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July 12, 2010

The Honorable Carl Levin
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Ranking Member
Committee on Armed Services
United States Senate

The Honorable Ike Skelton
Chairman
The Honorable Howard P. McKeon
Ranking Member
Committee on Armed Services
House of Representatives

Subject: *Human Capital: Quality of DOD Status of Forces Surveys Could Be Improved by Performing Nonresponse Analysis of the Results*

The Defense Manpower Data Center (DMDC) conducts a series of Web-based surveys called Status of Forces surveys,[1] which help enable decision makers within the Department of Defense (DOD) to (1) evaluate existing programs and policies, (2) establish baselines before implementing new programs and policies, and (3) monitor the progress of programs and policies and their effects on the total force.[2] In recent years, we have discussed the results of these surveys in several of our reports.[3] While we have generally found the survey results to be sufficiently reliable for the purposes of our reporting, several of our reports have

[1]The Status of Forces surveys include a survey of active duty military personnel, called the Status of Forces Active Duty Survey; a survey of reserve military personnel, called the Status of Forces Reserve Survey; and a survey of civilian employees, called the Status of Forces Survey of Civilian Employees. These surveys include outcome, or "leading indicator," measures for these individuals such as overall satisfaction, retention intention, and perceived readiness, as well as demographic items needed to classify individuals into various subpopulations.

[2]Specifically, DMDC is DOD's repository for departmentwide data and is a key support organization that, among other things, generates reports for decision makers in the Office of the Secretary of Defense, the military services, and the Joint Staff. External organizations such as GAO and federally funded research and development centers also rely on DMDC for quantitative data and analyses pertaining to a wide variety of issues, such as the number of DOD personnel in specified occupations or demographic groups, and DOD personnel's attitudes toward various DOD programs and policies.

[3]See, for example, GAO, *Human Capital: Monitoring of Safeguards and Addressing Employee Perceptions Are Key to Implementing a Civilian Performance Management System*, GAO-10-102 (Washington, D.C.: Oct. 28, 2009); *Military Personnel: Reserve Component Servicemembers on Average Earn More Income while Activated*, GAO-09-688R (Washington, D.C.: June 23, 2009); *Human Capital: DOD Needs to Improve Implementation of and Address Employee Concerns about Its National Security Personnel System*, GAO-08-773 (Washington, D.C.: Sept. 10, 2008); *Military Personnel: Federal Management of Servicemember Employment Rights Can Be Further Improved*, GAO-06-60 (Washington, D.C.: Oct. 19, 2005); and *Military Personnel: DOD's Tools for Curbing the Use and Effects of Predatory Lending Not Fully Utilized*, GAO-05-349 (Washington, D.C.: Apr. 26, 2005).

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discussed low response rates and the potential for bias in the survey results.[4] Nonresponse analysis is an established practice in survey research that helps determine whether nonresponse bias (i.e., survey results that do not accurately reflect the population) might occur due to under- or overrepresentation of some respondents' views on survey questions.[5] When nonresponse analysis is performed, survey researchers can use the results to select and adjust the statistical weighting techniques they use that help ensure that survey results accurately reflect the survey population.[6]

Because we have noted, in reports referring to the Status of Forces surveys, the potential for bias and because of DMDC's role in supporting DOD decision making, we initiated this review under the Comptroller General's statutory authority to conduct evaluations on his own initiative. Specifically, our objective was to determine the extent to which DMDC performs nonresponse analysis of the results of its Status of Forces surveys to determine whether reported results of respondents' views might be under- or overrepresented.

To address our objective, a team that included GAO social science analysts with survey research expertise and GAO's Chief Statistician (1) reviewed relevant documentation provided by DMDC regarding the survey methods used for the Status of Forces surveys, (2) interviewed DMDC survey officials who had knowledge of or were involved in the development and administration of the surveys, and (3) reviewed the response rates for the Status of Forces surveys conducted since 2003. We conducted this performance audit between November 2009 and May 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

DMDC Does Not Regularly Perform Nonresponse Analysis of the Results of Its Status of Forces Surveys, and It Lacks Guidance Specifying When and How Such Analysis Should Be Performed

Although DMDC has conducted some research to assess and monitor the effects of nonresponse bias in its Status of Forces surveys in the past, it lacks guidance specifying when and how additional analysis of the results of its Status of Forces surveys should be performed in order to determine the extent of differences between survey respondents and nonrespondents. Leading survey research professional organizations, such as the American Association for Public Opinion Research, recognize nonresponse analysis as a sound method for assessing whether nonresponse bias might cause under- or overrepresentation of respondents' views on survey questions. Further, survey research guidelines issued by the Office of Management and Budget state that nonresponse analysis should be performed when survey response rate is below 80 percent, so as to identify the possibility of bias in a survey's results.[7] Although these guidelines are not mandated for internal personnel surveys such as

[4]See, for example, GAO-08-773, GAO-06-60, and GAO-05-349.

