I. Reproductive Health Screening in Context of Total Health Care

A. Review components of episodic versus preventive health care.
   1. Problem(s) focus – limited ROS, exam, testing
   2. Annual exam
      a. **History** – complete ROS – "Has anything changed?" – Risk assessment!
      b. Physical exam
      c. Health screening testing
      d. Patient expectations? (Oboler & Smith articles)
      e. Education (Schwartz & McMullin articles)

B. Contrast setting for acute and preventive care.
   1. Medical facilities – hospital, ER, clinics → specialist
   2. Community – generalist – primary care
   3. Access issues

C. Identify the place for the female reproductive system within total health care.
   1. Reproductive system across life cycle and related health care needs
      a. Contraception
      b. Childbearing
      c. Perimenopause
      d. Post menopause
   2. Role of female sex hormones in body physiology
   3. Relationship between general aging and reproductive aging
   4. Role of reproductive history on epidemiology/risks of reproductive cancers

D. Examine the ways in which the practice of medicine takes on cultural characteristics. (Wilkes article)
   1. Organizational issues such as hierarchy, control, and divisions
   2. Language and values
   3. Providers contribution to the cultural interface with patients (Aldrich article)

E. Consider the manner in which the female patient's culture may affect her use and access to preventive reproductive health screening.
   1. Role of women in a culture (Parham & Hicks article as a model)
   2. Socioeconomic issues affecting status and access
   3. Educational needs associated with role and status

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Mexican physicians' knowledge and attitudes about the human papillomavirus and cervical cancer: a national survey

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HPV

Mexican physicians' knowledge and attitudes about the human papillomavirus and cervical cancer: a national survey

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Sex Transm Infect 2005;**81**:135–141. doi: 10.1136/sti.2003.008557

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Objective: To assess Mexican physicians' knowledge about the human papillomavirus (HPV) and cervical cancer and their opinions and practices related to screening, managing, and counselling women on these topics.

Methodology: In August 2002 we surveyed 1206 general practitioners (GPs) and obstetricians-gynaecologists (Ob-Gyns) working in a nationally representative sample of public and private facilities in urban Mexico. Eligible physicians completed a self administered questionnaire. We conducted a weighted analysis and used χ^2 tests to compare GPs and Ob-Gyns on outcome variables.

Results: 76% of recruited physicians responded to the survey. 43% of Ob-Gyns had performed a hysterectomy in the last year to treat a case of CIN I or II. With respect to HPV, while 80% of respondents identified the virus as the principal cause of cervical cancer, many lacked detailed knowledge about this association. Ob-Gyns were more likely than GPs to have heard about specific oncogenic strains of HPV ($p<0.001$). Nearly all respondents thought that women should be informed that HPV causes cervical cancer; nevertheless, physicians believed that positioning cervical cancer as a sexually transmitted infection (STI) could cause problems in partner relationships (60%), confusion (40%), and unnecessary anxiety among women (32%).

Conclusions: Mexican physicians support patient education on the HPV-cervical cancer link. However, findings suggest the need to present clear messages to women (emphasising, for example, that only certain types of HPV are oncogenic), to consider the conflicts such information might create for couples, and to further educate physicians about this topic and about overall cervical cancer screening and treatment protocols.

Cervical cancer is the second most common cancer in women, with an estimated 500 000 new cases and 231 000 deaths annually worldwide.[1 2] Latin America has among the highest incidence rates in the world, and unlike the United States and Canada, most of the region has seen little improvement in the past 30 years. In Mexico, cervical cancer remains a leading cause of death among women of reproductive age with a stable mortality rate of around 17/100 000 despite a national screening programme since 1974.[3] Several factors contribute to cervical cancer rates in Mexico, including low coverage of Papanicolaou (Pap) smears especially among high risk women such as those in rural areas with limited contact with the health system, poor quality of cytology services, and lack of follow up for women with abnormal Pap results. One study found that only 64% of women aged 15–49 in Mexico City and 30% in the state of Oaxaca had ever had a Pap test in their lifetime.[4]

Since the mid-1990s, clinical evidence has established the human papillomavirus (HPV) as a necessary cause of cervical cancer.[5] Knowledge of this association has spurred research on HPV based strategies for cervical cancer prevention, including primary prevention of HPV, HPV vaccines, and the use of HPV testing for follow up of women with abnormal Pap results and post-treatment for severe lesions or micro-invasive cancer. These clinical advances imply the need for appropriate education among both providers and the public. Physicians must remain up to date with research on HPV and cervical cancer diagnostic and treatment technologies. Clear and appropriate information must also be relayed to women in a way that encourages healthy sexual practices and healthcare seeking behaviour. While the United States has launched large scale HPV education programmes aimed at women and the general public,[6 7] information campaigns in Mexico seldom mention HPV. In fact, general knowledge about HPV is very low; in one study with 880 women between 18 and 49 years of age, 2% knew that the virus was a main risk factor for cervical cancer.[8]

Designing effective educational messages is not straightforward: firstly, most HPV infections regress without treatment and are undetectable within 6 months to 2 years.[9 10] Of the over 100 HPV strains, only certain types are oncogenic. In the rare case that these strains progress to cancer, the process can take between 5 and 30 years.[11] Furthermore, since HPV is transmitted through skin to skin contact, traditional barrier methods are unreliable in preventing transmission.[12]

Despite the role that physicians have in cervical cancer prevention and education, limited research on these topics has been conducted with Mexican providers to date. Findings from a 1998 study with 520 healthcare professionals in the state of Morelos showed poor knowledge about cervical cancer aetiology, diagnosis, and treatment, with 40% of obstetricians-gynaecologists (Ob-Gyns) unaware of the association between HPV and cervical cancer.[13] Since this study, the Ministry of Health has published a programme of action on cervical cancer for 2001–6, outlining national strategies for improving screening, treatment, education, service monitoring, and research. Mexico's official cervical cancer norms were also updated in March 1998. In this context, the present

Abbreviations: CIN, cervical intraepithelial neoplasia; GPs, general practitioners; HPV, human papillomavirus; Ob-Gyns, obstetricians-gynaecologists; Pap, Papanicolaou; STI, sexually transmitted infections

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survey sought to explore, on a national level, providers' knowledge, attitudes, and practices related to cervical cancer norms in Mexico and their opinions about patient education on HPV. Given their different professional profile and training, we compared specialists (Ob-Gyns) with non-specialists (family doctors and general practitioners (GPs)) to determine whether and how the two groups differed on these variables.

METHODS AND MATERIALS

Sample framework

Between July and August 2002 we surveyed a total of 1206 general practitioners, family doctors and Ob-Gyns working in a nationally representative sample of public and private health facilities in urban Mexico. Because Mexico has no national level accrediting board or registry of licensed physicians, we based our sample on the facility level. We used two Ministry of Health databases: the first, a census conducted in 2000 of public sector health facilities including those of the Secretary of Health and the Mexican Social Security Institute, and the second, a 2001 census of private facilities.

From these two databases we eliminated facilities without eligible physicians (Ob-Gyns, family doctors, or GPs). We also narrowed our sample to include only urban facilities (that is, located in municipalities with more than 2500 inhabitants), since the majority of providers in rural Mexico are still in training or are GPs with minimal professional experience. For practical reasons, we aimed to recruit four physicians per facility, thus eliminating public and private facilities with less than four full time, eligible providers.

The final sample included 1369 facilities, 845 public and 524 private, all located in urban areas of Mexico and with a total of 13 900 eligible physicians, 63% (n = 8810) who worked in public facilities and 37% (n = 5090) in private facilities. The databases registered only the total number of providers working in each facility and their specialty; names of individual physicians were not available.

Using this sampling frame, we randomly selected a total of 392 facilities stratified by three geographic regions: north, central, and south. We established quotas for each region and sampled accordingly: 131 facilities were randomly selected in the northern and central regions, respectively, and 130 in the southern region, with the aim of collecting a total of 400 questionnaires within each of the three regions (see table 1). Using a 95% confidence interval (CI), we calculated a margin of error of 4.6% for the north, 4.8% for the central region, and 4.6% for the south. We planned to complete four interviews with GPs, family doctors or Ob-Gyns in each health facility, resulting in a potential sample size of 1586 physicians. The sample of eligible facilities was calculated anticipating a non-response rate among physicians of 30% (n = 386 interviews). National estimates had a margin of error of plus or minus 2.73% at a 95% CI.

Questionnaire and data collection

We used a self administered, anonymous questionnaire that was part of a larger survey also assessing physicians' knowledge, attitudes, and practices regarding abortion in Mexico. The instrument included 56 questions—12 on sociodemographic variables, 28 on abortion, and 16 on cervical cancer and HPV. This paper reports results only for the cervical cancer/HPV portion of the survey. The questions were developed in collaboration with Mexico City gynaecologists, oncologists, and cervical cancer experts, and all items were piloted.

The survey team consisted of 74 interviewers and 25 field supervisors. The Population Council (PC) contracted the Mexican market research firm, Investigación de Mercado y Asesoría (IDM), to conduct fieldwork. Interviewers first met with each hospital or health centre director to explain study objectives and deliver a packet of literature on the non-governmental organisation conducting the study (Population Council), as well as information on a nationwide toll free number for participating physicians to call with study related questions. Where the director gave consent for his staff to participate, interviewers delivered the questionnaire to four eligible providers selected conveniently. The interviewers were instructed to seek out eligible physicians in the emergency room, outpatient, and inpatient services from each facility. They returned 2 days later to collect the surveys, which participants were asked to place in a sealed envelope. As compensation, we included two scientific articles about reproductive health topics other than abortion or cervical cancer. This study complied with institutional procedures for ethical review, and all informed consent forms were reviewed and approved.

Data analysis

Data were entered using SPSS version 4.5 and analysed with SPSS version 10. We conducted a weighted analysis since the study was carried out using quotas that were not proportional to the distribution of physicians in the sampling frame. Weights were calculated based on the distribution of doctors in the sample framework which contained 19 825 physicians: 17.9% (3559) in the north, 63.1% (12 940) in the central region, and 16.2% (3326) in the south. Physicians were distributed in the sample in the following way: 33.6% (406) in the north, 35.3% (426) in the central region, and 31% (374) in the south. To calculate the weights to be applied to each region, the framework distribution was divided by the actual sample: north (17.9%/33.6% = 0.5327), central (65.3%/35.3% = 1.8499), and south (16.8%/31.0% = 0.5419).

We used χ^2 tests to compare Ob-Gyns and GPs/family doctors on outcome variables. In Mexico, the services offered by GPs and family doctors are similar. The difference lies in that GPs belong to the Social Security Institute, which primarily serves government employees, while family doctors practise within the Secretary of Health. For purposes of this

Table 1 Distribution of health facilities and selected physicians in final sample. National survey of knowledge and attitudes regarding cervical cancer and HPV, Mexico 2002

	Total	North	Central	South
	No	No (%)	No (%)	No (%)
Total facilities	288	96 (33)	103 (36)	89 (31)
Physicians	1206	406 (34)	426 (35)	374 (31)
Public facilities	170	58 (34)	50 (29)	62 (36)
Physicians	694	243 (35)	185 (27)	266 (38)
Private facilities	118	38 (32)	53 (45)	27 (23)
Physicians	512	163 (32)	241 (47)	108 (21)

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Table 2 Mexican physicians' sociodemographic, and professional characteristics (n = 1206)*

Characteristic	Total	Provider type: Ob-Gyns No (%)	Provider type: GPs No (%)	p Value
Region				
North	216 (18)	78 (26)	138 (15)	0.000
Central	787 (65)	177 (60)	610 (67)	
South	203 (17)	41 (14)	162 (18)	
Age (years)				
22–34	300 (25)	64 (22)	236 (26)	0.170
35–44	405 (34)	111 (38)	294 (32)	
45 and older	500 (42)	120 (41)	380 (42)	
Sex				
Male	835 (69)	213 (72)	622 (68)	0.247
Female	371 (31)	83 (28)	288 (32)	
Civil status				
Single	225 (19)	43 (15)	182 (20)	0.039
Married (includes free union, divorced, widowed)	982 (81)	253 (86)	729 (80)	
Bimonthly salary (Mexican pesos†)				
Up to $3500	260 (22)	28 (10)	232 (26)	0.000
$3501–$9000	561 (48)	109 (38)	452 (51)	
$9001–$13 500	215 (18)	79 (27)	136 (15)	
>$13 500	141 (12)	73 (25)	68 (8)	
Religion				
Catholic	1036 (86)	256 (87)	780 (86)	0.723
Other	91 (8)	20 (7)	71 (8)	
None	73 (6)	20 (7)	53 (6)	
Frequency of church assistance				
Never or almost never	496 (42)	123 (42)	373 (41)	0.910
1–2 a month	359 (30)	85 (29)	274 (30)	
1 or more times a week	341 (29)	85 (29)	256 (28)	
Medical school				
UNAM	463 (38)	104 (35)	359 (40)	0.214
Other public university	660 (55)	166 (56)	494 (54)	
Other private university	84 (7)	26 (9)	58 (6)	
Year completed medical training				
1990–2002	413 (34)	97 (33)	316 (35)	0.519
1980–9	485 (40)	116 (39)	369 (41)	
Before 1980	308 (26)	83 (28)	225 (25)	
Type of practice				
Public	395 (33)	59 (20)	336 (37)	0.000
Private	487 (40)	117 (40)	370 (41)	
Both public and private	325 (27)	120 (41)	205 (23)	
Performed or ordered a Pap test in last 2 weeks				
Yes	1037 (86)	264 (89)	773 (85)	0.068
No	170 (14)	32 (11)	138 (15)	

*Totals not always equal to 1206 because of weighted analysis and/or missing variables.
†Exchange rate during study period (July–August 2002) was 10.4 Mexican pesos = 1 US$.

analysis it was deemed appropriate to group the two physician types under the category of "non-specialists."

RESULTS

Of the 1586 eligible physicians, 1206 providers working in a total of 288 medical facilities agreed to participate, resulting in a response rate of 76%. Private sector physicians had a higher non-response rate than those working in the public sector (28% *v* 21%). Approximately one third of respondents corresponded to each of the three regions of the country (33% north, 36% central, and 31% south).

Table 2 shows key characteristics of the study population by provider type. Approximately half of the respondents were GPs (54%), followed by Ob-Gyns (25%) and family doctors (21%). The majority were from the central region where the capital, Mexico City, is located, and significantly more Ob-Gyns were from the north. Respondents' age ranged from between 24 and 60, with an average age of 42. Most were male, married, or had a 2 week salary of between 3500 and 9000 Mexican pesos (roughly $US865). Roughly 86% self identified as Catholic—fairly consistent with the national average—although 41% reported to never or almost never attend religious services. The majority of physicians graduated from public universities.

Approximately 40% of respondents reported to work exclusively in the private sector, and Ob-Gyns were significantly less likely than GPs to work only in public institutions (20% *v* 37%). The majority of providers had ordered or performed a Pap test in the 2 weeks before the survey.

Cervical cancer screening: knowledge and practices

Most respondents had either been informed about or had read the official Mexican norms for cervical cancer (table 3). Despite this, there was discrepancy regarding the recommended periodicity for obtaining routine Pap tests. Importantly, current Mexican norms do not specify at what point or age women should initiate Pap testing. While 77% of all respondents said that women should begin having Pap tests after first sexual intercourse regardless of age, 10% of GPs said that women should initiate Pap tests after the birth of their first child. With regard to the appropriate interval for Pap testing, 73% of both Ob-Gyns and GPs recommended annual screening given a previous normal Pap test. However,

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Table 3 Knowledge about cervical cancer screening protocols and HPV, by type of provider (n = 1206)*

Variable	Total	Provider type: Ob-Gyn No (%)	Provider type: GP No (%)	p Value
Read or been informed about official norms on cervical cancer				
Yes	996 (83)	251 (85)	745 (82)	0.216
No	209 (17)	44 (15)	165 (18)	
When recommends for women to have first Pap test				
In late adolescence (16–19 years) or after first sexual intercourse	119 (10)	32 (11)	87 (10)	0.029
After first sexual intercourse regardless of age	932 (77)	240 (81)	692 (76)	
After birth of first child	104 (9)	15 (5)	89 (10)	
Other	51 (6)	8 (3)	43 (5)	
Should women continue to get routine Pap tests after menopause				
Yes	1124 (93)	274 (93)	850 (93)	0.789
No	81 (7)	21 (7)	60 (7)	
Time that woman should wait for next Pap if previous test normal				
6 months	193 (16)	53 (18)	140 (15)	0.098
1 year	880 (73)	216 (73)	664 (73)	
3 years	95 (8)	23 (8)	72 (8)	
Other	37 (3)	3 (1)	34 (4)	
Principal cause of cervical cancer				
Human papillomavirus (HPV)	968 (80)	253 (86)	715 (79)	0.000
Family history of cervical cancer	175 (15)	21 (7)	154 (17)	
Other (herpes virus, poor genital hygiene, OC pills, smoking)	64 (5)	22 (7)	42 (5)	
Knew about HPV cervical cancer link before reading paragraph*				
Yes	1161 (96)	288 (97)	873 (96)	0.297
No	46 (4)	8 (3)	38 (4)	
Had heard about oncogenic types of HPV before paragraph				
Yes	1013 (84)	283 (96)	730 (80)	0.000
No	192 (16)	12 (4)	180 (20)	
HPV types 16, 18, 31, 38, and 45 also cause genital warts				
Yes	739 (61)	185 (63)	554 (61)	0.000
No	225 (19)	83 (28)	142 (16)	
Don't know	243 (20)	28 (10)	215 (24)	

*Totals not always equal to 1206 because of weighted analysis and/or missing variables.

18% of Ob-Gyns incorrectly said that Pap tests should be repeated every 6 months regardless of previous results.

