

# Creating a useful vascular center: A statewide survey of what primary care physicians really want

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**Objective:** Multidisciplinary vascular centers (VCs) have been proposed to integrate vascular patient care. No studies, however, have assessed referring physician interest or which services should be provided. A statewide survey of primary care physicians (PCPs) was performed to answer these questions.

**Methods:** Questionnaires were mailed to 3711 PCPs, asking about familiarity with vascular disease, potential VC usage, and services VCs should provide. Univariate and multivariate analysis was used to determine which PCPs would refer patients, the services desired, and which patients would be referred.

**Results:** Of 1006 PCPs who responded, 66% would refer patients to a VC, especially patients younger than 50 years ( $P < .001$ ) and those with lower extremity disease ( $P < .001$ ) or abdominal aortic aneurysm ( $P < .001$ ). PCPs practicing within 50 miles of a VC ( $P < .001$ ), those in practice less than 5 years ( $P < .001$ ), and those without specific training in vascular disease during residency ( $P = .004$ ) were most likely to refer patients. Vascular surgery (97%), interventional radiology (90%), and a noninvasive vascular laboratory (82%) were considered the most important services, and physician educational services (62%) were also desirable. PCPs did not think cardiology, cardiac surgery, smoking cessation programs, or diabetes or lipid management are needed. Reasons for VC nonuse included travel distance (23%), sufficient local services (21%), and insurance issues (12%). Only 16% of PCPs believe that their patients with vascular disease currently receive optimal care.

**Conclusion:** There is considerable interest in VCs among PCPs. In contrast to recently described models, VCs need not incorporate cardiology, cardiac surgery, smoking cessation programs, or diabetes or lipid management. VCs should include vascular surgery, interventional radiology, a noninvasive vascular laboratory, and physician educational services. (*J Vasc Surg* 2004;39:763-70.)

Vascular centers (VCs) have been proposed to integrate the care of patients with vascular disease. Although the concept of a unified and multidisciplinary approach has been embraced by many specialists involved in the treatment of vascular disease, the success of a VC depends on the active participation and interest of referring physicians. The attitudes and perceived level of need among referring physicians, however, have not been established.

This study was designed to assess the desired elements of a VC among primary care physicians (PCPs), and the level of interest and potential usage of such a model. We further sought to determine which provider and patient characteristics were associated with an increased likelihood of referral to a VC, and what obstacles would preclude referral.

## METHODS

**Study design.** Approval for this project was obtained from the institutional review board for human subjects research at the Oregon Health & Science University

(OHSU). Mail surveys were sent to 3711 PCPs in Oregon, using the prospectively maintained database of the Oregon Medical Association, of which 70% of physicians living in Oregon are members. The database of 6785 members includes 3711 practitioners identified as PCPs (family practice, general internal medicine), although internists with subspecialty training were also included if their predominant clinical activity was general internal medicine.

**Survey instrument and process.** The questionnaire was developed in consultation with the Clinical Research Center and the Vascular Surgery Department at OHSU. Questions were categorical with options for the physician to select, or of the check-box type (5-point Likert scale), and were formatted on one double-sided page (Fig). Five topics were assessed: provider-specific demographic data, patient-specific demographic data, provider familiarity with various vascular disease states, desired specialists and services of a vascular center, and potential utilization of a VC.

The initial mailing was distributed in October 2002, and contained a coded, confidential survey, an explanatory cover letter, and a postage-paid return envelope. None of the literature identified the vascular surgery department or vascular surgeons as the source of the questionnaire, to eliminate potential bias. A second mailing containing another coded survey and postage-paid return envelope was sent to all nonrespondents 4 weeks later.

Responses were computer-read, and a blinded Clinical Research Center employee not involved with the study entered all data into a Microsoft Access database.

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Competition of interest: none.


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## Vascular Center Project Questionnaire

**INSTRUCTIONS:** Shade Circles Like This--> ●  
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- \* Do not use pencil.
- \* Use only a blue or black pen.
- \* Please fill in the circle completely.