[5]Nonresponse analysis may be performed using a variety of methods—for example, by randomly selecting a sample of survey nonrespondents and surveying them to obtain answers to key survey questions. Nonresponse analysis may be completed on more than one occasion, depending on how frequently a survey is administered.

[6]For example, if the population being surveyed is 50 percent male and 50 percent female, the survey results could be weighted to reflect this demographic characteristic.

[7]Office of Management and Budget, *Standards and Guidelines for Statistical Surveys*, September 2006.

the Status of Forces surveys, as we have previously reported,[8] they reflect generally accepted best practices in the field of survey research and are relevant for the purposes of assessing whether the results of a survey are representative of the population being surveyed.

In addition to our prior work discussing low response rates and the potential for bias in the Status of Forces surveys, we have also noted the need for caution when interpreting the results of federal surveys with low response rates.[9] In our review of the various Status of Forces surveys conducted since 2003, we found that the response rates have been between 28 percent and 40 percent for the Status of Forces Active Duty Survey; between 25 percent and 42 percent for the Status of Forces Reserve Survey; and between 55 percent and 64 percent for the Status of Forces Survey of Civilian Employees. While response rates alone are not sufficient indicators for determining the quality of survey results, we note—and DMDC survey officials recognize—that the Status of Forces surveys have had generally low response rates as compared with some other federal surveys. By not performing nonresponse analysis to identify the possibility for nonresponse bias in the results of its various Status of Forces surveys, DMDC survey officials may not have the information needed to adjust their statistical weighting techniques so as to ensure their survey results reflect the population being surveyed.

As mentioned previously, DMDC lacks guidance specifying when and how agency staff should assess the results of the Status of Forces surveys for nonresponse bias. Further, we found that since DMDC last conducted research on nonresponse bias and its Status of Forces surveys—in a study it conducted in 2007—DMDC has taken no steps to strengthen its understanding of the effects of nonresponse bias, even though its study noted that performing nonresponse analysis should be a priority for the agency. This is a concern, especially since DMDC's study also noted, for some of its survey measures, the existence of systematic nonresponse errors that had not been corrected by DMDC's current statistical weighting techniques. DMDC survey officials acknowledge the need to perform additional research on nonresponse bias. However, a senior DMDC survey official also told us that no additional research on nonresponse bias is planned at this time because of, among other things, a greater focus at this time in fielding surveys versus performing methodological evaluation. Without guidance for performing additional nonresponse analysis, DMDC's ability to identify and address the potential for nonresponse bias within the Status of Forces surveys is hindered.

[8]GAO, *Army Health Care: Progress Made in Staffing and Monitoring Units that Provide Outpatient Case Management, but Additional Steps Needed*, GAO-09-357 (Washington, D.C.: Apr. 20, 2009).

[9]For examples of our work on federal surveys other than the Status of Forces survey, see GAO-09-357; *Aviation Security: Federal Air Marshal Service Has Taken Actions to Fulfill Its Core Mission and Address Workforce Issues, but Additional Actions Are Needed to Improve Workforce Survey*, GAO-09-273 (Washington, D.C.: Jan. 14, 2009); and *Elections: Absentee Voting Assistance to Military and Overseas Citizens Increased for the 2004 General Election, but Challenges Remain*, GAO-06-521 (Washington, D.C.: Apr. 7, 2006).

Conclusion

The Status of Forces surveys provide decision makers within the DOD community valuable information that is used to evaluate and monitor the progress of various defense programs and policies. This community could derive significant further benefit, however, if DMDC were to perform additional nonresponse analysis of its Status of Forces survey results. Specifically, performing nonresponse analysis—an established practice in survey research—could help DMDC improve the quality of the Status of Forces surveys by identifying the potential for nonresponse bias within its Status of Forces surveys. Taking steps to then address any bias found—such as adjusting the statistical weighting techniques used—could help strengthen the quality of the survey results over time, thereby enabling decision makers and other users of the survey results to better understand the perspectives of DOD personnel regarding the department's various programs and policies.

