Cognitive Changes and Retirement among Senior Surgeons (CCRASS): Results from the CCRASS Study

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**BACKGROUND:** Because individuals age cognitively at different rates, there is considerable interest in ways to assure that older surgeons have the physical and mental stamina, coordination, reaction time, and judgment to provide appropriate care. To clarify potential relationships between cognitive changes related to aging, the decision to retire, and changes in patterns of surgical practice, this study aimed to identify specific parameters of cognitive change among senior surgeons.

**STUDY DESIGN:** Computerized cognitive tasks measuring sustained attention, reaction time, visual learning, and memory were administered to 359 surgeons at the annual meetings of the American College of Surgeons over a 6-year period. A self-report survey was also administered to assess subjective cognitive changes and the status of surgical practice and retirement decisions.

**RESULTS:** Expected age-related cognitive decline was demonstrated on all measures, although measured reaction time was notably better than age-appropriate norms. There was a marked relationship between self-reported subjective cognitive change and retirement status, but not to changes in surgical practice. There was no notable relationship, however, between subjective cognitive change and objective cognitive measures. There were marked relationships between age and retirement decision or status and between age and changes in surgical practice.

**CONCLUSIONS:** These results suggest that although self-perceived cognitive changes play a role in the decision to retire, they are not related to objective measures of cognitive change, and are not reliable in the decision to retire. The development of readily accessible measures of cognitive changes related to aging may serve to assist decisions either to continue surgical practice or to retire. (J Am Coll Surg 2008;207:69–79. © 2008 by the American College of Surgeons)

Aging is a complex and inescapable phenomenon that affects physicians and their patients. Most surgeons begin to reduce their operative workload considerably after 60 years of age, but approximately 17% continue to operate after 70 years of age, according to a survey reported in 1994.1 In a larger sampling of the American College of Surgeons in 1993, the most common reason for retirement was “malpractice climate;” fear of loss of competence was admitted by fewer surgeons.2 The logic behind the decision to retire and the role of perceived or confirmed cognitive decline remain unknown.

Neuropsychological tests demonstrate that cognitive efficiency decreases with old age, especially after 75 years of age.3 In addition to a generalized effect on multiple functions, there are specific sensory changes in vision, visual processing speed, and hearing. Also there is a decline in memory that affects recall more than recognition memory, and a decline in reasoning and executive functions related to general planning, arranging, and initiating. Although there is an increase in accumulated wisdom and verbal knowledge, there is an overall decline in cognitive processing efficiency.4

Recent studies have found that older and longer-practicing physicians possess less factual knowledge, are less likely to adhere to appropriate standards of care, and may have poorer patient outcomes than younger physicians.5 For surgeons, aging reflected by 20 or more years since licensure has been associated with higher mortality rates after carotid endarterectomy.6 Similarly, surgeons older...
than 60 years of age have been shown to have higher operative mortality rates for complex procedures such as coronary artery bypass grafting and pancreatectomy, predominantly when associated with low procedure volumes. We have suggested that when cognitive compromise occurs, surgical errors may result from limitations in combined visual and information processing, increased frustration, or the sustained attention necessary to complete long procedures. Because individuals age cognitively at different rates, there is considerable interest in ways to assure that older surgeons have the physical and mental stamina, coordination, reaction time, and judgment to provide appropriate care.

To clarify potential relationships between cognitive changes related to aging, the decision to retire, and changes in patterns of surgical practice, this study was designed to identify specific parameters of cognitive change among senior surgeons.

**METHODS**

**Study design**
A previous study of the relationship between performance on cognitive tasks and operative skill suggested that the cognitive domains of visual-spatial organization, stress tolerance, and psychomotor abilities were related to rating of resident surgical skills. We chose to administer three subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) that map to these and other domains. The subtests consisted of computerized measures of visual sustained attention (rapid visual information processing, RVIP), which would also address stress tolerance; reaction time (RTI), which would also address psychomotor abilities; and visual learning and memory (paired associates learning; PAL), which would also map to visual-spatial organization. RVIP measures the ability to identify three specific sequences of digits from among rapidly presented single digits, and RTI measures speed of touching colored dot stimuli on a computer touchscreen after presentation. PAL measures the ability to learn correct locations of visual stimuli among an increasing number of hidden location choices. CANTAB is widely used in clinical trials and has had norms developed in large groups of elderly individuals. It is easily transported and can be administered to those without earlier exposure to computers, minimizing cohort effects. Verbal learning and memory tasks were not included to eliminate potential language-related (ie, primary foreign language) influence on test results.