1. What is your specialty?
  - Family Practice
  - Internal Medicine
  - Internal Medicine with subspecialty training
  - Other \_\_\_\_\_
2. What is the population of the community in which you work?
  - < 1000 people
  - 1000 to 10,000 people
  - 10,000 to 100,000 people
  - > 100,000
3. What is the average age of your patient population?
  - < 50 years
  - 50 to 70 years
  - > 70 years
4. How many years have you been in practice?
  - 0 to 5 years
  - 5 to 10 years
  - > 10 years
5. Please specify the location of your practice:
  - Portland metropolitan area
  - < 50 miles from Portland
  - 50 to 100 miles from Portland
  - > 100 miles from Portland
6. Did you receive training during your residency in the management of peripheral arterial and venous disease?
  - Yes
  - No
7. On a scale of 1 to 5, (5 most comfortable and 1 least comfortable), please rate your current level of comfort in diagnosing/managing the following peripheral vascular problems:
  - Upper extremity arterial disease:  1  2  3  4  5
  - Lower extremity arterial disease:  1  2  3  4  5
  - Cerebrovascular disease:  1  2  3  4  5
  - Abdominal aortic aneurysms:  1  2  3  4  5
  - Venous disease:  1  2  3  4  5
8. On a scale of 1 to 5, (5 always and 1 never), how often do you refer patients with cerebrovascular disease to a specialist?
  - 1  2  3  4  5
9. On a scale of 1 to 5, (5 always and 1 never), how often do you refer patients with peripheral vascular disease or aneurysm disease to a specialist?
  - 1  2  3  4  5
10. What is your level of familiarity (5 being most familiar and 1 being unfamiliar) with the following treatment modalities for peripheral vascular disease?
  - surgical  1  2  3  4  5
  - endovascular (catheter-based)  1  2  3  4  5
  - medical  1  2  3  4  5
11. Which specialists do you feel should be included in a vascular center devoted to the management of peripheral vascular disease? (check all that apply)
  - Vascular surgery
  - Vascular medicine
  - Interventional radiology
  - Cardiology
  - Cardiothoracic surgery
  - Other \_\_\_\_\_

Vascular center survey.

**Statistical analysis.** Frequency distributions were analyzed for each of the survey variables. In addition to descriptive statistics, univariate associations between VC utilization and potential determinants of VC utilization, including provider-specific and patient-specific demographic factors, practice patterns, and the level of comfort or familiarity with various vascular disease states and therapeutic options, were analyzed with the  $\chi^2$  test. Variables significantly ( $P < .05$ ) related to utilization in the univariate model were entered into a multivariate logistic regression analysis, with the forward and backward elimination method, to identify independent predictors of utilization. Adjusted odds ratios (ORs) and 95% confidence intervals

(CIs) were used to describe the effect of each independent predictor, controlling for the other predictors in the model. All statistical analyses were performed with SAS Release 8.1 software (SAS Institute, Cary, NC).

## RESULTS

One thousand six questionnaires were returned, 727 from the first mailing and 279 from the second mailing, for an overall response rate of 27%. Eighty-three questionnaires were excluded because the respondent was not a currently practicing PCP ( $n = 45$ ) or did not complete the entire survey ( $n = 38$ ). The remaining 923 (25%) valid responses were used for further analysis.

12. On a scale of 1 to 5, (5 most important and 1 least important) please indicate how important it would be to provide each of the following services at a vascular center devoted to the management of peripheral vascular disease?

Surgical treatment	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Endovascular (catheter-based) treatment	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Medical/Pharmacologic treatment	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Comprehensive wound care management	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Management of diabetes mellitus	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Management of lipid disorders	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Noninvasive vascular laboratory	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Smoking cessation clinic	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Wellness/Prevention	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Vascular websites for physicians and/or patients	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
CME courses/seminars	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Exercise rehabilitation/Physical therapy	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

13. If a vascular center devoted to the management of peripheral vascular disease was established in Portland, would you refer patients to it?

Yes  
 No

If you answered YES to the above question, which types of patients would you likely refer? (you may check more than one)

patients with peripheral arterial disease  
 patients with aneurysms  
 patients with cerebrovascular disease  
 patients with venous disease

14. If you answered NO to question 16, why? (check all that apply)

Patient insurance issues  
 Sufficient services already exist  
 Distance from vascular center  
 Vascular center already exists in my location  
 Other \_\_\_\_\_

15. With the resources/consultants currently available in your practice, how would you rate the care that your patients with peripheral vascular disease presently receive (5 optimal care and 1 suboptimal)?

1    2    3    4    5

Fig (continued).

