6% and 54.5% respectively indicated that they actually offered HIV testing to all pregnant women (Hamm, Donnell Jr, Wilson, Meredith, Louise et al., 1996). In another study, a similar gap was found among a group of pediatricians in terms of their awareness of the importance of knowing the HIV status of pregnant women, and actually offering education on HIV screening to pregnant women or mothers of newborns (Kline & O'Connor, 2003).

The deficiency in compliance with the CDC recommendation of HIV testing to all patients who present for the care of STDs found among

gynecologists and family physicians in our study (67.7% and 78.9% compliance rate, respectively) was also found to varying degrees in other studies among physicians in different clinical specialties. One study conducted in Washington State revealed a compliance rate of 91% among obstetricians/gynecologists, 90% among family physicians, and 83% among internists (Montaño et al., 2008). In a study of a mixed group of family physicians, internists, pediatricians, obstetricians, and emergency medicine physicians in New Jersey, the compliance rate of individual specialties was not compared, but the compliance rate of the entire group testing for specific STDs was evaluated; 66% offered HIV testing to patients with gonorrhea, Chlamydia and syphilis, while 63% and 52%, respectively offered HIV testing for genital herpes and trichomoniasis (Seña et al., 2005). The lowest compliance rates were seen in the emergency medicine setting as noted in 3 studies (Gift et al.,

109

6

2006; Fincher-Mergi et al., 2002; Wilson et al., 1999).

Another deficiency in practice patterns uncovered by our study was that among the group of family physicians who state that they always test STD patients for HIV, less than 100% recommended HIV testing for all STDs. In addition, less than 100% of gynecologists who claimed to always test for HIV actually recommended HIV testing for herpes, HPV, trichomoniasis and hepatitis B. This discrepancy is of special concern for herpes, because of the strong causal linkage with HIV, as noted above. While 86% and 80% of gynecologists and family physicians, respectively, who claim to always test for HIV do so for patients with herpes, only 8% of family physicians who sometimes recommend HIV testing do so for herpes.

There are several limitations to our study. Most important is the low response rate to our survey. This may have prevented several observed trends from reaching statistical significance. However, the trends we observed that did not reach statistical significance were consistent with those that did reach statistical significance. Therefore, taken as a whole, we believe that our data supports our conclusions. The low response rate may also impact the generalizability of our results. Although it is unlikely that the practice demographics of our survey respondents differ from the majority of private practitioners in Broward County, the extent to which our results might apply to other areas in the country with similar demographics cannot be predicted. Moreover, different results might have been obtained from groups of physicians who are exposed to a higher prevalence of HIV, such as those who work in Health Department clinics that specialize in the management of STDs. Finally, our survey was conducted shortly before the CDC issued its latest guidelines which recommend universal testing for HIV in all individuals between ages 13 to 64, including the elimination of requirements for written consent and pretest counseling (CDC, 2006b). It is possible that once these new guidelines become widely known, the opinions and practice patterns of the physicians we surveyed will change.

Acknowledgement

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110

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111

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112