

TRENDS IN U.S. ATTITUDES TOWARD GENETIC TESTING, 1990–2004

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Abstract This research note examines changes in beliefs and attitudes over a 14-year period, from 1990, when the revolution in genomic science was just beginning, to 2004, the most recent time point for which data are available. The analysis makes clear that there is no simple causal path from changes in technology to changes in values and beliefs, at least over the period of time during which we have been able to track this process. At the same time, claimed awareness about the new technology is slowly and gradually diffusing throughout the society.

Scientific and technical advances have made possible development of genetic tests capable of diagnosing current disease, assessing the risk of future disease, and permitting treatments to be tailored to individual genetic variations. Completion of the sequencing of the human genome is accelerating these developments as well as other changes in genomic science (SACGHS 2006). Such changes potentially affect many social institutions, including the family, work, law, health care, and even ethics and religion. They also afford a rare opportunity to study the relationship between technological and social change. In this research note we examine changes in beliefs and attitudes over a 14-year period beginning in 1990, when the revolution in genomic science was barely getting under way, to 2004, the most recent time point for which data are

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available. The main hypothesis underlying the research (originally funded by NSF in 1988) was that normative acceptance of the new technology would increase as its use increases, and as such use is increasingly reported in the mass media. The main focus of the study was genetic testing, then in its infancy. Although the original study asked many additional questions (Singer 1991, 1993), limited funding and the desire for replication on a high-quality survey using the same methodology over time dictated limiting the number of questions in subsequent years.

Trends are measured by responses to four questions included at three time points on the General Social Survey (GSS). Although the number of questions is limited, they have the advantage of having been asked by the same survey organization—the National Opinion Research Center (NORC)—using the same mode and sampling method (face-to-face interviewing of an area probability sample), identical question wording, and very similar, high response rates. Although the specific context in which the questions are asked differs from one survey to another, all were omnibus surveys inquiring into a wide variety of beliefs and attitudes.

We have previously reported on trends in these attitudes over shorter periods of time (Singer, Corning, and Antonucci 1999; Singer, Van Hoewyk, and Antonucci 2005). These earlier analyses showed no change in preferences for prenatal genetic testing over time, despite the increased number and variety of such tests available; and a significant decline in the number of those who said they would opt for abortion in case a prenatal genetic test disclosed a genetic defect. There was also a significant decline in the proportion of those claiming to know “nothing at all” about genetic testing. There was no significant change in the proportion (about half) of those expecting genetic testing to do more good than harm in the long run. Here, we extend these analyses in time and examine differential change among various subgroups of the population.

Methods

Analyses of trends are based on four identical questions asked in 1990, 1996, and 2004 as part of the GSS. Questions are asked in four domains: awareness of genetic testing; preferences for prenatal genetic testing if pregnant (or partner is pregnant); preference for abortion in case of fetal defect; and expectations that genetic testing will bring more good than harm in the future or vice versa.

The GSS surveys a randomly selected national sample of the U.S. household population aged 18 and over, currently every other year. The sample sizes were 917, 969, and 2812, respectively. The large increase in sample size in 2004 is due to inclusion of an experiment on that study requiring a larger sample size and providing an opportunity to replicate the earlier questions. Response rates (AAPOR response rate 5) were 73.9, 76.1, and 70.4 percent.

Table 1. Trends in Claimed Awareness of Genetic Testing

Response	1990 %	1996 %	2004 %
A great deal	12.8	14.1	18.1
Not very much	59.0	60.8	67.4
Nothing at all	25.8	17.3	14.1
DK/Ref	2.4	7.7	0.4
N	917	969	2812

The significance of changes in responses to these questions over time was tested using multinomial regressions that controlled for gender, age, race, education, marital status, frequency of religious attendance, and fundamentalist religious beliefs.¹ The same method was used to examine differential change in subgroups defined by gender, race, age, and education.

Results

TRENDS IN AWARENESS OF GENETIC TESTING

Trends in responses to the question, “How much would you say you have heard or read about genetic testing—a great deal, something but not very much, or nothing at all?” are shown in table 1.

For the first time since we started measuring trends in awareness about genetic testing, we found a significant increase in the proportion of respondents claiming a great deal of awareness, compared to those saying they are not at all aware or answering “Don’t know” (DK) or refusing to answer (Ref). The proportion of those claiming at least some awareness of genetic testing likewise shows a significant increase relative to those saying they have heard or read nothing at all, or answering Don’t know or refusing to answer.