With regard to physicians' counselling practices during routine Pap tests, approximately 80% reported to always counsel women on the purpose of the Pap test, the meaning of test results, and the benefit of having a Pap (data not shown). Significantly more Ob-Gyns (58%) than GPs (45%) said that they counselled women about the relation between smoking and cervical cancer ($p<.001$). Nearly 60% of all respondents reported to regularly counsel women about the relation between unsafe sex and cervical cancer.

Respondents were also asked about knowledge and practices for the management of mild or moderate dysplasia, or CIN I and II as classified under the cervical intraepithelial neoplasia system (table 4). National guidelines consider electrosurgery, laser therapy, and cryotherapy as preferred management options for CIN I, II, or III, and hysterectomy is not recommended. Among GPs, 18% had performed a hysterectomy in the past year to treat CIN I or II, and between 11% and 15% had performed laser therapy, electrosurgery, or cryotherapy. Ob-Gyns were significantly more likely than GPs to both identify hysterectomy as a management option for low grade lesions (37%) and to have performed one in the past year for this indication (43%). Thirty per cent of physicians working in the private sector had performed a hysterectomy in the past year, compared to 13% of public sector physicians and 27% of providers working in both sectors ($p<0.05$).

Regarding physicians' strategies for keeping updated on clinical advances in cervical cancer prevention and treatment (data not shown), the most frequently cited source was medical journals (83%), followed by continuing medical

Table 4 Knowledge and practices regarding management of CIN I and CIN II* (n = 1206)†

	Provider type: Ob-Gyn No (%)	Provider type: GP No (%)	Sector: Public No (%)	Sector: Private No (%)	Sector: Both No (%)
Is an option for CIN I or CIN II					
Hysterectomy	108 (37)	227 (25)	82 (21)	166 (34)	88 (27)
Electrosurgery	217 (73)	360 (40)	159 (40)	230 (47)	188 (58)
Laser therapy	163 (55)	292 (32)	118 (30)	177 (36)	160 (49)
Cryotherapy	205 (70)	471 (52)	192 (49)	286 (59)	197 (61)
Has performed for CIN I or CIN II					
Hysterectomy	126 (43)	161 (18)	53 (13)	148 (30)	86 (27)
Electrosurgery	154 (52)	120 (13)	50 (13)	126 (26)	98 (30)
Laser therapy	68 (23)	98 (11)	30 (8)	79 (16)	57 (18)
Cryotherapy	151 (51)	139 (15)	53 (14)	132 (27)	105 (32)

*All results significant at the $p<0.01$ level.
†This question allowed for multiple responses.

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training (74%), conferences (73%), the internet (54%), and colleagues (34%). Responses for this question did not differ significantly between Ob-Gyns and GPs.

HPV knowledge and opinions on patient counselling

As table 3 shows, 86% of Ob-Gyns and 79% of GPs identified HPV as the principal cause of cervical cancer. GPs were more likely than Ob-Gyns to say that a family history of cervical cancer was the main causal factor. In response to this multiple choice question, a small number of physicians mentioned other factors including the herpes virus, poor genital hygiene, oral contraceptive pills, and smoking. Following a brief paragraph explaining the relation between HPV and cervical cancer, nearly all respondents reported to have previously heard about the association. (The paragraph read as follows: HPV is sexually transmitted and is the most common cause of cervical cancer throughout the world. Not all strains of HPV are oncogenic; the most high risk strains are types 16, 18, 31, 33, and 45. In some cases the infection disappears on its own and in others it progresses to cancer.) Ob-Gyns were significantly more likely to have heard about the most common oncogenic strains of HPV (96% *v* 80%; $p<.001$). However, roughly 62% of both Ob-Gyns and GPs incorrectly identified HPV types 16, 18, 31, 38, and 45 as also causing genital warts. GPs were more than twice as likely as Ob-Gyns to report not knowing whether these strains did or did not cause warts.

Nearly all respondents (99%) said that women in the general public should be informed that HPV is the principal cause of cervical cancer (data not shown). With respect to appropriate settings for or means of educating women on this topic, comparable proportions of Ob-Gyns and GPs (80–90%) said during routine Pap tests, at family planning clinics, in universities, through public education campaigns, and in high schools.

Table 5 shows physicians' opinions about potential consequences of informing women that HPV is the main cause of cervical cancer, by type of provider and region. The question was presented as a list of statements to which respondents could answer "strongly agree," "somewhat agree," "somewhat disagree," and "strongly disagree." Data were analysed using both these responses and, as presented here, collapsing responses into agree/disagree. Thirty seven per cent of Ob-Gyns agreed that this information would cause unnecessary anxiety among women. A roughly equal proportion of Ob-Gyns and GPs (37% and 35% respectively) also thought that women would not be able to understand this information. Physicians in the north were more than twice as likely as those in the central region to believe that the association between HPV and cervical cancer is not sufficiently established and that providers would not know how to counsel women on this topic ($p<0.05$). With the exception of GPs, the majority of respondents also thought that this information could cause conflict in intimate partner relationships. Relatively few respondents thought that knowing that an STI causes cervical cancer would dissuade women from having Pap tests.

DISCUSSION

Study limitations

Owing to lack of databases necessary to create the sampling frame for randomising individual physicians, this study was based on a probability sample at the health facility level in urban Mexico. Although the facilities represented a random sample, the providers surveyed within each facility comprised a convenience sample. One potential problem with this sampling strategy is that those providers who participated may not be representative of all providers who worked in these facilities. This would be of particular concern if the providers who were selected had characteristics that made them different from other providers with respect to their level of knowledge or attitudes on HPV and cervical cancer. In particular, since the larger survey also included questions on abortion, it is possible that the providers who agreed to participate were more likely to hold certain views on abortion that would affect their views on HPV and cervical cancer. In fact, survey findings suggest considerable diversity with respect to physicians' views on abortion. As reported elsewhere,[14] 55% of the sample said they would be willing to perform a legal abortion in a public institution, suggesting that the sample was not overwhelmingly pro-choice or anti-choice despite being largely Catholic. Indeed, while 86% self identified as Catholic, 42% reported to rarely or never attend religious services.

A second limitation is that the exclusion of rural areas from the sampling frame means that study findings are not generalisable to providers in these areas. Providers practising in rural Mexico were considered less appropriate participants for our survey for reasons explained earlier. However, future studies on cervical cancer and HPV should undoubtedly focus on this population, considering the poor quality of screening, treatment, and counselling services in rural Mexico.

A third potential problem is that the questionnaire included an informational paragraph on HPV in order to provide respondents with basic facts with which to answer the opinion questions on patient education. It is possible that respondents changed their answers to some of the HPV questions after reading the paragraph, although the fact that the survey was anonymous and confidential, and as many as 20% of GPs admitted to *not* having heard about high risk HPV strains after reading the paragraph, suggests that many did not. Perhaps a better measure of physicians' knowledge about HPV is the question on whether high risk strains cause genital warts—a topic not covered in the paragraph and one that 61% of all respondents answered incorrectly.

Table 5 Providers agreeing with the following possible consequences of informing women about the relation between HPV and cervical cancer ($n=1206$)

Opinion	Provider type		Region		
	Ob-Gyn No (%)	GP No (%)	Central No (%)	North No (%)	South No (%)
This information would cause unnecessary anxiety for women	109 (37)	255 (28)*	227 (29)	91 (42)	46 (23)*
Women would not understand this information	109 (37)	320 (35)	244 (31)	108 (50)	77 (39)*
The association between HPV and cervical cancer is not scientifically documented	71 (24)	178 (20)	129 (16)	77 (36)	43 (21)*
Providers would not know how to counsel women on this topic	60 (20)	162 (18)	116 (15)	69 (32)	37 (18)*†
Women would be less likely to have Pap tests	68 (23)	234 (26)	176 (22)	82 (38)	44 (22)*
This information could create problems in relationships	191 (65)	530 (58)	466 (59)	128 (59)	127 (63)

*Significant at the $p<0.05$ level.

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Provider knowledge about cervical cancer and HPV

Providers surveyed generally had accurate knowledge about Pap test norms and the appropriate periodicity with which women should be screened. Still, it is troubling that 10% of GPs believed that women should initiate Pap tests after giving birth to their first child. In addition to the already low screening coverage in Mexico, well over 50% of Mexican women will initiate sexual activity several years before their first child if they have children,[15] thus exposing them to HPV infection that can progress to various degrees of dysplasia over time. It is important to note that even the updated 1998 Mexican norms, which provide more explicit guidelines on screening and treatment protocols and public education, do not specify when women should begin having Pap tests. The recently revised American Cancer Society guidelines recommend that women initiate Pap tests roughly 3 years after first intercourse but no later than age 21.[16] It is essential that the Mexican Ministry of Health determine and include protocols for Pap test initiation in clinical norms.

The interval that women should wait to get Pap tests continues to be an area of discrepancy in Mexico, and findings suggest a gap between national guidelines and practice. Although the majority of physicians in this study correctly recommended annual Pap testing given a previous normal result, 18% of Ob-Gyns said that women should be tested again in 6 months. This latter recommendation has been documented in a previous study with Mexican providers.[13] It is possible that doctors tell patients to come in earlier than clinically indicated, assuming that they will return later if at all. However, studies have clearly established that annual screening yields minimal gains compared to screening every 3 years, in terms of reducing cumulative cancer rates.[17] Mexican norms recommend that women be screened every 3 years given two normal Pap tests of no more than a year apart and in the absence of HPV infection. The 2001–6 Program of Action on Cervical Cancer also states that, given epidemiological evidence, annual or semi-annual screening is unnecessary.[18] Semi-annual screening of a small portion of the population (likely the most low risk), while many women are never screened, is evidence of poor distribution of resources in Mexico's cervical cancer prevention programme.

Findings regarding physicians' knowledge and management of mild or moderate dysplasia suggest misuse of hysterectomy. Again, physicians might justify aggressive treatment given the tendency for women to not seek necessary follow up care. Many factors influence the decision to perform a hysterectomy, including the woman's age, additional risk factors, desire to discontinue childbearing, and the physician's own financial incentives. Regardless, given the problems associated with the "epidemic" proportion of hysterectomies in Latin America, appropriate dysplasia management is a priority area for provider education.

With respect to cervical cancer aetiology and causes, physicians in this study appear to have better basic knowledge about HPV compared with those surveyed in 1998.[13] Anecdotal evidence also indicates a growing awareness in the medical community about HPV. Nevertheless, both GPs and Ob-Gyns showed poor detailed knowledge about HPV, thus pointing to another area where physician education is needed.

Physicians' opinions on patient education about HPV

Mexican providers in our study strongly supported HPV education for women, in a variety of settings ranging from routine Pap examinations to universities and high schools. Researchers have suggested that this information would stigmatise cervical cancer and thus reduce participation in cancer screening.[19 20] Our study suggests the opposite—that is, few Mexican doctors believed that knowledge about the causal relation between an STI and cervical cancer would discourage women from having Pap tests.

Education about HPV will inevitably become more common, and since the inception of this study, there have been an increasing number of HPV public service announcements in Mexico. Further research in the area of patient counselling is needed, however, especially in light of current research into new HPV related technologies; though years away from marketing, research on both HPV tests and vaccines will have important implications for middle income countries like Mexico, and at least one study has assessed acceptability for an HPV trial vaccine in the state of Morelos.[8] The key will be to frame appropriate and effective messages that minimise confusion, pre-empt unnecessary anxiety, and take into account men's role in both prevention and risk. A study in Great Britain showed that information about HPV tended to cause confusion among women who did not previously know about its link with cervical cancer.[21] In Mexico, the fact that roughly 66% of women diagnosed with cervical cancer in 2000 were illiterate or had only incomplete primary school education[17] highlights the need for clarity and consistency in educational messages.

In addition, that most physicians believed information about HPV would cause problems in partner relationships is important, as it points to the increasingly expanded counselling role of healthcare professionals. Above all, and especially if combination HPV/Pap testing is to be introduced in Mexico in the future, providers need to be armed with accurate information to share with women and their partners, as well as an awareness of and sensitivity to the implications this information carries. For example, when giving a positive HPV diagnosis to a patient, providers might explain that such a diagnosis should not be taken as an indication of the woman's or her partner's sexual behaviour, as it is impossible to know when HPV was acquired or from whom.

CONCLUSIONS

This is the first study to evaluate provider knowledge and attitudes about cervical cancer and HPV on a national level in Mexico, a country with an unacceptably high cervical cancer mortality rate. Findings suggest the need for educational interventions with Mexican physicians, especially through increasing access to up to date information in medical journals, the internet, and implementing continuing education programmes. In fact, the present study was part of a package of provider studies in Mexico. Based on findings from a survey carried out with public sector providers in Mexico City, educational physician workshops on HPV and cervical cancer are being planned. Secondly, in addition to testing counselling messages aimed at women and the public,

Key messages

- Both obstetricians-gynaecologists and general practitioners in Mexico would benefit from further education about human papillomavirus (HPV) and cervical cancer, particularly screening and management protocols
- Mexican physicians generally support patient education about HPV and do not think that such information will discourage women from having Pap tests
- Informing women that HPV is a main cause of cervical cancer can cause confusion, anxiety, and conflict in partner relationships; therefore the topic must be handled with clarity and sensitivity in the clinical setting

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it will be necessary to do evaluation research to determine the effects of current HPV education campaigns.

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CONTRIBUTORS

TA contributed to the development of the questionnaire, conducted data analysis, and wrote the manuscript; DB contributed to the development of the questionnaire, and to manuscript revisions; SG assisted in revising the study protocol, questionnaire, and manuscript; DL drafted the study protocol and oversaw fieldwork.

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Influence of Beliefs about Cervical Cancer Etiology on Pap Smear Use Among Latina Immigrants

iet M. McMullin, Israel De Alba, Leo R. Chávez & Allan Hubbell

ective. *To assess Latina immigrants' beliefs about the role of sexual activities in ical cancer etiology and the impact of the beliefs on Papanicolaou (Pap) smear use. ious research has found that Latinas, particularly immigrants, believe that cervical er is related to 'unwise' sexual activities; however, their beliefs about the nature of relationship are unclear.*

ign. *We conducted semi-structured face-to-face interviews with a non-probability posive sample of 20 Mexican immigrant women who resided in Orange County, fornia regarding their beliefs about risk factors for cervical cancer and Pap smear use. used qualitative content analysis to identify major themes. Three investigators pendently reviewed transcripts of the audio-taped interviews to identify themes and e to a consensus about them.*

ults. *The women had a mean age of 39 years and had resided in the USA for an age of 16.3 years. We identified several themes. The majority of respondents had ted knowledge about cervical cancer and no knowledge about human papillomavirus PV); believed that infections caused by physical trauma, certain sexual activities, and r hygiene caused cervical cancer; believed that they only needed a Pap smear if they eloped symptoms of a pelvic infection; and felt that women who engaged in 'unwise' ual behaviors, in particular, should receive regular Pap smear exams.*

nclusion. *The results suggest that culturally related beliefs about the etiology of ical cancer play a role in the decision to obtain Pap smears for Latina immigrants.*

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The findings may help to explain why researchers have found Latino ethnicity to be an independent predictor of Pap smear use. They also suggest that programs designed to improve cervical cancer screening, particularly among Latina immigrants, should stress the nature of HPV transmission, its role in the etiology of cervical cancer, and the importance of Pap smear screening in the absence of symptoms.

Keywords: Knowledge and Attitudes; Cervical Cancer; Cancer Prevention; Culture; Latinas

Introduction

Cervical cancer ranks second only to breast cancer as the most common malignancy among women in the world (Schiffman *et al.* 2001). In the USA, the disease ranks ninth in incidence and accounts for 6% of all cancers among women (Greenlee *et al.* 2001). For Latinas (Hispanic women), however, the age adjusted incidence and mortality rates are higher than for non-Latino white women (Trapido *et al.* 1995). Moreover, Latinas tend to be younger at the time of diagnosis and to present at more advanced stages (Mandelblatt *et al.* 1991; Singh *et al.* 2004). These statistics may be accounted for, in part, by Latinas' relatively low rates of Papanicolaou (Pap) smear screening (Estrada *et al.* 1990; Calle *et al.* 1993; Pérez-Stable *et al.* 1994; Schur *et al.* 1995; Tortolero-Luna *et al.* 1995; Hubbell *et al.* 1996; O'Malley *et al.* 1997; Buller *et al.* 1998; Howe *et al.* 1998; Powell-Griner *et al.* 1999; Roetzheim *et al.* 1999; Zambrana *et al.* 1999; Wu *et al.* 2001).

Research on the factors that influence the use of Pap smears by Latinas usually falls under two major categories: economic and cultural. Economic factors, in particular having health insurance, are the most important predictors of cervical cancer screening in this population. Indeed, providing health insurance to the uninsured would probably be the most effective method of increasing use of preventive services. However, having a regular source of care, higher family incomes, and higher education levels also play an important role (Estrada *et al.* 1990; Calle *et al.* 1993; Pérez-Stable *et al.* 1994; Schur *et al.* 1995; Tortolero-Luna *et al.* 1995; Hubbell *et al.* 1996; O'Malley *et al.* 1997; Buller *et al.* 1998; Howe *et al.* 1998; Powell-Griner *et al.* 1999; Roetzheim *et al.* 1999; Zambrana *et al.* 1999; Wu *et al.* 2001).

Economic issues do not account for all aspects of life that influence use of preventive services. Indeed, Latino ethnicity has been identified as an independent negative predictor of preventive service use after controlling for health insurance, family income, and other potentially confounding variables (Pérez-Stable *et al.* 1994; Hubbell *et al.* 1996). Therefore, many investigators have suggested the possible role of culture in predicting preventive service use. Some of the issues of interest have included language, beliefs about the disease, fatalism, and knowledge about screening guidelines. For example Solis *et al.* (1990) found that speaking English was more important than ethnic identification in predicting use of preventive services among Latinos. Suarez *et al.* (1997) noted that Mexican American women with more fearful

and fatalistic attitudes about cancer were less likely than others to have had a recent Pap smear. Likewise, Chavez *et al.* (1997) reported that, after controlling for potentially confounding variables, fatalistic beliefs were negative predictors of Pap smear use among Latinas but not non-Latino white women. Finally, Ramirez *et al.* (2000) found that knowledge about screening guidelines differed among Hispanic populations (Central American, Mexican American, Cuban, and Puerto Rican) but overall, knowledge did not predict Pap smear screening behavior.

