White Paper

Trends in American Trust in Voting Technology

M. Glenn Newkirk

17 March 2008

InfoSENTRY Services, Inc.
www.infosentry.com
919.838.8570

Table of Contents

Introduction

Passage of the Help America Vote Act (HAVA) of 2002 came on the coattails of the paper-based, punch-card voting debacle in the U.S. presidential election in 2000. The legislation was a compromise, as is virtually every bill that passes Congress and the legislatures. It was a balance of Democratic Party and Republican Party concerns, a balance of voter fraud concerns and ballot access concerns, and a balance of speed and comprehensiveness concerns—among other compromises.

However, many of the debates that surfaced between the election of November 2000 and HAVA's passage in 2002 have taken a back seat to the seeming firestorm over voting technology security. Election critics have developed and pushed two arguments in state legislatures and Congress against voting systems known as direct-record electronic (DRE) systems. First, they argued that the devices are easily vulnerable to "hackers" and to corrupt or incompetent "insider" election officials. They implanted the idea that these devices have abnormally high malfunction and error rates. Their second argument is that there is a widespread public mistrust of these voting systems and that the mistrust has grown to a national crisis of public confidence over voting systems and elections administration.

This white paper's objective is to examine the second argument. It is this argument that has been so intimidating to many public officials. The blogosphere has been alive with the sound of claims that the campaign against paperless DRE voting, in particular, has broad grassroots support. Election system critics have found prominent spots in friendly state legislative committee hearings and in many media outlets. One of their consistent refrains has been that there is a silent majority of mistrust of computerized voting systems.

Interestingly, an initial thrust of these arguments was that "the public" demanded paper trails on all of the computerized DRE systems. Then, after winning the argument in many states that the systems needed paper trails and after lobbying for legislation requiring that all DREs have paper trails, election critics then changed the argument to contend that these systems do not work well enough.[1] Following this bit of logical judo, the critics argued that, instead of paper trails on DREs, the public trusted only precinct-count scan systems—and not DREs of any stripe.

We will leave the first argument about the actual security profiles of the various voting technologies for others to continue in other venues. This white paper's focus is solely on election critics' contentions that (1) public opinion is strongly, increasingly negative against DREs and strongly, increasingly positive for precinct-count scanners and (2) there is a crisis in public confidence about voting systems in the United States.

In early 2004, just over a year after passage of HAVA, InfoSENTRY decided to find out how much the American public trusted—or mistrusted—the major election technologies that are

---

[1] Most interestingly, during the spate of the mid-2000s paper-mandate bills typically entitled "To Increase Public Confidence in Elections…" in state legislatures, many election officials and election operations specialists argued against these bills. They pointed out that attaching paper trail devices to DREs created operational problems, operational costs, recount uncertainties, the likelihood of mechanical failures, and even greater system insecurity. Election critics immediately swift-boated these election officials and election specialists as being opponents of all election reform. The critics won the day in just over half the states that have enacted legislation requiring paper trails, even if attached to DREs. When election experience in 2004 and 2006 bore out the election officials' earlier arguments, election critics attacked the election administrators that had implemented DREs in compliance with the paper trails that the election critics themselves had initially demanded. The attack this time was that the election officials should have known better and implemented precinct-count scan systems, which "the public" had demanded in the first place. The election officials now appear to have been attacked heavily for being right in the first place. Currently, some election critics are turning against precinct-count scan systems, which they previously demanded, because of their supposed errors or security problems.

competing to replace the vast number of punchcard, lever, and paper-based voting systems in the United States. The firm contracted with Opinion Research Corporation (ORC), one of the best-known and most established opinion research organizations in the United States, to conduct a benchmark survey of public opinion toward the security of certain voting technologies.

ORC's professional cadre of interviewers asked respondents the following question:

> Now I am going to read to you some methods people use to vote in elections for public officials and ballot issues throughout the United States. As I read each one, please tell me on a scale of 1 to 5, where 1 means very low trust and 5 means very high trust, how much you trust each voting method to produce confidential and accurate election results. [READ AND RANDOMLY ROTATE STATEMENTS][2]

The interviewers then read four different descriptions of voting technology that ORC assisted in devising to avoid esoteric and biased language. One description was of an all-electronic, computerized voting system that is commonly known among elections practitioners through the shorthand terms of Direct Record Electronic (DRE) and "touch-screen" systems. Regardless of the specific vendor's implementation and procedures, this technology involves going to a polling place and making choices directly on a computer screen--and having the computer count the results. Some states have been using a mandated contemporaneously printed paper trail attached to the standard DRE device. Others have not adopted this requirement.

The second description was of a voting technology known as "in-precinct" or "precinct-count" scan technology. Use of this voting technology involves going to a polling place, marking choices on a paper ballot, and having the ballot counted by a computerized optical or digital scanner.

The third description also uses computerized scanning with a twist in that it involves what is referred to in the United States as Vote By Mail (VBM). In this process voters receive their ballots in the mail, mark their choices on the paper ballot, and mail the ballot back to be counted by a centrally located computer scanner.

The final description involves using a computer at home, office, overseas, or some other place of the voter's choice to cast a ballot over the Internet. This technology is by far the newest and least used in public elections of the choices presented to the survey's respondents.

The specific descriptions read by the interviewers are as follows:

> 1. Going to a polling place and making your choices directly on a computer screen and having the computer count the results
>
> 2. Going to a polling place, marking your choices on a paper ballot, and having your ballot counted by a computer scanner
>
> 3. Getting your ballot in the mail, marking your choices on the paper ballot, and mailing your ballot back to be counted by a computer scanner
>
> 4. Using a computer at your home, office, or some other place of your choice to cast your ballot over the Internet"[3]

---

[2] This type of question typically creates what is known as a Likert item. For the original source of this type of psychometric analysis, you can go straight to Likert, Rensis (1932), "A Technique for the Measurement of Attitudes", **Archives of Psychology** 140: pp. 1-55.

[3] The questions and response items are © InfoSENTRY Services, 2004 – 2008. All rights reserved. They may not be reproduced or used in other surveys without prior, written permission of InfoSENTRY Services, Inc.

We provide the questions to demonstrate that the survey was not biased with jargon, hot-buttons, or buzzwords to influence the result. One of the more facile arguments against survey results that do not fit one's own biases is to state that the survey might have been rigged to produce desired results by misleading questions and response sets. The full wording of our questions and response sets demonstrate that respondents received clear, understandable options over five identical surveys. Further evidence of the clarity the questions and response items is the stability of

ORC's computer-assisted telephone interviewing software randomly rotated the order in which the interviewers read the descriptions to each respondent. This procedure prevented an inadvertent bias arising from a simple, consistent placement of one description before or after another description.

ORC added a question to provide us with one more interesting look at a possible dimension that we suspected might be on the minds of election administrators. That dimension was a determination of the respondents' political party orientations. Respondents could self-identify themselves as a Republican, Independent leaning toward Republican, Independent, Independent leaning toward Democrat, or Democrat. A person declining identification or providing another party affiliation went into the "other" category.

InfoSENTRY has conducted the same national opinion surveys at roughly the same time in each of the years since 2004. Table 1 contains the dates and relevant weighted sample sizes of the opinion surveys in each year. The actual number of interviews slightly exceeded 1000 in each year.

---

many of the responses over five surveys. We have met the requirements of internal and external validity of the survey approach.

We did not ask whether respondents had any particular trust levels in DREs with attached paper trail devices, electronic audit devices, or any other form of verification. It would be a false approach to provide one alternative, such as the paper trail devices, and not provide a range of plausible alternatives to paperless voting. That is a common variant of a practice in political campaigns known as "push polling." In this practice, pollsters ask if you like Issue A. Next, they ask if you would still like Issue A if you knew something particularly good or bad about Issue A. Then, the pollsters release the results of attitudes toward issue A only after they have provided skewed information about the issue. At the same time they have planted biases in survey respondents. In some instances, these "pollsters" are only interested in making many robo-calls in order to plant usually negative impressions of an issue or candidate under the guise of an opinion survey.

So, we might have asked if the respondents would trust DREs more if the machines produced a paper trail. However, asking that question without asking questions about plausible alternatives, such as an independent, internal electronic audit process or a redundantly stored electronic copy of results, might well have produced the biased results some would have preferred. Researchers often refer to that type of bias as one type of "response effect" or "agreement effect." Some respondents give a socially acceptable answer that they think the questioner wants. So, to provide equal balance in questioning and to avoid an occurrence of the response effect in the case of adding some kind of paper trail to DREs, we would have had to ask about other alternatives to the paper trail. In order to control for the effects of potential agreement effect bias, we would also have to ask, for example, if respondents would trust computerized scans of paper ballots more if there was an independent, all-electronic audit of the scan results, a videotape of the counting process, or some other contrivance.

InfoSENTRY asked simple, accurately worded questions in a straightforward manner, allowing respondents to provide clear responses to clear alternatives. The survey responses over five years point to the content validity of the question and Likert-item responses. So, the same people who are making choices this coming November about President of the United States, members of Congress, and a host of complicated policy issues understood the questions and gave their own clear responses to simple choices about voting methods—without bias, push polling, or agreement effects.

Table 1

National Probability Sample Survey Dates and Sizes

Survey dates	Sample size, U.S. Adults (Weighted Total)	Females (Weighted Total)	Males (Weighted Total)
06 – 09 February, 2004	1000	520	480
13 – 16 January, 2005	1000	517	483
12 – 15 January, 2006	1000	517	483
04 – 07 January, 2007	1000	516	484
03 – 06 January 2008	1000	516	484

All of the telephone surveys reached individuals 18 years of age and older, living in private households in the continental United States. The margin of error in these surveys is plus or minus three percentage (±3%) points. In instances in which the total of responses varies from 100% on a particular question, the variation is due to mathematical rounding. Appendix 1 contains a substantial discussion of the survey's methodology provided to us by ORC.

InfoSENTRY Services, Inc. is solely responsible for the interpretations and analyses in this White Paper.[4]

Overall Trends in Confidence of Voting Technologies

Figure 1 presents an overall view of trends in U.S. adults' confidence in the four types of voting technologies included in the InfoSENTRY survey.

[4] Some election critics and conspiracy advocates have falsely claimed that one interest group or another sponsored our initial survey when we released the results in 2004. One election critic has implied that our research into types of statewide voter registration systems was sponsored with HAVA funding. None of these claims is true or accurate. InfoSENTRY did not receive any financial assistance in preparing, conducting, or analyzing any of the surveys. InfoSENTRY did not receive any input, other than technical assistance from ORC, in designing, conducting, tabulating, or analyzing the survey instruments and data. No party other than ORC was aware of the wording, timing, and release of the surveys and the results.

Figure 1

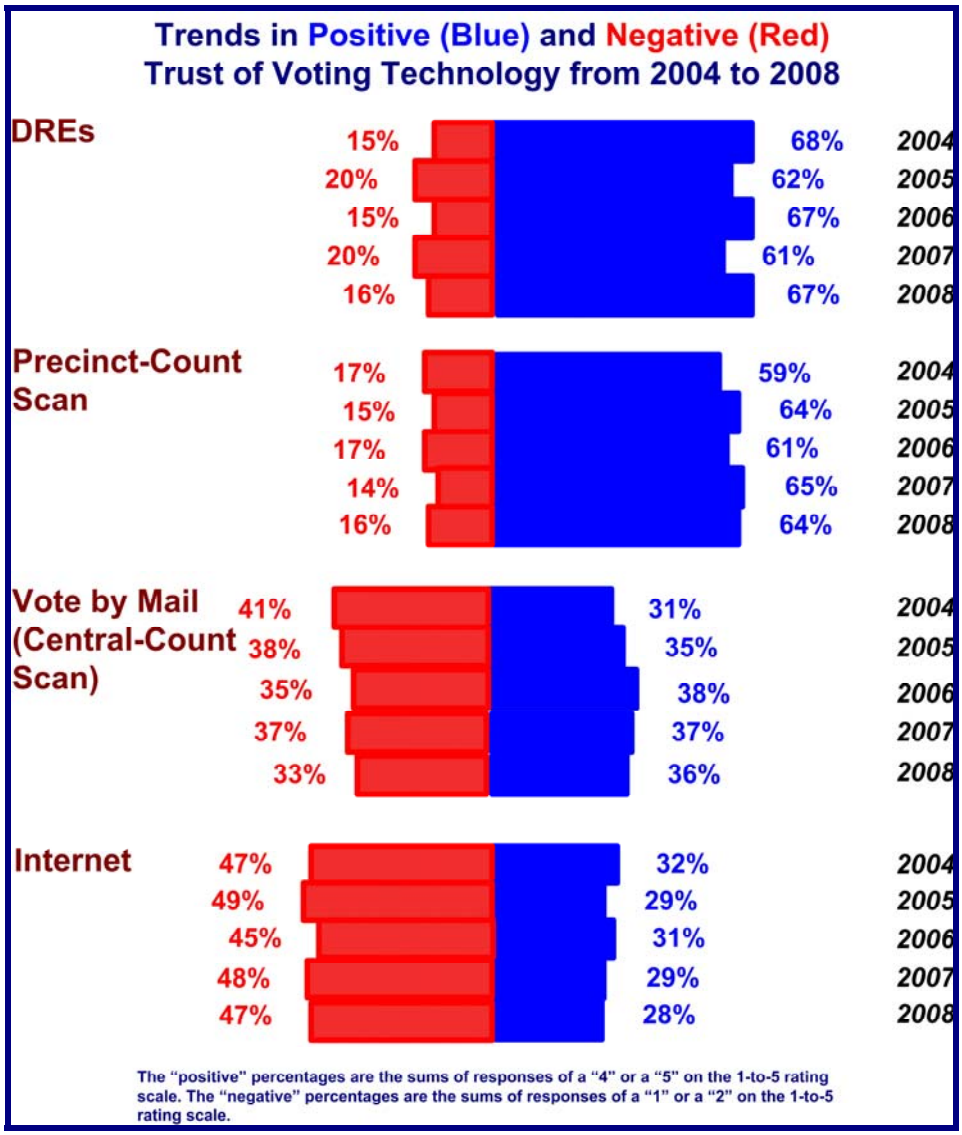
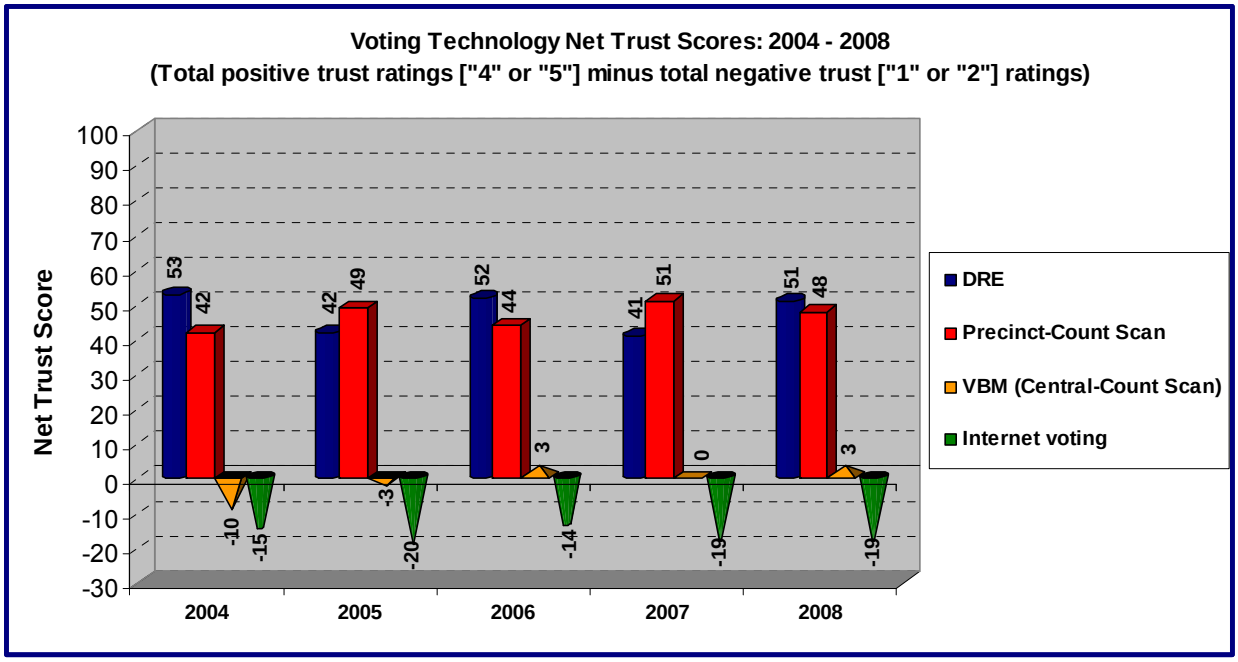