To assess patterns of practice and retirement planning, we administered a survey of self-appraisal of surgical practice and plans for retirement (Appendix). This assessed subjective information about surgical practice, retirement status or plans, changes in clinical practice, and changes in cognitive functioning during the previous 5 years. Information on alcohol and medication use within the previous 24 hours was also obtained.

**Data collection**
With the support of the American College of Surgeons (ACS), a booth at the annual Clinical Congress was used from 2001 through 2006 to administer the CANTAB tests and the survey of surgical practice and retirement. Both were completed in approximately 30 minutes. Surgeons were recruited to participate using video presentations in buses transporting attendees, announcements in the Congress newsletter, and signage. The study was approved by the Institutional Review Board at the University of Michigan, and all volunteers signed informed consent. Confidentiality and protection from legal discovery were provided by sending the results only to the surgeon’s personal physician. There were 359 surgeons, aged 45 years and older, who volunteered to participate between 2001 and 2005. Ninety-four of them were retested during the meetings in 2005 and 2006. Two hundred ninety-four also completed the self-report survey. Surgeons were given token novelty items for their participation (eg, pocket knives, stress balls).

**Statistical analysis**
Analyses were performed in the Neuropsychology Section at the University of Michigan by the authors using the SPSS Release for Windows, Version 14.01. Number of alcoholic drinks and medications consumed in the previous 24 hours were entered as covariates in multivariate analyses of covariance (MANCOVA), where appropriate. First, analyses of variance (ANOVAS) and chi-square analyses were conducted, as appropriate, to describe the surgeons who completed the self-report information about case load, cognitive functioning, practice arrangements, and retirement decisions. Second, a MANCOVA was conducted to compare age groups in cognitive function, separated into 5-year increments. Third, MANCOVAs were also conducted to determine if any gender differences in cognitive function were present in those matched by age group and

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**Abbreviations and Acronyms**

- CANTAB = Cambridge Neuropsychological Test Automated Battery
- M = mean age
- PAL = paired associates learning
- RTI = reaction time
- RVIP = rapid visual information processing

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practice. Fourth, the decision about when to retire was used in MANCOVAs to determine whether it was related to cognitive function. Fifth, a series of chi-square analyses were conducted to determine the ability of surgeons to self-identify cognitive decline. Finally, repeated measures ANOVA was conducted in a subset of surgeons to ascertain any interval change between time 1 and time 2 in any of the cognitive tests used. For all analyses, main effects and interaction effects were examined for statistical significance. If significant, then post hoc tests were conducted to address the specific relationships between age and test variables.

The specific cognitive variables of interest for analyses were:

1. RVIP: The mean latency (milliseconds) to make a response, the probability of making a correct response (hits), and the probability of making an incorrect response (false alarms).
2. RTI: Speed of response on a five-choice presentation from release of the resting platform (reaction time) to the target (movement time).
3. PAL: Number of trials to learn correct stimulus locations at all stages of complexity and the number of errors incurred when learning the locations at all stages.

RESULTS

Demographic and clinical practice information

Three hundred thirty men and 29 women volunteered for the study, with a mean age (M) of 61.4 years (SD = 8.61 years, range 45 to 86 years). The female group was considerably younger than the male group (male M = 62.2 years [SD = 8.4 years], female M = 53.1 years [SD = 6.7 years], t_{357} = 5.7, p < 0.0001). There were 62 surgeons in the study who were already retired, with a mean age of 70.3 years (SD = 5.48 years, range 60 to 84 years).