Our own research has raised a number of questions regarding the interplay between economics, knowledge about cervical cancer, and the use of Pap exams. In the early 1990s, we conducted in-depth face-to-face interviews with women (Salvadoran immigrants, Mexican immigrants, US born Latinas, and non-Latino whites) regarding their knowledge about cervical cancer and the use of Pap smears (Chavez *et al.* 1995). We found that the non-Latino white women believed that a combination of hereditary and lifestyle behaviors caused cervical cancer. Latinas, on the other hand, focused largely on sexual behaviors as the cause of the disease. Indeed, Martinez *et al.* (1997) argued that Latinas' knowledge about cervical cancer risk factors were imbued with moral injunctions: women who engaged in 'unnatural' and 'immoral' behaviors such as having many lovers, sex during menstruation, and abortions were more likely than others to get cervical cancer. To test the generalizability of these findings, we conducted a telephone survey of 803 randomly selected Latinas (Hubbell *et al.* 1996). We found that Latinas who believed that sexual behaviors increased the risk for cervical cancer were less likely than others to have had a Pap smear within the previous three years. These findings supported the notion that morality plays a role in Latinas' decisions to obtain regular Pap smear screening.

In contrast, Gregg (2000) found that women in Brazil responded to a public health campaign that clearly defined cervical cancer as a sexually transmitted disease (STD). While the campaign was successful in increasing Pap smear screening, it had unintended consequences. Women who were no longer sexually active understood the campaign to mean that they no longer needed Pap smears. Likewise, women who were sexually active thought that they would be examined for other STDs such as gonorrhea and syphilis. This belief led them to obtain exams as often as twice a year. On the other hand, women who did not engage in activities that increased the risk for STDs were less inclined to obtain regular Pap smear screening. These findings were important because they showed that many Latinas, at least in the villages of Brazil, were not so stigmatized by the notion that cervical cancer was an STD that they did not access Pap smear screening.

It is important to understand how beliefs about the sexual transmission of cervical cancer influence the use of Pap smears in order to develop effective culturally sensitive programs to increase cervical cancer screening rates among Latinas. Therefore, we conducted a qualitative study among Latina immigrants to explore these issues in more detail. Our major objective was to determine whether viewing

cervical cancer as sexually transmitted had an impact on cervical cancer screening and, if so, how?

Methods

We conducted the study with women who had migrated from Mexico, but now resided in California, concerning their knowledge and behaviors regarding cervical cancer and Pap exams. Because we were particularly interested in understanding why women did not obtain regular Pap smears, only women who had not had an exam within the past three years were eligible for the study. In addition, the women had to be Mexican immigrants, sexually active, and over the age of 30 years. We chose to study Mexican immigrants because previous research indicated that these women were more likely to make the link between sexual behaviors and cervical cancer and less likely to have Pap smear screening than other Latinas (Chavez *et al.* 1995; Hubbell *et al.* 1996). We set the age restriction at 30 years, giving the women a number of years from the onset of sexual activity in which they could have obtained a Pap exam. Current Pap smear screening recommendations suggest that testing should begin when a woman first engages in sexual intercourse and should be performed at least every three years thereafter (US Preventive Services Task Force 2003).

Using a non-probability purposive sample design, we contacted 20 Mexican immigrant women through Latino community-based organizations (CBOs) in Santa Ana, California. Approximately two-thirds of the residents in Santa Ana are Latino (US Census Bureau 2001). The CBOs with which we worked offered services including legal assistance, English language courses, and health information. We recruited Latinas for this study during health education sessions at the CBOs. Trained graduate student interviewers who were fluent in Spanish and English conducted face-to-face interviews with the women in their homes. They gave the women the choice of being interviewed in Spanish or English. All of the women chose to be interviewed in Spanish.

We used questions from a survey instrument that we had employed in a previous study of knowledge and attitudes about cancer among Latinas (Chavez *et al.* 1995) to which we added inquiries specific to this investigation. Following a grounded theory approach (Glaser & Strauss 1967), we began with open-ended questions designed to gather information about the women's knowledge about Pap exams, cancer of the cervix (*cuello de la matriz*), and causes of cervical cancer. We asked why the women had received their first, and often only, Pap smear, what they knew about cervical cancer, and what they thought caused it. Grounded theory emphasizes the simultaneous involvement of data collection and analysis (Charmaz 2001). Thus, in an effort to elaborate further on key themes that occurred in our previous research (Chavez *et al.* 1995; Hubbell *et al.* 1996; Martinez *et al.* 1997), we asked about the causes of cervical cancer. We first asked the open-ended question 'What things do you think might cause cervical cancer?' After that, we asked them to agree or disagree with

statements such as 'Some people have told us that God gives people illnesses such as cervical cancer' and 'Some people have told us that they would not get checked for cervical cancer because people might think they were "bad" women.' We also asked if they thought that specific sexual behaviors caused cervical cancer, how that behavior led to cervical cancer, and if engaging in that behavior would influence their decision to obtain a Pap exam. For example, we asked the women if 'having many lovers/ sexual partners would increase a woman's risk of getting cervical cancer?' If she responded, 'yes', then we asked her 'How does this lead to cervical cancer?' Finally, we asked if having that knowledge 'made her want to get a Pap smear test for cervical cancer?' These topics were directly related to the emergent themes of our earlier studies (Chavez *et al.* 1995; Hubbell *et al.* 1996; Martinez *et al.* 1997).

The last set of questions concerned demographic characteristics and acculturation levels. We used a five-item language assimilation scale to assess acculturation (Marin *et al.* 1987). In brief, the scale asked what languages the respondents spoke: in general; as a child; at home; and with friends and in what language they usually thought. Responses included: 1, only Spanish; 2, more Spanish than English; 3, both equally; 4, more English than Spanish; and 5, only English. The interviews lasted an average of two hours each.

We obtained permission from the women to tape record the interviews. We used qualitative content analysis to evaluate the transcripts of the tapes for recurring themes and explanations about cervical cancer and screening. The interviews were analyzed to assess the link between sexual behavior, cervical cancer, and the women's explanations for why they would obtain or not obtain a Pap exam. Three experienced investigators, two medical anthropologists (J.M.M. and L.R.C.) and a health services researcher (F.A.H.), independently reviewed the transcripts to identify themes and then came to a consensus about them. We resolved disagreements by reviewing the transcripts together and tracking down the source of disputes. We then discussed those sections until we arrived at consensus about coding categories and their application. We were able to reach consensus in all cases. The study received approval from the Human Subjects Review Committee of the University of California, Irvine.

Results

Demographic Characteristics

Table 1 shows the demographic characteristics of the 20 women and the timing of their most recent Pap exam. The mean age was 39 years. Respondents had lived in the USA for 16.3 years on average. All women scored three (spoke Spanish and English equally) on the language assimilation scale. Only one woman had completed a high school education, and most of the women had annual household incomes of less than $15,000. Half of the women had health insurance. All of the women had heard of Pap

Table 1 Demographics and Pap Smear Use of Mexican Immigrant Women ($N=20$)

Age	Number
<40	15
40–49	3
>49	2
Education (years)	
0–6	12
7–12	7
>12	1
Language	
Only Spanish	0
More Spanish than English	0
Equal Spanish and English	20
More English than Spanish	0
Only English	0
Annual household income[a]	
<$5,000	1
$5,000–$9,999	2
$10,000–$14,999	8
$15,000–$19,999	3
$20,000–$24,999	1
Years in the USA	
5–10	8
11–20	9
>20	3
Employment status	
Currently employed	9
Not currently employed	11
Health insurance status	
Any form of health insurance	10
No health insurance	10
Pap smear status	
Never had a Pap	2
Pap more than three years ago	18

[a]Three respondents declined to answer.

exams, and 18 of them had received at least one exam at some time in their lives (Table 1).

Themes

The qualitative content analysis revealed four major themes: the women had limited knowledge about cervical cancer; they believed that sexual behaviors caused cervical cancer by causing infections; they felt that they did not need a Pap smear in the absence of symptoms, and; they believed that women who engaged in 'unwise' sexual

behaviors needed Pap smears and those who didn't needed them less (Table 2). A discussion of the themes appears below.

• *Knowledge about cervical cancer*

Most of the women ($n = 16$) stated that they did not know much about cancer. When talking about cervical cancer, they often referred to their general knowledge about cancer. The concept that the human papillomavirus (HPV) was a precursor to cervical cancer was not part of that knowledge. Indeed, none of the women had heard of HPV. Rather, the women drew upon their personal experiences and stories they had heard throughout their lives to make sense of cervical cancer.

The women who said that they had knowledge of cervical cancer typically switched the topic either to a generalized form of cancer or to cancer of the ovaries or uterus. For example, this 31-year-old woman used an example of a friend who had cysts on her ovaries to talk about cervical cancer: '*I have heard that when a person gets cysts there, they say that there, from the cysts, cancer develops.*' Likewise, this 35-year-old woman drew on general knowledge of cancer and related it to cervical cancer. '*What I know is not much. What I have heard, the cancer is a malignant tumor that needs to be cut off if it is there. Because it is there in the cervix or in the breasts or parts.*'

Even women who had family members with cervical cancer stated that they had relatively little knowledge about the disease. When asked if she knew anyone who had been diagnosed with cervical cancer, this woman responded, '*Well, yes, my sister had cancer and they removed her womb.*' (Interviewer) Was it in the cervix? '*I don't know where it was from. They detected it in her womb, then in her ovaries.*' This woman's lack of specificity about the origination of her sister's cancer suggested a pattern of generalizing cervical cancer to any area in a woman's reproductive system.

• *Sexual behaviors lead to cervical cancer through infections*

Table 3 reports the number of women who agreed that a specified sexual behavior caused or increased the risk of cervical cancer. The large majority of women thought

Table 2 Themes Regarding Beliefs about Cervical Cancer and Pap Smear Use

Knowledge about cervical cancer
Knowledge about cervical cancer is limited
No knowledge about the human papillomavirus
Sexual behaviors cause cervical cancer through infections
Infections if not treated cause cervical cancer
Infections are caused by physical trauma, contact with an infected partner, or poor hygiene
Importance of symptoms and Pap smear use
Infections cause symptoms
Symptoms must be present for Pap smears to become a priority
Sexual behaviors and Pap smear use
Women who have 'unwise' behaviors should get Pap smears
Women who do not engage in these activities do not need Pap smears

Table 3 Sexual Behaviors, Cervical Cancer, and Pap Smear Use ($N=20$)

Behavior	Believed behavior could cause cervical cancer No. of women	Believed that behavior would affect decision to obtain Pap smear No. of women
Having an abortion	18	8
Having poor feminine hygiene	17	11
Having sex with a partner who is infected	16	9
Having multiple sexual partners	15	7
Having sex during menstruation	14	11
Having rough sex	10	6
Having sexual relations at a young age	7	3

that having an abortion ($n=18$), lacking good feminine hygiene ($n=17$), having sexual intercourse with a partner who is infected ($n=16$), having multiple sexual partners ($n=15$), and having sexual intercourse during menstruation ($n=14$) could cause cervical cancer.

From the women's responses, it was clear that the concept of infection was paramount in their thinking about cervical cancer. Figure 1 displays the relationship between behaviors, infection, and cervical cancer as related to us by the women. This model of infections was endorsed by 17 of the 20 women. The mechanisms through which the women thought they might obtain an infection can be divided into three overlapping categories: physical trauma, contact with infected males, and poor feminine hygiene (Figure 1).

Physical trauma was the first mechanism through which sexual activities could lead to infection and then to cervical cancer. By physical trauma, the women meant trauma to the womb (*matriz*) that could be caused by abortions, rough sex, and/or having sexual relations at a young age. The women considered the womb to be a sensitive area and damage to it put the woman at risk for infections. For example, when considering whether or not abortions increased the risk for cervical cancer, a 62-year-old woman stated, '... *yes, not only cancer, sometimes they even die, you can imagine how they crush the womb to extract the child and they can infect her and that's where the cancer comes from*'. According to the respondent, the damage done by

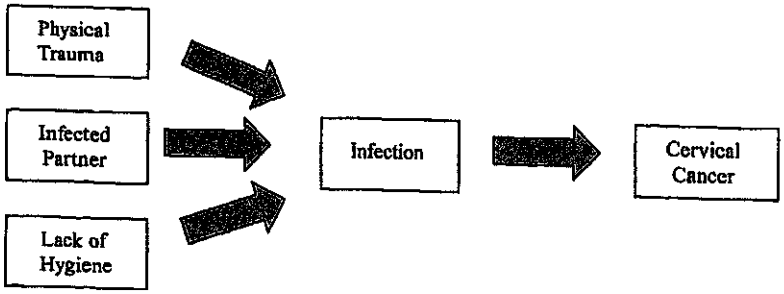

Figure 1 Infection as the Link between Behavior and Cancer.

forcibly removing the fetus can do irreparable damage to the womb, which in turn, allows an infection to enter and cause cancer.

Similarly, a 38-year-old woman stated that abortions were dangerous, but also that the process may not 'clean' everything out:

> *It may have a risk because I think it is worse to abort them by one's own will than have them. Because you go and abort a baby and you never know what kind of cleaning they did on your intimate parts. A piece of the baby may remain behind, or, one never knows.*

Her response illustrated two points about abortion. First, abortion interfered with the normal functioning of the body, '*it's worse to abort them by one's own will*'. Second, the act of aborting and not cleaning everything could lead to an infection.

The women also related that rough sex and sex at a young age had the potential of damaging a woman's delicate areas. Sex at a young age was considered damaging because the young female might be too small and delicate. Similar to abortion, rough sex could also damage a woman, as this 27-year-old woman stated, '*... yes I think it does. Because if the partner does it rough it wounds inside and one can catch some disease there.*' Damaging the womb through sexual intercourse or abortions and not properly cleaning everything out of the woman's body after the abortion can allow infections to begin. If these infections are left unattended, they may ultimately result in cancer.

The second mechanism for contracting an infection that could lead to cervical cancer was having sexual encounters with a husband or boyfriend who was infected or having multiple sexual partners. One woman said:

> *I think it* [having sex with a husband or boyfriend who is infected] *does, because it is penetrating, I think it does. An infection causes another infection, and if there is no care, attention, it becomes increasingly large and may become cancer.*

The act of putting a foreign substance into the woman's womb, the infection is 'penetrating', and may ultimately cause cancer. The women also stated that having many lovers increased the risk of having sex with an infected person, as this woman states, '*... yes, if one is, I am with one and another and another and I never go to the doctor, well, it is dangerous. I may catch an infection and lead to cancer.*' In this case, it was not that infections were deposited into the woman in a single act, but rather that having many lovers increased the risk of exposure to an infection that may lead to cancer. In describing what they meant by 'infection' in the partners, most of the women defined them as diseases, similar to AIDS, that could be sexually transmitted. However, some of the women also believed that the infections could be acquired because the male did not engage in good hygiene between sexual encounters.

Lack of good feminine hygiene was the third mechanism for obtaining an infection that could lead to cervical cancer. Some women believed that having sexual intercourse during menstruation did not allow the menstrual process to occur

'naturally', setting up the potential for infection. The following response is an example of how one woman was instructed by her mother in proper hygiene:

> *My mother would say, 'While the woman remains a virgin there is no corruption or anything, but it's another thing with a man. When the man empties his semen, it's something else.' I have heard that a married woman to prevent infection, and I have always done it, as soon as you have relations you need to go to the restroom fast. That's what I do, always. I never stay even if I am tired. I never remain laying down. I remember that my mom would always advise women to never stay laying down.*

The quotation implies that while a woman is a virgin, her body is not corrupt, she is pure, and hygiene is not an issue. However, proper hygiene must be strictly practiced once she is married. She must make sure that any foreign substances, in this case the man's semen, are promptly cleaned out or it may cause an infection.

Having sex during menstruation also evoked the same imagery of the diseases and infections attached to the semen as something unnatural in the woman's body, as this woman states when asked if this behavior causes cervical cancer, '*Yes, I think it does. Well, the womb is cleaning itself, discarding everything that needs to be thrown out. The man comes and deposits diseases and infections, and it's just a mess.*' For this woman, the natural process of the body during menstruation was to clean itself out. The lack of hygiene, not allowing the body to cleanse itself, was a behavior that could lead to an infection.

• *The importance of symptoms and Pap smear use*

The concept that untreated infections could lead to cervical cancer was also related to the importance the women placed on pelvic symptoms in seeking Pap smear screening. Most of the women said that they would seek a Pap smear if they were ill if, for example, they had a rash, pain in their reproductive organs, or abnormal bleeding. Indeed, none of the women received their first Pap smear as the result of seeking cervical cancer screening. They received the exam as part of a visit for prenatal care (10) or for birth control procedures (2) or were simply told by their physicians to get it (6). If there was nothing wrong, that is, there were no symptoms, then why go to a doctor? As this woman stated when asked what causes cervical cancer:

> *I wouldn't know how to answer that question because I have not talked like that, about that with other people like now that you are here. I have not had checkups like that. Those who live in small towns get checkups only when they are pregnant or when something else hurts, most of the time they don't.*

In addition, the women believed that doctors did not check private areas of the body unless there were symptoms, as in the case of this woman: '*I was nervous because in Mexico I had never heard of that being done to someone. When the woman was comfortable, the doctors would not do those things [the exams].*' The conjunction of lack of symptoms and physicians not emphasizing preventive Pap exams reinforced

the notion that women only needed to seek care if something was wrong—if you have symptoms of infection.

