

Table 2
 Characteristics of physician respondents to the DocStyles survey by awareness of DTCngts

Characteristic	Unaware ^a of DTCngts		Aware of DTCngts								
	Total	%	Total	%	<i>P</i> ^b	& Pts have asked ^c	%	& Pts have not asked ^c	%	<i>P</i> ^c	Total
Total	557	45	555	44		330	26	225	18		1250
Specialty					0.042					0.001	
Family/general practitioner	62	39	73	46		46	29	27	17		157
Internist	359	43	380	45		240	28	140	17		843
Pediatrician	136	54	102	41		44	18	58	23		250
Work setting					0.098					0.891	
Individual practice	99	45	97	44		57	26	40	18		221
Group practice	380	46	354	43		209	25	145	17		830
Hospital/clinic	78	39	104	52		64	32	40	20		199
Sex					0.008					0.117	
Male	353	42	394	47		243	29	151	18		843
Female	204	50	161	40		87	21	74	18		407
Race					0.813					0.061	
Hispanic	27	44	31	50		17	27	14	23		62
White	379	45	381	45		217	26	164	19		843
Black	115	44	104	40		74	28	30	11		262
Other	36	44	39	48		22	27	18	22		82
Age ^d	44.7 (8.3)	44.1 (8.4)	0.676	43 (8.2)		46 (8.5)		0.896			
No. of patients per wk ^d	120 (69)	121 (69)	0.837	125 (73)		116 (64)		0.751			
No. of yr of practice ^d	14 (7.6)	14 (7.5)	0.441	13 (7.1)		15 (7.8)		0.887			
Financial situation of patients					0.047					0.016	
Very poor–poor	13	45	14	48		5	17	9	31		29
Poor–lower middle class	60	42	68	48		36	25	32	23		142
Lower middle class–middle class	222	46	220	45		128	26	92	19		486
Middle class–upper middle class	220	42	234	45		144	28	90	17		520
Upper middle class–affluent	42	58	19	26		17	23	2	3		73
% Patients asking about DTC											
None	557	71	225	29		0	0	225	29		787
<1	0	0	192	65		192	65	0	0		294
1–10	0	0	118	81		118	81	0	0		145
>10	0	0	20	83		20	83	0	0		24
% Patients discussing DTC results											
None	557	53	409	39		187	18	222	21		1056
<1	0	0	105	74		102	72	3	2		142
1–10	0	0	30	79		30	79	0	0		38
>10	0	0	11	79		11	79	0	0		14

DTCngts, direct-to-consumer nutrigenomic tests; Pts, patients.

Row totals may vary because of missing data and because physicians who reported they were not aware of DTCngts but who had patients ask about these tests were excluded; rows may not add to 100% because of rounding error and because of the excluded physicians.

^aPhysicians who reported that they were not aware of DTCngts when asked “Genetic tests that analyze a person’s DNA, diet, and lifestyle for potential health risks are currently being marketed by companies DTC. Have you heard or read about these genetic tests?” and who also reported that none of their patients had asked questions about DTCngts or brought results from a DTCngt for discussion.

^bUnadjusted χ^2 test or *t* test comparing physicians who were aware versus not aware (*n* = 557) of DTCngts.

^cUnadjusted χ^2 test or *t* test comparing physicians who were aware of DTCngts and who had patients that asked about DTCngts versus physicians who were aware of DTCngts and who did not have patients that asked about DTCngts.

^dQuantitative covariates are reported as mean (SD). All other results are number (%).

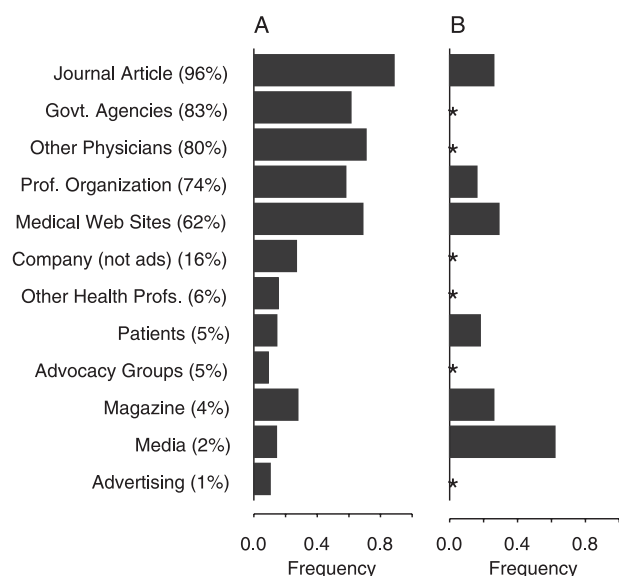


Fig. 3. Sources of information are ranked from highest to lowest based on the proportion of physicians who considered each source to be one of the most trusted sources of patient health-related information, which is indicated in parentheses next to each source (as many as five responses were allowed). Other health professionals include nurses, nurse practitioners, and physician assistants. Media include radio, television, and newspaper articles. Company includes information provided by the manufacturer other than advertisements. The Medical Web sites source was listed as a generic Internet category in part B and could include trusted sources such as medical Web sites or journal articles or less trusted sources such as the manufacturer's Web site, advertisements, and media reports. The information in this figure only includes the responses for physicians who were aware of DTCngts. (A) Proportion of physicians who reported that they "often" or "regularly" used each source for patient health-related information in general. (B) Proportion of physicians who reported that they did hear or read about DTCngts from each source (multiple responses were allowed). Categories with an asterisk were not part of the question in B.