Self-report changes in clinical practice, cognitive functioning, and recreational activities with age

Because of some missing forms among the self-report surveys, these data were available for between 286 and 294 participants; the degrees of freedom in each analysis indicate slight variances in participants used for each analysis. Some descriptive data for the surgeons, with significant chi-square analyses, are illustrated in Figure 1. There was an age-related decrease in volume of patients (chi-square = 51.47, p = 0.0001), decrease in complexity of cases (chi-square = 34.91, p = 0.0001), decreased mastery of new technologic developments (chi-square = 54.12, p = 0.0001), and a decrease in name recognition (chi-square = 14.18, p = 0.03). There was no age-related decrease in self-reported memory recall (chi-square = 5.21, p = 0.52). There were also no changes in recreational sports activities with age (chi-square = 9.82, p = 0.63), nor were there changes in age-related visual adaptations for reading the newspaper (chi-square = 19.40, p = 0.08).

Objective cognitive performance in surgeons from different age groups

These analyses were conducted excluding retired physicians. For the rapid visual information processing test, there was a marked effect of age on increased mean response latency (F_{6, 225} = 5.53, p = 0.002) and decreased probability of a hit (F_{1, 225} = 2.75, p = 0.01), but no notable age effect on probability of a false alarm (F_{1, 225} = 0.71, p = 0.64). There were no marked effects of alcohol consumption (F_{1, 213} = 0.63, p = 0.43) or of medication use (F_{1, 213} = 1.63, p = 0.20) on the measures of interest (Fig. 2).

Both five-choice reaction time and movement time showed considerable decline with age, as can be seen in Figure 3 (F_{6, 207} = 4.39, p = 0.0001). There were no considerable effects of medication use (F_{1, 207} = 0.93) on either variable, but there was a notable interaction between alcohol use and five-choice reaction time (F_{1, 207} = 6.26, p = 0.01). But surgeons who reported that they had not consumed any alcohol in the previous 24 hours had slower reaction times than those who consumed more than two (p < 0.0001) and more than six drinks (p < 0.003) in the same time period (F_{2, 225} = 9.00, p = 0.0001). There was no age difference among different groups of consumers of alcohol (F_{2, 225} = 0.21, p = 0.81).

For the paired associates learning (PAL, Fig. 4) test,
the number of stages it took the surgeons to learn correct stimulus locations on the first trial decreased considerably with age, and the mean number of errors incurred in learning all stimulus locations increased markedly with age (F_{6, 163} = 6.36, p < 0.0001). There were no effects of alcohol consumption (F_{1, 163} = 0.01, p = 0.94) or medications (F_{6, 163} = 0.22, p = 0.64) on either measure.

Gender differences in practicing surgeons
An age-matched group of male (n = 92, M = 53.16 years, SD = 3.88 years) and female (n = 22, M = 52.09 years, SD = 5.67 years) surgeons were compared on each of the cognitive tests. There were no effects of gender on RVIP measures (F_{1, 105} = 0.70, p = 0.40), but there was a notable effect on five-choice reaction time and movement time (F_{1, 102} = 4.11, p = 0.05), with slower performance in women on both subtests. On PAL, female surgeons had fewer mean errors and more levels completed on the first trial than male surgeons (F_{1, 78} = 4.24, p = 0.04; Fig. 5).

Relationship between retirement decision and objective cognitive functioning
The survey form provided four choices for decisions related to retirement: Already retired, plan to retire within 5 years, plan to retire when it is perceived that surgical skills are declining, and plan to retire at a certain age. Each of the four groups was markedly different in age from the other three, with the oldest surgeons already retired (M = 70.3 years, SD = 5.5 years). The next younger group contained those who planned to retire in 5 years (M = 62.2 years, SD = 7.2 years), then those retiring when surgical skills had declined (M = 58.9 years, SD = 8.9 years), and finally, those retiring at a predetermined age (M = 55.4 years, SD = 5.6 years). Accordingly, age was entered as a covariate in addition to alcohol consumption and medications for each of the test variables.