**Demographic data.** Demographic data for responding physicians are presented in Table I. Of the respondents, 47% (n = 437) were family practitioners, 33% (n = 306) were general internists, and 13% (n = 117) were internists with subspecialty training. Most respondents were PCPs practicing in the Portland metropolitan area (42%; n = 390). Most had been in practice for more than 10 years (54%; n = 500), treated patients between 50 and 70 years of age (55%; n = 510), and had been exposed to management of peripheral vascular disease during residency training (69%; n = 636).

**Familiarity with disease states and therapeutic options.** Results of provider comfort level with vascular disease states and specific practice patterns are shown in Table II. PCPs had the highest level of comfort with the diagnosis

and management of cerebrovascular disease (72%; n = 664) and venous disease (69%; n = 636), but were least comfortable with the diagnosis and management of upper extremity disease (44%; n = 406). PCPs had the highest degree of familiarity with medical therapy (75%; n = 692) and surgical therapy (63%; n = 581) for vascular disease, but were less knowledgeable about catheter-based treatment (31%; n = 286). Fewer than 15% of PCPs were completely unfamiliar with medical or open surgical treatment options, whereas more than 40% were completely unfamiliar with endovascular therapy for vascular disease. Six hundred PCPs (65%) currently refer patients with peripheral arterial disease or AAA to a specialist, whereas only 332 (36%) PCPs refer patients with cerebrovascular disease to a specialist on a consistent basis.

**Table I.** Respondent demographic data

	<i>n</i>	%
Specialty		
Family practice	437	47
Internal medicine	306	33
Internal medicine with subspecialty training	117	13
Other	60	7
Location		
Portland, Ore	390	42
<50 miles	116	13
50-100 miles	151	16
>100 miles	257	28
Patient age (y)		
<50	327	35
50-70	510	55
>70	68	7
Years in practice		
0-5	250	27
5-10	166	18
>10	500	54
Exposure to vascular disease during residency		
Yes	636	69
No	237	31

**Table II.** Provider level of comfort with vascular disease states and therapeutic options

<i>Specific disease state or therapeutic option</i>	<i>PCPs indicating high comfort level or familiarity</i>	
	<i>n</i>	%
Cerebrovascular disease	664	(72)
Venous disease	636	(69)
Upper extremity arterial disease	406	(44)
Abdominal aortic aneurysm	409	(44)
Lower extremity arterial disease	510	(55)
Medical therapy	692	(75)
Open surgical therapy	581	(63)
Endovascular therapy	286	(31)

PCP, Primary care physician.

**Motivations and barriers to referral to a VC.** Six hundred seven PCPs (66%) indicated they would refer patients to a VC devoted to the management of vascular disease if one were established, compared with 316 PCPs (34%) who said they would not. The types of patients PCPs would refer, if they indicated they would refer patients, are shown in Table III, and perceived barriers to referral for the PCPs who indicated they would not use a VC are shown in Table IV.

**Important components of the ideal VC.** Eight hundred ninety-five PCPs (97%) thought vascular surgeons should be included in the VC, 831 (90%) thought interventional radiologists should be included, and 600 (65%) thought vascular medicine should be included. Only 360 PCPs (39%) thought cardiology was necessary, and 314 (34%) thought cardiothoracic surgical services should be

**Table III.** Vascular conditions for which PCPs would refer patients to a vascular center

<i>Condition</i>	<i>Physicians who would refer (N = 607)</i>	
	<i>n</i>	%
Peripheral arterial disease	526	87
Aneurysm	486	81
Cerebrovascular disease	284	47
Venous disease	358	59

PCP, Primary care physician.

**Table IV.** Reasons for nonreferral among responding PCPs

<i>Reason for nonreferral</i>	<i>Nonreferring physicians (N = 316)</i>	
	<i>n</i>	%
Patient insurance issues	81	26
Sufficient existing services	163	52
Distance from VC	173	55
VC already exists near practice	47	15

PCP, Primary care physician; VC, vascular center.

**Table V.** Factors included in univariate model

<i>Variable</i>	<i>P</i>
Provider specialty	.15
Population of community	.30
Years in practice	<.001*
Practice within 50 miles of VC	<.001*
Exposure to PVD during residency	.003*
Patient age <50 years	<.001*
Low level of comfort with disease states	<.001*
High utilization of specialists currently	<.001*
Lack of familiarity with treatment options	.01*
VC includes vascular surgeons	<.001*
VC includes interventional radiologists	.07
VC includes vascular medicine specialists	.05
VC includes other providers	.20
VC provides surgical treatment options	.002*
VC provides endovascular options	.45
VC provides medical options	.08
VC includes educational resources	<.001*
Rating of current care	<.001*

VC, Vascular center; PVD, peripheral vascular disease.