The search for symptoms of infection played an important role in the women's thinking about cervical cancer. One woman stated her frustration about what caused her friend's cancer of the cervix:

> *I don't know what causes it and it's what I would like to know because one can help, like someone that has daughters, friends. Like me, I ask 'What is this? How does it feel?' or 'Why do you get it? Why this? Why that?' No, they don't answer, they don't answer right. And one wants to know everything so one can identify the symptoms that would be good for one to know.*

The focus was on the woman's ability to locate the feeling, the cause, to identify the symptoms.

The focus on symptoms of infection was also linked with the issue of procrastination:

> *... it's like every visit to the doctor, its just that if one feels something. If one is ill and they feel the pain, they say 'Well, I have to go right now because I am sick.' But if not, they go when they can, and the day has never come. Like me, that day has not come.*

In summary, the importance of infection and resulting symptoms cannot be underestimated in women's decisions to obtain Pap smears. Obtaining preventive care was not a meaningful or pragmatic response to the feeling of wellness.

• *Sexual behaviors and Pap smear use*

Sixteen of the 20 participants knew that Pap smears were tests for cancer. Among the women who agreed that specific sexual behaviors increased their risk for cervical cancer, most also agreed that that knowledge affected their decision to obtain a Pap smear (Table 3). However, most of them qualified their responses. They stated that women who engaged in those behaviors would know that their actions would increase their risk of infection. Therefore, they should get a Pap smear to make sure that everything was fine. For example, this woman in responding to the question of sex during menstruation states: '*Yes, because if someone did not take care of themselves, if they had relations during menstruation and they are scared they will get cancer, they have to go to the doctor.*' In her response, the woman knew that the behavior was risky and could cause an infection that would lead to cancer if unchecked. Her focus, however, was on being 'scared' of getting cancer.

Similarly, many of the women said that if people engaged in specified sexual behaviors, they should have the exam '*to make sure everything is fine*'. Although there appeared to be a link between the sex-based behaviors, infection, and cervical cancer, we do not want to argue that the perceived link prevented women from seeking care. Indeed, 19 of the women interviewed disagreed with the statement that 'they would not get checked for cervical cancer because they did not want other people to think they were "bad" women [*mujeres malas*]'. Likewise, 17 of the women disagreed with

the statement that 'God gives people illnesses like cervical cancer because they have lived a bad life.'

Conclusion

Based on previous research (Calle *et al.* 1993; Chavez *et al.* 1995; Hubbell *et al.* 1996; Martinez *et al.* 1997), we anticipated that knowledge about the sexual nature of cervical cancer etiology would have a negative impact on Pap smear use among Mexican immigrant women. Because of moral implications, we expected that knowledge about the relationship between 'unwise' sexual behaviors, such as having multiple sexual partners, and cervical cancer would make them reluctant to seek cervical cancer screening. We found just the opposite. Most of the women said that, if they engaged in unwise behaviors, they would be more likely to obtain the test. Likewise, if they did not engage in these behaviors, they would be less likely to get a Pap smear.

The women also related that they would be unlikely to request a Pap smear if they did not have symptoms of a gynecological problem, in particular, an infection. This concept was reinforced by the finding that none of the women had requested their first, and often only, Pap smear for cervical cancer screening. Most had received it as part of a prenatal examination or in conjunction with another medical procedure. This finding is consistent with previous research about the importance of symptoms in health seeking behaviors among Latinas (Borrayo & Jenkins 2001).

There is strong evidence that HPV infection plays an important role in the etiology of cervical cancer (Bosch *et al.* 1995; Liaw *et al.* 1995). Activities such as having multiple sexual partners and beginning sexual intercourse at an early age increase the risk of contracting HPV and thereby increase the risk of cervical cancer. The women in this study clearly believed that infections caused cervical cancer. However, none of them had heard of HPV. They perceived that engaging in specific sexual activities introduced an infection either through physical trauma to the womb, contact with an infected partner, or lack of hygiene. If the infection was not treated, then cervical cancer was a possibility. Thus, their concepts about the etiology of cervical cancer were consistent with the biomedical model except that they did not include HPV as the connection between infection and the disease.

Other studies have documented that Latina immigrants in different geographical locations believe that sexual activities are related to cervical cancer (Scarinci *et al.* 2003; Goldman & Risica 2004). For instance, Dominicans and Puerto Ricans in Rhode Island perceived sexual behaviors, including active sexual life at an early age and multiple sexual partners, as strong risk factors for cervical cancer (Goldman & Risica 2004). On the other hand, studies in other ethnic minorities indicate that, while these groups believe that sexual behaviors are potential causes of cervical cancer, they do not appear to place as much importance on them as Latina immigrants do. For example, among East Asian immigrants, cervical cancer is not generally known to be associated with the number of sexual partners or having sexual

relations at an early age (Yi 1994; Schulmeister & Lifsey 1999; Lee 2000; Ralston *et al.* 2003). Among Pacific Islanders, a higher proportion believed that cervical cancer was linked to multiple sexual partners; yet, only a few considered it as linked to initiating sexual relations at an early age. Moreover, knowledge and attitudes about cervical cancer etiology among Pacific Islanders did not predict Pap smear screening (Mishra *et al.* 2001).

While our study focused specifically on beliefs about sexual behaviors and Pap smear use, previous research has documented other culturally related factors that may influence cervical cancer screening among Latinas (Solis *et al.* 1990; Chavez *et al.* 1997; Suarez *et al.* 1997; Ramirez *et al.* 2000). A recent literature review summarized negative and positive factors related to cervical cancer screening in this population (Austin *et al.* 2002). The common barriers included fear of cancer, fatalistic views about cancer, linguistic barriers, and culturally based embarrassment. Positive cues to undergo screening included physician recommendation, community outreach programs particularly those using lay health workers, Spanish print educational materials, and use of culturally specific media.

The study had important limitations. First of all, it was a small qualitative study using a non-probability purposive sample design. As such the results may not be generalizable to the larger Latina population. However, obtaining the kind of information that we desired is difficult using more quantitative approaches with closed ended questions. Thus, the methodology was appropriate for this exploratory study. Secondly, we recruited the participants from CBOs during health promotion events. It is possible that these women were more interested in their health and perhaps more knowledgeable about cervical cancer than other Latina immigrants. Thirdly, we focused on beliefs about sexual behaviors and their relationship to cervical cancer and Pap smear use because of findings from previous studies (Chavez *et al.* 1995; Hubbell *et al.* 1996; Martinez *et al.* 1997). Therefore, we cannot comment on the relative importance of sexual behaviors compared with other cervical cancer risk factors in the minds of the respondents or the magnitude of the impact on Pap smear use. However, our previous research found that Mexican immigrants ranked various sexual behaviors as eight of the 10 most important risk factors for cervical cancer (Chavez *et al.* 1995).

What are the implications of this study for cervical cancer prevention programs? Because the evidence is strong that cervical cancer is sexually transmitted and that this fact does not appear to be a deterrent to Pap smear use among Latinas, we believe that cervical cancer prevention programs should stress the nature of HPV transmission and the role of this virus in the etiology of cervical cancer. Currently, we are conducting a study to educate Latinas about HPV (using *promotoras*—lay health workers) and to assess the feasibility and acceptability of a home test kit for HPV to improve cervical cancer screening rates. However, how far health promotion programs should go with the emphasis on HPV is not yet clear. A next logical step would seem to be the recommendation to use condoms or other barrier methods of birth control for primary prevention of HPV infection. Unfortunately, available data

are too inconsistent to conclude that condoms prevent this infection (Manhart & Koutsky 2002), and expert panels such as the US Preventive Services Task Force have not recommended this method for cervical cancer prevention (US Preventive Services Task Force 2003). Clearly, there is a need for much more research on how best to improve health promotion programs for cervical cancer prevention among Latinas.

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Public Expectations and Attitudes for Annual Physical Examinations and Testing

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Background: Recent guidelines for adult prevention do not recommend a comprehensive annual physical examination, but current public expectations in light of this change are unknown.

Objective: To determine public belief in the need for and content of an annual physical examination and to examine the effect of financial charges on these beliefs.

Design: Telephone survey.

Setting: Three U.S. cities.

Participants: Adult English-speaking respondents.

Measurements: Percentage of respondents answering that an annual physical examination is necessary and percentage desiring individual components of the history, physical examination, and laboratory testing, with and without knowledge of charges.

Results: Of 1203 respondents, 66% (67% in Denver, Colorado; 71% in Boston, Massachusetts; and 58% in San Diego, California) believed that in addition to regular care, an annual physical examination is necessary. Among the 600 respondents presented with charge information, interest decreased from 63% to 33% if payment were required. For history, greater than 90% believed that diet, exercise, and tobacco and alcohol use should be discussed, while 60% believed that seatbelt use and sexual history should be discussed. For the physical examination, greater than 90% felt that blood pressure should be measured and that the heart and lungs, abdomen, reflexes, and prostate should be examined. However, fewer than 80% thought that hearing and vision should be tested. Many tests, including the Papanicolaou smear (75%), mammography (71%), cholesterol measurement (65%), prostate-specific antigen test (65%), urinalysis (40%), blood glucose measurement (41%), fecal occult blood testing (39%), and chest radiography (36%), were desired. Interest in these tests decreased substantially when the charges were known.

Conclusion: Public desire for a comprehensive annual physical examination is high across the United States and is sensitive to charges.

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See editorial comment on pp 701-703.

The model of the comprehensive annual physical examination advocated by the American Medical Association in the 1920s (1) was the standard of care until the 1970s, when principles of evidence were first applied to the components of the periodic health evaluation (2–5). In recent years, several expert panels have examined the content of and appropriate mechanisms for providing preventive services to asymptomatic adults. In 1979, the Canadian Task Force on the Periodic Health Examination first suggested that the few preventive health care interventions that are well supported by data could be done during visits for short-term and long-term care and did not require scheduled annual physical examinations (6). Since then, the American College of Physicians, the American Medical Association, the U.S. Preventive Services Task Force (USPSTF), and the U.S. Public Health Service have all agreed that routine annual checkups for healthy adults should be abandoned in favor of a more selective approach to preventing and detecting health problems (7–12).

Little is known about public acceptance of this change in emphasis. A 1984 study (13) showed that patients in a university-based family practice expected a comprehensive annual physical examination with a battery of routine tests. A more recent survey (14) showed that British general practice patients favored "general health screening"; however, that study did not evaluate expectations for specific tests. Patient satisfaction with medical care has been linked to expectation for services (15, 16). If the public is unaware that an annual physical examination and accompanying laboratory and miscellaneous testing are no longer considered valuable, the physicians who follow contemporary recommendations risk having dissatisfied patients. Public knowledge and acceptance of these changes in recommendations regarding an annual physical examination are unknown.

We designed and implemented a survey instrument to ascertain the public's perception of the need for and content of an annual physical examination. Because medical services usually involve a charge or cost to the recipient, we also ascertained the effect of an imposed dollar cost on public desire for an annual examination.

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METHODS

We performed a two-phase study. In phase I, we evaluated public expectations and attitudes of Denver, Colorado, residents about an annual physical examination and preventive health care. In phase II, we assessed public attitudes about an annual physical examination in two other metropolitan areas (Boston, Massachusetts, and San Diego, California) and ascertained the effect of a financial barrier on desire for annual evaluation.

Phase I

For phase I, we developed a telephone questionnaire that was administered to Denver-area adults. The questionnaire assessed demographic information (sex, age, ethnicity/race, annual income, education level), usual source of medical care (health maintenance organization [HMO], private-sector clinic, hospital-based clinic, community clinic, or none), frequency of visits to a physician in the past year, the presence of any of five chronic medical conditions (hypertension, heart disease, lung disease, diabetes mellitus, or cancer), and smoking status. These factors were selected to determine whether demographic variables, system of medical care, pattern of physician use, and the presence of one or more chronic diseases are variables that could affect respondents' attitudes about an annual examination. We asked respondents to agree or disagree with the following statement: "In addition to seeing my regular doctor when I am sick or for chronic medical problems, I need an annual physical exam." We then asked which items, from a fixed list of history, physical examination, or blood or other tests, should be included in an annual physical examination. The instrument was developed after we reviewed similar published instruments (17). It was reviewed by several physicians knowledgeable in general internal medicine and preventive health care and by an expert with substantial training and experience in survey design and administration; the survey was also pretested on a sample of 20 persons. On the basis of this process, the survey was modified slightly. A professional telephone surveyor administered the survey to Denver-area adults 18 years of age or older, who were selected by random-digit dialing in fall 1997. We estimated that a sample size of 600 respondents would detect 20% differences among respondents and provide sufficient power to detect differences when the data were analyzed according to age, sex, or usual source of medical care.

Context

Recent preventive health guidelines recommend against comprehensive annual examination of healthy adults. Yet, many Americans are accustomed to receiving such examinations.

Contribution

This population-based survey of adults in three U.S. cities suggests that many people expect annual physical examinations that include many tests (for example, complete blood counts) that prevention guidelines do not recommend.

Conversely, adults do not feel strongly about receiving tests and counseling that have proven benefit.

Desires for tests decrease as out-of-pocket costs increase.

Implications

Public education about preventive health interventions is needed.

—The Editors

Phase II

Phase II was conducted in a new sample, primarily to ascertain whether the relatively high public expectation for annual physical examination found in Denver would be replicated in two other diverse metropolitan areas located in different regions of the country. As we had done for phase I, we determined demographic characteristics, source of medical care, frequency of physician visits, presence of five chronic medical conditions, smoking status, and response to the following statement: "In addition to seeing my regular doctor when I am sick or for chronic medical problems, I need an annual physical exam." The remainder of the questionnaire was modified for phase II.

For some persons, obtaining an annual physical examination involves payment of a fee. To ascertain the potential effect of a financial barrier, respondents affirming the need for an annual physical examination were next asked whether they would still want a physical examination if they had to pay a $150 charge. Subsequently, respondents were asked if they felt they needed eight selected tests (urinalysis; stool tests for blood; chest radiography; mammography and Papanicolaou [Pap]

smear [for women only]; and tests for prostate-specific antigen [PSA] [for men only], cholesterol, and blood glucose levels) every 1 to 3 years. Those who affirmed the need for any of these tests were immediately asked whether they would still want the test if payment of a specified amount were required ($10 for urinalysis, $20 for cholesterol test, $20 for blood glucose test, $20 for fecal occult blood testing, $50 for PSA test, $125 for chest radiography, $150 for Pap smear, and $160 for mammography). We determined the charges after surveying several Denver-area hospitals, clinics, and commercial laboratories and determining, on the basis of these sources, mean dollar amounts for all care-related charges, such as facility and laboratory fees and physician charges. The same professional telephone surveyor used in phase I administered the phase II questionnaire in spring 1998 to Boston, San Diego, and Denver residents at least 18 years of age. We selected the respondents by random-digit dialing. For both study phases, 75% of telephone calls were made after 6:00 p.m. The telephone surveyor spoke only English; thus, potential non–English-speaking respondents were excluded.

Statistical Analysis

We performed statistical comparisons of categorical responses between groups by using the chi-square test for unpaired categorical data and the McNemar chi-square test for paired categorical data (that is, for the effect of charge on test expectations). We compared between-group data for continuous variables using the Student *t*-test. We used multivariable logistic regression analysis to measure independent associations between expectations for annual physical examination and respondent age, sex, ethnicity/race, education level, annual income level, smoking status, HMO enrollment, regularity of physician visits, frequency of physician visits, and city. We combined phase I and II data for multivariable analysis. We treated age (<65 vs. ≥65 years), ethnicity/race (white vs. nonwhite), education level (≤high school vs. >high school), annual income level (<$30 000 vs. ≥$30 000), and frequency of physician visits in past year (0 vs. >0) as dichotomous variables. We did this mainly to provide more stable parameter estimates in the logistic regression model, given the limited sample size, and to yield measures of association that are easily interpreted. Medicare eligibility at 65 years of age was another reason to categorize patients according to age as a dichotomous variable, because propensity to seek care and to expect an annual examination could vary by insurance coverage. Variables were included in the model if the bivariate association with expectations for annual physical examination had a P value less than 0.20. Because only age did not fulfill this criterion, all variables were included in the final model.

All analyses were conducted by using SAS software, version 8.0 (SAS Institute, Inc., Cary, North Carolina). Finally, because reporting odds ratios for common outcomes (>10%) can overestimate the magnitude of the association, we converted odds ratios to relative risk (RR) ratios; this was done according to the Flanders and Rhodes method, by using marginal standardization (18). Results are reported as adjusted RRs with 95% CIs, which were computed by using bootstrap resampling.

Role of the Funding Source

The funding source from divisional funds had no role in the collection, analysis, and interpretation of the data or in the decision to submit the paper for publication.

RESULTS

In phase I, 603 of 689 persons answering the telephone (89%) agreed to participate and completed the telephone survey. In phase II, 600 of 660 persons (90%) answering the telephone agreed to participate and completed the survey. Table 1 shows the demographic characteristics and health status variables of the respondents. Most respondents were white women with at least some college education, and 78% were younger than 65 years of age.

In phase I, 69% of respondents residing in the Denver metropolitan area had an expectation for an annual physical examination. The Denver respondents expected most components of a comprehensive health evaluation to be performed. When asked, "During an annual physical my doctor should ask me about . . . ," greater than 90% responded "yes" for alcohol and tobacco use (94% for each), exercise (93%), and diet (92%). More than 80% wanted their physicians to discuss mental health (88%) and drug (marijuana and cocaine) use (86%). In comparison, fewer respondents wished to discuss their job (66%), sexual history (62%), or seatbelt use (60%).