Age was a major covariate with retirement decision for all three RVIP variables (F_{1, 270} = 23.11, p = 0.0001). Retirement decision or status was not notable for any of the three RVIP variables (F_{3, 270} = 1.52, p = 0.21), nor was alcohol consumption (F_{1, 270} = 3.07, p = 0.08), or medication (F_{1, 270} = 0.46, p = 0.50).

Age was a major covariate with retirement decision for five-choice reaction time and movement time (F_{1, 263} = 16.70, p = 0.0001). There was no effect of retirement decision on the five-choice reaction time (F_{3, 263} = 0.97, p = 0.41). Also, recent alcohol (F_{1, 263} = 1.92, p = 0.17) and medication use (F_{1, 263} = 0.73, p = 0.39) did not considerably affect five-choice reaction time or movement time.
Age was also a major covariate with retirement decision on both PAL variables \((F_{1, 211} = 35.16, p < 0.0001)\). Again, there was no marked effect of retirement decision for either PAL variable \((F_{3, 263} = 0.60, p = .62)\). There was no effect on the PAL variables caused by either alcohol \((F_{1, 263} = 0.001, p = 0.97)\) or medication use \((F_{1, 263} = 0.19, p = 0.66)\).

To examine the effects of retirement decision alone, each retirement group was equated for age by selecting for comparison those less than 67 years of age in the retired group \((M = 63.1 \text{ years, } SD = 1.8 \text{ years})\), the entire group that planned to retire within 5 years \((M = 62.2 \text{ years, } SD = 7.2 \text{ years})\), those older than 57 years of age in the group that would retire when they thought they were losing their skills \((M = 62.0 \text{ years, } SD = 7.5 \text{ years})\), and those over 56 years of age who indicated they would retire at a certain age \((M = 60.5 \text{ years, } SD = 3.9 \text{ years})\). When age differences were removed, there was no considerable effect of retirement decision for any of the PAL or RVIP variables. For the RTI, there was an effect of retirement decision on movement time but not reaction time \((F_{3, 179} = 2.73, p = 0.045)\). Here, the retired group had considerably slower movement time compared with the other three groups \((ps = 0.04 – p = .06, \text{ Fig. 6})\). There was decreasing reaction time with increasing alcohol consumption and increasing movement time associated with increasing number of drinks consumed \((F_{1, 179} = 4.45, p = 0.04)\), but not medications \((F_{1, 179} = 1.85, p = 0.18)\) in this group of retired surgeons.

**Relationship between retirement decision and subjective cognitive functioning**

To examine the effects of subjective cognitive functioning on retirement status, we conducted two chi-square analyses, one with retirement decision or status and memory recall change, and the second with retirement decision or status and name recognition change. There was no difference in age between those who did and did not think that their memory recall had declined. The chi-square of retirement decision or status and memory recall change was considerable \((\text{chi-square} = 16.8, n = 262, p = 0.001)\),
with a higher proportion of surgeons in the currently retired and “retire in the next 5 years” groups indicating memory recall declines (49% and 51%, respectively) compared with the “retire at predetermined age” and “retire when lose skills” groups (22% and 33%, respectively). For surgeons who thought their name recognition had declined, there was a slight difference in age. By removing surgeons below 50 years of age in the “not declined” group, we were able to equate these two groups in age ($t_{242} = -0.94$, $p = 0.35$). The chi-square analysis of name recognition changes (yes or no) versus the four retirement decisions showed no significant differences.

Figure 4. Performance on the paired associate learning task indicated that with increasing age, the mean number of errors per trial increased, and the number of stages where the correct responses were made on the first trial decreased. a, Posthoc analyses indicated that the 45 to 59, 50 to 54, 55 to 59, and 60 to 64 years of age groups had a greater number of stages to learn correct stimulus locations on the first trial in comparison with the 75+ years of age group ($p < 0.05$). b, The 45 to 49 and 50 to 54 years of age groups had considerably fewer errors per trial in comparison with the 60 to 64, 65 to 69, 70 to 74, and 75+ years of age groups ($p < 0.05$). c, The 55 to 59 years of age group had considerably fewer errors per trial in comparison with the 65 to 69, 70 to 74, and 75+ years of age groups ($p < 0.05$). d, The 60 to 64 and 59 to 65 years of age groups had considerably fewer errors per trial in comparison with the 70 to 74 and 75+ years of age groups ($p < 0.05$).