Figure 2 provides a slightly different look at the same data than does Figure 1, based on a practice common in political polling of arriving at a "net approval rating." By subtracting the "negative" trust responses from the "positive" trust responses, we derive the "net trust scores" for each voting technology.

The underlying assumption is that the neutral trust responses (that is, a "3" on the five-point scale) and non-responses have neutral impact on the overall psychological "affect" toward the voting technology in question. In political polling terms, these groups often make up the "undecideds" or the "persuadables" to which campaigns devote so much money and time.

Figure 2



FINDING 1: The American public's trust level in the accuracy of DREs in 2008 is statistically the same as it was in 2004.

DREs started in the 2004 survey with slightly over two-thirds (68%) of respondents providing positive trust responses for them and 15% providing negative responses. By 2008, those figures were 67% with positive trust responses and 16% with negative responses. The net trust scores for DREs started at +53 in 2004 and ended at +51 in 2008. After fluctuations in the interim surveys, the American public's trust level in the accuracy of DREs in 2008 remained statistically at the same level it was in 2004.

FINDING 2: The American public's trust level in precinct-count, computerized scan technology has increased from 2004, to a point in 2008 that is statistically equal to the public's trust level for DREs.

Computerized precinct-count scan technology began with a statistically lower net trust rating than DREs (with net trust scores of 42 and 53, respectively) in the 2004 survey. This technology's positive trust rating was at 59% and its negative trust level was at 17%. By 2008, precinct-count scan's positive trust rating had a statistically significant increase to 64%, although the technology's negative trust level remained statistically unchanged at 16%. The resulting net trust score for precinct-count scan was +48 in 2008. This net trust level for precinct-count scan meant that the technology was statistically tied with the public trust level for DREs (+51) in 2008.

FINDING 3: The American public's trust level in the central-count, computerized scan technology associated with Vote By Mail (VBM) registered a statistically significant increase from 2004 to 2008.

Figure 2 shows that VBM technology, which typically uses central-count scanners, had a net negative trust score of -10 points in our 2004 national survey. However, by January, 2008, VBM's net score had changed direction, ending with a statistically significant increase to +3. The data in Figure 1 indicate that this improvement of 13 net points came about as a result of a statistically significant improvement of the negative responses from -41% to -33% and a statistically significant improvement of the positive responses from 31% to 36%. Still, VBM's public trust levels remain well below the trust levels for both DREs and precinct-count scan technologies, both of which are in much wider use—and thereby have much wider familiarity—than VBM.

VBM was the only voting technology to show statistically significant improvements in both negative and positive responses. Subsequent sections of this analysis will show some surprising demographic sources of this improving trend for VBM.

FINDING 4: The American public's trust level in using the Internet for public elections remains negative and has fallen by a slight, but statistically significant, amount from 2004 through 2008.

Public trust in Voting By Internet (VBI) technology started low and trended slightly lower from 2004 through 2008. Internet voting started with a net negative trust score of -15 in 2004 and dropped to a net negative score of -19. While Internet voting's negative trust score started at -47% in 2004 and had the same score in 2008, Internet's positive trust score dropped from 32% in 2004 to 28% in 2008. It is likely that this decline stems from (1) the public's lack of familiarity of the growing use of Internet voting in other countries and, more importantly, (2) the public's growing awareness of the failure of computer scientists to resolve many of the Internet's more difficult security issues in public and private sector commerce.

Generally, the data in Figures 1 and 2 reveal a pattern of very small shifts in confidence, positive for some technologies (precinct-count scan and VBM central-count scan) and negative for one technology (Voting By Internet), over the five national surveys. In the instance of the voting technology (DREs) that has received the most negative attacks from election critics, there has been no statistically significant change one way or the other from 2004 to 2008.

The data from five national surveys indicate clearly that there have been no major, broad-based public opinion shifts in attitudes relating to trust in the confidentiality and security of voting technologies. These data indicate that individuals and groups who argue that there has been or is a broad-based, mounting loss of trust in America's voting technologies are wrong.

Trends in the Genders' Trust in Voting Technology

Demographic data collected in ORC's Caravan® survey allows us to analyze the survey data to determine if there are any differences in public trust levels of voting technology across various demographic groups.

As we conduct the analyses for these demographic groups, it is important to keep in mind that the survey's margin of error, ±3%, does not hold for the various sub-categories. The original margin of error derives from the full size of the statistical sample. As the sub-categories increase in number, the number of responses in the individual sub-categories declines. This

decline in the number of responses in the individual sub-categories will almost inevitably increase the margin of error for any given set of responses.

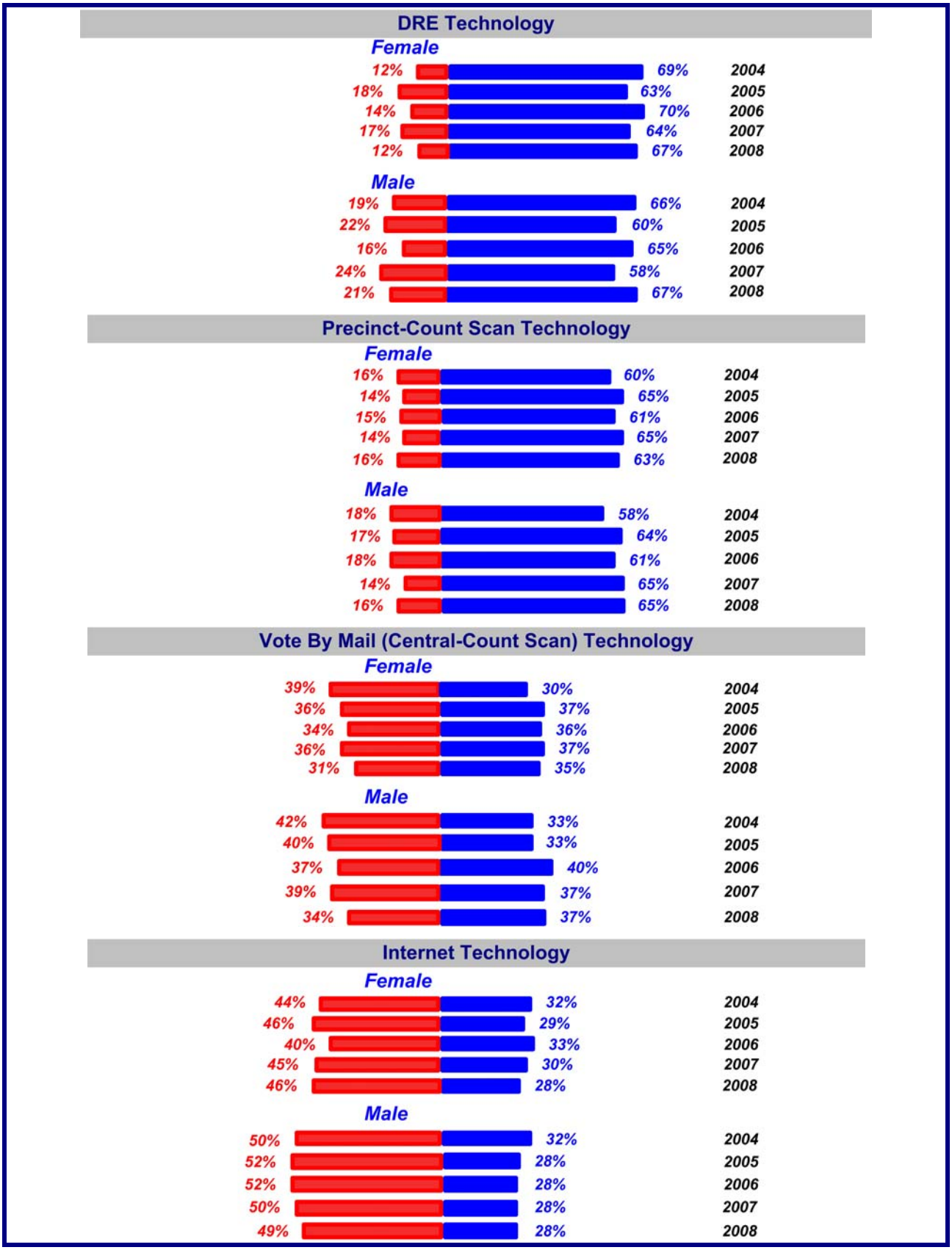
This inverse relationship between the number of responses in a given sub-category (such as women respondents, Southern respondents, 18-24 year old respondents, and Hispanic respondents) and the margin of error (such as ±3%, ±4%, or ±6%) pushes us to be conservative in our interpretation of data for the sub-categories. In general, we will look for somewhat larger differences between sub-category responses and for very consistent trend changes before we describe a clear data trend.[5]

Figure 3 contains data on trends in the genders' trust in the four voting technologies that have been the focus of our national surveys.

[5] We could have turned this paper into a more academic treatment of specific numerical thresholds required to measure statistical significance. In particular, given the potentials of using these types of survey data as nominal, ordinal, or even interval measurements, we might have spent time subjecting the data to examinations such as the Mann-Whitney test, Wilcoxon signed-rank test, Kruskal-Wallis test, Chi-Square, Cochran Q, or Spearman's rho. We will leave it to others to argue about whether the data should be treated properly as nominal, ordinal, or interval data. We like all three. However, those arguments and statistical presentations would have made the paper significantly longer without increasing the statistical relevance or understandability of the data.

Figure 3

Trends in the Genders' Trust in Voting Technology



FINDING 5: Men generally have lower overall trust in DRE voting technology than do women, largely reflected in their greater negative trust scores in DREs.

Women's trust levels in DREs fluctuated over the survey periods, but ended at 67% positive trust and 12% negative trust in 2008. Those numbers were statistically unchanged from their 2004 levels of 69% positive trust and 12% negative trust.

Men's trust levels in DREs also fluctuated over the survey periods, but ended in 2008 statistically unchanged from their 2004 levels. In 2004, men's trust levels for DREs were at 66% positive and 19% negative. In 2008, those numbers for the male respondents were 67% positive and 21% negative.

However, men's overall trust in DREs is lower than is women's overall trust in DREs, largely as a result of men having maintained greater negative trust scores in DREs over the survey periods. While the positive trust scores for DREs for women and men were statistically the same in the surveys, the negative trust scores for DREs among men were lower in 2004 (19%) and 2008 (21%) than were the negative trust scores for DREs among women in 2004 (12%) and 2008 (12%).

FINDING 6: While women's trust in precinct-count, computerized scan technology remained statistically unchanged from 2004 to 2008, men's trust in the technology increased slightly over the five surveys.

Women's positive and negative trust ratings for precinct-count scan technology remained statistically unchanged over the five surveys. In 2004, women's positive and negative trust ratings were at 60% and 16% respectively. In 2008, those ratings were at 63% and 16%. The result is a net positive change of only +3 net points.

Men's positive and negative trust ratings saw slightly more change over the years. In 2004, men's positive and negative trust ratings in precinct-count scan were at 58% and 18%, respectively. Those ratings yield a net trust score of +40 points. In 2008, men's positive and negative trust ratings were at 65% and 16%, respectively. The result is a net positive of +49 points, which is a net positive change of +9 net points.

Most of the positive change in the trust ratings of precinct-count, computerized scan that we reported in Figures 1 and 2 came from changes that occurred in men's increases in positive trust in that technology.

FINDING 7: Trust in VBM's central-count scanning technology increased slightly among both females and males over the 2004-to-2008 survey periods.

Women's positive trust in VBM increased the most from the 2004 survey to the 2005 survey, with a jump from 30% to 37%. In the following years' surveys, women's positive trust in VBM remained consistent at this level, finishing with a 35% positive trust rating in the 2008 survey. The negative ratings in VBM among women dropped steadily from 39% in 2004 to 31% in 2008. These figures meant that women's net score for VBM went from a -9 in 2004 to a +4 in 2008, a 13 point shift.

Changes in men's trust ratings for VBM have seen similar changes, but with a different course in the way the changes occurred. Men's positive trust rating in VBM was 33% in 2004. Their negative trust rating was 42%. These positive and negative trust ratings remained statistically unchanged in 2005. However, in 2006, one year after the women's ratings changed, the male

demographic group's positive trust ratings for VBM jumped to 40% and the negative trust ratings improved to 37% (from 42% negative in 2004). By 2008, the men's positive trust rating was 37% and their negative trust rating was 34%. For the entire period, men's net trust scores improved from a -9 to a +3, a total shift of +12 points. That shift in net trust scores is not statistically different from the net change among women's shift (+13 points) in net trust scores.