Recommendation for Executive Action

To better determine the effects of nonresponse bias on the Status of Forces survey results, we recommend that you direct the Director of DMDC to develop and implement guidance both for conducting nonresponse analysis and for using the results of nonresponse analysis to inform DMDC's statistical weighting techniques, as part of the collection and analysis of the Status of Forces survey results.

Agency Comments and Our Evaluation

In its written comments responding to a draft of this report, DMDC concurred with our recommendation. DMDC's comments are reprinted in enclosure I.

In these comments, DMDC stated that it understands our concerns regarding response rates and the lack of recurring nonresponse bias studies for its Status of Forces surveys. DMDC also stated that it concurs with us on the benefits of developing a systematic program to continually monitor the impact of nonresponse bias for its surveys. To that end, DMDC stated that it will take several actions to address our recommendation. These actions include developing plans to periodically assess the effect of nonresponse on its survey results by performing formal nonresponse bias studies, testing its approach and developing alternative approaches if necessary, and developing a comprehensive plan and guidance to continually monitor for nonresponse bias in its Status of Forces surveys. We commend DMDC for committing to actions that could help it better determine the effects of nonresponse bias in its studies, and note that such actions, if taken, would constitute steps in the right direction.

We note that, in its cover letter accompanying these comments, DMDC stated that it disagreed with our observation that "DMDC does not regularly perform nonresponse analysis of the results of its status of forces surveys, and it lacks guidance specifying when and how such analysis should be performed," noting that, while it does not formally perform nonresponse analysis, it continually monitors changes in response rates and potential nonresponse bias. While we acknowledge that DMDC takes some steps to address nonresponse—for example, monitoring response rates for a fixed set of variables and incorporating statistical weighting techniques in its survey estimates—monitoring response rates without performing more in-depth nonresponse analysis may not necessarily identify problems with nonresponse bias. In addition, during the course of our review, DMDC survey officials told us that they did not have any written policy or guidance in place on performing nonresponse analysis.

We are sending copies of this report to the Secretary of Defense, the Under Secretary of Defense for Personnel and Readiness, the Director of DMDC, and interested congressional committees. In addition, this report will be available at no charge on GAO's Web site at http://www.gao.gov.

If you or your staff have any questions about this report, please contact Brenda S. Farrell at (202) 512-3604 or farrellb@gao.gov, or Ronald S. Fecso at (202) 512-7791 or fecsor@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report include Marion A. Gatling, Assistant Director; James D. Ashley; Virginia A. Chanley; Wesley A. Johnson; Lonnie J. McAllister; and Cheryl A. Weissman. Other contributors include Jill N. Lacey and Jennifer L. Weber.

Brenda S. Farrell
Director, Defense Capabilities and Management

Ronald S. Fecso
Chief Statistician

Comments from the Defense Manpower Data Center

DEPARTMENT OF DEFENSE
HUMAN RESOURCES ACTIVITY
DEFENSE MANPOWER DATA CENTER
1600 WILSON BOULEVARD SUITE 400
ARLINGTON VA 22209-2593

JUN 24 2010

Ms. Brenda S. Farrell, Director, Defense Capabilities and Management
Mr. Ronald S. Fecso, Chief Statistician
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Farrell and Mr. Fecso:

Enclosed is the Department of Defense response to the GAO report, GAO-10-751R, "Human Capital: The Defense Manpower Data Center Could Improve the Quality of the Status of Forces Surveys by Performing Nonresponse Analysis of the Results," dated May 27, 2010 (GAO Code 351398).

DMDC thanks the GAO for the opportunity to respond to GAO report, GAO-10-751R. Although DMDC concurs with the GAO recommendation, we want to point out that the department disagrees with the report where it states, "DMDC does not regularly perform nonresponse analysis of the results of its status of forces surveys, and it lacks guidance specifying when and how such analysis should be performed." DMDC continually monitors response rates across multiple detailed demographic and geographic groups, including but not limited to branch of service, pay grade, geographic location (U.S. versus overseas), deployment status, gender, and race. While DMDC does not formally call this program nonresponse analysis, we continually monitor changes in potential nonresponse bias through analysis of respondent sample composition relative to nonrespondents.