Table 2 presents the unstandardized coefficients and standard errors from a multinomial logistic regression analysis of these data. The first row of table 2 shows the results of a multinomial logistic regression evaluating the significance of changes in the proportion of those claiming to have heard or read a great deal (versus nothing at all/DK/refused), and in the proportion of those claiming to have heard or read not very much (versus nothing at all/DK/refused). The regression controls for gender, age, race, education, marital status, frequency of religious attendance, and fundamentalist religious beliefs. The effects of age, racial status, gender, and education are statistically significant; that is, older people are more aware than younger ones; nonwhites are less aware than

1. The question asked respondents to categorize their religion as fundamentalist, moderate, or liberal. The last two categories were collapsed in the analysis.

Table 2. Multinomial Regression Models for Changes in Awareness of Genetic Testing

Predictor variables	1. Great deal versus Nothing/DK/Ref.		2. Not much versus Nothing/DK/Ref.	
	Beta	(S.E.)	Beta	(S.E.)
Years since 1990	0.059	(0.010)*	0.054	(0.007)*
Age \geq 35	0.534	(0.134)*	0.186	(0.100)
Nonwhite	-0.632	(0.138)*	-0.763	(0.101)*
Female	0.279	(0.110)*	0.219	(0.085)*
Some college	1.018	(0.134)*	0.688	(0.100)*
College graduate	1.824	(0.145)*	1.105	(0.119)*
Married	0.095	(0.152)	0.217	(0.116)
Widowed	-0.652	(0.241)*	-0.291	(0.170)
Separated	-0.002	(0.192)	0.057	(0.148)
Divorced	-0.186	(0.325)	0.109	(0.225)
Protestant	-0.299	(0.194)	-0.125	(0.155)
Catholic	-0.550	(0.199)*	-0.361	(0.156)*
Jewish	0.295	(0.454)	0.056	(0.413)
Other	-0.748	(0.641)	-0.085	(0.473)
Attends church once/year or less	-0.348	(0.238)	-0.362	(0.184)*
Attends several times/year	-0.087	(0.227)	-0.093	(0.178)
Attends 1-3 times/month	-0.100	(0.228)	-0.105	(0.179)
Attends weekly	-0.256	(0.233)	-0.176	(0.181)
Fundamentalist	0.011	(0.144)	-0.019	(0.109)
Intercept	-1.334	(0.324)*	0.518	(0.247)*

* $p < .05$.

NOTE.—Reference category for marital status is Never married; for religion, None; for church attendance, More than once a week.

whites; women are more aware than men; and those with at least some college education are more aware than those with a high school education or less. With respect to the other characteristics, only three betas are significant: Catholics are significantly less likely than those with no religion to say “A great deal” rather than “Nothing/DK/refused,” and the same is true of the widowed compared with the never married; similarly, those who attend church once a year or less are less likely to say “Not much” rather than “Nothing/DK/refused” than those attending more than once a week.

We also used separate multinomial regressions to examine change over time among subgroups defined by one of four demographic characteristics (age, white and nonwhite, gender, and education), again controlling for each of the other demographic characteristics listed above. These data are not shown in the article but are available in the online appendix. Two things are clear from these interaction models. First, claimed awareness about genetic testing

Table 3. Trends in Preferences for Prenatal Genetic Testing

Response	1990 %	1996 %	2004 %
Yes	64.3	63.7	64.0
No	27.9	29.6	33.2
DK/Ref	7.8	6.7	2.8
N	917	969	2812

has increased in all subgroups in the society. Second, most of the subgroups that are less aware on average in the main-effects model (i.e., younger people, nonwhites, men, those with a high school education or less, Catholics) show the greatest gains in awareness over time (although explicit tests of the interaction fail to reach statistical significance). So, for example, those 35 or younger show more gains in awareness than those 35 or older; nonwhites show greater gains than whites; men show greater gains than women; those with less than a high school education show greater gains than those with some college. This tendency is clearest with respect to changes in claiming to have a great deal of awareness compared to none at all or to answering Don't know.