FINDING 8: Trust levels for Voting By Internet (VBI) among both female and male demographic groups has remained consistently negative in all five of InfoSENTRY's national surveys.

In InfoSENTRY's initial survey in 2004, one in three (32%) of both the female and male demographic groups gave positive trust ratings to Internet voting technology. On the other end of the continuum, 44% of females and 50% of males gave negative trust ratings to that technology. Those numbers yielded net trust scores of -12 for women and -18 for men in that first InfoSENTRY national survey.

By 2008, there had been little change. If there was any change at all, it displayed a very slight negative drift. Women's positive trust rating in Internet voting was now 28% and their negative trust rating was 46%. Women's net trust score in 2008 stood at -18. Men's positive trust rating in Internet voting was now at 28%. Negative trust ratings came from half (49%) of the men. Those figures gave men a net trust score in 2008 of -21, statistically the same as women's net trust score.

Trends in Geographic Regions' Trust in Voting Technology

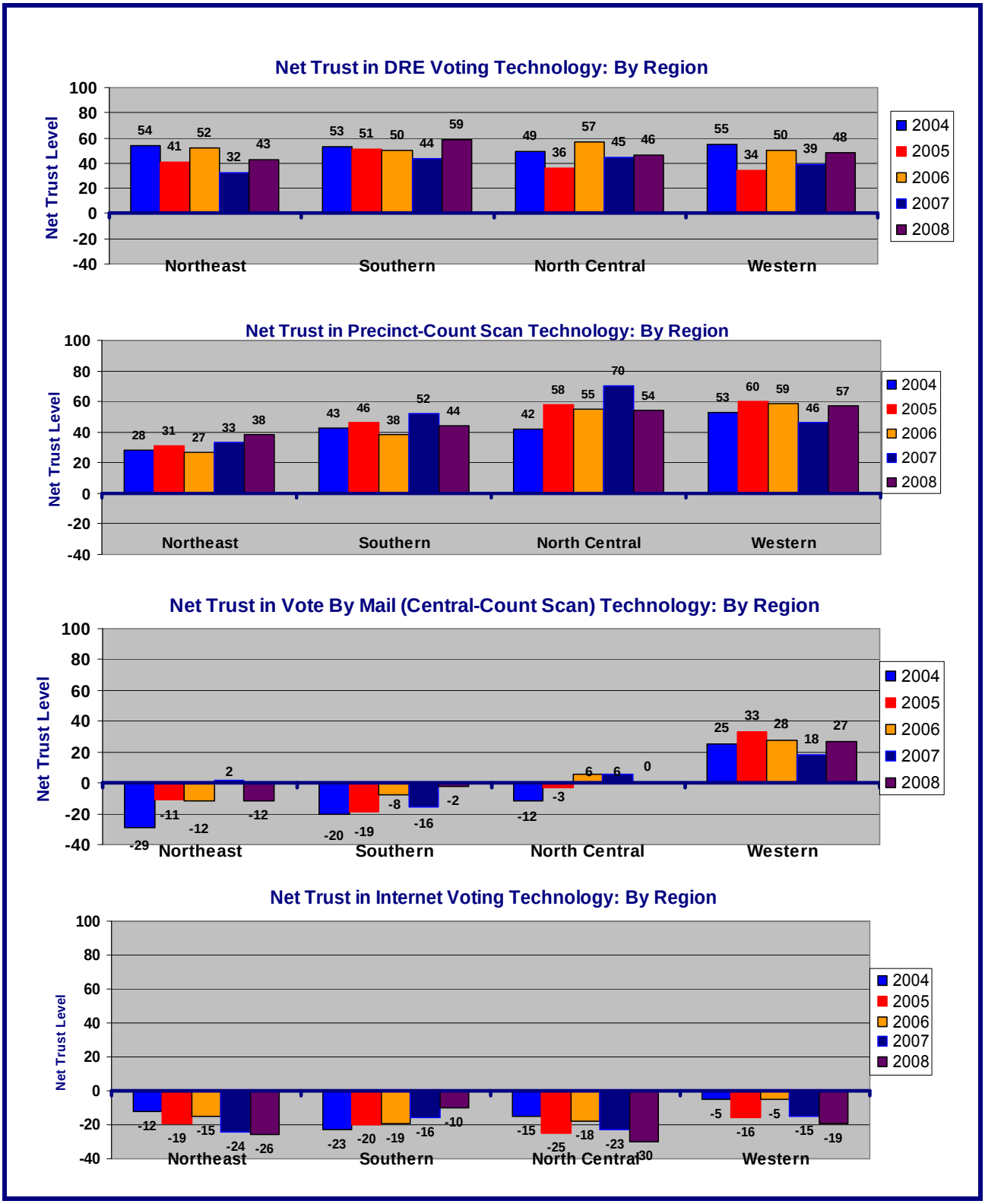
Adoption of the various voting technologies has not been consistent in all regions of the country. So, we also broke down the responses to trust in voting technologies according the regions in the United States. Before delving into these responses, we note immediately that the standard error changes for our analysis of responses by regions because the survey's standard error (±3) no longer applies when we disaggregate the data into increasingly small sub-samples for each region. This disaggregation into subgroups brings about a requirement for a more conservative approach to data interpretation.[6] There must be larger and more consistent changes in percentage differences before making a finding of actual differences or trends.

Figure 4 displays graphically the results when we compute the "net trust scores" for the four regions in Opinion Research Corporation's national sample: Northeast, Southern, North Central, and Western. This study's technical appendix contains the states included in each region.

[6] We will suggest this same conservative interpretation of numerical differences among age groups, racial/ethnic groups, and income groups that occur in subsequent sections of this white paper. As the number of demographic subgroups increases, so must the conservative nature of the interpretation increase.

Figure 4

Trends in Geographic Regions' Trust in Voting Technology



FINDING 9: Net trust in DREs remained relatively stable across the regions, except in the Southern region where the 2008 net trust in DREs reached the highest level of any region in the five surveys.

In the South, where deployment of DREs has been most widespread and publicized after the 2000 election, public trust in that technology has been consistently higher than in other regions. This is the region that contains Florida, which had its reputation sullied in the 2000 election, in which there was a large adoption of paperless DREs in the 2004 General Election, and in which one political party waged a losing attack on DREs in a single congressional district in an attempt to show that alleged DRE malfunctions cost its candidate an election. This is the region in which two states, Maryland and Georgia, were early adopters of paperless DREs after 2000. This is the region in which one of the largest states, Texas, has seen widespread adoption of DREs since 2000. In 2004, Southerners' responses yielded a net trust score for DREs of +53. In the 2008 survey, that net trust score was +59 points, with relatively stable scores in the intermediate years.

On the other end of the spectrum, net trust in DREs trended down in the Northeast region. In that region, the net trust score in DREs started at +54 in 2004 but ended at +43 in 2008. Net scores in the interim surveys trended lower than the initial high in 2004. This is a region in which election critics have actively pilloried DREs, with or without attached paper printers, in some very populous states.

In the North Central region, the 2004 survey yielded a net trust score in DREs of +49. The 2008 survey yielded a net trust score of +46. While there was a substantial fluctuation in the region's net score to +57 in 2006, the region's trust of DREs began and ended our five-survey period at statistically equivalent levels.

The net trust scores in the Western region also fluctuated over the period, but ended on a downward trend. In 2004, Westerners gave DREs a net trust score of +55, which was consistent with the scores in the other three regions. However, by 2008 that net trust score had fallen to +48, consistent with the trend in the North Central states and the Northeast. The downward net trust score trend for DREs in the West is hardly surprising given the actions of election interest groups and some election officials who have been among the most ardent critics of DREs. The West is also a region that has seen the greatest increase in adoption of the alternative central-count scan technology involved in Vote By Mail.

FINDING 10: Net trust levels in computerized, precinct-count scan voting technology remained stable in the regions, except in the North Central region where it trended higher over the five national surveys.

In the 2004 survey, precinct-count scan voting systems received a net trust score of +42 points in the North Central region. Displaying steady growth over the next four surveys, this technology ended with a net trust score in this region of +54 points in 2008. This growth included a net trust score of +70 points in the 2007 national survey. The North Central region's net trust scores for precinct-count scan systems consistently equaled or exceeded that region's net trust scores for DRE technology.

The Western region ended in 2008 with a high mark of +57 points for precinct-count scan technology, statistically equivalent to the last observation for that voting method in the North Central region. However, the net trust scores in the Western region did not display the same level of volatility as they did in the North Central region. The West's net trust score for precinct-count scan began in 2004 at +53, somewhat higher than the +42 initial score in the North Central region. In all five of InfoSENTRY's national surveys, the West's net trust scores for precinct-count scan statistically equaled or exceeded the region's net trust scores for DREs.

The Northeast region yielded consistently the lowest net trust scores for computerized precinct-count scan technology. In 2004, respondents in this region gave the technology a net score of +28. After steady, incremental increases, the Northeast's net trust score for precinct-count scan rose to +38 in 2008. In four out of the five national surveys, the net trust scores in this region for precinct-count scan technology were lower than the corresponding net trust scores for DRE voting technology.

The story in the South was somewhat different. That region's 2004 net trust score for computerized precinct-count scan systems was +43. In 2008, the South's net trust score for these systems was a statistically equivalent +44. In only one survey, that of January 2007 when the score was +52, did the net trust score exceed these levels. Also, it was only in that January 2007 survey when the Southern region's net trust score for precinct-count scan exceeded the region's net trust score for DREs.

FINDING 11: Net trust in Vote By Mail (VBM) technology from January 2004 through January 2008 remained substantially lower in all regions than did the trust for either DREs or precinct-count scan.

There is an important caveat to introduce when discussing the "Western" region. The very heavy preponderance of population—and thereby interviews in the sample—in the West is in California. This heavy overweighting of population in this one state makes interpretation of data about the entire Western region somewhat difficult, especially with regard to discussions of voting systems. It is in California that much national attention has been on voting technology of all types. While two other states, Oregon and Washington, have moved forward significantly with VBM, it has been adopted more slowly in California and other Western states.

Having noted that, VBM's central-count scanning technology was consistently in positive net trust territory in the Western region. In our 2004 national survey, Westerners gave VBM/central scan technology a +25 net trust score. The corresponding figure in 2008 was a statistically equivalent +27. The intervening years produced only a gently undulating variation in these scores. [7]

However, some important regional differences are evident in the data and interesting regional trends started to appear outside the West. In the North Central region, VBM's net trust score started at -12 in 2004 and ended at a ±0 in 2008. That is a gain of 12 points over the survey period.

In the Northeastern region, VBM received a -29 net trust score in 2004 and a -12 net trust score in 2008. That is a gain of +17 points over the survey period, although the final score remains in negative territory.

In the Southern region, VBM's net trust score was -20 in 2004. It was -2 in the 2008 survey. That is a significant gain of +18 points over the survey period.

These data indicate that trust in VBM remained basically stable in the West and was significantly higher there than in other regions. However, the greatest improvement in net trust scores for VBM over the five-survey set actually occurred outside the West.

[7] Oregon is the state that has adopted VBM on a statewide basis for all elections. Both in public opinion surveys and at the polls, when asked to vote on whether to keep VBM or not, public approval ratings of this method of voting in Oregon have consistently and sometimes substantially exceeded 70% approval.

FINDING 12: Net trust in Voting By Internet remained negative in all regions in all five national surveys, trending lower in all regions except the South.

The net trust scores in Internet voting technology started with negative values in 2004 and maintained those negative values right through the 2008 survey. Internet voting's net trust score in the Northeast was at -12 in 2004 and dipped to -26 in 2008, reflecting a 14 point decline in trust. The technology's net trust score in the North Central region started at -15 in 2004 and fell to -30 in 2008. In the Western region, the net trust score decline was from -5 in 2004 to -19 in 2008.

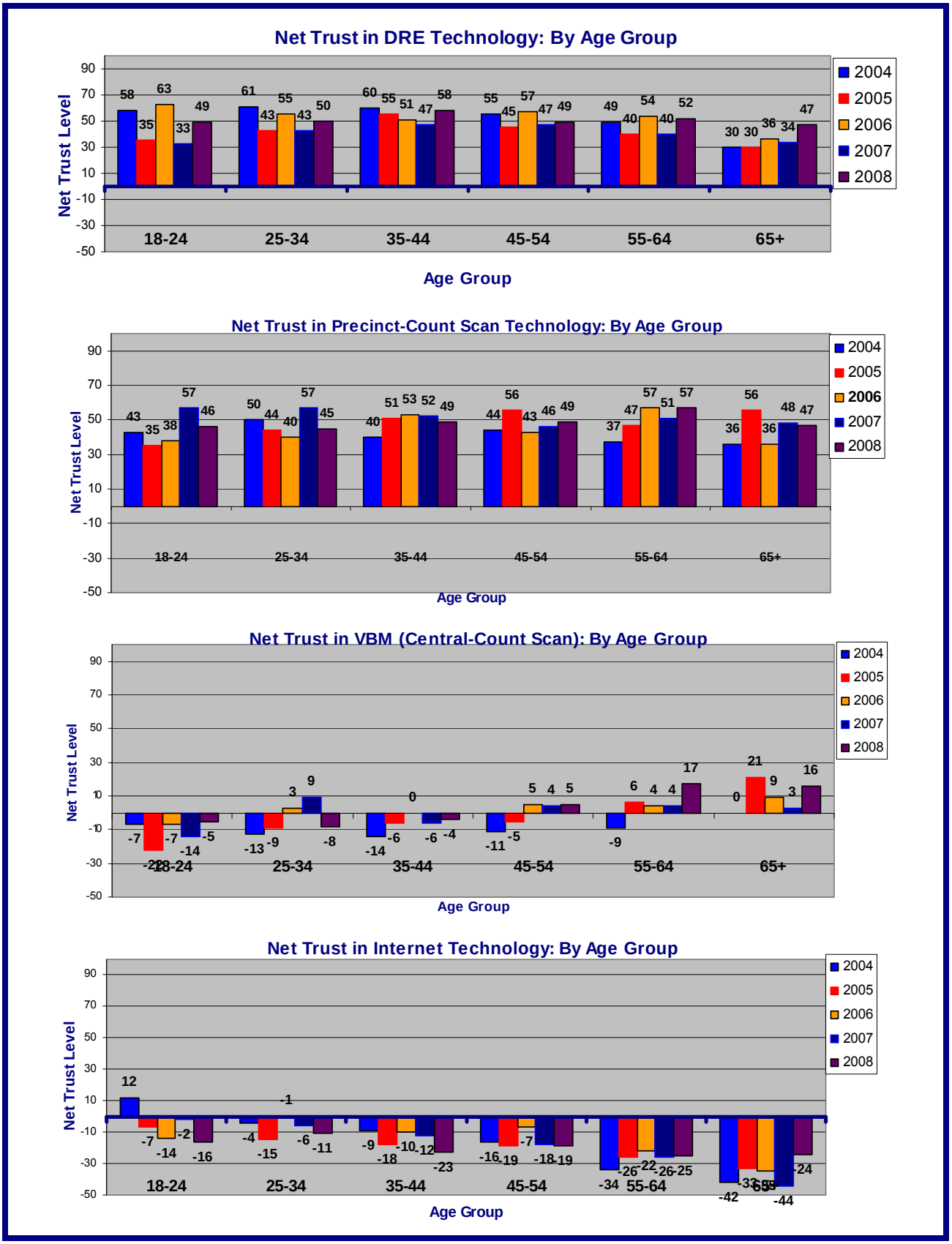
However, the vector was in a different direction in the Southern region. Internet voting's 2004 net trust score of -23 improved to a -10 in 2008. That is an increase of +13 points over the survey period. While Internet voting's net trust scores are negative throughout the country and increasingly negative in much of the country, InfoSENTRY's surveys indicate that attitudes toward the technology have started to change in the South.