\*Variables significantly associated with VC utilization.

provided. Other services thought important were a noninvasive vascular laboratory (94%;  $n = 868$ ) and educational resources (62%;  $n = 572$ ). Many PCPs did not think diabetes and lipid management services (35%;  $n = 323$ ) or smoking cessation programs (49%;  $n = 452$ ) were essential to an ideal VC model.

**Factors predictive of utilization of a VC.** Factors included in the univariate regression model are listed in Table V. PCPs practicing within 50 miles of the VC ( $P < .0001$ ), those in practice less than 5 years ( $P < .001$ ), those

**Table VI.** Multivariate logistic regression model of factors associated with PCP utilization of a vascular center

Variable	Odds ratio	95% Confidence interval	P
Average age of population (y)			.035
<50	1.76	0.91-3.42	0.09
50-70	1.09	0.59-2.030	0.79
>70	1.00	Reference value	
Years in practice			<.001
0-5	2.39	1.54-3.71	<.001
5-10	1.97	1.23-3.18	.005
>10	1.00	Reference value	
Location of practice			<.001
Portland metro area	3.36	2.24-5.06	<.001
<50 miles	2.45	1.37-4.38	.002
50-100 miles	1.75	1.07-2.89	.027
>100 miles	1.00	Reference value	
Almost always refer CVD to specialist	1.48	1.20-1.81	<.001
Almost always refer LED or AAA to specialist	1.34	1.09-1.64	.005
Vascular surgery essential at VC	5.14	1.17-22.61	.030
Open surgical therapy essential at VC	1.30	1.02-1.67	.035
Educational resources essential at VC	1.36	1.16-1.60	<.001
Highly satisfied with care currently available	0.42	0.33-0.533	<.001

PCP, Primary care physician; CVD, cerebrovascular disease; LED, lower extremity arterial disease; AAA, abdominal aortic aneurysm; VC, vascular center.

without specific training during residency ( $P < .004$ ), and those treating predominantly patients younger than 50 years ( $P < .001$ ) were most likely to refer patients to a VC. A patient diagnosis of lower extremity arterial disease ( $P < .001$ ) or AAA ( $P < .001$ ) was also associated with PCP utilization of a VC. A high level of satisfaction with care currently available was negatively associated with referral to a VC ( $P < .001$ ). The inclusion of vascular surgeons and surgical therapy was strongly associated with referral ( $P = .002$ ), whereas other specialists and treatment options, including endovascular therapy ( $P = .45$ ) and vascular therapy ( $P = .08$ ), were not.

Results of the multivariate logistic regression model are shown in Table VI. As with the univariate model, PCPs in practice 5 years or less (OR, 2.39; 95% CI, 1.54-3.71;  $P < .001$ ) and those practicing within 50 miles of the VC (OR, 2.45; 95% CI, 1.37-4.38;  $P = .002$ ) were most likely to refer patients. Further, PCPs with an established history of specialist utilization (ie, those who already refer patients with cerebrovascular disease, peripheral vascular disease, or AAA to a specialist) were also most likely to use a VC (OR, 1.48; 95% CI, 1.20-1.82;  $P < .001$ ). In contrast, PCPs who were very satisfied with the current care available were unlikely to refer patients (OR, 0.42; 95% CI, 0.33-0.53;  $P < .001$ ). The inclusion of vascular surgeons and surgical therapy was strongly associated with utilization (OR, 5.14; 95% CI, 1.17-22.62;  $P = .03$ ).

## DISCUSSION

The concept of a VC was initially suggested by Elkin and DeBakey,<sup>1</sup> who described the benefits of concentration of resources, personnel, and data collection for patients with vascular diseases. They believed comprehensive care would enable more efficient treatment of a growing patient population and provide larger cohorts for outcomes research. Recent changes in treatment algorithms, coupled

with increased economic pressure, have renewed interest in a unified, multidisciplinary approach to vascular disease.<sup>2-13</sup> VC models have been developed at a handful of tertiary hospitals, including Brigham and Women's Hospital, the Miami Cardiac & Vascular Institute, the University of Rochester, and Stanford University.<sup>2-4,14</sup> Despite their widespread appeal, several important controversies remain. First, the infrastructure of these collaborations differ significantly; some are joint ventures between the vascular surgery department and the interventional radiology department, whereas others include cardiology, preventive medicine, and other ancillary specialties traditionally involved in the care of vascular disease.<sup>2-8,14-17</sup> Second, although the main consumers of an established VC are the PCPs who currently provide care to most patients with vascular disease, neither their potential utilization of a VC nor their needs and preferences have been clearly defined. Third, provider-specific factors associated with higher degrees of utilization that can be targeted to enhance the success of a VC are unknown.