TRENDS IN PREFERENCES FOR PRENATAL GENETIC TESTING

We expected that increasing availability of prenatal genetic tests would increase the desire for them, but this is clearly not the case. Respondents were asked the following question: "Today, tests are being developed that make it possible to detect serious genetic defects before a baby is born. But so far, it is impossible either to treat or to correct most of them. If (you/your partner) were pregnant, would you want (her) to have a test to find out if the baby has any serious genetic defects?" Results are shown in table 3, which indicates an increase in the proportion saying they would not want such a test, as well as a decline in the proportion of those responding DK or refusing.

Table 4 repeats the analyses of table 2 for the question about preferences for prenatal testing. Coefficients from logistic regression models evaluating the significance of trends in responses of Yes versus No and Don't know versus No are shown in columns 1 and 2. Coefficients for both trends are significant and negative, indicating a significant decline in the proportion of Yes and Don't know responses relative to No responses over time. Not unexpectedly, the variables significantly predicting *preferences for* prenatal testing are very different from those predicting *awareness about* genetic testing. Age and race have a significant effect on preferences for testing, with significantly larger proportions of respondents over 35, and nonwhite respondents, answering Yes rather than No to the preference question. College graduates are significantly

Table 4. Multinomial Regression Models for Changes in Preferences for Genetic Testing

Predictor variables	1. Yes versus No		2. Don't know versus No	
	Beta	(S.E.)	Beta	(S.E.)
Years since 1990	-0.016	(0.006)*	-0.083	(0.013)*
Age \geq 35	0.243	(0.083)*	0.475	(0.198)*
Nonwhite	0.491	(0.096)*	0.763	(0.192)*
Female	-0.079	(0.070)	-0.366	(0.157)*
Some college	-0.016	(0.082)	-0.288	(0.185)
College graduate	0.176	(0.086)*	-0.411	(0.208)*
Married	-0.413	(0.101)*	-0.611	(0.219)*
Widowed	-0.456	(0.155)*	0.163	(0.290)
Separated	-0.251	(0.128)*	-0.723	(0.299)*
Divorced	-0.381	(0.204)	-0.288	(0.413)
Protestant	0.070	(0.128)	0.473	(0.295)
Catholic	-0.294	(0.129)*	0.379	(0.297)
Jewish	0.752	(0.324)*	0.990	(0.643)
Other	-0.203	(0.341)	0.049	(1.068)
Attends church once/year or less	0.997	(0.144)*	1.232	(0.341)*
Attends several times/year	1.096	(0.135)*	0.809	(0.339)*
Attends 1-3 times/month	0.909	(0.135)*	0.758	(0.337)*
Attends weekly	0.397	(0.134)*	0.332	(0.342)
Fundamentalist	-0.260	(0.091)*	-0.329	(0.202)
Intercept	0.258	(0.203)	-1.905	(0.468)*

* $p < .05$.

NOTE.—Reference category for marital status is Never married; for religion, None; for church attendance, More than once a week.

more likely than high school graduates to answer Yes rather than No, but the preferences of those with some college do not differ from those of high school graduates. Nor are the effects of gender significant. On the other hand, marital status, religion, and church attendance, which had virtually no effect on awareness, have significant effects on preferences for prenatal testing. The married, separated, and widowed are all less likely than the never married to express a relative preference for prenatal testing, whereas all those who attend church less frequently than several times a week are more likely to do so than those who attend more than once a week. Catholics are significantly less likely, and Jews significantly more likely, to answer Yes rather than No to the preference question. Those who define their religion as fundamentalist are significantly less likely to answer Yes rather than No. The effects of these demographic characteristics on the likelihood of answering Don't know rather than No are similar but attenuated.

Table 5. Trends in Preferences for Abortion in Case of Fetal Defect

Response	1990 %	1996 %	2004 %
Yes	41.1	41.7	28.7
No	37.8	44.8	58.4
DK/Ref	21.1	13.4	12.8
N	917	969	2812

The coefficients from the interaction models (data available in the online appendix) are uniformly negative, indicating that the decline in Yes and Don't know responses relative to No responses is common to all the demographic subgroups we examined; and in general, the rate at which subgroups are changing is very similar, though not all the coefficients are significant.