Trends in the Age Groups' Trust in Voting Technology

As part of our survey, ORC provided us with a detailed breakdown of responses to our technology questions by a set of standard age subgroups. The following figure contains a graphic presentation of the net trust scores in those subgroups for each of the four voting technologies.

Figure 5

Trends in Age Groups' Trust in Voting Technology



FINDING 13: Early middle-aged Americans (35-44 year olds) have slightly higher trust levels in DREs than do other age groups.

Keeping in mind the importance of being conservative when dealing with small differences in results while looking at subgroups reflecting small sample sizes, we note that the net trust scores for Americans in the early middle-age (35-44 years old) subgroup maintained the highest level of net trust scores for DREs from 2004 (+60) to 2008 (+58).

However, the most interesting change in net trust scores from 2004 through 2008 occurred in the oldest age group (65+ years old). While older voters' net trust in DREs was generally below that of other age groups, by 2008 that age group's net trust score was statistically the same as all other age groups—except for the net trust score for the 35-44 year-old subgroup. The senior group's change in net trust scores from +20 to +47 was the largest increase in net trust scores for DREs of all the age groups.

Interestingly, the increase in net trust scores for this group came about as a result of both a decrease in negative responses and an increase in positive responses. In 2004, 55% of this group gave positive trust ratings to DREs, while 25% gave negative trust ratings. By 2008, those numbers had changed to 65% and 15% respectively. The age group that typically turns out in the largest percentage numbers at the polls, seniors 65+ years old, showed the largest increase in trust for DREs.

At the other end of the age spectrum, the net trust scores among the youngest age demographic (18 – 24 year olds) in the survey showed the greatest variation in net trust scores for DREs. The year-to-year changes in net trust scores for this age group were -23 points from 2004 to 2005, +28 points from 2005 to 2006, -30 points from 2006 to 2007, and +16 points from 2007 to 2008. No other group came close to this level of variation. The youngest age group in our survey, which typically turns out in the smallest percentage number at the polls, showed the least consistency in net trust scores for DREs.

FINDING 14: The greatest increases in levels of trust in computerized precinct-count scanner voting devices were in the older age groups.

The surveys indicated that Americans who are in the 55-64 year-old age group had an increase of +11 net trust points from 2004 to 2008. Americans who are 65+ years old had a +20 point increase in their net trust scores for precinct-count computerized scanner technology. The net trust scores of the groups younger than these two older groups all displayed more stable net trust scores, ending the five-survey period at relatively unchanged score levels.

It is very interesting that not only did Americans in the oldest age subgroup (65+ years old) have the largest absolute and relative increases in their net trust scores of both DREs and precinct-count scanners, this group ended with identical net trust scores (+47 points) for both technologies. The supposed crisis in confidence in the most widely used voting systems in the country appears to have overlooked this age group.

FINDING 15: In InfoSENTRY's five national surveys from 2004 through 2008, youngest adults (ages 18 – 24 years) expressed lower trust in Vote By mail (VBM) while older adults (ages 65+ years) expressed higher trust in VBM.

Even a brief glance at the VBM/central-scan section of Figure 5 makes clear a relationship between age and overall trust scores in VBM. The youngest adults, those in the 18-24 year age

category, had the consistently lowest net trust scores for VBM. This group's net trust score in VBM began at -7 points in 2004, dipped to -20 points in 2005, and resurrected to only -5 points in 2008. The 25 – 34 year olds and the 35 – 44 year olds were scarcely different, the former ending in 2008 with a -8 net trust score and the latter ending in 2008 with a -4 net trust score for VBM.

The younger groups are far more mobile than are other groups. They are less likely at this time to rely on what they typically view as "snail mail" in their daily lives.

Once again, it is the senior-most groups that end both with the highest net trust scores in VBM and the greatest increases in those net trust scores over the set of five national surveys. The 45 – 54 year olds saw a +16 point increase in their net trust scores. The 55 – 64 year olds provided a +26 point increase in their net trust scores. The most senior subgroup, the 65+ year olds, had a +16 point increase in their net trust scores of VBM.

It is very likely that the older age groups' familiarity with postal service activities, their preference for the convenience of VBM, and their increasing preference for activities that overcome their mobility disadvantages have tended over time to increase their trust in VBM. Once again, we point out that these older age groups are the faster growing groups in the population and they are the groups with the greatest likelihood of voting when given the opportunity.

FINDING 16: In the five national surveys from 2004 through 2008, the youngest adults (ages 18 – 24 years) expressed highest trust in Vote By Internet (VBI) while the oldest Americans (ages 65+ years) expressed lowest trust in VBI[8].

At first glance, the Internet voting graph in Figure 5 appears to be as visually telling as is the VBM section of the graph. Overall, negative net trust scores predominate. Also, the older demographic subgroups have more negative net trust scores toward Voting By Internet than do the younger demographic subgroups. At one end of the continuum, the 65+ year olds had a net trust score of -24 points in 2008 and the 55 – 64 year olds had a net trust score in Internet voting of -25 points. At the other end of the continuum, 25 – 34 year-old Americans had a net trust score of -11 points in 2008 and 18 – 24 year-old Americans had a -16 net trust score in Internet voting in that same year's survey.

However, a closer look in the net trust scores shows an interesting divergence in these age groups' net score trend lines. The 18 – 24 year olds' net trust scores in Internet voting technology decreased the most of any age group in the survey period, falling from +12 in 2004 to -16 in 2008. That is a -28 point shift in net trust scores.

For the oldest Americans (65+ years), the trend was quite the opposite. In 2004, the seniors had a net trust score of -42. In 2008, the seniors' net trust scores in Internet voting had risen to a still negative -24. However, that change is the largest increase, +18 points, of any age group in Internet voting.

It is very noteworthy that the older age subgroups displayed the greatest positive change in net trust of all four voting technologies in the study. This trend undercuts two stereotypes. One is

[8]We have used the shorthand of VBI for Voting by Internet because the term e-voting has become meaningless. The election critics and media have conflated both Internet voting and use of DREs into "e-voting." We have examples media reports using "e-voting" to describe voter registration systems, electronic pollbooks, and election night reporting systems over the Internet. It is now a term void of accurate meaning. In reality all of the voting systems in this study, DREs, computerized precinct-count scanners, computerized central-count scanners, and the Internet, involve electronic-voting. The conflation of all of these technologies into a single term of "e-voting" probably serves to confuse issues of trust and security, because it subconsciously and cleverly links DREs to the Internet. The term e-voting is now so imprecisely applied as to be useless at best and misleading at worst.

that the older groups will not adapt to new voting technologies. It appears quite likely that they will adopt those technologies, and trust them as they become more familiar with them, if those technologies make the act of voting more convenient. These data also debunk a second stereotype that there is a widespread crisis of confidence in voting technologies in this country. Indeed, in this instance, the demographic subgroups that tend to vote in higher numbers are the ones that have displayed so far an increasing trust trend over the past five years in DREs, precinct-count computerized scanning, VBM/central-count computerized scanning, and even VBI.

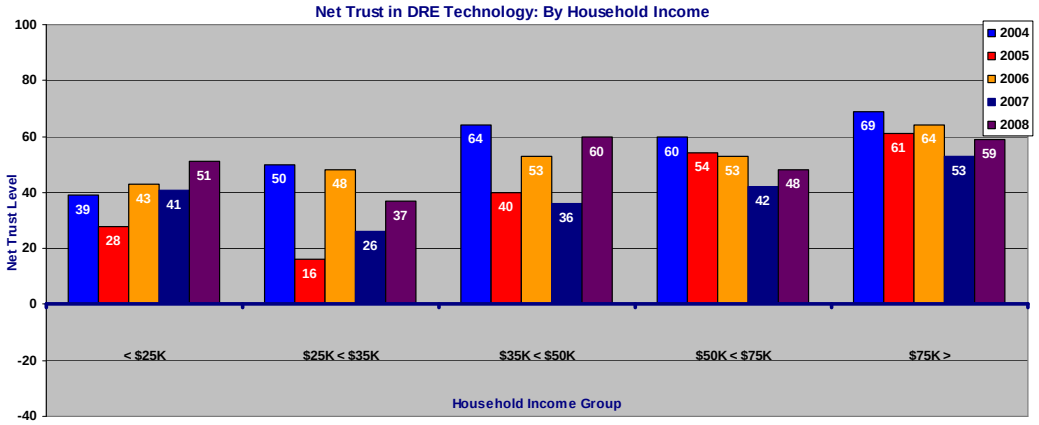
Trends in the Income Groups' Trust in Voting Technology

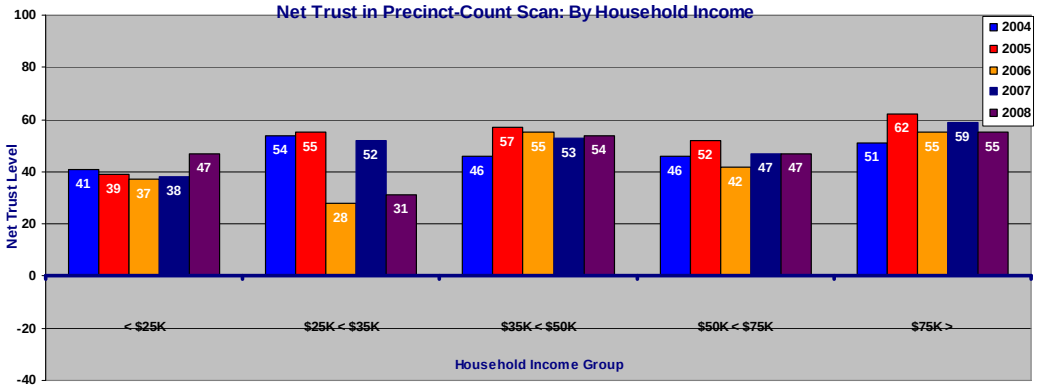
Already in the 2008 season of presidential primaries, we have seen discussions, particularly in the Democratic Party, of how various candidates appeal to certain income groups. Indeed, in the post-Super-Duper Tuesday period after February 5, 2008, there has been widespread analysis of how one candidate or the other drew more votes from the lower income groups while the other candidate drew more votes from the wealthier groups.

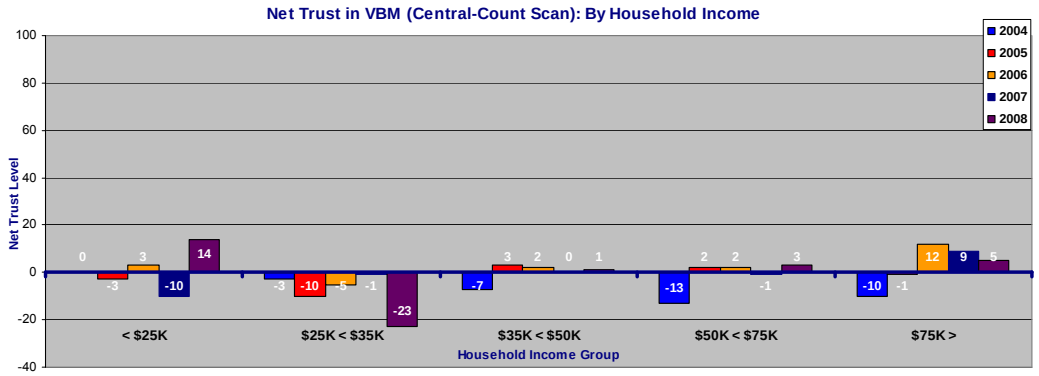
We were interested in finding out if any trends existed in how members of those same household family income groups viewed voting technologies. The next figure contains the results of the analysis when we broke down the survey results by ORC's standard household income groups.

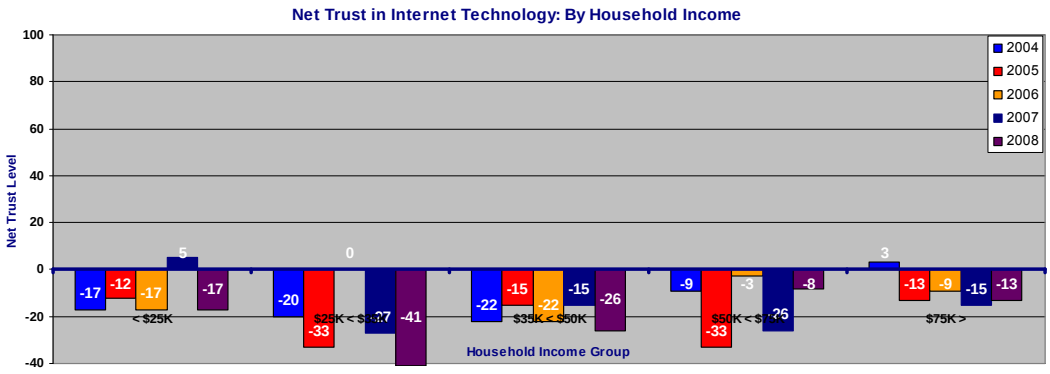
Figure 6

Trends in Household Income Groups' Trust in Voting Technology









FINDING 17: Americans from households with the highest annual income level ($75,000>) maintained a consistently higher level of net trust in DRE voting technology than did Americans from households with lower incomes.