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Table 1. **Characteristics of Respondents**

Characteristic	Phase I, Denver	Phase II			
		Total	Denver	Boston	San Diego
Total participants, *n*	603	600	205	186	209
Women, %	61	59	66	55	55
Mean age, *y*	49	48	50	42	50
White, %	77	80	84	75	81
Education > high school, %	70	77	71	82	78
Annual income ≥ $30 000, %	72	68	68	68	69
Health maintenance organization care, %	44	52	51	49	57
Physician visits in the past year, %					
0	18				
1–2	40				
3–5	22				
≥6	19				
Chronic medical conditions, %					
Hypertension	22	14	17	10	17
Heart disease	7	7	10	5	6
Lung disease	7	4	4	5	4
Diabetes mellitus	6	4	4	4	5
Cancer	6	4	3	4	5
Smoker, %	20	17	17	19	14

Elderly respondents were significantly less likely ($P < 0.05$) than younger respondents to expect questioning about all behavioral and psychosocial issues, except for seatbelt use. In bivariate analysis, women were more likely than men to expect discussion of sexual history (71% vs. 48%; $P = 0.001$) and seatbelt use (65% vs. 52%; $P = 0.003$) and were less willing to discuss alcohol use (92% vs. 97%; $P = 0.02$). White respondents differed from nonwhite respondents only in having a higher expectation to discuss diet (93% vs. 81%; $P < 0.001$) and job issues (68% vs. 60%; $P < 0.02$). Those who used HMOs differed from non-HMO users only in having a lower expectation to be asked about illicit drug use (82% vs. 88%; $P < 0.02$).

The Denver-area public wanted a "head-to-toe" examination. More than 90% of respondents desired blood pressure measurement (99%), heart and lung examinations (99%), reflex testing (95%), an abdominal examination (93%), and prostate examination (91% of men). However, of these tests and procedures, the USPSTF currently recommends only blood pressure measurement for average-risk adults (11). In contrast, only 89% of women expected a breast examination, and 78% expected a Pap smear. Elderly respondents were less likely than younger respondents to want a heart and lung examination (96% vs. 99%; $P = 0.005$), reflex testing (90% vs. 97%; $P = 0.001$), abdominal examination (85% vs. 95%; $P = 0.001$), hearing test (73% vs. 82%; $P = 0.027$), and vision test (67% vs. 78%; $P = 0.008$). Women differed from men only in having lower expectations for hearing testing (77% vs. 85%; $P = 0.02$). Nonwhite respondents were more likely than white respondents to desire vision testing (86% vs. 72%; $P = 0.001$). Users and nonusers of HMOs did not differ for any of the physical examination components.

The Denver-area public also desired extensive blood tests, including many tests not currently recommended for screening in asymptomatic adults. Cholesterol testing—the only blood test currently recommended for routine screening by the USPSTF—was desired by 92% of all Denver-area respondents. However, more than 80% of male respondents desired a PSA test (90%), and more than 80% of respondents desired tests for glucose level (89%), renal and liver function (86%), thyroid level (81%), and hemoglobin level (90%) as part of an annual evaluation. Expectations for blood tests did not differ according to age. Women were less likely than men (82% vs. 90%; $P = 0.007$) and white respondents were less likely than nonwhite respondents (84% vs. 92%; $P < 0.01$) to want renal and liver function testing. Persons enrolled in HMOs were significantly less likely than non–HMO-enrolled persons to desire every blood test, except renal and liver function.

Desire for routine testing other than blood tests varied. Tests currently recommended by the USPSTF and other groups—including mammography for women

Table 2. **Public Expectation for Annual Physical Examination**

Test	Total (n = 600)	Denver (n = 205)	Boston (n = 186)	San Diego (n = 209)
	← % →			
Annual physical examination	62	71	58	63
Urinalysis	50	54	44	49
Cholesterol screening	63	69	63	65
Blood glucose testing	43	48	32	41
Prostate-specific antigen test*	67	60	69	66
Fecal occult blood testing	44	35	33	38
Chest radiography	32	38	38	36
Mammography†	71	66	77	71
Papanicolaou smear†	75	79	71	75

* For men only.
† For women only.

(68%) and colon cancer screening by fecal occult blood testing (58%) or by sigmoidoscopy (30%)—were desired less often than urinalysis (78%) or blood tests. Electrocardiography and chest radiography were desired by 43% of respondents, and exercise treadmill testing was desired by 28%.

Phase II demonstrated that the high public-perceived need for an annual physical examination demonstrated in the Denver metropolitan area during phase I was similarly high for Boston and San Diego (Table 2). A comparison of the demographic profiles of respondents in phases I and II (Table 1) is similar, except for increased HMO enrollment in phase II ($P < 0.05$). Overall, public desire for some tests and procedures (cholesterol, urinalysis, blood glucose, PSA, fecal occult blood) but not all tests and procedures (chest radiography, mammography, Pap smear) was modestly lower in phase II than in phase I.

To better delineate the factors associated with public expectations for annual physical examination, we conducted a multivariable analysis using results from phases I and II (Table 3). Factors independently associated with desire for annual physical examination included having at least one of the specified chronic medical conditions, having more than a high school education, and having at least one physician visit in the past year. Factors independently associated with lack of desire for annual physical examination included white ethnicity/race, male sex, and no regular physician. The RR was 1.22 (95% CI, 1.06 to 1.45) for Denver respondents expecting a physical examination compared with San Diego respondents and 0.92 (CI, 0.81 to 1.03) for Denver respondents compared with Boston respondents.

The addition of information on charges significantly reduced the public desire for an annual physical examination and for specific tests. The Figure shows the change in desire for specific tests with charges known. Overall, the percentage of respondents wanting an annual physical examination decreased from 63% to 33% if they had to pay $150, a relative decrease of 48%. The percentages still wanting an annual physical examination with required payment were 35% for Denver respondents, 35% for Boston respondents, and 30% for San Diego respondents. Desire for Pap smear among women decreased from 75% to 38%, while interest in mammography decreased from 71% to 38%. The percentage of men wanting PSA testing decreased from 66% to 43%. Interest in chest radiography, which was desired least at baseline, had the largest decrease, from 36% to 13%. Decreased desire for laboratory tests appeared generally related to charge for the test. The least expensive tests—urinalysis, blood glucose test, fecal occult blood test, and cholesterol test—had the smallest decrease in interest when respondents were presented with charge information.

Discussion

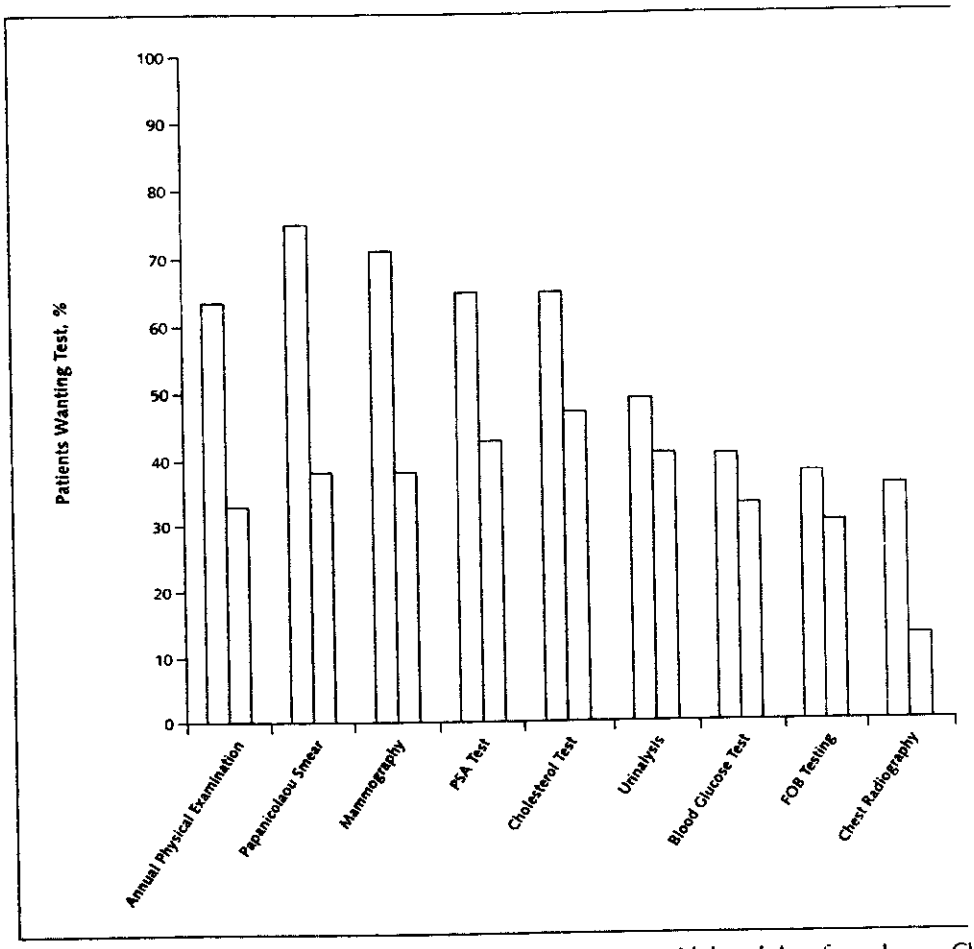
Our results demonstrate that in addition to short-term and long-term medical care, most adults residing in three

Table 3. **Multivariable Logistic Regression Analysis of Physical Examination Expectations***

Variable	Adjusted Relative Risk (95% CI)	P_0 (95% CI)
Age ≥ 65 years	1.01 (0.87–1.18)	0.57 (0.41–0.81)
White ethnicity	0.83 (0.72–0.96)	0.71 (0.56–0.87)
Male sex	0.89 (0.80–1.00)	0.65 (0.51–0.83)
Chronic medical condition	1.28 (1.09–1.50)	0.46 (0.32–0.65)
Current tobacco smoker	1.00 (0.87–1.15)	0.58 (0.44–0.76)
Annual income ≥ $30 000	1.12 (0.97–1.30)	0.52 (0.37–0.73)
Education > high school	1.18 (1.00–1.39)	0.50 (0.34–0.72)
Health maintenance organization care	0.99 (0.88–1.10)	0.58 (0.42–0.80)
No regular physician	0.75 (0.59–0.96)	0.78 (0.70–0.87)
At least 1 physician visit in the past year	1.53 (1.24–1.89)	0.38 (0.25–0.58)

* The probabilities of desire for annual physical examination for different sets of values of variables and relative risks (RRs) were calculated according to the method of Flanders and Rhodes (18). Relative risk was calculated as follows: $RR = P_1/P_0$, where P_0 is the probability of desire for annual physical examination for the reference group and P_1 is the probability for the comparison group. For example, for age, the reference group (persons < 65 y) has a probability of 0.57. For respondents ≥ 65 y, $P_1 = 0.58$, leading to the reported RR of 1.01.

'gure. **Desire for tests decreases when respondents are informed of typical charges.**



White bars indicate patients without knowledge of test charges; shaded bars indicate patients with knowledge of test charges. Charges were as follows: physical examination—$150, Papanicolaou smear—$150, mammography—$160, prostate-specific antigen *(PSA)* test—$50, cholesterol test—$20, urinalysis—$10, blood glucose test—$20, fecal occult blood *(FOB)* test—$20, and chest radiography—$125.

geographically separated metropolitan areas had a relatively high desire for an annual physical examination. In Denver-area residents, this expectation encompassed a comprehensive physical examination, including an extensive history, physical examination, and routine tests. Since 1979, most major medical organizations have changed the recommendation for a scheduled complete annual physical examination to recommend selective preventive services in the context of visits for other reasons. Although a comprehensive physical examination in asymptomatic adults has little screening value (19), 66% of the more than 1200 adults we surveyed in 1997 and 1998 believed that an annual physical examination was necessary. Persons who were higher consumers of medical care and who thus may have had less need for a scheduled annual physical examination (such as persons with chronic medical conditions, those who reported having a regular physician, and those who had at least one physician visit in the previous year) were more likely to believe that they needed an annual physical examination.

An important finding is that the high expectations for specific components of an annual physical examination do not match the current recommendations. The only blood test currently recommended by the USPSTF for screening in asymptomatic adults, cholesterol, was expected only slightly more often than tests for PSA, glucose, or hemoglobin levels or for renal, liver, or thyroid function. Four tests or procedures with proven screening benefit—mam-

mography, Pap smear, fecal occult blood testing, and sigmoidoscopy—were expected less often than any of the nonrecommended blood tests. Collectively, these results demonstrate the need for public education on medical practices of proven and unproven benefit.

Compared with respondents not enrolled in an HMO, patients enrolled in HMOs were as likely to believe that they needed an annual physical examination, had the same expectations for history and physical examination, but were less likely to expect most laboratory tests. Whether this is because of successful education by the HMO or self-selection of HMO care (enrollment by patients who expect fewer laboratory tests) is unknown.

The sources of high public expectations for a comprehensive annual physical examination are unknown. Our study shows that between different age levels, sexes, ethnicities/races, and education and income groups, more than 60% of the surveyed public believed an annual physical examination was necessary. Insurance plans may contribute to the public expectation for an annual physical examination. Some insurance plans prominently display preventive health services as part of their benefits packages, and such promotion may imply to consumers that these services are necessary. For example, in 1997 the standard Blue Cross and Blue Shield package for federal employees included annual cancer screening and comprehensive laboratory panels every 3 years for enrollees 20 to 64 years of age and annual blood tests beginning at 65 years of age (20). Another potential explanation for the high public desire for an annual examination is that patients want their care from someone they already know, and one way to get to know your physician is to see him or her before being preoccupied with ill health. The role of the media in promoting high expectation for annual testing is less clear, since several recent articles in the popular press suggest that a comprehensive annual physical examination is not necessary (21–25). However, other widely read popular press articles have extolled the value of comprehensive periodic testing in relatively healthy persons (26). Physicians may directly or unwittingly encourage the continued practice for annual examinations. For example, use of the term *annual checkup* in encounter sheets and in conversation may encourage these examinations. In this regard, as recently as 1993, family practitioners in New England reported spending 35% of their office time on annual physical examinations of adults (27). This was estimated to add as many as 11 million potentially unnecessary visits annually to the national health care system (28). Studies to evaluate physicians' current attitudes about comprehensive, periodic evaluations would thus be of great interest. Another important area for future investigation is why the public has relatively low expectations for the few services of proven benefit.

Although our analysis does not address the genesis of high public expectation for an annual examination, our results do demonstrate a significant effect of a financial barrier on public desires for an annual examination and selected testing. Romm (17) previously reported that provision of cost data could decrease patient desire for some but not all laboratory studies. Our survey showed decreased desire by the public for a comprehensive physical examination and for all tests when presented with charges, with the largest decrease in desire for the most expensive tests. This suggests that the use of graduated copayments could decrease demand for nonrecommended tests. Future sensitivity analyses could reveal a threshold charge that affects public desire for an annual examination. In addition to charges, informational items, such as cost-effectiveness data and operating characteristics of tests, if widely known, could influence public desire for annual examinations and testing.

Our study has limitations. Our data were obtained from residents of three U.S. metropolitan areas and may not be representative of smaller urban or rural areas. Moreover, our telephone survey method underrepresented some populations, such as non–English-speaking persons and persons without telephones. Our two surveys in Denver-area residents revealed some modest discrepancies. In phase II, respondents expressed a lower expectation for all the tests than in phase I. However, the two questionnaires differed. For example, the inclusion of charge data in phase II may have lead to more conservative responses. In addition, the number of Denver-area respondents was much smaller in phase II and may not have been adequately powered relative to phase I. However, it is noteworthy that even with the lower public desire for selected tests in phase II, the perceived need was still substantial. In addition, the charge data used in phase II were derived from the Denver area and may not accurately reflect charges in other parts of the country. Some of the laboratory tests and charges for Pap smears are often included in a laboratory panel or as part of a comprehensive physical examina-

tion. Of note, our survey deals with self-reported expectations and may not reflect actual behavior. Moreover, our survey instrument has not been validated for accuracy, precision, or reproducibility. Finally, although the public expectation we observed for an annual physical examination may be considered unrealistic in terms of current recommendations, such visits probably have value in developing patient–physician relationships and other aspects of medical care, such as discussion of psychosocial issues. Thus, they may be of value in periodic health assessments.

In conclusion, the public has a high expectation for a comprehensive annual physical examination and extensive routine testing. The public apparently needs education about the value of periodic health examinations and current recommendations for specific preventive health services. Further studies delineating the factors underlying public desire for annual examinations and optimal ways of educating the public to change their expectations from tests and procedures of unproven value to those of proven benefit are needed.

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The Appendix, current author addresses, and author contributions are available at www.annals.org.

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Enthusiasm for Cancer Screening in the United States

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Context Public health officials, physicians, and disease advocacy groups have worked hard to educate individuals living in the United States about the importance of cancer screening.

Objective To determine the public's enthusiasm for early cancer detection.

Design, Setting, and Participants Survey using a national telephone interview of adults selected by random digit dialing, conducted from December 2001 through July 2002. Five hundred individuals participated (women aged ≥40 years and men aged ≥50 years; without a history of cancer).

Main Outcome Measures Responses to a survey with 5 modules: a general screening module (eg, value of early detection, total-body computed tomography); and 4 screening test modules: Papanicolaou test; mammography; prostate-specific antigen (PSA) test; and sigmoidoscopy or colonoscopy.

Results Most adults (87%) believe routine cancer screening is almost always a good idea and that finding cancer early saves lives (74% said most or all the time). Less than one third believe that there will be a time when they will stop undergoing routine screening. A substantial proportion believe that an 80-year-old who chose not to be tested was irresponsible: ranging from 41% with regard to mammography to 32% for colonoscopy. Thirty-eight percent of respondents had experienced at least 1 false-positive screening test; more than 40% of these individuals characterized that experience as "very scary" or the "scariest time of my life." Yet, looking back, 98% were glad they had had the initial screening test. Most had a strong desire to know about the presence of cancer regardless of its implications: two thirds said they would want to be tested for cancer even if nothing could be done; and 56% said they would want to be tested for what is sometimes termed *pseudodisease* (cancers growing so slowly that they would never cause problems during the persons lifetime even if untreated). Seventy-three percent of respondents would prefer to receive a total-body computed tomographic scan instead of receiving $1000 in cash.