Preferences for Abortion in Case of Fetal Defect

Following the question about prenatal testing, respondents were asked, "Suppose a test shows the baby has a serious genetic defect, would you, yourself want (your partner) to have an abortion if a test shows the baby has a serious genetic defect?" Results in 2004 accelerate a trend already apparent earlier: A substantial increase in the proportion of those saying they would *not* choose to have an abortion under those circumstances, with the increase between 1996 and 2004 about twice as large as that between 1990 and 1996.² The most recent increase comes entirely from a decline in the proportion saying they would want an abortion; there is no significant change in the proportion responding Don't know or refusing to answer. Data are shown in table 5.³

2. The 2004 GSS also included the seven "standard" items measuring trends in attitudes toward the availability of an abortion (should a woman be able to have an abortion for any reason; if there is a strong chance of a serious defect in the baby; if the pregnancy would seriously endanger the woman's health; if she is married and wants no more children; if she is poor and cannot afford more children; if she is pregnant as a result of rape; and if she is single), asked of one quarter of the sample. Approval of the availability of abortion is much higher than the desire to have an abortion; but the relationships between answers to our question, which measures personal desire for an abortion if a prenatal test shows a serious defect in the baby, and answers to the normative questions are strong and positive. For example, only 54 percent of those who approve of abortion if there is a strong chance of serious defect in the baby would themselves choose to abort under those circumstances, but 98 percent of the latter group approve of the availability of abortion under such circumstances.

3. Three surveys, including the 1990 GSS, have asked, immediately following this question, "When I say serious defect, what kinds of defects do you think of?" (Singer, Van Hoewyk, and Antonucci 2005). By far the most frequently named defects in all years were those implying mental retardation or incapacity. Most frequently mentioned second on all three surveys were missing limbs and major deformities.

Trends in preferences for abortion since 1990 parallel data released by the Centers for Disease Control (CDC) about trends in actual abortions (Strauss 2004). The CDC reports that legal-induced abortions generally increased from 14 per 1000 females aged 15–44 in 1973, the year of the *Roe v. Wade* decision, to 25 in 1980, then remained stable through 1993. Beginning in about 1994, the rate has gradually declined to 16 per 1000 women aged 15–44 in 2001, the last year for which figures from the CDC were available. Because these figures are voluntarily reported to the CDC, they may underestimate the number of abortions actually performed. However, figures from the Alan Guttmacher Institute, which carries out periodic censuses of all known abortion providers, parallel these trends, though the absolute numbers and rates reported are higher (Finer and Henshaw 2005). Thus, it would appear that the decline in preferences for abortion in case of fetal defect reported by GSS respondents reflects a more general change in the climate of opinion around abortion in the United States.

We examined the relationship between a preference for genetic testing and a preference for abortion in case of fetal defect, hypothesizing that those with a preference for genetic testing would be more likely to express a desire for abortion. This, indeed, turns out to be the case. Respondents who express a preference for prenatal testing (versus responding No or DK) are significantly more likely to say they would want an abortion under those circumstances (versus responding No or DK; $p = .0001$ with demographic characteristics and change over time controlled). However, the relationship between the two variables has weakened over time (years since 1990 \times testing Wald chi-square = 4.45; $df = 1$; $p = .035$).

We also examined the impact of demographic characteristics on preferences for abortion with trends in opinion controlled (table 6). Most of the demographic characteristics we looked at had an effect on those preferences. Respondents aged 35 and older were significantly more likely to express a preference for abortion (relative to answering No) than those under 35; and those with at least some college education were significantly more likely to do so relative to those with a high school education or less; but there were no significant differences by gender or race. Married respondents were significantly less likely to express a preference for abortion (relative to answering No) than those who had never married; Catholics, those who attended church more than once a week, and those who categorized their religion as fundamentalist were significantly less likely to express a preference for abortion. Jews were significantly more likely to express such a preference. These relationships are for the most part similar to those shown in column 2 as well as in table 4 for prenatal testing.

We examined differential changes among subgroups by means of multinomial regression models including interaction terms (data available in the online appendix). As with preferences for prenatal testing, all coefficients in these models were negative, indicating that changes in attitudes were occurring among all demographic categories; in the case of abortion, all coefficients were also significant. The attitudes of younger respondents, whites,

Table 6. Multinomial Regression Models for Changes in Preferences for Abortion in Case of Genetic Defect