This study shows that there is considerable interest in development of VCs among PCPs in Oregon who responded to the survey. However, utilization of the VC depends on demographic factors, such as proximity, and provider-specific factors, such as a history of specialist utilization.

Results of univariate analysis demonstrated that PCPs without exposure to vascular disease during residency were more likely to refer patients to a VC, and that patients with cerebrovascular disease, a condition with which PCPs were highly comfortable, were least likely to be referred for specialist care. This finding is in agreement with other studies that have shown that provider knowledge is inversely related to specialist referral.<sup>18-20</sup> The identification of these provider-specific characteristics associated with a high level of utilization may enable more productive mar-

keting of VCs, because fiscal resources can be focused to a receptive audience.

Respondents thought vascular surgeons and open surgical therapy were important elements of an ideal VC. Multivariate analysis revealed that vascular surgeons were the only providers (as opposed to interventional radiologists, cardiologists, or cardiothoracic surgeons) positively associated with an increased likelihood of referral (OR, 5.14; 95% CI, 1.17-22.62;  $P = .03$ ). This is in agreement with data from the Legs for Life National Screening and Awareness Program for Peripheral Vascular Disease, in which patients with vascular disease most frequently identified vascular surgeons (42%) as the primary providers responsible for their care.<sup>21</sup> In contrast, only 4.8% of patients who responded recognized interventional radiologists as specialists involved in treating peripheral vascular disease.<sup>21,22</sup> These data, which show that both patients and referring physicians identified vascular surgeons as a critical element in providing optimal care, suggest that vascular surgeons have a unique opportunity to firmly establish themselves as the primary caretakers of patients with vascular disease.

Contrary to many previously established models, PCPs in Oregon did not consider related medical therapy, such as diabetes and lipid management or other preventive or wellness programs, to be essential components of a VC.<sup>2-4,6,12</sup> While clearly an important aspect of the care of vascular disease, these findings likely reflect a higher level of comfort among PCPs in managing related medical issues.

In contrast, providing educational resources was positively associated with referral to a vascular center. The results of the multivariate analysis in this study demonstrated that educational programs were as important to PCPs as the availability of surgical services (OR, 1.36; 95% CI, 1.16-1.60;  $P < .001$ , and OR, 1.36; 95% CI, 1.02-1.67;  $P = .04$ , respectively). As catheter-based treatments of vascular disease become more widespread, the importance of knowledge dissemination likewise increases.<sup>2,3</sup> PCPs may not have up-to-date knowledge of the expanding options available to care for vascular disease today,<sup>2,3,6</sup> including new endovascular therapies, as well as updated information regarding indications, appropriate patient selection, and outcomes data for open surgical options. A recent survey of 360 internal medicine physicians in Illinois identified deficiencies in the identification of peripheral arterial disease among respondents.<sup>2,3</sup> The authors concluded that improvements in education of internal medicine physicians and awareness may provide earlier diagnosis and referral, lower healthcare costs, and improved patient outcomes. A VC would potentially provide referring physicians this important information.

This study has several limitations. First, the survey instrument was not validated in a pilot study. Second, that the institution, OHSU, was identified on the survey may have introduced bias. Respondents may have been either positively or negatively influenced on the basis of previous interactions with OHSU that may have been unrelated to vascular care. Third, preexisting referral patterns may also

have influenced the results. Those respondents who have strong relationships with OHSU may be disproportionately represented, but because the responses were confidential, we are unable to identify which physicians already refer their patients to our university. Fourth, although the response rate of this survey compares favorably with many mailed provider-based surveys,<sup>18,24,25</sup> the large percentage of nonresponders raises the possibility that bias affected the results. That is, if lack of response to the questionnaire was due to lack of interest in a VC, the finding that 66% of PCPs would use a VC may be an overestimate. Furthermore, whereas 70% of all PCPs practicing in Oregon are Oregon Medical Association members, the results of the survey may not be representative of all PCPs in Oregon.