The highest household income group, those earning $75,000> annually, started in 2004 with a net DRE trust score of +69 points and ended in 2008 with a net trust score of +59 points. Only households in the $35,000 < $50,000 category had statistically similar scores of +65 and +60 in 2004 and 2008, respectively. However, the middle income group had substantial dips its net trust scores in the interim surveys.

All other household income groups had both lower and more fluctuating net trust scores for DREs. The $25,000 < $35,000 income group produced the largest fall in net trust for DRE voting technology, declining from +50 in 2004 to +37 in 2008, for a drop of 13 points.

FINDING 18: Americans with the highest household income ($75,000>) and those in the middle household income category ($35,000 < $50,000) had higher levels of net trust in precinct-count computerized ballot scanning voting systems than did Americans from other income groups.

Americans in two income categories ($75,000> and $35,000 < $50,000) had a higher level of net trust in precinct-count computerized ballot scanning systems than did their counterparts in other income groups. In 2004, the two groups had net trust scores in this technology of +46 and +51, respectively. In 2008, the net scores for the groups stood at the statistically equivalent scores of +47 and +55, respectively. Overall in the five surveys, these two groups' net trust scores in precinct-count scanning technology remained consistently at or above these levels.

Other income groups displayed relatively constant net trust levels in precinct-count computerized scan technology, with an exception of substantial variability in the $25,000 < $35,000 annual income category's scores. As with their net trust scores for DREs, this group saw substantial swings in the net trust scores for precinct-count scanning across the five surveys. It also registered the largest drop in net trust in precinct-count ballot scanning over the survey period, from +54 in 2004 to +31 in 2008. That is a drop of 23 points, the largest point drop for any income group on any voting technology from 2004 to 2008.

FINDING 19: Americans at the opposite ends of the household income groups, those making <$25,000 annually and those making $75,000> annually, increased their net trust in VBM, while Americans with annual household incomes of $25,000 < $35,000 had a significant net trust decline in VBM over the five annual surveys.

Americans living in households with incomes of <$25,000 were neutral (±0) in their net trust of VBM's central-count, computerized scan technology in 2004. By the 2008 survey period, that net trust had risen to a +14. That rise included a 24-point net trust score increase from the 2007 survey to the 2008 survey. Americans at the other end of the household income continuum, those making more than $75,000, saw an overall 15-point increase in their VBM net trust scores. Those scores rose from -10 points in 2004 to +5 points in 2006. In the two household income groups that spanned the range from $35,000 < $75,000, VBM's net scores ranged upward slightly from low negative numbers to neutral numbers, statistically indistinguishable from ±0.

As with their trust in precinct-count scanning, it was the $25,000 < $35,000 annual household income group that registered the largest drop in net trust in VBM from 2004 to 2008. This group's net trust in VBM's central-count, computerized scan technology dropped from -3 to -23

in the five annual surveys, a 20-point decline in net trust in VBM. It was the only income category registering a drop in VBM technology over the survey periods.

FINDING 20: Internet voting technology received net negative trust ratings consistently across all household income groups in all five national opinion surveys.

Internet voting still does not have the trust of American voters, regardless of their household income. There was consistently high variability in most household income groups' net trust scores in Internet voting. The primary exception was in the mid-group with household incomes between $35,000 and $50,000. This group saw little variability, with its net trust scores hovering consistently at or near -20. All of the household income groups started with negative net trust scores for Internet voting in 2004 and ended with net negative scores in 2008. No household income group expressed a statistically significant positive net trust for Internet voting in any survey period.

Once again, it was the $25,000 < $35,000 household income group that registered the greatest decline in net trust scores on this question. In 2004, the group had a net trust score in Internet voting technology of -20. By 2008, after some wild swings, the group's net trust score for Internet voting had dropped to -41. This household income group provided our survey analysis with both the lowest net trust score and the greatest decline in net trust scores for Voting By Internet (VBI).

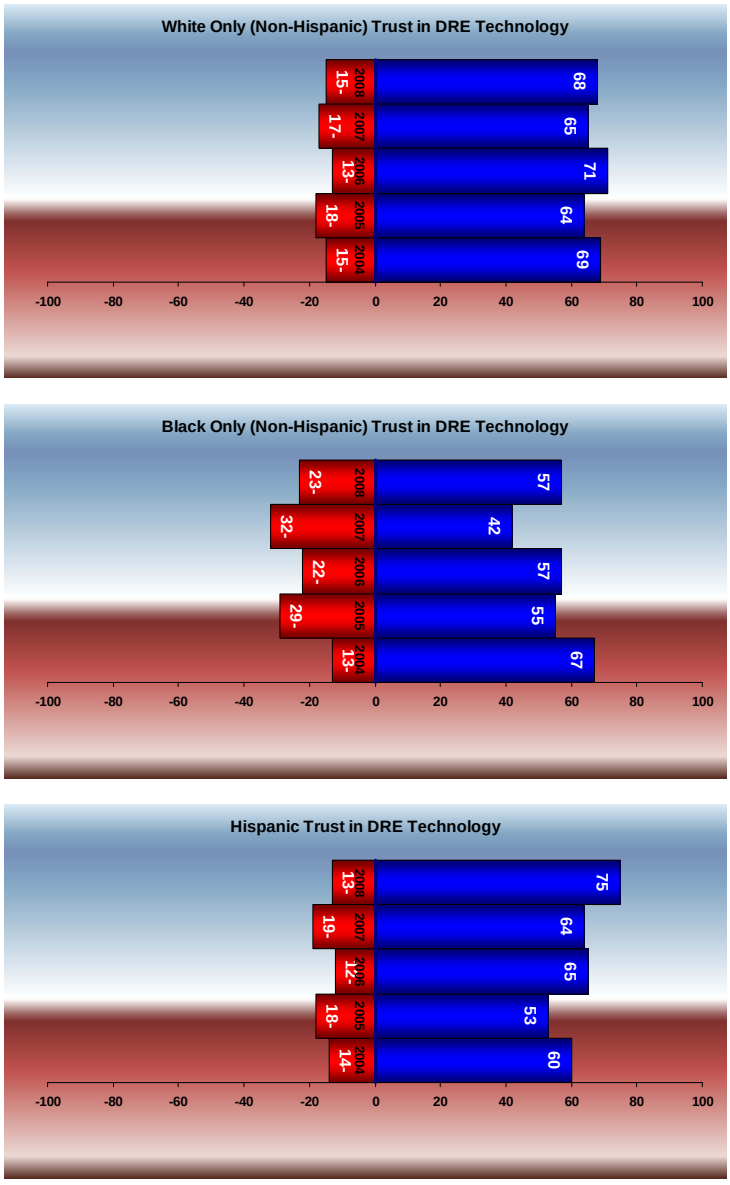
Notably, the $25,000 < $35,000 household income group produced the largest drops in net trust for all of the voting technologies in our research. If this income group's increasing mistrust in all of the forms of voting available to them in the U.S. carries over into their decision of whether to vote, that result could have interesting unintended consequences for the 2008 General Election turnout for the Democratic Party. That party often draws a substantial number of its voters from this income group.

Trends in the Racial/Ethnic Groups' Trust in Voting Technology

The oratory and writings of election critics have created the image that there is a crisis across all demographic groups in confidence in election technology, in general, and DREs, in particular. Analysis of the earlier gender, regional, and income demographics groups indicate that there are no real, widespread trends toward crisis in those groups. There is one more very important demographic group deserving of a closer look, if only because it is within that demographic group that many fault lines exist in American political and electoral life: racial/ethnic identification.

The next four figures present three racial/ethnic groups' positive and negative trust scores for each of the technologies we have examined over the past five annual national surveys.

Figure 7
Trends in Race/Ethic Groups' Positive (Blue) and Negative (Red) Trust of DRE Voting Technology from 2004 to 2008



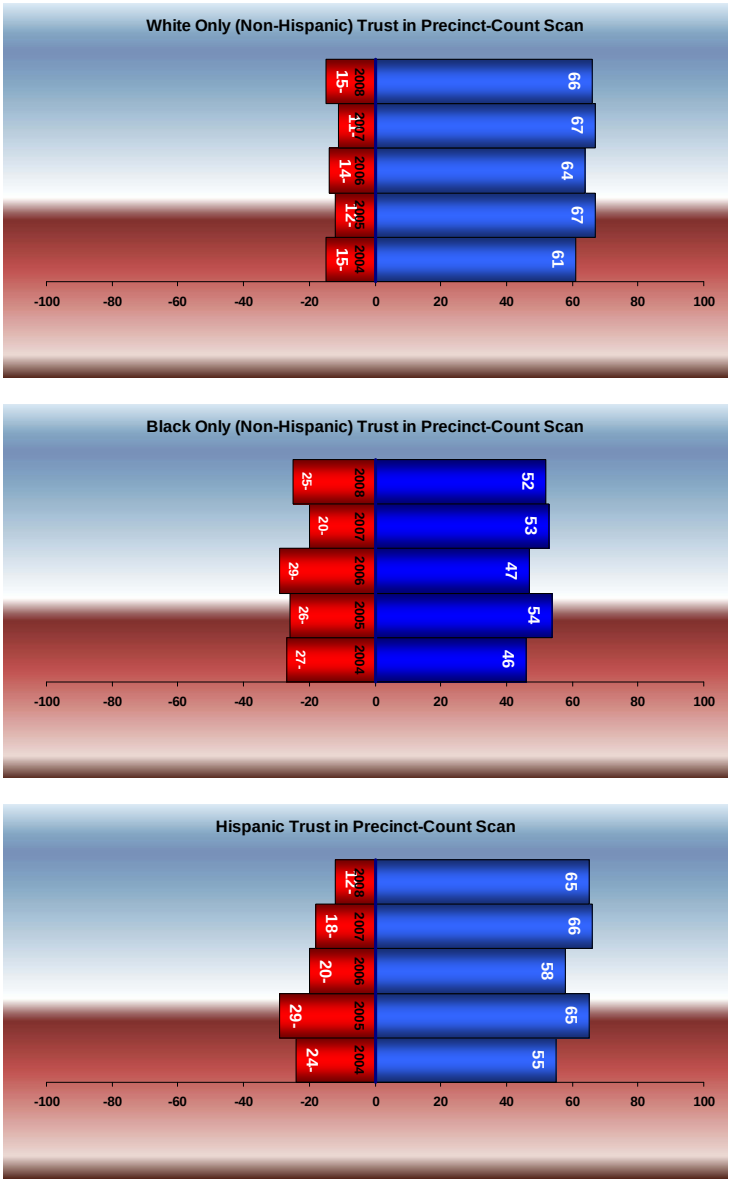
FINDING 21: Among racial/ethnic groups in the U.S., Whites' trust in DREs remained statistically unchanged, Hispanics' trust in DREs increased substantially, and Blacks' trust in DREs declined steeply from InfoSENTRY's 2004 survey to the 2008 survey.

In the 2004 survey, seven in ten (69%) Whites expressed positive trust in DREs while 15% expressed low trust in DREs. In the 2008 survey, those numbers remained statistically unchanged at 68% and 15%. Hispanics' positive trust scores began in 2004 at 60% and jumped to 75% in 2008, while their negative trust scores in the two surveys remained steady at 14% and 13%, respectively.

Another real change came among Black Americans. Statistically identical to their White counterparts in 2004, Black positive responses to DREs stood at 67% and negative responses to DREs stood at 13%. However, Blacks' positive trust scores dropped to 57% and their

negative trust scores declined further to 23% in 2008. Blacks' positive trust score for DREs in 2008 is lower by statistically significant margins than comparable trust scores for Whites and Hispanics. Blacks' negative trust scores in 2008 are also significantly more negative than the comparable negative trust scores for Whites and Hispanics.

Figure 8
Trends in Race/Ethic Groups' Positive (Blue) and Negative (Red) Trust of Precinct-Count Computerized Scan Voting Technology from 2004 to 2008



FINDING 22: Whites' trust in computerized precinct-count scan remained stable and more positive than Blacks' trust in the technology, while Hispanics' trust increased substantially throughout InfoSENTRY's five national surveys.

In InfoSENTRY's 2004 survey, six in ten (61%) Whites expressed positive trust in precinct-count scan voting systems, while only 15% of Whites gave negative trust responses. In the 2008

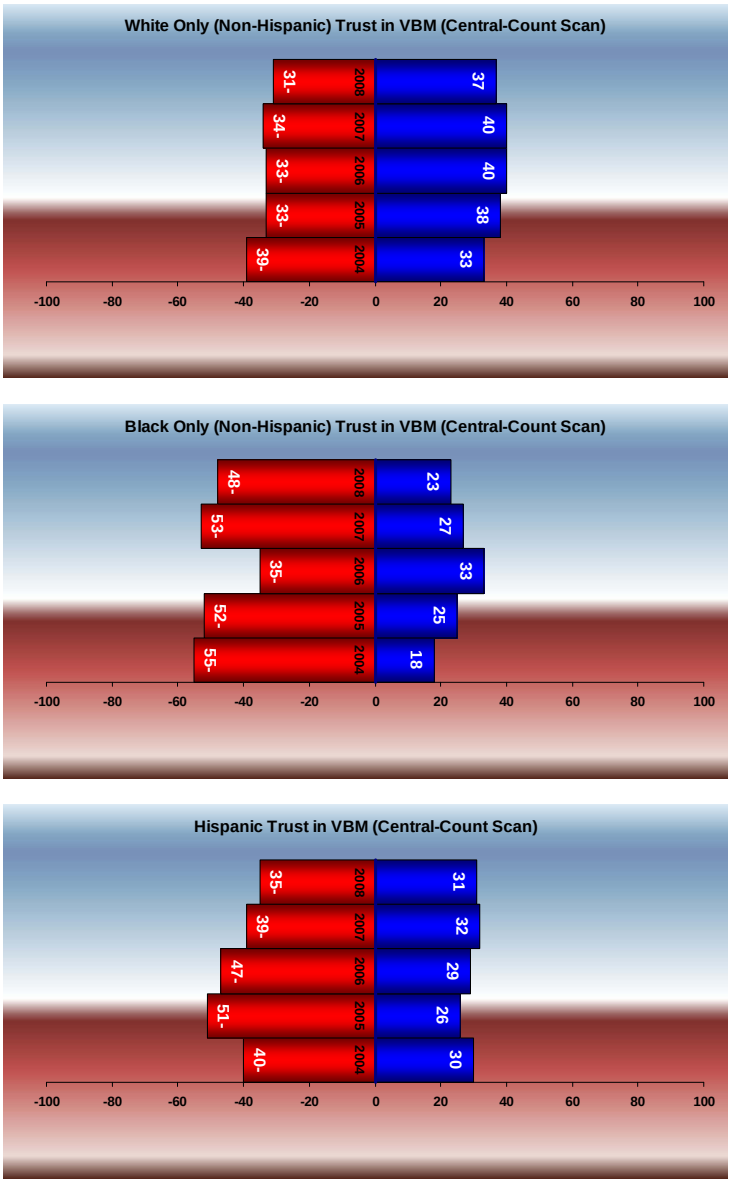
survey, the Whites' percentage of negative responses remained at 15% while the positive response rose slightly to 66%.