Figure 5. On the paired associated learning task, female surgeons had considerably fewer mean errors per trial compared with male surgeons (* $p < 0.05$); there was no difference between genders on the number of stages where the correct responses were made on the first trial.

Figure 6. The retired surgeons group had considerably slower five-choice movement time in comparison with the other three nonretired groups (*$p < 0.05$); no difference existed among the groups in five-choice reaction time.
tion or status groups was considerable (chi-square = 8.5, \( n = 240, p < 0.04 \)), with the same pattern of greater belief in recognition impairment in the retired and "retire in 5 years" groups (56% and 48%, respectively) compared with the "retire at predetermined age" and "retire when lose skills" groups (32% and 34%, respectively).

Surgeon awareness of cognitive performance and decline

We then investigated whether participants' perception of cognitive changes was related to their performance on cognitive tasks. For this purpose, surgeons who were already retired were excluded from the data analysis. In the self-report survey, participants were asked whether there had been any perceived change in their name recognition or memory recall. There was no marked effect of age on self-reported memory recall, as noted in Figure 1. There was also no notable relationship between the perception of difficulty in memory recall during the past 5 years and cognitive task performance on PAL measures (\( F_{1, 147} = 0.10, p = 0.75 \)), RVIP measures (\( F_{1, 192} = 1.11, p = 0.29 \)), or the reaction time measure (\( F_{1, 188} = 0.01, p = 0.91 \)). There was also no notable relationship between name recognition changes during the past 5 years and performance on PAL (\( F_{1, 145} = 1.06, p = 0.31 \)), RVIP (\( F_{1, 194} = 0.53, p = 0.47 \)), or reaction time (\( F_{1, 186} = 1.19, p = 0.28 \)).

Similarly, there was no notable relationship between surgeons perceived decline in complexity of cases handled and performance on PAL (\( F_{1, 145} = 1.06, p = 0.31 \)), RVIP (\( F_{1, 194} = 0.53, p = 0.47 \)), or reaction time (\( F_{1, 186} = 1.19, p = 0.28 \)). Although there was no marked effect of reported decline in volume of cases for RVIP (\( F_{2, 217} = 2.63, p = 0.08 \)) and reaction time (\( F_{2, 211} = 2.08, p = 0.13 \)), there was a pronounced effect on PAL with increased mean errors per stage (\( F_{2, 167} = 4.36, p = 0.01 \), Fig. 7).

Changes in surgeons' cognitive functioning with time

Finally, surgeons were retested at intervals between 1 and 6 years postbaseline testing (\( M = 3.2 \) years, SD = 1.0 years) with repeated measures ANCOVAs. Years from test 1 to test 2 were entered as a covariate to control for length of time between tests. There was no overall marked change between test-retest results (\( F_{1, 89} = 0.007, p = 0.05 \)), nor was there a notable interaction (\( F_{1, 89} = 0.11, p = 0.75 \)) between task variable for five-choice reaction time task and testing interval. There appeared to be a trend toward a marked change over time for the PAL measures (\( F_{1, 85} = 3.32, p = 0.07 \), Fig. 8), but no interaction between the two PAL variables and time between testings (\( F_{1, 85} = 0.08, p = 0.78 \)). There was actually a decrease in mean number of errors per trial.

On RVIP measures over the test-retest interval (Fig. 9), mean latency of response increased (\( t_{1, 91} = 3.78, p = 0.001, r = 0.41 \)), though the probability of a hit (\( t_{1, 91} = -1.56, p = 0.12, r = 0.64 \)) and the probability of a false alarm (\( t_{1, 91} = -0.95, p = 0.35, r = 0.43 \)) did not change considerably.