Conclusions The public is enthusiastic about cancer screening. This commitment is not dampened by false-positive test results or the possibility that testing could lead to unnecessary treatment. This enthusiasm creates an environment ripe for the premature diffusion of technologies such as total-body computed tomographic scanning, placing the public at risk of overtesting and overtreatment.

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THERE IS A GROWING RECOGNITION among medical professionals that cancer screening is a double-edged sword. While some individuals may benefit from early detection, others may only be diagnosed and treated for cancer unnecessarily.[1,2] In recent years, the public has been exposed to expert debate about many of the most basic assumptions of screening: some scientists have challenged the utility of mammography for women younger than age 50 years[3-5] or even for women at any age[6,7]; questions have been raised about how often to be screened for cervical cancer[8,9]; and whether to be screened at all for prostate[8,9] or lung cancer.[10] Emerging from these debates is a growing consensus that to make good decisions about screening, the public needs access to balanced information about its potential benefits and harms.[11,12]

But the public has long received a different message. Public health officials, physicians, and disease advocacy groups have worked hard over a number of years to persuade individuals living in the United States about the importance of cancer screening. It is practically impossible to read a major newspaper or popular magazine, watch television, ride public transportation, visit the beauty parlor,[13] or even lick a stamp[14] without seeing a public service announcement promoting some form of cancer screening. Most recently, aggressive direct to consumer advertising is bringing a variety of new advanced, but unproven screening tests including brain magnetic resonance imaging, lung and total-body computed tomographic (CT) screening,[15] and genetic testing for "cancer genes" to the public.[16]

To understand the issues facing those who hope to bring balanced information to the public, we conducted a national telephone survey during 2001 and 2002 to learn about adults' experience with a broad array of screening

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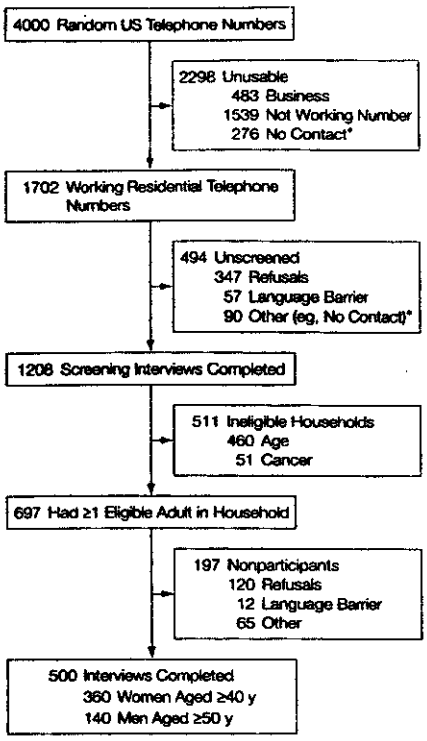
Figure 1. Survey Sample



Asterisk indicates after 10 attempts at different times of the day and 3 additional attempts 2 weeks later.

tests. Specifically, we explored general beliefs about early detection, personal commitment to screening, screening as an obligation, attitudes toward false-positive results, and desire for total-body CT scanning, a new and potentially comprehensive screening method.

METHODS

Sample Selection

Our goal was to interview a nationally representative sample of adults for whom screening for cancer was relevant. Because our focus was on screening, we specifically targeted a screen-eligible population. Thus, we excluded individuals with a history of cancer because a prior cancer diagnosis may change how one thinks about screening and early detection. We further restricted our sample to women aged 40 years or older and to men aged 50 years or older because it is at these ages that most cancer screening is recommended (a notable exception being Papanicolaou testing). This project was approved by the institutional review boards at Dartmouth Medical School, Hanover, NH, and at the University of Massachusetts, Boston.

We used random digit dialing to obtain a national probability sample of households in the continental United States with telephone service. FIGURE 1 details the steps of our sampling procedure. The process began with the generation of a random list of 4000 US telephone numbers for the goal of 500 completed interviews. From this list, 1702 working residential telephone numbers were identified. Interviewers successfully completed a 3-minute "screening" interview with an English-speaking adult at 1208 of the residences to identify individuals meeting study criteria. At least one eligible adult resided in 697 of the households (if ≥1 eligible adult was identified, a computer selected a respondent so that each eligible person had an equal chance of being selected). A total of 500 individuals completed the interview.

There is some debate in the survey research literature about how best to calculate a response rate in this setting. The specific question is whether to account for residences that could not be screened. To maximize transparency of this issue, the American Association of Public Opinion Research[17] suggests calculating 2 response rates using 2 different denominators. The simplest approach (commonly seen in the literature) is to ignore unscreened residences and use known eligible households as the denominator. In our case, 500 responses were obtained from 697 eligible households—a response rate of 72% among individuals known to be eligible. However, there are almost certainly some eligible households among those not screened. The second approach attempts to account for this by increasing the denominator to include the estimated number of eligible households among unscreened households. This estimate takes the proportion eligible among those households screened (in our case, 697/1208=0.58) as the best estimate of the proportion eligible among those households not screened. Thus in our case, among the 494 households not screened, 287 (0.58×494) would be expected to be eligible. Using this approach, we obtained 500 responses from an estimated 984 (697+287) eligible households—providing responses from 51% of those estimated to be eligible (N=500).

Interview Protocol

Development. To learn how the public thinks about screening, we conducted 2 focus groups with adults aged 40 years or older to discuss cancer screening tests in general, experiences with specific tests, and perceptions of the pros and cons of such testing. The focus group and all subsequent survey development was done in collaboration with experts at the Center for Survey Research, a professional survey research firm affiliated with the University of Massachusetts. A draft survey instrument was developed based on the results of the focus groups. Experienced interviewers then conducted 10 cognitive interviews to ensure that the questions were understood and that the answers were meaningful. After revising the draft based on this feedback, 17 eligible adults identified by random digit dialing completed the survey; these interviews were audiotaped and then coded to identify questions that were difficult for interviewers to read or for respondents to answer. Final revisions were made to the survey based on the pretest results.

Instrument. The survey consisted of a general screening module (general questions about the value of early detection, worry about cancer, and interest in total-body CT screening) and 4 modules about common screening tests (mammography, Papanicolaou smear, prostate-specific antigen [PSA] testing, and sigmoidoscopy or colonoscopy). The screening test modules contained a parallel series of questions about the value of the test, testing preferences (eg, frequency, starting and stopping age, current behavior), experience with ab-

ıal test results, understanding of :ning controversies or uncertain- ıd risk perceptions about the cor- ɔnding cancer. All respondents re- d the general screening module and gmoidoscopy or colonoscopy mod- vomen also received the mammog- y and Papanicolaou test modules, : men received the PSA module.

lministration. From December through July 2002, interviews conducted by professional inter- ɛrs from the University of Massa- ɛtts Center for Survey Research. All ɹiewers received special training on urposes and procedures of this par- ar study; all underwent routine toring for quality control and feed- from a supervisor. The inter- ; took an average of 20 minutes e, 10-54 minutes). Answers to the ions were directly entered into the ɹuter-assisted telephone interview- ɹstem by the interviewer.

alysis. We created weights to ac- t for differential probability of se- n into our sample. An individu- ɹrobability of selection was a ion of the number of residential telephone lines (ie, more phone higher probability of selection) ıe number of eligible adults at the nce (ie, more eligible adults, lower bility of selection).

vey researchers sometimes cre- ɛecond set of weights to force the .e proportions for selected demo- ic characteristics to match those : population. Theoretically such ratification weights reduce bias re- g from differences in response ımong demographic subgroups. ɛchnique is controversial, how- because it requires a substantial ɹption that nonrespondents would ɛr questions similarly to respon- Thus, if Native American males id not graduate from high school ınderrepresented in the sample, sponses of these few individuals l be weighted upward to repre- ıe US population proportion of .bgroup. Ironically, the more this ɹf weighting has the potential to nce the results (ie, when the sample looks least like the target population), the more heroic the assumption.

Because the distribution of most demographic characteristics in our sample closely approximated those in the 2000 US Census (TABLE 1), poststratification weighting is unlikely to influence our results. Nevertheless, because the lowest education and oldest age groups were underrepresented, we created poststratification weights to match the US Census distribution on age, sex, race, Hispanic origin, educational attainment, and region.[18] Analyses using these weights yielded results nearly identical (ie, ± 1%-2%) to those using only the probability weights. For simplicity, and to avoid the assumptions inherent in poststratification weighting, we present results using only the probability weights. All analyses were performed using STATA statistical software (Version 7; College Station, Tex).

RESULTS

Desire for Early Detection

Most adults (87%) living in the United States believe routine cancer screening is "almost always a good idea." Seventy-four percent believe that finding cancer early saves lives "most" or "all of the time" (TABLE 2). Fifty-three percent believe screening usually reduces the amount of treatment needed when cancer is found. But enthusiasm for screening also reflects a desire to know about the presence of cancer—regardless of its implications. Two thirds of individuals would want to be tested for a cancer even if nothing could be done. Fifty-six percent would want to be tested for what is sometimes called

Table 1. Demographic Characteristics for Women Older Than 40 Years and Men Older Than 50 Years

Characteristic	No.* of Survey Respondents (Weighted %†) (N = 500)	% in 2000 US Census[18]
Age, y		
40-49	155 (26)	22
50-69	257 (57)	53
70-84	77 (17)	21
≥85	3 (1)	4
Sex		
Men	140 (33)	35
Women	360 (67)	65
Race		
White	397 (81)	85
Black	51 (10)	10
American Indian	9 (2)	1
Asian	17 (4)	3
Other	15 (3)	1
Hispanic		
No	470 (95)	95
Yes	24 (5)	5
Geographic region		
Northeast	92 (18)	20
Midwest	131 (29)	24
South	188 (38)	36
West	89 (15)	20
Education		
<High school	27 (6)	17
High school graduate	136 (31)	35
Some college	140 (27)	25
College degree	194 (37)	23

*Numbers may not add to 500 due to lack of response for an item.
†Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

pseudodisease, cancers so slow growing that even untreated would never cause problems during the person's lifetime. Thirty-five percent believed they had had too few cancer screening tests in the past (64% thought they had had "about the right number"). Virtually no one interviewed (2%) thought they had had "too many" cancer screening tests.

Personal Commitment to Screening

We found that most adults say they have had cancer screening tests: 99% of US women aged 40 years or older reported having a Papanicolaou test and having 89% mammography; 71% of men aged 50 years or older had a PSA test; and 46% of the men and women in these age groups had a sigmoidoscopy or colonoscopy (our findings closely reflect those from the 2001 Behavioral Risk Factor Surveillance Survey[19] whose corresponding numbers were 96%, 88%, 75%, and 48%, respectively). We also found that most women who had been screened with a Papanicolaou test or mammography and most men who had been screened with a PSA plan to undergo at least annual testing (TABLE 3).

To further gauge how personally committed individuals are to screening, we asked those who were currently being screened how they would respond if their physician told them to be screened less often. Fifty-eight percent of women said they would overrule their physician if he or she suggested less frequent Papanicolaou tests. Seventy-seven percent of men would continue to undergo prostate screening and 74% of men and women would continue with colon cancer screening (colonoscopy or sigmoidoscopy) even if their physician recommended against testing. Few individuals thought there would ever be a time when they would stop having routine screening tests; ranging from a high of 35% saying they would ever stop having Papanicoloau tests to a low of 21% for stopping mammography. In addition, if cost was not a concern, some would like to be screened as frequently as every 6 months: 4% for colonoscopy or sigmoidoscopy, 13% for Papanicoloau test, 16% for mammography, and 19% for PSA test.

Table 2. General Beliefs About Early Detection

	No.* of Survey Respondents (Weighted %†) (N = 500)
How often does finding cancer early mean that treatment saves lives?	
None of the time	10 (3)
Some of the time	122 (24)
Most of the time	287 (58)
All of the time	79 (16)
How often does finding cancer early mean that a person can have less treatment?	
None of the time	16 (3)
Some of the time	220 (44)
Most of the time	195 (42)
All of the time	52 (11)
If there was a kind of cancer for which nothing can be done, would you want to be tested to see if you have it?	
No	64 (34)
Yes	325 (66)
Have you ever heard of cancers that grow so slowly that they are unlikely to cause you problems in your lifetime?	
No	248 (48)
Yes	251 (52)
Would you want to be tested to see if you had a slow-growing cancer like that?	
No	201 (44)
Yes	288 (56)
Routine screening means testing healthy persons to find cancer before they have any symptoms. Do you think routine cancer screening tests for healthy persons are almost always a good idea?	
No	57 (13)
Yes	439 (87)
In the past, do you think you have had too many routine screening tests for cancer, too few tests, or about the right number?	
Too few	171 (35)
About the right number	304 (64)
Too many	10 (2)

*Numbers may not add to 500 because of item nonresponse.
†Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

Screening as an Obligation

To learn whether the public views screening as an obligation (eg, the right thing to do, or something individuals owe to their loved ones), we asked respondents to judge whether a person in average health would be "irresponsible" if he or she did not have screening (FIGURE 2). When asked about a 55-year-old person in average health, responses ranged from 79% (rating forgoing Papanicoloau tests as irresponsible) to 54% (for colonoscopy). A substantial proportion also believed that an 80-year-old who chose not to be tested was irresponsible: ranging from 41% for mammography to 32% for colonoscopy.

Impact of False-Positive Results

Overall, 38% of men and women in our sample had had at least 1 false-positive screening result that required further testing (11% for PSA, 30% for Papanicoloau, and 35% for mammography). Many of these individuals underwent invasive follow-up procedures (TABLE 4). While most individuals found out they did not have cancer within 2 weeks, 25% of women with abnormal Papanicoloaou test results, 13% with abnormal mammograms, and 25% of men with false-

positive PSA test results waited more than 1 month for this information. Many individuals characterized this time as either "very scary" or the "scariest time" of their lives (43% for Papanicoloau test, 37% for mammography, and 58% for PSA test). Yet, looking back, 98% were glad they had had the initial screening test.

Total-Body CT Scanning

Finally, to gauge general enthusiasm for screening, we examined the public's interest in total-body CT scanning, a relatively new technology now aggressively marketed to consumers. We first described a total-body CT as a "3-D look inside your body using a CT scanner. A CT scan gives a very detailed picture of your lungs, liver, heart, and other internal organs, as well as bones and arteries. A total body scan can find many diseases like cancer before they can be found by routine check-ups. The body scan is quick and painless." After hearing this description, 86% said they wanted to have a free total-body CT. To learn about the strength of desire for CT, we asked those individuals who chose a free CT whether they would prefer a total-body CT scan or receiving $1000 in cash. Eighty-five percent would choose the total-body CT scan (ie, 73% of the entire sample). Only 27% thought there might be any downside to having a total-body scan (mostly discomfort during the procedure or anxiety); 14% mentioned concern for false-positive results, and 3% mentioned the downside of unnecessary subsequent testing.

COMMENT

Most people in the United States are firmly committed to cancer screening. Most individuals would overrule a physician who recommended against cancer screening and could not imagine a

Table 3. Personal Commitment to Screening Among Persons Who Had Been Previously Screened*

	No. for Papanicolaou Test (Weight %) (n = 355)	No. for Mammography (Weighted %) (n = 317)	No. for Prostate-Specific Antigen Test (Weighted %) (n = 97)	No. for Colonoscopy or Sigmoidoscopy (Weighted %) (n = 219)
Screening Behavior				
At what age did you have your first [test]?				
<40 y	315 (88)	133 (42)	0	32 (13)
40-49 y	39 (12)	140 (43)	19 (17)	42 (20)
≥50 y	0	44 (15)	77 (73)	141 (67)
Do you have a plan for how often you get [test]?				
No	109 (31)	76 (23)	40 (41)	138 (63)
Yes	246 (69)	241 (77)	57 (59)	81 (37)
If yes, how often?				
More than once per year	9 (4)	7 (4)	7 (10)	NA†
Once per year	200 (82)	201 (85)	43 (79)	NA†
Every 2 y	34 (13)	25 (10)	5 (9)	NA†
Every 3 y or less often	3 (1)	4 (1)	1 (3)	NA†
Commitment to Screening				
If cost was not a concern, would you like to have [test]?				
Every month	2 (1)	1	0	0
Every 6 mo	46 (12)	51 (16)	19 (19)	5 (4)
Every year	220 (63)	189 (61)	57 (56)	29 (17)
Every 2 y	48 (14)	50 (16)	15 (18)	53 (31)
≤Every 5 y	33 (11)	23 (7)	6 (7)	85 (48)
Do you think there might be a time when you still stop having routine [test]?				
No	226 (65)	252 (79)	68 (73)	112 (68)
Yes	114 (35)	60 (21)	26 (27)	56 (33)
If a physician recommended you stop having or have less frequent testing.Would you?‡				
Try to keep having them	206 (58)	NA	72 (77)	70 (74)
Agree to have less	143 (43)	NA	20 (23)	34 (26)

Abbreviation: NA, data not available.

*The numbers may not add to up to the number of persons screened because of item nonresponse. Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

†Because colonoscopy and sigmoidoscopy are performed less frequently, the questions were asked differently. Fifty-six percent reported that they planned to have another test performed within the next 5 years.

‡For Papanicolaou test, respondents were asked "How would you respond if your doctor told you that the benefit of Pap smears (Papanicolaou test) would be the same if you had them less often than you do now, and recommended that you have them less often? Would you agree to have Pap smears less often or would you try to keep having them as often as you do now? The question was not asked in regard to mammography because of strong negative reactions to the question in focus groups. For colonoscopy or sigmoidoscopy, respondents were asked "How would you respond if your doctor recommended that you not have routine [tests]? Would you agree not to have [test] or would you try to keep having them?" Note because of skip pattern error, 70 eligible respondents were not asked this question about colonoscopy.