Blacks' trust trend in precinct-count scan was more positive, although their overall trust level still fell short of the trust expressed by Whites and Hispanics. While Blacks' negative trust levels remained statistically unchanged from 2004 (27%) to 2008 (25%), their positive trust levels increased very slightly from 46% to 52% over the same years.

Hispanics saw the both the greatest increase in positive trust scores and the greatest improvement in negative trust scores for precinct-count scan technology of the three racial/ethnic groups in the survey. The negative trust scores improved from a negative 24% in 2004 to a negative 12% in 2008 while the positive trust scores increased from 55% to 65% in the surveys.

Figure 9

Trends in Race/Ethic Groups' Positive (Blue) and Negative (Red) Trust of Vote By Mail (Central-Count Scan) Technology from 2004 to 2008



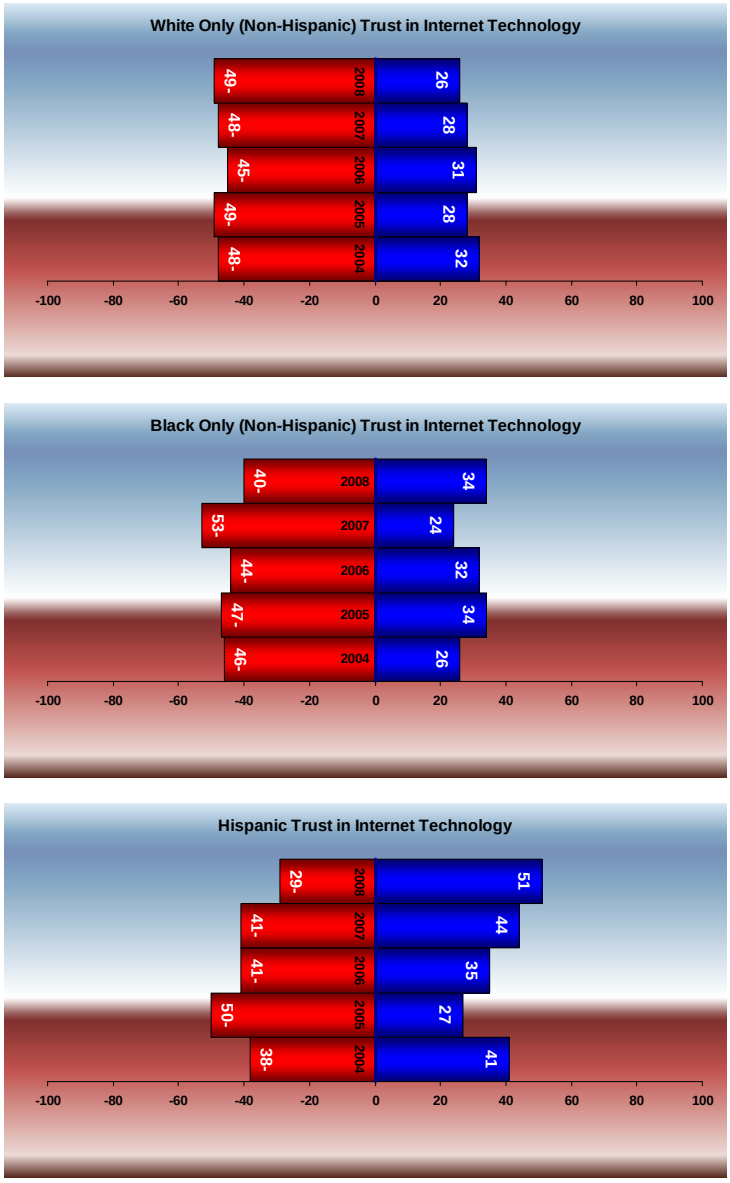
FINDING 23: Whites' and Blacks' net trust in VBM's computerized central-count scan technology trended slightly higher, while Hispanics' net trust in the voting method remained statistically unchanged from 2004 to 2008.

One in three Whites (33%) expressed positive trust in the kind of computerized central-count scan voting used in VBM counties in 2004. In that same survey, 39% gave negative trust ratings to VBM voting technology, yielding a -6 net trust score. However, by 2008 the net trust score was a significant +6 points because the positive trust had climbed to 37% and the negative trust had improved to 31%.

Hispanics' net trust improvement was small enough that it would be unwise to call it a significant increase, given the size of the demographic sub-sample in the survey. In the 2004 survey, 30% of Hispanics gave positive responses to VBM, while 40% gave negative responses. By 2008, those responses had changed to 31% positive, statistically unchanged from 2004, and to 35% negative, also statistically unchanged. The overall change in net trust scores, from -10 points in 2004 to -4 points in 2008, is not a significant change considering once again the relatively small size of the Hispanics' sub-sample in the survey.

Blacks' overall trust in VBM technology remained nationally at a much lower level than did the trust in VBM by Whites and Hispanics. In 2004, only 18% of Blacks expressed positive trust in VBM, the lowest expression of trust in VBM in any of the surveys. In that year over half (55%) of Blacks expressed negative trust in VBM, one of the most negative responses to VBM in any of the surveys. By 2008, the outlook for VBM among Blacks had improved, although the net trust score was still at a low -25 points. That net trust score came as a result of a 23% positive rating and a 48% negative rating.

Figure 10
Trends in Race/Ethic Groups' Positive (Blue) and Negative (Red) Trust of Internet Voting Technology from 2004 to 2008



FINDING 24: Hispanics' net trust in Internet voting technology trended up sharply over the five-survey study and was generally more positive than Internets' net trust ratings scored by both Whites and Blacks.

Hispanics started the surveys as the only racial/ethnic group with a less than outright negative view of Internet voting technology and ended the surveys as the only racial/ethnic group with a strongly positive trust in VBI. In 2004, 41% of Hispanics expressed positive trust in Internet voting and 38% gave negative trust responses. Statistically, those ratings are neutral with a +3 net score.

By 2008 those scores changed dramatically. Half of Hispanics (51%) gave positive trust ratings to Internet voting technology while the negative trust ratings had improved to 29%. The result was a net trust score of +22 points.

The differing and changing responses of Hispanics to VBM and VBI might well provide a fascinating topic of analysis in coming years. The Hispanic population in the United States is still, by most research accounts, more mobile than most other racial/ethnic groups. It is likely that use of the mail is more problematic for such a mobile population. However, wherever this young, mobile population goes, within states and across state lines, they find the Internet with access to financial activities—and potentially voting. Filling primarily blue collar-level occupations, they find it difficult to take time off from work to vote. Both VBM and Internet voting are likely to appeal to such a demographic group.

The summary table below summarizes trends in the racial/ethnic categories' net trust levels for all four voting technologies in InfoSENTRY's national surveys.

Table 2
Summary of Net Trust Scores for Voting Technologies
For All Racial/Ethnic Groups

Ethnic Group/Technology	Net Trust Score 2004	Net Trust Score 2008	Five Survey Trend Direction
White-DRE	+54	+53	◄►
Black-DRE	+54	+34	▼
Hispanic-DRE	+46	+62	▲
White-Precinct Scan	+46	+51	◄►[9]
Black-Precinct Scan	+19	+27	▲
Hispanic-Precinct Scan	+21	+53	▲
White-VBM/Central Scan	-6	+6	▲
Black-VBM/Central Scan	-37	-25	▲
Hispanic-VBM/Central Scan	-10	-4	◄►[9]
White-VBI	-16	-23	▼
Black-VBI	-20	-6	▲
Hispanic-VBI	+3	+22	▲

[9] The differences in the 2004 and 2008 scores might well have warranted assignment of an up arrow (▲) in both instances. Such an assignment in the instance of the higher net score for precinct-count scan among Whites might have been warranted because of the larger sample size for that demographic sub-group. However, we decided to make the "no change" indication (◄►) in both instances and present the actual data for the reader's own review.

Several substantial shifts in racial/ethnic groups' attitudes emerge from the trend data in this table. Large shifts occurred only in three areas. **(1)** Blacks have turned decidedly negative against DREs over the past five years. **(2)** Hispanics have displayed significant increases in their net trust in all voting technologies except VBM. **(3)** Whites' net trust declined in only one voting technology: Internet voting.

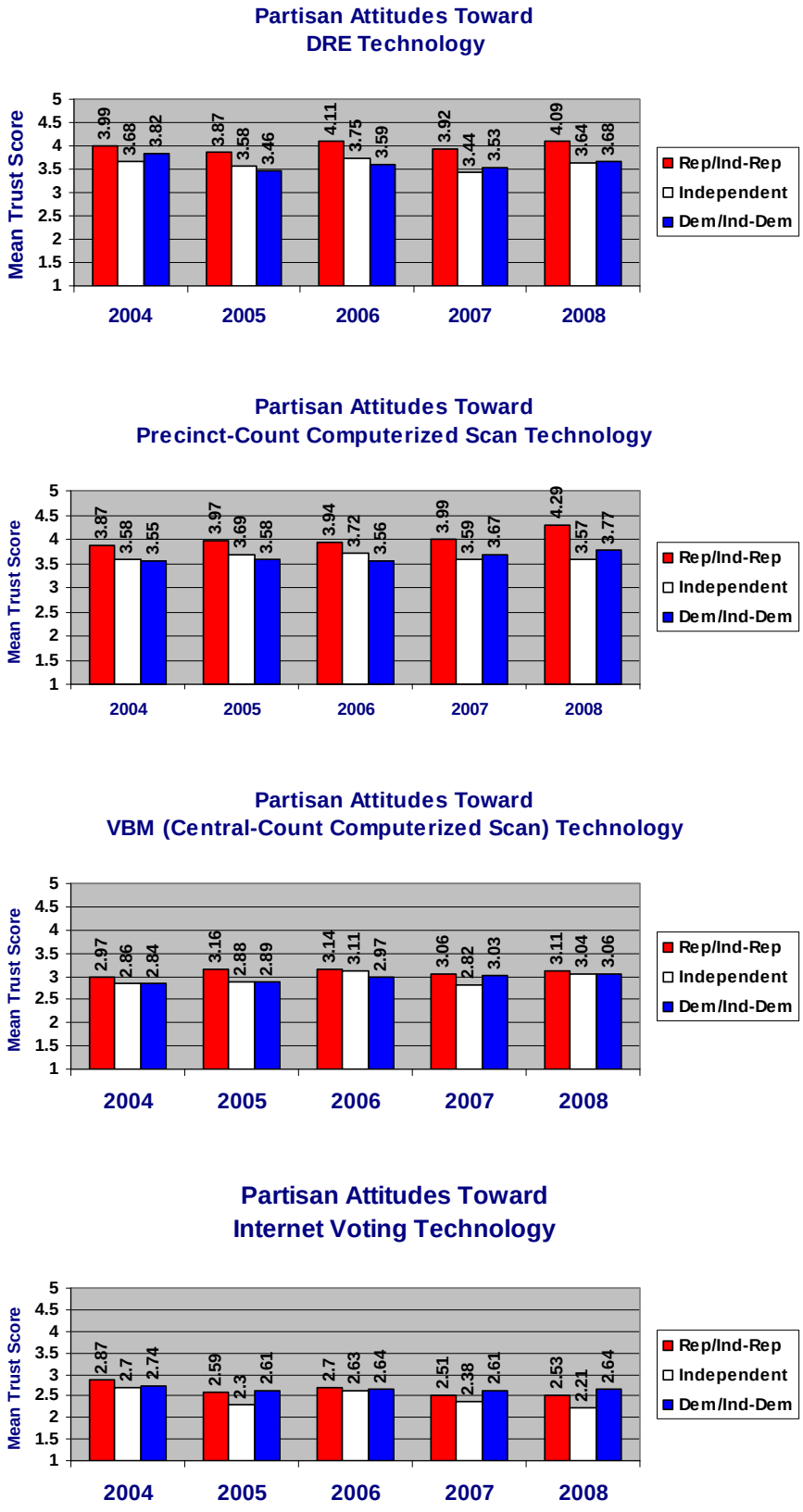
If there is any mounting crisis in confidence in voting technology among racial/ethnic subgroups over the past five years, it is largely the decline in Black net trust in DREs—which still remains at a net positive level of +34 points.

Trends in Partisan Attitudes toward Voting Technology

One of the suspicions frequently voiced by election officials with whom we have worked and met since the election of 2000 is that most of the paranoia and criticism about election administration, in general, and election technology, in particular, comes from the Democratic side of the political spectrum. In our survey, ORC asked respondents questions to allow them to identify their partisan leanings: Democratic, Independent-leaning-to-Democratic, Independent, Independent-leaning-to-Republican, Republican, and other.

Figure 11 contains the graphic and mathematical mean scores of the partisan groups' trust in the four voting technologies. Looking back at our Likert-type construction of the questions, a mean score of a 1.00 would be the lowest possible trust score and a mean score of 5.00 would be the highest possible trust score.

Figure 11
Trends in Partisan Attitudes toward Voting Technology: 2004-2008



FINDING 25: Republicans/Republican-leaning-Independents expressed higher trust in DRE voting technology than did Independents and Democrats/Democratic-leaning-Independents in all five InfoSENTRY national surveys.

Republicans and Republican-leaning Independents started with a mean trust score of 3.99 in the 2004 survey. In 2006, their mean trust score spiked to 4.11, which was the highest mean score recorded by any partisan sub-group for any technology. In the 2008 survey, the Republican and Republican-leaning group's net trust score was 4.09, the second highest score recorded by any group on this question.

Independents' responses on this question regarding trust in DREs produced very stable mean trust scores over all five surveys. Their mean trust score in 2004 was 3.68. In 2008, their mean trust score for DREs was 3.64, showing no trust crisis and no change over the survey period.