Predictor variables	1. Yes versus No		2. Don't know versus No	
	Beta	(S.E.)	Beta	(S.E.)
Years since 1990	-0.081	(0.006)*	-0.076	(0.008)*
Age \geq 35	0.863	(0.092)*	0.511	(0.116)*
Nonwhite	0.128	(0.098)	0.205	(0.125)
Female	0.011	(0.074)	-0.202	(0.095)*
Some college	0.204	(0.088)*	0.168	(0.114)
College graduate	0.471	(0.090)*	0.369	(0.117)*
Married	-0.208	(0.104)*	-0.114	(0.132)*
Widowed	0.001	(0.161)	0.117	(0.206)
Separated	-0.026	(0.130)	-0.121	(0.171)
Divorced	0.089	(0.204)	-0.462	(0.316)
Protestant	-0.166	(0.125)	0.128	(0.166)
Catholic	-0.510	(0.130)*	-0.136	(0.171)
Jewish	0.961	(0.307)*	0.794	(0.390)*
Other	-0.110	(0.370)	-0.030	(0.519)
Attends church once/year or less	2.120	(0.199)*	1.569	(0.242)*
Attends several times/year	1.971	(0.193)*	1.473	(0.233)*
Attends 1-3 times/month	1.502	(0.194)*	1.083	(0.235)*
Attends weekly	0.936	(0.198)*	0.577	(0.241)*
Fundamentalist	-0.519	(0.097)*	-0.533	(0.125)*
Intercept	-1.596	(0.244)*	-1.914	(0.303)*

* $p < .05$.

NOTE.— Reference category for marital status is Never married; for religion, None; for church attendance, More than once a week.

and women are changing more rapidly than those of their demographic counterparts.

Trends in Expectations about the Future of Genetic Testing

Respondents to all three surveys were asked, "Some people say that genetic testing is a wonderful advance. Others think it may cause trouble. Based on what you know, do you think genetic testing will do more good than harm or more harm than good?" In 1996, this question was asked in split-ballot form, with half the respondents being asked about "genetic screening" and half about "genetic testing." Half were asked the question with "more good than harm" as the first alternative, and half were asked it with "more harm than good" as the first alternative. Because neither of these splits produced a significant

Table 7. Trends in Expectations about Genetic Testing

Response	1990%	1996%	2004%
More good than harm	47.3	49.2	62.3
More harm than good	20.7	22.6	25.1
DK/Ref	32.0	28.2	12.5
N	917	969	2812

difference, responses to the two versions were combined for analysis. In 2004, the question was asked only about genetic testing, with “more good than harm” as the first alternative.

Table 7 indicates that there was a change in perceptions in 2004, with more people saying they expected genetic testing to bring about more good rather than harm. However, the percentage of those saying they expected more harm than good also increased somewhat, and both of these trends come at the expense of a significant decline in those answering Don’t know or refusing to answer. As a result, the trend of expecting more good relative to expecting more harm is not statistically significant (data not shown).

Though question wordings are not identical, perceptions about the benefits of genetic testing appear to be somewhat lower than those reported for scientific research in general; in recent surveys about 84 percent of Americans (but much smaller percentages of Europeans and Japanese) agreed that the “benefits of scientific research outweigh any harmful results” (National Science Foundation 2006, p. 7-2).

Multinomial regression models evaluating these trends are shown in table 8. Nonwhite respondents were the only ones significantly less likely than their counterparts to respond “more good than harm” relative to giving a DK response; those with more than a high school education were significantly more likely to do so, as were, generally, respondents attending church less often than once a week compared to more frequent church attenders. The same trends characterized nonwhites’ and better educated respondents’ responses of “more harm than good” relative to a DK response—that is, they were significantly more likely to answer both “more harm” and “more good” relative to answering Don’t know. Interestingly enough, however, less frequent church attenders were generally *less* likely to reply “more harm than good” (relative to a DK response) than those who attended church more often than once a week.

We also looked at the relationship between having heard or read about genetic testing and future expectations, hypothesizing that those who were more knowledgeable would be more optimistic about the future. This expectation was borne out: Those who responded that they had heard or read a great deal about genetic testing were significantly more likely to respond “more good

Table 8. Multinomial Regression Models for Changes in Expectations about Genetic Testing