Effective Organizational Control: Implications for Academic Medicine

Michael S. Wilkes, MD, PhD, Malathi Srinivasan, MD, and Eric Flamholtz, PhD

Abstract

This article provides a framework for understanding the nature, role, functioning, design, and effects of organizational oversight systems. Using a case study with elements recognizable to an academic audience, the authors explore how a dean of a fictitious School of Medicine might use organizational control structures to develop effective solutions to global disarray within the academic medical center. Organizational control systems are intended to help influence the behavior of people as members of a formal organization. They are necessary to motivate people toward organizational goals, to coordinate diverse efforts, and to provide feedback about problems.

The authors present a model of control to make this process more visible within organizations. They explore the overlap among academic medical centers and large businesses—for instance, each is a billion-dollar enterprise with complex internal and external demands and multiple audiences. The authors identify and describe how to use the key components of an organization's control system: environment, culture, structure, and core control system. Elements of the core control system are identified, described, and explored. These closely articulating elements include planning, operations, measurement, evaluation, and feedback systems. Use of control portfolios is explored to achieve goal–outcome congruence.

Additionally, the authors describe how the components of the control system can be used synergistically by academic leadership to create organizational change, congruent with larger organizational goals. The enterprise of medicine is quickly learning from the enterprise of business. Achieving goal–action congruence will better position academic medicine to meet its multiple missions.

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Academic University Medical Center (AUMC) is in crisis. This major regional medical center has had difficulty meeting its triple mission of providing high-quality patient care, research, and medical education. While AUMC has a reputation for training excellent physicians, its patient satisfaction ratings are low, and its market share is rapidly shrinking. Employees are leaving AUMC for other centers because of poor pay and low morale. Clinic wait times have gotten longer, patient–physician communication is poor, and staff are bickering. AUMC cannot prove to the public that its patient care is high quality based on national benchmarks. Research faculty are reluctant to teach, since promotion pathways do not reward educational scholarship. New resident physician work and educational regulations have created major unfunded mandates within the residency programs. The dean of the School of Medicine and other leaders decide to meet to discuss these issues.

This fictitious case of the AUMC may sound familiar to *Academic Medicine* readers as it contains an amalgam of problems commonly encountered by academic leaders around the United States. Although not representing any one health system, the case illustrates the problems of a health system with poorly developed and implemented organizational control systems. By "organizational control system" we refer to the processes of influencing the behavior of people as members of a formal organization—with the goal of increasing the probability that they will achieve organizational goals.[1–4] Such systems play a major part in the management of the academic medical center (AMC). Unlike tangibles, such as office space, equipment, finances, and people, the role of the organizational control systems is not usually visible. Without clear understanding of the levers of change within an organization, complex organizations are challenging to manage.[5,6] While major organizations (American Hospital Association, American College of Physician Executives, etc.) have provided hospital directors guidance on creating functional organizations, in most AMCs, academic leaders find it difficult to adapt their organization to address problems encountered by individuals trying to achieve their organizational objectives.

In this article, we examine organizational control systems—a neglected but indispensable aspect of management and leadership. Understanding these systems will allow systems and individuals to move academic medicine toward improved function. Specifically, we shall focus on four key issues involved in organizational control.[7–9]

- How can control benefit organizations?
- Why examine models of control in academic medicine?
- What are the functions of organizational control?
- What are core elements of organizational control systems?

Exploration of these issues will elucidate how AMCs can use control systems to meet their objectives. For each major section, we will use the response of the fictitious dean to illustrate the use of the appropriate control system element.

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Table 1
Comparison of an Academic Medical Center and a Large Financial Corporation

Domain of comparison	Academic medical centers	Large financial corporations
Revenue	>US $1 billion/year	>US $1 billion/year
Profit orientation	Nonprofit: Reinvests all profits	For-profit: Reinvests portion of profits and takes out a portion for shareholders
Product lines	Patient care delivery	Business or consumer loans
	Education of health care workers	Investment banking
	Research (biomedical, clinical, health services, education)	Telecommunication
		Financial Technology
		Research into new financial products
Complex revenue sources	Patient care	Product sales
	State and federal funding of education	Investor and shareholders
	Student tuition	Short-term and long-term loans
	Research funding	Reserves
	Fundraising and endowments	
	Reserves	
Employee base	>1,000	>1,000
Prerequisites for midlevel leadership position	Division chief: nationally recognized research experience	Corporate director or vice president: Masters in business administration
	Medical director: clinical opinion leader in area	Content expertise
Management/leadership training	Variable training, often absent	Strongly committed to leadership training
	Research or clinical productivity needed for promotion	Management experience often needed for promotion

How Can Control Benefit Organizations?

Control systems are the tools that leaders use to accomplish their goals. The term "control" is typically used in a negative context.[7–11] Many academics think of control systems as dictatorial authorities seeking complete behavioral control of an individual at the expense of personal autonomy, happiness, warmth, and flexibility. Total behavioral control is neither feasible nor desirable, since it stifles creativity and disenfranchises individuals.[1–4] However, appropriate flexible and compassionate control systems increase accountability, promote creative solutions to problems, allow rapid identification of problems, and allow people within an organization to function synchronously. The level of complexity of an organization helps determine the appropriate type of organizational control and oversight needed. The more complex the organization, the more a well-designed system of control can benefit the organization.[5]

Why Examine Models of Control in Academic Medicine?

Academic institutions share many similarities with large corporations (see Table 1). Both produce multiple products, have complex revenue sources, are often the largest area employer, invest in employee professional development, and compete for business. AMC leaders typically achieve their positions through successful research or clinical endeavors. However, unlike corporate entities, mid- and upper-level leaders in AMCs often have no formal training in organizational management.[6] As such, AMCs have the potential to learn from corporate models of leadership. The business model that we are describing, based on work by Flamholtz,[8] can be used at the macro level for examining the organization as a whole, or at the micro level to examine control within a single patient care unit. At each level, having leadership who recognize major problems and are willing to tackle organizational redesign is a necessary step to toward improvement.

> *Recognizing AUMC's problems:* The dean, several department chairs and hospital unit directors meet over lunch to discuss shared problems. Some were dismayed at the economic downturn in the state, as state resources had diminished. Educators described an inability to recruit medical and nursing faculty for small-group teaching. Chairs felt the dean spent funds on low-priority projects. The nursing director felt that her staff was poorly treated by physicians. Departments felt underresourced for the acuity of patient illness. Review of studies by the institutional review board (IRB) took three to six months, and few faculty statisticians had been hired. Learners were afraid to ask questions, because of fears of retaliation and looking "weak." The diagnosis—an organization out of control.

What Are the Functions of Organizational Control?

A primary function of control systems is to create congruence around organizational goals among the many parts of the organization. However, implementing a well-developed control system faces many obstacles. In AMCs, opposition to effective coordination and control of core functions may occur with everyday activities (see Table 2). This opposition often occurs because of power decentralization, product diversification, cultural isolation among departments, and a culture of academic independence. Thus, care is needed in designing control systems to respect both the individual and the academic culture. An ideal control systems is neither too loose (which may lead to chaos), nor too tight (which may lead to stifling bureaucracy, hostility, and rebellion).

Table 2

Examples of Opposition to Effective Control of Organizational Behavior at Academic Medical Centers

Area	Issue	Typical statement during conflict	Level of conflict	Stated reason for conflict	True reason for conflict
Clinical	Patient admission to a surgical service for severe abdominal pain	"This patient is a medical patient, not a surgical patient, since his CT is negative. You can consult us, however!"	One department versus another department	Best interest of patient	Understaffing Payor status High case load Low teaching value Overworked physicians
Administrative	Appropriate and timely billing	"Our records show that your insurance still hasn't paid your inpatient bill. You need to pay this now."	Medical center subsystem versus patient	Patient accountability	Contracting dispute: medical center versus insurer Poor communication of billing procedures Lack of centralized billing system Frustration over declining revenues and market share
Research	Access to patient records for researchers	"You can't access this patient's records for your research, because doing so will violate HIPAA standards."	Medical center administration versus researchers	HIPAA violations Complexity of request	Cost and personnel for data-mining Low priority for medical center Unsearchable medical record infrastructure Lack of negotiation between dean and CEO about areas of collaboration No consensus over HIPAA guideline interpretation
Education	Curricular centralization	"In our basic science course, we're the experts, and we'll teach our learners the way we think is best."	Basic science department versus school of medicine	Content expertise	Lack of time to revise curriculum Desire for autonomy Distrust of common school goals Lack of understanding of clinical relevance Resistance to change

Achieving Organizational Goals

To motivate people to behave in ways consistent with organizational goals, control systems must plan four related steps: motivate toward congruence, define desired outcomes, implement and integrate efforts, and create feedback structures (see Table 3).

Control systems must be able to motivate and enable people to make strategic decisions and act consistent with organizational objectives. Without control systems, people's decisions often fulfill their own needs rather than the organization's goals. For example, the organization may be concerned with quality of care, reducing medical error, and increasing patient satisfaction. An individual within the institution may, instead, be focused on generating personal income or getting home as early as possible.

After agreement on congruent objectives, an effective control system will define outcomes and objectives for each goal, and clearly communicate those outcomes to the involved groups. This information allows the organization to remain on target, while simultaneously permitting people to operate daily without micromanagement. Using an "autonomy with control" strategy, units run their day-to-day operations as they wish, but evaluate the results using acknowledged, explicit criteria.

Organizations should work to develop implementation methods that anticipate obstacles to success. Here, organizations should carefully explore the perspectives of key stakeholders and their potential influence on implementing outcomes. Control systems might wish to integrate the efforts of different parts of an organization to prevent them from working at cross-purposes. For example, departments may have overlapping areas of expertise and may find themselves competing instead of cooperating (e.g., obstetrics–gynecology and radiology may both perform pelvic ultrasounds and compete for services).

Lastly, a well-designed control system monitors the effects of implementation, and provides feedback to multiple levels. Some of these feedback loops will be have predetermined rewards (i.e., monetary bonus for clinical performance) or corrective feedback (i.e., letters triggered for not meeting quality of care benchmarks). Others feedback loops require review at different levels to determine if action is needed.

What Are Core Elements of Organizational Control Systems?

Unlike simple processes that can be modified with rapid cycles of review, broad initiatives at AMCs are complex and affect the organization. Thus, we need some way of making control structures more visible and understandable.[8] One framework is represented schematically in Figure 1, in

Table 3
Using Core Control Systems in Problem Analysis: Steps and Major Substeps

Major Steps	Role of control system	Necessary substeps
Step 1: Motivate toward congruence	Create a process to identify stakeholders	Identify stakeholders
	Create an environment for dialogue	Concordance about importance of problem, and need for solution
	Identify barriers to congruence	
	Facilitate discussion about barriers and congruence	Agree on definition of doctor–patient communication
	Enhance communication among stakeholders	
Step 2: Identify appropriate outcomes	Create a process to identify stakeholders	Identify both intermediate benchmarks and long-term outcomes of interest
	Create an environment for dialogue	Agreement by stakeholders on outcomes
	Identify barriers to congruence	
	Facilitate discussion about barriers and congruence	
	Disseminate outcomes to stakeholders	
Step 3: Develop implementation system	Develop key processes to approach outcomes	Identify personnel to enact key processes
	Develop lines of accountability	Ensure personnel have adequate training for process functions
	Identify methods of monitoring desired and undesired outcomes	
	Disseminate plan among stakeholders	
Step 4: Develop feedback system	Develop systems to distribute negative and positive feedback appropriately	Identify monitoring groups
		Identify how key personnel will interact on feedback
	Develop strategies for adapting to positive and negative outcomes	

which core control systems are nested in the organizational structure and culture, as well as in the organization's environment (see also List 1).

Organizational environment

Each organization exists in an external environment that exerts powerful controls through external rewards and punishments. These influences may be manifest as changes in student or patient enrollment, patient satisfaction, research funding, health system recognition, lawsuits, public health, and gifts and endowments. Components of this external system include patients, payers, community, special populations, community infrastructure, research funders, legislative environment, legal environment, learners, faculty, and the local and national economy. The needs of each group, and the probable variation of those needs over time, create the environment for the organization.

AUMC Response, Part 1: Understanding the Environment. The dean explored the extent of the crisis at AUMC. He met individually with major stakeholders who influenced the environment in which the AUMC operated. Through an iterative process, he identified community groups, key legislators, resident students, departmental opinion-leaders, referring doctors, patients, community donors, major foundation and federal funders. The dean asked them, "What do you need from us to make your organization [your career] successful?" He began to understand the needs of the community and environment, and areas in which overlapping interests could be met. He created a representative community advisory board to provide input into AUMC reorganization.

Organizational culture

In an organizational context, Ouchi[12] defines culture as the broader values and normative patterns that guide worker behavior, practices, and policies.[13] According to Kluckhorn, "Culture consists of patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievement of human groups. [T]he essential core of culture consists of traditional (i.e., historically derived and selected) ideas and . . . their attached values."[14] Organizational culture in medicine, then, is the set of values, beliefs, and social norms shared by its members and, that in turn, tend to influence their thoughts and actions and are passed on to others. Academic medicine has evolved its own culture, including designing strongly hierarchical relationships, developing unique academic currency (research papers and grants), and creating unique administrative and educational tasks

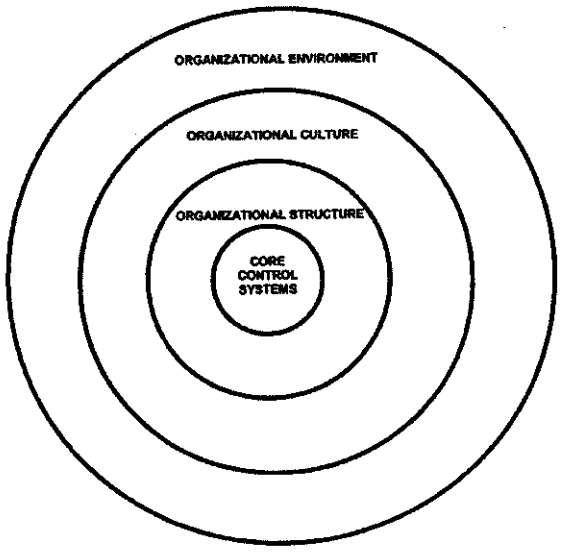

Figure 1 Schematic representation of an organizational control system.

List 1

Four Major Components of Control Systems at Academic Medical Centers

Organizational environment

The extraorganizational system in which the organization exists. The extraorganizational system will exert powerful controls on the system, through external rewards and punishments. These influences will manifest as changes in learner or patient enrollment, research funding, health system recognition, lawsuits, public health, and endowments.

Components include patients, payers, community, research funders, learners, and faculty

Organizational culture

Patterned ways of thinking that are characteristic of an organization. Within a larger organizational culture, multiple subcultures exist and each has patterned thinking about its relationships. Culture profoundly influences the ability of the system to function as planned.

Components include values, beliefs, assumptions, biases, informal, and hidden agenda

Organizational structure

The individuals and overt interactional systems that are designed to accomplish organizational goals.

Components include organizational rules, and hierarchical and nonhierarchical relationships

Core control system

The processes that underpin the organization's methods of achieving its goals.

Components include planning, operations, measurement, evaluation and incentive, and feedback

(mandated but unsupported committee and teaching responsibilities). Conflicts arise when the organization is not cognizant of its culture, leading to the development of inappropriate corrective/evaluative reward structures. Influences on organizational culture include values, beliefs, assumptions, and biases of all participants in the system.

Understanding culture is, in fact, the starting point for the design or change of an organizational control system, but cultural change occurs slowly and typically with great difficulty. However, culture is modifiable, and can be altered by leadership decisions.[15,16] For instance, curricular reform often succeeds or fails based on the perceived value of the change to a unit or department not on whether it inherently makes sense or will improve student learning. In this sense, communication of culture is vital and can ensure that all levels of the organization initiates actions consistent with the culture and without feeling powerless or vulnerable.

AUMC Response, Part 2: Understanding the Culture. Next, the dean set up group and individual meetings with people working at AUMC and listened carefully to their concerns and preconceptions. Through these discussions the dean identified core values and perceptions about working conditions, expectations, and individuals' approaches to challenges in problem solving. The dean asked, "What do you consider your role to be?," "What are the most difficult portions of your job?," "What would make your job easier?," and "What gets in the way of you achieving your goals?" He heard about problems in workflow, in staffing, work–life balance, and role responsibilities. Each group had specific desires, expectations, and reflections about the institution.

Organizational structure

The second component of the macro control system is organizational structure. Scholars have long recognized that structure functions as a form of control.[17–19] Organizational structure specifies the role behaviors expected from people, as well as the authority and reporting relationship of the entire set of roles in the organizational structure.[14] Dimensions of structure include the degree of centralization or decentralization, functional specialization, degree of vertical or horizontal integration, and the "span of control" (number of direct reports). Appropriately created, these structures can respond strategically to shifts in medical markets, new technology, and the cultural environment. Conflict arises when the structure cannot adapt its core control systems to changes in organizational objectives or environmental needs.

AUMC Response, Part 3: Understanding the Structure. The dean realized that the true reporting lines, system accountability, and reward systems at AUMC were not known. Informal hierarchical relationships had replaced many systemwide checks and balances, making change difficult. Neither superb or substandard performance was recognized, rewarded, or corrected. The dean asked each department and unit to identify a well-respected member of the rank and file, who would serve as change agents. Change agents from all departments (from medical records and security to surgical faculty) would be trained by social scientists on interviewing techniques and asking their peers a series of specific questions. Over three months, these agents systematically inquired about role satisfaction, job challenges, and solutions.