The third group, Democrats and Democratic-leaning Independents, started in 2004 with a mean trust score toward DREs of 3.82, reasonably close to the mean trust score for Republicans in that survey. However, by 2008 the Democrats and Democratic-leaning Independents' mean trust score in DREs had declined to 3.68. While the number was still in the positive trust level, it represented the only statistically significant decline in trust of DREs among the partisan groupings.

FINDING 26: Republicans and Republican-leaning-Independents expressed higher trust in precinct-count, computerized scanning technology than did the other partisan groups in all five surveys.

Democrats' mean trust scores in precinct-count, computerized scan voting technology increased slightly from 3.55 to 3.77 over the five surveys. Independents' mean trust scores varied slightly over the years, but began in 2004 at 3.58 and ended in 2008 at a statistically unchanged 3.57.

It was among Republicans and Republican-leaning-Independents that precinct-count scan technology saw its greatest change in trust. This grouping of partisans began in 2004 with a mean trust score of 3.87, which was higher than the comparable mean trust scores for either of the other two partisan groupings. The Republican-oriented grouping ended the five-survey period in 2008 with a mean trust score for precinct-count scan technology of 4.29. That mean was statistically higher than the groups' score in 2004 and statistically higher than the other two partisan groupings' means in 2008.

For both of the technologies that have been at the center of the voting technologies "debate" since the passage of HAVA, Republicans gave higher ratings to DREs and precinct-count scan devices than did the other two partisan groupings. All three of the partisan groups gave both technologies positive mean scores (above the neutral score of 3.00). However, in a manner not totally unlike many other issues in American political life, there is a divide in how partisans trust the two main voting technologies in use in America.

FINDING 27: Trust in VBM (central-count, computerized scan) voting technology remained stable, consistent, and statistically undifferentiated among Republican identifiers, Independents, and Democratic identifiers over the five surveys.

VBM technology evoked very consistent, level mean trust scores among the three partisan groupings, with a slight upward trend. In 2004, all three groups responded with mean trust scores that were slightly below the neutral 3.00 score: 2.97 for Republican-leaning adults, 2.86 for Independents, and 2.84 for Democratic-leaning adults. However, in the 2008 survey, the mean scores for the three partisan groups had increased to 3.11, 3.04, and 3.06 respectively.

Notably, the growth in mean trust for VBM among the Democratic-leaning group (+0.22) was the largest among the three groups over the five years.

As noted earlier, the net trust in VBM moved from overall slightly negative to overall slightly positive during those five years.

FINDING 28: Republican-leaning adults' mean trust scores in Voting By Internet (VBI) declined significantly from 2004 to 2008, as did Independents' mean trust scores, while the Democratic-leaning adults' mean trust scores remained stable throughout the surveys.

Republican-oriented adults' mean trust score in VBI in 2004 was at a below-neutral 2.87. After a general pattern of steady decline in the intervening surveys, their mean trust score was significantly lower at 2.53 in 2008.

Independent adults' mean trust score in 2004 was also below the neutral 3.00 mark at 2.7. By the 2008 survey, their mean trust score had dropped significantly to 2.21. That was the lowest net trust score given to Internet voting technology by any partisan group on any of our national surveys.

Democratic-leaning adults' mean trust scores in Internet voting showed the least decline among the partisan groupings. Their mean trust scores in Internet voting began in 2004 at 2.74, slightly below the comparable mean trust scores given by Republican-leaning adults. By 2008, the mean trust score from the Democratic-leaning group had dropped very slightly to 2.64. However, at that level, their score was slightly more positive than the mean trust score given by Republican-leaning adults (2.53) and significantly more positive than the mean trust score given by Independents (2.21).

It will be very interesting to see how these attitude trends move in coming years now that the Democratic Party has allowed the group, Democrats Overseas, to participate in their Party's primaries by Internet voting and has allocated a small number of delegates to their National Convention based on that voting. It will also be interesting to see how Americans react as election officials and voting publics in other countries adopt VBI.

Observations and Comments on Findings

Almost no one will be completely satisfied with the scores on the various technologies. Proponents of one technology or another will want the scores to be higher and will look for the positive spin to get them there. Opponents of one technology or another will point solely to the negatives of those technologies without focusing on the comparative results or the overall context of the responses.

The United States is a much divided country on a whole host of topics. It seems that a survey taken on the level of satisfaction with almost any political topic or public issue would bring about strongly differing opinions, depending on how someone felt about the fairness of the election in 2000. Given that condition, the level of trust in both DREs and precinct-count, computerized scanning is actually reassuring—probably jaw-dropping for some people. Those levels of trust point to anything but a crisis of trust in a voting technology that many election officials looked hopefully toward as a replacement for paper punchcards and lever machines.

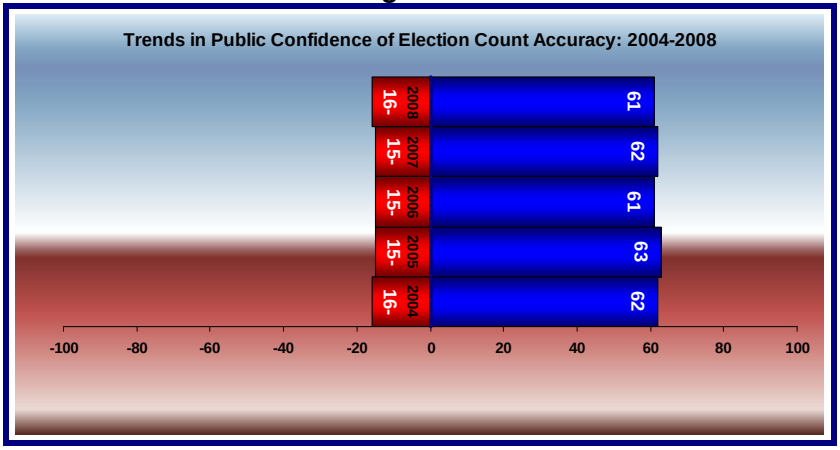
To provide some perspective on these numbers, we have two additional sets of data from our national surveys. For the first additional data set, we turn to an additional question we asked on those surveys:

Now I have a question about elections in your local area. On a scale of 1 to 5, where 1 means you are not at all confident and 5 means you are very confident, how confident are you that votes for federal, state, and local offices and ballot issues are counted accurately in the elections in your area?

Not At All Confident (1)
(2)
(3)
(4)
Very Confident (5)
Don't Know

The figure below contains the results from this question over the five years of InfoSENTRY's annual, national opinion surveys.

Figure 12



These numbers contradict any thesis that there is a growing crisis of confidence in America's elections. Instead, the data suggest several notable points.

First, they are remarkably stable. If there were an increasing or impending crisis of confidence in the accuracy of America's elections, we would expect to see a decline in the positive responses and growth in the percentage of negative responses. According to election critics' suppositions and representations to boards of elections, national commissions, state legislatures, and Congress, there has been a precipitous decline in confidence that elections are secure and accurate. They argue that the crisis started in the 2000 election and has escalated with flaws found in DREs in the 2004 and 2006 elections. They have succeeded in convincing many media outlets—including even the information systems trade press—that a real crisis exists. However, these numbers show amazing stability and consistency over that time period up to the present day. No decline in confidence. No widespread crisis in technology.

Another point is that very few election officials in the United States will be initially comfortable with these results. They want higher positive ratings for their work. However, we must place these numbers into a clearer perspective. First, virtually any political candidate or officeholder would love to have approval ratings this high at election time. Most presidential, congressional, and gubernatorial candidates would be delighted to have a two-thirds positive rating and a less-than-20% negative rating. In light of the overall partisan mistrust, rancor, and hard feelings towards all things electoral by certain interest groups after the 2000 election, these numbers are surprisingly high—and stable[10].

[10]A good example of how this rancor affects attitudes toward vote counts showed up in a CNN survey reported in October 2004, just before that year's Presidential election. The CNN story indicated that "A majority say they are confident the vote count in their own state will be accurate. Fewer than half of Democrats say they are "very confident" their state's vote count will be accurate, while three-fourths of Republicans feel that way."

Election critics will decry the glass as being 1/3 empty in Figure 12. Given the context of character assassination and mistrust on the blogosphere towards anything to do with elections, it is more appropriate to be surprised that the glass is 2/3 full. These are not numbers reflecting a growing crisis in confidence in a democracy.

Surveys by academics found similar results about confidence in voting systems and confidence in the accuracy of the systems on which they voted.[11] Also, surveys conducted by respectable national news outlets after the 2006 election found that upwards of 90% of respondents believed that their vote had been counted accurately, regardless of the type of voting technology used. Similar results have registered in state polls about the confidence in local voting systems, most notably in university-conducted surveys in Georgia and Maryland about the voting systems used in those states.

For the second data set that we can use as a further point of comparison and to provide additional context for the level of confidence in election count accuracy, InfoSENTRY asked another series of questions on its past three national surveys.

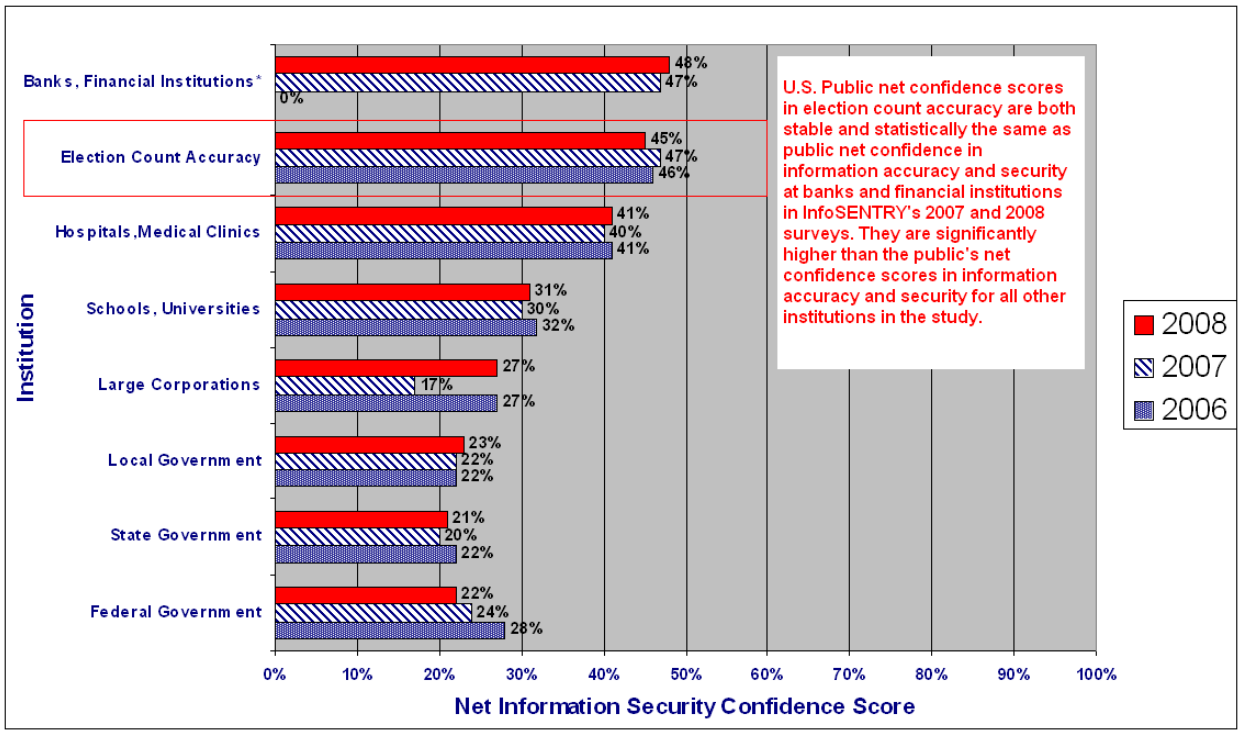
This set of questions read as follows:

> Now I am going to read you some types of organizations and governments. As I read each one, using a scale of 1 to 5, where 1 means very low confidence and 5 means very high confidence, please tell me how confident you are that the information in these organizations' computer systems is accurate and secure. [ROTATE ITEMS]
>
> Very low confidence (1)
> (2)
> (3)
> (4)
> Very high confidence (5)
> Don't Know

Interviewers then read the names of public and private institutions and recorded their responses. Figure 13 contains the results of the survey over the past three years, with the inserted net responses from corresponding years to the "confidence in election accuracy" question in Figure 12 (above).

[11] Some of these studies suffered from the lack of context that we are reporting here. These surveys likely suffered from the "response effect" that we mentioned in an earlier footnote. By simply asking the lone question, "Are you concerned about the potential of fraud with electronic voting?" you are signaling to respondents that somebody must be worried about it, so the respondents become worried and accordingly provide a socially acceptable response.

Figure 13
Trends in Public Confidence of U.S. Institutions' Information Security and Accuracy



***InfoSENTRY's 2006 national information security survey did not include banks/financial institutions as a response category.**

Comparing the results of these net confidence scores, which result as do the voting systems' net trust scores from subtracting the negative responses (1 and 2) from the positive responses (4 and 5), it becomes clear that the confidence in election count accuracy is fundamentally identical to the net confidence scores for information accuracy and security at banks and financial institutions. In 2007 and 2008, banks and financial institutions had net security confidence scores of +47 and +48, respectively. In those same years, the net accuracy confidence scores in election count accuracy were +47 and +45, numbers that are statistically equivalent to banks and financial institutions. Confidence in the accuracy of information in information systems in all other institutions in the survey, including medical institutions and educational institutions, were below—and sometimes well below—the confidence that Americans had in the accuracy of their elections.

Once again, these data support no thesis that there is a crisis of public confidence in American elections accuracy or in Americans' trust in the most widely used voting technologies. There are no broadly-based, mass groundswells of negative public opinion regarding voting technologies.

Even though there is no growing, widespread crisis in confidence in election count accuracy or in confidence about any of the four technologies included in InfoSENTRY's survey research, some election interest groups have been able to convince elected officials, the media, and some demographic groups that there is a crisis of critical proportions. That success at the state and local level has had substantial impact on the deployment of election technology reform in the United States.

Even though public confidence in DREs has remained statistically unchanged, the election critics' argument that there is a crisis of confidence in that technology has changed the deployment of that technology greatly. DREs are being rolled back in some states and replaced with other voting technology, largely precinct-count scanning systems. Other states have passed a requirement that DREs come with a printer to prepare a contemporaneous paper record of the voting transaction. As mentioned earlier, election interest groups who previously

demanded these devices have now found that there are other reliability and security problems associated with these paper printers.