Predictor variables	1. Good versus DK/Refused		2. Harm versus DK/Refused	
	Beta	(S.E.)	Beta	(S.E.)
Years since 1990	0.085	(0.007)*	0.080	(0.008)*
Age \geq 35	-0.169	(0.106)	-0.353	(0.119)*
Nonwhite	-0.512	(0.108)*	-0.238	(0.120)*
Female	0.073	(0.087)	-0.090	(0.098)
Some college	0.759	(0.105)*	0.579	(0.117)*
College graduate	0.925	(0.109)*	0.275	(0.127)*
Married	0.109	(0.122)	0.053	(0.138)
Widowed	-0.278	(0.176)	-0.350	(0.204)
Separated	0.067	(0.156)	0.166	(0.175)
Divorced	0.042	(0.241)	0.014	(0.272)
Protestant	-0.277	(0.159)	-0.216	(0.184)
Catholic	-0.289	(0.164)	-0.032	(0.188)
Jewish	0.028	(0.358)	-0.549	(0.479)
Other	-0.406	(0.483)	-0.195	(0.530)
Attends church once/year or less	0.206	(0.182)	-0.586	(0.195)*
Attends several times/year	0.573	(0.176)*	-0.499	(0.188)*
Attends 1-3 times/month	0.433	(0.176)*	-0.354	(0.186)
Attends weekly	0.159	(0.178)	-0.225	(0.185)
Fundamentalist	-0.037	(0.109)	0.059	(0.125)
Intercept	-0.30	(0.253)	0.167	(0.278)

* $p < .05$.

NOTE.—Reference category for marital status is Never married; for religion, None; for church attendance, More than once a week.

than harm” relative to all other responses, with demographic characteristics controlled (Wald chi-square = 68.46, $df = 1$, $p < .0001$).

We examined differential change among subgroups by means of interaction models (data available in the online appendix). All coefficients are positive and significant, indicating that expectations of both Good and Harm, relative to responses of Don't know or Refused, have increased significantly over time in all demographic subgroups. Expectations of more good than harm (versus DK or Refused) increased more among men than women. Expectations of more harm than good (relative to DK or Refused) increased more among nonwhites than whites, and more among younger people than older ones. Interestingly enough, this suggests a trend toward somewhat more pessimistic views of the genetic future on the part of the youngest adult members of the society, and possibly a greater concern among nonwhites about the potential for genetic discrimination.

Summary and Conclusion

In 2004, for the first time since 1990, when we began monitoring trends in knowledge and attitudes about genetic testing, the public's claimed awareness about this new technology increased significantly, extending across all subgroups of the population. As of 2000, however, there had been no increase in the accuracy of the information held by the public; the lack of public information about science and technology is well documented in other surveys (National Science Foundation 2006, p. 7-3). It would be important to investigate whether the observed increase in awareness (i.e., reading or hearing) about genetic testing has brought with it increased accuracy of information.

Concerns that the ability to diagnose a greater number of fetal conditions and defects would lead to greater preferences for prenatal testing and to more frequent demands for abortion appear to have been unfounded. The preference for prenatal testing has not increased over time, and information about the extent of prenatal testing is difficult to come by. As of 1994, it appeared that the number of women undergoing such tests had increased (Caruso, Westgate, and Holmes 1998), but we have no information about trends in the last ten years. Such information, like that about the accuracy of the public's beliefs, would be important for understanding the relationship between beliefs, attitudes, and behavior in this area.

Preference for abortion in case of fetal defect has actually declined significantly, as has the number of abortions performed. Thus, in at least one key area, technological change has not brought about a change in values; these appear, rather, to have an independent impact on public preferences and behavior.

Over the 14-year period during which these three surveys were conducted, there is some indication that optimism about the future of genetic testing is beginning to outweigh pessimism, but the trend is not statistically significant. However, greater awareness of the technology is related to more optimism about its future impact. Support for this finding comes from an unpublished analysis of the results of nearly 200 surveys in 40 countries between 1988 and 2003, which concluded that, other things equal, the more people know about science, the more likely they are to have favorable attitudes toward it (National Science Foundation 2006, p. 7-39, note 1).

Thus, the time is ripe for a more detailed examination of the public's knowledge, beliefs, and attitudes about genetic testing, how these are related to each other, and how accurate the information held by the public is. At the same time, more attention is needed to the influence the mass media and other institutions have on knowledge, beliefs, and attitudes in this area. What is it that is being communicated to the public about genomic science and its applications, for example, and how is exposure to various kinds of media related to beliefs about genomic science and attitudes toward its utilization? Studies such as those by Nelkin and Lindee (1995) have provided an impressionistic view of the image

conveyed by the media at that time. What is needed now is a much more fine-grained understanding of the information communicated by various media—its accuracy and emphasis, and the relation of these to the knowledge, beliefs, and attitudes held by the public.

Supplementary Data

Supplementary Data are available online at <http://poq.oxfordjournals.org/>.

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