Core Control Systems

Core control systems are the processes that underpin the organization's methods of achieving its goals; however, these processes are often poorly understood

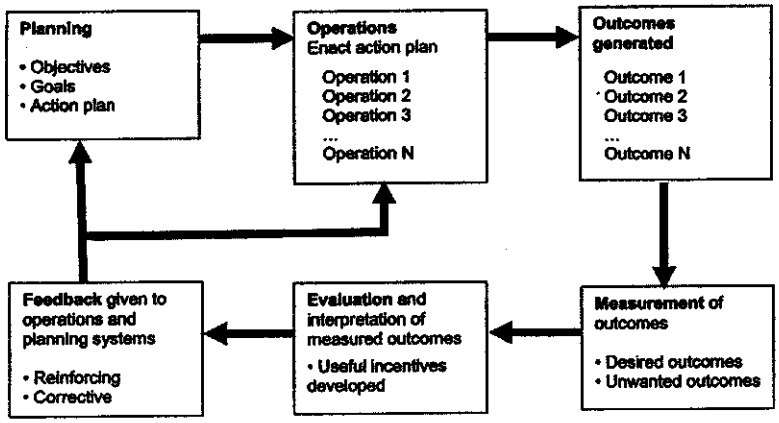

Figure 2 The function of the core control subsystem components in a large organization.

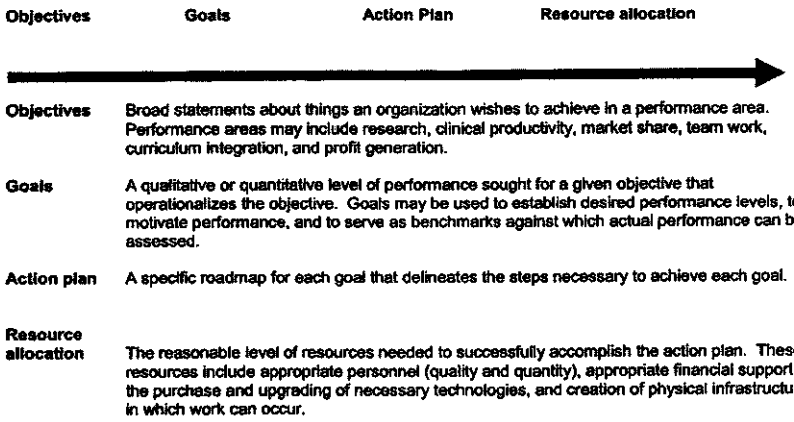

Figure 3 Progressively increasing specificity within the planning subsystem.

(see Table 3). Broadly, core control systems are composed of five subsystems: planning, operations, measurement, evaluation incentives, and feedback (see Figure 2).

Planning

Planning is the process of defining the objectives and goals of an organization in specific performance areas (termed key result areas), and then defining the means to attain goals (see Figure 3).[20–23]

Failure of the planning subsystem often results from limiting goals and objectives in an attempt to keep within the organizational resources and mission. For instance, objectives may compete for scare resources or may actually be at odds with each other. A medical school may face an internal conflict in its admissions process as it attempts to both increase the geographic diversity of students and attract the most academically rigorous students. Organizational planners must be explicit in their tradeoffs among these objectives and anticipate sources of conflict. Plans also fail because planners do not provide the adequate personal, financial, or infrastructural resources to accomplish action plans in a reasonable manner. Underresourcing of a system (the classic unfunded mandate) leads to failure, while overresourcing leads to waste.

Operations

The operational subsystem is the on-going method of performing the functions required for day-to-day organizational activities. Operations refer to the organizational level where work is performed, and action is implemented. Operational work is performed by individuals, teams, departments, divisions, and other strategic business units. Ideally, the relationships between individuals and groups should also be clearly defined and may be hierarchical or flexible, but should be explicitly addressed.

Many problems arise at the operational level. For instance, motivational tools that are at odds with organizational culture will undermine the control system. In addition, operational subsystems that are not given the appropriate resources to accomplish their tasks must internally reprioritize, which results in poor morale due to mixed administrative messages.

Measurement

In an organizational context, measurement is the process of identifying outcomes that represent key aspects of organizational performance. These outcomes may be measured using tools drawn from health services research (i.e., patient quality of care or satisfaction), the educational literature (i.e., validated knowledge and attitudinal scales), or economic metrics (i.e., different ways of cost accounting).[24] Appropriate measurement systems should be linked to organizational objectives. Traditionally, objectives used in academic medicine (such as becoming a leader in academic medicine) are vague, have no defined outcome measures, and may not be valued by those in the trenches. Conversely, having a year-end profit may be valued, but may not be linked to other organizational objectives.

Measurement performs a dual function in the control system. First, data provide organizations with evaluative or formative feedback. Second, the organizational awareness of measurement demonstrates the importance of those outcomes and encourages attention to their objectives. Since it creates a Hawthorne Effect (where the process of observation affects the outcome), measurement itself is considered a stimulus and process function.

For example, for adequate patient–inpatient access and flow, some experts believe that 10% of inpatient beds should be free at any given point. Thus, to improve patient access, the hospital may want to increase the number of early morning patient discharges from the intensive care unit and inpatient wards. The associated action plan may include increasing the number of discharge planners, working on early patient education, speeding up night discharge dictations, and ensuring discharge prescriptions are filled early in the morning. One outcome measurement may be the percentage of patients who are discharged before 10 AM. However, the early discharges may also affect patient and provider satisfaction, increase missed lab results, and increase seven-day hospital readmission rate. Thus, planning for measurement of negative consequences of actions is essential.

Evaluation and Incentives

Evaluation and rewards are the tools that anchor feedback to individual and groups. As part of ongoing evaluation, those who manage the organizational control system must ask the following questions:

- Does the organizational control system promote the behavior it intends to?
- Does the control system repeatedly produce the same behavior regardless of whether this behavior is intended?

Incentives for performance may be either positive (e.g., receipt of a bonus or recognition award for meeting benchmarks) or negative (e.g., nonreceipt of a bonus, public sharing of substandard results, or censure by the group). The evaluation and incentive subsystem begins with evaluating data, and deciding upon appropriate-use incentives (positive or negative). After measuring performance outcomes, the outcome data must be analyzed and a judgment made about the value of each measurement.

Table 4

The Measurement Subsystem: Typical Discordance between Stated Organizational Objectives, Measurement, and Rewards in Academic Medical Centers

Objective	Measurement area	Measurement tool	Commonly measured?	Commonly rewarded or punished?
Fiscal responsibility	Profits	Accounting system	Yes	Yes
	Expenditures	Accounting and budgeting	Yes	Yes
Research excellence	Research productivity	Grants funded Papers published	Yes	Yes
	Research quality	Continuous funding from competitive agencies Journal quality in which papers are published Peer review for Complexity of research Importance of question Innovation	Variable	No
	Research Impact and Use	Changes in Clinical practice Research direction Education Health policy	No	No
	Research mentorship	Successful new mentees	No	No
Patient care leadership	Patient satisfaction	Survey instruments	Yes, increasingly	Yes
	Medical market share	Market analysis	Yes	Yes
	Health care quality ratings	National or local benchmarks	Yes, increasingly	Yes
	Physician and care provider satisfaction	Survey instruments	No	No
	Adoption of appropriate technology	National standards	No	No
	Physician and care provider professionalism	Incident reporting	Yes	Yes
		Behavioral observation	No	No
		Patient satisfaction	Yes	Yes
	Physician and care provider knowledge	Tests scores	No	No
	Physician and care provider skills acquisition	Behavioral observation Faculty Standardized patients	Variable	No
	Physician and care provider skills Maintenance	CME hours	Yes	Yes
		CME content	No	No
Educational excellence	Learner recruitment and retention	Learner profiling	Yes	No
	Learner knowledge	Test scores	Yes	Yes
	Learner skills acquisition	Behavioral observation Faculty Standardized patients	No	No
	Learner behaviors and habits	Monitoring professionalism	No	No
	Educator recruitment and retention	Educator profiling	No	No
	Educator knowledge	Test scores	No	No
	Educator skills acquisition and maintenance	Behavioral observation Faculty Standardized patients	No	No
	Educator behaviors and habits	Monitoring professionalism	No	No
	Educational resources			
Community and regional leadership	Outreach program for underserved	Free health clinics	No	No
	Programs for elementary through high school	Speaker-lecture programs	No	No
	Testimony for state and federal legislature	Speaker invitations and impact	No	No
	Participation on community and state boards	Board invitations and impact	No	No
	Program recognition	Community fund-raising goals	Yes	Yes

Key result area	Objectives	Goals	Stake holders	Communication strategy	This year's goals	Last year's goals
Revenue Generation						
Quality of Care						
Employee and Patient Satisfaction						
Innovation Research Clinical Education						
Education outcomes (all levels)						
Research quality and productivity						
Community impact						
State and national prestige						

Figure 4 A sample control portfolio for an academic medical center.

Ideally, during the planning phase, outcome thresholds are clarified, and participants develop transparent, credible evaluation measures. However, in many AMCs, the stated domains are not measured or rewarded (see Table 4).

To effectively motivate people, incentives must be perceived as linking specific actions with organizational goals. Rewards, such as compensation, promotion, and recognition, are intended to motivate people to behave in ways that will help attain organizational goals, reinforce positive performance, and modify negative performance. When people perform tasks because they are motivated from within (by pride, a sense of duty, a work ethic, or a sense of professionalism), the reward is said to be intrinsic. When tasks are performed because of rewards they expect to receive from others (praise, patient satisfaction, pay, etc.), rewards are said to be extrinsic.[25–27] Both intrinsic and extrinsic rewards can be augmented by primary reinforcers which directly satisfy basic needs (e.g., a feeling of self-worth, food, and certain types of respect) or by secondary reinforcers which are positively associated with primary reinforcers. Organizations should be cautious to ensure that incentives are not contradictory and reward one type of desired behavior (efficiency), while actually providing a disincentive for another desired behavior (courtesy).[28]

Feedback

The process of providing feedback on outcomes should follow the application of a well-developed evaluation and incentive system. Feedback involves the appropriate dissemination of evaluation and incentives, attending to the impact on the receiver, and providing an opportunity for discussion and reinterpretation of measurement data. Conflict occurs in the feedback subsystem when corrective or reinforcing feedback is inappropriately applied. The feedback may be given at the wrong level, for example, to agents who are unable to influence future behaviors or be provided in an inappropriate manner, for instance, using a heavy-handed method in a culture that values independence and kindness. It is also important to recall that the greater the interval between the measured behavior and the application of the incentive, the less the reinforcing effect on future behavior. Unfortunately, in most health organizations, immediate feedback is not usually available.

AUMC Response, Part 4: Developing Core Controls. As the change agent interviews progressed, the dean's understanding of the organizational environment, culture, and structure grew significantly. At a weekend retreat the dean encouraged department chairs, educators, and researchers to select ten to 20 essential processes that seemed to affect the major AUMC missions. He asked them to include environmental stakeholders priorities. The group met over several days, and selected issues surrounding patient admission and discharge processes, consultant and referral follow-up, streamlining IRB processes, a system that stressed research over education, the lack of online educational resources, quality of hospital cafeteria food, patient outreach and education, parking, etc. Soon afterwards, they convened groups affected by these processes changes to test ideas for achieving their goals. The dean asked them to pay attention to planning methods, operations, measurement, evaluation, and feedback. With a focused effort, the dean had spent four or five months identifying the scope of health system problems and planning for organizational improvement.

The Control Portfolio

Academic medical centers can use simple tools on a daily basis to better bring about an effective control system. One such tool is the "control portfolio." This is a chart or log (paper or electronic) that includes most (if not all) of the relevant information for controlling any activity or process (see Figure 4). Specifically, it includes a well-defined set of key result areas, objectives and/or goals for each performance area, and measurements of actual performance against each goal.

The portfolio encourages linkages between the performance areas and goals to a predetermined set of rewards that are contingent upon performance. AUMC's control portfolio shows that the institution has identified key result areas. Each of these areas is different and many areas compete with each other for resources, attention, and strategic priority. While seemingly simple, effective use of the control portfolio requires negotiation and commitment from all stakeholders. Effective completion of the portfolio allows stakeholders to quickly assess the relevance and achievability of the objectives, baseline starting point, and expected interval change. This approach can be useful for the institution as a whole, a department, a division, or even an individual such as a faculty member or student. At the individual level, personnel can set learning goals based on outcome data, and track their outcomes over time. Using control portfolios, we can evaluate the functioning and effectiveness of the system in an organization. We can determine whether all three of the major elements of a control system have been sufficiently developed (culture, structure, and the core control). Additionally, the portfolios articulate where major elements articulate with one another. In some systems, not all the parts of a control system may be in place. In others, component pieces may be present but may not articulate as a system with each other.

AUMC Response, Part 5: Creating the Core Systems and System Relationships. After four months, the dean understood his organization through the lens of a control system (see Table 5). He developed a template for reasonable control systems in 20 essential processes, with congruent goals and rewards. He acquired an understanding of the processes, interactions, and perspectives of major

Table 5

Case of the Troubled Academic University Medical Center (AUMC) Trying to Balance the Missions of Pursuing Excellence in Patient Care, Research, and Education, As Seen Through the Lens of the Control System

Element of the control system	Problems at AUMC
Organizational culture	Values discordance: Emphasis on research and clinical productivity
	"All they really care about is money."
	Department chairs are former researchers
	Learning on the job, little mentoring
	Little team work or shared problem solving
	Units and departments are autonomous
	Lack of centralized management
	Chairs are successful if they attract, motivate, and retain "top researchers—not top educators or clinicians"
Organizational structure	Structural discordance
	Job descriptions are inaccurate
	Many required activities are not funded
	Department chair's responsibility emphasizes financial productivity
	Reporting lines increase bureaucracy and are tangled
	Little flexibility to respond to feedback
Core control system	Control system underdeveloped
	Resolving competing priorities not explored (for instance, the formal budget has no incentives for quality or the accounting system measures only revenue)
	Operations are resourced only to meet clinical goals
	Rewards and evaluation do not achieve organizational objectives
	Thresholds for corrective or reinforcing feedback not defined
	The feedback system relies on crude performance measures
	Results such as professionalism or kindness are not measured

departments and units. Using the essential processes for the system, he first targeted those ideas with the greatest visibility that would also have the biggest impact on improving the work lives of staff and learners. Some processes were short-term loss-leaders, while others were cost neutral. For instance, housekeeping was expanded. Funds for this change came from downsizing the number of parking lot attendees through the creation of an automatic self-pay process upon leaving the parking garage. The dean consolidated secretarial support services and hired new IRB personnel and grant writers to improve the productivity of current faculty. For larger initiatives, the dean worked with the state to float a bond for infrastructural development. The dean publicized these changes, and helped create microenvironments in which change could occur. For each initiative, the control system was articulated, and internal feedback structures created. The dean used a "control portfolio" to track results, and provide regular feedback to the system members about their achievement of organizational goals. Local control, flexibility, and accountability were encouraged. He spent 5% of his budget to ensure accountability and create incentives. Over time, goal congruence was achieved for major processes, and the organization began to visibly improve.

Conclusions

To help realize their organizational vision, leaders of AMCs would benefit from a greater understanding of management and administrative sciences. Traditionally, these fields have not been part of the training of academic medicine leaders. Using the concepts of organizational control systems will increase the probability that people will behave in ways that lead to the attainment of organizational objectives. Our fictitious case of the troubled AUMC illustrates the steps necessary to systematically review and understand problems in an organization, and then use a well-established business model to improve the functioning of the organization.

Although idealized, and somewhat effort intensive, the process we set out in this article—inclusive, bold, flexible—allows for continual growth and change within large systems. Local control is given to responsible individuals, and accountability is encouraged. Additionally, this process of change and development is not static; leadership must routinely monitor the shift in the organizational environment, culture, and structure. While in this article we do not solve the case of the troubled AUMC, we provide a systematic approach to understanding the outcomes generated by AUMC's operations, and a template for approaching a systemwide redesign to achieve objective–outcome congruence.

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Cover Note

Drexel University College of Medicine

Just three years after its inception, Drexel University College of Medicine (DUCOM) is already a dynamic force in academic medicine. DUCOM combines the 150-year tradition of excellence in education, clinical care, and research embodied by its predecessor institutions, Hahnemann Medical College and Woman's Medical College of Pennsylvania, with Drexel University's command of technology and engineering.

By merging that technical expertise with the art and science of healing, the school has established some of the most innovative academic programs available. DUCOM offers a world-class student-focused training ground for 1,007 MD candidates, 565 residents and fellows, and some 400 students in biomedical graduate programs, taught by 499 full-time faculty and 1,750 volunteers.

Medical students at DUCOM choose between two innovative preclinical curricula developed for different learning styles: Interdisciplinary Foundations of Medicine (IMF) and the Program for Integrated Learning (PIL). IMF presents basic science courses through clinical symptom modules. PIL is a problem-based curriculum, using case studies as the stimulus for students to search out the information they need to understand and treat clinical problems. Health-related community service is required in both curricula.

Students gain exposure to clinical skills in the Clinical Education and Assessment Center beginning in the first year. Later, a clinical skills "passport" follows them through their clerkships, requiring each department to certify that the student has achieved discipline-specific clinical skills. Thanks to DUCOM's location in the heart of the Northeast's health science corridor, students can receive clinical education at 25 affiliated hospitals and ambulatory sites chosen for medical excellence and commitment to teaching. A particular strength of the program is the unique fourth-year Pathways system in which students choose from discipline-specific or generalist pathways, each with dedicated faculty and both required and elective courses. This structured curriculum, with a focus on career planning, is very successful in preparing our students for residency.

First- and second-year students complete their basic science studies at DUCOM's 15-acre Queen Lane campus, a suburban-like setting that also houses core research facilities such as the Molecular Genomics Laboratory and DNA Sequencing Center. An 18,000-square-foot student activities center will open in 2006.

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