## CONCLUSION

There is considerable interest in development of a VC among PCPs responding to the survey. Although endovascular services were desired by all survey respondents, only vascular surgical services and educational resources were independent predictors of PCP utilization. Providers who practice in close proximity to an established VC and treat younger patients with AAA or peripheral vascular disease are more likely to refer patients to a VC. Although considerable resources are necessary to form a successful collaboration, our results show that an ideal VC may be a fairly simple entity that supplements referring physicians' existing knowledge base of medical therapeutic options, rather than supplanting it entirely.

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## DISCUSSION

**Dr Kenneth McIntyre** (Las Vegas, Nev). Members and guests, you have just heard the results of a survey of primary care physicians concerning their opinions of a vascular center in the state of Oregon. In our current climate of full disclosure, and with apologies to Elliott Spitzer, I must tell you that I am currently a practicing full-time academic vascular surgeon in Las Vegas, Nevada, with no ties to a vascular center, and of course I have no financial interest in the proposed vascular center in Portland.

It wasn't clear to me exactly what the motivation was for performing this survey, but if it was a preamble to developing a vascular center at Oregon Health & Science University, I am not so sure that the data presented here today offer a strong case.

First of all, only physicians who were identified as primary care providers by the Oregon Medical Association data base were sent the survey. Other potential referral sources, for example, cardiologists, endocrinologists, podiatrists, and orthopedists, were not included in the survey unless they performed primary care as a major component of their practice. Only 70% of physicians living in the state belong to the Oregon Medical Association, but it was unclear to me how many of the other 30% who aren't members are actively practicing physicians who may have been overlooked and therefore contributed something to the survey. Moreover, less than one quarter responded to the survey, which actually may be reasonable for such a study, but did the nonresponders do so because they really weren't interested in the development of a vascular center? Therefore, can one accept the data as representing a consensus by primary care physicians when such a small number documented their opinions?

The questions that were asked of the primary care providers were generic, and the results indicate that certain components of a vascular center were not deemed important by the primary care physicians surveyed. For example, diabetes and lipid management, as well as smoking cessation, were not considered essential components of a vascular center, even though modification of these important risk factors is known to influence the natural history of occlusive disease as well as outcomes after surgical and endovascular treatment. In addition, ischemic heart disease is present in a high percentage of our vascular patients, especially those with limb-threatening ischemia, and yet cardiology services were not considered to be an essential component of a vascular center by the physicians surveyed.

The authors attribute these responses to primary care physicians being "comfortable" with the management of these problems. I would suggest that perhaps another explanation for these responses is that primary physicians may be unaware of patients with peripheral arterial disease, as well as the beneficial effects of risk factor modification in the natural history and interventional outcomes in patients with vascular disease. In other words, you don't know when you don't know. To support my position, I need only point out that the best estimates of aspirin use in patients with known atherosclerosis approaches only 70%, even though the beneficial effects of aspirin have been known for years.

Regardless of professional biases concerning cardiology, their services are an important component in the care of vascular surgery patients. A successful vascular center should address all aspects of patient vascular profiles, not just the problem referred to by the referring physician. After all, when you take your car to the carwash, the entire car is cleaned, not just the tires.

Perhaps the thing about the paper that concerned me the most was the statement in the manuscript by the authors that the main consumer of the vascular center is the primary care physician. The main consumer in all of our practices is not the referring physician, but the patient with vascular disease, and patients want the best care in the setting of convenience, that is, one-stop shopping. Especially if patients live far away from a metropolitan area, they don't want to make multiple trips to the vascular center for evaluation and treatment. There ought to be a way that patients with vascular diseases can be seen and evaluated by a physician, have the appropriate noninvasive laboratory tests performed, and have a risk profile generated, including a lipid survey, hemoglobin A<sub>1c</sub>, and so forth. In addition, the discussion of risk factor modification should take place at the same time. The most successful centers have made patient comfort and convenience their top priority. However, the relationship with the referring physicians must be cemented with timely and accurate follow-up correspondence, just as we all do in our practices. Patient satisfaction and appropriate referring physician follow-up will ultimately determine the success of the vascular center.

The Oregon Health & Sciences University has established itself as a center of excellence in the management and treatment of vascular diseases. This was accomplished through the vision of John Porter, and has been successfully carried on by Drs Taylor, Moneta, Yeager, Edwards, and Landry.