0.8%). This estimate may be inaccurate if consumers were uncertain about interpretation of the questions. However, if these results are accurate, the observed proportion would correspond to 1.8 million users of DTCngts nationwide. Although 44% of physicians in the DocStyles survey were aware of DTCngts, the apparent lack of trusted sources of professional information on DTCngts is a concern because physicians may be influential in consumers' decisions regarding the use of DTCngts.

This study provides valuable data from the consumers' perspective on the national policy debate surrounding DTCngts. The vast majority of individuals who are aware of DTCngts have not used them. It is also notable that the media are the primary sources of information on DTCngts for both consumers and physicians. Thus, educational efforts geared to consumers or health care providers from alternative sources such as professional organizations or government agencies are not being heard or are not yet sufficiently developed. The lack of professional information sources may be related to the scarcity of studies and data gaps that exist for many of the products that are currently available. Until this deficiency is rectified, there is a need and an opportunity for professional organizations, individual scientists, and government agencies to inform the professional community that these knowledge gaps exist. Educating the professional community is especially important

because the majority of respondents who used a DTCngt reported that the information about these tests came from a health care provider. Finally, the differences in demographic characteristics between those who are aware of DTCngts and those who are not raise legitimate concerns regarding the potential for increased health disparities from this mode of delivery, such as inconsistent access to these tests (because of cost) or awareness of these tests (because of targeted marketing). Any DTCngts that are demonstrated to have a health benefit should be marketed to everyone so that the benefits are shared across society.

Several limitations of the present study can be addressed in future surveys on this topic. First, the sampling methodology that was used for both surveys may not have produced a truly random national sample. For instance, previous studies that asked about awareness of conventional genetic tests reported a higher percentage of respondents who were aware of specific types of genetic tests,^{12–14} although in some instances the sample sizes were smaller than in this study, and the study questions may have referred to specific genetic tests (e.g., genetic testing for breast cancer susceptibility) rather than types of genetic testing (e.g., predictive genetic testing) as in this study. Thus, the findings from these studies may not be representative of the entire U.S. population. Although we are not aware of any other national surveys collecting the same information at this time, the results of this study will be compared with similar questions from the Behavioral Risk Factor Surveillance System, contributed by CDC-funded genomics programs in three state departments of health (Utah, Oregon, and Michigan), when these data become available late in 2007. Second, the small number of respondents who had used a DTCngt naturally limits the precision and generalizability of the study findings. Third, the nested format of the questions could have led to an underestimate of the number of respondents who had used a DTCngt because individuals were not asked whether they had used a DTCngt unless they answered that they were aware of these tests. However, for more conventional genetic tests or services that did not have this nested format, only a small percentage of respondents (between 0.7% and 1.6%) indicated that they had used a genetic test or service when they indicated that they were not aware of that type of test or service. Thus, we anticipate that this bias would be small. In a related issue, the validity of the questions has not been fully assessed, and some residual confusion over the survey questions may exist. Some questions were not evaluated because the meaning of the responses was unclear. For example, some male respondents reported that they had used a genetic test during pregnancy (this could refer to carrier testing of the father, carrier testing of the mother, or genetic testing of the fetus), and some elderly respondents reported that they had undergone newborn screening even though such testing was not available at the time they were infants. Finally, the survey questions were restricted only to nutrigenomic tests, although other types of genetic tests are sold DTC. It is possible that awareness and use of other types of DTC genetic tests may be higher than for nutrigenomic tests, particularly those that are more medical in

nature (e.g., cystic fibrosis carrier testing or testing for hereditary hemochromatosis). Despite these concerns, this study represents an initial effort to assess public awareness of this issue, and we anticipate that future versions of these questions will clarify these remaining problems.

Alternative sources of information on consumers' awareness and use of DTCngts could include marketing surveys or records of sales from the genetic test distributors. However, companies are not always willing to share such information and are rarely required to provide such information, except in New York State, which does not disclose the information. Furthermore, information on providers' awareness and experiences with DTCngts should be extended beyond physicians because consumers could be learning about these tests from nutritionists, chiropractors, or other health care providers. A related limitation of the present study is that the term *health care providers* was never explicitly defined and could have a different meaning for different respondents.

Despite these limitations, this report provides valuable initial baseline data that are important for public health surveillance and for tracking trends within the population. We anticipate that these trends will change over the next few years as these tests are applied, used, and advertised more frequently. In addition, these studies are unique in providing a national picture of awareness and use of DTCngts and may influence policy and educational efforts concerning the appropriate use of genetic tests.

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