DISCUSSION

We usually associate the decision to retire with aging, but the rationale for this important decision remains unknown. Cognitive changes may play a role, but in a
sample of 1,002 MDs, deterioration in general cognition was not found between working and retired physicians until 70 years of age.\(^9\)

In this study, cognitive skills related to attention, reaction time, and visual learning, and memory showed expected age-related declines among surgeons. Although reaction and movement times on the RTI showed a marked decline with age, they were considerably better than in normative groups, as demonstrated in a previous study showing remarkable psychomotor performance. The question of whether this is an inherent skill or a function of surgical training was addressed in that study, and we found that medical students accepted into surgical programs already demonstrated this ability.\(^16\) Valid normative data are not available for the RVIP and PAL measures.

There were no consistent effects of recent consumption of alcohol or use of medications on the test data. When surgeons were retested at intervals between 1 and 6 years, there was no major deterioration except for a decline in mean response latency on RVIP, indicating some diminution in visual sustained attention. There was no notable change, however, in accuracy of responding. So, for the relatively brief interval between tests, aging surgeons did not show marked cognitive decline. Stability or improvement in some tests may be attributable to test familiarity or the practice effect of earlier testing.

There were no age-related self-reported changes in memory recall or name recognition, despite age-related changes shown on all test measures. Effects of gender on cognitive task performance are difficult to interpret because of the small number of female participants in this study. Within the limits of this small sample, female surgeons showed slower reaction and movement times than men, although they were better at learning efficiency than their male counterparts.

Surgeons, as they aged, reported decreasing volume and complexity of surgical cases, decrease in mastery of new technologic developments, and decreased name recognition. But there was no notable relationship between reported decrease in complexity of surgical cases and performance on all tests, or between reported decrease in volume of cases and performance on measures of sustained attention and reaction times. The only relationship of self-reported decreased volume of cases was to mean errors per stage on visual learning and memory (PAL). When the effects of age were removed, there was no notable relationship between retirement decision and cognitive task performance.

This study showed no marked relationship among aging surgeons between self-perceived cognitive changes in memory and objectively demonstrated cognitive performance. But self-perception of declining recall and name recognition was related to retirement status. This suggests that subjective awareness of declining cognitive status does play...
a role in retirement decisions, though it may not accurately reflect objective cognitive status.

It seems clear that decisions about retirement are related to increasing age and probably other unknown factors. Although measured cognitive status also clearly declines with age, we did not see a notable relationship to decisions about retirement. Although the study showed no notable relationship among aging surgeons between self-perceived cognitive difficulty and objectively demonstrated cognitive performance, the fact that 30% of active surgeons over 45 years of age reported some memory impairment suggests that some surgeons might choose to retire prematurely.

Although a number of the surgeons surveyed also indicated that they planned to retire at a certain age (18%), chronologic age alone should not necessarily be the determinant of retirement status, especially because the majority of older physicians and surgeons are practicing similarly to their younger colleagues.8,9 We do see age-related cognitive changes among surgeons, and although subjective awareness of these changes is not accurate, some surgeons do detect changes that influence their decision to retire. This study supports the need for development of measures of functional aging that can be used over time to assist with decisions about retirement that are in the best of interest of surgeons and the patients they serve.

Author Contributions

Study conception and design: Bieliauskas, Greenfield
Acquisition of data: Bieliauskas, Langenecker, Graver, Lee, O’Neill
Analysis and interpretation of data: Bieliauskas, Langenecker
Drafting of manuscript: Bieliauskas, Langenecker, Lee, Greenfield
Critical revision: Bieliausksas, Langenecker, Greenfield

Appendix: Survey of self-appraisal of surgical practice and plans for retirement

CCRASS

Self Report Survey 2006

<table>
<thead>
<tr>
<th>Age:</th>
<th>□ 45–54</th>
<th>□ 55–65</th>
<th>□ &gt; 65</th>
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<tr>
<td>Sex:</td>
<td>□ Male</td>
<td>□ Female</td>
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<td>Type of Practice:</td>
<td>□ Private</td>
<td>□ Group</td>
<td>□ Academic</td>
</tr>
</tbody>
</table>