DMDC statisticians assert that SOFS surveys likely have lower levels of nonresponse bias than surveys with much higher response rates because generally survey organizations know very little about survey nonrespondents, and consequently have limited accessible data to assist with nonresponse adjustments. For instance, in telephone surveys, the survey organization may only know limited geographic data based on the telephone exchange for "ring-no answer" cases. For household interview surveys, the surveyor may have outdated knowledge (usually Census data) of characteristics of the block (e.g., percent Hispanic).

DMDC has an uncommon and advantageous position as a surveyor by maintaining extremely detailed, complete, and timely administrative data for our entire survey frames. Due to this complete sampling frame, DMDC has more extensive information regarding the characteristics of survey nonrespondents prior to conducting nonresponse analysis studies than most other survey organizations know after such studies. For the SOFS program, DMDC uses this thorough knowledge of nonrespondents both for statistical

imputations for item-missing data and nonresponse and post-stratification weighting adjustments to compensate for unit nonresponse. Both of these procedures are specifically designed to reduce nonresponse bias in SOFS estimates.

Beginning with the first test of the SOFS in 2002, DMDC has periodically included tests of methodology differences affecting response rates and data quality. Such tests have concluded that a follow-up paper survey increases response rates by around seven percentage points without significantly or meaningfully changing estimates from the survey. Other tests have concentrated on contact methods that can improve response rates or at least not adversely impact response rates while lowering costs.

For all SOFS surveys, DMDC statisticians consider survey estimates representative of their respective populations, allowing the results to be effectively used in program evaluation, policy decisions, and program planning and execution. While DMDC is confident in its survey program, we will investigate the advantages of an external review panel established by an organization such as the National Research Council.

Sincerely,

Mary Snavely-Dixon

Mary Snavely-Dixon
Director

Enclosure:
As stated

GAO draft report, GAO-10-751R, "Human Capital: The Defense Manpower Data Center Could Improve the Quality of the Status of Forces Surveys by Performing Nonresponse Analysis of the Results," dated May 27, 2010 (GAO Code 351398).

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO RECOMMENDATIONS

RECOMMENDATION 1: To better determine the effects of nonresponse bias on the Status of Forces (SOFS) survey results, the GAO recommends that the Secretary of Defense direct the Director of the Defense Manpower Data Center (DMDC) develop and implement guidance both for conducting nonresponse analysis and for using the results of nonresponse analysis to inform DMDC's statistical weighting techniques, as part of the collection and analysis of the Status of Forces survey results.

DOD RESPONSE: Concur. DMDC understands GAO's concerns regarding response rates and lack of recurring nonresponse bias studies in the SOFS program, but a low response rate, in and of itself, is not indicative of a flawed study, nor does the lack of specific nonresponse analysis indicate that the original survey results are not statistically valid. Groves (2006) shows that, "...if we examine in a meta-analytic way what the survey methodological literature finds for the linkage between nonresponse rates and nonresponse biases, we find large nonresponse biases for some statistics but no strong empirical relationship between response rates and nonresponse bias."[1]

DMDC concurs with the GAO regarding the benefits of developing a systematic program to continually monitor the impact of nonresponse on survey results in the SOFS program. To address GAO's concerns, DMDC will develop plans to periodically assess the effect of nonresponse on SOFS survey estimates through formal nonresponse bias studies. In support of the Federal Voting Assistance Program (FVAP), DMDC will conduct two nonresponse bias studies in the winter 2010 on post-election voting surveys on behalf of FVAP. The study methodology consists of contacting survey nonrespondents by telephone and asking a subset of key survey questions. To assess nonresponse bias, DMDC will compare responses from initial survey respondents to survey nonrespondents converted to response by the more expensive telephone mode. There will also be a comparison group of individuals initially contacted by phone. If the telephone nonresponse follow-up method proves effective in the voting surveys, judged by response rates to the nonresponse follow-up study and substantive, statistically significant differences in the estimates of key analysis variables, DMDC will further test these methods in

[1] Groves, Robert M (2006). "Nonresponse Rates and Nonresponse Bias in Household Surveys." Public Opinion Quarterly, 70(5):646-675.

the SOFS program starting in 2011, and completing studies for the active duty, Reserve, and civilian SOFS by 2012. If this method proves ineffective, DMDC will develop alternate plans to assess SOFS nonresponse bias and test these plans in 2011. Based on the results of these studies, DMDC will develop a comprehensive plan and guidance to continually monitor nonresponse bias in the SOFS program.

(351398)

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