Also, the harshness of the attack on DREs has made vendors less than willing to invest in research and development for that technology. Promising potentials for independent third-party electronic auditing of the devices and other data security measures appear to have all but ceased.[12] This DRE technology showed substantial potential for offering physically disabled Americans equal access to a secret, independently cast ballot. Paper ballots, which some major disability groups have questioned on their ability to provide equal and confidential ballot access, are replacing that technology.

Many jurisdictions are turning back to precinct-count ballot scanning technology. New state laws and administrative actions have caused election administrators in several states to drop the DREs they have had for years and replace them with precinct-count scanners. These moves in state legislatures and boards of elections come after receiving strong support from small, but well-organized and vocal, election interest groups over the past few years. The moves come at a time when public confidence in precinct-count scan technology's security is now statistically equal to the public confidence in DREs.

However, precinct-count scanning now is the subject of growing criticism from some of the election critics who previously demanded them. In addition to so-called "hack attacks" being staged for the media, precinct-count scanners have failed security examinations in some jurisdictions. Some of the devices have failed closer accuracy and data integrity examinations. There have been widespread, though largely unreported, recalls of the "memory cards" in some optical scan models. As recently as in the 2008 New Hampshire Presidential Primary, candidates have called their precinct-scan systems' accuracy into account and demanded recounts. Also, as recently as early March, 2008, one of the critics of DREs and previously staunch advocate of precinct-count scan devices questioned their functionality on a national radio broadcast and proclaimed, "There is no perfect system."

In the West, use of VBM and central-count ballot scanning has started to grow outside its base in Oregon. Washington State is moving steadily toward full implementation. Local jurisdictions in other western states, including California, are increasingly looking at VBM. In a pinch, talk surfaced in the Democratic Party in March, 2008, at the potential of using VBM to provide Florida and Michigan the capability to hold "Mulligan Primaries" rapidly and with less expense than through usual precinct-count scan procedures. This apparent step comes in jurisdictions that have had no experience with actual VBM elections, unlike Oregon and Washington State. Both of those states migrated to VBM over years of incremental operational experimentation, testing, and refinement of policies and procedures.

However, election critics are now turning their guns on VBM. After use of the technology in Cleveland in the 2008 Ohio Presidential Primary, a **Government Computer News** article entitled "Voting technology remains an issue at the polls" reported on central-count scan by writing, "But this system has flaws that risk greater voter error, say members of a research team from the universities of Maryland, Rochester and Michigan who conducted a comprehensive analysis of the voting technology over the past several years." Without going into the tenor and factual problems of the report, the article highlights that election critics have spread their criticisms well beyond their initial focus on DREs. These "warnings" come as vendors have

[12] There have been some "interesting" intellectual contortions during attempts to get independent, electronic auditing innovations off the ground. One of the leading critics of DREs and strongest supporters of precinct-count scan systems for voting has had a significant change of heart from 1997 when he wrote in absolute terms that "Audit is best where it is largely automated." (Rubin, Avi, et. al., **Web Security Sourcebook.** John Wiley & Sons, Inc. 1997. After a change of heart, he now argues for repetitive audits of paper ballots using multiple machines and hand counts. (National Public Radio, Science Friday, February, 2008.) State requirements for paper-only auditing, based on these critics' current advice, have produced a severe drag on voting system developers' willingness to invest in automated elections auditing and vote tally verification technology.

developed “digital image” technologies to replace the “optical scan” operations in earlier generations of both precinct-count and central-count ballot scanning systems.

However, as our research shows, public confidence in VBM technology has grown over five national surveys. It is also important to keep in mind that this technology is the one increasingly used by a very large segment of the American public: absentee voters. As absentee voting continues to grow and more voters gain experience using the mail to vote, it will be interesting to see how the election community and vendors respond with new technologies to route, handle, and tabulate increasing volumes of paper absentee ballots and much heavier volume VBM ballots.

That leaves Voting By Internet (VBI). It has been and is the most negatively received electronic voting technology listed in our research. Nonetheless, election jurisdictions have started to use Internet voting. In 2008, Democrats Abroad allowed use of Internet to request paper ballots and, in some instances, to cast votes by Internet in the Presidential Primary. This receptivity to new technology drew howls of complaint from a few in the blogosphere. However, early accounts point to a smooth process that resulted in votes being cast in the primary and delegates being apportioned, in part, on the basis of these votes.

In the United Kingdom, voters in Swindon, England, were able to use high-speed Internet access (at speeds for which most U.S. citizens can only wish at the current time in their homes), VBM, and public kiosks to vote in local elections. Post-election opinion surveys and our discussions with an election administrator in the area reflected widespread public satisfaction with all of the channels for voting and particularly with VBI.

Similar efforts at using Voting By Internet in Switzerland and Estonia revealed similar positive comments and results. Variants of VBI are under way in Brazil and India. Apparently, computer scientists in these European, Asian, and Latin American countries are making progress in dealing with the many formidable security issues involved in Internet voting.

However, no one should expect that kind of innovation and reform anytime soon in the United States. More than half the states have passed laws requiring the use of paper ballots and making those ballots the only legal record in recounts. Some laws require a so-called “hand-to-eye” recount using only paper ballot records. These laws have the effect of suppressing the kinds of multi-channel voting technology that other nations are turning to as they attempt to expand access to the ballot.

As we said in the beginning, there are two arguments made by interest groups of elections critics about the use of new voting technologies, particularly DREs. The first is that there are technical security weaknesses in all of the voting technologies. As we also indicated, this white paper has not focused on the technical, operational, and physical security flaws and fixes of DREs, precinct-count scan, Vote By Mail, and Vote By Internet systems.

Instead, the paper focused on the public confidence in the accuracy and security of those four technologies and the election critics’ contention that the public does not have confidence in them. The survey results show that by 2008, broad public opinion’s net trust was at statistically equivalent levels for precinct-count scans and DREs. Vote By Mail (VBM) and central-count ballot scanning has moved from a negative net trust level to a slightly positive trust level after five years. Voting By Internet (VBI) started at broadly negative levels and remained at those levels through the 2008 survey.

There has been very little broad-based, pronounced change in American adult trust in election technology or in the accuracy and security of election counts in their areas. The primary groundswells of opinion have been those of election interest group blogs, emails, faxes, and legislative testimony. There has been no broadly based loss of confidence in America’s voting systems. There is no crisis in confidence over our election technology. A substantial majority of American adults simply expect the opportunity to vote. While there are occasionally wide

variations of attitudes about specific technologies among demographic groups within the population, Americans generally have confidence that both election administrators and the election technologies they use will deliver secure and accurate election counts. It will behoove policy makers to pay more detailed attention to actual technical test results and operational steps that election administrators are already taking to secure their voting systems and less attention to critics' claims that Americans are rapidly and broadly losing confidence in their voting technologies and their election administrators. They are not.

Appendix 1: Survey Technical Details

This report presents the findings of a telephone survey conducted among a national probability sample of 1026 adults comprising 512 men and 514 women 18 years of age and older, living in private households in the continental United States.

Interviewing for this CARAVAN® Survey was completed during the period February 6 - 9, 2004. All data collection efforts took place at Opinion Research Corporation's Central Telephone Facility in Tucson, Arizona and/or Tampa, Florida. The core of our telephone center is the interviewers. All Opinion Research Corporation's interviewers complete an intensive training and test period. Additionally, they attend follow-up training classes that cover advanced screening techniques, in-depth probing and the art of refusal avoidance. Interviewers are continuously supervised, monitored and reviewed in order to maintain the highest quality interviewing standards.

All CARAVAN interviews are conducted using Opinion Research Corporation's computer assisted telephone interviewing (CATI) system. The system is state-of-the-art and offers several distinct advantages such as: full-screen control which allows multi-question screens, fully-programmable help and objection screens to aid interviewing, an extremely flexible telephone number management system and powerful data checking facilities. CATI ensures that interviews are conducted in the most efficient manner and allows interviewers easy response recording. This interviewing method also allows for the most accurate form of data entry by guiding the interviewer through the programmed question flow and by providing on-screen interviewer instructions.

The most advanced probability sampling techniques are employed in the selection of households for telephone interviewing. Opinion Research Corporation utilizes an unrestricted random sampling procedure that controls the amount of serial bias found in systematic sampling to generate its random-digit-dial sample. The sample is fully replicated and stratified by region. Only one interview is conducted per household. All sample numbers selected are subject to up to four attempts to complete an interview.

Completed interviews are weighted by four variables: age, sex, geographic region, and race, to ensure reliable and accurate representation of the total population, 18 years of age and older. The raw data are weighted by a custom designed program which automatically develops a weighting factor for each respondent. Each respondent is assigned a single weight derived from the relationship between the actual proportion of the population with its specific combination of age, sex, geographic characteristics and race and the proportion in our CARAVAN sample that week. Tabular results show both weighted and unweighted bases.

The use of replicable sampling, standardized interviewing procedures and representative weighting provides that all CARAVAN studies are parallel to one another. Thus, CARAVAN usage is appropriate both for point-in-time analysis as well as tracking and trend comparisons.

Included in the Technical Information which follows are tables of sampling tolerances of survey results, and a copy of the question series as it appeared in the survey questionnaire.

As required by the Code of Standards of the Council of American Survey Research Organizations, we will maintain the anonymity of our respondents. No information will be released that in any way will reveal the identity of a respondent. Our authorization is required for any publication of the research findings or their implications.

Opinion Research Corporation's CARAVAN is a shared cost data collection vehicle. Opinion Research Corporation has exercised its best efforts in the preparation of this information. In any event, Opinion Research Corporation assumes no responsibility for any use which is made of this information or any decisions based upon it.

CARAVAN Telephone Sampling Methodology

Opinion Research Corporation's national probability telephone sample is an efficient form of random-digit-dialing. The sample is designed to be a simple random sample of telephone households. Unlike published directories, Opinion Research Corporation's national probability telephone sample includes both unlisted numbers and numbers issued after publication of the directories. The following procedure was used to create the sample:

- Opinion Research Corporation has an annual license for GENESYS, a custom RDD sample generation system developed by Marketing Systems Groups.

- The methodology for generating random digit dialing (RDD) telephone samples in the GENESYS system provides for a single stage, EPSEM (Equal Probability of Selection Method) sample of residential telephone numbers. It is updated twice a year.

- When a national probability sample is needed, a random selection is made from approximately 40,000 exchanges in two million working banks.

- Each telephone number is transferred to a separate call record. The record shows the computer generated telephone number to be called, as well as the county, state, MSA (if applicable), band and time zone into which the telephone number falls. Our computerized interviewing system (CATI) uses this information to keep track of regional quotas. The CATI interviewing program also keeps track of the disposition categories for each call attempt.

Reliability Of Survey Percentages

Results of any sample are subject to sampling variation. The magnitude of the variation is measurable and is affected by the number of interviews and the level of the percentages expressing the results.

The table below shows the possible sample variation that applies to percentage results reported from Opinion Research Corporation's CARAVAN sample. The chances are 95 in 100 that a CARAVAN survey result does not vary, plus or minus, by more than the indicated number of percentage points from the result that would be obtained if interviews had been conducted with all persons in the universe represented by the sample.

Size of Sample on Which Survey Results Are Based	Approximate Sampling Tolerances Applicable to Percentages At or Near These Levels				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
2,000 interviews	1%	2%	2%	2%	2%
1,000 interviews	2%	2%	3%	3%	3%
500 interviews	3%	4%	4%	4%	4%
250 interviews	4%	5%	6%	6%	6%
100 interviews	6%	8%	9%	10%	10%

Additional Sampling Tolerances for Samples of 1,000 Interviews

9% or 91%	8% or 92%	7% or 93%	6% or 94%	5% or 95%
2%	2%	2%	1%	1%
4% or 96%	3% or 97%	2% or 98%	1% or 99%	
1%	1%	1%	.2%	

Sampling Tolerances When Comparing Two Samples

Tolerances are also involved in the comparison of results from independent parts of any one Opinion Research Corporation's CARAVAN sample and in the comparison of results between two independent CARAVAN samples. A difference, in other words, must be of at least a certain number of percentage points to be considered statistically significant. The table below is a guide to the sampling tolerances in percentage points applicable to such comparisons, based on a 95% confidence level.

Differences Required for Significance At Size of Samples or Near These Percentage Levels Compared					
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
1,000 and 1,000	3%	4%	4%	4%	4%
1,000 and 500	3%	4%	5%	5%	5%
1,000 and 250	4%	6%	6%	7%	7%
1,000 and 100	6%	8%	9%	10%	10%
500 and 500	4%	5%	6%	6%	6%
500 and 250	5%	6%	7%	7%	8%
500 and 100	6%	9%	10%	11%	11%
250 and 250	5%	7%	8%	9%	9%
250 and 100	7%	9%	11%	11%	12%
100 and 100	8%	11%	13%	14%	14%

Definition Of Classification Terms

The following definitions are provided for some of the standard demographics by which the results are tabulated. Other demographics are self explanatory.

Geographic Region

The continental states are contained in four geographic regions as follows:

North East

New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut

Middle Atlantic: New York, New Jersey, Pennsylvania

North Central

East North Central: Ohio, Indiana, Illinois, Michigan, Wisconsin

West North Central: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas

South

South Atlantic: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida

East South Central: Kentucky, Tennessee, Alabama, Mississippi

West South Central: Arkansas, Louisiana, Oklahoma, Texas

West
Mountain: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada
Pacific: Washington, Oregon, California

Significance Testing

When results from sub-groups of a CARAVAN sample appear in the detailed tabulations, an indicator of statistically significant differences is added to the tables run on our standard demographic banners. The test is performed on percentages as well as mean values. Each sub-sample is assigned a letter. When the percentage of one sub-sample is significantly different from the percentage of another sub-sample, the letter representing one of the two samples appears next to the percentage (or mean) of the other sample.

For instance the percentage of males answering yes to a particular question may be compared to the percentage of females answering yes to the same question. In the example on the next page, the male sample is assigned the letter B, and the female sample is assigned the letter C. Here, respondents were asked whether a certain business practice is acceptable. 67% of women said that it was -- a proportion significantly greater than the 57% of males who believe that the practice is acceptable. To indicate that women are significantly more likely to find the practice acceptable than are men, the letter B -- the letter assigned to the male sub-sample -- appears next to the “67%” in the female column. Similarly, the 37% of men that find the practice unacceptable is significantly greater than the 29% of women who do so and, therefore, the letter C -- the letter assigned to the female sub-sample -- appears next to the “37%” in the male column.

Significance testing is done to the 95% confidence level.