Over the past 5 years:
1. The volume of cases I manage has:
   □ Increased
   □ Decreased
   □ Not changed
2. The complexity of cases I manage has:
   □ Increased
   □ Decreased
   □ Not changed
3. My recall has:
   □ Not changed
   □ Deteriorated
4. My name recognition has:
   □ Not changed
   □ Deteriorated
5. Regarding new technology in my field (eg, laparoscopy, endovascular), I have:
   □ Been an observer
   □ Actively learned to master it
   □ Contributed to development
6. In my recreational sports activities (skiing, tennis, team sports), I have:
   □ Maintained or increased the level and intensity
   □ Reduced the level and intensity
   □ Abandoned one or more activities in favor of less demanding recreation
7. To read the newspaper, I:
   □ Read without assistance
   □ Take off my distance glasses
   □ Use bifocals or reading glasses
8. I plan to retire:
   □ Currently retired
   □ Within the next 5 years
   □ When I reach a predetermined age
   □ When I feel my skills are deteriorating
9. In the past 12–24 hours, how many alcoholic drinks have you had (drink = one 12 oz beer, one 4 oz glass of wine, or 1 oz shot of liquor).
   □ 0 drinks □ < 3 drinks □ < 6 drinks □ > 6 drinks
10. At the present time (past 24 hours) I am taking (check all that apply):
   □ No medications □ Pain medication (controlled)
   □ Sedative □ Muscle relaxant
   □ Anti-depressant □ Tranquilizer
11. Are you presently fatigued?
   □ Not □ Moderate □ Very

REFERENCES


**Invited Commentary**

Donald D Trunkey, MD, FACS
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The authors have presented us with a timely and very important article.1 They have modified the Cambridge Neuropsychological Test Automated Battery (CANTAB) and have administered three subtests from the CANTAB to surgeons older than 45 years of age. The test was administered at the annual American College of Surgeons meeting, and over a 6-year period, 359 surgeons volunteered to participate. Ninety-four were retested during the meetings in 2005 and 2006, and an additional self-report survey was administered to 294 of the surgeons. The results are impressive. Most importantly, this 30+ minute test appears to be valid and reliable. The authors concluded, “This study supports the need for development of measures of functional aging, which can be utilized over time to assist with decisions about retirement, which are in the best interests of surgeons and the patients they serve.” This is a very cautious conclusion, and although I do not disagree with it, I think the ramifications of the author’s results have more far reaching possibilities.

Seven years ago, Dr Richard Botney and I published an article in the Journal of the American College of Surgeons entitled, “Assessing competency: A tale of two professions.” It is important in discussing this current article that I repeat some observations from the 2001 study. In his book, Blind Eye, James B Stewart stated that in 1986, “Five out of every 100 doctors are so incompetent, drunk, senile, or otherwise impaired, that they should not be practicing medicine without some form of restriction.” He obtained this quote from the New York Times.3 He further stated that a Kaiser Foundation Health Plan medical director in the same year said, “Three to five percent of the nation’s then 425,000 practicing physicians, have an ‘impairment’ of some degree from a wide variety of causes.” I believe both of these statements are hyperbole, but I also think that many patients believe these statements.

Another publication, To Err is Human, a report from the Institutes of Medicine, attributed errors largely to system factors and not necessarily to negligent or incompetent individuals.4 I believe this report is flawed because it used only two studies with small patient numbers, particularly surgical patients, and extrapolated to the entire United States. In the 2001 article, we point out that competency is something that professional societies should examine and not turn this over or allow the government to do this. We stated that there were two groups of physicians in which competency has been a problem: physicians or surgeons just entering practice and surgeons who are older. The purpose of this commentary is not to address the younger group of surgeons, other than to say that Neff5 has focused on certain kinds of behavior and has addressed this issue. The purpose of my comments will be to address the very group that the authors of this article studied.

There have been many studies looking at ways of measuring either IQ or deterioration of cognitive function and psychomotor skills.6–8 In the 2001 article, we compared how physicians, and specifically surgeons, are tested for competency, and we compared them with commercial airline pilots. To summarize, pilots must undergo a very rigorous set of tests every 6 months, including a history, physical examination, and laboratory tests. The medical evaluation of the commercial airline pilot is quite extensive. It includes 11 pages in the