As an analyst, I would advise the following. On the concept of primary care physicians deciding the composition of a vascular center, sell. On the vascular surgeon being the central figure in a vascular center composed of important adjunct consultants, that is, cardiology, interventional radiology, vascular medicine, appropriate risk reduction strategies, and research, buy. Finally, on the future of the proposed vascular center at Oregon Health & Sciences University, hold. George Bernard Shaw wrote, "Build a system that even a fool can use and only a fool will use it." I hope that this doesn't apply to the plans for building a vascular center in Portland. Thank you very much.

**Dr. Tara Karamlou.** I thank Dr McIntyre for his comments. His first point was, what was the impetus for the generation of this study. Our main impetus for carrying out this study was twofold. One, there has been a predominance of literature in recent years surrounding the concept of vascular centers, and there is no general consensus about what constitutes an adequate and efficient vascular center. Therefore we wanted to determine whether there were some other data, specifically from the consumers, that we could collect that might help solve this discrepancy.

Second, about his comments regarding primary care physicians and their lack of knowledge about some of the treatment options, prevalence of ischemic heart disease, etc, and regarding the care of vascular patients, which has become increasingly complex, we agree. However, our data show that primary care physicians feel quite differently about this. They realize that there is a knowledge gap, specifically with respect to endovascular and catheter-based treatment options, and they would like to fill this gap. They indicated they would send their patients to a center that provided this type of expertise and that they wanted the vascular center to serve as a reference center, that is, provide educational services.

With regard to his other comments about whether we should create a vascular center in Portland, I think the main issue here is not should we or shouldn't we, but what, in general, the different components of a successful vascular center are in a competitive arena such as the city of Portland, that is, the infrastructure a vascular center should possess to best utilize diminishing fiscal resources. Primary care physicians, whether we like it or not, are intimately involved with both the preoperative referral of vascular patients to a tertiary center, and the postoperative surveillance and care of these patients. So, addressing their needs, including whether they perceive there to be a need for a vascular center, would be prudent.

**Dr Cornelius Olcott** (Stanford, Calif). I enjoyed your paper. This is a topic that we are working on at Stanford, and just to veer off a little bit from your work with primary care physicians, there are a couple of things that we have found as stumbling blocks to establishing a vascular center. How are you handling these?

First, who is in and who is out? You mentioned interventional radiologists, but in this day and age I think you have to also include the cardiologists and radiologists involved in CT angiograms and MRAs. When you appeal to primary care physicians, they need to be part of the package.

Second, in an academic setting such as you have at Oregon and we have at Stanford, who is in charge? You are setting up a multidisciplinary center that runs against the culture of departmental chairs. We have found it very difficult to set up a multidisciplinary center where the chairs may lose some of their control. I'd be interested to hear how you deal with this. Thank you.

**Dr Karamlou.** With regard to your questions, creating a collaborative and multidisciplinary center and including all physicians who have a vested financial interest in treating patients is certainly a problem. However, in Oregon we have a very strong interventional radiology department, which both educates and collaborates with us in the endovascular approach to our patients as well as in the diagnosis and treatment algorithms for all of our patients. So in terms of who we would include currently, the most important components are interventional radiology and vascular surgery. However, in an ideal world a trained vascular surgeon who is capable of doing complex endovascular procedures would be the ideal person to have at a vascular center. The other medical specialties are not perceived to be as essential to the primary care physicians that responded to our survey. Perhaps they feel that they have a pretty good handle on either treating those themselves or that they have sufficient services in existence within their own location to care for the other "medical" aspects associated with vascular disease.

**Dr George Andros** (North Hollywood, Calif). [Microphone off] By their nature, universities are centers.

**Dr Karamlou.** Correct.

**Dr Andros.** So you are creating a center for a center, basically. The question I have is, what advice can you give those of us in private practice, who live under your long shadow, when we want to try and centralize our services and provide the care for the patients in our own locations so perhaps they won't have to make that long trip to Portland?

**Dr Karamlou.** Although a university is a tertiary care center, all of us who practice at these institutions realize that it is not always the most expeditious and efficient generator of health care for patients. I think the main impetus for creating a center devoted to regionalization of care, in terms of different disease entities such as vascular or cardiovascular disease, is to streamline that care. So, although I agree that universities are "centers," I think we can still do better in terms of providing more efficient and focused care for our complex patients. As to the distance issue, I don't really have any comments.